

SITRANS P measuring instruments for pressure

Remote seals for transmitters and pressure gauges

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Overview

In many cases the pressure transmitter and the measured medium have to be physically separated. It is then necessary to use a remote seal.

The remote seals can be used with the following SITRANS P pressure transmitter series:

- Pressure (MK II, MS, DS III, DS III PA, DS III FF)
- Absolute pressure (DS III, DS III PA, DS III FF)
- Differential pressure and flow (DS III, DS III PA, DS III FF)

Note

When configuring your remote seal, be sure to read the information about transmission response, temperature error and response time to be found in the sections "Function" and "Technical data". Only then will the remote seal work to optimum effect.

Benefits

- No direct contact between the pressure transmitter and the medium
- Individual configuration of the pressure transmitter for perfect adaptation to the operating conditions
- Available in many versions
- Specially designed for difficult operating conditions
- Quick-release versions available for the food industry

Application

Remote seal systems should be used if a separation between the measured medium and the measuring instrument is essential or appropriate.

Examples of such cases:

- The temperature of the medium is outside the limits specified for the pressure transmitter.
- The medium is corrosive and requires diaphragm materials which are not available for the pressure transmitter.
- The medium is highly viscous or contains solids which would block the measuring chambers of the pressure transmitter.
- The medium may freeze in the measuring chambers or pulse line.
- The medium is heterogeneous or fibrous.
- The medium tends towards polymerization or crystallization.
- The process requires quick-release remote seals, as necessary e.g. in the food industry for fast cleaning.
- The process requires cleaning of the measuring point, e.g. in a batch process.

Design

A remote seal system consists of the following components.

- Pressure transmitter
- One or two remote seals
- Filling liquid
- Connection between pressure transmitter and remote seal (direct mounting or by means of capillary)

The volume in contact with the measured medium is terminated by a flat elastic diaphragm lying in a bed. Between the diaphragm and the pressure transmitter is the filling liquid.

In many cases, a capillary has to be connected between the remote seal and the pressure transmitter in order e.g. to minimize temperature effects on the latter when hot media are involved.

However, the capillary influences the response time and the temperature response of the complete remote seal system. Two capillaries of equal length must always be used to connect a remote seal to a pressure transmitter for differential pressure.

The remote seal can be optionally equipped with a projecting diaphragm (tube).

Remote seals of sandwich design are fitted with a dummy flange.

Designs

Diaphragm seal

With diaphragm seals, the pressure is measured by means of a flat diaphragm which rests in a bed.

The following types of diaphragm seals exist:



Diaphragm seal of sandwich design without /left) and with a projecting diaphragm (tube)

- Sandwich design
- Sandwich design with projecting diaphragm (tube) to DIN or ASME which are secured using a dummy flange.



Diaphragm seal of flange design without /left) and with a projecting diaphragm (tube)

- Flange design
- Flange design with projecting diaphragm (tube) to DIN or ASME, secured using holes in the flange.



Quick-release diaphragm seal

- Quick-release remote seals, e.g. to DIN 11 851, SMS standard, IDF standard, APV RJT standard, clamp connection, etc.
 - Miniature diaphragm seal with male thread for screwing into tapped holes
 - Remote seals with customer-specific process connections

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Miniature diaphragm seal with diaphragm flush with front

- Miniature diaphragm seals

The quick-release remote seals are used above all in the food industry. Their design means that the measured medium cannot accumulate in dead volumes. The quick-release clamp present on the remote seal means that quick dismantling is possible for cleaning.

Clamp-on seal



Clamp-on seal with quick-release design (left) and for flange mounting

With clamp-on seals, the pressure is first measured using a cylindrical diaphragm positioned in a pipe, and then transmitted to the pressure transmitter by means of the filling liquid.

The clamp-on seal is a special design for flowing media. It consists of a cylindrical pipe in which a cylindrical diaphragm is embedded. Since it is completely integrated in the process pipe, no turbulences, dead volumes or other obstructions to the flow occur. Furthermore, the clamp-on seal can be cleaned by a pig.

The following types of clamp-on seals exist:

- Quick-release clamp-on seals, e.g. to DIN 11 851, SMS standard, IDF standard, APV/RJT standard, clamp connection etc. The quick-release facility attached to the remote seal enables the seal to be removed quickly for cleaning purposes.
- Clamp-on seals for flanging to EN or ASME.
- Clamp-on seals with customer-specific process connections.

Function

The measured pressure is transferred from the diaphragm to the filling liquid and passes through the capillary to the measuring chamber of the pressure transmitter. The interior of the diaphragm seal and of the capillary, as well as the measuring chamber of the transmitter, are filled gas-free by the filling liquid.

Transmission response

The transmission response of a remote seal is characterized by the following variables:

- Temperature error
- Adjustment time

Temperature error

Temperature errors are caused by the change of volume of the filling liquid due to temperature variations. To select the right remote seal you must calculate the temperature error.

Below you will find an overview of the factors which influence the size of the temperature error, as well as information on how to calculate the temperature error.

The temperature error is dependent on the following variables:

- Rigidity of the diaphragm used
- Filling liquid used
- Influence of the filling liquid underneath the process flanges or in the connection shank of the pressure transmitter
- Internal diameter of the capillary: The bigger the internal diameter, the bigger the temperature error
- Length of the capillary: The longer the capillary, the bigger the temperature error

Diaphragm rigidity

The rigidity of the diaphragm is of decisive importance. The bigger the diameter of the diaphragm, the softer the diaphragm and the more sensitively it reacts to temperature-induced changes in volume of the filling liquid.

The result is that small measuring ranges are only possible with large diaphragm diameters.

Other factors apart from diaphragm rigidity which also play a role:

- Diaphragm thickness
- Diaphragm material
- Coatings if present

Filling liquid

Every filling liquid reacts to temperature variations with a change of volume. Temperature errors can be minimized by selecting a suitable filling liquid, but the filling liquid must also be appropriate for the temperature limits and operating pressure. Furthermore, the filling liquid must also be physiologically harmless.

Since the filling liquid is present under the diaphragm, in the capillary and under the process flange of the pressure transmitter (or in the connection shank), the temperature error must be calculated separately for each combination.

Note:

When operating in the low-pressure range, also during commissioning, it is recommended to use a vacuum-proof remote seal (see Selection and Ordering data).

An example of a temperature error calculation can be found in the section "Technical Specifications".

Response time

The response time is dependent on the following factors:

- Internal diameter of the capillary: The bigger the internal diameter, the shorter the response time
- Viscosity of the filling liquid: The greater the viscosity, the longer the response time
- Length of the capillary: The longer the capillary, the longer the response time
- Pressure in the pressure measuring system: The higher the pressure, the shorter the response time

Recommendations

The following should be observed to obtain an optimum combination of transmitter and remote seal:

- Choose the biggest possible diameter for the remote seal. The effective diameter of the seal diaphragm is then bigger and the temperature error smaller.
- Choose the shortest possible capillary. The response time is then shorter and the temperature error smaller
- Choose the filling liquid with the least viscosity and the smallest coefficient of expansion. Make sure, however, that the filling liquid meets the process requirements with regard to pressure, vacuum and temperature. And ensure that the filling liquid and the medium are compatible with one another.
- Note the following points for use in the vacuum range:
 - The pressure transmitter must always be positioned below the lowest spigot.
 - The operating range of some filling liquids is very limited with regard to the permissible temperature of the medium.
 - A vacuum-proof seal is necessary for continuous operation in the low-pressure range.
- Recommendations for the minimum span can be found in the section "Technical data".

Note

The remote seals listed here are a selection of the most common designs. On account of the large variety of process connections, certain remote seals which are not listed here may be available nevertheless.

Other versions can be:

- Other process connections, standards
- Aseptic or sterile connections
- Other dimensions
- Other nominal pressures
- Special diaphragm materials, including coatings
- Other sealing faces
- Other filling liquids
- Other capillary lengths
- Sheathing of capillaries with protective hose
- Calibration at higher/lower temperatures etc.

Please contact your Siemens Regional Office for more information.

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Technical specifications

Temperature error Diaphragm seals

Temperature errors of diaphragm seals when connected to pressure transmitters for pressure, absolute pressure, differential pressure (single-sided) and level

	Nominal diameter/design	Diaphragm diameter		Temperature error of remote seal		Temperature error of capillary		Temperature error of process flange/connection spigot		Recommended min. spans (guidance values, observe temp. error)	
		mm	(inch)	mbar/10 K	(psi/18 °F)	mbar/(10 K · m _{Kap})	(psi/(18 °F · m _{Kap}))	mbar/10 K	(psi/18 °F)	mbar	(psi)
Sandwich design or with flange to EN 1092-1	DN 50 without tube, with sinusoidal diaphragm	59	(2.32)	3	(0.044)	4	(0.058)	4	(0.058)	500	(7.25)
	DN 50 without tube, with step diaphragm	59	(2.32)	0.6	(0.009)	0.8	(0.012)	0.8	(0.012)	100	(1.45)
	DN 50 with tube	48	(1.89)	5	(0.073)	10	(0.145)	10	(0.145)	500	(7.25)
	DN 80 without tube, with sinusoidal diaphragm	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	DN 80 without tube, with step diaphragm	89	(3.50)	0.08	(0.0012)	0.08	(0.0012)	0.08	(0.0012)	50	(0.73)
	DN 80 with tube	72	(2.83)	1	(0.015)	1	(1.015)	1	(1.015)	250	(3.63)
	DN 100 without tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	DN 100 with tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	DN 125 without tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
DN 125 with tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)	
Sandwich design or with flange to ASME B16.5	2 inch without tube, with sinusoidal diaphragm	59	(2.32)	3	(0.044)	4	(0.058)	4	(0.058)	500	(7.25)
	2 inch without tube, with step diaphragm	59	(2.32)	0.6	(0.009)	0.8	(0.012)	0.8	(0.012)	100	(1.45)
	2 inch with tube	48	(1.89)	5	(0.073)	10	(0.145)	10	(0.145)	500	(7.25)
	3 inch without tube, with sinusoidal diaphragm	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	3 inch without tube, with step diaphragm	89	(3.50)	0.08	(0.0012)	0.08	(0.0012)	0.08	(0.0012)	50	(0.73)
	3 inch with tube	72	(2.83)	1	(0.015)	1	(1.015)	1	(1.015)	250	(3.63)
	4 inch without tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	4 inch with tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	5 inch without tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
	5 inch with tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
Remote seal with union nut to DIN 11851	DN 25	25	(0.98)	25	(0.363)	160	(2.321)	160	(2.321)	6000	(87)
	DN 32	32	(1.26)	17	(0.247)	70	(1.015)	70	(1.015)	4000	(58)
	DN 40	40	(1.57)	7	(0.102)	15	(0.218)	15	(0.218)	2000	(29)
	DN 50	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)
	DN 65	59	(2.32)	3	(0.044)	4	(0.058)	4	(0.058)	500	(7.25)
	DN 80	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)
Remote seal with threaded socket to DIN 11851	DN 25	25	(0.98)	25	(0.363)	160	(2.321)	160	(2.321)	6000	(87)
	DN 32	32	(1.26)	17	(0.247)	70	(1.015)	70	(1.015)	4000	(58)
	DN 40	40	(1.57)	7	(0.102)	15	(0.218)	15	(0.218)	2000	(29)
	DN 50	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)
	DN 65	59	(2.32)	3	(0.044)	4	(0.058)	4	(0.058)	500	(7.25)
	DN 80	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)
Clamp connection	1½ inch	32	(1.26)	17	(0.247)	70	(1.015)	70	(1.015)	4000	(58)
	2 inch	40	(1.57)	7	(0.102)	15	(0.218)	15	(0.218)	2000	(29)
	2½ inch	59	(2.32)	3	(0.044)	5	(0.073)	5	(0.073)	500	(7.25)
	3 inch	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)
Miniature diaphragm seal	G1B	25	(0.98)	25	(0.363)	160	(2.321)	160	(2.321)	6000	(87)
	G1½B	40	(1.57)	7	(0.102)	15	(0.218)	15	(0.218)	2000	(29)
	G2B	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)

Remarks:

- Step diaphragm available only for flanged remote seals without tube in the diaphragm materials 316L, Hastelloy C276 and tantalum, and not in vacuum-proof version (V01 and V04 as options)
- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and vegetable oil.
- Half the values apply to glycerin/water mixture as the filling liquid.
- Values apply to stainless steel as the diaphragm material.

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Temperature errors of diaphragm seals with connection to differential pressure transmitters (double-sided)

	Nominal diameter/design	Diaphragm diameter		Temperature error of remote seal		Temperature error of capillary		Temperature error of process flange/connection spigot		Recommended min. spans (guidance values, observe temperature error)	
		mm	(inch)	mbar/10 K	(psi/18 °F)	mbar/10 K	(psi/18 °F · m _{Kap})	mbar/10 K	(psi/18 °F)	mbar	(psi)
Sandwich design or with flange to EN 1092-1	DN 50 without tube, with sinusoidal diaphragm	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	DN 50 without tube, with step diaphragm	59	(2.32)	0.14	(2.03)	0.134	(1.94)	0.134	(1.94)	100	(1.45)
	DN 50 with tube	48	(1.89)	1.26	(0.018)	1.7	(0.025)	1.7	(0.025)	250	(3.626)
	DN 80 without tube, with sinusoidal diaphragm	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	DN 80 without tube, with step diaphragm	89	(3.50)	0.02	(0.029)	0.014	(0.203)	0.014	(0.203)	50	(0.725)
	DN 80 with tube	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.45)
	DN 100 without tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	DN 100 with tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	DN 125 without tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
DN 125 with tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)	
Sandwich design with flange to ASME B16.5	2 inch without tube, with sinusoidal diaphragm	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	2 inch without tube, with step diaphragm	59	(2.32)	0.14	(2.03)	0.134	(1.94)	0.134	(1.94)	100	(1.45)
	2 inch with tube	48	(1.89)	1.26	(0.018)	1.7	(0.025)	1.7	(0.025)	250	(3.626)
	3 inch without tube, with sinusoidal diaphragm	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	3 inch without tube, with step diaphragm	89	(3.50)	0.02	(0.029)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	3 inch with tube	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.45)
	4 inch without tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	4 inch with tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	5 inch without tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
5 inch with tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)	
Remote seal with union nut to DIN 11851	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	DN 80	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)
Remote seal with threaded socket to DIN 11851	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	DN 80	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)
Clamp connection	2 inch	40	(1.57)	1.7	(0.025)	3	(0.044)	3	(0.044)	2000	(29.01)
	2½ inch	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	3 inch	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)

Remarks:

- Step diaphragm available only for flanged remote seals without tube in the diaphragm materials 316L, Hastelloy C276 and tantalum, and not in vacuum-proof version (V03 as option).
- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and vegetable oil
- Half the values apply to glycerin/water mixture as the filling liquid
- Values apply to stainless steel as the diaphragm material.

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Temperature error Clamp-on seals

Temperature errors of clamp-on seals when connected to pressure transmitters for pressure and absolute pressure, and with single-sided connection to pressure transmitters for differential pressure

Nominal diameter/design	Temperature error of remote seal		Temperature error of capillary		Temperature error of process flange/connection		Recommended min. spans (guidance values, observe temperature error)	
	mbar/10 K	(psi/18 °F)	mbar/10 K	(psi/18 °F)	(psi/18 °F)	(psi/18 °F)	mbar	(psi)
DN 25 (1 inch)	6.0	(0.0870)	8.5	(0.123)	8.5	(0.123)	1000	(14.5)
DN 40 (1½ inch)	4.5	(0.065)	4.5	(0.065)	4.5	(0.065)	250	(3.63)
DN 50 (2 inch)	4.0	(0.058)	3.0	(0.044)	3.0	(0.044)	100	(1.45)
DN 80 (3 inch)	9.5	(0.138)	5.0	(0.073)	5.0	(0.073)	100	(1.45)
DN 100 (4 inch)	8.0	(0.012)	3.0	(0.044)	3.0	(0.044)	100	(1.45)

Temperature errors of clamp-on seals with double-sided connection to pressure transmitters for differential pressure

Nominal diameter/design	Temperature error of remote seal		Temperature error of capillary		Temperature error of process flange/connection		Recommended min. spans (guidance values, observe temperature error)	
	mbar/10 K	(psi/18 °F)	mbar/10 K	(psi/18 °F)	(psi/18 °F)	(psi/18 °F)	mbar	(psi)
DN 25 (1 inch)	2.3	(0.033)	1.8	(0.026)	1.8	(0.026)	1000	(14.5)
DN 40 (1½ inch)	0.8	(0.012)	0.3	(0.004)	0.3	(0.004)	250	(3.63)
DN 50 (2 inch)	0.3	(0.004)	0.1	(0.002)	0.1	(0.002)	100	(1.45)
DN 80 (3 inch)	3.0	(0.044)	0.5	(0.007)	0.5	(0.007)	100	(1.45)
DN 100 (4 inch)	1.0	(0.015)	0.1	(0.002)	0.1	(0.002)	100	(1.45)

Remarks:

- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and vegetable oil.
- Half the values apply to glycerin/water mixture as the filling liquid.
- Values apply to stainless steel as the diaphragm material.
- Diaphragm thickness 0.05 mm (0.002 inch) for DN 25/DN 40/DN 50 and 0.1 mm (0.004 inch) for DN 80/DN 100

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Calculation of the temperature error

The following equation is used to calculate the temperature error:

$$dp = (\vartheta_{RS} - \vartheta_{Cal}) \cdot f_{RS} + (\vartheta_{Cap} - \vartheta_{Cal}) \cdot l_{Cap} \cdot f_{Cap} + (\vartheta_{TR} - \vartheta_{Cal}) \cdot f_{PF}$$

dp	Additional temperature error (mbar)
ϑ_{RS}	Temperature on remote seal diaphragm (generally corresponds to temperature of medium)
ϑ_{Cal}	Calibration (reference) temperature (20 °C (68 °F))
f_{RS}	Temperature error of remote seal
ϑ_{Cap}	Ambient temperature on the capillaries
l_{Cap}	Capillary length
f_{Cap}	Temperature error of capillaries
ϑ_{TR}	Ambient temperature on pressure transmitter
f_{PF}	Temperature error of the oil filling in the process flanges of the pressure transmitter

Example of temperature error calculation

Existing conditions

SITRANS P pressure transmitter for differential pressure, 250 mbar, set to 0 ... 100 mbar, with DN 80 remote seal diaphragms without tube, diaphragm made of stainless steel, mat. No. 1.4404/316L	$f_{RS} = 0.1 \text{ mbar}/10 \text{ K}$ (0.0014 psi/18 °F)
Capillary length	$l_{Cap} = 2 \cdot 6 \text{ m}$ (2 · 19.7 ft) = 12 m (39.4 ft)
Capillaries fitted on both sides	$f_{Cap} = 0.07 \text{ mbar}/(10 \text{ K} \cdot m_{Cap})$ (0.001 psi/(18 °F · m _{Cap}))
Filling liquid silicone M5	$f_{PF} = 0.07 \text{ mbar}/10 \text{ K}$ (0.001 psi/18 °F)
Process temperature	$\vartheta_{RS} = 100 \text{ °C}$ (212 °F)
Temperature on the capillaries	$\vartheta_{Cap} = 50 \text{ °C}$ (122 °F)
Temperature on pressure transmitter	$\vartheta_{TR} = 50 \text{ °C}$ (122 °F)
Calibration temperature	$\vartheta_{Cal} = 20 \text{ °C}$ (68 °F)

Required

Additional temperature error of remote seals	dp
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Calculation

in mbar
$dp = (100 \text{ °C} - 20 \text{ °C}) \cdot 0.1 \text{ mbar}/10 \text{ K} + (50 \text{ °C} - 20 \text{ °C}) \cdot 12 \text{ m} \cdot 0.07 \text{ mbar}/(10 \text{ K} \cdot \text{m}) + (50 \text{ °C} - 20 \text{ °C}) \cdot 0.07 \text{ mbar}/10 \text{ K}$
$dp = 0.8 \text{ mbar} + 2.52 \text{ mbar} + 0.21 \text{ mbar}$
in psi
$dp = (212 \text{ °F} - 68 \text{ °F}) \cdot 0.0014 \text{ psi}/18 \text{ °F} + (112 \text{ °F} - 68 \text{ °F}) \cdot 39.4 \text{ ft} \cdot 0.001 \text{ psi}/(18 \text{ °F} \cdot 3.28 \text{ ft}) + (112 \text{ °F} - 68 \text{ °F}) \cdot (0.001 \text{ psi}/18 \text{ °F})$
$dp = 0.012 \text{ psi} + 0.036 \text{ psi} + 0.003 \text{ psi}$

Result

dp = 3.53 mbar (0.051 psi) (corresponds to 3.53% of set span)

Note

The determined temperature error only applies to the error resulting from connection of the remote seal.
The transmission response of the respective transmitter is not included in this consideration.
It must be calculated separately, and the resulting error added to the error determined above from connection of the remote seal.

Dependence of temperature error on diaphragm material

The temperature errors listed in the previous table are based on the use of stainless steel as the diaphragm material. If other diaphragm materials are used, the temperature errors change as follows:

Diaphragm material	Change in temperature error of remote seal
	Increase in values by
Stainless steel	See previous tables
Hastelloy C4, mat. No. 2.4610	50%
Hastelloy C276, mat. No. 2.4819	50%
Monel 400, mat. No. 2.4360	60%
Tantalum	50%
Titanium	50%
PTFE coating on stainless steel diaphragm	120%
ECTFE coating or PFA coating on stainless steel diaphragm	100%
Gold coating on stainless steel diaphragm	40%

Maximum temperature of medium

The following maximum temperatures of the medium apply depending on the material of the wetted parts:

Material	$P_{abs} < 1 \text{ bar}$ (14.5 psi)		$P_{abs} > 1 \text{ bar}$ (14.5 psi)	
	°C	(°F)	°C	(°F)
Stainless steel, 316L	200	(392)	400	(662)
PTFE coating	100	(212)	260	(500)
ECTFE/PFA coating	100	(212)	150	(302)
Hastelloy C4, mat. No. 2.4610	200	(392)	260	(500)
Hastelloy C276, mat. No. 2.4819	200	(392)	400	(662)
Monel 400, mat. No. 2.4360	200	(392)	400	(662)
Tantalum	200	(392)	300	(572)

Maximum capillary length for diaphragm seals (guidance values)

Nom. diam.	Max. length of capillary	Diaphragm seal		Clamp-on seal	
		m	(ft)	m	(ft)
DN 25 (1 inch)	2.5	(8.2)	2.5	(8.2)	
DN 32 (1¼ inch)	2.5	(8.2)	2.5	(8.2)	
DN 40 (1½ inch)	4	(13.1)	6	(19.7)	
DN 50 (2 inch)	6	(19.7)	10	(32.8)	
DN 65 (2½ inch)	8	(26.2)	10	(32.8)	
DN 80 (3 inch)	10	(32.8)	10	(32.8)	
DN 100 (4 inch)	10	(32.8)	10	(32.8)	
DN 125 (5 inch)	10	(32.8)	-	-	

SITRANS P measuring instruments for pressure

Remote seals for transmitters and pressure gauges

Technical description

Response times

The values listed in the following table are the response times (in seconds per meter of capillary) for a change in pressure which corresponds to the set span.

The listed values must be multiplied by the respective length of the capillary, or with transmitters for differential pressure and flow by the total length of both capillaries.

The response times are independent of the set span within the range of the respective transmitter. The response times are of insignificant importance for spans above 10 bar (145 psi). The response times of the pressure transmitters are not considered in the table.

Filling liquid	Density		Temperature on capillary		Response time in s/m (s/ft) with max. span of pressure transmitter					
	kg/dm ³	lb/in ³	°C	(°F)	250 mbar	(3.63 psi)	600 mbar	(8.7 psi)	1600 mbar	(23.2 psi)
Silicone oil M5	0,914	(0.033)	+60	(140)	0.06	(0.018)	0,02	(0.006)	0.01	(0.003)
			+20	(68)	0.11	(0.034)	0.02	(0.006)	0.02	(0.006)
			-20	(-4)	0.3	(0.091)	0.12	(0.037)	0.05	(0.015)
Silicone oil M50	0.966	(0.035)	+60	(140)	0.6	(0.183)	0.25	(0.076)	0.09	(0.027)
			+20	(68)	0.61	(0.186)	0.26	(0.079)	0.1	(0.030)
			-20	(-4)	1,69	(0.515)	0.71	(0.216)	0.27	(0.082)
High-temperature oil	1.070	(0.039)	+60	(140)	0.14	(0.043)	0.06	(0.018)	0.02	(0.006)
			+20	(68)	0.65	(0.198)	0.27	(0.082)	0.1	(0.030)
			-10	(14)	3.96	(1.207)	1.65	(0.503)	0.62	(0.189)
Halocarbon oil	1.968	(0.071)	+60	(140)	0.07	(0.021)	0.03	(0.009)	0.01	(0.003)
			+20	(68)	0.29	(0.088)	0.12	(0.037)	0.05	(0.015)
			-20	(-4)	2.88	(0.878)	1.2	(0.366)	0.45	(0.137)
Vegetable oil	0.940	(0.034)	+60	(140)	0.18	(0.055)	0.08	(0.024)	0.03	(0.009)
			+20	(68)	0.43	(0.131)	0.18	(0.055)	0.07	(0.021)
			-20	(-4)	1.19	(0.363)	0.5	(0.152)	0.18	(0.055)
Glycerin/water	1.220	(0.044)	+60	(140)	0.13	(0.040)	0.05	(0.015)	0.02	(0.006)
			+20	(68)	0.76	(0.232)	0.32	(0.098)	0.12	(0.037)
			0	(32)	9.72	(2.963)	4.05	(1.234)	1.51	(0.460)

Technical data of filling liquids

When selecting the filling liquid, check that it is suitable with respect to the permissible temperature of the medium and the process pressure.

Also check the compatibility of the filling liquid with the measured medium. For example, only physiologically harmless filling liquids may be used in the food industry.

Oxygen and chlorine are special cases of measured medium. The liquid must not react with either of these two media or a leaking remote seal may lead to an explosion or fire

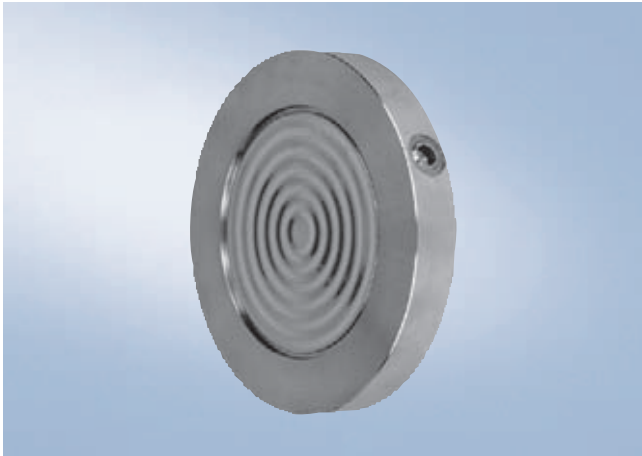
Filling liquid	Digit in Order No.	Permissible temperature of medium		Density at 20 °C (68 °F)	Viscosity at 20 °C (68 °F)		Coefficient of expansion				
		$p_{abs} < 1 \text{ bar}$ ($p_{abs} < 14.5 \text{ psi}$)	$p_{abs} > 1 \text{ bar}$ ($p_{abs} > 14.5 \text{ psi}$)								
		°C	(°F)	°C	(°F)	kg/dm ³	(lb/in ³)	m ² /s·10 ⁶	(ft ² /s·10 ⁶)	1/°C	(1/°F)
Silicone oil M5	1	-60 ... +80	(-76 ... +176)	-90 ... +180	(-130 ... +356)	0.914	(0.03)	4	43	0.00108	(0.00060)
Silicone oil M50	2	-40 ... +150	(-40 ... +302)	-40 ... +250	(-40 ... +482)	0.96	(0.03)	50	538	0.00104	(0.00058)
High-temperature oil	3	-10 ... +200	(+14 ... +392)	-10 ... +350	(+14 ... +662)	1.07	(0.04)	39	420	0.00080	(0.00044)
Halocarbon oil	4	-40 ... +80	(-40 ... +176)	-40 ... +175	(-40 ... +347)	1.968	(0.07)	14	151	0.00086	(0.00048)
Vegetable oil	5	-10 ... +200	(+14 ... +392)	-10 ... +250	(+14 ... +392)	0.94	(0.03)	66	710	0.00082	(0.00045)
Glycerin/water	6	Not possible	Not possible	-10 ... +120	(+14 ... +248)	1.22	(0.04)	88	(947)	0.00050	(0.00028)

SITRANS P measuring instruments for pressure

Diaphragm seal of sandwich design

For pressure, absolute pressure, diff. pressure and flow, with flexible capillary

Overview



Diaphragm seals of sandwich design

Technical specifications

Diaphragm seals of sandwich design

• DN 50	PN 16 ... PN 100
• DN 80	PN 16 ... PN 100
• DN 100	PN 16 ... PN 100
• DN 125	PN 16 ... PN 100
• 2 inch	Class 150 ... class 2500
• 3 inch	Class 150 ... class 2500
• 4 inch	Class 150 ... class 2500
• 5 inch	Class 150 ... class 2500
Sealing face	
• For stainless steel, mat. No. 1.4404/216L	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
• For the other materials	To EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel 316L
• Wetted parts	Stainless steel 316L <ul style="list-style-type: none"> • Without foil • PTFE (for vacuum on request) • ECTFE (for vacuum on request) • PFA (for vacuum on request) Monel 400, mat. No. 2.4360 Hastelloy C276, mat. No. 2.4819 Hastelloy C4, mat. No. 2.4610 Tantalum
• Capillary	Stainless steel, mat. No. 1.4571/316Ti
• Sheath	Spiral hose made of stainless steel, mat. No. 1.4301/316
Sealing material in the process flanges	
• For pressure transmitters, absolute pressure transmitters and low-pressure applications	Copper
• For other applications	Viton
Maximum pressure	See above and the technical data of the pressure transmitters

Tube length	Without tube as standard (tube available on request)
Capillary	
• Length	Max. 10 m (32.8 ft), longer lengths on request
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	
	Silicone oil M5
	Silicone oil M50
	High-temperature oil
	Halocarbon oil (for measuring O ₂)
	Vegetable oil
	Glycerine/water (not suitable for use in low-pressure range)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
Weight	Approx. 4 kg (8.82 lb)

Certificate and approvals

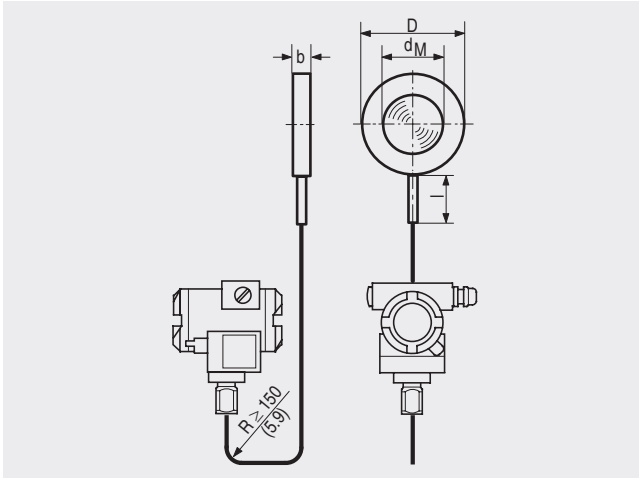
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
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SITRANS P measuring instruments for pressure

Diaphragm seal of sandwich design

For pressure, absolute pressure, diff. pressure and flow, with flexible capillary

Dimensional drawings



Connection to EN 1092-1

Nom. diam.	Nom. press.	b	D	d _M	l
		mm	mm	mm	mm
DN 50	PN 16 ... PN 100	20	102	59	100
DN 80		20	138	89	100
DN 100		20	158	89	100
DN 125		22	188	124	100

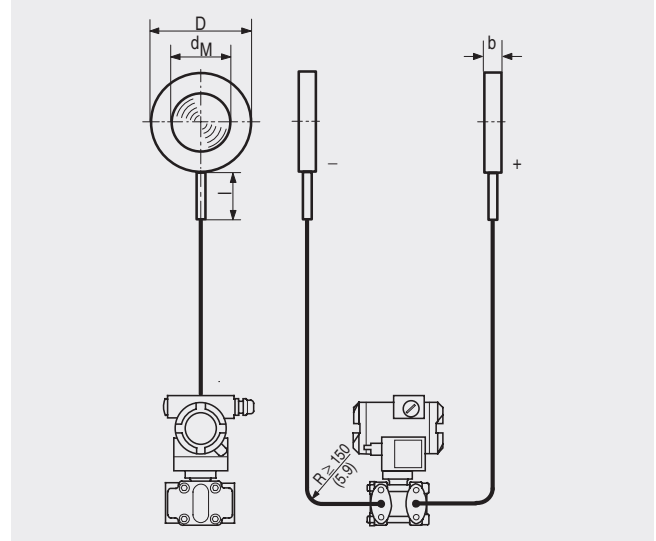
Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d _M	l
	lb/sq.in.	mm	mm	mm	mm
		(inch)	(inch)	(inch)	(inch)
2 inch	150 ... 2500	20	100	59	100
		(0.79)	(3.94)	(2.32)	(3.94)
3 inch		20	134	89	100
		(0.79)	(5.28)	(2.32)	(3.94)
4 inch		20	158	89	100
		(0.79)	(6.22)	(2.32)	(3.94)
5 inch		22	186	124	100
		(0.87)	(7.32)	(4.88)	(3.94)

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5

d_M: Effective diaphragm diameter

Diaphragm seals of sandwich design with flexible capillary for connection to SITRANS P pressure transmitters for pressure, dimensions in mm (inch)



Connection to EN 1092-1

Nom. diam.	Nom. press.	b	D	d _M	l
		mm	mm	mm	mm
DN 50	PN 16 ... PN 100	20	102	59	100
DN 80		20	138	89	100
DN 100		20	158	89	100
DN 125		22	188	124	100

Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d _M	l
	lb/sq.in.	mm	mm	mm	mm
		(inch)	(inch)	(inch)	(inch)
2 inch	150 ... 2500	20	100	59	100
		(0.79)	(3.94)	(2.32)	(3.94)
3 inch		20	134	89	100
		(0.79)	(5.28)	(2.32)	(3.94)
4 inch		20	158	89	100
		(0.79)	(6.22)	(2.32)	(3.94)
5 inch		22	186	124	100
		(0.87)	(7.32)	(4.88)	(3.94)

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5

d_M: Effective diaphragm diameter

Diaphragm seals of sandwich design (without flange) with flexible capillary for connection to SITRANS P pressure transmitters for absolute pressure or differential pressure and flow, dimensions in mm (inch)

SITRANS P measuring instruments for pressure

Diaphragm seal of sandwich design

For pressure, absolute pressure, diff. pressure and flow, with flexible capillary

2

Selection and Ordering data	Order No.	Ord.code
Diaphragm seal Sandwich-type design, with flexible capillary connected to a SITRANS P transmitter (order separately): for pressure 7MF4010, 7MF4013, 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design); Scope of delivery (1 off) for absolute pressure 7MF423 and 7MF433; Scope of delivery (1 off) for differential pressure and flow 7MF443; scope of delivery 2 off	7MF4900-	
	7MF4901-	
	7MF4903-	
	1	B
Nominal diameter and nominal pressure • DN 50 PN 16 ... 100 (recommended only for pressure transmitters for pressure) • DN 80 PN 16 ... 100 • DN 100 PN 16 ... 100 • DN 125 PN 16 ... 100 • 2 inch Class 150 ... 2500 (recommended only for pressure transmitters for pressure) • 3 inch Class 150 ... 2500 • 4 inch Class 150 ... 2500 • 5 inch Class 150 ... 2500 Smooth sealing face to EN 1092-1, form B1 or to ASME B16.5 RF 125 ... 250 AA Other version Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ... Sealing face: see "Technical data"	A	
	B	
	C	
	D	
	E	
	H	
	L	
	N	
	Z	J 1 Y
Wetted parts materials • Stainless steel 316L - without foil - with PTFE coating ¹⁾ - with ECTFE coating ¹⁾ - with PFA coating ¹⁾ • Monel 400, mat. No. 2.4360 • Hastelloy C276, mat. No. 2.4819 • Hastelloy C4, mat. No. 2.4610 • Tantalum Other version Add Order code and plain text: Wetted parts materials: ...	A	
	E 0	
	F	
	D	
	G	
	J	
	A	
	K	
	Z	K 1 Y
Tube length • without tube Other version: Add Order code and plain text: Tube length: ...	0	
	9	L 1 Y
Filling liquid • Silicone oil M5 • Silicone oil M50 • High-temperature oil • Halocarbon oil (for measuring O ₂) • Vegetable oil • Glycerin/water ²⁾ Other version Add Order code and plain text: Filling liquid: ...	1	
	2	
	3	
	4	
	5	
	6	
	9	M 1 Y

1) For vacuum on request

2) Not suitable for use in low-pressure range.

Selection and Ordering data	Order No.	Ord.code
Diaphragm seal Sandwich-type design, with flexible capillary connected to a SITRANS P transmitter (order separately): for pressure 7MF4010, 7MF4013, 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design); Scope of delivery (1 off) for absolute pressure 7MF423 and 7MF433; Scope of delivery (1 off) for differential pressure and flow 7MF443; scope of delivery 2 off	7MF4900-	
	7MF4901-	
	7MF4903-	
	1	B
Length of capillary¹⁾ • 1.0 m (3.28 ft) • 1.6 m (5.25 ft) • 2.5 m (8.20 ft) • 4.0 m (13.1 ft) • 6.0 m (19.7 ft) • 8.0 m (26.25 ft) • 10.0 m (32.8 ft) Other version Add Order code and plain text: Length of capillary: ...	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	N 1 Y

1) Max. capillary length, see section "Technical description".

Further designs	Order code
Please add "-Z" to Order No. and specify Order code.	
Spark arrester With spark arrester for mounting on zone 0 (including documentation) • Pressure and absolute pressure • for differential pressure transmitters	A01 A02
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9001	C11
Acceptance test certificate B to EN 10204, section 3.1.B	C12
With step diaphragm only for: • Nominal diameters DN50/DN80 or 2"/3" • Materials: - Stainless steel without foil (316L) - Hastelloy C276 - Tantalum • without tube • not in vacuum-proof design	M01
Vacuum-proof design for use in low-pressure range for transmitters for • Pressure • For differential pressure transmitters	V01 V03
Calculation of span of associated pressure transmitter Enclose filled-in questionnaire with order	Y05

SITRANS P measuring instruments for pressure

Diaphragm seal of flange design

For pressure, absolute pressure, diff. pressure and flow, with flexible capillary

Overview



Diaphragm seals of flange design

Technical specifications

Diaphragm seals of flange design with flexible capillary

Nom. diam.	Nom. press.
<ul style="list-style-type: none"> • DN 50 (recommendable only for pressure transmitters for pressure) • DN 80 • DN 100 • DN 125 • 2 inch (recommendable only for pressure transmitters for pressure) • 3 inch • 4 inch • 5 inch 	<ul style="list-style-type: none"> • PN 10 ... PN 40, PN 100 • PN 10 ... PN 40, PN 100 • PN 16, PN 40 • PN 16, PN 40 • Class 150, class 300, class 600, class 1500 • Class 150, class 300, class 600 • Class 150, class 300, class 400 • Class 150, class 300, class 400
Sealing face	
<ul style="list-style-type: none"> • For stainless steel, mat. No. 1.4404/316L • For the other materials 	<ul style="list-style-type: none"> • To EN 1092-1, form B1 or ASMR B16.5 RF 125 ... 250 AA • To EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
<ul style="list-style-type: none"> • Main body • Wetted parts 	<ul style="list-style-type: none"> • Stainless steel 316L • Stainless steel 316L <ul style="list-style-type: none"> • Without foil • PTFE (for vacuum on request) • ECTFE (for vacuum on request) • PFA (for vacuum on request) • Monel 400, mat. No. 2.4360 • Hastelloy C276, mat. No. 2.4819 • Hastelloy C4, mat. No. 2.4610 • Tantalum
<ul style="list-style-type: none"> • Capillary • Sheath 	<ul style="list-style-type: none"> • Stainless steel, mat. No. 1.4571/316Ti • Spiral hose made of stainless steel, mat. No. 1.4404/316L

Sealing material in the process flanges	
<ul style="list-style-type: none"> • For pressure transmitters, absolute pressure transmitters and low-pressure applications • For other applications 	<ul style="list-style-type: none"> • Copper • Viton
Maximum pressure	See above and the technical data of the pressure transmitter
Tube length	Without tube as standard (tube available on request)
Capillary	
<ul style="list-style-type: none"> • Length • Internal diameter • Minimum bending radius 	<ul style="list-style-type: none"> • Max. 10 m (32.8 ft), longer lengths on request • 2 mm (0.079 inch) • 150 mm (5.9 inch)
Filling liquid	
(for remote seals of sandwich and flange design)	<ul style="list-style-type: none"> • Silicone oil M5 • Silicone oil M50 • High-temperature oil • Halocarbon oil (for measuring O₂) • Vegetable oil • Glycerine/water (not for use in low-pressure range)
Permissible ambient temperature	<ul style="list-style-type: none"> • Dependent on the pressure transmitter and the filling liquid of the remote seal • More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
Weight	Approx. 4 kg (8.82 lb)

Certificate and approvals

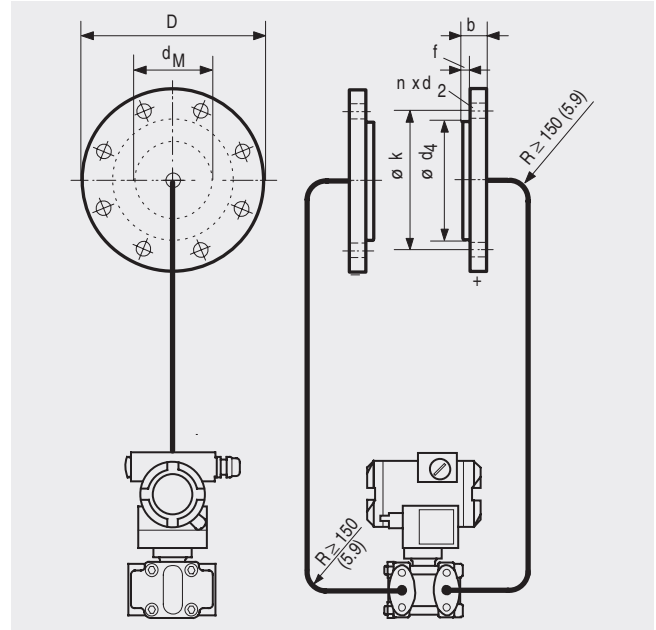
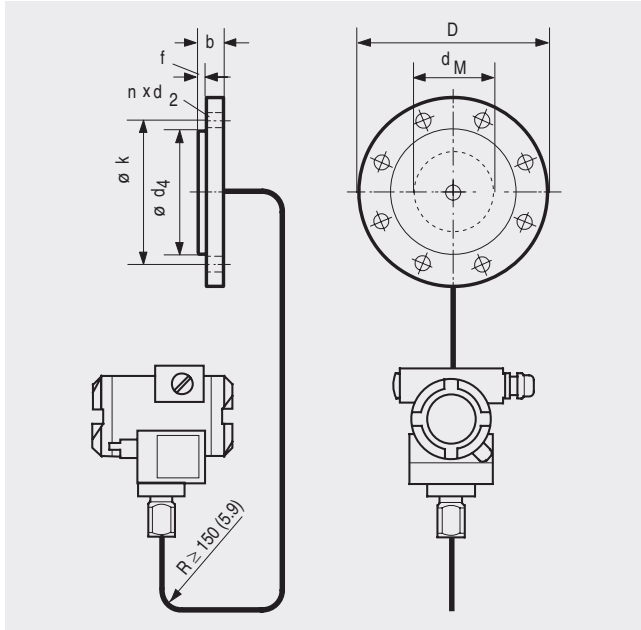
Classification according to pressure equipment directive (DRGL 97/23/EC) For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

SITRANS P measuring instruments for pressure

Diaphragm seal of flange design

For pressure, absolute pressure, diff. pressure and flow, with flexible capillary

Dimensional drawings



Connection to EN 1092-1

Nom. diam.	Nom. press.	b mm	D mm	d ₂ mm	d ₄ mm	d _M mm	f mm	k mm	n
DN 50	PN 40	20	165	18	102	59	2	125	4
	PN 100	28	195	26	102	59	2	145	4
DN 80	PN 40	24	200	18	138	89	2	160	8
	PN 100	32	230	26	138	89	2	180	8
DN 100	PN 16	20	220	18	158	89	2	180	8
	PN 40	24	235	22	162	89	2	190	8
DN 125	PN 16	22	250	18	188	124	2	210	8
	PN 40	26	270	26	188	124	2	220	8

Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d ₂	d ₄	d _M	f	k	n
		mm	mm	mm	mm	mm	mm	mm	
2 inch	150	20	150	20	92	59	1.6	120.5	4
		(0.79)	(5.80)	(0.79)	(3.62)	(2.32)	(0.06)	(4.74)	
	300	22.5	165	20	92	59	1.6	127	8
		(0.89)	(6.50)	(0.79)	(3.62)	(2.32)	(0.06)	(5)	
3 inch	150	24	190	20	127	89	1.6	152.5	4
		(0.96)	(7.48)	(0.79)	(5)	(3.50)	(0.06)	(6)	
	300	29	210	22	127	89	1.6	168.5	8
		(1.14)	(8.27)	(0.87)	(5)	(3.50)	(0.06)	(6.63)	
400	38.5	210	22	127	89	6.4	168.5	8	
	(1.52)	(8.27)	(0.87)	(5)	(3.50)	(0.25)	(6.63)		
4 inch	150	24	230	20	158	89	1.6	190.5	4
		(0.95)	(9.06)	(0.79)	(6.22)	(3.50)	(0.06)	(7.5)	
	300	32	255	22	158	89	1.6	200	8
		(1.26)	(10.04)	(0.87)	(6.22)	(3.50)	(0.06)	(7.87)	
400	41.5	255	26	158	89	6.4	200	8	
	(1.62)	(10.04)	(1.02)	(6.22)	(3.50)	(0.25)	(7.87)		
5 inch	150	24	255	22	186	124	2	216	4
		(0.94)	(10.04)	(0.87)	(7.32)	(4.88)	(0.08)	(8.50)	
	300	35	280	22	186	124	2	235	8
		(1.38)	(11.02)	(0.87)	(7.32)	(4.88)	(0.08)	(9.25)	
400	45.5	280	26	186	124	7	235	8	
	(1.79)	(11.02)	(1.02)	(7.32)	(4.88)	(0.28)	(9.25)		

Connection to EN 1092-1

Nom. diam.	Nom. press.	b mm	D mm	d ₂ mm	d ₄ mm	d _M mm	f mm	k mm	n
DN 80	PN 40	24	200	18	138	89	2	160	8
	PN 100	32	230	26	138	89	2	180	8
DN 100	PN 16	20	220	18	158	89	2	180	8
	PN 40	24	235	22	162	89	2	190	8
DN 125	PN 16	22	250	18	188	124	2	210	8
	PN 40	26	270	26	188	124	2	220	8

Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d ₂	d ₄	d _M	f	k	n
		mm	mm	mm	mm	mm	mm	mm	
3 inch	150	24	190	20	127	89	1.6	152.5	4
		(0.96)	(7.48)	(0.79)	(5)	(3.50)	(0.06)	(6)	
	300	29	210	22	127	89	1.6	168.5	8
		(1.14)	(8.27)	(0.87)	(5)	(3.50)	(0.06)	(6.63)	
400	38.5	210	22	127	89	6.4	168.5	8	
	(1.52)	(8.27)	(0.87)	(5)	(3.50)	(0.25)	(6.63)		
4 inch	150	24	230	20	158	89	1.6	190.5	4
		(0.95)	(9.06)	(0.79)	(6.22)	(3.50)	(0.06)	(7.5)	
	300	32	255	22	158	89	1.6	200	8
		(1.26)	(10.04)	(0.87)	(6.22)	(3.50)	(0.06)	(7.87)	
400	41.5	255	26	158	89	6.4	200	8	
	(1.62)	(10.04)	(1.02)	(6.22)	(3.50)	(0.25)	(7.87)		
5 inch	150	24	255	22	186	124	2	216	4
		(0.94)	(10.04)	(0.87)	(7.32)	(4.88)	(0.08)	(8.50)	
	300	35	280	22	186	124	2	235	8
		(1.38)	(11.02)	(0.87)	(7.32)	(4.88)	(0.08)	(9.25)	
400	45.5	280	26	186	124	7	235	8	
	(1.79)	(11.02)	(1.02)	(7.32)	(4.88)	(0.28)	(9.25)		

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5

d_M: Effective diaphragm diameter

Diaphragm seals of flange design with flexible capillary for connection to SITRANS P pressure transmitters for absolute pressure or for differential pressure and flow, dimensions in mm (inch)

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5

d_M: Effective diaphragm diameter

Diaphragm seals of flange design with flexible capillary for connection to SITRANS P pressure transmitters for pressure, dimensions in mm (inch)

SITRANS P measuring instruments for pressure

Diaphragm seal of flange design

For pressure, absolute pressure, diff. pressure and flow, with flexible capillary

2

Selection and Ordering data

Order No. Ord. code

Diaphragm seal

Flange design, with flexible capillary, connected to a pressure transmitter
SITRANS P (order separately):

for pressure 7MF4010, 7MF4013, 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design); scope of delivery: 1 off

7MF4920 -

for absolute pressure 7MF423 and 7MF433; scope of delivery: 1 off

7MF4921 -

for differential pressure and flow 7MF443; scope of delivery: 2 off

7MF4923 -

1 ■■■■ - ■ B ■■■■

Nominal diameter and nominal pressure

- DN 50 PN 10 ... 40
PN 100
- (DN 50 recommended only for pressure transmitters for pressure)
- DN 80 PN 10 ... 40
PN 100
- DN 100 PN 16
PN 40
- DN 125 PN 16
PN 40
- 2 inch Class 150
Class 300
Class 600
Class 1500
- (2 inch recommended only for pressure transmitters for pressure)
- 3 inch Class 150
Class 300
Class 600
- 4 inch Class 150
Class 300
Class 400
- 5 inch Class 150
Class 300
Class 400

A
B

D
E

G
H

J
K

L
M
N
P

Q
R
S

T
U
V

W
X
Y

Z

Smooth sealing face to EN 1092-1, form B1 or to ASME B16.5 RF 125 ... 250 AA

Other version
Add Order code and plain text:
Nominal diameter: ...; Nominal pressure: ...
Sealing face: See "Technical data"

J 1 Y

Wetted parts materials

- Stainless steel 316L
 - without foil
 - with PTFE coating¹⁾
 - with ECTFE coating¹⁾
 - with PFA coating¹⁾
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Hastelloy C4, mat. No. 2.4610
- Tantalum

A
E 0
F
D
G
J
U
K
Z

Other version
Add Order code and plain text:
Wetted parts materials: ...

K 1 Y

Tube length

- without tube
- Other version:
Add Order code and plain text:
Tube length: ...

0
9 L 1 Y

Selection and Ordering data

Order No. Ord. code

Diaphragm seal

Flange design, with flexible capillary, connected to a pressure transmitter
SITRANS P (order separately):

for pressure 7MF4010, 7MF4013, 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design); scope of delivery: 1 off

7MF4920 -

for absolute pressure 7MF423 and 7MF433; scope of delivery: 1 off

7MF4921 -

for differential pressure and flow 7MF443; scope of delivery: 2 off

7MF4923 -

1 ■■■■ - ■ B ■■■■

Filling liquid

- Silicone oil M5
- Silicone oil M50
- High-temperature oil
- Halocarbon oil (for measuring O₂)
- Vegetable oil
- Glycerin/water²⁾
- Other version
Add Order code and plain text:
Filling liquid: ...

1
2
3
4
5
6
9 M 1 Y

Length of capillary³⁾

- 1.0 m (3.28 ft)
- 1.6 m (5.25 ft)
- 2.5 m (8.20 ft)
- 4.0 m (13.1 ft)
- 6.0 m (19.7 ft)
- 8.0 m (26.25 ft)
- 10.0 m (32.8 ft)

2
3
4
5
6
7
8
9 N 1 Y

Other version
Add Order code and plain text:
Length of capillary: ...

- 1) For vacuum on request.
- 2) Not suitable for use in low-pressure range.
- 3) Max. capillary length, see section "Technical description".

Further designs

Order code

Please add "-Z" to Order No. and specify Order code.

Spark arrester

With spark arrester for mounting on zone 0 (including documentation) for transmitters for

- pressure and absolute pressure
- differential pressure

A01
A02

Manufacturer's test certificate M

to DIN 55350, Part 18 and to ISO 9001

C11

Acceptance test certificate B

to EN 10204, section 3.1.B

C12

with step diaphragm

only for:

- Nominal diameters DN50/DN80 or 2"/3"
- Pressure ratings PN 40 or class 150/300
- Materials:
 - Stainless steel without foil (316L)
 - Hastelloy C276
 - Tantalum
- without tube
- not in vacuum-proof design

M01

Vacuum-proof design

for use in low-pressure range for transmitters for

- pressure
- differential pressure

V01
V03

Calculation of span of associated pressure transmitter

Enclose filled-in questionnaire with order

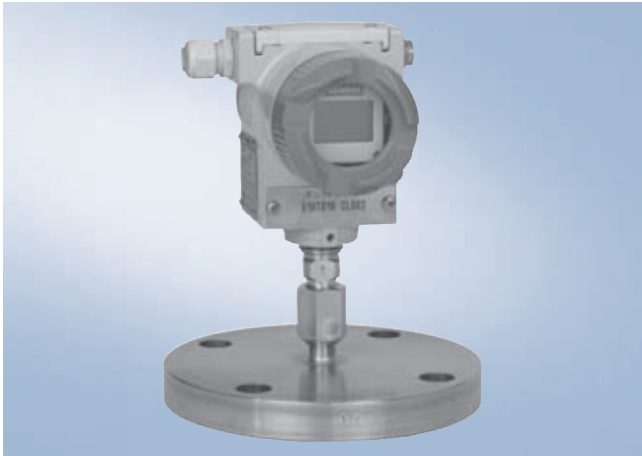
Y05

SITRANS P measuring instruments for pressure

Diaphragm seal of flange design

For pressure and absolute pressure,
directly fitted on transmitter

Overview



Diaphragm seals of flange design, directly fitted on a pressure transmitter for pressure

Technical specifications

Diaphragm seals (flange design) for pressure and absolute pressure, directly fitted on a transmitter

Nom. diam.	Nom. press.
• DN 50	PN 40, PN 63
• DN 80	PN 40, PN 63
• DN 100	PN 16, PN 40
• 2 inch	Class 150, class 300, class 600, class 1500
• 3 inch	Class 150, class 300, class 600
• 4 inch	Class 150, class 300, class 400
Sealing face	
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
• For the other materials	Smooth to EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel 316L
• Wetted parts	Stainless steel 316L
	<ul style="list-style-type: none"> • Without foil • PTFE (for vacuum on request) • ECTFE (for vacuum on request) • PFA (for vacuum on request)
	Monel 400, mat. No. 2.4360
	Hastelloy C276, mat. No. 2.4819
	Hastelloy C4, mat. No. 2.4610
	Tantalum
• Capillary	Stainless steel, 1.4571/316Ti
• Sheath	Spiral hose made of stainless steel, mat. No. 1.4301/316
• Sealing material on the process connection	Copper
Maximum pressure	See above and the technical data of the transmitter
Tube length	<ul style="list-style-type: none"> • Without tube • 50 mm (1.97 inch) • 100 mm (3.94 inch) • 150 mm (5.91 inch) • 200 mm (7.87 inch)

Capillary	
• Length	Max. 10 m (32.8 ft), longer lengths on request
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	
	<ul style="list-style-type: none"> • Silicone oil M5 • Silicone oil M50 • High-temperature oil • Halocarbon oil (for measuring O₂) • Vegetable oil • Glycerine/water (not suitable for use in low-pressure range)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal.
	More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals.
Weight	Approx. 4 kg (8.82 lb)

Certificate and approvals

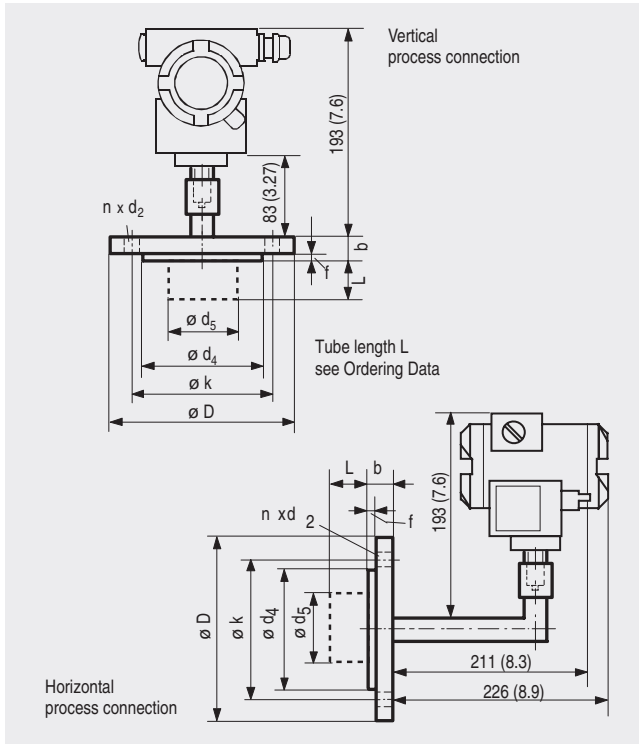
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
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SITRANS P measuring instruments for pressure

Diaphragm seal of flange design

For pressure and absolute pressure,
directly fitted on transmitter

Dimensional drawings



Diaphragm seals of flange design, direct connection to a SITRANS P pressure transmitter (process connection vertical (top) and horizontal (bottom)), dimensions in mm (inch)

Connection to EN 1092-1

Nom. diam.	Nom. press.	b	D	d ₂	d ₄	d ₅	d _M	f	k	n
		mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 50	PN 40	20	165	18	102	48.3	59	2	125	4
	PN 63	28	195	26	102	48.3	59	2	145	4
DN 80	PN 40	24	200	18	138	76	89	2	160	8
	PN 63	32	230	26	138	76	89	2	180	8
DN 100	PN 16	20	220	18	158	94	89	2	180	8
	PN 40	24	235	22	162	94	89	2	190	8

Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d ₂	d ₄	d ₅	d _M	f	k	n
lb/sq.in.	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)
2 inch	150	20	150	20	92	48.3	59	1.6	120.5	4
		(0.79)	(5.91)	(0.79)	(3.62)	(1.9)	(2.32)	(0.06)	(4.74)	
	300	22.5	165	20	92	48.3	59	1.6	127	8
	(0.89)	(6.5)	(0.79)	(3.62)	(1.9)	(2.32)	(0.06)	(5)		
600	32	165	20	92	48.3	59	6.4	127	8	
	(1.26)	(6.5)	(0.79)	(3.62)	(1.9)	(2.32)	(0.25)	(5)		
1500	45	215	26	92	48.3	59	6.4	165	8	
	(1.77)	(8.46)	(1.02)	(3.62)	(1.9)	(2.32)	(0.25)	(6.5)		
3 inch	150	24	190	20	127	76	89	1.6	152.5	4
		(0.95)	(7.48)	(0.79)	(5)	(3)	(3.50)	(0.06)	(6)	
	300	29	210	22	127	76	89	1.6	168.5	8
	(1.14)	(8.27)	(0.87)	(5)	(3)	(3.50)	(0.06)	(6.63)		
600	38.5	210	22	127	76	89	6.4	168.5	8	
	(1.52)	(8.27)	(0.87)	(5)	(3)	(3.50)	(0.25)	(6.63)		
4 inch	150	24	230	20	158	94	89	1.6	190.5	8
		(0.95)	(9.06)	(0.79)	(6.22)	(3.69)	(3.50)	(0.06)	(7.5)	
	300	32	255	22	158	94	89	1.6	200	8
	(1.26)	(10.04)	(0.79)	(6.22)	(3.69)	(3.50)	(0.06)	(7.87)		
400	41.5	255	26	158	94	89	6.4	200	8	
	(1.62)	(10.04)	(1.02)	(6.22)	(3.69)	(3.50)	(0.25)	(7.87)		

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5

d_M: Effective diaphragm diameter

SITRANS P measuring instruments for pressure

Diaphragm seal of flange design

For pressure and absolute pressure,
directly fitted on transmitter

2

Selection and Ordering data		Order No. Ord.code	
Diaphragm seal		7MF4910-	
Directly fitted to a pressure transmitter SITRANS P for pressure 7MF4010, 7MF4013 and 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design); must be ordered separately			
Process connection			
• Vertical (pressure transmitter upright)	0		
• Horizontal	2		
Nominal diameter and nominal pressure			
• DN 50	PN 40	A	
	PN 100	B	
• DN 80	PN 40	D	
	PN 100	E	
• DN 100	PN 16	G	
	PN 40	H	
• 2 inch	Class 150	L	
	Class 300	M	
	Class 600	N	
	Class 1500	P	
• 3 inch	Class 150	Q	
	Class 300	R	
	Class 600	S	
• 4 inch	Class 150	T	
	Class 300	U	
	Class 400	V	
Smooth sealing face to DIN 1092-01, form B1 or B2, or to ASME B16.5 125 ... 250 AA or RFSF			
Other version Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ...		Z	J 1 Y
Wetted parts materials			
• Stainless steel 316L			
- without foil		A	
- with PTFE coating ¹⁾		E 0	
- with ECTFE coating ¹⁾		F	
- with PFA coating ¹⁾		D	
• Monel 400, mat. No. 2.4360		G	
• Hastelloy C276, mat. No. 2.4819		J	
• Hastelloy C4, mat. No. 2.4610		U	
• Tantalum		K	
Other version Add Order code and plain text: Wetted parts materials: ...		Z	K 1 Y
Tube length			
• Without tube		0	
• 50 mm	(1.97 inch)	1	
• 100 mm	(3.94 inch)	2	
• 150 mm	(5.90 inch)	3	
• 200 mm	(7.87 inch)	4	

Selection and Ordering data		Order No. Ord.code	
Diaphragm seal		7MF4910-	
Directly fitted to a pressure transmitter SITRANS P for pressure 7MF4010, 7MF4013 and 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design); must be ordered separately			
Other version: Add Order code and plain text: Tube length: ...		9	LTY
Filling liquid			
• Silicone oil M5		1	
• Silicone oil M50		2	
• High-temperature oil		3	
• Halocarbon oil (for measuring O ₂)		4	
• Vegetable oil		5	
• Glycerin/water ²⁾		6	
Other version Add Order code and plain text: Filling liquid: ...		9	M 1 Y

- 1) For vacuum on request.
2) Not suitable for use in low-pressure range.

Further designs	Order code
Please add "-Z" to Order No. and specify Order code.	
Spark arrester	A01
With spark arrester for mounting on zone 0 (including documentation) for transmitters for pressure and absolute pressure	
Manufacturer's test certificate M	C11
to DIN 55350, Part 18 and to ISO 9001	
Acceptance test certificate B	C12
to EN 10204, section 3.1.B	
with step diaphragm	M01
only for:	
• Nominal diameters DN50/DN80 or 2"/3"	
• Pressure ratings PN 40 or class 150/300	
• Materials:	
- Stainless steel without foil (316L)	
- Hastelloy C276	
- Tantalum	
• without tube	
• not in vacuum-proof design	
Vacuum-proof design	V01
for use in low-pressure range for transmitters for pressure	
Calculation of span of associated pressure transmitter	Y05
Enclose filled-in questionnaire with order	

SITRANS P measuring instruments for pressure

Diaphragm seal of flange design

For differential pressure,
fixed connection and with capillary

Overview



Diaphragm seals of flange design for pressure transmitters for differential pressure, fixed connection and with flexible capillary

Technical specifications

Diaphragm seals of flange design for pressure transmitters for differential pressure, fixed connection and with flexible capillary

Nom. diam.	Nom. press.
• DN 80	PN 40
• DN 100	PN 16, PN 40
• 3 inch	Class 150, class 300
• 4 inch	Class 150, class 300
Sealing face	
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
• For the other materials	To EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel 316L
• Wetted parts	Stainless steel 316L
	<ul style="list-style-type: none"> • Without foil • PTFE (for vacuum on request) • ECTFE (for vacuum on request) • PFA (for vacuum on request)
	Monel 400, mat. No. 2.4360
	Hastelloy C276, mat. No. 2.4819
	Hastelloy C4, mat. No. 2.4610
	Tantalum
• Capillary	Stainless steel, mat. No. 1.4571/316Ti
• Sheath	Spiral hose made of stainless steel, mat. No. 1.4301/316
Sealing material in the process flanges	
• For pressure transmitters, absolute pressure transmitters and low-pressure applications	Copper
• For other applications	Viton
Maximum pressure	See above and the technical data of the pressure transmitter

Tube length	Without tube
	50 mm (1.97 inch)
	100 mm (3.94 inch)
	150 mm (5.91 inch)
	200 mm (7.87 inch)
Capillary	
• Length	Max. 10 m (32.8 ft), longer lengths on request
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	
	Silicone oil M5
	Silicone oil M50
	High-temperature oil
	Halocarbon oil (for measuring O ₂)
	Vegetable oil
	Glycerine/water (not suitable for use in low-pressure range)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal
	More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
Weight	Approx. 4 kg (8.82 lb)

Certificate and approvals

Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
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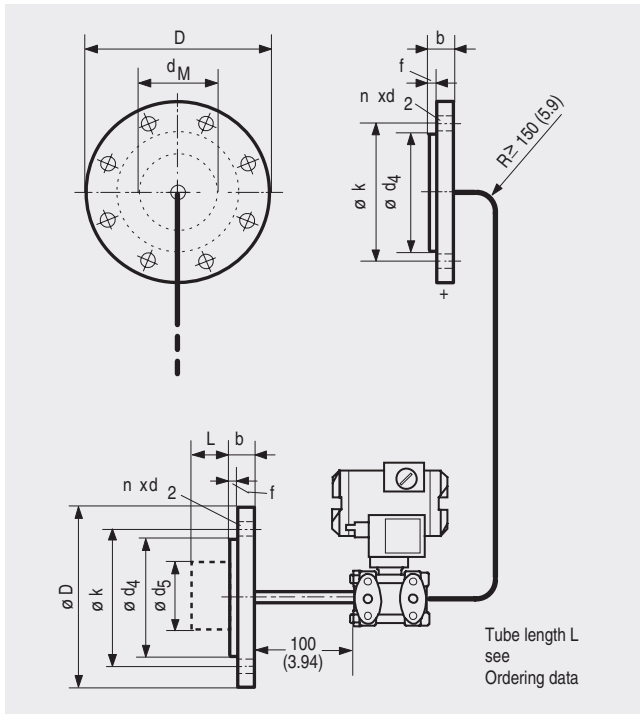
SITRANS P measuring instruments for pressure

Diaphragm seal of flange design

For differential pressure,
fixed connection and with capillary

2

Dimensional drawings



Diaphragm seals of flange design with flexible capillary, fixed connection, for connection to a SITRANS P pressure transmitter for differential pressure, dimensions in mm (inch)

Connection to EN 1092-1

Nom. diam.	Nom. press.	b	D	d ₂	d ₄	d ₅	d _M	f	k	n
		mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 80	PN 40	24	200	18	138	76	89	2	160	8
DN 100	PN 16	20	200	18	158	94	89	2	180	8
	PN 40	24	235	22	162	94	89	2	190	8

Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d ₂	d ₄	d ₅	d _M	f	k	n
	lb/sq.in.	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
3 inch	150	24 (0.96)	190 (7.48)	20 (0.79)	127 (5)	76 (3)	89 (3.50)	1,6 (0.06)	152,5 (6)	4
	300	29 (1.14)	210 (8.27)	22 (0.87)	127 (5)	76 (3)	89 (3.50)	1,6 (0.06)	168,5 (6.63)	8
4 inch	150	24 (0.95)	230 (9.06)	20 (0.79)	158 (6.22)	94 (3.69)	89 (3.50)	1,6 (0.06)	190,5 (7)	4
	300	32 (1.26)	255 (10.04)	22 (0.87)	158 (6.22)	94 (3.69)	89 (3.50)	1,6 (0.06)	200 (7.87)	8

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5

d_M: Effective diaphragm diameter

SITRANS P measuring instruments for pressure

Diaphragm seal of flange design

For differential pressure,
fixed connection and with capillary

2

Selection and Ordering data		Order No.	Ord. code
Diaphragm seal		7MF4913-	
Mounting flange (with tube as option) for direct mounting to high-pressure side and flanged remote seal without tube , fitted by means of capillary to low-pressure side of SITRANS P for differential pressure, DS III series (7MF443)		1	- B
Flange, connection to EN 1092-1			
Nom. diam.	Nom. press.		
• DN 80	PN 40	D	
• DN 100	PN 16	G	
	PN 40	H	
Flange, connection to ASME B16.5			
Nom. diam.	Nom. press.		
• 3 inch	Class 150	Q	
	Class 300	R	
• 4 inch	Class 150	T	
	Class 300	U	
Other version		Z	J 1 Y
Add Order code and plain text: Flange: ..., Nominal diameter: ...; Nominal pressure: ...			
Wetted parts materials			
Smooth sealing face to EN 1092-1, form B1 or B2, or to ASME B16.5 RF 125 ... 250 AA or RF5F			
• Stainless steel 316L			
- without foil			
- with PTFE coating ¹⁾		A	
- with ECTFE coating ¹⁾		E 0	
- with PFA coating ¹⁾		F	
• Monel 400, mat. No. 2.4360		D	
• Hastelloy C276, mat. No. 2.4819		G	
• Hastelloy C4, mat. No. 2.4610		J	
• Tantalum		K	
Other version		U	
Add Order code and plain text: Wetted parts materials: ...		Z	K 1 Y
Tube length			
(for mounting flange on high-pressure side)			
• Without tube		0	
• 50 mm	(1.97 inch)	1	
• 100 mm	(3.94 inch)	2	
• 150 mm	(5.90 inch)	3	
• 200 mm	(7.87 inch)	4	
Other version:		9	L 1 Y
Add Order code and plain text: Tube length: ...			
Filling liquid			
• Silicone oil M5		1	
• Silicone oil M50		2	
• High-temperature oil		3	
• Halocarbon oil (for measuring O ₂)		4	
• Vegetable oil		5	
• Glycerin/water ²⁾		6	
Other version		9	M 1 Y
Add Order code and plain text: Filling liquid: ...			

Selection and Ordering data		Order No.	Ord. code
Diaphragm seal		7MF4913-	
Mounting flange (with tube as option) for direct mounting to high-pressure side and flanged remote seal without tube , fitted by means of capillary to low-pressure side of SITRANS P for differential pressure, DS III series (7MF443)		1	- B
Length of capillary³⁾			
• 1.0 m	(3.28 ft)	2	
• 1.6 m	(5.25 ft)	3	
• 2.5 m	(8.20 ft)	4	
• 4.0 m	(13.1 ft)	5	
• 6.0 m	(19.7 ft)	6	
• 8.0 m	(26.25 ft)	7	
• 10.0 m	(32.8 ft)	8	
Other version		9	N 1 Y
Add Order code and plain text: Length of capillary: ...			

- 1) For vacuum on request.
- 2) Not suitable for use in low-pressure range.
- 3) Max. capillary length, see section "Technical description".

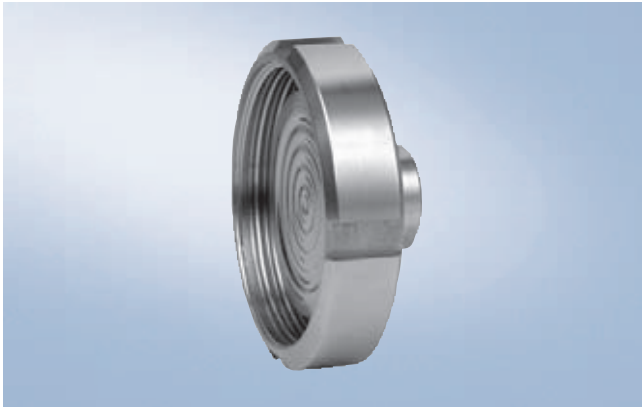
Further designs	Order code
Please add "-Z" to Order No. and specify Order code.	
Spark arrester With spark arrester for mounting on zone 0 (including documentation)	A02
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9001	C11
Acceptance test certificate B to EN 10204, section 3.1.B	C12
With step diaphragm only for: • Nominal diameters DN50/DN80 or 2"/3" • Materials: - Stainless steel without foil (316L) - Hastelloy C276 - Tantalum • without tube • not in vacuum-proof design	M01
Vacuum-proof design for use in low-pressure range	V03
Calculation of span of associated pressure transmitter Enclose filled-in questionnaire with order	Y05

SITRANS P measuring instruments for pressure

Quick-release diaphragm seals

For pressure, absolute pressure and diff. pressure

Overview



Quick-release diaphragm seals, to DIN 11 851 with slotted union nut



Quick-release diaphragm seals, with clamp connection

Quick-release diaphragm seals are available for the following SITRANS P pressure transmitter series:

- For pressure: MK II, MS, DS III, DS III PA, DS III FF
- For differential pressure and flow: DS III, DS III PA, DS III FF

The quick-release remote seals are common designs in the food industry. Their design means that the measured medium cannot accumulate in dead volumes. The quick-release clamp present on the remote seal means that quick dismantling is possible for cleaning.

Technical specifications

Quick-release diaphragm seal

Connection, nominal diameter Nom. press.

For pressure

- To DIN 11 851 with slotted union nut
 - DN 25 PN 40
 - DN 32 PN 40
 - DN 40 PN 40
 - DN 50 PN 25
 - DN 65 PN 25
 - DN 80 PN 25
- To DIN 11 851 with threaded socket
 - DN 25 PN 40
 - DN 32 PN 40
 - DN 40 PN 40
 - DN 50 PN 25
 - DN 65 PN 25
 - DN 80 PN 25

- Clamp connection
 - 1½ inch PN 40
 - 2 inch PN 40
 - 2½ inch PN 40
 - 3 inch PN 40

For differential pressure and flow

- To DIN 11 851 with slotted union nut
 - DN 50 PN 25
 - DN 65 PN 25
 - DN 80 PN 25
- To DIN 11 851 with threaded socket
 - DN 50 PN 25
 - DN 65 PN 25
 - DN 80 PN 25

- Clamp connection
 - 2 inch PN 40
 - 2½ inch PN 40
 - 3 inch PN 40

Sealing face

- For stainless steel, mat. No. 1.4404/316L To EN 1092-1, form B1 or ASME B 16.5RF 125 ... 250 AA
- For the other materials To EN 1092-1, form B2 or ASME B16.5 RFSF

Materials

- Main body Stainless steel 316L
- Wetted parts Stainless steel 316L
- Capillary Stainless steel, mat. No. 1.4571/316Ti
- Sheath Spiral hose made of stainless steel, mat. No. 1.4301/316

Maximum pressure See above and the technical data of the pressure transmitter

Tube length Without tube

Capillary

- Length Max. 10 m (32.8 ft), longer lengths on request
- Internal diameter 2 mm (0.079 inch)
- Minimum bending radius 150 mm (5.9 inch)

Filling liquid Vegetable oil
Glycerin/water (not suitable for use in low-pressure range)

Permissible ambient temperature Dependent on the pressure transmitter and the filling liquid of the remote seal

More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals

Weight Approx. 4 kg (8.82 lb)

Certificates and approvals

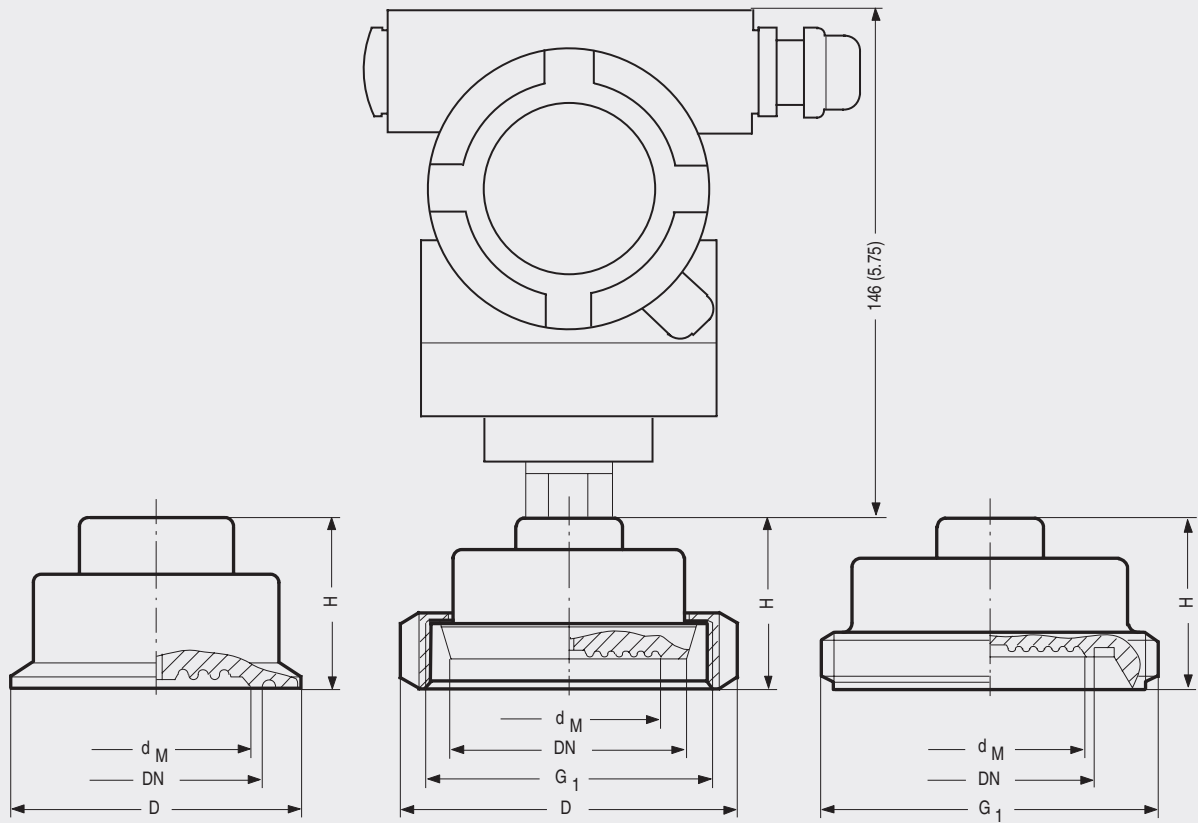
Classification according to pressure equipment directive (DRGL 97/23/EC) For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

SITRANS P measuring instruments for pressure

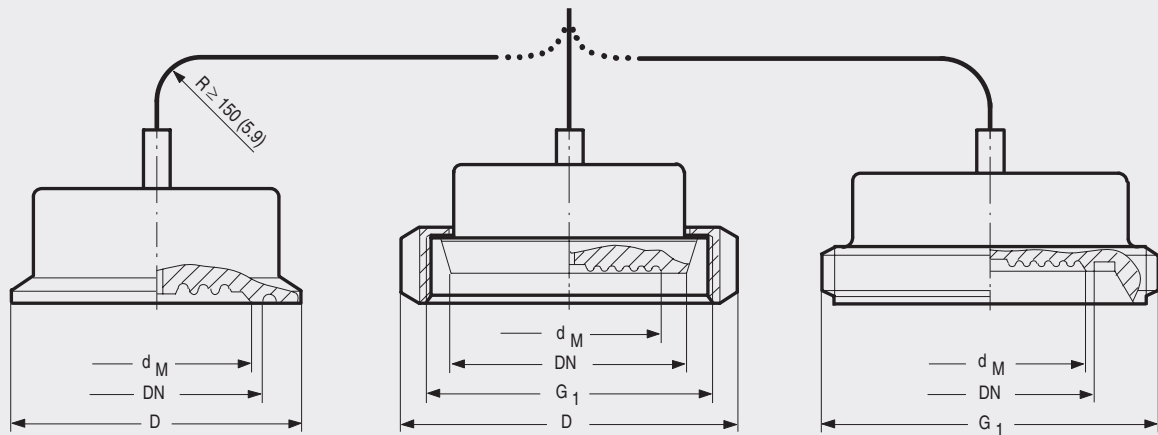
Quick-release diaphragm seals

For pressure, absolute pressure and diff. pressure

Dimensional drawings



Mounted directly on SITRANS P transmitter for pressure



Mounted on SITRANS P transmitter for pressure or differential pressure and flow

Clamp connection (left)

DN	$\varnothing d_M$	$\varnothing D$	H
(1½ inch)	32 (1.26)	50,5 (2)	35 (1.38)
(2 inch)	40 (1.57)	64 (2.52)	35 (1.38)
(2½ inch)	52 (2.05)	77,5 (3.05)	35 (1.38)
(3 inch)	72 (2.83)	91 (3.58)	35 (1.38)

Connection to DIN 11 851 with slot-
ted union nut (center)

DN	$\varnothing d_M$	$\varnothing D$	H	G_1
25	25	63	36	Rd 52x1/6
32	32	70	36	Rd 52x1/6
40	40	78	36	Rd 65x1/6
50	52	112	36	Rd 78x1/6
65	65	112	36	Rd 95x1/6
80	72	127	36	Rd 110x1/6
25	25	63	36	Rd 52x1/6

Connection to DIN 11 851 with
threaded socket (right)

DN	$\varnothing d_M$	H	G_1
25	25	36	Rd 52x1/6
32	32	36	Rd 52x1/6
40	40	36	Rd 65x1/6
50	52	36	Rd 78x1/6
65	65	36	Rd 95x1/6
80	72	36	Rd 110x1/6

d_M Effective diaphragm diameter

Quick-release diaphragm seal, dimensions in mm (inch)

SITRANS P measuring instruments for pressure

Quick-release diaphragm seals

For pressure, absolute pressure and diff. pressure

2

Selection and Ordering data	Order No.	Ord. code
Quick-release diaphragm seal	7 M F 4 9 4 0 -	
for SITRANS P pressure transmitters for pressure 7MF4010, 7MF4013 and 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design); must be ordered separately Filling liquid: Vegetable oil Material: Stainless steel, mat. No. 1.4435	■ A 0 ■ - ■ B ■ ■ ■ ■	
Nom. diam.		
Nom. press.		
• Connection to DIN 11851 with slotted union nut		
- DN 25	PN 40	1 B
- DN 32	PN 40	1 C
- DN 40	PN 40	1 D
- DN 50	PN 25	1 E
- DN 65	PN 25	1 F
- DN 80	PN 25	1 G
• Connection to DIN 11851 with screw necks		
- DN 25	PN 40	2 B
- DN 32	PN 40	2 C
- DN 40	PN 40	2 D
- DN 50	PN 25	2 E
- DN 65	PN 25	2 F
- DN 80	PN 25	2 G
• Clamp connection		
- 1½ inch	PN 40	4 L
- 2 inch	PN 40	4 M
- 2½ inch	PN 40	4 N
- 3 inch	PN 40	4 P
Other version		9 Z
Add Order code and plain text:		H 1 Y
Nominal diameter: ...; Nominal pressure: ...		
Filling liquid		
• Vegetable oil		5
• Glycerin/water ¹⁾		6
Other version		9
Add Order code and plain text:		M 1 Y
Filling liquid: ...		
Connection to pressure transmitter		
• direct		0
through capillary, Length: ²⁾		
• 1.0 m (3.28 ft)		2
• 1.6 m (5.25 ft)		3
• 2.5 m (8.20 ft)		4
• 4.0 m (13.1 ft)		5
• 6.0 m (19.7 ft)		6
• 8.0 m (26.25 ft)		7
• 10.0 m (32.8 ft)		8
Other version		9
Add Order code and plain text:		N 1 Y
Length of capillary: ...		

1) Not suitable for use in low-pressure range.
2) Max. capillary length, see section "Technical description"

Further designs	Order code
Please add "-Z" to Order No. and specify Order code.	
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9001	C11
Acceptance test certificate B to EN 10204, section 3.1.B	C12
Vacuum-proof design for use in low-pressure range	V01

Selection and Ordering data	Order No.	Ord. code
Quick-release diaphragm seal	7 M F 4 9 4 3 -	
for SITRANS P pressure transmitters for pressure for differential pressure and flow, type 7MF4433 or 7MF4434; order separately Filling liquid: Vegetable oil Material: Stainless steel, mat. No. 1.4435 Delivery unit: 2 off	■ A 0 ■ - ■ B ■ ■ ■ ■	
Nom. diam.		
Nom. press.		
• Connection to DIN 11 851 with slotted union nut		
- DN 50	PN 25	1 E
- DN 65	PN 25	1 F
- DN 80	PN 25	1 G
• Connection to DIN 11 851 with threaded socket		
- DN 50	PN 25	2 E
- DN 65	PN 25	2 F
- DN 80	PN 25	2 G
• Clamp connection		
- 2 inch	PN 40	4 M
- 2½ inch	PN 40	4 N
- 3 inch	PN 40	4 P
Other version		9 Z
Add Order code and plain text:		H 1 Y
Nominal diameter: ...; Nominal pressure: ...		
Filling liquid		
• Vegetable oil		5
• Glycerin/water ¹⁾		6
Other version		9
Add Order code and plain text:		M 1 Y
Filling liquid: ...		
Connection to transmitter		
through capillary, Length: ²⁾		
• 1.0 m (3.28 ft)		2
• 1.6 m (5.25 ft)		3
• 2.5 m (8.20 ft)		4
• 4.0 m (13.1 ft)		5
• 6.0 m (19.7 ft)		6
• 8.0 m (26.25 ft)		7
• 10.0 m (32.8 ft)		8
Other version		9
Add Order code and plain text:		N 1 Y
Length of capillary: ...		

1) Not suitable for use in low-pressure range.
2) Max. capillary length, see section "Technical description"

Further designs	Order code
Please add "-Z" to Order No. and specify Order code.	
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9001	C11
Acceptance test certificate B to EN 10204, section 3.1.B	C12
Vacuum-proof design for use in low-pressure range	V01

SITRANS P measuring instruments for pressure

Miniature diaphragm seal

For pressure and absolute pressure

Overview



Miniature diaphragm seals

The miniature diaphragm seals are available for the following SITRANS P pressure transmitter series for pressure:

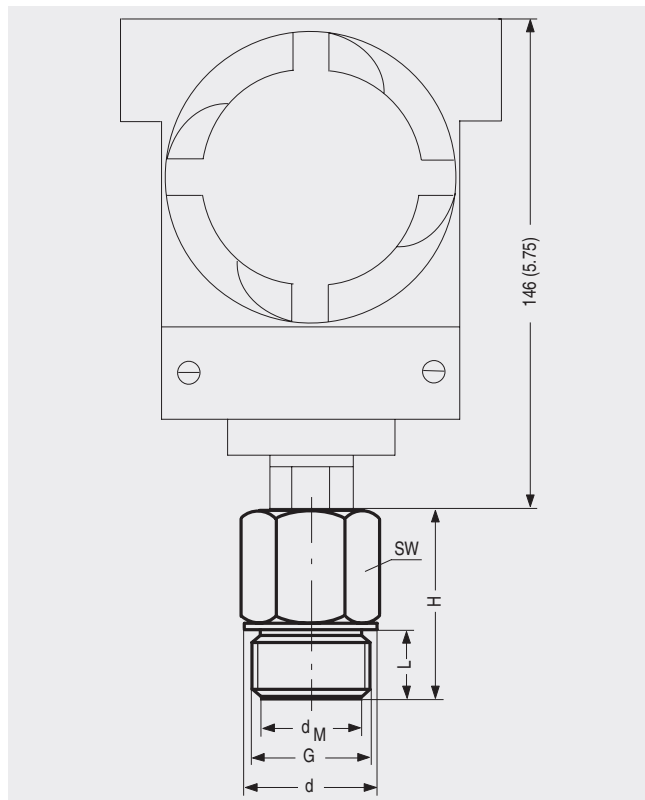
- MK II, MS, DS III, DS III PA, DS III FF

Suitable for high pressures, contaminated, fibrous and viscous media in the chemical, paper, food and drink industries.

Design

- Flush-mounted diaphragm
- No dead spaces
- Fixed threaded stems

Dimensional drawings



G	Ø d _M	SW	Ø d	L	H
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
G1B 25 (0.98)	41 (1.61)	39 (1.53)	28 (1.1)	56 (2.21)	
G1½B 40 (1.57)	55 (2.17)	60 (2.36)	30 (1.18)	50 (1.97)	
G2B 50 (1.97)	60 (2.36)	70 (2.76)	30 (1.18)	63 (2.48)	

d_M: Effective diaphragm diameter

Miniature diaphragm seal, dimensions in mm (inch)

Technical specifications

Miniature diaphragm seals

Span with	
• G1B	> 6 bar (> 87 psi)
• G1½B	> 2 bar (> 29 psi)
• G2B	> 600 mbar (> 8.7 psi)
Filling liquid	Silicone oil M5 or vegetable oil
Material	Stainless steel, mat. No. 1.4404 / 316L
Maximum pressure	100% of nominal pressure of pressure transmitter, up to maximum of PN 600
Linearity	Same as pressure transmitter
Temperature of use	Same as pressure transmitter
Temperature range of medium	Same as pressure transmitter
Weight	
• G1B	Approx. 0.3 kg (approx. 0.66 lb)
• G1½B	Approx. 0.5 kg (approx. 1.10 lb)
• G2B	Approx. 0.8 kg (approx. 1.76 lb)

Certificate and approvals

Classification according to pressure equipment directive (DRGL 97/23/EC)

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

Selection and Ordering data

Order No. Ord. code

Miniature diaphragm seals

7MF4960 -

directly fitted to SITRANS P pressure transmitters for pressure; type 7MF4010, 7MF4013, 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design); must be ordered separately
Material: Stainless steel, mat. No. 1.4401
Pressure rating, see "Pressure transmitters"

1 0

Process connection

- G1B
- G1½B
- G2B

C
D
E

Wetted parts materials

- Stainless steel 316L

Other version

Add Order code and plain text:

Wetted parts materials: ...

A
Z

K1Y

Filling liquid

- Silicone oil M5
- Vegetable oil

Other version

Add Order code and plain text:

Filling liquid: ...

1
5
9

M1Y

Further designs

Order code

Please add "-Z" to Order No. and specify Order code.

Manufacturer's test certificate M

to DIN 55350, Part 18 and to ISO 9001

C11

Acceptance test certificate B

to EN 10204, section 3.1.B

C12

Vacuum-proof design

for use in low-pressure range

V01

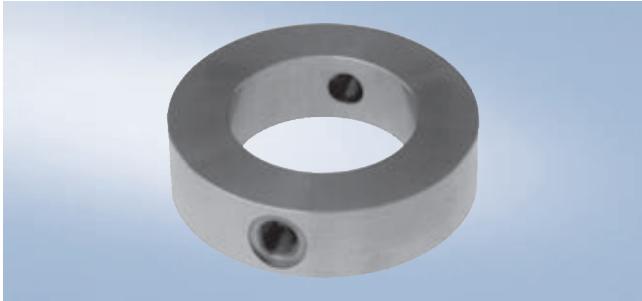
SITRANS P measuring instruments for pressure

Accessories for diaphragm seal

Flushing rings

2

Overview



Flushing ring

Flushing rings are required for flange-mounted and sandwich-type remote seals (Order No. 7MF4900 ... 7MF4923) if the danger exists that the process conditions and the geometry of the connection could cause the medium to form deposits or blockages.

The flushing ring is clamped between the process flange and the remote seal.

Deposits can be flushed away from the diaphragm through the holes in the side, or the pressure volume can be vented. Different nominal diameters and forms permit adaptation to the respective process flange.

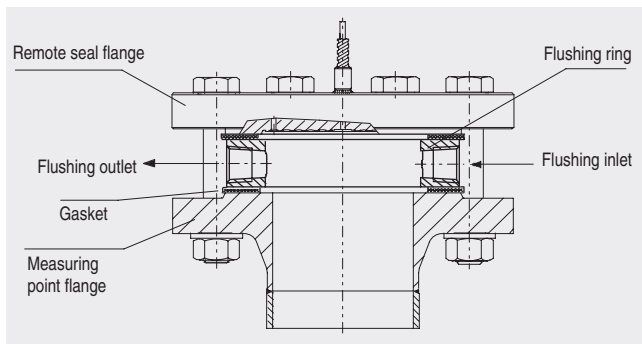
Process connection

For flanges to EN and ASME:
DN 50, 80, 100, 125; PN 16 ... 100 or
DN 2 inch, 3 inch, 4 inch, 5 inch; Class 150 ... 600

Standard design

Material: CrNi-Stahl, mat. No. 1.4404/316L
Sealing faces and flushing holes: See Selection and Ordering data

Design



Installation example

Technical specifications

Flushing ring for remote seals of sandwich and flange design

Nom. diam.	Nom. press.
• DN 50	PN 16 ... PN 100
• DN 80	PN 16 ... PN 100
• DN 100	PN 16 ... PN 100
• DN 125	PN 16 ... PN 100
• 2 inch	Class 150 ... class 600
• 3 inch	Class 150 ... class 600
• 4 inch	Class 150 ... class 600
• 5 inch	Class 150 ... class 600

Sealing face

• To EN 1092-1	Form B1
	Form B2
	Form D/Form D
	Form C/Form C
	Form C/Form C
	Form E
• To ASME B16.5	Form F
	RF 125 ... 250 AA
	RFSF
	RJT ring groove

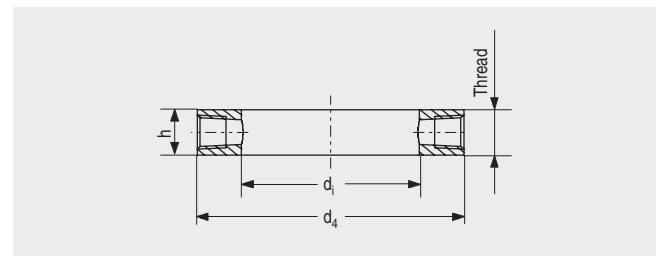
Flushing holes (2 off), female thread:

- G $\frac{1}{4}$
- G $\frac{1}{2}$
- $\frac{1}{4}$ -18 NPT
- $\frac{1}{2}$ -14 NPT

Material

Stainless steel 1.4404/316L

Dimensional drawings



Connection to EN 1092-1

DN	PN	d ₄	d ₁	h	Weight
(mm)	(bar)	(mm)	(mm)	(mm)	(kg)
50	16 ... 100	102	62	30	1.10
80	16 ... 100	138	92	30	1.90
100	16 ... 100	162	92	30	3.15
125	16 ... 100	188	126	30	3.50

Connection to ASME B 16.5

DN	Class	d ₄	d ₁	h	Weight
inch		mm (inch)	mm (inch)	mm (inch)	kg (lb)
2	150 ... 600	92 (3.62)	62 (2.44)	30 (1.18)	0.60 (1.32)
3	150 ... 600	127 (5)	92 (3.62)	30 (1.18)	1.05 (2.31)
4	150 ... 600	157 (6.18)	92 (3.62)	30 (1.18)	2.85 (6.28)
5	150 ... 600	185.5 (7.3)	126 (4.96)	30 (1.18)	3.30 (7.28)

Flushing ring, dimension drawing

SITRANS P measuring instruments for pressure

Accessories for diaphragm seal

Flushing rings

2

Selection and Ordering data Order No. Ord. code

Flushing ring		7MF4925 -	
for remote seals 7MF4900 to 7MF4923		1	
Nom. diam.	Nom. press.		
• DN 50	PN 16 ... PN 100	A	
• DN 80	PN 16 ... PN 100	B	
• DN 100	PN 16 ... PN 100	C	
• DN 125	PN 16 ... PN 100	D	
• 2 inch	Class 150 ... 600	G	
• 3 inch	Class 150 ... 600	H	
• 4 inch	Class 150 ... 600	J	
• 5 inch	Class 150 ... 600	K	
Other version		Z	J 1 Y
Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ...			
Sealing face			
• To EN 1092-1			
- Form B1		A	
- Form B2		C	
- Form C / Form C		D	
- Form D / Form C		E	
- Form D / Form D		F	
- Form E		G	
- Form F		H	
• ASME B16.5			
- RF 125 ... 250 AA		M	
- RFSF		Q	
- RJT ring groove		R	
Other version		Z	K 1 Y
Add Order code and plain text: Sealing face: ...			
Flushing holes (2 off)			
• Female thread G $\frac{1}{4}$		1	
• Female thread G $\frac{1}{2}$		2	
• Female thread $\frac{1}{4}$ -18 NPT		3	
• Female thread $\frac{1}{2}$ -14 NPT		4	
Material			
• Stainless steel 316L		0	
Other version		9	M 1 Y
Add Order code and plain text: Material: ...			

Further designs Order code

Please add "-Z" to Order No. and specify Order code.		
Acceptance test certificate B		C12
to EN 10204, section 3.1.B		

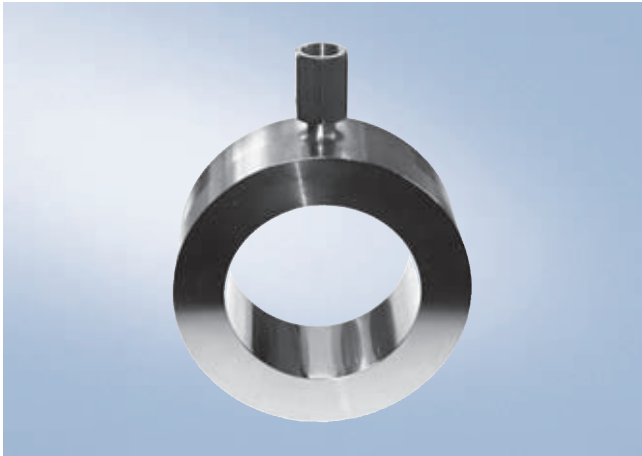
SITRANS P measuring instruments for pressure

Clamp-on seals of flange design

For pressure, differential pressure and flow

2

Overview



Clamp-on seals for flange-mounting

The clamp-on seal is completely integrated in the process line. It is particularly suitable for flowing and highly viscous media.

The clamp-on remote seal consists of a cylindrical jacket into which a thin-walled pipe is welded. It is clamped directly between two flanges in the pipeline.

Design

- Clamp-on seals for flange-mounting (flange design) to EN/ASME for SITRANS P pressure transmitters
 - For pressure: MK II, MS, DS III, DS III PA and DS III FF series
 - For differential pressure and flow: DS III, DS III PA and DS III FF
- Sealing face to EN 1092-1 or ASME B16.5
- Connection to the transmitter directly or by means of a flexible capillary (max. 10 m long)
- See Technical data for details of materials used for the wetted parts
- Material used for the capillary, the guard sleeve, the seal's main body and the measuring cell: Stainless steel, mat.-No. 1.4571
- Filling liquid: Silicone oil, high-temperature oil, halocarbon oil, vegetable oil or glycerin/water (not suitable for uses in low-pressure range)

Function

The measured pressure is transferred from the diaphragm to the filling liquid and passes either directly or through the capillary to the measuring chamber of the pressure transmitter. The interior of the diaphragm seal and of the capillary, as well as the measuring chamber of the pressure transmitter, are filled gas-free by the filling liquid.

Note:

When operating in the low-pressure range, also during commissioning, it is recommended to use a vacuum-proof remote seal (see Selection and Ordering data).

Technical specifications

Clamp-on seals for flange-mounting

Nom. diam.	Nom. press.
• DN 25	PN 6 ... PN 100
• DN 40	PN 6 ... PN 100
• DN 50	PN 6 ... PN 100
• DN 80	PN 6 ... PN 100
• DN 100	PN 6 ... PN 100
• 1 inch	Class 150 ... class 2500
• 1½ inch	Class 150 ... class 2500
• 2 inch	Class 150 ... class 2500
• 3 inch	Class 150 ... class 2500
• 4 inch	Class 150 ... class 2500
Process connection	Flange to EN 1092-1 or ASME B 16.5
Sealing face	To EN 1092-1, form B1 or to ASME B16.5 RF 125 ... 250 A or RF5F
Materials	
• Main body	Stainless steel 1.4404/316L
• Diaphragm	Stainless steel 1.4404/316L
• Wetted parts	Stainless steel 1.4404/316L <ul style="list-style-type: none"> • Without foil • ECTFE coating • PFA coating (for vacuum on request)
	Monel 400, mat. No. 2.4360
	Hastelloy C276, mat. No. 2.4819
	Hastelloy C4, mat. No. 2.4610
	Tantalum
• Capillary	Stainless steel, mat. No. 1.4571/316Ti
• Sheath	Spiral hose made of stainless steel, mat. No. 1.4301/316
Capillary	
• Length	Max. 10 m (32.8 ft)
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	Silicone oil M5
	Silicone oil M50
	High-temperature oil
	Halocarbon oil
	Vegetable oil
	Glycerin/water (not suitable for uses in low-pressure range)
Permissible ambient temperature	See pressure transmitters, see filling liquid
Weight	Approx. 4 kg (8.82 lb)

Certificates and approvals

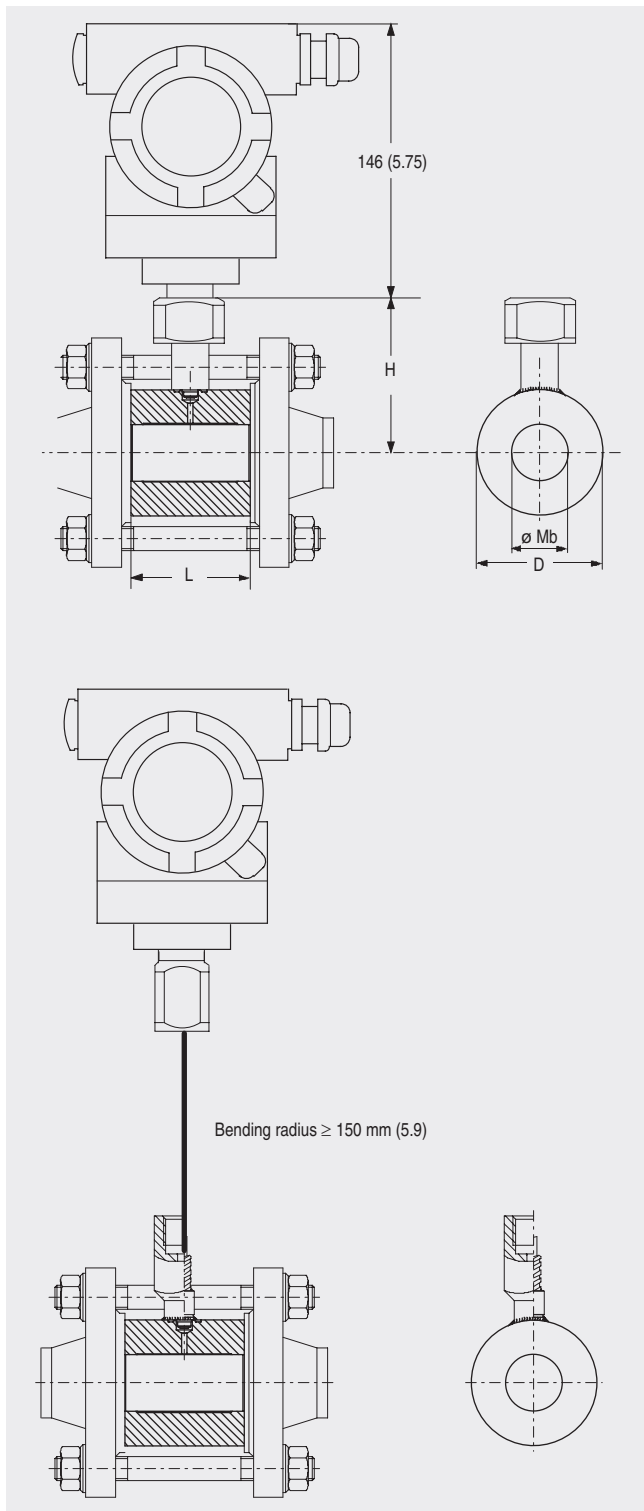
Classification according to pressure equipment directive (DRGL 97/23/EC) For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 3, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord

SITRANS P measuring instruments for pressure

Clamp-on seals of flange design

For pressure, differential pressure and flow

Dimensional drawings



Connection to EN 1092-1

DN	PN	D	Mb	L	H
mm	bar	mm	mm	mm	mm
25	6 ... 100	63	28,5	60	78.5
40	6 ... 100	85	43	60	89.5
50	6 ... 100	95	54.5	60	92.5
80	6 ... 100	130	82.5	60	112
100	6 ... 100	150	107	60	122

Connection to ASME B16.5

DN	Class	D	Mb	L	H
(inch)		mm	mm	mm	mm
		(inch)	(inch)	(inch)	(inch)
1	150 ... 2500	63 (2.48)	28.5 (1.12)	60 (2.36)	78.5 (3.1)
1½	150 ... 2500	85 (3.35)	43 (1.69)	60 (2.36)	86 (3.4)
2	150 ... 2500	95 (3.74)	54.5 (2.15)	60 (2.36)	94.5 (3.72)
3	150 ... 2500	130 (5.12)	82.5 (3.25)	60 (2.36)	112 (4.4)
4	150 ... 2500	150 (5.9)	107 (4.21)	60 (2.36)	122 (4.8)

Clamp-on seal for flange-mounting, connected to SITRANS P pressure transmitter, dimensions in mm (inch)

SITRANS P measuring instruments for pressure

Clamp-on seals of flange design

For pressure, differential pressure and flow

2

Selection and Ordering data	Order No. Ord. code	Further designs	Order code
Clamp-on seal for flange-mounting for SITRANS P pressure transmitters for pressure 7MF4010, 7MF4013, 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design); must be ordered separately, scope of delivery: 1 off for differential pressure and flow 7MF4433 or 7MF4434; order separately, scope of delivery: 1 pair (set); Material: Completely of stainless steel, mat. No. 1.4404/316L; Process connection to EN 1092-1 or ASME B16.5; sealing face to EN 1092-1, form B1, or to ASME B16.5 RF 125 ... 250 AA	7MF4980 - 7MF4983 - 1 0 - B	Please add "-Z" to Order No. and specify Order code. Spark arrester With spark arrester for mounting on zone 0 (including documentation) • Pressure and absolute pressure • for differential pressure transmitters Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9001 Acceptance test certificate B To EN 10204, section 3.1.B Vacuum-proof design For use in low-pressure range Calculation of span of associated pressure transmitter Enclose filled-in questionnaire with order Note: Suffix "Y01" required with pressure transmitter!	A01 A02 C11 C12 V01 Y05
Nominal diameter and nominal pressure <ul style="list-style-type: none"> • DN 25 PN 6 ... 100 • DN 40 PN 6 ... 100 • DN 50 PN 6 ... 100 • DN 80 PN 6 ... 100 • DN 100 PN 6 ... 100 • 1 inch Class 150 ... 2500 • 1½ inch Class 150 ... 2500 • 2 inch Class 150 ... 2500 • 3 inch Class 150 ... 2500 • 4 inch Class 150 ... 2500 Other version Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ...	B D E G H L M N P Q Z J 1 Y		
Wetted parts materials <ul style="list-style-type: none"> • Stainless steel 316L <ul style="list-style-type: none"> - Without foil - With PFA coating¹⁾ - With ECTFE coating¹⁾ • Monel 400, mat. No. 2.4360 • Hastelloy C276, mat. No. 2.4819 • Hastelloy C4, mat. No. 2.4610 • Tantalum Other version Add Order code and plain text: Wetted parts materials: ...	A D F G J U K Z K 1 Y		
Filling liquid <ul style="list-style-type: none"> • Silicone oil M5 • Silicone oil M50 • High-temperature oil • Halocarbon oil (for measuring O₂) • Vegetable oil • Glycerin/water²⁾ Other version Add Order code and plain text: Filling liquid: ...	1 2 3 4 5 6 9 M 1 Y		
Connection to transmitter <ul style="list-style-type: none"> • direct through capillary, Length: ³⁾ <ul style="list-style-type: none"> • 1.0 m (3.28 ft) • 1.6 m (5.25 ft) • 2.5 m (8.20 ft) • 4.0 m (13.1 ft) • 6.0 m (19.7 ft) • 8.0 m (26.25 ft) • 10.0 m (32.8 ft) Other version Add Order code and plain text: Length of capillary: ...	0 2 3 4 5 6 7 8 9 N 1 Y		

1) For vacuum on request.
 2) Not suitable for use in low-pressure range.
 3) Max. capillary length, see section "Technical description"

SITRANS P measuring instruments for pressure

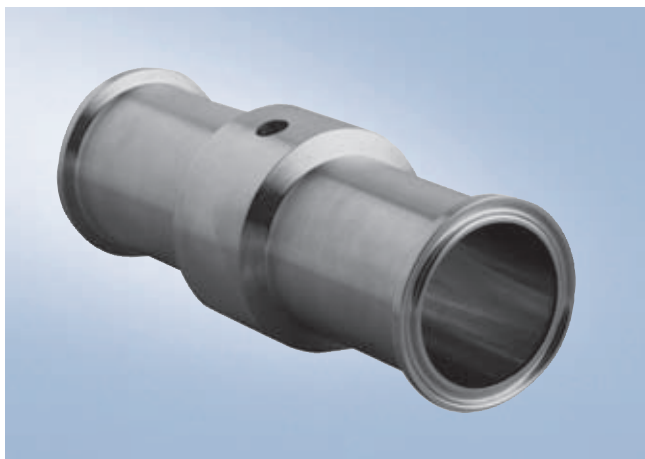
Quick-release clamp-on seals

For pressure and absolute pressure

Overview



Quick-release clamp-on seals, to DIN 11851 with threaded socket



Quick-release clamp-on seals, with clamp connection

Quick-release clamp-on seals for pressure are available for the following SITRANS P pressure transmitter series:

- MK II
- MS
- DS III
- DS III PA
- DS III FF

Application

The quick-release clamp-on seal is a special design for flowing media and high-viscosity media. Since it is completely integrated in the process pipe, no turbulences, dead volumes or other obstructions to the flow occur. The measured medium flows unhindered through the clamp-on seal and results in self-cleaning of the measuring chamber. Furthermore, the clamp-on seal can be cleaned by a pig.

Design

The quick-release clamp is available in two versions:

- DIN 11851 with threaded socket
- Clamp connection

The clamp-on seal is connected to the pressure transmitter either directly or by way of a capillary.

Function

The measured pressure is transferred from the diaphragm, mounted on the inner circumference of the clamp-on seal, to the filling liquid and then passes through the capillary to the measuring chamber of the pressure transmitter. The interior of the clamp-on seal and of the capillary, as well as the measuring chamber of the pressure transmitter, are filled gas-free by the filling liquid.

Note:

When operating in the low-pressure range, also during commissioning, it is recommended to use a vacuum-proof pressure transmitter (see Selection and Ordering data).

Technical specifications

Clamp-on seals of quick-release design for pressure		
Connection	Nom. diam.	Nom. press.
• To DIN 11 851 with threaded socket	DN 25	PN 40
	DN 40	PN 40
	DN 50	PN 25
	DN 65	PN 25
	DN 80	PN 25
• Clamp connection	DN 100	PN 25
	1½ inch	PN 40
	2 inch	PN 40
	2½ inch	PN 40
3 inch	PN 40	
Material	Stainless steel 1.4404/316L	
Capillary		
• Length	Max. 10 m (32.8 ft)	
• Internal diameter	2 mm (0.079 inch)	
• Minimum bending radius	150 mm (5.9 inch)	
Filling liquid	<ul style="list-style-type: none"> • Vegetable oil • Glycerin/water (not suitable for use in low-pressure range) 	
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals	
Weight	Approx. 4 kg (approx. 8.82 lb)	

Certificate and approvals

Classification according to pressure equipment directive (DRGL 97/23/EC)

For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 3, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord

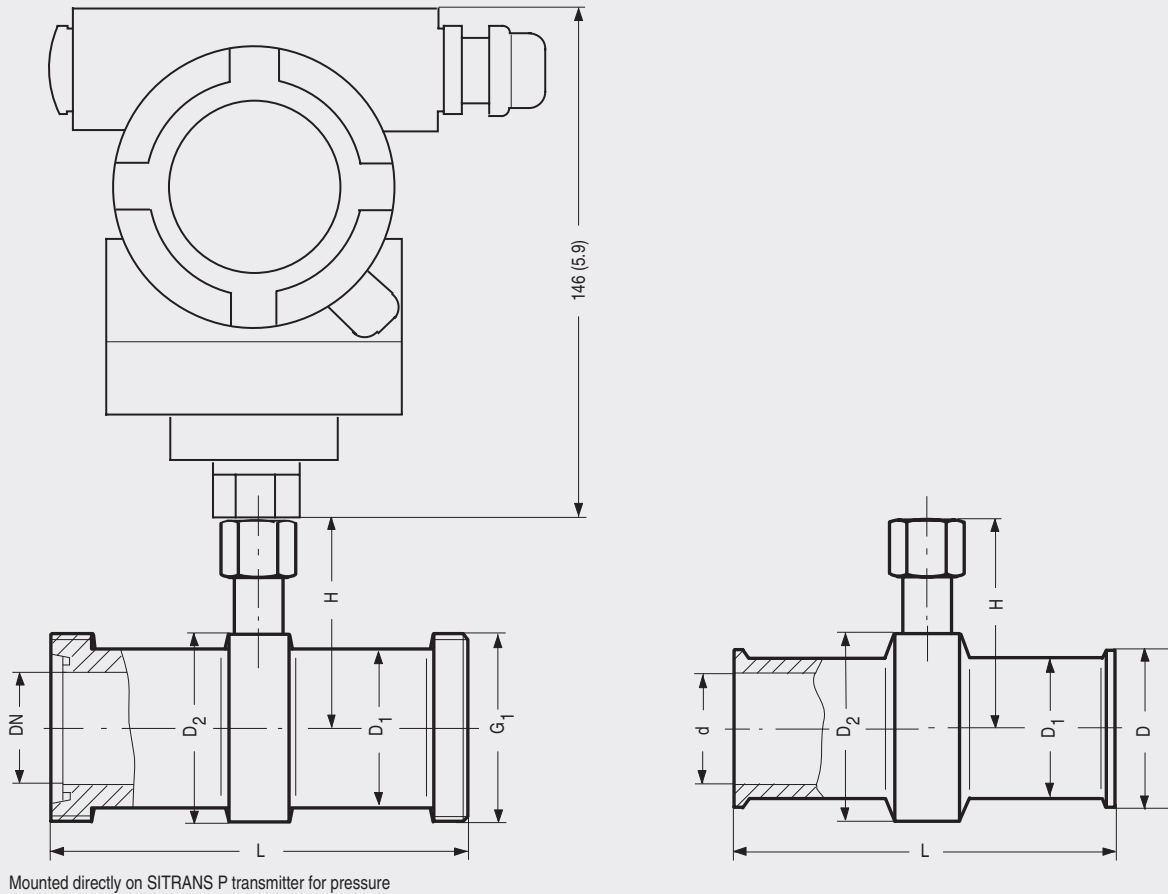
SITRANS P measuring instruments for pressure

Quick-release clamp-on seals

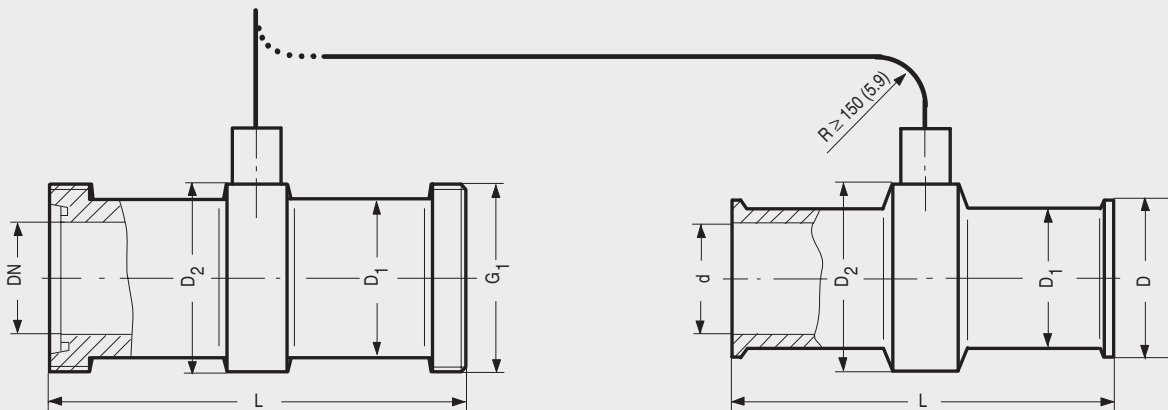
For pressure and absolute pressure

2

Dimensional drawings



Mounted directly on SITRANS P transmitter for pressure



Mounted on SITRANS P transmitter for pressure or differential pressure and flow

Connection to DIN 11851 with screw necks

DN	Ø D ₁	Ø D ₂	H	L	G ₁
25	38	52	68	128	Rd 52x1/6
40	55	65	74,5	160	Rd 65x1/6
50	68	78	81	170	Rd 78x1/6
65	85	95	89,5	182	Rd 95x1/6
80	110	110	97	182	Rd 110x1/4
100	130	130	107	182	Rd 110x1/4

Clamp connection for pipes to BS 4825/3 and o.D. tubes

d	Ø D ₁	Ø D ₂	H	L	D
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
22,2 (1)	38 (1.5)	50 (1.97)	67 (2.64)	114 (4.49)	50,5 (1.98)
34,9 (1½)	43 (1.69)	65 (2.56)	74,5 (2.93)	146 (5.75)	50,5 (1.98)
47,6 (2)	56 (2.2)	75 (2.95)	79,5 (3.13)	156 (6.14)	64 (2.52)
60,3 (2½)	68 (2.68)	77 (3.03)	80,5 (3.17)	156 (6.14)	77,5 (3.05)
73,0 (3)	82 (3.23)	91 (3.58)	87,5 (3.44)	156 (6.14)	91 (3.58)

Quick-release clamp-on seal, dimensions in mm (inch)

SITRANS P measuring instruments for pressure

Quick-release clamp-on seals

For pressure and absolute pressure

2

Selection and Ordering data		Order No.	Ord. code
Quick-release clamp-on seal		7 M F 4 9 5 0 -	
for SITRANS P pressure transmitters for pressure 7MF4010, 7MF4013 and 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design); must be ordered separately Filling liquid: Vegetable oil Material: Stainless steel 316L		■ A 0 ■ - ■ B ■ ■ ■ ■	
Nom. diam.	Nom. press.		
• Connection to DIN 11851 with screw necks			
- DN 25	PN 40	2 B	
- DN 40	PN 40	2 D	
- DN 50	PN 25	2 E	
- DN 65	PN 25	2 F	
- DN 80	PN 25	2 G	
- DN 100	PN 25	2 H	
• Clamp connection			
- 1½ inch	PN 40	4 L	
- 2 inch	PN 40	4 M	
- 2½ inch	PN 40	4 N	
- 3 inch	PN 40	4 P	
Other version		9 Z	H 1 Y
Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ...			
Filling liquid			
• Vegetable oil		5	
• Glycerin/water ¹⁾		6	
Other version		9	M 1 Y
Add Order code and plain text: Filling liquid: ...			
Connection to transmitter			
• Direct		0	
Through capillary, Length: ²⁾			
• 1.0 m	(3.28 ft)	2	
• 1.6 m	(5.25 ft)	3	
• 2.5 m	(8.20 ft)	4	
• 4.0 m	(13.1 ft)	5	
• 6.0 m	(19.7 ft)	6	
• 8.0 m	(26.25 ft)	7	
• 10.0 m	(32.8 ft)	8	
Other version		9	N 1 Y
Add Order code and plain text: Length of capillary: ...			

1) Not suitable for use in low-pressure range.

2) Max. capillary length, see section "Technical description"

Further designs	Order code
Please add "-Z" to Order No. and specify Order code.	
Manufacturer's test certificate M to DIN 55.350, Part 18 and to ISO 9001	C11
Acceptance test certificate B to EN 10 204, section 3.1	C12
Vacuum-proof design for use in low-pressure range	V01

Overview

This section shows examples of typical measuring setups for using SITRANS P pressure transmitters with and without remote seals.

Equations for calculating start of scale and full scale are provided for each example.

Questionnaires are included to help you select the right combination of remote seal and pressure transmitter.

Installation

Remote seals of sandwich design are fitted between the connection flange of the measuring point and a dummy flange. Remote seals of flange design are fitted directly on the connection flange of the measuring point. The respective pressure rating of the dummy flange or the flanged remote seal must be observed.

The pressure transmitter should be installed below the connection flange (and below the lower connection flange in the case of differential pressure transmitters). This arrangement must be used in the low-pressure range.

When measuring at pressures above atmospheric, the pressure transmitter can also be installed above the connection flange.

The capillaries between the remote seal and the pressure transmitter should be as short as possible to obtain a good transmission response.

Offset of measuring range

If there is a difference in height between the two connection flanges when measuring with two remote seals, an additional differential pressure will result from the oil filling of the remote seal capillaries. This results in a measuring range offset which has to be taken into account when you set the pressure transmitter.

An offset in the measuring range also occurs when combining a remote seal with a transmitter if the latter is not installed at the same height as the former.

Pressure transmitter output

If the level, separation layer or density increase in closed vessels, the differential pressure and hence the output signal of the pressure transmitter also increase.

For an inverted relationship between the differential pressure and the output signal, the start-of-scale and full-scale values of the SITRANS P must be interchanged.

With open vessels, a rising pressure is usually assigned to an increasing level, separation layer or density.

Influence of ambient temperature

Temperature differences between the individual capillaries and between the individual remote seals should be avoided.

Temperature variations in the area of the measuring setup cause a change in volume of the filling liquid and hence measuring errors.

Notes

- For the separation layer measurement, the separation layer has to be positioned between the two spigots. Also you must make sure that the level in the container is always above the top spigot.
- When measuring density, make sure that the level of the medium remains constant. The level should be above the top spigot.

Possible combinations of pressure transmitters and remote seals

Type of installation	Pressure transmitters	Remote seals
A/B	7MF4010	7MF4900
	7MF4013	7MF4910
	7MF4033	7MF4920
	7MF4034	
	7MF4035	
C ₁ and C ₂	7MF4233	7MF4900
	7MF4234	7MF4910
	7MF4235	7MF4920
		(vacuum-proof design in each case)
	7MF4333	7MF4901
	7MF4334	7MF4921
	7MF4335	
D	7MF4433	7MF4903
	7MF4434	7MF4923
	7MF4435	
E	7MF4433	7MF4913
	7MF4434	
	7MF4435	
G, H and J	7MF4433	7MF4903
	7MF4434	7MF4923
	7MF4435	

SITRANS P measuring instruments for pressure

Remote seals

Measuring setups with remote seals

Dimensional drawings

Types of installation for pressure and level measurements (open vessels)

Installation type A

Pressure transmitter above the measuring point
 $H_1 \leq 7 \text{ m (23 ft)}$, with halocarbon oil as filling liquid only $H_1 \leq 4 \text{ m (13.1 ft)}$

Installation type B

Pressure transmitter below the measuring point

Installation type A

Start-of-scale: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_1$

Full-scale: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_1$

Installation type B

Start-of-scale: $p_{MA} = \rho_{FL} \cdot g \cdot H_U + \rho_{Oil} \cdot g \cdot H_1$

Full-scale: $p_{ME} = \rho_{FL} \cdot g \cdot H_O + \rho_{Oil} \cdot g \cdot H_1$

Legend

p_{MA} Start-of-scale value to be set

p_{ME} Full-scale value to be set

ρ_{FL} Density of medium in vessel

ρ_{Oil} Density of filling oil in the capillary to the remote seal

g Local acceleration due to gravity

H_U Start-of-scale value

H_O Full-scale value

H_1 Distance between vessel flange and pressure trans.

Types of installation for absolute level measurements (closed vessels)

Installation type C₁

Installation type C₂

Installation type C₁ and C₂

Start-of-scale: $p_{MA} = p_{START} + \rho_{Oil} \cdot g \cdot H_1$

Full-scale: $p_{ME} = p_{END} + \rho_{Oil} \cdot g \cdot H_1$

Legend

p_{MA} Start-of-scale value to be set

p_{ME} Full-scale value to be set

p_{START} Start-of-scale value

p_{END} Full-scale value

ρ_{Oil} Density of filling oil in the capillary to the remote seal

g Local acceleration due to gravity

H_1 Distance between vessel flange and pressure trans.

Pressure transmitter for absolute pressure always below the measuring point: $H_1 \geq 200 \text{ mm (7.9 inch)}$

Type of installation for differential pressure and flow measurements

Installation type D Filter monitoring

Installation type D

Start-of-scale: $p_{MA} = p_{START} - \rho_{Oil} \cdot g \cdot H_V$

Full-scale: $p_{ME} = p_{END} - \rho_{Oil} \cdot g \cdot H_V$

Legend

p_{MA} Start-of-scale value to be set

p_{ME} Full-scale value to be set

p_{START} Start-of-scale value

p_{END} Full-scale value

ρ_{Oil} Density of filling oil in the capillary to the remote seal

g Local acceleration due to gravity

H_V Distance between the measuring points (spigots)

SITRANS P measuring instruments for pressure

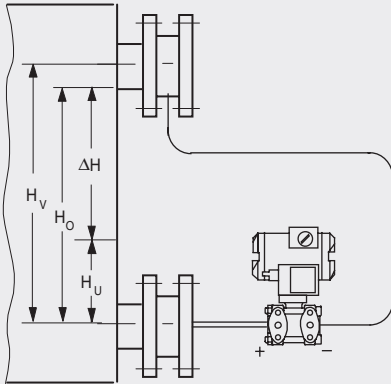
Remote seals

Measuring setups with remote seals

2

Types of installation for level measurements (closed vessels)

Installation type E



Installation type E

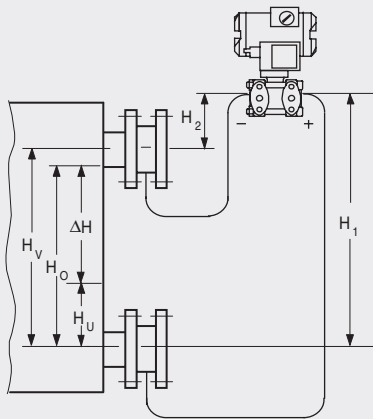
Start-of-scale: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_V$

Full-scale: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_V$

Legend

- p_{MA} Start-of-scale value to be set
- p_{ME} Full-scale value to be set
- ρ_{FL} Density of medium in vessel
- ρ_{Oil} Density of filling oil in the capillary to the remote seal
- g Local acceleration due to gravity
- H_U Start-of-scale value
- H_O Full-scale value
- H_V Distance between the measuring points (spigots)

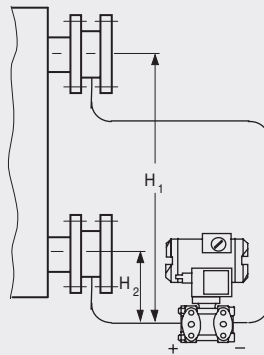
Installation type G



Pressure transmitter for differential pressure above the upper measuring point, no vacuum

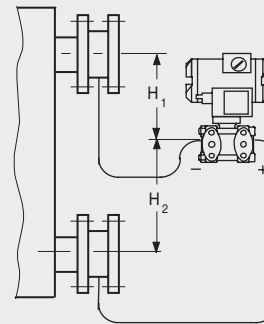
$H_1 \leq 7$ m (23 f), with halocarbon oil as filling liquid only $H_1 \leq 4$ m (13.1 ft)

Installation type H



below the lower measuring point

Installation type J



between the measuring points, no vacuum

$H_2 \leq 7$ m (23 ft), with halocarbon oil as filling liquid only $H_2 \leq 4$ m (13.1 ft)

Installation type G, H and J

Start-of-scale: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_V$

Full-scale: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_V$

Legend

- p_{MA} Start-of-scale value to be set
- p_{ME} Full-scale value to be set
- ρ_{FL} Density of medium in vessel
- ρ_{Oil} Density of filling oil in the capillary to the remote seal
- g Local acceleration due to gravity
- H_U Start-of-scale value
- H_O Full-scale value
- H_V Distance between the measuring points (spigots)

SITRANS P measuring instruments for pressure

Remote seals

Measuring setups without remote seals

Overview

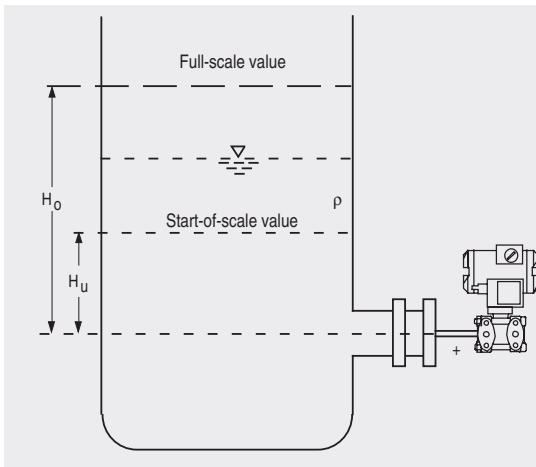
Notes

- For the separation layer measurement, the separation layer has to be positioned between the two spigots. Also you must make sure that the level in the container is always above the top spigot.
- When measuring density, make sure that the level of the medium remains constant. The level should be above the top spigot.

Dimensional drawings

Pressure transmitters for differential pressure, for flanging

Measuring setups for open containers



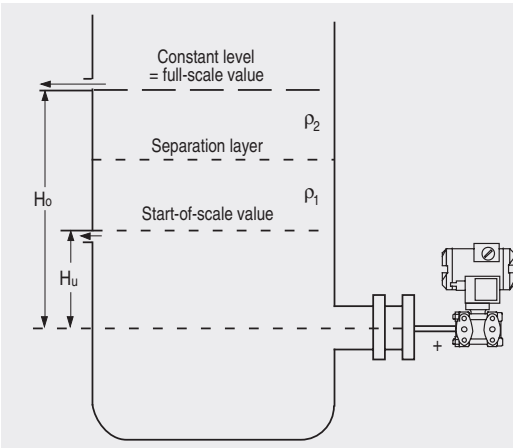
Level measurement

$$\text{Start-of-scale: } p_{MA} = \rho \cdot g \cdot H_U$$

$$\text{Full-scale: } p_{ME} = \rho \cdot g \cdot H_O$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value



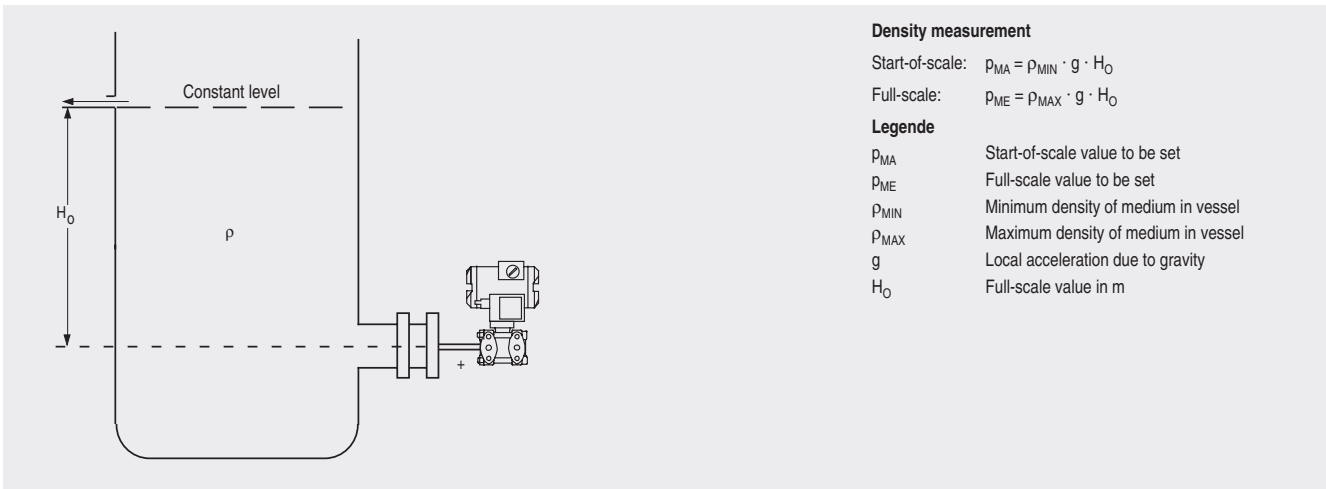
Separation layer measurement

$$\text{Start-of-scale: } p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2)$$

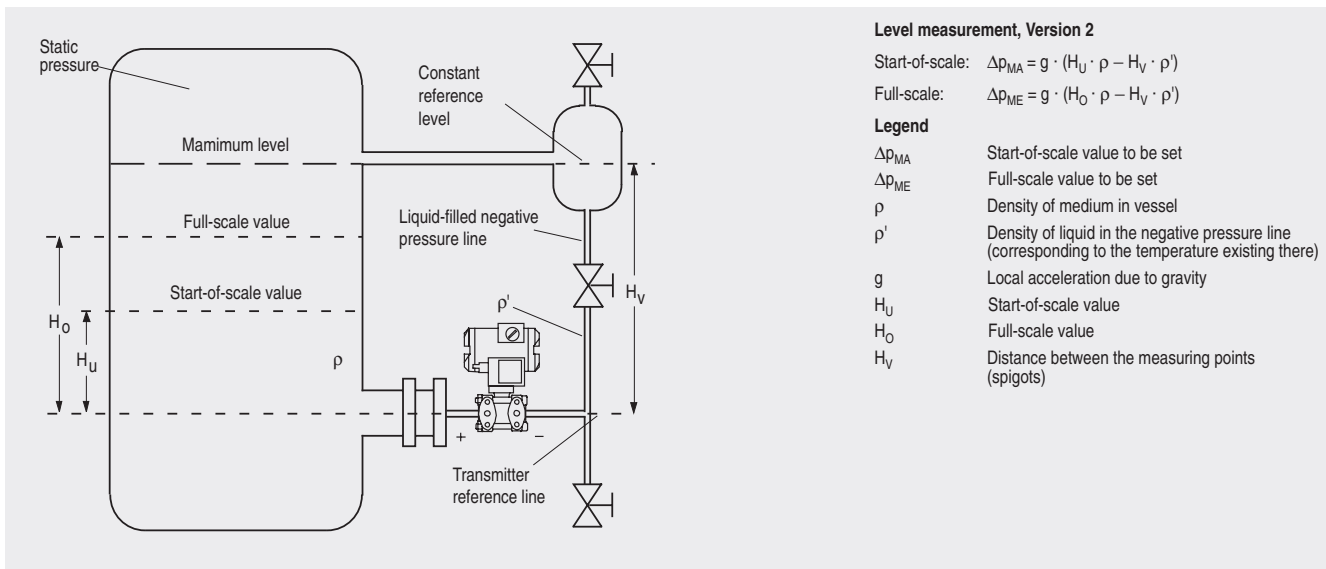
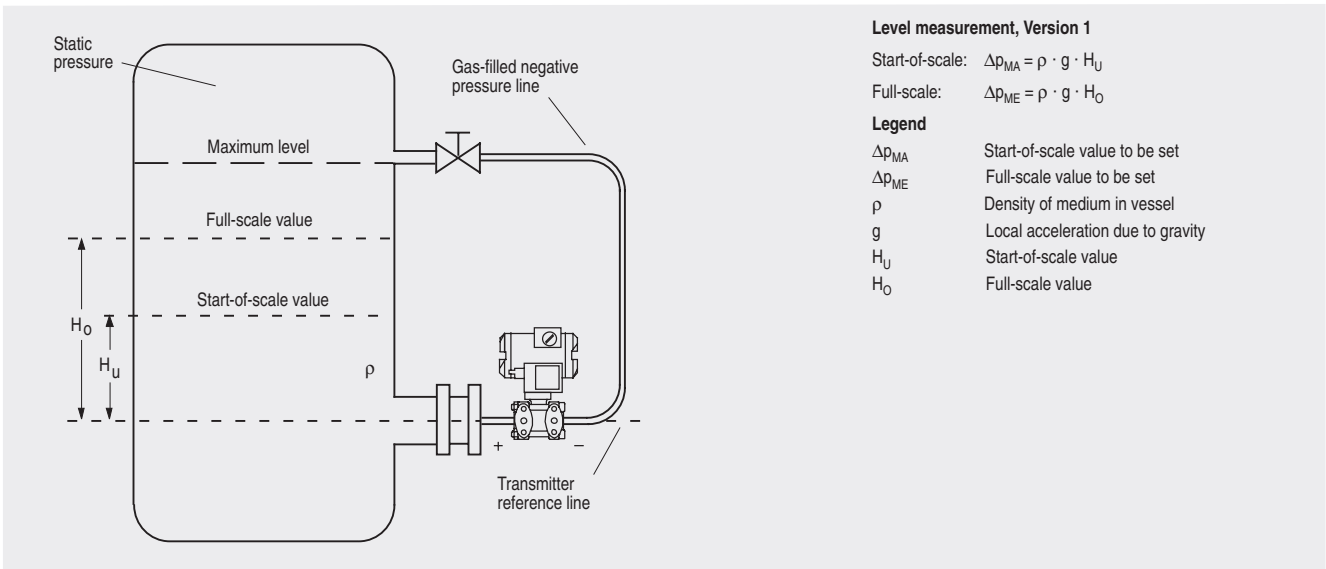
$$\text{Full-scale: } p_{ME} = \rho_1 \cdot g \cdot H_O$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_1	Density of heavier liquid
ρ_2	Density of lighter liquid
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value



Measuring setups for closed containers



Checking of transmitter/remote seal combinations

2

* Customer: _____ Tag. No.: _____
 * Plant: _____ Item No.: _____
 * Ordering code: _____ Person responsible: _____
 * Ordering department: _____ Phone: _____
 * **Transmitter Order No.:** 7MF 4 □□□ -1 □□□□ -1 □□□

Order No. of transmitter known?

Yes No

*** Order No. of remote seal:**
 7MF 4 9 □□ - □□□□□ - □□ -Z
 Suffixes _____
 Suffixes _____

*** Or without Order No.: Process connection**

* Standard: _____
 * Nominal diameter: _____
 * Nominal pressure: _____
 * Constructional design:
 Sandwich-type rem. seal
 Flanged remote seal
 Quick-release remote seal
 Clamp-on seal
 Other.: _____
 * Connection:
 Direct connection
 Capillary on one side; connection to:
 + side - side
 Capillaries on both sides;
 Capillary length: ___ m
 Yes No
 * Vacuum-proof design
 * Wetted parts materials: _____
 * Tube: No Yes, ___mm long
 * Filling liquid: _____
 * Miscellaneous: _____

Calculation of measuring range necessary?

No Yes

*** Range to be set:**
 (without calculation)
Start-of-scale: _____ mbar (4 mA)
Full-scale: _____ mbar (20 mA)
*** Required measuring accuracy:**
Error: < . % of set span per 10 V change in temperature

Please fill in this questionnaire and enclose with every order!

Medium _____
Density of medium: _____ kg/m³
*** Temperature of medium:** Normal _____ °C
 Minimum _____ °C
 Maximum _____ °C
*** Ambient temperature on capillaries:** Normal _____ °C
 Minimum _____ °C
 Maximum _____ °C
*** Ambient temperature on transmitter:** Normal _____ °C
 Minimum _____ °C
 Maximum _____ °C
*** Operating pressure referred to absolute zero:** _____ bar_{abs}
*** Does a vacuum occur during startup?** No Yes
 If yes, associated temperature of medium: _____ °C
*** Installation type,** see pages 2/144 and 2/145 [A] [B] [C₁] [C₂] [D]
[E] [G] [H] [J]
*** Measuring range:** With install. types A, B, C₁, C₂ and D: from ___ to ___ mbar
 With install. types A, B, G, H and J: H_U = ___ mm; H_O = ___ mm
*** Dimensions:** With install. types A, B, C₁ and C₂: H₁ = ___ mm
 With install. types D, G, H and J: H_V = ___ mm
*** Start-of-scale value following calculation:** _____ mbar (4 mA)
Full-scale value following calculation: _____ mbar (20 mA)
Associated span: _____ mbar
Error to be expected: < . % of set span per 10 K change in temperature

Checked: Name: _____
 Department: _____
 Date: _____

Checking of transmitter/remote seal combinations

2

* Customer: _____ Tag. No.: _____
 * Plant: _____ Item No.: _____
 * Ordering code: _____ Person responsible: _____
 * Ordering department: _____ Phone: _____
 * **Transmitter Order No.:** 7MF 4 □□□ -1 □□□□ -1 □□□

Order No. of transmitter known?

Yes No

*** Order No. of remote seal:**
 7MF 4 9 □□ - □□□□□ - □□ -Z
 Suffixes _____
 Suffixes _____

*** Or without Order No.: Process connection**

* Standard: _____
 * Nominal diameter: _____
 * Nominal pressure: _____
 * Constructional design:
 Sandwich-type rem. seal
 Flanged remote seal
 Quick-release remote seal
 Clamp-on seal
 Other.: _____
 * Connection:
 Direct connection
 Capillary on one side; connection to:
 + side - side
 Capillaries on both sides;
 Capillary length: ___ ft
 Yes No
 * Vacuum-proof design _____
 * Wetted parts materials: _____
 * Tube: No Yes, ___ inch long
 * Filling liquid _____
 * Miscellaneous _____

Calculation of measuring range necessary?

No Yes

*** Range to be set:**
 (without calculation)
Start-of-scale: _____ psi (4 mA)
Full-scale: _____ psi (20 mA)
*** Required measuring accuracy:**
Error: < . % of set span per 18 °F change in temperature

Please fill in this questionnaire and enclose with every order!

Medium _____
Density of medium: _____ kg/m³
*** Temperature of medium:** Normal _____ °F
 Minimum _____ °F
 Maximum _____ °F
*** Ambient temperature on capillaries:** Normal _____ °F
 Minimum _____ °F
 Maximum _____ °F
*** Ambient temperature on transmitter:** Normal _____ °F
 Minimum _____ °F
 Maximum _____ °F
*** Operating pressure referred to absolute zero:** _____ psi_{abs}
*** Does a vacuum occur during startup?** No Yes
 If yes, associated temperature of medium: _____ °F
*** Installation type,** see pages 2/144 and 2/145 [A] [B] [C₁] [C₂] [D]
[E] [G] [H] [J]
*** Measuring range:** With install. types A, B, C₁, C₂ and D: from ___ to ___ psi
 With install. types A, B, G, H and J: H_U = ___ inch; H_O = ___ inch
*** Dimensions:** With install. types A, B, C₁ and C₂: H₁ = ___ inch
 With install. types D, G, H and J: H_V = ___ inch
*** Start-of-scale value following calculation:** _____ psi (4 mA)
Full-scale value following calculation: _____ psi (20 mA)
Associated span: _____ psi
Error to be expected: < . % of set span per 18 °F change in temperature

Checked: Name: _____
 Department: _____
 Date: _____