Huba Control

FOR FINE PRESSURE AND FLOW MEASUREMENT

Product Catalogue

Pressure transmitter

Pressure level transmitter

Pressure switch

Pressure measuring cells

Flow sensor

Force cells

Digital indicating devices

Since 1945 your qualified partner


(Huba Control 1956)

1945	Huba Control AG founded
1974	Taken over by Stäfa Control System AG
1990	Concentration on pressure measurement technology
1995	ISO 9001 Certification
2005	Automotive standard ISO/TS 16949 Accreditation Accredidation acc. ISO/IEC 17025
2006	Factory Extension Completed
2008	Automotive standard ISO/TS 16949 certification
2010	Certification acc. ISO 14001
2012	Certification acc. ISO 18001 (Managment of employment protection)

CONTENT

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Huba Control

FOR FINE PRESSURE AND FLOW MEASUREMENT

Huba Control AG develops, manufactures and markets components designed exclusively for the measurement of pressure and flow.

1 mbar ... 1000 bar
0.5 ... 240 l/min

View the latest data sheets, operating instructions and certificates at

www.hubacontrol.com

Market performance

With its clear focus on pressure measurement technology Huba Control is able to develop innovative products across a very broad spectrum, covering an extensive range of applications for the optimisation of machine, system and plant processes.

Sales engineers at the headquarters in Switzerland, in our own branch offices in Germany, France, United Kingdom and Netherlands as well as representatives all over the world guarantee the optimum in technical advice.

Production competence

Huba Control production department is designed for the assembly, setting and adjustment of pressure switches and pressure transmitters. The individual stages of the process are carried out with varying degrees of rationalisation. A key strength is our expertise in complex automated production processes, including automatic adjustment.

Quality - Security - Environment

We achieve the requirements for the conversion of our strategy, company policy and targets with our integrated process orientated management system complying to the legal obligations in force an further demands.
With well managed processes and our skilled employees we master the quality, environment and security demands.

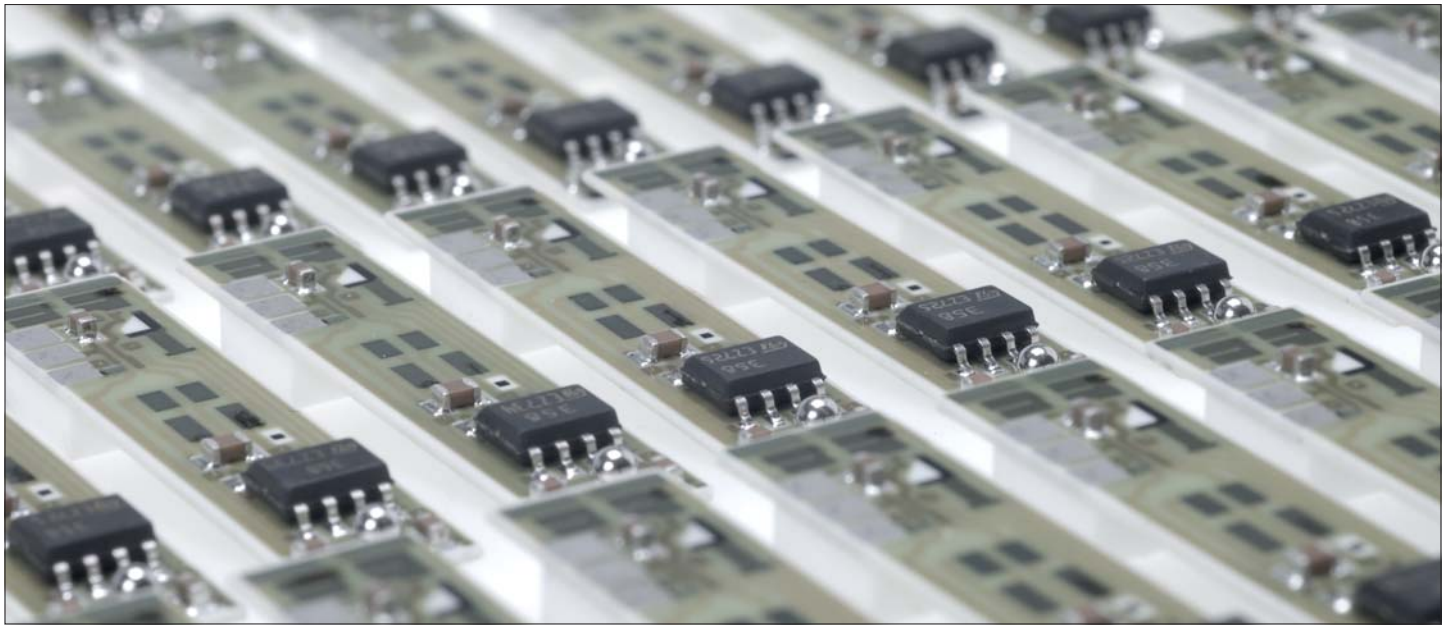
The philosophy of our employees is:
«I steadily improve and aspire to make no mistakes.»

Certifications

ISO 9001 Certification
ISO/TS 16949 Certification
ISO/IEC 17025 Accredidation
ISO 14001 Certification
OHSAS 18001 Certification

Cantilevered ceramic beam technology from Huba Control

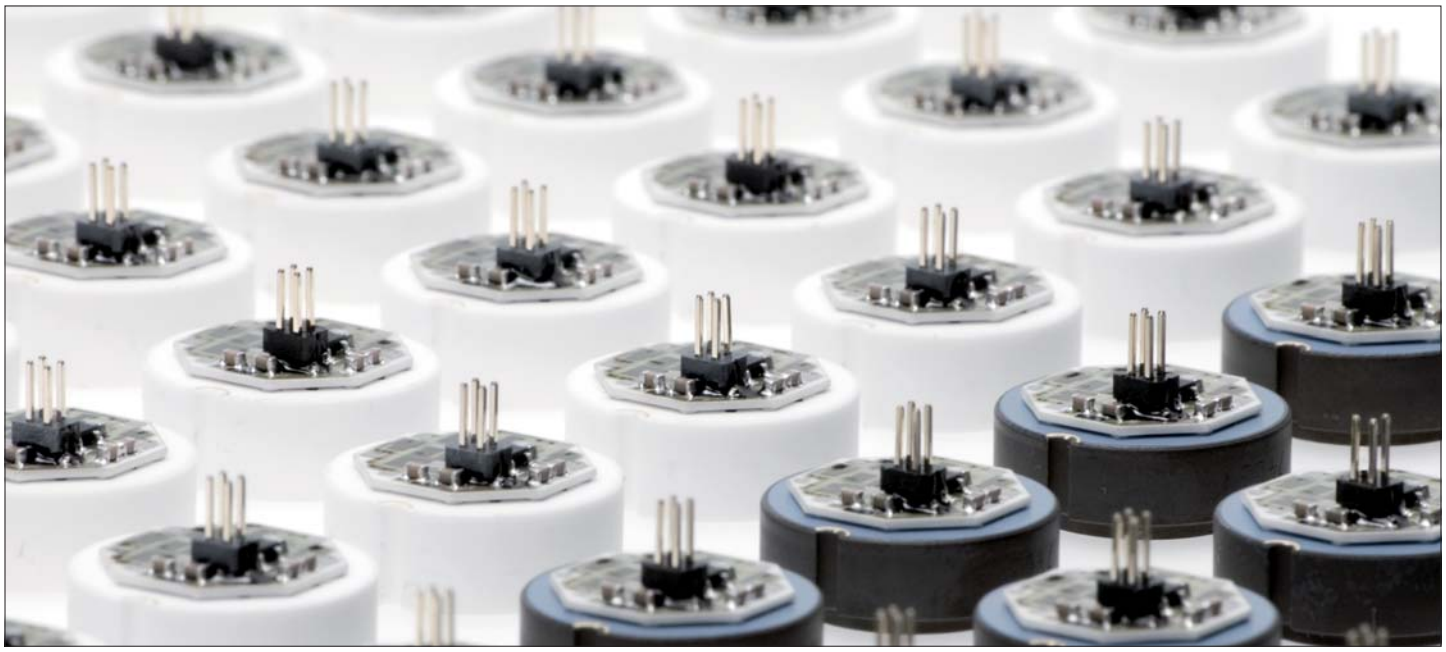
The excellent synergy of our unique diaphragm in combination with our ceramic cantilever beam sensors allow us to produce transmitters with long term stability for very fine measurement in the Pascal range. This technology has been proven on millions of sensors in many different applications.



Pressure measuring cell technology from Huba Control

The in-house development and production of pressure measuring cells in combination with the excellent electronic design allows the production of innovative pressure transmitters. Huba Control draws on over 20 years experience in the use of ceramic technology.

The products are proven millionfold in various applications.

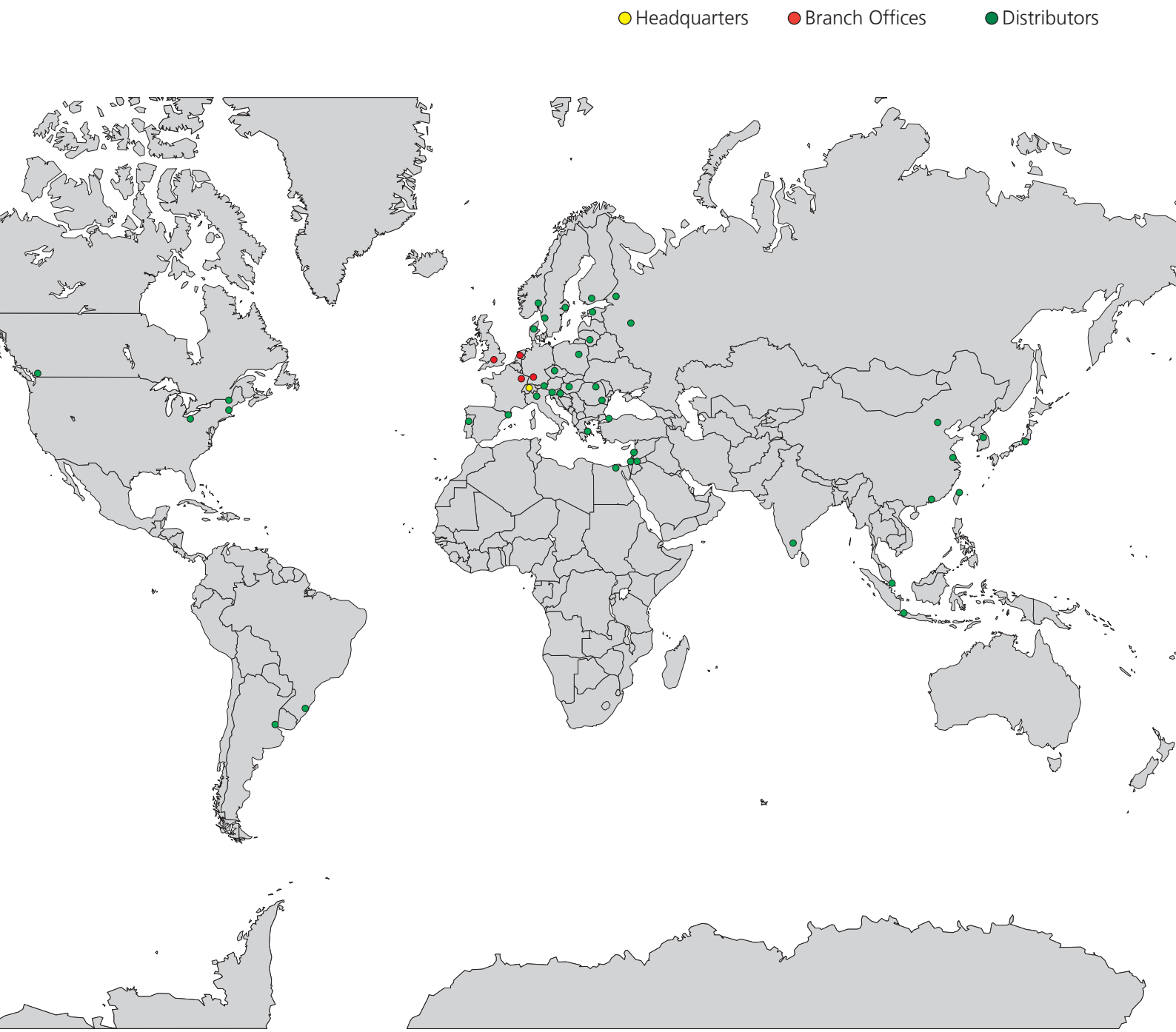


Markets and presence

The target market for Huba pressure and flow measurement technology is divided into several sectors based upon application as special pressure sensors for Industrial automation (INDUSTRY) or components for gas boilers (GAS), heating, ventilation and air conditioning (HVAC) and automotive industry.

Huba Control is the market leader in the GAS BOILER and HVAC sectors. 97% of our products are exported. Over 49 specialist agents and own sales engineers in Germany, France, United Kingdom and Netherlands, allow us to expand our market presence continually.

Huba's production department is designed for the assembly, balancing and adjustment of pressure switches and pressure transmitters. The individual stages of the process are carried out with varying degrees of rationalisation (fully, semi and partially automated manufacture) depending on the quantities involved. A key strength is our mastery of complex automated routines, including automatic calibration, manufacture of one-off products and large-scale production runs, and the maintenance of short throughput times.



OEM Relative pressure transmitter type 400

Pressure range
0 ... 10 – 100 mbar

The type 400 pressure transmitter, with its proven ceramic lever technology, has adjusted temperature compensated sensor signals and is available with a voltage output.
The voltage output (VDC) is an amplified, linear signal suitable for direct processing in electronic control systems. The sensors are ideal for continuous level measurement in washing machines, dishwashers etc.

- Robust construction, sensor element has no contact with media
- Special design developed for large scale manufacture at an attractive price
- Fully automated manufacture, including in-line adjustment of zero point and full scale value
- Special snap mounting bracket for easy single handed mounting in sheet steel of varying thicknesses

Technical Overview

Pressure range [1]

Relative	0 ... 10 – 100 mbar

Operating conditions

Medium		Liquids and neutral gases
Temperature	Medium / ambient	0 ... +70 °C
	Storage	-10 ... +70 °C
Tolerable overload		200 mbar
Rupture pressure		500 mbar
Leak rate		< 0.2 cm³/h (Air)

Materials in contact with the medium

Cover	Polypropylene
Diaphragm	Thermoplastic elastomer

Electrical overview

Output / Power supply [2]	ratiom. 10 ... 70%	5 VDC ±5%
Load		> 50 kOhm / < 10 nF
Current consumption	At nominal voltage with 50 kOhm load	< 3 mA
Polarity reversal protection		mechanically protected
Electromagnetic compatibility	The product is designed exclusively for installation in equipment. The customer is responsible for CE conformity.	

Dynamical response

Response time	< 10 ms
Load cycle	< 10 Hz

Protection standard

IP 00

Electrical connections

3-pole plug connector RAST 2.5

Pressure connection

Pipe Ø 6.2 mm

Mounting instruction

Installation arrangement	Diaphragm horizontal (Recommendation)	Pressure connection and electrical connections downward
	Diaphragm vertical (on request)	To be agreed, signal is approx. 0.3 mbar higher than real pressure [3]
Mounting		Snap mounting in sheet steel from 0.9 to 1.5 mm

Weight

~ 17 g

Packaging

Cardboard boxes with blister pack inserts (35 pcs)

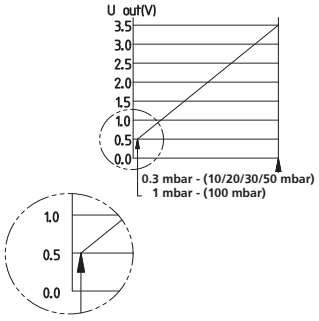
Ordering batches quantities / Transport volumes

Pieces	Execution	Length (cm)	Width (cm)	Height (cm)	Weight (kg)	Blister (35 pcs)
2520	12 boxes per Euro-pallet	120	80	93	103	72
210	1 box	59	39	26	6.9	6

Accuracy

Linearity

Parameter		Unit	10 mbar	20 mbar	30 mbar	50 mbar	100 mbar
Tolerance zero point [4]	max.	% fs	–	± 1.5	± 1.5	± 1.5	± 1.5
Tolerance at 0.5 mbar	max.	% fs	± 1.5	–	–	–	–
Tolerance full scale [4]	max.	% fs	± 2.5	± 2.5	± 1.5	± 1.5	± 1.5
Resolution		% fs	0.1	0.1	0.1	0.1	0.1
Total of linearity, hysteresis and repeatability *at 0.3 mbar (10 ... 50 mbar) and 1 mbar (100 mbar)*		% fs	± 0.5	± 0.5	± 0.5	± 0.5	± 0.5
Long term stability acc. to DIN IEC 60770		% fs	± 1.0	± 1.0	± 0.5	± 0.5	± 0.5
TC zero point [5]	typ.	% fs/10K	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
TC zero point [5]	max.	% fs/10K	± 0.4	± 0.4	± 0.4	± 0.4	± 0.4
TC sensibility [5]	max.	% fs/10K	± 0.2	± 0.2	± 0.2	± 0.2	± 0.4
Positional error [4]		mbar	~ 0.3	~ 0.3	~ 0.3	~ 0.3	~ 0.3
Ratiometric error	typ.	% fs	0.5	0.5	0.5	0.5	0.5
Ratiometric error	max.	% fs	1.0	1.0	1.0	1.0	1.0



Test conditions: 25 °C, 45% rF, Power supply 5 VDC
TK0 / TKE: 0 ... +70 °C

[1] other pressure ranges on request
[2] Other supply voltages and outputs on request.
[3] In Case of condensed water, auto-zero significant.
[4] For changing diaphragm position from horizontal to vertical, approx. 0.3 mbar.
[5] TC = Temperature coefficient

Order code selection table

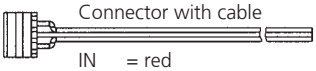
		Order number								
Pressure range	0 ... 10 mbar	4	0	0	.	9	1	1	0	0
	0 ... 20 mbar	4	0	0	.	9	2	1	0	0
	0 ... 30 mbar	4	0	0	.	9	3	1	0	0
	0 ... 50 mbar	4	0	0	.	9	5	1	0	0
	0 ...100 mbar	4	0	0	.	9	7	1	0	0

▲ Full scale signal at these pressure

Accessories [1)]

	Order number
Connector RAST 2.5 with cable 30 cm	111668
Connector RAST 2.5 with cable 110 cm	101817
Connector RAST 2.5 with cable 150 cm	112282
Calibration certificat	104551

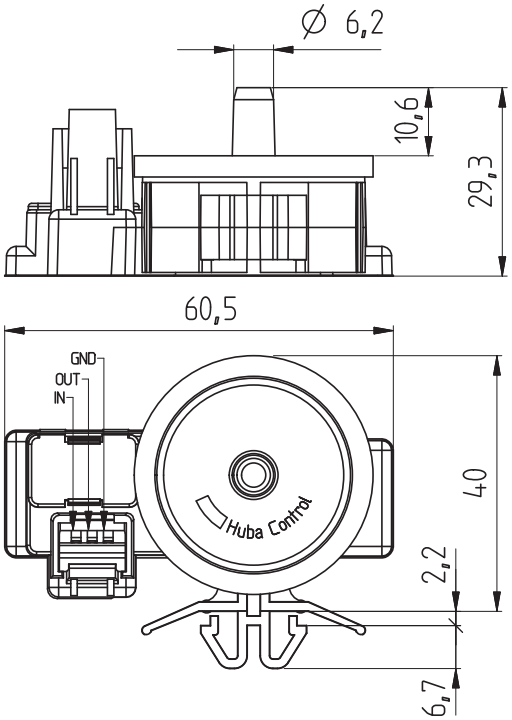
AMP Connector [2)]	Manufacture's Part No.	Colour	for flexible wire
	3-829868-3	grey	7 x 0.20 mm = 0.22 mm² or 12 x 0.20 mm = 0.35 mm²
	1-966194-3	beige	7 x 0.25 mm = 0.35 mm²



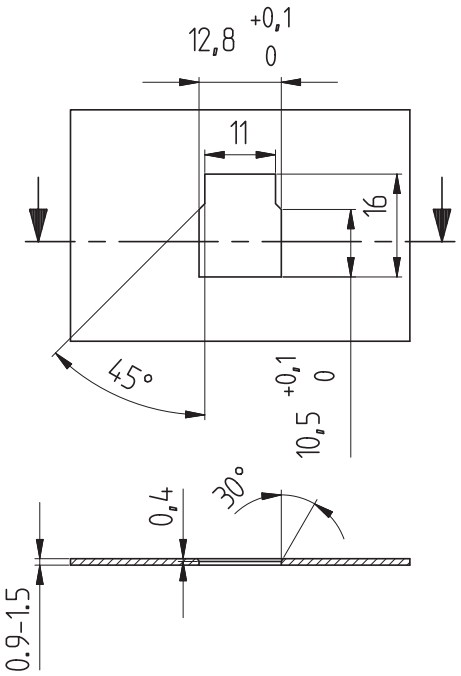
Connector with cable

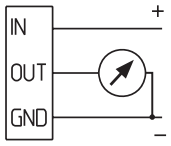
IN = red
OUT = yellow
GND = black

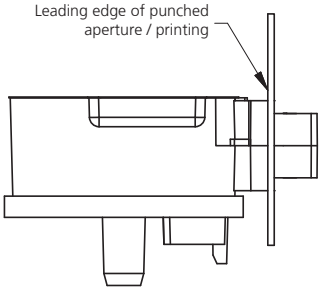
Dimensions in mm / Electrical connections



Hole pattern for mounting (supplied by the customer)







[1)] Accessories supplied loose

[2)] To be ordered separately from original manufacturer. Further information can be found in the manufacturer specification No. 114-18049.

OEM Relative and absolute pressure transmitter type 501

Pressure ranges
-1 ... 0 – 60 bar

Type 501 pressure transmitters, with partially automated production processes, are suitable for larger quantity industrial OEM applications.
Various pressure and electrical connections, together with several standardised output signals, provide suitability for a wide variety of applications.

- Compact construction
- Automated manufacture in large quantities for ideal price / performance ratio
- Robust ceramic sensor technology
- High resistance to extremetemperatures
- No mechanical creepage

Technical overview

Pressure range

Relative	-1 ... 0 – 60 bar
Absolute	0 ... 2.5 – 16 bar

Operating conditions

Medium		Liquids and gases
Temperature	Medium / ambient	-15 ... +80 °C
	Storage	-40 ... +80 °C
Tolerable overload		2 x fs (max. 80 bar)
Rupture pressure	3 x fs (max. 90 bar)	

Materials

Case		PA6
Materials in contact with the medium	Sensor	Ceramic Al_2O_3 (96%)
	Pressure connection	Stainless steel 1.4305 / AISI 303
	Sealing material	FPM, EPDM, NBR, MVQ

Electrical overview

	Output	Power supply	Load	Current consumption[1]
2 wire	4 ... 20 mA	8.0 ... 33 VDC	$< \frac{\text{Supply voltage - 8 V}}{0.02\ \text{A}}$ [Ohm]	< 20 mA
	4 ... 20 mA	10.0 ... 33 VDC	$< \frac{\text{Supply voltage - 10 V}}{0.02\ \text{A}}$ [Ohm]	< 20 mA
3 wire	0 ... 5 V	9.0 ... 33 VDC	> 10 kOhm / < 100 nF	< 5 mA
	1 ... 6 V	10.4 ... 33 VDC	> 10 kOhm / < 100 nF	< 5 mA
	0 ... 10 V	16.2 ... 33 VDC	> 10 kOhm / < 100 nF	< 6 mA
	ratiom. 10 ... 90%	5 VDC ±5%	> 10 kOhm / < 100 nF	< 3 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			

Dynamic response

Response time	< 5 ms
Load cycle	< 50 Hz

Protection standard

IP 65

Electrical connection

Cable 1.5 m
Connector DIN EN 175301-803-A
Connector DIN EN 175301-803-C (industrial standard 9.4 mm)
Connector M12x1

Pressure connection

Inside thread	G ¼ mit O-Ring sealing
Outside thread	¼ -18 NPT
	G ¼, sealed at back, DIN 3852-E
	R ¼ EN 10226
	G ¼, sealed at back and manometer (combi)
	G ½, sealed at back and manometer (combi)

Installation arrangement

Recommened: Pressure connection downwards

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3

Weight

With inside thread	~ 95 g
With ouside thread	~ 110 g
With cable 1.5 m additional	~ 40 g

Packaging (Please state on order)

Single packaging in cardboard
Multiple packaging in cardboard per 25 pcs.

Accuracy

Parameter		Unite	
Tolerance zero point	max.	% fs	± 1.0
Tolerance full scale	max.	% fs	± 1.0
Resolution		% fs	0.1
Total of linearity, hysteresis and repeatability	max.	% fs	± 0.5
Long term stability acc. to DIN EN 60770		% fs	± 1.0
TC zero point [2]	max.	% fs/10K	± 0.4
TC sensitivity [2]	typ.	% fs/10K	- 0.15
TC sensitivity [2]	max.	% fs/10K	- 0.3

Test conditions: 25 °C, 45% RH, power supply 24 VDC
TC z.p. / TC s. -40 ... +80 °C

[1] At nominal pressure
[2] TC = Temperature coefficient

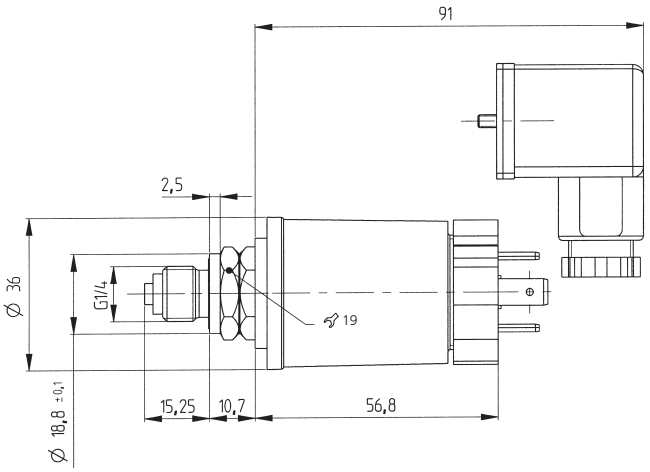
Order code selection table

			1	2	3	4	5	6	7	8	9	10
	501.		X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative		9									
	Absolute		8									
Pressure range	-1 ... 0 bar		9	0	0							
	0 ... 1 bar		9	1	1							
	0 ... 1.6 bar		9	1	2							
	0 ... 2.5 bar			1	4							
	0 ... 4 bar			1	5							
	0 ... 6 bar			1	7							
	0 ... 10 bar			3	0							
	0 ... 16 bar			3	1							
	0 ... 25 bar		9	3	2							
	0 ... 40 bar		9	3	3							
	0 ... 60 bar		9	4	0							
	▲ Full scale signal at these pressures											
Sealing material [1]	FPM	Fluoro elastomer				0						
	EPDM	Ethylene propylene				1						
	NBR	Butadiene Acylonitrile				2						
	MVQ	Silicone polymer				3						
Adjustment	Factory						0					
Output / power supply	0 ... 5 V	9.0 ... 33 VDC						1				
	1 ... 6 V	10.4 ... 33 VDC						6				
	0 ... 10 V	16.2 ... 33 VDC						2				
	4 ... 20 mA	10.0 ... 33 VDC						3				
		8.0 ... 33 VDC						8				
	ratiom. 10 ... 90%	5 VDC ±5%						4				
Electrical connection	Cable 1.5 m								0			
	Connector [2]	DIN EN 175301-803-A							1			
		DIN EN 175301-803-C (industrial standard 9.4 mm)							2			
		M12x1 plastic thread							3			
Pressure connection	Inside thread	G ¼ with O-Ring seal								1		
	Outside thread	¼ - 18 NPT								3		
		G ¼, sealed at back, DIN 3852-E								4		
		R ¼ EN 10226								7		
		G ¼, sealed at back and manometer (combi)								5		
		G ½, sealed at back and manometer (combi)								8		
Pressure tip orifice	Without										1	
	With										2	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 9bar/OUT1...9V)											W

Storage versions

Output	4 ... 20 mA
Power supply	10 ... 33 VDC
Eletrical connection [2]	Connector DIN EN 175301-803-A, IP 65
Pressure connection	G ¼ sealed at back and manometer
Sealing material	FPM - Fluoro elastomer
Colour of cover	black

Pressure range	Order number
-1 ... 0 bar	501.914023151W - 1...0 bar (high overload protection)
0 ... 10 bar	501.930023151
0 ... 25 bar	501.932023151



Female connector
DIN EN 175301-803-A

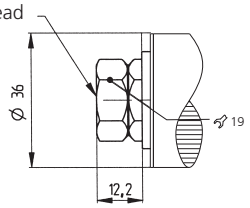
Accessories [3]

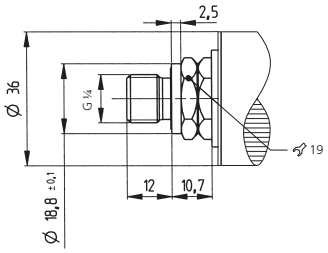
		Order number
Female connector DIN EN 175301-803-A	with seal (IP 65, when installed and latched)	103510
Female connector DIN EN 175301-803-C	with seal (IP 65, when installed and latched)	104244
Female connector M12x1		106975
Calibration certificate		104551

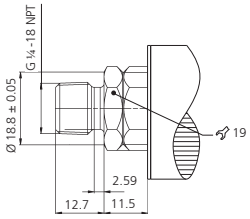
[1] According to ISO standard R 1629, other sealing materials on request
[2] Without female connector
[3] Accessories supplied loose

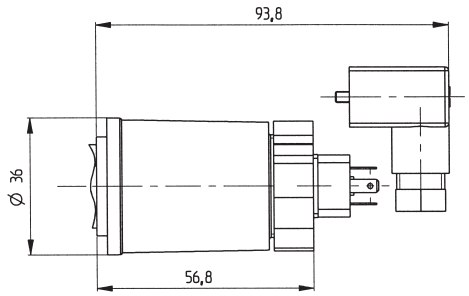
Dimensions in mm / Electrical connections

Inside thread
G ¼

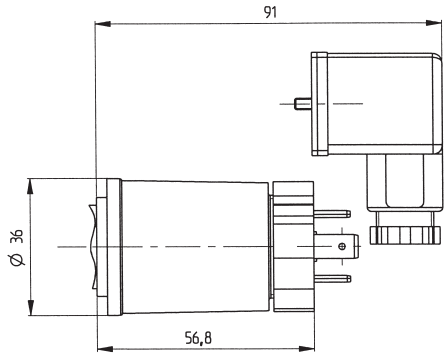






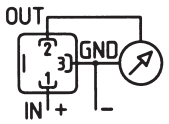


Female connector
DIN EN 175301-803-C

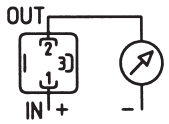


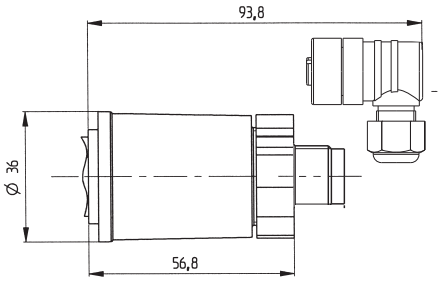
Female connector
DIN EN 175301-803-A

3 wire



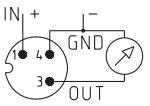
2 wire



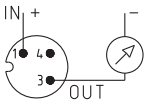


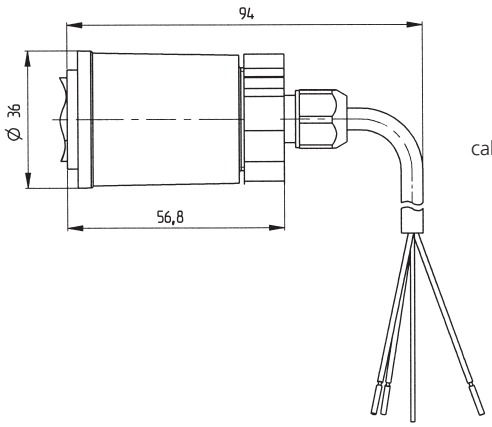
Female connector
M12x1

3 wire



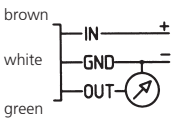
2 wire



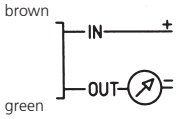


cable

3 wire



2 wire



OEM Relative pressure transmitter type 503

Pressure range
0 ... 2.5 – 25 bar

Type 503 pressure transmitters, with their excellent price / performance ratio, are specially designed for industrial OEM applications.
Partially automated production techniques allow us to produce high quantities, yet retaining the flexibility to offer different versions.

- Partial automatic production, giving ideal price / performance ratio.
- Ideal for use as a control element, owing as a result of a small hysteresis
- Incorporates all the benefits of ceramics technology for industrial applications

Technical overview

Pressure range			
Relative			0 ... 2.5 – 25 bar
Operating conditions			
Medium			
Temperature		Medium	+2 ... +90 °C
		Ambient	+10 ... +60 °C
		Storage	-30 ... +85 °C
Overload admissible			2 x fs
Rupture pressure			3 x fs (max. 50 bar)
Materials			
Housing material	ABS for cover with connector RAST 2.5		ABS
	PA 6 for cover with connector DIN or cable		PA 6
Materials in contact with the medium		Sensor	Ceramic Al_2O_3 (96%)
		Pressure connector	Grivory GV 5H or Noryl GTX 20% GF
		Sealing material	FPM, EPDM, NBR

Electrical overview

	Output	Power supply	Load	Current consumption
2 wire	4 ... 20 mA	10.0 ... 33 VDC	$< \frac{\text{supply voltage - 10 V}}{0.02\ \text{A}}$ [Ohm]	< 20 mA
3 wire	0 ... 5 V	9.0 ... 33 VDC	> 10 kOhm / < 100 nF	< 5 mA
	0 ... 10 V	16.2 ... 33 VDC	> 10 kOhm / < 100 nF	< 5 mA
	ratiom. 10 ... 90%	5 VDC ±5%	> 10 kOhm / < 100 nF	< 5 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. For connector versions mechanical protection only. The correct wiring acc. to the scheme has to be guaranteed by the OEM-customer.			
Electromagnetic compatibility	The product is designed exclusively for installation in equipment. The customer is responsible for CE conformity.			

Dynamic response		
Response time		< 5 ms
Load cycle		< 50 Hz
Protection standard		
With connector RAST 2.5		IP 00
With DIN connector or cable 1.5 m		IP 54
Electrical connections		
DIN connector EN 175301-803-A		
Cable 1.5 m		
Connector RAST 2.5		
Pressure connections		
Outside thread	G ⅜ seal at front	Grivory GV 5H
	G ⅜ seal at back	Grivory GV 5H
	G ¼ seal at back	Grivory GV 5H
Plug connector	(to max. 6 bar nominal pressure)	Grivory GV 5H
Mounting instructions		
Installation arrangement		Unrestricted
Starting torque G ⅜	min. 0.4 Nm / max. 0.8 Nm	Destruction > 30 Nm
Weight		
With connector RAST 2.5		~ 41 g
With connector DIN		~ 55 g
With cable		~ 95 g
Packaging		
Multiple packaging Cardboard boxes with blister pack inserts		per 240 pcs.
		per 600 pcs.

Accuracy

Parameter		Unit	
Tolerance zero point	max.	% fs	± 1.5
Tolerance full scale	max.	% fs	± 1.5
Resolution		% fs	0.1
Total of linearity, hysteresis and repeatability		% fs	± 1.0
Long term stabilitiy acc. DIN EN 60770		% fs	± 0.5
TC zero point [1]	max.	% fs/10K	± 0.6
TC sensitivity [1]	max.	% fs/10K	± 0.15

Test conditions: 25 °C, 45% RH, power supply 24 VDC / 5 VDC
TK0 / TKE 2 ... 85 °C

[1] TC = Temperature coefficient

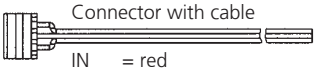
Order code selection table

				1	2	3	4	5	6	7	8	9
			503.	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... 2.5 bar			9	1	4						
	0 ... 4 bar			9	1	5						
	0 ... 6 bar			9	1	7						
	0 ... 10 bar			9	3	0						
	0 ... 16 bar			9	3	1						
	0 ... 25 bar			9	3	2						
	▲ Fullscale signal at these pressures											
Sealing material [2]	FPM	Fluoro-elastomer					0					
	EPDM	Ethylene propylene					1					
	NBR	Butadiene Acylonitrile					2					
Adjustment	Factory							0				
Output / power supply	0 ... 5 V	9.0 ... 33 VDC							3			
	0 ... 10 V	16.2 ... 33 VDC							4			
	4 ... 20 mA	10.0 ... 33VDC							5			
	ratiom. 10 ... 90%	5 VDC ±5%							6			
Electrical connection [3]	Connector	RAST 2.5								6	0	
		DIN EN 175301-803-A								1		
	Cable 1.5 m									2		
Pressure connection	Outside thread	G ⅜, seal at front	Grivory GV 5H		1						0	
		G ⅜, seal at back	Grivory GV 5H								1	
		G ¼, seal at back	Grivory GV 5H		3						3	
	Plug connector	(to max. 6 bar measuring range)	Noryl GV 5H		1			1			2	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 9bar/OUT1...9V)											W

Accessories [4]

	Order number
Safety spring for plug connector	105883
Female connector DIN EN 175301-803-A with sealing	103510
Female connector RAST 2.5 with cable 1450 mm	103167
Calibration Certificate	104551

AMP connector [5]	Manufacturer's Part No.	Colour	For flexible wire
	3-829868-3	grey	7 x 0.20 mm = 0.22 mm² or 12 x 0.20 mm = 0.35 mm²
	1-966194-3	beige	7 x 0.25 mm = 0.35 mm²

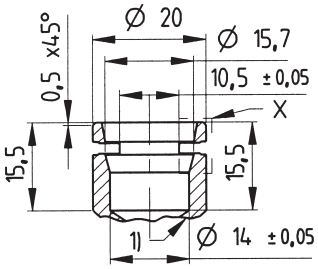


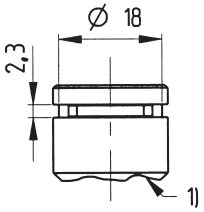
Connector with cable

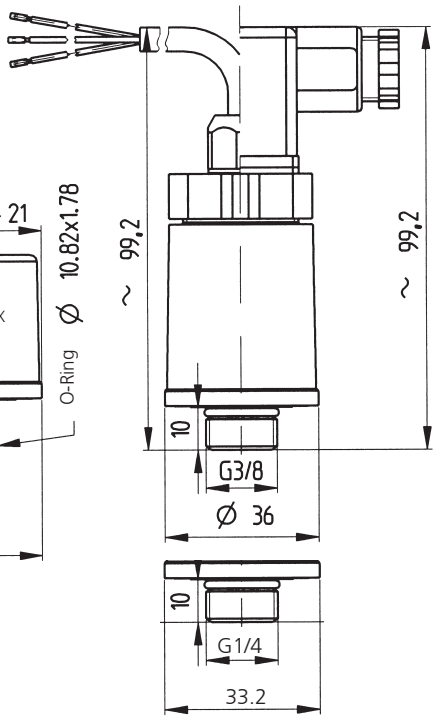
IN = red
OUT = yellow
GND = black

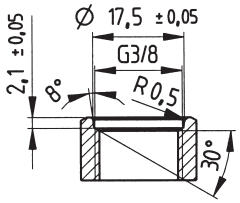
[1] Other pressure ranges on request
[2] According to ISO standard R 1629, other sealing materials on request
[3] Delivery without female connector
[4] Accessories supplied loose
[5] To be ordered separately from original manufacturer. Further information can be found in the manufacturer specification No. 114-18049

Dimensions in mm / Electrical connections

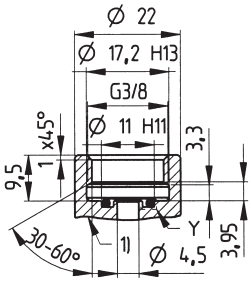




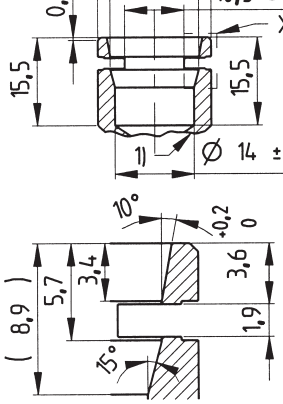




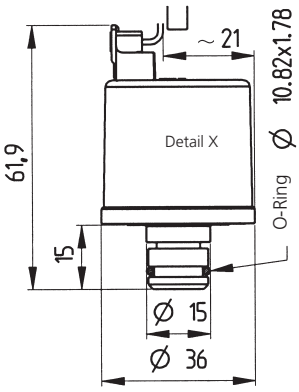
Counter part G 3/8 sealed at back

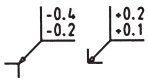


Counter part G 3/8 sealed at front

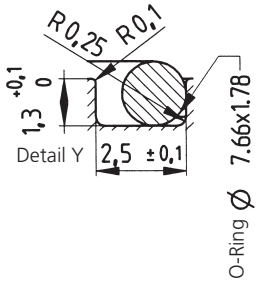


Counter part for plug connector

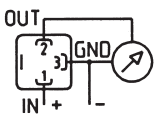




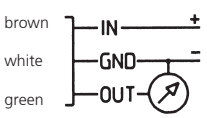
1) Bottom variable!



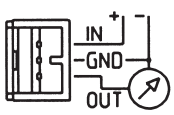
3 wire



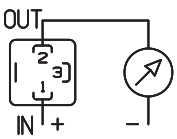
3 wire



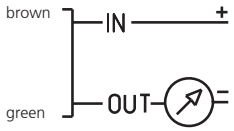
3 wire



2 wire



2 wire



OEM relative pressure transmitter type 505

Pressure range
0 ... 4 – 16 bar

Type 505 pressure transmitters are particularly suitable for measuring water pressure rates in heating and industrial circular flow.

Due to partially automated manfacturing we are able to handle customer orders in high quantities.

- Best price / performance ratio through:
  – electronic integrated in measuring element
  – optimised mounting concept
  – automatic production
- Ideal for use as a control element, owing to small hysteresis
- The measuring element includes the well proven ceramic technology of Huba Control AG.

Technical overview

Pressure range

Relative	0 ... 4 – 16 bar

Operating conditions

Medium		Liquids and not aggressive gases
Temperature	Medium	+2 ... +90 °C
	Ambient	+2 ... +85 °C
	Storage	-30 ... +85 °C
Tolerable overload	≤ 4 bar	8 bar
	> 4 bar	20 bar
Rupture pressure	≤ 4 bar	12 bar
	> 4 bar	25 bar

Materials

Case		Plastic thermoplast
Materialien in contact with the medium	Pressure connection	Fibre reinforced plastic
	Sensor	Ceramic Al_2O_3 (96%)
	Sealing material	EPDM (Ethylene propylene)

Electrical overview

Output	Power supply	Load	Current consumption [1]
0.5 ... 3.5 V	8.5 ... 30 VDC	> 10 kOhm / < 100 nF	< 7 mA
Ratiom. 10 ... 70%	5 VDC ±5%	> 10 kOhm / < 100 nF	< 4 mA
Ratiom. 10 ... 50%	5 VDC ±5%	> 10 kOhm / < 100 nF	< 4 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.		
Electromagnetic compatibility	The product is designed exclusively for installation in equipment.The customer is responsible for CE conformity.		

Dynamic response

Response time	< 5 ms
Load cycle	< 50 Hz

Protection standard

IP 00

Pressure connection

Connection plug fitting		Standard
		Form 2
		Form 3
		Form 4
Outside thread	G ¼	without orifice
	G ⅜	
	G ⅜	material admission for portable water ≤ 85 °C
	G ⅜	with bedstop for plug value
	G ⅜	without orifce
	G ⅜	with bedstop for plug value without orifce

Electrical connection

Connector RAST 2.5

Installation arrangement

Recommended: Electrical connection upwards

Tests / Admissions

Shock acc. to DIN IEC 60068-2-27	40 *g*, 11 ms half sine wave, all directions. Free fall from 1 m on concrete.
Vibration acc. to DIN IEC 60068-2-6	5 *g*, 2 ... 2000 Hz

Weight

~ 30 g

Packaging

Bulk cargo in cardboard boxes on Euro pallet (500 pcs.)

Accuracy

Parameter		Unit	
Tolerance zero point	max.	% FS	± 1.5
Tolerance full scale	max.	% FS	± 1.5
Resolution		% FS	0.1
Total of linearity, hysteresis and repeatability	max.	% FS	± 1.0
Long term stabilitiy acc. to DIN EN 60770		% FS	± 0.5
TC zero point [3]	typ.	% FS/10K	± 0.6 [4]
TC sensitivity [3]	typ.	% FS/10K	± 0.15
Ratiometric error [5]	typ.	% FS	± 0.5

Test conditions: 25 °C, 45% RH, power supply 24 VDC / 5 VDC
TC z.p. / TC s. 2 ... +80 °C

[1] At nominal pressure
[2] Ratiometric version only through the electrical connector mechanically protected.
[3] TC = Temperature coefficient
[4] ≥10 bar = max. ±1.0 % FS/10K
[5] At ratiometric version only

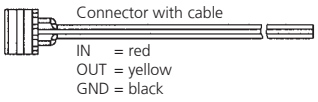
Variantenplan

			1	2	3	4	5
	505.		X	X	X	X	X
Pressure range [1]	0 ... 4 bar		9	1	5		
	0 ... 10 bar	material admission for drinking water ≤ 85 °C	9	3	0	7,B	2
	0 ... 12 bar	material admission for drinking water ≤ 85 °C	9	3	B	7,B	
	0 ... 16 bar ▲ Full scale signal at this pressure	material admission for drinking water ≤ 85 °C	9	3	1	7,B	
Pressure connection	Connection plug fitting standard				5	3	
	Connection plug fitting standard	without orifice			5	9	
	Connection plug fitting form 2				5	2	
	Connection plug fitting form 3				5	1	
	Connection plug fitting form 4	without orifice			5	A	
	Outside thread G ⅜				5	4	
	Outside thread G ⅜	material admission for drinking water ≤ 85 °C			5	5	
	Outside thread G ⅜	with needle valve			5	6	
	Outside thread G ⅜	without orifice				7	
	Outside thread G ⅜	with with needle valve without orifice			5	8	
	Outside thread G ¼	without orifice				B	
Output / power supply	0.5 ... 3.5 V	8.5 ... 30 VDC					0
	ratiom. 10 ... 70%	5 VDC ±5%					1
	ratiom. 10 ... 50%	5 VDC ±5%					2

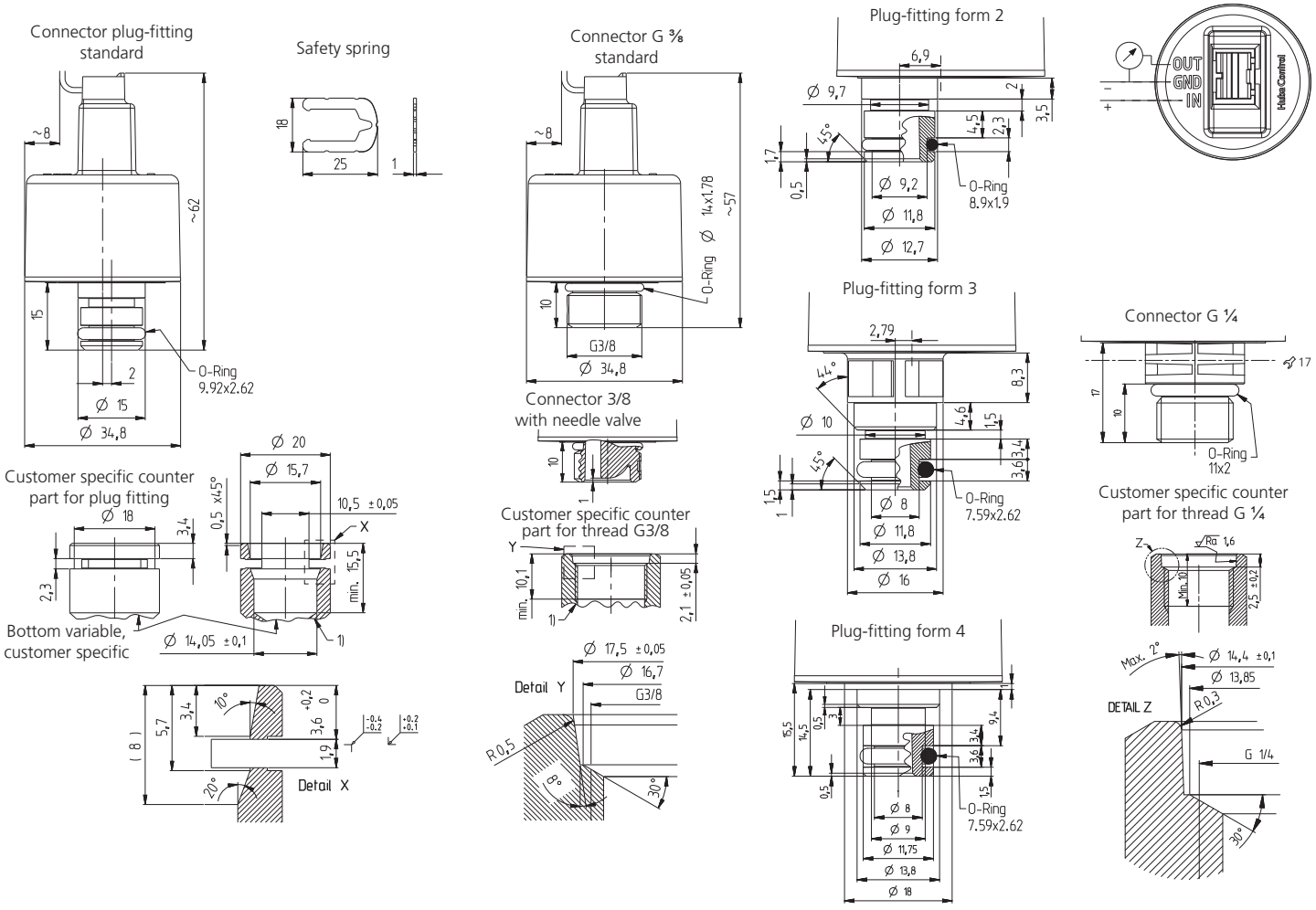
Accessories [2]

	Order number
Safety spring for plug connector standard	105883
Female connector RAST 2.5 with cable 1450 mm	103167
Calibration certificate	104551

AMP Connector [4]	Manufacturer's Part No.	Colour	For flexible wire
	3-829868-3	grey	7 x 0.20 mm = 0.22 mm² or 12 x 0.20 mm = 0.35 mm²
	1-966194-3	beige	7 x 0.25 mm = 0.35 mm²



Dimensions in mm / Electrical connections



[1] Other pressure ranges on request
[2] Accessories supplied loose
[3] To be ordered separately from original manufacturer. Further information can be found in the manufacturer specification No. 114-18049

OEM relative pressure transmitter type 506

Pressure range
-0.5 ... 7 bar / 0 ... 10 – 60 bar

Type 506 pressure transmitters are suitable for different applications in the field of industrial refrigeration due to it's application specific pressure connections.
Partially automated manufacturing allows the efficient production of large quantities, resulting in an excellent price / performance ratio.

- Compact construction
- Automated manufacture in large quantities for ideal price / performance ratio
- Robust ceramic sensor technology
- High resistance to extreme temperatures
- No mechanical creepage

Technical overview

Pressure range

Relative	-0.5 ... 7 bar / 0 ... 10 – 60 bar

Operating conditions

Medium		Refrigerants
Temperature	Medium / ambient	-40 ... +80 °C
	Storage	-40 ... +80 °C
Tolerable overload		2 x fs (max. 80 bar)
Rupture pressure		3 x fs (max. 90 bar)

Materials

Case		PA6, red
Materials in contact with the medium	Sensor	Ceramic Al_2O_3 (96%)
	Pressure connection	Stainless steel 1.4305 / AISI 303
	Sealing material	CR (chlorine caoutchouc)

Electrical overview

	Output	Power supply	Load	Current consumption[1)]
2 wire	4 ... 20 mA	8.0 ... 33 VDC	$< \frac{\text{supply voltage - 8 V}}{0.02\ \text{A}}$ [Ohm]	< 20 mA
	4 ... 20 mA	10.0 ... 33 VDC	$< \frac{\text{supply voltage - 10 V}}{0.02\ \text{A}}$ [Ohm]	< 20 mA
3 wire	0 ... 5 V	9.0 ... 33 VDC	> 10 kOhm / < 100 nF	< 5 mA
	1 ... 6 V	10.4 ... 33 VDC	> 10 kOhm / < 100 nF	< 5 mA
	0 ... 10 V	16.2 ... 33 VDC	> 10 kOhm / < 100 nF	< 6 mA
	ratiom. 10 ... 90%	5 VDC ±5%	> 10 kOhm / < 100 nF	< 3 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			

Dynamic response

Response time	< 5 ms
Load cycle	< 50 Hz

Protection standard

IP 65

Electrical connection

Cable 1.5 m
Connector DIN EN 175301-803-A
Connector DIN EN 175301-803-C (industrial standard 9.4 mm)
Connector M12x1 (pastic)

Pressure connection

Inside thread	7/16 - 20 UNF Schrader
Outside thread	7/16 - 20 UNF ¼ -18 NPT

Installation arrangement

Recommened: Pressure connection downwards

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3

Weight

With inside thread	~ 95 g
With outside thread	~ 110 g
With cable 1.5 m additional	~ 40 g

Packaging (Please state on order)

Single packaging in cardboard
Multiple packaging in cardboard per 25 pcs.

Accuracy

Parameter		Unit	0 ... 10 bar	> 10 ... 60bar
Tolerance zero point	max.	% fs	± 1.0	± 1.0
Tolerance full scale	max.	% fs	± 1.0	± 1.0
Resolution		% fs	0.1	0.1
Total of linearity, hysteresis and repeatability	max.	% fs	± 1.0	± 0.5
Long term stability acc. to DIN EN 60770		% fs	± 1.0	± 1.0
TC zero point [2)]	max.	% fs/10K	± 0.4	± 0.4
TC sensitivity [2)]	typ.	% fs/10K	- 0.15	- 0.15
TC sensitivity [2)]	max.	% fs/10K	- 0.3	- 0.3

Test conditions: 25 °C, 45% RH, power supply 24 VDC
TC z.p. / TC s. -40 … +80 °C

[1)] At nominal pressure
[2)] TC = Temperature coefficient

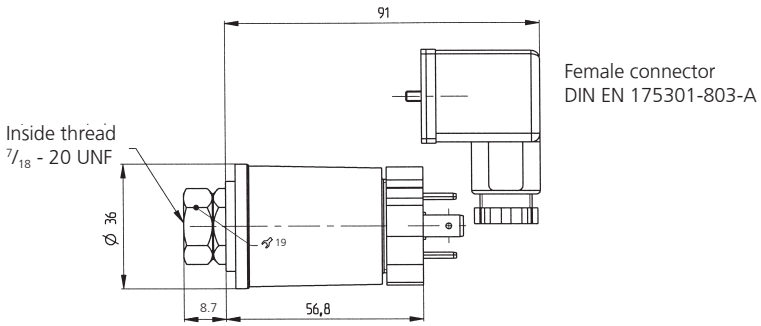
Order code selection table

			1	2	3	4	5	6	7	8	9	10
	506.		X	X	X	X	X	X	X	X	X	X
Pressure range	0 ... 10 bar		9	3	0							
	0 ... 16 bar		9	3	1							
	0 ... 25 bar		9	3	2							
	0 ... 40 bar		9	3	3							
	0 ... 60 bar		9	4	0							
	▲ Full scale signal at these pressures											
Sealing material [1]	CR					A						
Adjustment	Factory						0					
Output / power supply	0 ... 5 V	9.0 ... 33 VDC						1				
	1 ... 6 V	10.4 ... 33 VDC						6				
	0 ... 10 V	16.2 ... 33 VDC						2				
	4 ... 20 mA	10.0 ... 33 VDC						3				
		8.0 ... 33 VDC						8				
	ratiom. 10 ... 90%	5 VDC ±5%						4				
Electrical connection	Cable 1.5 m								0			
	Connector [2]	DIN EN 175301-803-A							1			
		DIN EN 175301-803-C (industrial standard 9.4 mm)							2			
		M12x1 (plastic)							3			
Pressure connection	Inside thread	$^{7}/_{16}$ - 20 UNF Schrader								0	1	
	Outside thread	$^{7}/_{16}$ - 20								2		
		¼ - 18 NPT								3		
Pressure tip orifice	without										1	
	with										2	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0...8bar/Out1...8V)											W

Storage versions

Output	4 … 20 mA
Power supply	10 … 33 VDC
Electrical connection [2]	Connector DIN EN 175301-803-A, IP 65
Pressure connection	Inside thread 7/16-20 UNF
Sealing material	CR (chlorine caoutchouc)
Colour of cover	black

Pressure range	Order number
-0.5 … 7 bar	506.930A23101W-0.5…7bar
0 … 25 bar	506.932A23101W0…25bar

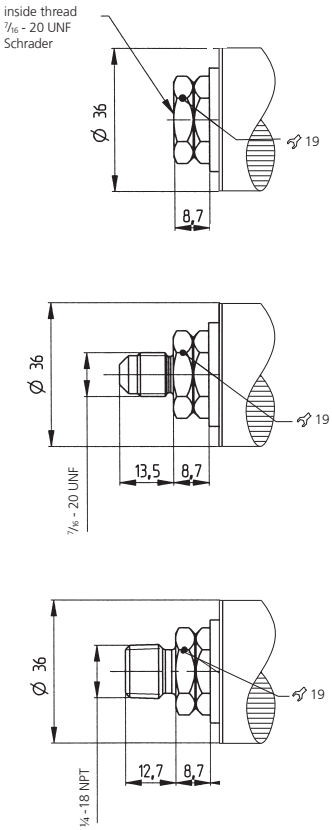


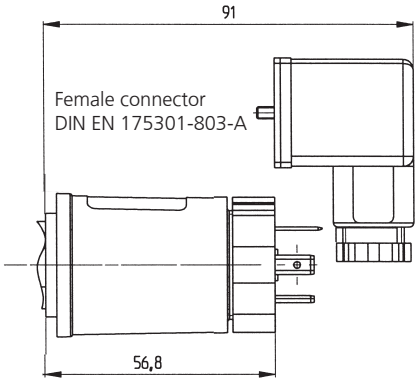
Accessories [3]

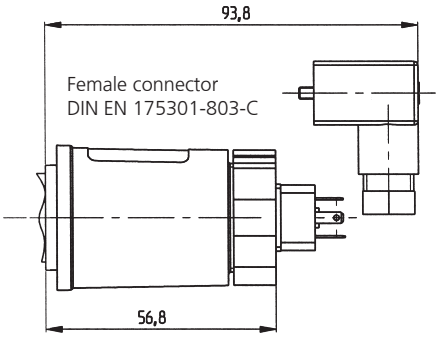
	Order number
Female connector DIN EN 175301-803-A with seal (IP 65, when installed and latched)	103510
Female connector DIN EN 175301-803-C with seal (IP 65, when installed and latched)	104244
Female connector M12x1	103524
Calibration certificate	104551

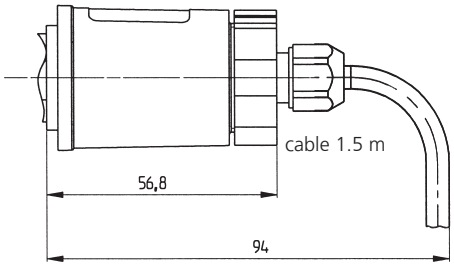
[1] According to ISO standard R 1629, other sealing materials on request
[2] Without female connector
[3] Accessories supplied loose

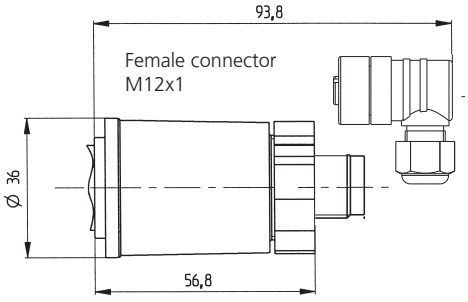
Dimensions in mm / Electrical connections



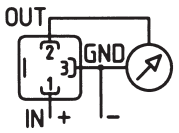




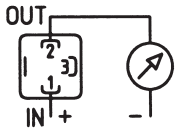




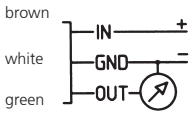
3 wire



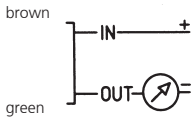
2 wire



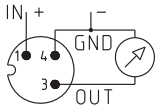
3 wire



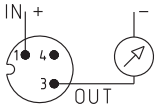
2 wire



3 wire



2 wire



OEM relative and absolute pressure transmitter type 511

Pressure range
-1 ... 0 – 600 bar

Type 511 pressure transmitters meet the highest specifications for longevity, accuracy, temperature stability and EMC characteristics, making them suitable for an extremely wide range of demanding industrial applications.

- Compact, rugged construction for highest operational reliability
- No media egress when exceeding rupture pressure
- Negligible temperature influence on accuracy
- Excellent EMC capacity
- Saving time by quick cable mounting by the customer with swift connector

Technical overview

Pressure range

Relative	-1 ... 0 – 600 bar
Absolute	0 ... 25 bar

Operating conditions

Medium			Liquids and gases
Temperature	Ambient [1]	FPM	-15 ... +125 °C
		EPDM	-25 ... +125 °C
		NBR	-25 ... +85 °C
		FPM spec.	-40 ... +150 °C (UL max. 125 °C)
		ratiom. output, AMP JPT	max. +125 °C
		all other versions	max. + 85 °C
Tolerable overload / Rupture pressure [2]		< 6	3.0 x fs
		≥ 6	2.5 x fs (max. 900 bar)

Materials

Case		Stainless steel 1.4305 / AISI 303
Materials in contact with the medium	Pressure connection	Stainless steel 1.4305 / AISI 303
	Sensor	Ceramic Al_2O_3 (96%)
	Media stop system	PPS
	Sealing material	FPM, EPDM, NBR, FPM spec.

Media stop system

Huba-patented media stop system to prevent media egress when exeeding rupture pressure range (> 40 bar nominal value).

Electrical overview

	Output	Power supply	Load	Current consumption [4]
2 wire	4 ... 20 mA	8.0 ... 33 VDC	$< \frac{\text{supply voltage - 8 V}}{0.02\ \text{A}}$ [Ohm]	< 20 mA
3 wire	0 ... 5 V	8.0 ... 33 VDC	>10 kOhm / < 100 nF	< 4 mA
	1 ... 6 V	8.0 ... 33 VDC	>10 kOhm / < 100 nF	< 4 mA
	0 ... 10 V	11.4 ... 33 VDC	>10 kOhm / < 100 nF	< 4 mA
	0 ... 10 V	24 VAC ±15%	>10 kOhm / < 100 nF	< 4 mA
	ratiom. 10 ... 90%	5 VDC ±5%	>10 kOhm / < 100 nF	< 4 mA

Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.	
Insulation voltage	standard	500 VDC
	optional	1000 VDC

Dynamic response

Response time	< 2 ms, typ. 1 ms
Load cycle	< 100 Hz

Protection standard

With connector DIN EN 175301-803-C	IP 65
All other versions	IP 67

Electrical connection

Cable 1.5 m
Swift connector
Connector AMP (Junior power time)
Connector M12x1 plastic thread
Connector M12x1 metal thread
Connector DIN EN 175301-803-C (industrial standard 9.4 mm)

Pressure connection

Inside thread	G ¼ with O-Ring seal
Outside thread	G ¼ sealed at back, DIN 3852-E
	G ½ sealed at front
	G ½ sealed at back and manometer (combi)
	¼ -18 NPT
	R ¼ EN 10226
	M12x1.5 sealed at back, DIN 3852-E
	M14x1.5 sealed at back, DIN 3852-E

Installation arrangement

Unrestricted

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3
UL	acc. Standard 61010-1
Shock acc. IEC 60068-2-27	100 *g*, 11 ms half sine wave, all 6 directions. Free fall from 2 m on concrete (6x)
Constant shock acc. IEC 60068-2-29	40 *g* for 6 ms, 1000x all 3 directions
Vibration acc. IEC 60068-2-6	20 *g*, 2 ... 2000 Hz with amplitude ± 15 mm, 1 Octave/min. all 3 directions, 50 constant load

Weight

Version with inside thread	~ 85 g
Version with outside thread	~ 95 g

Packaging (Please state on order)

Single packaging in cardboard	accessories integrated
Multiple packaging in cardboard (25 pcs)	accessories integrated

Accuracy

Parameter		Unit	
Tolerance zero point	max.	% fs	±0.3
Tolerance full scale	max.	% fs	±0.3
Resolution		% fs	0.1
Total of linearity, hysteresis and repeatability	max.	% fs	±0.3
Long term stability acc. DIN EN 60770		% fs	±1.0
TC zero point [4]	max.	% fs/10K	±0.15
TC sensitivity [4]	max.	% fs/10K	±0.15

Test conditions: 25 °C, 45% RH, power supply 24 VDC
TC z.p. / TC s. -40 ... +125 °C

[1] Version until +150 °C on request
[2] higher overload and rupture pressure on request
[3] at nominal pressure
[4] TC = Temperature coefficient

Order code selection table in bar

			1	2	3	4	5	6	7	8	9	10
			511.	X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative		9									
	Absolute		8									
Pressure range [1]	-1 ... 0 bar		9	0	0							
	0 ... 1 bar			1	1							
	0 ... 1.6 bar			1	2							
	0 ... 2.5 bar			1	4							
	0 ... 4 bar			1	5							
	0 ... 6 bar			1	7							
	0 ... 10 bar			3	0							
	0 ... 16 bar			3	1							
	0 ... 25 bar			3	2							
	0 ... 40 bar		9	3	3						2	
	0 ... 60 bar		9	4	0						2	
	0 ... 100 bar		9	4	1						2,5	
	0 ... 160 bar		9	4	2						2,5	
	0 ... 250 bar		9	4	3						2,5	
	0 ... 400 bar	(FPM spec. seal only)	9	5	4	6					2,5	
	0 ... 600 bar	(FPM spec. seal only)	9	5	5	6					2,5	
	▲ Full scale signal at these pressures											
Sealing material [2]	FPM	Fluoro elastomer				0						
	EPDM	Ethylene propylene				1						
	NBR	Butadiene Acylonitrile				2						
	FPM spec.	Fluoro elastomer spec.				6						
Adjustment	Factory						0					
Output / power supply	0 ... 5 V	8.0 ... 33 VDC IN=1 / OUT=3 / GND=4						1				
		8.0 ... 33 VDC IN=1 / OUT=4 / GND=3						F	5,7			
	1 ... 6 V	8.0 ... 33 VDC IN=1 / OUT=3 / GND=4						6				
		8.0 ... 33 VDC IN=1 / OUT=4 / GND=3						G	5,7			
	0 ... 10 V	11.4 ... 33 VDC IN=1 / OUT=3 / GND=4						2				
		11.4 ... 33 VDC IN=1 / OUT=4 / GND=3						H	5,7			
		24 VAC ±15%						7	1,0			
	4 ... 20 mA	8.0 ... 33 VDC						3				
	ratiom. 10 ... 90%	5 VDC ±5%						4				
Electrical connection	Cable 1.5 m								0			
	Swift connector								1			
	Connector	AMP JPT [3]								2		
		M12x1 plastic thread [3]							5			
		M12x1 metal thread [3]							7			
		DIN EN 175301-803-C *2 w: IN=3 / OUT=1 3 w: IN=3 / OUT=2 / GND=1*							8			
		DIN EN 175301-803-C *2 w: IN=1 / OUT=2 3 w: IN=1 / OUT=3 / GND=2*							9			
Pressure connection [4]	Inside thread	G ¼ with O-Ring seal (no pressure tip orifice possible)								1	1,2	
	Outside thread	G ¼ sealed at back, DIN 3852-E								4		
		G ½ sealed at front								9		
		G ½ sealed at back and manometer (combi)								8		
		¼ -18 NPT								3		
		R ¼, EN 10226								7		
		M12x1.5 sealed at back, DIN 3852-E								5		
		M14x1.5 sealed at back, DIN 3852-E								6		
Version	Stainless steel without media stopper (≤ 60 bar)										1	
	Stainless steel with media stopper (standard ≥ 40 bar)										2	
	Stainless steel with pressure tip orifice (≥ 100 bar)										5	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 8bar/OUT1...6V)											W

Accessories

	Order number
Female connector for connector M12x1	106975
Female connector AMP (Junior power timer) 2-wire	110442
Female connector AMP (Junior power timer) 3-wire	108767
Female connector swift connector (included in delivery)	107359
Female connector	104244
Calibration certificate	104551

[1] Other pressure range on request
[2] Other sealing material on request
[3] Delivery without female connector
[4] Other pressure connection on request

Order code selection table in psi			511.	1 X	2 X	3 X	4 X	5 X	6 X	7 X	8 X	9 X	10 X
Pressure mode	Relative			9									
	Absolute			8									
Pressure range [1]	-30 ... 0 "hg			9	A	0							
	0 ... 15 psi				B	1							
	0 ... 30 psi				B	4							
	0 ... 60 psi				B	5							
	0 ... 100 psi				B	7							
	0 ... 200 psi				C	1							
	0 ... 300 psi				C	2							
	0 ... 500 psi			9	C	3						2	
	0 ... 750 psi			9	D	0						2	
	0 ... 1000 psi			9	D	1						2,5	
	0 ... 2000 psi			9	D	2						2,5	
	0 ... 3000 psi			9	D	3						2,5	
	0 ... 5000 psi	(FPM spec. seal only)		9	E	4	6					2,5	
	0 ... 7500 psi	(FPM spec. seal only)		9	E	5	6					2,5	
	▲ Full scale signal at these pressures												
Sealing material [2]	FPM	Fluoro elastomer					0						
	EPDM	Ethylene propylene					1						
	NBR	Butadiene Acylonitrile					2						
	FPM spec.	Fluoro elastomer spec.					6						
Adjustment	Factory							0					
Output / power supply	0 ... 5 V	8.0 ... 33 VDC IN=1 / OUT=3 / GND=4							1				
		8.0 ... 33 VDC IN=1 / OUT=4 / GND=3							F	5,7			
	1 ... 6 V	8.0 ... 33 VDC IN=1 / OUT=3 / GND=4							6				
		8.0 ... 33 VDC IN=1 / OUT=4 / GND=3							G	5,7			
	0 ... 10 V	11.4 ... 33 VDC IN=1 / OUT=3 / GND=4							2				
		11.4 ... 33 VDC IN=1 / OUT=4 / GND=3							H	5,7			
		24 VAC ±15%							7	1,0			
	4 ... 20 mA	8.0 ... 33 VDC							3				
	ratiom. 10 ... 90%	5 VDC ±5%							4				
Electrical connection	Cable 1.5 m									0			
	Swift connector									1			
	Connector	AMP JPT [3]								2			
		M12x1 plastic thread [3]								5			
		M12x1 metal thread [3]								7			
		DIN EN 175301-803-C *2 w: IN=3 / OUT=1 3 w: IN=3 / OUT=2 / GND=1*								8			
		DIN EN 175301-803-C *2 w: IN=1 / OUT=2 3 w: IN=1 / OUT=3 / GND=2*								9			
Pressure connection [4]	Inside thread	G ¼ mit O-Ring seal (no pressure tip orifice possible)									1	1,2	
	Outside thread	G ¼ sealed at back, DIN 3852-E									4		
		G ½ sealed at front									9		
		G ½ sealed at back and manometer (combi)									8		
		¼ -18 NPT									3		
		R ¼, EN 10226									7		
		M12x1.5 sealed at back, DIN 3852-E									5		
		M14x1.5 sealed at back, DIN 3852-E									6		
Version	Stainless steel without media stopper (≤ 700 psi)											1	
	Stainless steel with media stopper (standard ≥ 500 psi)											2	
	Stainless steel with pressure tip orifice (≥ 1000 psi)											5	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 120psi/OUT1...6V)												W

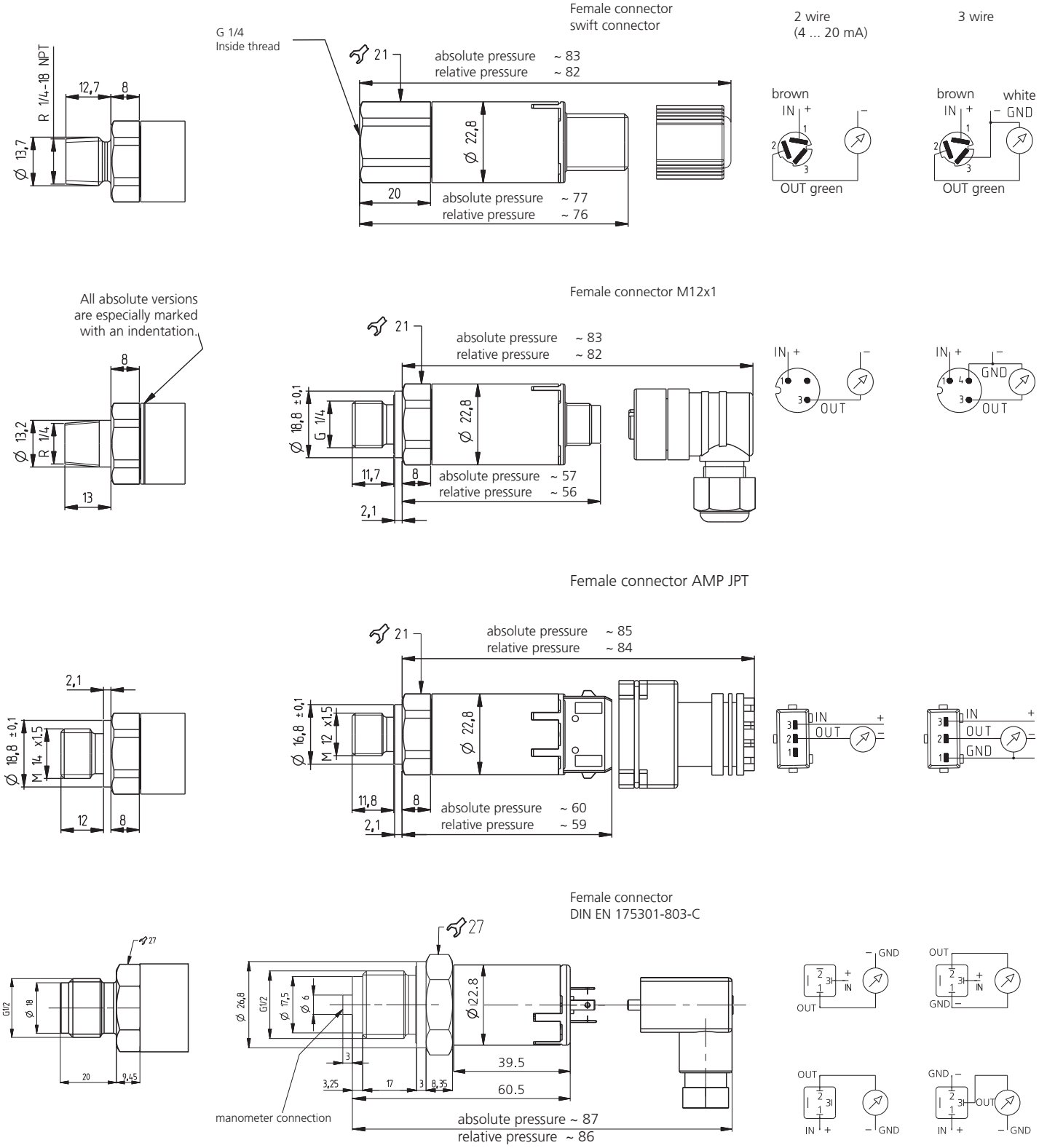
[1] Other pressure range on request
[2] Other sealing material on request
[3] Delivery without female connector
[4] Other pressure connection on request

Order code selection table in MPa

			1	2	3	4	5	6	7	8	9	10
	511.		X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative		9									
	Absolute		8									
Pressure range [1]	-0.1 ... 0 MPa		9	F	0							
	0 ... 0.1 MPa			G	1							
	0 ... 0.16 MPa			G	2							
	0 ... 0.25 MPa			G	4							
	0 ... 0.4 MPa			G	5							
	0 ... 0.6 MPa			G	7							
	0 ... 1 MPa			H	0							
	0 ... 1.6 MPa			H	1							
	0 ... 2.5 MPa			H	2							
	0 ... 4 MPa		9	H	3						2	
	0 ... 6 MPa		9	K	0						2	
	0 ... 10 MPa		9	K	1						2,5	
	0 ... 16 MPa		9	K	2						2,5	
	0 ... 25 MPa		9	K	3						2,5	
	0 ... 40 MPa	(FPM spec. seal only)	9	L	4	6					2,5	
	0 ... 60 MPa	(FPM spec. seal only)	9	L	5	6					2,5	
	▲ Full scale signal at these pressures											
Sealing material [2]	FPM	Fluoro elastomer				0						
	EPDM	Ethylene propylene				1						
	NBR	Butadiene Acylonitrile				2						
	FPM spec.	Fluoro elastomer spec.				6						
Adjustment	Factory						0					
Output / power supply	0 ... 5 V	8.0 ... 33 VDC IN=1 / OUT=3 / GND=4						1				
		8.0 ... 33 VDC IN=1 / OUT=4 / GND=3						F	5,7			
	1 ... 6 V	8.0 ... 33 VDC IN=1 / OUT=3 / GND=4						6				
		8.0 ... 33 VDC IN=1 / OUT=4 / GND=3						G	5,7			
	0 ... 10 V	11.4 ... 33 VDC IN=1 / OUT=3 / GND=4						2				
		11.4 ... 33 VDC IN=1 / OUT=4 / GND=3						H	5,7			
		24 VAC ±15%						7	1,0			
	4 ... 20 mA	8.0 ... 33 VDC						3				
	ratiom. 10 ... 90%	5 VDC ±5%						4				
Electrical connection	Cable 1.5 m								0			
	Swift connector								1			
	Connector	AMP JPT [3]							2			
		M12x1 plastic thread [3]							5			
		M12x1 metal thread [3]							7			
		DIN EN 175301-803-C *2 w: IN=3 / OUT=1 3 w: IN=3 / OUT=2 / GND=1*							8			
		DIN EN 175301-803-C *2 w: IN=1 / OUT=2 3 w: IN=1 / OUT=3 / GND=2*							9			
Pressure connection [4]	Inside thread	G ¼ with O-Ring seal (no pressure tip orifice possible)								1	1,2	
	Outside thread	G ¼ sealed at back, DIN 3852-E								4		
		G ½ sealed at front								9		
		G ½ sealed at back and manometer (combi)								8		
		¼ -18 NPT								3		
		R ¼, EN 10226								7		
		M12x1.5 sealed at back, DIN 3852-E								5		
		M14x1.5 sealed at back, DIN 3852-E								6		
Version	Stainless steel without media stopper (≤ 6 MPa)										1	
	Stainless steel with media stopper (standard ≥ 4 MPa)										2	
	Stainless steel with pressure tip orifice (≥ 10 MPa)										5	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 0.8MPa/OUT1...6V)											W

[1] Other pressure range on request
[2] Other sealing material on request
[3] Delivery without female connector
[4] Other pressure connection on request

Dimensions in mm / Electrical connections



Relative pressure transmitter type 512 for mobile hydraulic

Pressure range
0 ... 60 – 1000 bar

The pressure transmitter type 512 with cable connection meets the highest demands of industrial and mobil hydraulic applications. This sensor is available with protection standard IP69K. The standard pressure orifice prevents damage due to pressure peaks.

The compact and rugged design meets the requirement of shock- and vibration stability according Kfz-norm ISO 16750. The pressure transmitter type 512 guarantees highest EMC stability according to various Kfz regulations with test level up to 100V/m.

The measuring cell is based upon the Huba Control developed thick film technology on stainless steel and is fully hermetically welded .

- Compact and rugged construction for highest operational reliability
- Welded construction – no elastomer seals
- Negligible temperature influence on accuracy
- Excellent EMC-capacity
- Rugged PUR cable with IP 69K

Technical Overview

Pressure range

Relative	0 ... 60 – 1000 bar

Operating conditions

Medium		Liquids and gases
Temperature	Medium	-40 ... +125 °C
	Ambient	-40 ... +100 °C
	Storage	-40 ... +100 °C
Tolerable overload	≤ 400 bar	3 x FS
	> 400 bar	2.5 x FS (max. 1500 bar)
Rupture pressure	≤ 400 bar	6 x FS
	> 400 bar	4 x FS (max. 2500 bar)

Materials

Case		Stainless steel 1.4404 / AISI 316 L
Cable		PUR
Materials in contact with the medium	Pressure connection	Stainless steel 1.4404 / AISI 316 L
	Sensor	Stainless steel

Electrical overview

	Output	Power supply	Load	Current consumption
2 wire	4 ... 20 mA	9.5 ... 33 VDC	$< \frac{\text{Power supply - 9.5 V}}{0.02\ \text{A}}$ [Ohm]	< 23 mA
3 wire	0 ... 5 V	7.5 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
	1 ... 6 V	8.5 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
	0 ... 10 V	12.5 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
	ratiom. 10 ... 90%	5 VDC ± 10%	>10 kOhm / < 100 nF	< 7 mA
Insulation voltage				1000 VDC
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			

Protection class

Protection class III

Dynamic response

Response time	< 2 ms (10... 90%, typ. 1 ms)
Load cycle	< 100 Hz

Protection standard

IP 69K

Electrical connection

Cable PUR 1.5 m

Pressure connection

Outside thread	$^{7}/_{16}$ - 20 UNF
	¼ -18 NPT
	G ¼ sealed at back DIN 3852-E with profile seal FPM (-30 ... +135 °C)
	M14x1.5 sealed at back DIN 3852-E with profile seal FPM (-30 ... +135 °C)
	R ¼ EN 10226

Installation arrangement

Unrestricted

Tests / Admissions

	Noise immunity / Noise emission	Noise immunity automotive guideline	Noise emission automotive guideline
Electromagnetic compatibility	ISO 13766 - earth-moving equipment	ISO 11452-2, HF (Field), 100 V/m (200 ... 2000 MHz)	CISPR25
	DIN EN 13309 - construction equipment	ISO 11452-4, HF (BCI), 100 mA (20 ... 400 MHz)	
	DIN ISO 14982 - agriculture and forestry	ISO 10605, ESD, ±8 kV contact, ±15 kV air	
	Automotive guideline ECE R10 [1]	ISO 7637-2, puls [2], test level 4 [3]	
	Automotive guideline 2004/104/EG [1]	ISO 16750-2, Load Dump, 155 V (1 Ω, 300 ms)	
	EN 61326-2-3 - pressure transducer		
Environmental test	ISO 16750-Z-J-O-Z IP69K		
Shock acc. IEC 68-2-27	50 *g*, 11 ms, half sine wave, 1000x / axis		
Vibration acc. ISO 16750-3	Test VI (12 g, sinusodial 18 g random vibration)		
cULus	acc. 61010-1		

Weight

~ 176 g

Packaging (Please state on order)

Single packaging in cardboard
Multiple packaging in cardboard (2 pcs)
Multiple packaging in cardboard (25 pcs)

Accuracy

Parameter		Unit	
Characteristic line acc. IEC 61298-2 [4),5)]		% fs	± 0.5
Resolution		% fs	0.1
Thermal characteristic [6)]	max.	% fs/10K	± 0.2
Long term stability acc. IEC 61298-2	max.	% fs	± 0.25

[1)] E1 approval for customer specific type on request
[2)] Puls 1, 2a, 2b, 3a, 3b
[3)] Pressure sensor for 12 V and 24 V power system (0 ... 5 V, 0 ... 10 V / 1 ... 6 V and 4 ... 20 mA)
[4)] incl. zero point, full scale, linearity, hysteresis and repeatability
[5)] Considering EMC interference < ±1.5% fs
[6)] -15 ... 85 °C

Order code selection table in bar

			1	2	3	4	5	6	7	8	9	10	11
		512.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... + 60 bar		9	4	0	S	0						
	0 ... + 100 bar		9	4	1	S	0						
	0 ... + 160 bar		9	4	2	S	0						
	0 ... + 250 bar		9	4	3	S	0						
	0 ... + 400 bar		9	5	4	S	0						
	0 ... + 600 bar		9	5	5	S	0						
	0 ... + 1000 bar		9	5	7	S	0						
Output / Power supply	0 ... 5 V	7.5 ... 33 VDC						1					
	0 ... 10 V	12.5 ... 33 VDC						2					
	1 ... 6 V	8.5 ... 33 VDC						6					
	4 ... 20 mA	9.5 ... 33 VDC						3					
	10 ... 90% ratiom.	5 VDC ±10%						7					
Electrical connection	Cable 1.5 m								L				
Pressure connection [1]	Outside thread	7/16-20 UNF								2	2	1	
		¼ -18 NPT								3	2	1	
		G ¼ sealed at back DIN 3852-E with profile seal FPM								4	2	1	
		M14x1.5 sealed at back DIN 3852-E with profile seal FPM								6	2	1	
		R ¼ acc. EN 10226								7	2	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 300bar/Out1...8V)												W

Order code selection table in psi

			1	2	3	4	5	6	7	8	9	10	11
		512.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... + 1000 psi		9	D	1	S	0						
	0 ... + 1500 psi		9	D	2	S	0						
	0 ... + 2000 psi		9	D	3	S	0						
	0 ... + 3000 psi		9	D	4	S	0						
	0 ... + 5000 psi		9	E	4	S	0						
	0 ... + 6000 psi		9	E	5	S	0						
	0 ... + 8700 psi		9	E	6	S	0						
	0 ... + 14500 psi		9	E	7	S	0						
Output / Power supply	0 ... 5 V	7.5 ... 33 VDC						1					
	0 ... 10 V	12.5 ... 33 VDC						2					
	1 ... 6 V	8.5 ... 33 VDC						6					
	4 ... 20 mA	9.5 ... 33 VDC						3					
	10 ... 90% ratiom.	5 VDC ±10%						7					
Electrical connection	Cable 1.5 m								L				
Pressure connection [1]	Outside thread	7/16-20 UNF								2	2	1	
		¼ -18 NPT								3	2	1	
		G ¼ sealed at back DIN 3852-E with profile seal FPM								4	2	1	
		M14x1.5 sealed at back DIN 3852-E with profile seal FPM								6	2	1	
		R ¼ acc. EN 10226								7	2	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 4000psi/Out1...8V)												W

Order code selection table in MPa

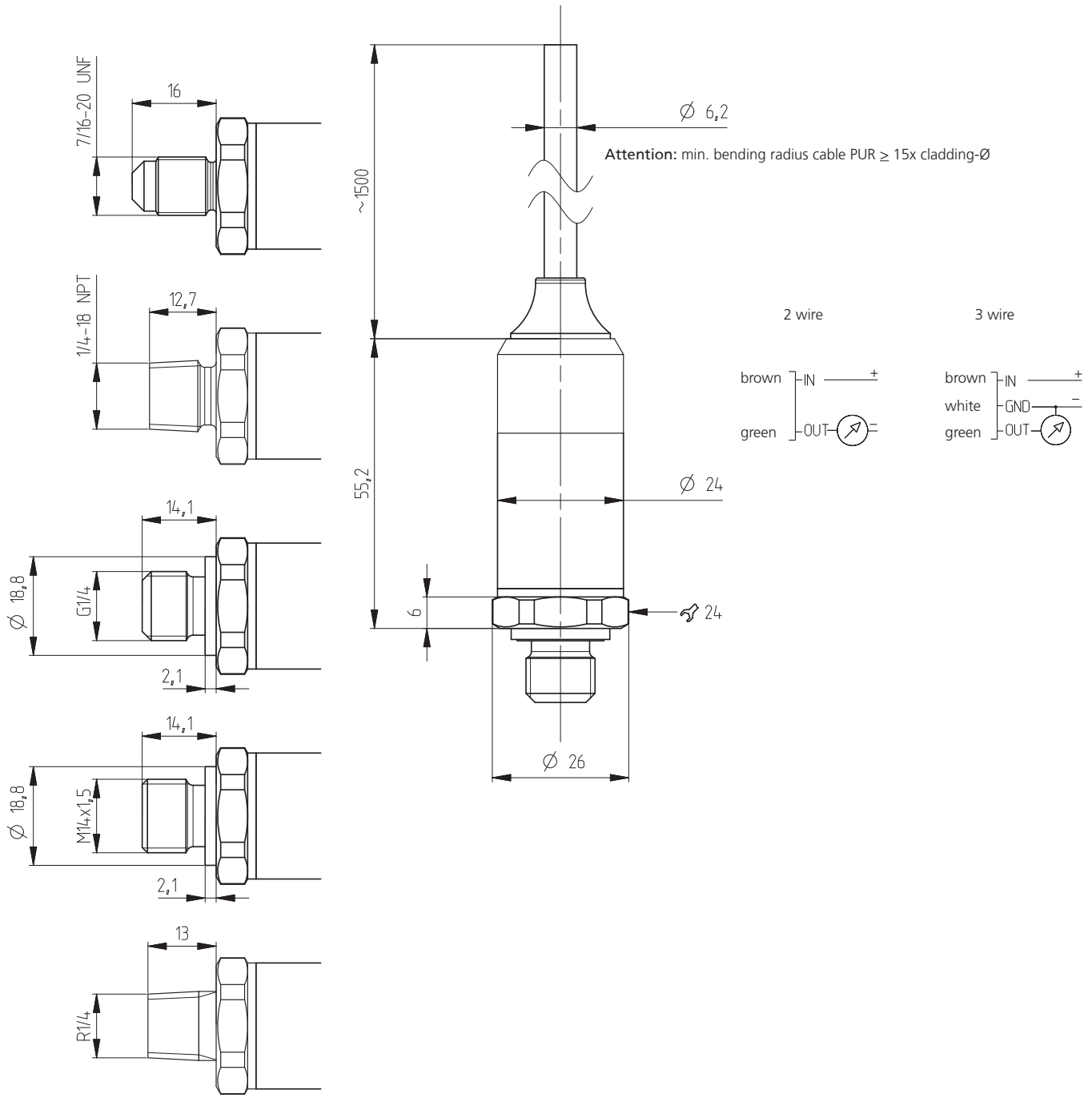
			1	2	3	4	5	6	7	8	9	10	11
		512.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... + 6 MPa		9	K	0	S	0						
	0 ... + 10 MPa		9	K	1	S	0						
	0 ... + 16 MPa		9	K	2	S	0						
	0 ... + 25 MPa		9	K	3	S	0						
	0 ... + 40 MPa		9	L	4	S	0						
	0 ... + 60 MPa		9	L	5	S	0						
	0 ... + 100 MPa		9	L	7	S	0						
Output / Power supply	0 ... 5 V	7.5 ... 33 VDC						1					
	0 ... 10 V	12.5 ... 33 VDC						2					
	1 ... 6 V	8.5 ... 33 VDC						6					
	4 ... 20 mA	9.5 ... 33 VDC						3					
	10 ... 90% ratiom.	5 VDC ±10vc%						7					
Electrical connection	Cable 1.5 m								L				
Pressure connection [1]	Outside thread	7/16-20 UNF								2	2	1	
		¼ -18 NPT								3	2	1	
		G ¼ sealed at back DIN 3852-E with profile seal FPM								4	2	1	
		M14x1.5 sealed at back DIN 3852-E with profile seal FPM								6	2	1	
		R ¼ nach EN 10226								7	2	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 30MPa/Out1...8V)												W

Accessories

	Order number
Calibration certificate (not possible with pressure range 0 ... 1000 bar)	104551

[1] Other pressure range or pressure connection on request

Dimensions in mm / Electrical connections



Attention: min. bending radius cable PUR ≥ 15x cladding-Ø

OEM Relative and absolute pressure transmitter type 515

Pressure range
-1 ... 0 – 600 bar

Type 515 pressure transmitter with cable connection meets the highest demands for industry and vehicle manufacturing applications.
The compact and robust mechanical design incorporating protection standard IP69K allows the use in stringent conditions.

- Compact, rugged construction for highest operational reliability
- Negligible temperature influence on accuracy
- Excellent EMC capacity

Technical overview

Pressure range [1)]

Relative	-1 ... 0 – 600 bar
Absolute	0 ... 25 bar

Operating conditions

Medium		Liquids
Temperature	FPM	-15 ... +125 °C
	EPDM	-25 ... +125 °C
	NBR	-25 ... +85 °C
	FPM spec.	-40 ... +150 °C
	Ambient	max. +85 °C
Tolerable overload / Rupture pressure [2)]	< 6	3.0 x fs
	≥ 6	2.5 x fs (max. 900 bar)

Materials

Case		Stainless steel 1.4305 / AISI 303
Materials in contact with the medium	Pressure connection	Stainless steel 1.4305 / AISI 303
	Sensor	Ceramic Al_2O_3 (96%)
	Media stop sytsem	PPS
	Sealing material	FPM, EPDM, NBR, FPM spec.

Media stop system

Patented media stop system to prevent media egress when exeeding rupture pressure range (> 40 bar nominal value).

Electrical overview

	Output	Power supply	Load	Current consumption [3)]
2 wire	4 ... 20 mA	8.0 ... 33 VDC	$< \frac{\text{supply voltage - 8 V}}{0.02\ \text{A}}$ [Ohm]	< 20 mA
3 wire	0 ... 5 V	8.0 ... 33 VDC	>10 kOhm / < 100 nF	< 4 mA
	1 ... 6 V	8.0 ... 33 VDC	>10 kOhm / < 100 nF	< 4 mA
	0 ... 10 V	11.4 ... 33 VDC	>10 kOhm / < 100 nF	< 4 mA
	0 ... 10 V	24 VAC ±15%	>10 kOhm / < 100 nF	< 4 mA
	ratiom. 10 ... 90%	5 VDC ±5%	>10 kOhm / < 100 nF	< 4 mA

Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.	
Insulation voltage	standard	500 VDC
	optional	1000 VDC

Dynamic response

Response time	< 2 ms, typ. 1 ms
Load cycle	< 100 Hz

Protection standard

IP 69K

Electrical connection

Cable PUR 1.5 m

Pressure connection

Inside thread	G ¼, with O-Ring seal
Outside thread	G ¼, sealed at back, DIN 3852-E
	G ½, sealed at front
	G ½, sealed at back and manometer (combi)
	¼, -18 NPT
	R ¼, EN 10226
	M12x1.5 sealed at back, DIN 3852-E
	M14x1.5 sealed at back, DIN 3852-E

Installation arrangement

Unrestricted

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3
Shock acc. IEC 60068-2-27	40 *g*, 6 ms half sine wave, all 3 directions. Free fall from 2 m on concrete (6x)
Constant shock acc. IEC 60068-2-29	40 *g* for 6 ms, 1000 x all 3 directions
Vibration acc. IEC 60068-2-6	25 *g*, 2 ... 2000 Hz with amplitude ± 15 mm, 1 Octave/min. all 3 directions, 50 constant load

Weight

With thread G ½	~ 225 g
All other versions	~ 180 g

Packaging (Please state on order)

Single packaging in cardboard
Multiple packaging in cardboard per 25 pcs.

Accuracy

Parameter			Unit
Tolerance zero point	max.	% fs	± 0.3
Tolerance full scale	max.	% fs	± 0.3
Resolution		% fs	0.1
Total of linearity, hysteresis and repeatability	max.	% fs	± 0.3
Long term stability acc. DIN EN 60770		% fs	± 0.5
TC zero point [4)]	max.	% fs/10K	± 0.15
TC sensitivity [4)]	max.	% fs/10K	0/-0.3

Test conditions: 25 °C, 45% RH, power supply 24 VDC
TC z.p. / TC s. -25 ... +85 °C

[1)] Other pressure range on request
[2)] Other overload and Rupture pressure on request
[3)] At nominal pressure
[1)] TC = Temperature coefficient

Order code selection table in bar

			1	2	3	4	5	6	7	8	9	10
			515.	X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative		9									
	Absolute		8									
Pressure range [1]	-1 ... 0 bar		9	0	0							
	0 ... 1 bar			1	1							
	0 ... 1.6 bar			1	2							
	0 ... 2.5 bar			1	4							
	0 ... 4 bar			1	5							
	0 ... 6 bar			1	7							
	0 ... 10 bar			3	0							
	0 ... 16 bar			3	1							
	0 ... 25 bar			3	2							
	0 ... 40 bar		9	3	3						2	
	0 ... 60 bar		9	4	0						2	
	0 ... 100 bar		9	4	1						2,5	
	0 ... 160 bar		9	4	2						2,5	
	0 ... 250 bar		9	4	3						2,5	
	0 ... 400 bar	FPM spec. seal only	9	5	4	6					2,5	
	0 ... 600 bar	FPM spec. seal only	9	5	5	6					2,5	
	▲ Full scale signal at these pressures											
Sealing material [2]	FPM	Fluoro elastomer				0						
	EPDM	Ethylene propylene				1						
	NBR	Butadiene Acylonitrile				2						
	FPM spec.	Fluoro elastomer spec.				6						
Adjustment	Factory						0					
Output / power supply	0 ... 5 V	8.0 ... 33 VDC						1				
	1 ... 6 V	8.0 ... 33 VDC						6				
	0 ... 10 V	11.4 ... 33 VDC						2				
	4 ... 20 mA	8.0 ... 33 VDC						3				
	ratiom. 10 ... 90%	5 VDC ±5%						4				
Electrical connection	Cable 1.5 m PUR								0			
Pressure connection [3]	Inside thread	G ¼ mit O-Ring seal								1		
	Outside thread	G ¼ sealed at back, DIN 3852-E								4		
		G ½ sealed at front								9		
		G ½ sealed at back and manometer (combi)								8		
		¼ -18 NPT								3		
		R ¼, EN 10226								7		
		M12x1.5 sealed at back, DIN 3852-E								5		
		M14x1.5 sealed at back, DIN 3852-E								6		
Version	Stainless steel	without media stopper									1	
		with media stopper (standard from 40 bar)									2	
		with pressure tip orifice (from 100 bar on)									5	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 8bar/OUT1...9V)											W

Order code selection table in psi

			1	2	3	4	5	6	7	8	9	10
			515.	X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative		9									
	Absolute		8									
Pressure range [1]	-30 ... 0"hg		9	A	0							
	0 ... 15 psi			B	1							
	0 ... 30 psi			B	4							
	0 ... 60 psi			B	5							
	0 ... 100 psi			B	7							
	0 ... 200 psi			C	1							
	0 ... 300 psi			C	2							
	0 ... 500 psi		9	C	3						2	
	0 ... 750 psi		9	D	0						2	
	0 ... 1000 psi		9	D	1						2,5	
	0 ... 2000 psi		9	D	2						2,5	
	0 ... 3000 psi		9	D	3						2,5	
	0 ... 5000 psi	FPM spec. seal only	9	E	4	6					2,5	
	0 ... 7500 psi	FPM spec. seal only	9	E	5	6					2,5	
	▲ Full scale signal at these pressures											
Sealing material [2]	FPM	Fluoro elastomer				0						
	EPDM	Ethylene propylene				1						
	NBR	Butadiene Acylonitrile				2						
	FPM spec.	Fluoro elastomer spec.				6						
Adjustment	Factory						0					
Output / power supply	0 ... 5 V	8.0 ... 33 VDC						1				
	1 ... 6 V	8.0 ... 33 VDC						6				
	0 ... 10 V	11.4 ... 33 VDC						2				
	4 ... 20 mA	8.0 ... 33 VDC						3				
	ratiom. 10 ... 90%	5 VDC ±5%						4				
Electrical connection	Cable 1.5 m PUR								0			
Pressure connection [3]	Inside thread	G ¼ mit O-Ring seal								1		
	Outside thread	G ¼ sealed at back, DIN 3852-E								4		
		G ½ sealed at front								9		
		G ½ sealed at back and manometer (combi)								8		
		¼ -18 NPT								3		
		R ¼, EN 10226								7		
		M12x1.5 sealed at back, DIN 3852-E								5		
		M14x1.5 sealed at back, DIN 3852-E								6		
Version	Stainless steel	without media stopper									1	
		with media stopper (standard from 750 psi)									2	
		with pressure tip orifice (from 2000 psi on)									5	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 120psi/OUT1...9V)											W

[1] Other pressure ranges on request
[2] Other sealing material on request
[3] Other pressure connection on request

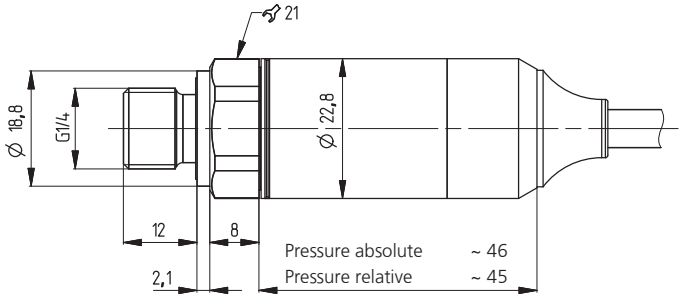
Order code selection table in MPa			1	2	3	4	5	6	7	8	9	10
	515.		X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative		9									
	Absolute		8									
Pressure range [1]	-0.1 ... 0 MPa		9	F	0							
	0 ... 0.1 MPa			G	1							
	0 ...0.16 MPa			G	2							
	0 ...0.25 MPa			G	4							
	0 ... 0.4 MPa			G	5							
	0 ... 0.6 MPa			G	7							
	0 ... 1 MPa			H	0							
	0 ... 1.6 MPa			H	1							
	0 ... 2.5 MPa			H	2							
	0 ... 4 MPa		9	H	3						2	
	0 ... 6 MPa		9	K	0						2	
	0 ... 10 MPa		9	K	1						2,5	
	0 ... 16 MPa		9	K	2						2,5	
	0 ... 25 MPa		9	K	3						2,5	
	0 ... 40 MPa	FPM spec. seal only	9	L	4	6					2,5	
	0 ... 60 MPa	FPM spec. seal only	9	L	5	6					2,5	
	▲ Full scale signal at these pressures											
Sealing material [2]	FPM	Fluoro elastomer				0						
	EPDM	Ethylene propylene				1						
	NBR	Butadiene Acylonitrile				2						
	FPM spec.	Fluoro elastomer spec.				6						
Adjustment	Factory						0					
Output / power supply	0 ... 5 V	8.0 ... 33 VDC						1				
	1 ... 6 V	8.0 ... 33 VDC						6				
	0 ... 10 V	11.4 ... 33 VDC						2				
	4 ... 20 mA	8.0 ... 33 VDC						3				
	ratiom. 10 ... 90%	5 VDC ±5%						4				
Electrical connection	Cable 1.5 m PUR								0			
Pressure connection [3]	Inside thread	G ¼ mit O-Ring seal								1		
	Outside thread	G ¼ sealed at back, DIN 3852-E								4		
		G ½ sealed at front								9		
		G ½ sealed at back and manometer (combi)								8		
		¼ -18 NPT								3		
		R ¼, EN 10226								7		
		M12x1.5 sealed at back, DIN 3852-E								5		
		M14x1.5 sealed at back, DIN 3852-E								6		
Version	Stainless steel	without media stopper									1	
		with media stopper (standard from 4 MPa)									2	
		with pressure tip orifice (from 10 MPa on)									5	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 0.8MPa/OUT1...9V)											W

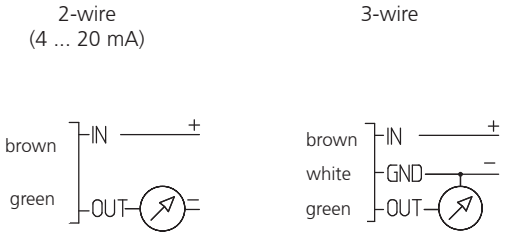
[1] Other pressure ranges on request

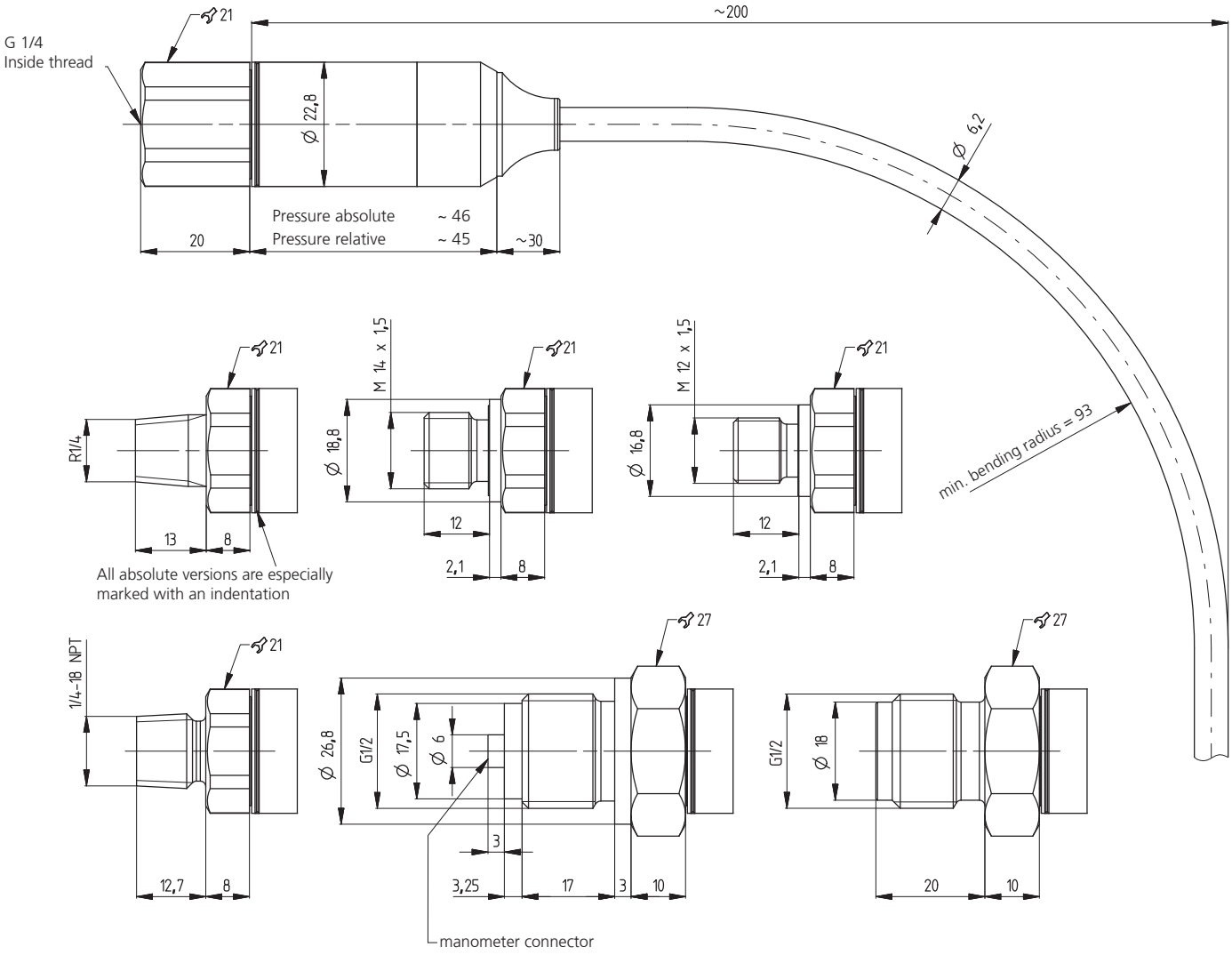
[2] Other sealing material on request

[3] Other pressure connection on request

Dimensions in mm / Electrical connections







OEM Relative and absolute pressure transmitter type 516

Pressure range
-1 ... 0 – 16 bar

Used in combination with a unique integrated electronic design the type 516 gives a high degree of accuracy for all temperature ranges.

This technology, with its amplified ratiometric output signal, allows direct assembly without the need of user temperature or pressure adjustment.

- Integrated amplifier electronics
- No customer specific adjustment necessary
- Excellent EMC capacity by reinforcement on measuring cell
- Easy and quick fitting on PCB
- Negligible temperature influence on accuracy

Technical overview

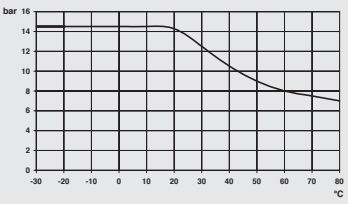
Pressure range			
Relative			-1 ... 0 – 16 bar
Absolute			0 ... 1 – 16 bar
Barometric sensor			0.8 ... 1.4 bar
Operating conditions			
Medium			Liquids and gases
Temperature *	Medium / ambient	NBR	-25 ... +80 °C
		FPM spec.	-30 ... +80 °C
	Storage	in packaging	-40 ... +65 °C
		without packaging	-40 ... +80 °C
Overload / rupture pressure*		< 6	3.0 x fs
		≥ 6	2.5 x fs
Materials			
Case			PA
Materials in contact with medium		Pressure connection	PA / Stainless steel 1.4305
		Sensor	Ceramic Al_2O_3 (96%)
		Sealing material	NBR, FPM spec.

Elektrical overview				
	Output	Power supply	Load	Current consumption
With full scale adjustment	ratiom. 10 ... 90%	5 VDC ±5%	> 10 kOhm / < 100 nF	< 4 mA
Without full scale adjustment	ratiom. 10 ... 60% ±1.2 V	5 VDC ±5%	> 10 kOhm / < 100 nF	< 4 mA
ESD handling				Necessary
Electromagnetic compatibility	The product is designed exclusively for installation in equipment.The customer is responsible for CE conformity.			

Dynamic response	
Response time	< 2 ms, typ. 1 ms
Load cycle	< 100 Hz
Protection standard	
IP 00	
Electrical connection	
Flexible connector	(Prevent repeated bending)
Contact spacing Rast 2.54 (100 mil)	
Pressure connection	
Plastic quick fitting	
Metal quick fitting	
Installation arrangement	
Unrestricted	
Tests / Admissions	
Vibration acc. DIN IEC 600-68-2-6	20 *g*, 2 ... 2000 Hz with amplitude ± 15 mm, 10 Octave/min. all 3 directions, 3 constant load.
Weight	
With plastic quick fitting	~ 15 g
With metal quick fitting	~ 25 g
Packaging	
Multiple packaging 4 blisters in covering box (140 pcs)	

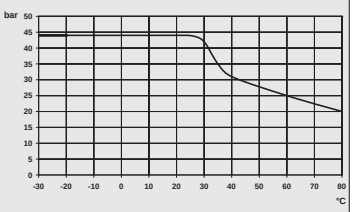
*) **Please note:**
Max. admissible pressure and temperature can be limited with the applied tube (see diagram). It is essential to consider the manufacturers' instruction for the tube.

Tube for plastic quick fitting



Material: Polyamid Ø inside: 2.9 mm
Ø outside: 4 mm

Tube for metal quick fitting



Material: Polyamid Ø inside: 2 mm
Ø outside: 4 mm

Accuracy

Parameter		Unit	-1 … 0 – 16 bar	barometric sensor
Tolerance zero point [1]	max.	% fs	±0.5	±0.5
Tolerance full scale [1]	max.	% fs	±0.5	±0.5
Resolution		% fs	0.1	0.1
Total of linearity, hysteresis and repeatability		% fs	±0.5	±0.8
Long term stability acc. to DIN EN 60770		% fs	±0.5	±0.5
TC zero point [2]	max.	% fs/10K	±0.3	±0.3
TC sensitivity [2]	max.	% fs/10K	±0.2	±0.2

Test conditions:
25 °C, 45% RH, Power supply 24 VDC
TC z.p. / TC s. -15 … +80 °C

[1] Versions with full scale adjustment, only

[2] TC = Temperature coefficient

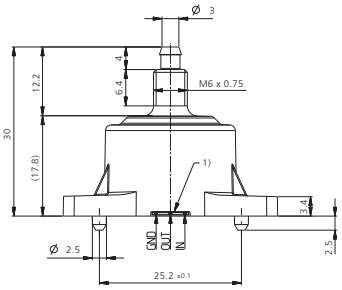
Order code selection table

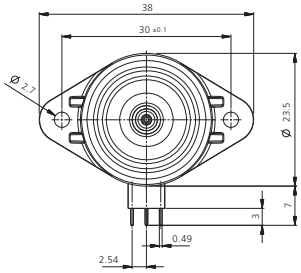
				1	2	3	4	5	6	7
				516.	X	X	X	X	X	X	X
Pressure mode	Relative			9						
	Absolute			8						
Pressure range	-1 … + 0 bar			9	0	0				
	0.8 … + 1.4 bar	barometric Sensor		8	1	0				
	0 … + 1 bar				1	1				
	0 … + 1.6 bar				1	2				
	0 … + 2.5 bar				1	4				
	0 … + 4 bar				1	5				
	0 … + 6 bar				1	7				
	0 … + 10 bar				3	0				
	0 … + 16 bar				3	1				
	▲ Full scale signal at these pressures									
Sealing material/ Pressure connection	O-Ring NBR	Plastic quick fitting					2			
		Metal quick fitting					3			
	O-Ring FPM spec.	Plastic quick fitting					6			
		Metal quick fitting					7			
Adjustment / Output	Factory adjustment zero point and fullscale	ratiom. 10 ... 90%	at 5 VDC power supply					0	4	
	Factory adjustment zero point only	ratiom. 10 ... 60% ±1.2V	at 5 VDC power supply	9				1	8	
Pressure range variation [1] (Optional)	Indicate W and state range on order (e.g.: W0... + 8 bar/OUT0.5...4.5V)							0	4	W

Accessories [2]

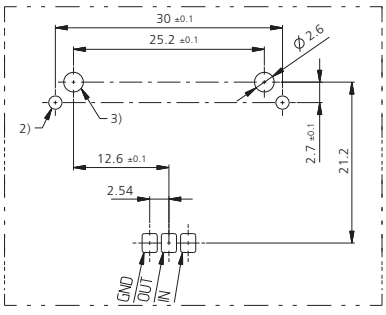
		Order number
Self tapping filister head screw WN 1412	KA22x8	108436
Mounting set for 35 pieces (screws, serrated look washers, nuts)	M2.5x10	111423
Calibration certificate		104551

Dimensions in mm / Electrical connections





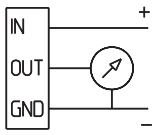
Drilling plan for print



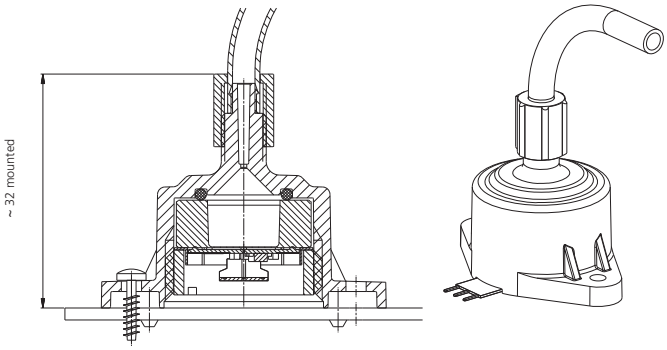
[1] Keep the space at the flex cable open for relative pressure for the pressure compensation. Do not seal or cover it.

[2] Securing holes
– for self tapping screw (K22) Ø 1.75 mm
– for metric screw (M2.5) Ø 2.7 mm
We recommend metric screws with nut instead of self tapping screws for higher pressure or eventual mechanical loads.
(see accessories mounting set)

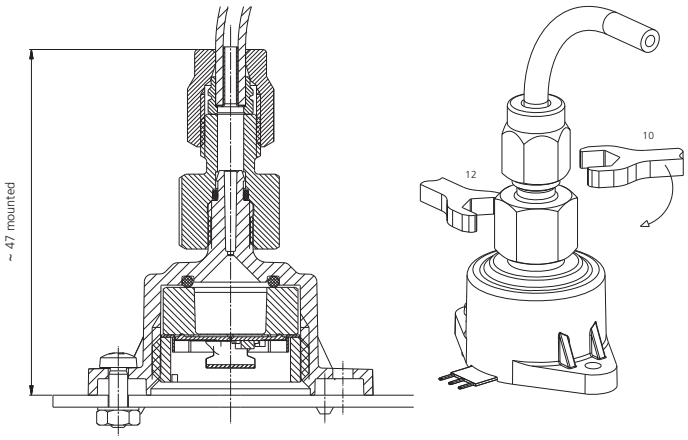
[3] Positioning holes



Pressure connection: Plastic quick fitting (standard)



Pressure connection: Metal quick fitting for higher pressure / higher temperature



Installation advice for metal screwing
1. It is essential to connect the tube to the sensor before mounting on the pcb.
2. Assemble finger tight, final adjustment 1.5 turn with spanner 10.

[1] Versions with full scale adjustment, only

[2] Accessories supplied loose

Relative pressure transmitter type 520

Pressure range
-1 ... 9 bar / 0 ... 2.5 – 1000 bar

The compact type 520 pressure transmitter is based upon the Huba Control developed thick film technology where the pressure measuring cell is fully welded.
This transmitter meets the high burst protection demands and is suitable for the use in all types of refrigerants including ammonia.

- Compact, rugged construction
- Welded without sealing parts, no elastomer seals
- Large selection of connections available.
- Saving time by quick cable mounting by the customer with swift connector

Technical overview

Pressure range

Relative	-1 ... 9 bar / 0 ... 2.5 – 1000 bar

Operating conditions

Medium	Liquids, gases and refrigerants (incl. ammonia)	
Temperature	Medium -40 ... +135 °C	(Ex) -30 ... +120 °C)
	Ambient -30 ... +85 °C	(Ex) -25 ... +85 °C)
	Storage -50 ... +100 °C	
Tolerable overload	≤ 6 bar 5 x fs	
	> 6 bar 3 x fs (max. 1500 bar)	
Rupture pressure	≤ 6 bar 10 x fs	
	> 6 bar 6 x fs (max. 2500 bar)	

Materials

Cover		Stainless steel 1.4404 / AISI 316L (inside thread Schrader 1.4305 / AISI 303 only)
Plug accommodation		Polyarylamide 50% GF UL 94 V-0
Materials in contact with medium	Pressure connection	Stainless steel 1.4404 / AISI 316L (inside thread Schrader 1.4305 / AISI 303 only)
	Sensor	Stainless steel

Electrical overview

		Output	Power supply	Load	Current consumption
2 wire		4 ... 20 mA	7 ... 33 VDC	$< \frac{\text{supply voltage - 7 V}}{0.02\ \text{A}}$ [Ohm]	< 23 mA
	(Ex)	4 ... 20 mA	10 ... 30 VDC	$< \frac{\text{supply voltage - 10 V}}{0.02\ \text{A}}$ [Ohm]	< 23 mA
3 wire		0 ... 5 V	7 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
		1 ... 6 V	8 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
		0 ... 10 V	12 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
		0 ... 10 V	12 ... 33 VDC / 24 VAC ± 15%	>10 kOhm / < 100 nF	< 7 mA
		ratiom. 10 ... 90%	5 VDC ± 10%	>10 kOhm / < 100 nF	< 7 mA
	(Ex)	ratiom. 10 ... 90%	5 VDC ± 10%	>10 kOhm / < 100 nF	< 7 mA
Polarity reversal protection		Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			
Insulation voltage				standard	500 VDC

Protection class

Protection class III

Dynamic response

Response time	< 2 ms, 1 ms typ.
Load cycle	< 100 Hz

Protection standard

Connector DIN EN 175301-803, Braids	IP 65
Connector RAST 2.5	IP 00
Swift connector, Metri Pack, Connector M12x1	IP 67

Electrical connection

Swift connector with or without cable 1.5 / 2.0 / 3.0 / 5.0 m (PVC spec.)
Connector DIN EN 175301-803-A
Connector DIN EN 175301-803-C (industrial standard 9.4 mm)
Metri Pack Serie 150
Connector M12x1
Braids
Connector RAST 2.5 (3 wire only)

Pressure connection

Inside thread	7/16 - 20 UNF	without or with Schrader
	½ -14 NPT	(≤ 60 bar)
	G ¼	with O-Ring seal FPM (-30 ... +135 °C)
Outside thread	7/16 - 20 UNF	sealed at front or sealing cone
	¼ -18 NPT	
	G ¼	sealed at back DIN 3852-E with profile seal ring in FPM (-30 ... +135 °C)
	G ¼	sealed at back and manometer (combi) with profile seal ring in FPM (-30 ... +135 °C) (≤ 60 bar)
	R ¼	EN 10226
	G ½	sealed at back and manometer (combi) with profile seal ring in FPM (-30 ... +135 °C)
	⅛ - 27 NPT	(≤ 60 bar)
	G ⅛	sealed at front (≤ 60 bar)
	G ⅛	sealed at back, with profile seal ring in FPM (-30 ... +135 °C) (≤ 60 bar)
	M10x1	sealed at back with Profile seal ring in FPM (-30 ... +135 °C) (≤ 60 bar)
	M20x1.5	sealed at front and manometer (combi)
	G ½	sealed at front

Installation arrangement

Unrestricted

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3
Raised noise resistantcy	EN 50121-3-2
Shock acc. IEC 68-2-27	100 g, 11 ms half sine wave, all 6 directions, free fall from 1 m on concrete (6x)
Constant shock acc. IEC 68-2-29	40 g for 6 ms, 1000x all 3 directions
Vibration acc. IEC 68-2-6	20 g, 15 ... 2000 Hz, 15 ... 25 Hz with amplitude ± 15 mm, 1 Octave/min. all 3 directions, 50 constant load
UL	ANSI/UL 61010-1 acc. E325110
Drinking water approval	NSF/ANSI 61/372 acc. MH60087

Protection against explosion (Ex)

	ratiom. 10 ... 90%	4 ... 20 mA
Intrinsic safety "i"	Ex II 1/2 G Ex ia IIC T4 Ga/Gb	Ex II 1/2 G Ex ia IIC T4 Ga/Gb
	Ex II 1/2 D Ex ia IIIC T125°C Da/Db	Ex II 1/2 D Ex ia IIIC T125°C Da/Db
EC type examination certificate	SEV 15 ATEX 0173	SEV 10 ATEX 0145
Connection to certified intrinsically safe resistive circuits with maximum values	Ui ≤ 15 VDC; Ii ≤ 200 mA; Pi ≤ 750 mW	Ui ≤ 30 VDC; Ii ≤ 100 mA; Pi ≤ 750 mW
Effective internal inductance and capacitance for versions with plugs complying with EN 175301-803-A or M12x1	Li = 0 nH; Ci ≤ 150 nF	Li = 0 nH; Ci = 0 nF

Weight

~ 90 g

Packaging (Please state on order)

Single packaging in cardboard	accessories integrated
Multiple packaging in cardboard (25 pcs)	

Accuracy

Parameter		Unit	
Characteristic line [1]		% fs	± 0.3
Resolution		% fs	0.1
Thermal characteristic [2]	max.	% fs/10K	± 0.2
Long term stability acc. IEC EN 60770-1	max.	% fs	± 0.25

Test conditions: 25 °C, 45% RH, power supply 24 VDC

Order code selection table in bar

			1	2	3	4	5	6	7	8	9	10	11
			520.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [3]	-1 ... 9 bar		9	0	6								
	0 ... 2.5 bar		9	1	4								
	0 ... 4 bar		9	1	5								
	0 ... 6 bar		9	1	7								
	0 ... 10 bar		9	3	0								
	0 ... 16 bar		9	3	1								
	0 ... 25 bar		9	3	2								
	0 ... 40 bar		9	3	3								
	0 ... 60 bar		9	4	0								
	0 ... 100 bar		9	4	1								
	0 ... 160 bar		9	4	2								
	0 ... 250 bar		9	4	3								
	0 ... 400 bar		9	5	4								
	0 ... 600 bar		9	5	5								
	0 ... 1000 bar		9	5	7								
Application	standard					S	0						
	for oxygen applications					S	1				0		
	with drinking water approval NSF 61					S	4				0	1	
Output / power supply	0 ... 5 V	7 ... 33 VDC						1					
	1 ... 6 V	8 ... 33 VDC						6					
	0 ... 10 V	12 ... 33 VDC						2					
		12 ... 33 VDC / 24 VAC ±15% *(not possible with M12x1, metri Pack, RAST, braids)*						8					
	ratiom. 10 ... 90%	5 VDC ±10%						7					
		5 VDC ±10% Ex protection					0,4	9	3			1	
	4 ... 20 mA	7 ... 33 VDC						3					
		7 ... 33 VDC Raised noise resistantcy *(not possible with Braids)*						A					
		10 ... 30 VDC Ex protection					0,4	4	1,3			1	
Electrical connection	Connector [4]	DIN EN 175301-803-A							1				
		DIN EN 175301-803-C (industrial standard 9.4 mm)							2				
		M12x1 *2w: IN=1 / OUT=3 3w: IN=1 / OUT=4 / GND=3*							3				
		M12x1 *2w: IN=1 / OUT=4 3w: IN=1 / OUT=3 / GND=4*							M				
		M12x1 *2w: IN=1 / OUT=2 3w: IN=1 / OUT=2 / GND=3*							P				
		RAST 2.5					0,4	7	4				
		Metri Pack Serie 150 [5]					0,4		5				
	Braids	80 ±10 mm							6				
		290 ±10 mm							7				
		480 ±10 mm							8				
		730 ±10 mm							9				
	Swift connector	without cable							0				
		with cable 1.5 m							L				
		with cable 2.0 m							N				
		with cable 3.0 m							Q				
		with cable 5.0 m							R				
Pressure connection [3]	Inside thread	$^{7}/_{16}$-20 UNF sealing cone with schrader								0	0	N	
		$^{7}/_{16}$-20 UNF sealing cone								K		1	
		½ -14 NPT [6]								D		1	
		G ¼ with O-Ring seal FPM								1		1	
	Outside thread	$^{7}/_{16}$ -20 UNF sealing cone								2		1	
		¼ -18 NPT								3		1	
		G ¼ sealed at back DIN 3852-E with profile seal ring in FPM								4		1	
		G ¼ sealed at back and manometer with profile seal ring in FPM								5	0	1	
		R ¼ acc. to EN 10226								7		1	
		G ½ sealed at back and manometer with profile seal ring in FPM					0,1			8		1	
		$^{7}/_{16}$-20 UNF sealed at front								G		1	
		⅛ - 27 NPT [6]								A		1	
		G ⅛ sealed at front [6]								M		1	
		G ⅛ sealed at back DIN 3852-E with Profile seal ring in FPM [6]					0,1			H		1	
		M10x1 sealed at back with profile seal ring in FPM [6]					0,1			F		1	
		M20x1.5 sealed at front and manometer (combi)								E		1	
		G ½ sealed at front								9		1	
Pressure orifice	without (inclusive pressure tip orifice from 100 bar on)										0		
	with										2		
Material pressure connection	Stainless steel 1.4305 / AISI 303											N	
	Stainless steel 1.4404 / AISI 316L											1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 3bar/OUT0...5V)												W

Accessories

	Order number
Swift connector	107359
Female connector DIN EN 175301-803-A with seal	103510
Female connector DIN EN 175301-803-C with seal	104244
Corner-wire box for connector M12x1	106975
Corner-wire box for connector M12x1 with cable 2.0 m	114604
Straight-wire box for connector M12x1	114570
Straight-wire box for connector M12x1 with cable 2.0 m	114605
Mounting bracket with screw	118716
Calibration certificate (not possible with pressure range 0 ... 1000 bar)	104551

[1] typ. ; max. 0.5% fs (incl. zero point, full scale, linearity, hysteresis and repeatability) [2] -15 ... 85 °C [3] Other pressure ranges or pressure connections on request [4] Delivery without female connector
[5] For pressure ranges ≤ 10 bar only possible if deareation through the cable is assured [6] (≤ 60 bar)

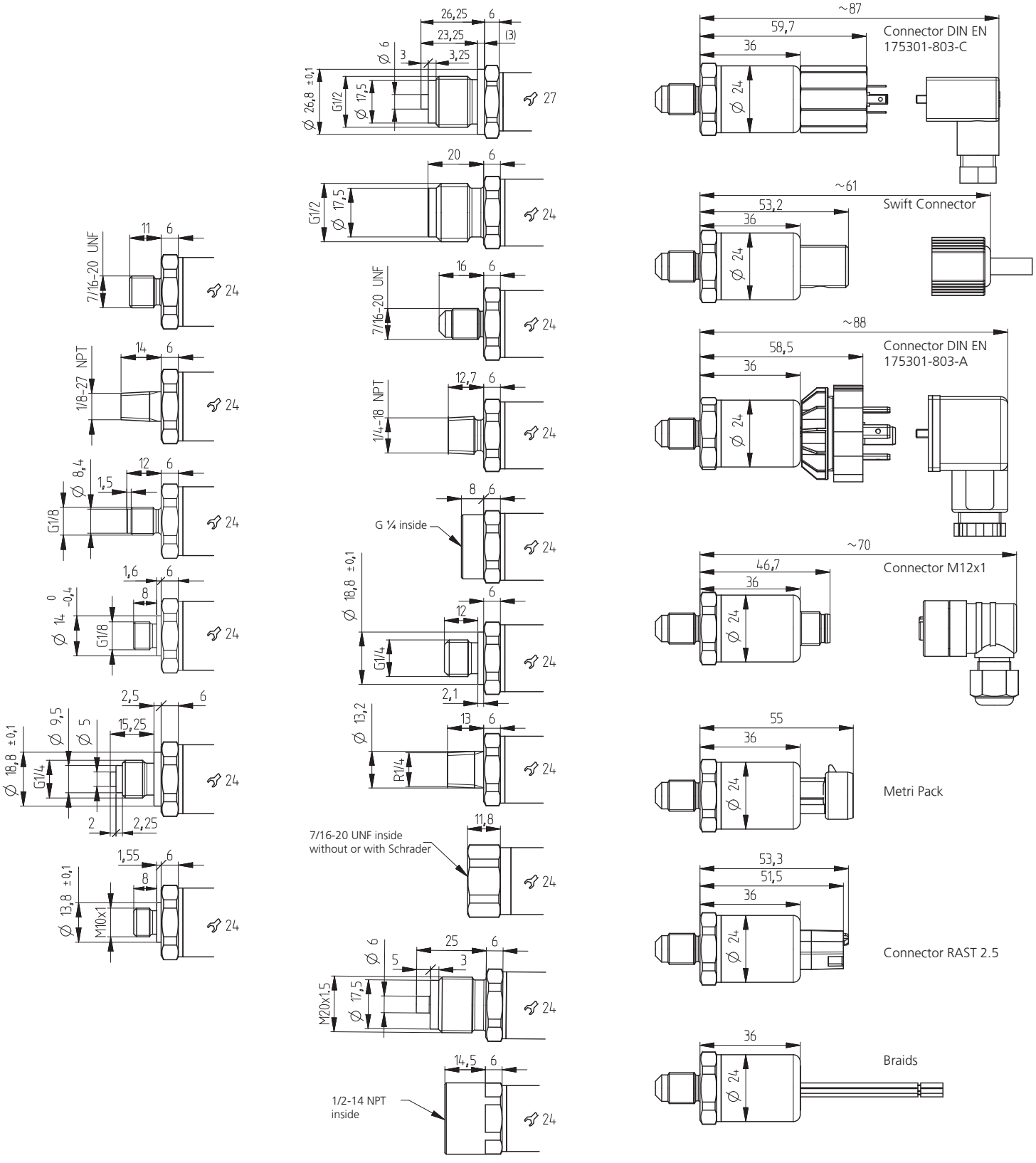
Order code selection table in psi			1	2	3	4	5	6	7	8	9	10	11
		520.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	-15 ... 130 psi		9	A	6								
	0 ... 30 psi		9	B	4								
	0 ... 60 psi		9	B	4								
	0 ... 100 psi		9	B	7								
	0 ... 200 psi		9	C	1								
	0 ... 300 psi		9	C	2								
	0 ... 500 psi		9	C	3								
	0 ... 750 psi		9	D	0								
	0 ... 1000 psi		9	D	1								
	0 ... 2000 psi		9	D	2								
	0 ... 3000 psi		9	D	3								
	0 ... 5000 psi		9	E	4								
	0 ... 7500 psi		9	E	5								
	0 ... 14500 psi		9	E	7								
Application	standard					S	0						
	for oxygen applications					S	1				0		
	with drinking water approval NSF 61					S	4				0	1	
Output / power supply	0 ... 5 V	7 ... 33 VDC						1					
	1 ... 6 V	8 ... 33 VDC						6					
	0 ... 10 V	12 ... 33 VDC						2					
		12 ... 33 VDC / 24 VAC ±15% *(not possible with M12x1, metri Pack, RAST, braids)*						8					
	ratiom. 10 ... 90%	5 VDC ±10%						7					
		5 VDC ±10% Ex protection					0,4	9	3			1	
	4 ... 20 mA	7 ... 33 VDC						3					
		7 ... 33 VDC Raised noise resistantcy *(not possible with Braids)*						A					
		10 ... 30 VDC Ex protection					0,4	4	1,3			1	
Electrical connection	Connector [2]	DIN EN 175301-803-A							1				
		DIN EN 175301-803-C (industrial standard 9.4 mm)							2				
		M12x1 *2w: IN=1 / OUT=3 3w: IN=1 / OUT=4 / GND=3*							3				
		M12x1 *2w: IN=1 / OUT=4 3w: IN=1 / OUT=3 / GND=4*							M				
		M12x1 *2w: IN=1 / OUT=2 3w: IN=1 / OUT=2 / GND=3*							P				
		RAST 2.5					0,4	7	4				
		Metri Pack Serie 150 [3]					0,4		5				
	Braids	80 ±10 mm							6				
		290 ±10 mm							7				
		480 ±10 mm							8				
		730 ±10 mm							9				
	Swift connector	without cable							0				
		with cable 1.5 m							L				
		with cable 2.0 m							N				
		with cable 3.0 m							Q				
		with cable 5.0 m							R				
Pressure connection [1]	Inside thread	$^{7}/_{16}$-20 UNF sealing cone with schrader								0	0	N	
		$^{7}/_{16}$-20 UNF sealing cone								K		1	
		½ -14 NPT [4]								D		1	
		G ¼ with O-Ring seal FPM								1		1	
	Outside thread	$^{7}/_{16}$ -20 UNF sealing cone								2		1	
		¼ -18 NPT								3		1	
		G ¼ sealed at back DIN 3852-E with profile seal ring in FPM								4		1	
		G ¼ sealed at back and manometer with profile seal ring in FPM								5	0	1	
		R ¼ acc. to EN 10226								7		1	
		G ½ sealed at back and manometer with profile seal ring in FPM					0,1			8		1	
		$^{7}/_{16}$-20 UNF sealed at front								G		1	
		⅛ - 27 NPT [4]								A		1	
		G ⅛ sealed at front [4]								M		1	
		G ⅛ sealed at back DIN 3852-E with Profile seal ring in FPM [4]					0,1			H		1	
		M10x1 sealed at back with profile seal ring in FPM[4]					0,1			F		1	
		M20x1.5 sealed at front and manometer (combi)								E		1	
		G ½ sealed at front								9		1	
Pressure orifice	without (inclusive pressure tip orifice from 750 psi on)										0		
	with										2		
Material pressure connection	Stainless steel 1.4305 / AISI 303											N	
	Stainless steel 1.4404 / AISI 316L											1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 400psi/OUT0...5V)												W

[1] Other pressure ranges or pressure connections on request [2] Delivery without female connector [3] For pressure ranges ≤ 150 psi only possible if deareation through the cable is assured [4] (≤ 870 psi)

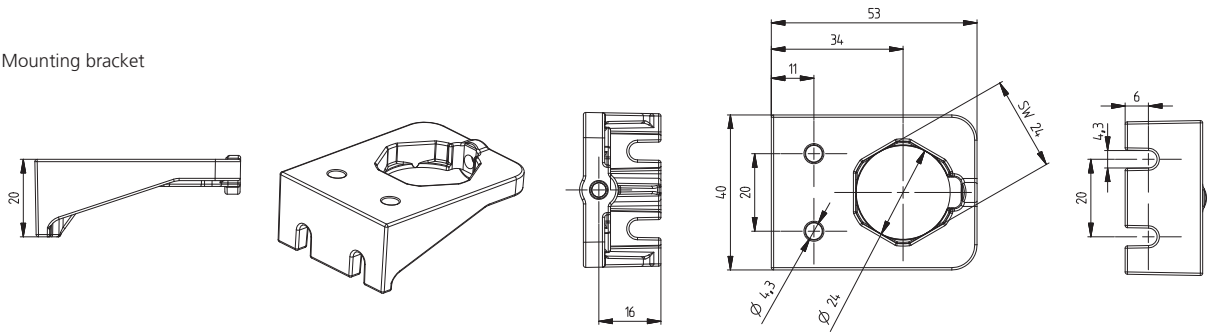
Order code selection table in MPa			1	2	3	4	5	6	7	8	9	10	11
		520.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	-0.1 ... 0.9 MPa		9	F	6								
	0 ... 0.25 MPa		9	G	4								
	0 ... 0.4 MPa		9	G	5								
	0 ... 0.6 MPa		9	G	7								
	0 ... 1 MPa		9	H	0								
	0 ... 1.6 MPa		9	H	1								
	0 ... 2.5 MPa		9	H	2								
	0 ... 4 MPa		9	H	3								
	0 ... 6 MPa		9	K	0								
	0 ... 10 MPa		9	K	1								
	0 ... 16 MPa		9	K	2								
	0 ... 25 MPa		9	K	3								
	0 ... 40 MPa		9	L	4								
	0 ... 60 MPa		9	L	5								
	0 ... 100 MPa		9	L	7								
Application	standard					S	0						
	for oxygen applications					S	1				0		
	with drinking water approval NSF 61					S	4				0	1	
Output / power supply	0 ... 5 V	7 ... 33 VDC						1					
	1 ... 6 V	8 ... 33 VDC						6					
	0 ... 10 V	12 ... 33 VDC						2					
		12 ... 33 VDC / 24 VAC ±15% *(not possible with M12x1, metri Pack, RAST, braids)*						8					
	ratiom. 10 ... 90%	5 VDC ±10%						7					
		5 VDC ±10% Ex protection					0,4	9	3			1	
	4 ... 20 mA	7 ... 33 VDC						3					
		7 ... 33 VDC Raised noise resistantcy *(not possible with braids)*						A					
		10 ... 30 VDC Ex protection					0,4	4	1,3			1	
Electrical connection	Connector [2]	DIN EN 175301-803-A							1				
		DIN EN 175301-803-C (industrial standard 9.4 mm)							2				
		M12x1 *2w: IN=1 / OUT=3 3w: IN=1 / OUT=4 / GND=3*							3				
		M12x1 *2w: IN=1 / OUT=4 3w: IN=1 / OUT=3 / GND=4*							M				
		M12x1 *2w: IN=1 / OUT=2 3w: IN=1 / OUT=2 / GND=3*							P				
		RAST 2.5					0,4	7	4				
		Metri Pack Serie 150 [3]					0,4		5				
	Braids	80 ±10 mm							6				
		290 ±10 mm							7				
		480 ±10 mm							8				
		730 ±10 mm							9				
	Swift connector	without cable							0				
		with cable 1.5 m							L				
		with cable 2.0 m							N				
		with cable 3.0 m							Q				
		with cable 5.0 m							R				
Pressure connection [1]	Inside thread	$^{7}/_{16}$-20 UNF sealing cone with schrader								0	0	N	
		$^{7}/_{16}$-20 UNF sealing cone								K		1	
		½ -14 NPT [4]								D		1	
		G ¼ with O-Ring seal FPM								1		1	
	Outside thread	$^{7}/_{16}$ -20 UNF sealing cone								2		1	
		¼ -18 NPT								3		1	
		G ¼ sealed at back DIN 3852-E with profile seal ring in FPM								4		1	
		G ¼ sealed at back and manometer with profile seal ring in FPM								5	0	1	
		R ¼ acc. to EN 10226								7		1	
		G ½ sealed at back and manometer with profile seal ring in FPM					0,1			8		1	
		$^{7}/_{16}$-20 UNF sealed at front								G		1	
		⅛ - 27 NPT [4]								A		1	
		G ⅛ sealed at front [4]								M		1	
		G ⅛ sealed at back DIN 3852-E with Profile seal ring in FPM [4]					0,1			H		1	
		M10x1 sealed at back with profile seal ring in FPM [4]					0,1			F		1	
		M20x1.5 sealed at front and manometer (combi)								E		1	
		G ½ sealed at front								9		1	
Pressure orifice	without (inclusive pressure tip orifice from 10 MPa on)										0		
	with										2		
Material pressure connection	Stainless steel 1.4305 / AISI 303											N	
	Stainless steel 1.4404 / AISI 316L											1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 0.3MPa/OUT0...5V)												W

[1] Other pressure ranges or pressure connections on request [2] Delivery without female connector [3] For pressure ranges ≤ 1 MPa only possible if deareation through the cable is assured [4] (≤ 6 MPa)

Dimensions in mm



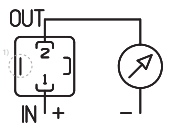
Mounting bracket



Electrical connections

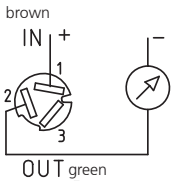
2 wire

Connector DIN EN 175301-803-A or C



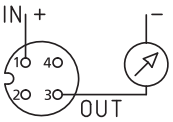
1 (IN) 2 (OUT)

Swift connector



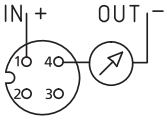
1 (IN) 2 (OUT)

Connector M12x1



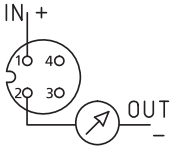
1 (IN) 3 (OUT)

Connector M12x1



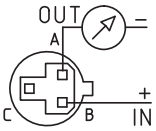
1 (IN) 4 (OUT)

Connector M12x1



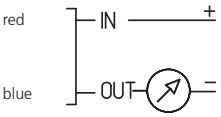
1 (IN) 2 (OUT)

Metri Pack Serie 150



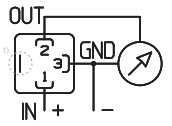
B (IN) A (OUT)

Braids



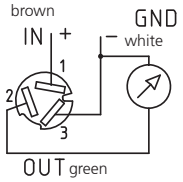
3 wire

Connector DIN EN 175301-803-A or C



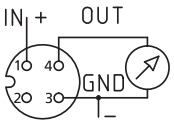
1 (IN) 2 (OUT) 3 (GND)

Swift connector



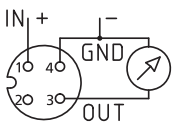
1 (IN) 2 (OUT) 3 (GND)

Connector M12x1



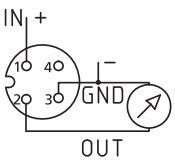
1 (IN) 4 (OUT) 3 (GND)

Connector M12x1



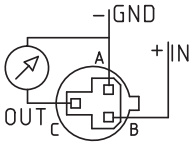
1 (IN) 3 (OUT) 4 (GND)

Connector M12x1



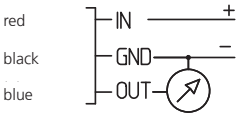
1 (IN) 2 (OUT) 3 (GND)

Metri Pack Serie 150

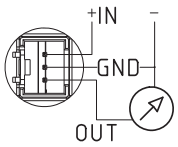


B (IN) C (OUT) A (GND)

Braids

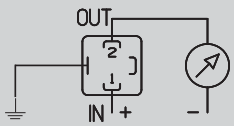


Connector RAST 2.5



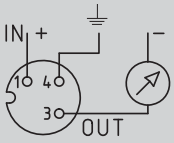
Device design with explosion protection: 4 ... 20 mA
The grounding connection is conductively connected to the transmitter housing.

Connector DIN EN 175301-803-A



1 (IN) 2 (OUT) ⏚

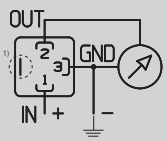
Connector M12x1



1 (IN) 3 (OUT) 4 (⏚)

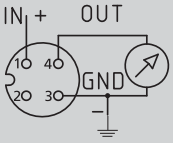
Device design with explosion protection: ratiom. 10 ... 90%
The electronic GND is connected with a 1MΩ resistor to the transmitter housing.

Connector DIN EN 175301-803-A



1 (IN) 2 (OUT) 3 (GND)

Connector M12x1



1 (IN) 3 (GND) 4 (OUT)

[1] Not connected with transmitter housing

Relative pressure transmitter type 522 for shipbuilding

Pressure range
0 ... 2.5 – 600 bar

The compact type 522 pressure transmitter for shipbuilding is based upon the Huba Control developed thick film technology where the pressure measuring cell is fully welded.

The pressure measuring cell incorporates a fully welded construction within the transducer housing. Highest requirements in various applications concerning burst can be met.

All pressure transmitters of type 522 have the most important certifications for the shipbuilding industry.

- Compact, rugged construction
- Welded without sealing parts
- Certified for shipbuilding with:
  - Germanischer Lloyd
  - American Bureau of Shipping
  - Bureau Veritas
  - Det Norske Veritas
  - Lloyd`s Register

Technical overview

Pressure range

Relative	0 ... 2.5 – 600 bar

Operating conditions

Medium		Liquids, gases and refrigerants (incl. ammonia)	
Temperature	Medium	-40 ... +135 °C	(Ex -30 ... +120 °C)
	Ambient	-30 ... +85 °C	(Ex -25 ... +85 °C)
	Storage	-50 ... +100 °C	
Tolerable overload	≤ 6 bar	5 x FS	
	> 6 bar	3 x FS (max. 1500 bar)	
Rupture pressure	≤ 6 bar	10 x FS	
	> 6 bar	6 x FS (max. 2500 bar)	

Materials

Cover		Stainless steel 1.4404 / AISI 316L
Plug accommodation		Polyarylamide 50% GF UL 94 V-0
Materials in contact with medium	Pressure connection	Stainless steel 1.4404 / AISI 316L
	Sensor	Stainless steel

Electrical overview

		Output	Power supply	Load	Current consumption
2 wire		4 ... 20 mA	7 ... 33 VDC	$< \frac{\text{supply voltage - 7 V}}{0.02\ \text{A}}$ [Ohm]	< 23 mA
	Ex	4 ... 20 mA	10 ... 30 VDC	$< \frac{\text{supply voltage - 10 V}}{0.02\ \text{A}}$ [Ohm]	< 23 mA
3 wire		0 ... 10 V	12 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
Polarity reversal protection		Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			

Protection class

Protection class III

Dynamic response

Response time	< 2 ms, 1 ms typ.
Load cycle	< 100 Hz

Protection standard

Connector DIN EN 175301-803-A	IP 65
Swift connector, Connector M12x1	IP 67

Electrical connection

Swift connector with cable 1.5 m (PVC spec.)
Connector DIN EN 175301-803-A
Connector M12x1

Pressure connection

Inside thread	7/16 - 20 UNF	
	½ - 14 NPT	(≤ 60 bar)
Outside thread	7/16 - 20 UNF	
	¼ -18 NPT	
	G ¼	sealed at back DIN 3852-E with Profile seal ring in FPM (-30 ... +135 °C)
	G ½	sealed at back and manometer (combi) with Profile seal ring in FPM (-30 ... +135 °C)
	M20x1.5	sealed at front and manometer (combi)
	G ½	sealed at front

Installation arrangement

Unrestricted

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3
Shock acc. IEC IEC 68-2-27	100 *g*, 11 ms half sine wave, all 6 directions, free fall from 1 m on concrete (6x)
Constant shock acc. IEC 68-2-29	40 *g* for 6 ms, 1000x all 3 directions
Vibration acc. IEC 68-2-6	20 *g*, 15 ... 2000 Hz, 15 ... 25 Hz with amplitude ± 15 mm, 1 Octave/min. all 3 directions, 50 constant load
Shipbuilding	Germanischer Lloyd
	American Bureau of Shipping
	Bureau Veritas
	Det Norske Veritas
	Lloyd`s Register

Protection against explosion

Intrinsic safety "i" (with current output only)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIIC T125°C Da/Db
EC type examination certificate	SEV 10 ATEX 0145
Connection to certified intrinsically safe resistive circuits with maximum values	Ui = 30 VDC; Ii = 100 mA = Pi = 0.75 W
Effective internal inductance and capacitance for versions with plugs complying with EN 175301-803-A or M12x1	Li = 0 nH; Ci = 0 nF

Weight

~ 90 g

Packaging (Please state on order)

Single packaging in cardboard	accessories integrated
Multiple packaging in cardboard (25 pcs)	

Accuracy

Parameter		Unit	
Characteristic line [1]		% fs	± 0.3
Resolution		% fs	0.1
Thermal characteristic [2]	max.	% fs/10K	± 0.2
Long term stability acc. IEC EN 60770-1	max.	% fs	± 0.25

Test conditions: 25 °C, 45% RH, power supply 24 VDC

[1] typ. ; max. 0.5% fs (incl. zero point, full scale, linearity, hysteresis and repeatability) [2] -15 ... 85 °C

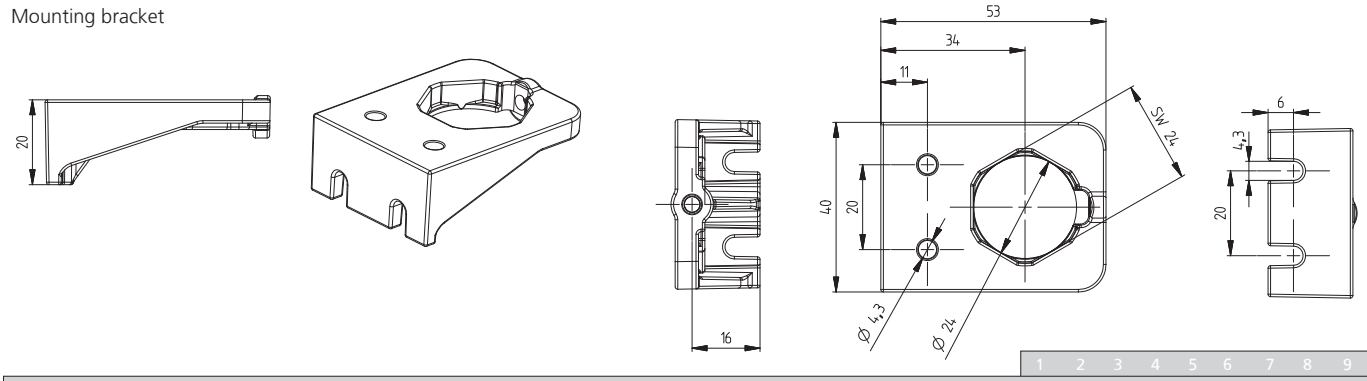
Order code selection table in bar

			1	2	3	4	5	6	7	8	9	10	11
			522.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... 2.5 bar			9	1	4	S	0						
	0 ... 4 bar			9	1	5	S	0						
	0 ... 6 bar			9	1	7	S	0						
	0 ... 10 bar			9	3	0	S	0						
	0 ... 16 bar			9	3	1	S	0						
	0 ... 25 bar			9	3	2	S	0						
	0 ... 40 bar			9	3	3	S	0						
	0 ... 60 bar			9	4	0	S	0						
	0 ... 100 bar			9	4	1	S	0						
	0 ... 160 bar			9	4	2	S	0						
	0 ... 250 bar			9	4	3	S	0						
	0 ... 400 bar			9	5	4	S	0						
	0 ... 600 bar			9	5	5	S	0						
Output / power supply	0 ... 10 V	12 ... 33 VDC						2					
	4 ... 20 mA	7 ... 33 VDC						3					
		10 ... 30 VDC Ex protection						4	1,3				
Electrical connection	Connector	DIN EN 175301-803-A [2]							1				
		M12x1 [2] *2w: IN=1 / OUT=3 3w: IN=1 / OUT=4 / GND=3*							3				
		M12x1 [2] *2w: IN=1 / OUT=4 3w: IN=1 / OUT=3 / GND=4*							M				
		Swift connector with cable 1.5 m							L				
Pressure connection	Inside thread	7/16 - 20 UNF								K	0	1	
		½ - 14 NPT (≤ 60 bar)								D	0	1	
	Outside thread	7/16 - 20 UNF								2	0	1	
		¼ - 18 NPT								3	0	1	
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM								4	0	1	
		G ½ sealed at back and manometer with Profile seal ring in FPM								8	0	1	
		M20x1.5 sealed at front and manometer (combi)								E	0	1	
		G ½ sealed at front								9	0	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 3bar/OUT0...5V)												W

Accessories

		Order number
Female connector DIN EN 175301-803-A with seal		103510
Corner-wire box for connector M12x1	3-pole	106975
Mounting bracket with screw		118716
Calibration certificate		104551

Mounting bracket



Order code selection table in psi

			1	2	3	4	5	6	7	8	9	10	11
			522.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... 30 psi			9	B	4	S	0						
	0 ... 60 psi			9	B	5	S	0						
	0 ... 100 psi			9	B	7	S	0						
	0 ... 200 psi			9	C	1	S	0						
	0 ... 300 psi			9	C	2	S	0						
	0 ... 500 psi			9	C	3	S	0						
	0 ... 750 psi			9	D	0	S	0						
	0 ... 1000 psi			9	D	1	S	0						
	0 ... 2000 psi			9	D	2	S	0						
	0 ... 3000 psi			9	D	3	S	0						
	0 ... 5000 psi			9	E	4	S	0						
	0 ... 7500 psi			9	E	5	S	0						
Output / power supply	0 ... 10 V	12 ... 33 VDC						2					
	4 ... 20 mA	7 ... 33 VDC						3					
		10 ... 30 VDC Ex protection						4	1,3				
Electrical connection	Connector	DIN EN 175301-803-A [2]							1				
		M12x1 [2] *2w: IN=1 / OUT=3 3w: IN=1 / OUT=4 / GND=3*							3				
		M12x1 [2] *2w: IN=1 / OUT=4 3w: IN=1 / OUT=3 / GND=4*							M				
		Swift connector with cable 1.5 m							L				
Pressure connection	Inside thread	7/16 - 20 UNF								K	0	1	
		½ - 14 NPT (≤ 750 psi)								D	0	1	
	Outside thread	7/16 - 20 UNF								2	0	1	
		¼ - 18 NPT								3	0	1	
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM								4	0	1	
		G ½ sealed at back and manometer with Profile seal ring in FPM								8	0	1	
		M20x1.5 sealed at front and manometer (combi)								E	0	1	
		G ½ sealed at front								9	0	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 400psi/OUT0...5V)												W

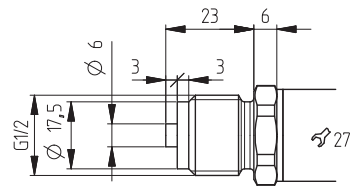
[1] Other pressure ranges on request

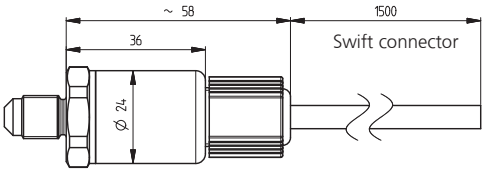
[2] Delivery without female connector

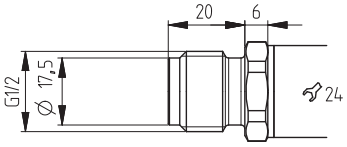
Order code selection table in MPa

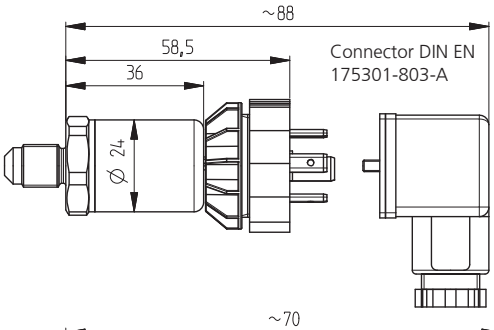
			1	2	3	4	5	6	7	8	9	10	11
			522.	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... 0.25 MPa		9	G	4	S	0						
	0 ... 0.4 MPa		9	G	5	S	0						
	0 ... 0.6 MPa		9	G	7	S	0						
	0 ... 1 MPa		9	H	0	S	0						
	0 ... 1.6 MPa		9	H	1	S	0						
	0 ... 2.5 MPa		9	H	2	S	0						
	0 ... 4 MPa		9	H	3	S	0						
	0 ... 6 MPa		9	K	0	S	0						
	0 ... 10 MPa		9	K	1	S	0						
	0 ... 16 MPa		9	K	2	S	0						
	0 ... 25 MPa		9	K	3	S	0						
	0 ... 40 MPa		9	L	4	S	0						
	0 ... 60 MPa		9	L	5	S	0						
Output / power supply	0 ... 10 V	12 ... 33 VDC						2					
	4 ... 20 mA	7 ... 33 VDC						3					
		10 ... 30 VDC Ex protection						4	1,3				
Electrical connection	Connector	DIN EN 175301-803-A [2]							1				
		M12x1 [2] *2w: IN=1 / OUT=3 3w: IN=1 / OUT=4 / GND=3*							3				
		M12x1 [2] *2w: IN=1 / OUT=4 3w: IN=1 / OUT=3 / GND=4*							M				
		Swift connector with cable 1.5 m							L				
Pressure connection	Inside thread	7/16 - 20 UNF								K	0	1	
		½ - 14 NPT (≤ 6 MPa)								D	0	1	
	Outside thread	7/16 - 20 UNF								2	0	1	
		¼ - 18 NPT								3	0	1	
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM								4	0	1	
		G ½ sealed at back and manometer with Profile seal ring in FPM								8	0	1	
		M20x1.5 sealed at front and manometer (combi)								E	0	1	
		G ½ sealed at front								9	0	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 0.3MPa/OUT0...5V)												W

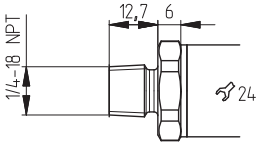
Dimensions in mm / Electrical connections

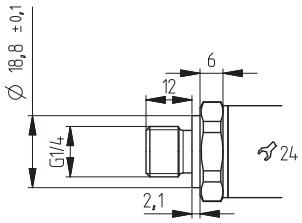


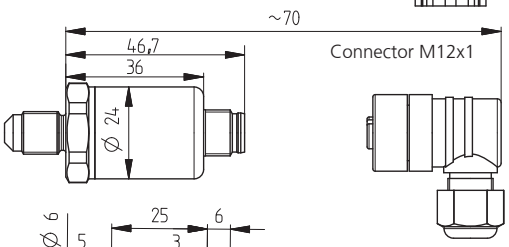


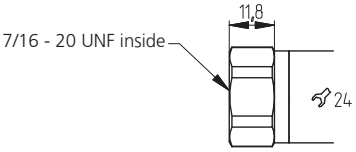


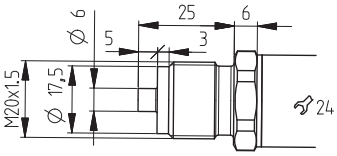


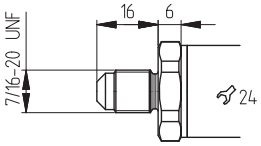


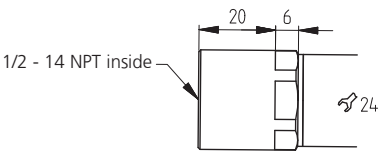




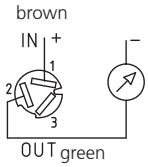






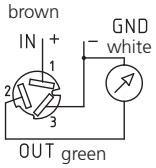


2 wire

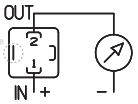


1 (IN) 2 (OUT)

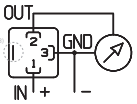
3 wire



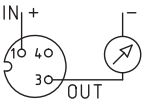
1 (IN) 2 (OUT) 3 (GND)



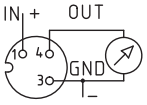
1 (IN) 2 (OUT)



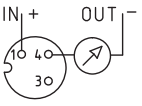
1 (IN) 2 (OUT) 3 (GND)



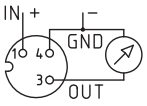
1 (IN) 3 (OUT)



1 (IN) 4 (OUT) 3 (GND)



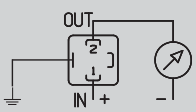
1 (IN) 4 (OUT)



1 (IN) 3 (OUT) 4 (GND)

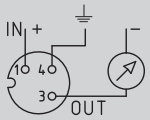
Device design with explosion protection: 4 ... 20 mA
The grounding connection is conductively connected to the transmitter housing.

Connector DIN EN 175301-803-A



1 (IN) 2 (OUT) ⏚

Connector M12x1



1 (IN) 3 (OUT) 4 (⏚)

[1] Other pressure ranges on request
[2] Delivery without female connector
[3] Not connected with transmitter housing

Relative and absolute pressure transmitter type 527 for shipbuilding

Pressure range
0 ... 1 – 60 bar

The compact type 527 pressure transmitter is based upon the well proven ceramic technology developed by Huba Control over 20 years ago.

These transmitters are suitable for applications across a broad spectrum of industries and shipbuilding.

- Compact, rugged construction
- Negligible temperature influence on accuracy
- Certified for shipbuilding with:
  - Germanischer Lloyd
  - American Bureau of Shipping
  - Bureau Veritas
  - Det Norske Veritas
  - Lloyd`s Register

Technical overview

Pressure range

Relative	0 – 60 bar
Absolute	0 ... 1 – 16 bar

Operating conditions

Medium			Liquids and gases	
Temperature	Medium	FPM	-15 ... +125 °C	(Ex -15 ... +120 °C)
		EPDM	-40 ... +125 °C	(Ex -30 ... +120 °C)
		NBR	-20 ... +100 °C	
	Ambient		-30 ... +85 °C	(Ex -25 ... +85 °C)
	Storage		-50 ... +100 °C	
Tolerable overload / Rupture pressure	≤ 4 bar		3.0 x fs	
	> 4 bar		2.5 x fs	

Materials

Cover		Stainless steel 1.4404 / AISI 316L
Plug accommodation		Polyarylamid 50% GF UL 94 V-0
Materials in contact with medium	Pressure connection	Stainless steel 1.4404 / AISI 316L
	Sensor	Ceramic Al_2O_3 (96%)
	Sealing material	FPM, EPDM, NBR

Electrical overview

	Output	Power supply	Load	Current consumption
2 wire	4 ... 20 mA	7 ... 33 VDC	$< \frac{\text{supply voltage - 7 V}}{0.02\ A}$ [Ohm]	< 23 mA
	(Ex) 4 ... 20 mA	10 ... 30 VDC	$< \frac{\text{supply voltage - 10 V}}{0.02\ A}$ [Ohm]	< 23 mA
3 wire	0 ... 10 V	12 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			

Protection class

Protection class III

Dynamic response

Response time	< 2 ms, 1 ms typ.
Load cycle	< 100 Hz

Protection standard

Connector DIN EN 175301-803-A	IP 65
Swift connector, Connector M12x1	IP 67

Electrical connection

Swift connector with cable 1.5 m (PVC spec.)
Connector DIN EN 175301-803-A
Connector M12x1

Pressure connection

Inside thread	7/16 - 20 UNF	
	½ - 14 NPT	
Outside thread	7/16 - 20 UNF	
	¼ -18 NPT	
	G ¼	sealed at back DIN 3852-E with Profile seal ring in FPM (-30 ... +135 °C)
	G ½	sealed at back and manometer (combi) with Profile seal ring in FPM (-30 ... +135 °C)
	M20x1.5	sealed at front and manometer (combi)
	G ½	sealed at front

Installation arrangement

Unrestricted

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3
Shock acc. IEC IEC 68-2-27	100 *g*, 11 ms half sine wave, all 6 directions, free fall from 1 m on concrete (6x)
Constant shock acc. IEC 68-2-29	40 *g* for 6 ms, 1000x all 3 directions
Vibration acc. IEC 68-2-6	20 *g*, 15 ... 2000 Hz, 15 ... 25 Hz with amplitude ± 15 mm, 1 Octave/min. all 3 directions, 50 constant load
Shipbuilding	Germanischer Lloyd
	American Bureau of Shipping
	Bureau Veritas
	Det Norske Veritas
	Lloyd`s Register

Protection against explosion

Intrinsic safety «i» (with current output only)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIIC T125°C Da/Db
EC type examination certificate	SEV 10 ATEX 0145
Connection to certified intrinsically safe resistive circuits with maximum values	Ui = 30 VDC; Ii = 100 mA = Pi = 0.75 W
Effective internal inductance and capacitance for versions with plugs complying with EN 175301-803 or M12x1	Li = 0 nH; Ci = 0 nF

Weight

~ 90 g

Packaging (Please state on order)

Single packaging in cardboard	accessories integrated
Multiple packaging in cardboard (25 pcs)	

Accuracy

Parameter		Unit	
Characteristic line [1]		% fs	± 0.3
Resolution		% fs	0.1
Thermal characteristic [2]	max.	% fs/10K	± 0.2
Long term stability acc. IEC EN 60770-1	max.	% fs	± 0.25

Test conditions: 25 °C, 45% RH, power supply 24 VDC

[1] typ. ; max. 0.5% fs (incl. zero point, full scale, linearity, hysteresis and repeatability) [2] -15 ... 85 °C

Order code selection in bar

				1	2	3	4	5	6	7	8	9	10	11
			527.	X	X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative			9										
	Absolute			8										
Pressure range [1]	0 ... 1 bar				1	1								
	0 ... 1.6 bar				1	2								
	0 ... 2.5 bar				1	4								
	0 ... 4 bar				1	5								
	0 ... 6 bar				1	7								
	0 ... 10 bar				3	0								
	0 ... 16 bar				3	1								
	0 ... 25 bar			9	3	2								
	0 ... 40 bar			9	3	3								
	0 ... 60 bar			9	4	0								
Sealing material	FPM	Fluoro elastomer					0	0						
	EPDM	Ethylene propylene					1	0						
	NBR	Butadiene Acylonitrile					2	0						
Output / power supply	0 ... 10 V	12 ... 33 VDC							2					
	4 ... 20 mA	7 ... 33 VDC							3					
		10 ... 30 VDC	Ex protection						4	1,3				
Electrical connection	Connector	DIN EN 175301-803-A [2]								1				
		M12x1 [2]	*2w: IN=1 / OUT=3* *3w: IN=1 / OUT=4 / GND=3*							3				
		M12x1 [2]	*2w: IN=1 / OUT=4* *3w: IN=1 / OUT=3 / GND=4*							M				
	Swift connector with cable 1.5 m									L				
Pressure connection	Inside thread	$^{7}/_{16}$ - 20 UNF									K	1	1	
		½ - 14 NPT									D	1	1	
	Outside thread	$^{7}/_{16}$ - 20 UNF									2	1	1	
		¼ - 18 NPT									3	1	1	
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM									4	1	1	
		G ½ sealed at back and manometer with Profile seal ring in FPM									8	1	1	
		M20x1.5 sealed at front and manometer (combi)									E	1	1	
		G ½ sealed at front									9	1	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 3bar/OUT0...5V)													W

Accessories

		Order number
Female connector DIN EN 175301-803-A with seal		103510
Corner-wire box for connector M12x1	3-pole	106975
Mounting bracket with screw		118716
Calibration certificate		104551

Order code selection in psi

				1	2	3	4	5	6	7	8	9	10	11
			527.	X	X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative			9										
	Absolute			8										
Pressure range [1]	0 ... 15 psi				B	1								
	0 ... 20 psi				B	2								
	0 ... 30 psi				B	4								
	0 ... 60 psi				B	5								
	0 ... 100 psi				B	7								
	0 ... 150 psi				C	0								
	0 ... 200 psi				C	1								
	0 ... 300 psi			9	C	2								
	0 ... 500 psi			9	C	3								
	0 ... 750 psi			9	D	0								
Sealing material	FPM	Fluoro elastomer					0	0						
	EPDM	Ethylene propylene					1	0						
	NBR	Butadiene Acylonitrile					2	0						
Output / power supply	0 ... 10 V	12 ... 33 VDC							2					
	4 ... 20 mA	7 ... 33 VDC							3					
		10 ... 30 VDC	Ex protection						4	1,3				
Electrical connection	Connector	DIN EN 175301-803-A [2]								1				
		M12x1 [2]	*2w: IN=1 / OUT=3* *3w: IN=1 / OUT=4 / GND=3*							3				
		M12x1 [2]	*2w: IN=1 / OUT=4* *3w: IN=1 / OUT=3 / GND=4*							M				
	Swift connector with cable 1.5 m									L				
Pressure connection	Inside thread	$^{7}/_{16}$ - 20 UNF									K	1	1	
		½ - 14 NPT									D	1	1	
	Outside thread	$^{7}/_{16}$ - 20 UNF									2	1	1	
		¼ - 18 NPT									3	1	1	
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM									4	1	1	
		G ½ sealed at back and manometer with Profile seal ring in FPM									8	1	1	
		M20x1.5 sealed at front and manometer (combi)									E	1	1	
		G ½ sealed at front									9	1	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 16psi/OUT0...5V)													W

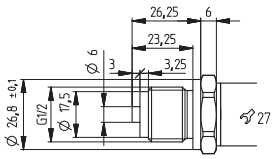
[1] Other pressure ranges on request

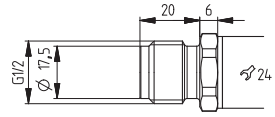
[2] Delivery without female connector

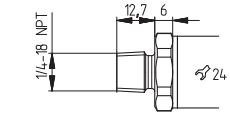
Order code selection in MPa

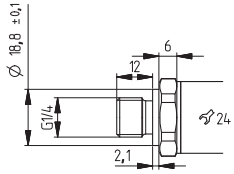
			1	2	3	4	5	6	7	8	9	10	11
	527.		X	X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative		9										
	Absolute		8										
Pressure range [1]	0 ... 0.1 MPa			G	1								
	0 ... 0.16 MPa			G	2								
	0 ... 0.25 MPa			G	4								
	0 ... 0.4 MPa			G	5								
	0 ... 0.6 MPa			G	7								
	0 ... 1 MPa			H	0								
	0 ... 1.6 MPa			H	1								
	0 ... 2.5 MPa		9	H	2								
	0 ... 4 MPa		9	H	3								
	0 ... 6 MPa		9	K	0								
Sealing material	FPM	Fluoro elastomer				0	0						
	EPDM	Ethylene propylene				1	0						
	NBR	Butadiene Acylonitrile				2	0						
Output / power supply	0 ... 10 V	12 ... 33 VDC						2					
	4 ... 20 mA	7 ... 33 VDC						3					
		10 ... 30 VDC Ex protection						4	1,3				
Electrical connection	Connector	DIN EN 175301-803-A [2]							1				
		M12x1 [2] *2w: IN=1 / OUT=3 3w: IN=1 / OUT=4 / GND=3*							3				
		M12x1 [2] *2w: IN=1 / OUT=4 3w: IN=1 / OUT=3 / GND=4*							M				
	Swift connector with cable 1.5 m								L				
Pressure connection	Inside thread	$^{7}/_{16}$ - 20 UNF								K	1	1	
		½ - 14 NPT								D	1	1	
	Outside thread	$^{7}/_{16}$ - 20 UNF								2	1	1	
		¼ - 18 NPT								3	1	1	
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM								4	1	1	
		G ½ sealed at back and manometer with Profile seal ring in FPM								8	1	1	
		M20x1.5 sealed at front and manometer (combi)								E	1	1	
		G ½ sealed at front								9	1	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 0.3MPa/OUT0...5V)												W

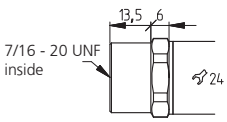
Dimensions in mm / Electrical connections

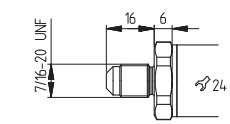


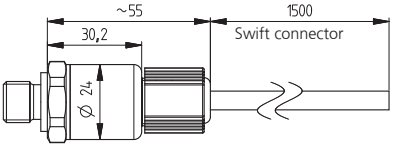


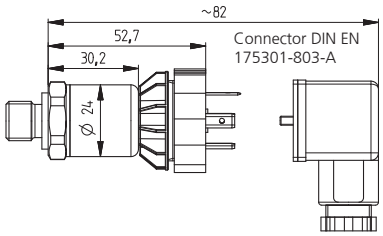


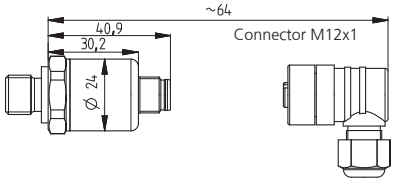


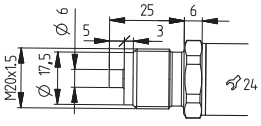


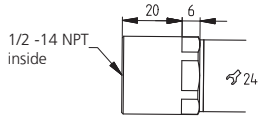




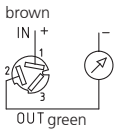






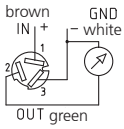


2 wire

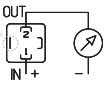


1 (IN) 2 (OUT)

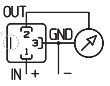
3 wire



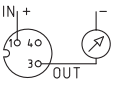
1 (IN) 2 (OUT) 3 (GND)



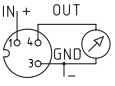
1 (IN) 2 (OUT)



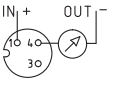
1 (IN) 2 (OUT) 3 (GND)



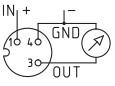
1 (IN) 3 (OUT)



1 (IN) 4 (OUT) 3 (GND)



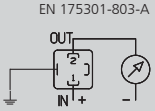
1 (IN) 4 (OUT)



1 (IN) 3 (OUT) 4 (GND)

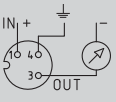
Device design with explosion protection: 4 ... 20 mA
The grounding connection is conductively connected to the transmitter housing.

Connector DIN EN 175301-803-A



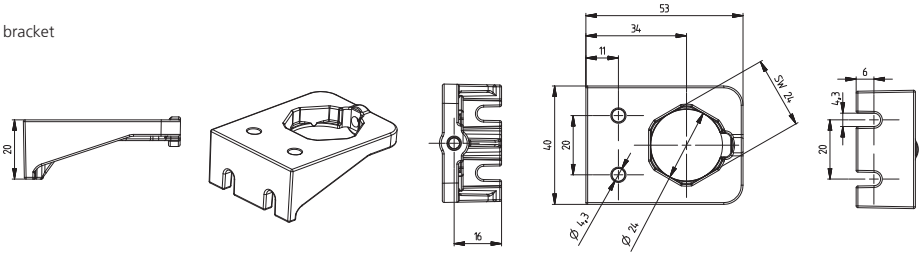
1 (IN) 2 (OUT) ⏚

Connector M12x1



1 (IN) 3 (OUT) 4 (⏚)

Mounting bracket



[1] Other pressure ranges on request
[2] Delivery without female connector
[3] Not connected with transmitter housing

Relative and absolute pressure transmitter type 528

Pressure range
-1 ... 0 – 60 bar

The compact type 528 pressure transmitter is based upon the well proven ceramic technology developed by Huba Control over 20 years ago.

These transmitters are suitable for applications across a broad spectrum of industries.

- Compact, rugged construction
- Negligible temperature influence on accuracy
- Large selection of connections available
- Saving time by quick cable mounting by the customer with swift connector

Technical overview

Pressure range

Relative	-1 ... 0 – 60 bar
Absolute	0 ... 1 – 16 bar

Operating conditions

Medium				Liquids and gases
Temperature	Medium	FPM	-15 ... +125 °C	(Ex) -15 ... +120 °C)
		EPDM	-40 ... +125 °C	(Ex) -30 ... +120 °C)
		NBR	-20 ... +100 °C	
		MVQ	-40 ... +125 °C	(Ex) -30 ... +120 °C)
		FPM	-40 ... +125 °C	(Ex) -30 ... +120 °C)
	Ambient		-30 ... +85 °C	(Ex) -25 ... +85 °C)
	Storage		-50 ... +100 °C	
Tolerable overload / Rupture pressure		≤ 4 bar	3.0 x fs	
		> 4 bar	2.5 x fs	

Materials

Cover		Stainless steel 1.4404 / AISI 316L
Plug accommodation		Polyarylamide 50% GF UL 94 V-0
Materials in contact with medium	Pressure connection	Stainless steel 1.4404 / AISI 316L
		PVDF
	Sensor	Ceramic Al_2O_3 (96%)
	Sealing material	FPM, EPDM, NBR, MVQ

Electrical overview

	Output	Power supply	Load	Current consumption
2 wire	4 ... 20 mA	7 ... 33 VDC	$< \frac{\text{supply voltage - 7 V}}{0.02\ \text{A}}$ [Ohm]	< 23 mA
	(Ex) 4 ... 20 mA	10 ... 30 VDC	$< \frac{\text{supply voltage - 10 V}}{0.02\ \text{A}}$ [Ohm]	< 23 mA
3 wire	0 ... 5 V	7 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
	1 ... 6 V	8 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
	0 ... 10 V	12 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
	0 ... 10 V	12 ... 33 VDC / 24 VAC ± 15%	>10 kOhm / < 100 nF	< 7 mA
	ratiom. 10 ... 90%	5 VDC ± 10%	>10 kOhm / < 100 nF	< 7 mA
	(Ex) ratiom. 10 ... 90%	5 VDC ± 10%	>10 kOhm / < 100 nF	< 7 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			
Insulation voltage				500 VDC

Protection class

Protection class III

Dynamic response

Response time	< 2 ms, 1 ms typ.
Load cycle	< 100 Hz

Protection standard

Connector DIN EN 175301-803, Braids	IP 65
Connector RAST 2.5	IP 00
Swift connector, Metri Pack, Connector M12x1	IP 67

Electrical connection

Swift connector with or without cable 1.5 / 2.0 / 3.0 / 5.0 m (PVC spec.)
Connector DIN EN 175301-803-A
Connector DIN EN 175301-803-C (industrial standard 9.4 mm)
Metri Pack Serie 150
Connector M12x1
Braids
Connector RAST 2.5 (3 wire, only)

Pressure connection

Inside thread	7/16 - 20 UNF	
	½ -14 NPT	
	G ¼	with O-Ring seal FPM (-30 ... +135 °C)
Outside thread	7/16 - 20 UNF	sealed at front or sealing cone
	¼ -18 NPT	
	G ¼, G ½, G ⅛	sealed at back DIN 3852-E with Profile seal ring in FPM (-30 ... +135 °C)
	G ¼, G ½	sealed at back and manometer (combi) with Profile seal ring in FPM (-30 ... +135 °C)
	R ¼	EN 10226
	⅛ - 27 NPT	
	G ⅛	sealed at front or sealed at back and manometer (combi) with Profile seal ring in FPM (-30 ... +135 °C)
	M10x1	sealed at back DIN 3852-E with Profile seal ring in FPM (-30 ... +135 °C)
	M20x1.5	sealed at front and manometer (combi)
	G ¼, G ½	sealed at front

Installation arrangement

Unrestricted

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3
Raised noise resistantcy	EN 50121-3-2
Shock acc. IEC 68-2-27	100 g, 11 ms half sine wave, all 6 directions, free fall from 1 m on concrete (6x)
Constant shock acc. IEC 68-2-29	40 g for 6 ms, 1000x all 3 directions
Vibration acc. IEC 68-2-6	20 g, 15 ... 2000 Hz, 15 ... 25 Hz with amplitude ± 15 mm, 1 Octave/min. all 3 directions, 50 constant load
UL	ANSI/UL 61010-1 acc. E325110
Drinking water approval	NSF/ANSI 61/372 acc. MH60087

Protection against explosion (Ex)

	ratiom. 10 ... 90%	4 ... 20 mA
Intrinsic safety «i»	Ex II 1/2 G Ex ia IIC T4 Ga/Gb	Ex II 1/2 G Ex ia IIC T4 Ga/Gb
	Ex II 1/2 D Ex ia IIIC T125°C Da/Db	Ex II 1/2 D Ex ia IIIC T125°C Da/Db
EC type examination certificate	SEV 15 ATEX 0173	SEV 10 ATEX 0145
Connection to certified intrinsically safe resistive circuits with maximum values	Ui ≤ 15 VDC; Ii ≤ 200 mA; Pi ≤ 750 mW	Ui ≤ 30 VDC; Ii ≤ 100 mA; Pi ≤ 750 mW
Effective internal inductance and capacitance for versions with plugs complying with EN 175301-803-A or M12x1	Li = 0 nH; Ci ≤ 150 nF	Li = 0 nH; Ci = 0 nF

Weight

~ 90 g

Packaging (Please state on order)

Single packaging in cardboard	accessories integrated
Multiple packaging in cardboard (25 pcs)	

Accuracy

Parameter		Unit	
Characteristic line [1]		% fs	± 0.3
Resolution		% fs	0.1
Thermal characteristic [2]	max.	% fs/10K	± 0.2
Long term stability acc. IEC EN 60770-1	max.	% fs	± 0.25

Test conditions: 25 °C, 45% RH, power supply 24 VDC

Order code selection in bar

				1	2	3	4	5	6	7	8	9	10	11
				528.	X	X	X	X	X	X	X	X	X	X	X
Pressure range (relative) [3]	-1 ... 0 bar			9	0	1								
	0 ... 1 bar			9	1	1								
	0 ... 1.6 bar			9	1	2								
	0 ... 2.5 bar			9	1	4		0,4						
	0 ... 4 bar			9	1	5		0,4						
	0 ... 6 bar			9	1	7		0,4						
	0 ... 10 bar			9	3	0		0,4						
	0 ... 16 bar			9	3	1		0,4						
	0 ... 25 bar			9	3	2		0,4					1	
	0 ... 40 bar			9	3	3		0,4					1	
	0 ... 60 bar			9	4	0		0,4					1	
Pressure range (absolute) [3]	0 ... 1 bar			8	1	1								
	0 ... 1.6 bar			8	1	2								
	0 ... 2.5 bar			8	1	4								
	0 ... 4 bar			8	1	5								
	0 ... 6 bar			8	1	7								
	0 ... 10 bar			8	3	0								
	0 ... 16 bar			8	3	1								
Sealing material	FPM	Fluoro elastomer	(Ex) -15 ... +120 °C				0							
	EPDM	Ethylene propylene	(Ex) -30 ... +120 °C				1							
	NBR	Butadiene Acylonitrile					2							
	MVQ	Silicone polymer	(Ex) -30 ... +120 °C				3							
	FPM	Fluoro elastomer	(Ex) -30 ... +120 °C				5							
Application	standard							0						
	for oxygen applications						0	1				1	1	
	with drinking water approval NSF 61						0	4				1	1	
Output / power supply	0 ... 5 V	7 ... 33 VDC							1					
	1 ... 6 V	8 ... 33 VDC							6					
	0 ... 10 V	12 ... 33 VDC							2					
		12 ... 33 VDC / 24 VAC ±15% *(not possible with M12x1, metri Pack, RAST, braids)*							8					
	ratiom. 10 ... 90%	5 VDC ±10%							7					
		5 VDC ±10% Ex protection						0,4	9	3			1	
	4 ... 20 mA	7 ... 33 VDC							3					
		7 ... 33 VDC Raised noise resistantcy *((not possible with Braids)*							A					
		10 ... 30 VDC Ex protection						0,4	4	1,3			1	
Electrical connection	Connector [4]	DIN EN 175301-803-A								1				
		DIN EN 175301-803-C (industrial standard 9.4 mm)								2				
		M12x1 *2w: IN=1 / OUT=3 3w: IN=1 / OUT=4 / GND=3*								3				
		M12x1 *2w: IN=1 / OUT=4 3w: IN=1 / OUT=3 / GND=4*								M				
		M12x1 *2w: IN=1 / OUT=2 3w: IN=1 / OUT=2 / GND=3*								P				
		RAST 2.5						0,4	7	4				
		Metri Pack Serie 150 [5]						0,4		5				
	Braids	80 ±10 mm								6				
		290 ±10 mm								7				
		480 ±10 mm								8				
		730 ±10 mm								9				
	Swift connector	without cable								0				
		with cable 1.5 m								L				
		with cable 2.0 m								N				
		with cable 3.0 m								Q				
		with cable 5.0 m								R				
Pressure connection [3]	Inside thread	7/16-20 UNF sealing cone									K		1	
		½ -14 NPT									D		1	
		G ¼ with O-Ring seal FPM									1		1	
	Outside thread	7/16 -20 UNF sealing cone									2		1	
		¼ -18 NPT									3		1	
		G ¼ sealed at back DIN 3852-E with profile seal ring in FPM									4		1	
		G ¼ sealed at back and manometer with profile seal ring in FPM									5	1	1	
		R ¼ acc. to EN 10226									7		1	
		G ½ sealed at back and manometer with profile seal ring in FPM						0,1			8		1	
		7/16-20 UNF sealed at front									G		1	
		⅛ - 27 NPT									A		1	
		G ⅛ sealed at front									M		1	
		G ⅛ sealed at back DIN 3852-E with Profile seal ring in FPM						0,1			H		1	
		G ¼ sealed at front									J	1	2	
		G ½ sealed at back and manometer with profile seal ring in FPM						0,1			C		1	
		M10x1 sealed at back with profile seal ring in FPM spec						0,1			F		1	
		M20x1.5 sealed at front and manometer (combi)									E		1	
		G ½ sealed at front									9			
Pressure orifice	without											1		
	with											2		
Material pressure connection	Stainless steel 1.4404 / AISI 316L												1	
	PVDF outside thread	sealed at front G ¼, G ½	≤ 16 bar										2	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 3bar/OUT0...5V)													W

[1] typ. ; max. 0.5% fs (incl. zero point, full scale, linearity, hysteresis and repeatability)
[2] -15 ... 85 °C
[3] Other pressure ranges or pressure connections on request
[4] Delivery without female connector
[5] For pressure ranges ≤ 10 bar (relative) only possible if deareation through the cable is assured

Order code selection in psi				528.	1 X	2 X	3 X	4 X	5 X	6 X	7 X	8 X	9 X	10 X	11 X
Pressure range (relative) [1]	-30 ... 0" hg				9	B	0								
	0 ... 15 psi				9	B	1								
	0 ... 20 psi				9	B	2								
	0 ... 30 psi				9	B	4		0,4						
	0 ... 60 psi				9	B	5		0,4						
	0 ... 100 psi				9	B	7		0,4						
	0 ... 150 psi				9	C	0		0,4						
	0 ... 200 psi				9	C	1		0,4						
	0 ... 300 psi				9	C	2		0,4					1	
	0 ... 500 psi				9	C	3		0,4					1	
	0 ... 750 psi				9	D	0		0,4					1	
Pressure range (absolute) [1]	0 ... 15 psi				8	B	1								
	0 ... 20 psi				8	B	2								
	0 ... 30 psi				8	B	4								
	0 ... 60 psi				8	B	5								
	0 ... 100 psi				8	B	7								
	0 ... 150 psi				8	C	0								
	0 ... 200 psi				8	C	1								
Sealing material	FPM	Fluoro elastomer	(Ex) -15 ... +120 °C)					0							
	EPDM	Ethylene propylene	(Ex) -30 ... +120 °C)					1							
	NBR	Butadiene Acylonitrile						2							
	MVQ	Silicone polymer	(Ex) -30 ... +120 °C)					3							
	FPM	Fluoro elastomer	(Ex) -30 ... +120 °C)					5							
Application	standard								0						
	for oxygen applications							0	1				1	1	
	with drinking water approval NSF 61							0	4				1	1	
Output / power supply	0 ... 5 V	7 ... 33 VDC								1					
	1 ... 6 V	8 ... 33 VDC								6					
	0 ... 10 V	12 ... 33 VDC								2					
		12 ... 33 VDC / 24 VAC ±15% *(not possible with M12x1, metri Pack, RAST, braids)*								8					
	ratiom. 10 ... 90%	5 VDC ±10%								7					
		5 VDC ±10% Ex protection							0,4	9	3			1	
	4 ... 20 mA	7 ... 33 VDC								3					
		7 ... 33 VDC Raised noise resistantcy *(not possible with Braids)*								A					
		10 ... 30 VDC Ex protection							0,4	4	1,3			1	
Electrical connection	Connector [2]	DIN EN 175301-803-A									1				
		DIN EN 175301-803-C (industrial standard 9.4 mm)									2				
		M12x1 *2w: IN=1 / OUT=3 3w: IN=1 / OUT=4 / GND=3*									3				
		M12x1 *2w: IN=1 / OUT=4 3w: IN=1 / OUT=3 / GND=4*									M				
		M12x1 *2w: IN=1 / OUT=2 3w: IN=1 / OUT=2 / GND=3*									P				
		RAST 2.5							0,4	7	4				
		Metri Pack Serie 150 [3]							0,4		5				
	Braids	80 ±10 mm									6				
		290 ±10 mm									7				
		480 ±10 mm									8				
		730 ±10 mm									9				
	Swift connector	without cable									0				
		with cable 1.5 m									L				
		with cable 2.0 m									N				
		with cable 3.0 m									Q				
		with cable 5.0 m									R				
Pressure connection [3]	Inside thread	7/16-20 UNF sealing cone										K		1	
		½ -14 NPT										D		1	
		G ¼ with O-Ring seal FPM										1		1	
	Outside thread	7/16 -20 UNF sealing cone										2		1	
		¼ -18 NPT										3		1	
		G ¼ sealed at back DIN 3852-E with profile seal ring in FPM										4		1	
		G ¼ sealed at back and manometer with profile seal ring in FPM										5	1	1	
		R ¼ acc. to EN 10226										7		1	
		G ½ sealed at back and manometer with profile seal ring in FPM							0,1			8		1	
		7/16-20 UNF sealed at front										G		1	
		⅛ - 27 NPT										A		1	
		G ⅛ sealed at front										M		1	
		G ⅛ sealed at back DIN 3852-E with Profile seal ring in FPM							0,1			H		1	
		G ¼ sealed at front										J	1	2	
		G ½ sealed at back and manometer with profile seal ring in FPM							0,1			C		1	
		M10x1 sealed at back with profile seal ring in FPM							0,1			F		1	
		M20x1.5 sealed at front and manometer (combi)										E		1	
		G ½ sealed at front										9			
Pressure orifice	without												1		
	with												2		
Material pressure connection	Stainless steel 1.4404 / AISI 316L													1	
	PVDF outside thread	sealed at front G ¼, G ½	≤ 200 psi											2	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 16psi/OUT0...5V)														W

Accessories	Order number
Swift connector	107359
Female connector DIN EN 175301-803-A with seal	103510
Female connector DIN EN 175301-803-C with seal	104244
Corner-wire box for connector M12x1	106975
Corner-wire box for connector M12x1 with cable 2.0 m	114604
Straight-wire box for connector M12x1	114570
Straight-wire box for connector M12x1 with cable 2.0 m	114605
Mounting bracket with screw	118716
Calibration certificate	104551

[1] Other pressure ranges or pressure connections on request [2] Delivery without female connector [3] For pressure ranges ≤ 150 psi (relative) only possible if deareation through the cable is assured

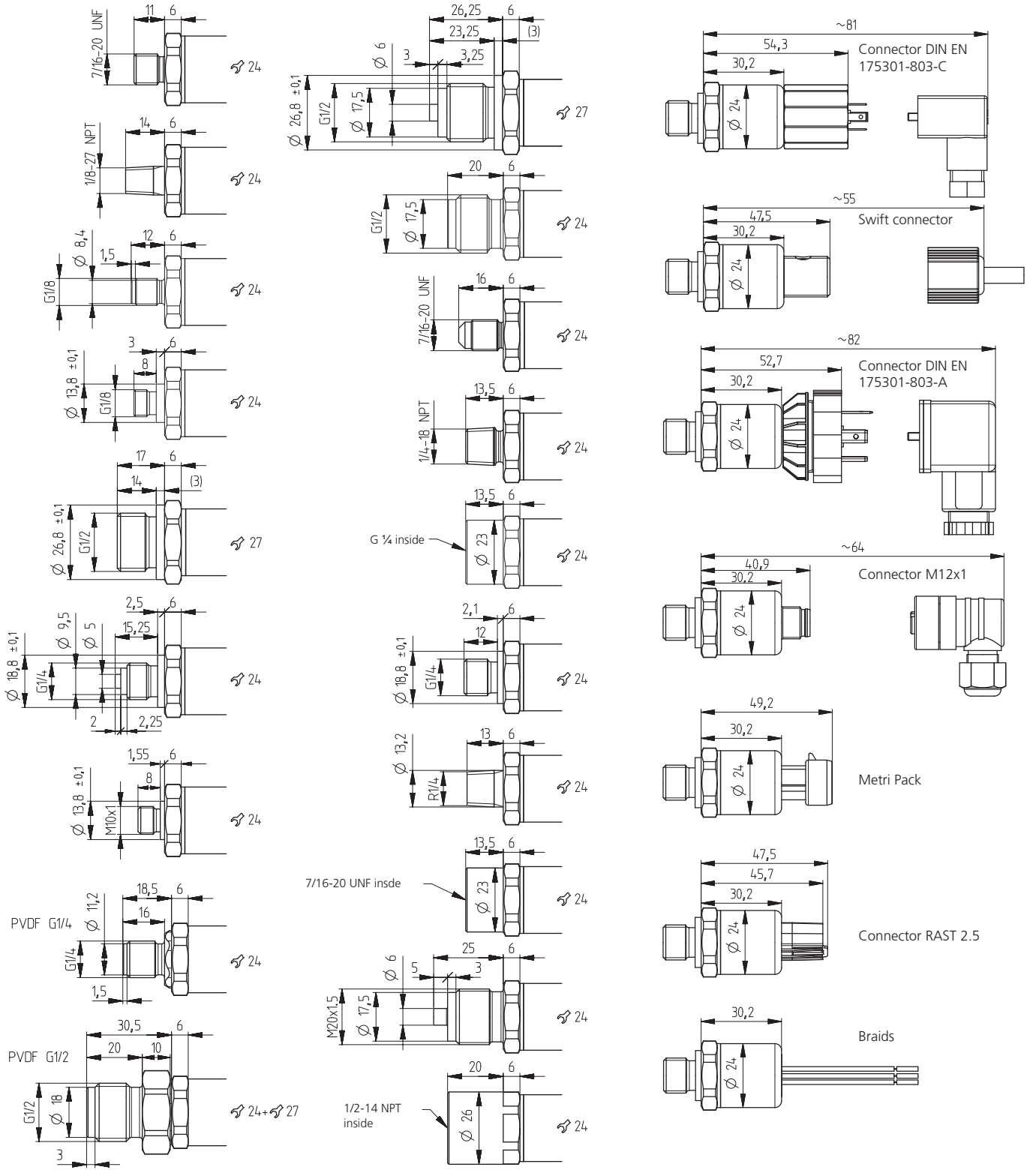
Order code selection in MPa				1	2	3	4	5	6	7	8	9	10	11
				528.	X	X	X	X	X	X	X	X	X	X	X
Pressure range (relative) [1]	-0.1 ... 0 MPa				9	G	0								
	0 ... 0.1 MPa				9	G	1								
	0 ... 0.16 MPa				9	G	2								
	0 ... 0.25 MPa				9	G	4		0,4						
	0 ... 0.4 MPa				9	G	5		0,4						
	0 ... 0.6 MPa				9	G	7		0,4						
	0 ... 1 MPa				9	H	0		0,4						
	0 ... 1.6 MPa				9	H	1		0,4						
	0 ... 2.5 MPa				9	H	2		0,4					1	
	0 ... 4 MPa				9	H	3		0,4					1	
	0 ... 6 MPa				9	K	0		0,4					1	
Pressure range (absolute) [1]	0 ... 0.1 MPa				8	G	1								
	0 ... 0.16 MPa				8	G	2								
	0 ... 0.25 MPa				8	G	4								
	0 ... 0.4 MPa				8	G	5								
	0 ... 0.6 MPa				8	G	7								
	0 ... 1 MPa				8	H	0								
	0 ... 1.6 MPa				8	H	1								
Sealing material	FPM	Fluoro elastomer	(Ex) -15 ... +120 °C)				0								
	EPDM	Ethylene propylene	(Ex) -30 ... +120 °C)				1								
	NBR	Butadiene Acylonitrile					2								
	MVQ	Silicone polymer	(Ex) -30 ... +120 °C)				3								
	FPM	Fluoro elastomer	(Ex) -30 ... +120 °C)				5								
Application	standard							0							
	for oxygen applications						0	1				1	1		
	with drinking water approval NSF 61						0	4				1	1		
Output / power supply	0 ... 5 V	7 ... 33 VDC							1						
	1 ... 6 V	8 ... 33 VDC							6						
	0 ... 10 V	12 ... 33 VDC							2						
		12 ... 33 VDC / 24 VAC ±15% *(not possible with M12x1, metri Pack, RAST, braids)*							8						
	ratiom. 10 ... 90%	5 VDC ±10%							7						
		5 VDC ±10% Ex protection						0,4	9	3			1		
	4 ... 20 mA	7 ... 33 VDC							3						
		7 ... 33 VDC Raised noise resistantcy *(not possible with Braids)*							A						
		10 ... 30 VDC Ex protection						0,4	4	1,3			1		
Electrical connection	Connector [2]	DIN EN 175301-803-A								1					
		DIN EN 175301-803-C (industrial standard 9.4 mm)								2					
		M12x1 *2w: IN=1 / OUT=3 3w: IN=1 / OUT=4 / GND=3*								3					
		M12x1 *2w: IN=1 / OUT=4 3w: IN=1 / OUT=3 / GND=4*								M					
		M12x1 *2w: IN=1 / OUT=2 3w: IN=1 / OUT=2 / GND=3*								P					
		RAST 2.5						0,4	7	4					
		Metri Pack Serie 150 [3]						0,4		5					
	Braids	80 ±10 mm								6					
		290 ±10 mm								7					
		480 ±10 mm								8					
		730 ±10 mm								9					
	Swift connector	without cable								0					
		with cable 1.5 m								L					
		with cable 2.0 m								N					
		with cable 3.0 m								Q					
		with cable 5.0 m								R					
Pressure connection [3]	Inside thread	7/16-20 UNF sealing cone									K		1		
		½ -14 NPT									D		1		
		G ¼ with O-Ring seal FPM									1		1		
	Outside thread	7/16 -20 UNF sealing cone									2		1		
		¼ -18 NPT									3		1		
		G ¼ sealed at back DIN 3852-E with profile seal ring in FPM									4		1		
		G ¼ sealed at back and manometer with profile seal ring in FPM									5	1	1		
		R ¼ acc. to EN 10226									7		1		
		G ½ sealed at back and manometer with profile seal ring in FPM						0,1			8		1		
		7/16-20 UNF sealed at front									G		1		
		⅛ - 27 NPT									A		1		
		G ⅛ sealed at front									M		1		
		G ⅛ sealed at back DIN 3852-E with Profile seal ring in FPM						0,1			H		1		
		G ¼ sealed at front									J	1	2		
		G ½ sealed at back and manometer with profile seal ring in FPM						0,1			C		1		
		M10x1 sealed at back with profile seal ring in FPM						0,1			F		1		
		M20x1.5 sealed at front and manometer (combi)									E		1		
		G ½ sealed at front									9				
Pressure orifice	without											1			
	with											2			
Material pressure connection	Stainless steel 1.4404 / AISI 316L												1		
	PVDF outside thread	sealed at front G ¼, G ½	≤ 1.6 MPa										2		
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 0.3MPa/OUT0...5V)														W

[1] Other pressure ranges or pressure connections on request

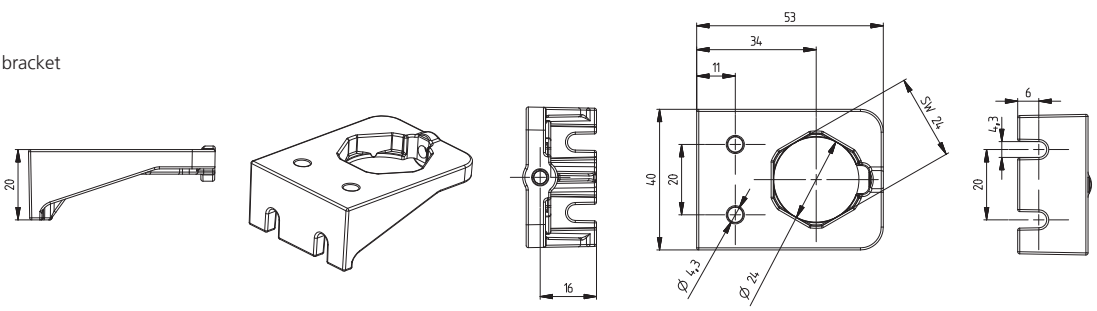
[2] Delivery without female connector

[3] For pressure ranges ≤ 1 MPa (relative) only possible if deareation through the cable is assured

Dimensions in mm



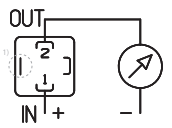
Mounting bracket



Electrical connections

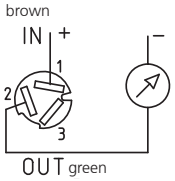
2 wire

Connector DIN
EN 175301-803-A or C



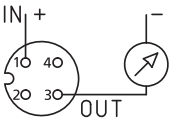
1 (IN) 2 (OUT)

Swift connector



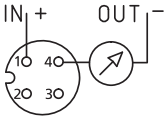
1 (IN) 2 (OUT)

Connector M12x1



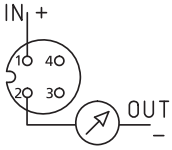
1 (IN) 3 (OUT)

Connector M12x1



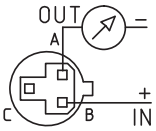
1 (IN) 4 (OUT)

Connector M12x1



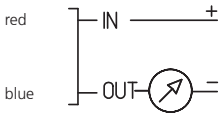
1 (IN) 2 (OUT)

Metri Pack Serie 150



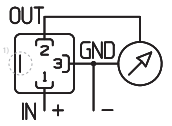
B (IN) A (OUT)

Braids



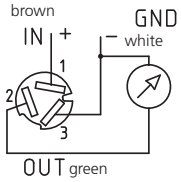
3 wire

Connector DIN
EN 175301-803-A or C



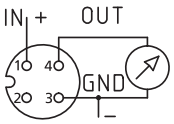
1 (IN) 2 (OUT) 3 (GND)

Swift connector



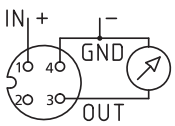
1 (IN) 2 (OUT) 3 (GND)

Connector M12x1



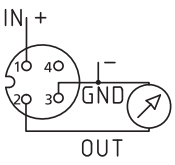
1 (IN) 4 (OUT) 3 (GND)

Connector M12x1



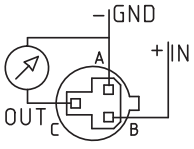
1 (IN) 3 (OUT) 4 (GND)

Connector M12x1



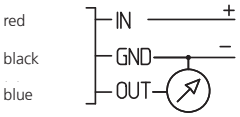
1 (IN) 2 (OUT) 3 (GND)

Metri Pack Serie 150

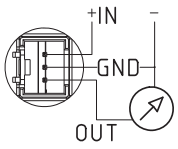


B (IN) C (OUT) A (GND)

Braids

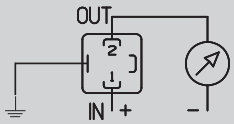


Connector RAST 2.5



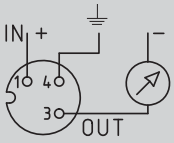
Device design with explosion protection: 4 ... 20 mA
The grounding connection is conductively connected to the transmitter housing.

Connector DIN
EN 175301-803-A



1 (IN) 2 (OUT) ⏚

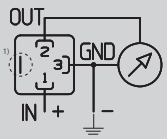
Connector M12x1



1 (IN) 3 (OUT) 4 (⏚)

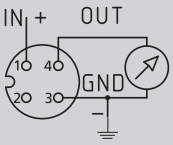
Device design with explosion protection: ratiom. 10 ... 90%
The electronic GND is connected with a 1MΩ resistor to the transmitter housing.

Connector DIN
EN 175301-803-A



1 (IN) 2 (OUT) 3 (GND)

Connector M12x1



1 (IN) 3 (GND) 4 (OUT)

[1] Not connected with transmitter housing

Pressure transmitter type 540 with display and programmable switching outputs

Pressure range
0 ... 60 – 600 bar

The µP-regulated, programmable pressure transmitter type 540 has a robust industry design. The parameters are easily adjustable with two function keys in the configuration menue which disposes of up to two programmable switching points.

All systems are equipped with a diagnostic function. The large 4 digit LED display assures a good accuracy of reading.
The pressure switch type 540 is based upon the Huba Control developed thick film technology where the pressure measuring cell is fully welded.

- Compact, rugged construction
- High over pressure
- Clearly readable display
- Sensitive operation keys
- Diagnostic function
- with analogue signal available
- by up to 2 programmable switching outputs

Technical overview

Pressure range

Relative		0 ... 60 – 600 bar

Operating conditions

Medium		Liquids and gases
Temperature	Medium / Ambient	-20 ... +80 °C
	Storage	-40 ... +80 °C
Overload		3 x fs (max. 1500 bar)
Rupture pressure		6 x fs (max. 2500 bar)

Materials

Case		Polyarylamid 50% GF black
Materials in contact with medium	Sensor	Stainless steel
	Pressure connection	Stainless steel 1.4404 / AISI 316L

Electrical overview

Output	0 ... 10 V	
	4 ... 20 mA	
	Open-collector switching output for max. 250 mA, contact NO or contact NC	
Power supply		17 ... 33 VDC
Load	0 ... 10 V	> 10 kOhm
	4 ... 20 mA	< 500 Ohm
Current consumption		max. 50 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.	
Response time		≤ 5 ms

Protection class

Protection class III

Displays (rotatable by 180°)

7 Segment LED, 4 digits for the indication of pressure measuring values and parameter values.
Point-LED for state indication of switching points.
Point-LED for indication of programmed measuring unit.

Programmring

All settings can made in unpressurised state or during the operation. Ex works with standard setting.
Analogue output: characteristic line adjustable of 75 ... 125% FS
Digital output: Measuring range
rising pressure 8 ... 100% fs
falling pressure 5 ... 97% fs
P or N-switching, open-close-contact, rise delay time eligible Rise delay time 0 – 50 s, Switch off delay time 0 – 50 s, Response time 5 ... 500 ms.

Diagnostic function

Manual operation with keyboard: Test of sensor circuit and of stainless steel cell. Version available with diagnostic function.
Version with diagnostic input (shunt-cal): feed-back with 50% fs signal 12 mA or 5 V.

Protection standard

IP 65 and IP 67 acc. IEC 60529

Electrical connection

Connector M12x1

Pressure connection

Inside thread	G ¼	with O-Ring sealing FPM spez.
	7/16 - 20 SAE	
	¼ -18 NPT	
Outside thread	¼ -18 NPT	
	G ¼	sealed at back DIN 3852-E with profile seal ring FPM spez.
	R ¼	EN 10226
	7/16 - 20 UNF	

Installation arrangement

Unrestricted (Electrical connection not recommended down)

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3
UL acc. 61010-1	
Shock acc. IEC IEC 68-2-27	100 g, 11 ms half sine wave, all 6 directions, free fall from 1 m on concrete (6x)
Vibration acc. IEC 68-2-6	20 g, 15 ... 2000 Hz, 15 ... 25 Hz with amplitude ± 15 mm, 1 Octave/min. all 3 directions, 50 constant load

Weight

~ 120 g

Packaging

Single packaging in cardboard

Accuracy

Parameter		Unit	
Characteristic line [1]		% fs	± 1.0
Thermal characteristic [2]	max.	% fs/10K	± 0.65
Long term stability acc. IEC EN 60770-1	max.	% fs	± 0.3

Test conditions: 25 °C, 45% RH, power supply 24 VDC

[1] typical; (incl. zero point, full scale, linearity, hysteresis and repeatability) [2] -15 ... 85 °C

Order code selection table

				1	2	3	4	5	6	7	8	9	10
				540.	X	X	X	X	X	X	X	X	X	X
Pressure range [1] (adjustment in bar)	bar	psi	MPa										
	0 ... 60	0 ... 870	0 ... 6		9	4	0	S						
	0 ... 100	0 ... 1450	0 ... 10		9	4	1	S						
	0 ... 160	0 ... 2320	0 ... 16		9	4	2	S						
	0 ... 250	0 ... 3625	0 ... 25		9	4	3	S						
	0 ... 400	0 ... 5800	0 ... 40		9	5	4	S						
	0 ... 600	0 ... 8700	0 ... 60		9	5	5	S						
Pressure range [1] (adjustment in psi)	psi	bar	MPa										
	0 ... 750	0 ... 52	0 ... 5.17		9	D	0	S						
	0 ... 1000	0 ... 69	0 ... 6.90		9	D	1	S						
	0 ... 2000	0 ... 138	0 ... 13.79		9	D	2	S						
	0 ... 3000	0 ... 207	0 ... 20.69		9	D	3	S						
	0 ... 5000	0 ... 345	0 ... 34.48		9	E	4	S						
	0 ... 7500	0 ... 517	0 ... 51.72		9	E	5	S						
Pressure indication	bar	factory calibration in bar						0					
	psi	factory calibration in bar						1					
	MPa	factory calibration in bar						3					
Output	1 analogue output	4 ... 20 mA	diagnostic input						0	0			
		0 ... 10 V	diagnostic input						1	0			
		4 ... 20 mA	1 digital output						2	1,2			
		0 ... 10 V	1 digital output						3	1,2			
	2 digital outputs								4	1,2			
	2 digital outputs	4 ... 20 mA	1 analogue output						5	1,2			
		0 ... 10 V	1 analogue output						6	1,2			
Electrical connection [2]	without digital output									0			
	M12x1 NPN									1			
	M12x1 PNP									2			
Pressure connection	Inside thread	7/16 -20 SAE									A	0	1
		G ¼ with O-ring sealing FPM spez.									1	0	1
		¼ -18 NPT									D	0	1
	Outside thread	7/16 -20 UNF									2	0	1
		¼ -18 NPT									3	0	1
		G ¼ sealed at back DIN 3852-E with profile seal ring FPM spez.									4	0	1
		R ¼ acc. EN 10226									7	0	1

Accessories [3]

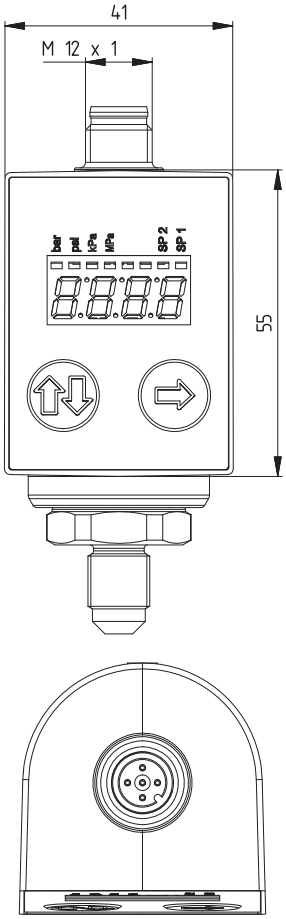
			Order Number
Mounting bracket with screw			118716
Heat sink with outside thread G ½ - inside thread G ¼			105073
Heat sink with outside thread G ¼ - inside thread G ¼			105074
Straight-wire box for connector M12x1 with cable	5-pole	200 cm	114564
Straight-wire box for connector M12x1 with cable (with UL-admission)	5-pole	200 cm	118099
Calibration certificate (available for analogue output, only)			104551

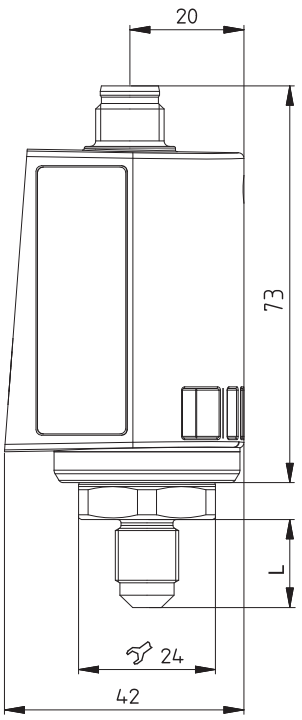
[1] Other pressure on request

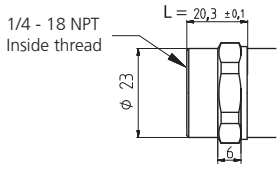
[2] Delivery without female connector

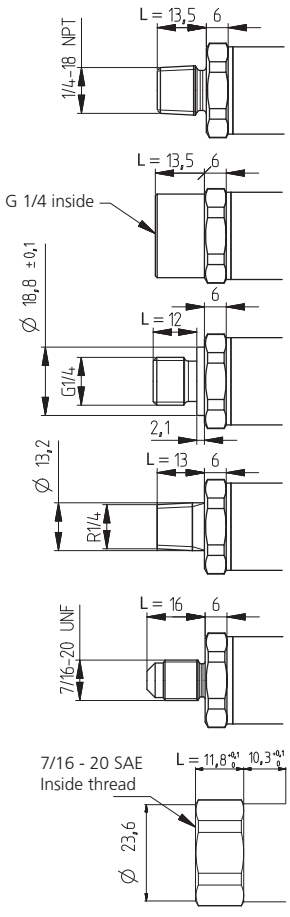
[3] Accessories supplied loose

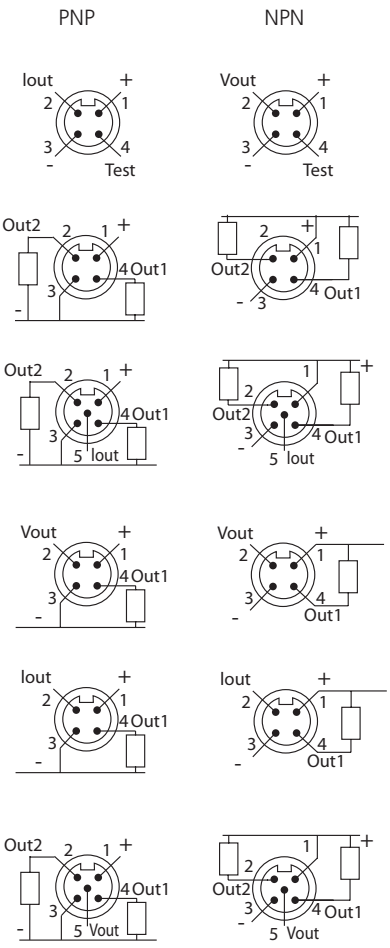
Dimensions in mm / Electrical connections





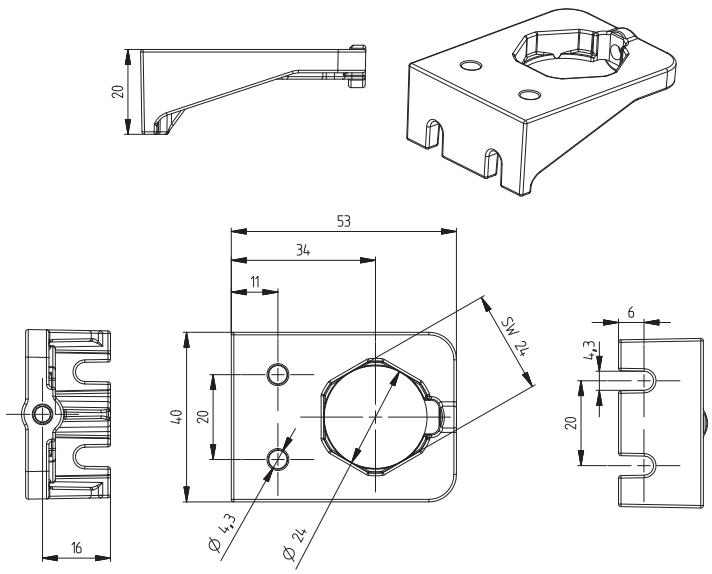




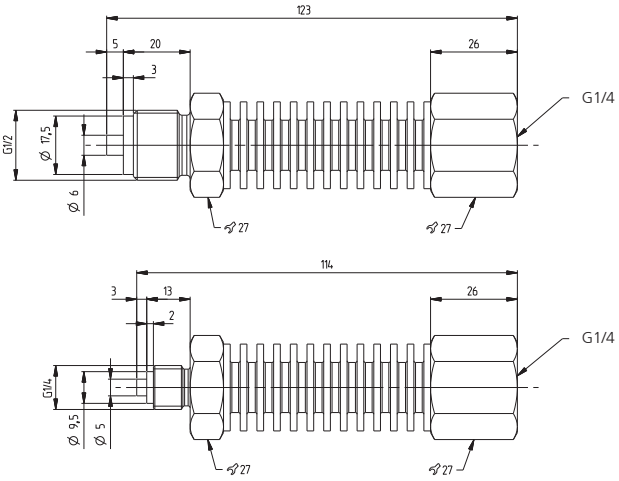


Pin	Colour
1	brown
2	white
3	blue
4	black
5	grey

Mounting bracket



Heat sink



Pressure transmitter type 548 with display and programmable switching outputs

Pressure range
-1 ... 0 – 40 bar

The µP-regulated, programmable pressure transmitter type 548 has a robust industry design. The parameters are easily adjustable with two function keys in the configuration menue which disposes of up to two programmable switching points.

All systems are equipped with a diagnostic function. The large 4 digit LED display assures a good accuracy of reading.
The pressure switch type 548 is based upon the well proven ceramic technology developed by Huba Control over 20 years ago.

- Compact, rugged construction
- High over pressure
- Clearly readable display
- Sensitive operation keys
- Diagnostic function
- with analogue signal available
- by up to 2 programmable switching outputs

Technical overview

Pressure range

Relative		-1 ... 0 bar / 0 ... 40 bar

Operating conditions

Medium		Liquids and gases
Temperature	Medium / ambient	-20 ... +80 °C
	Storage	-40 ... +80 °C
Overload / Rupture pressure	≤ 10 bar	4.0 x FS
	> 10 bar	3.5 x FS

Materials

Case		Polyarylamid 50% GF black
Materials in contact with medium	Sensor	ceramic Al_2O_3 (96%)
	Pressure connection	Stainless steel 1.4404 / AISI 316L
	Sealing material	FPM

Electrical overview

Output	0 ... 10 V	
	4 ... 20 mA	
	Switching output for max. 250 mA, contact NO or contact NC	
Power supply		17 ... 33 VDC
Load	0 ... 10 V	> 10 kOhm
	4 ... 20 mA	< 500 Ohm
Current consumption		max. 50 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.	
Response time		≤ 5 ms

Protection class

Protection class III

Displays (rotatable by 180°)

7 Segment LED, 4 digits for the indication of pressure measuring values and parameter values.
Point-LED for state indication of switching points.
Point-LED for indication of programmed measuring unit.

Programmring

All settings can made in unpressurised state or during the operation. Ex works with standard setting.
Analogue output: characteristic line adjustable of 75 ... 125% FS
Digital output: Measuring range

rising pressure	8 ... 100% fs
falling pressure	5 ... 97% fs

P or N-switching, open-close-contact, rise delay time eligible Rise delay time 0 – 50 s, Switch off delay time 0 – 50 s, Response time 5 ... 500 ms.

Diagnostic function

Manual operation with keyboard: Test of sensor circuit and of ceramic cell. Version available with diagnostic function.
Version with diagnostic input (shunt-cal): feed-back with 50% fs signal 12 mA or 5 V.

Protection standard

IP 65 and IP 67 acc. IEC 60529

Electrical connection

Connector M12x1

Pressure connection

Inside thread	G ¼	with O-Ring sealing FPM spec.
	7/16 - 20 SAE	
	¼ -18 NPT	
Outside thread	¼ -18 NPT	
	G ¼	sealed at back DIN 3852-E with profile seal ring FPM spec.
	R ¼	EN 10226
	7/16 - 20 UNF	

Installation arrangement

Unrestricted	(Electrical connection not recommended down)

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3
UL acc. 61010-1	
Shock acc. IEC IEC 68-2-27	100 g, 11 ms half sine wave, all 6 directions, free fall from 1 m on concrete (6x)
Vibration acc. IEC 68-2-6	20 g, 15 ... 2000 Hz, 15 ... 25 Hz with amplitude ± 15 mm, 1 Octave/min. all 3 directions, 50 constant load

Weight

~ 120 g

Packaging

Single packaging in cardboard

Accuracy

Parameter		Unit	
Characteristic line [1]		% fs	± 1.0
Thermal characteristic [2]	max.	% fs/10K	± 0.65
Long term stability acc. IEC EN 60770-1	max.	% fs	± 0.3

Test conditions: 25 °C, 45% RH, power supply 24 VDC

[1] typical; (incl. zero point, full scale, linearity, hysteresis and repeatability) [2] -15 ... 85 °C

Order code selection table

548. X X X X X X X X X X

					1	2	3	4	5	6	7	8	9	10
Pressure range [1] (adjustment in bar)	bar	psi	kPa	MPa										
	-1 ... 0	-14.5 ... 0.00	-100 ... 0	-0.1 ... 0.00	9	0	1	0						
	0 ... 1	0 ... 14.50	0 ... 100	0 ... 0.10	9	1	1	0						
	0 ... 2.5	0 ... 36.25	0 ... 250	0 ... 0.25	9	1	4	0						
	0 ... 6	0 ... 87.00	0 ... 600	0 ... 0.60	9	1	7	0						
	0 ... 10	0 ... 145.00	0 ... 1000	0 ... 1.00	9	3	0	0						
	0 ... 16	0 ... 232.00	0 ... 1600	0 ... 1.60	9	3	1	0						
	0 ... 25	0 ... 362.50	0 ... 2500	0 ... 2.50	9	3	2	0						
	0 ... 40	0 ... 580.00	0 ... 4000	0 ... 4.00	9	3	3	0						
Pressure range [1] (adjustment in psi)	psi	bar	kPa	MPa										
	-14.5 ... 0	-1 ... 0.00	-100 ... 0	-0.1 ... 0.00	9	A	1	0						
	0 ... 15	0 ... 1.03	0 ... 103	0 ... 0.10	9	B	1	0						
	0 ... 30	0 ... 2.07	0 ... 207	0 ... 0.21	9	B	4	0						
	0 ... 100	0 ... 6.90	0 ... 690	0 ... 0.69	9	B	7	0						
	0 ... 145	0 ... 10.00	0 ... 1000	0 ... 1.00	9	C	0	0						
	0 ... 200	0 ... 13.79	0 ... 1379	0 ... 1.38	9	C	1	0						
	0 ... 300	0 ... 20.69	0 ... 2069	0 ... 2.07	9	C	2	0						
	0 ... 500	0 ... 34.48	0 ... 3448	0 ... 3.45	9	C	3	0						
Pressure indication	bar	factory calibration in bar							0					
	psi	factory calibration in bar							1					
	kPa	factory calibration in bar							2					
	MPa	factory calibration in bar							3					
Output	1 analogue output	4 ... 20 mA	diagnostic input							0	0			
		0 ... 10 V	diagnostic input							1	0			
		4 ... 20 mA	1 digital output							2	1,2			
		0 ... 10 V	1 digital output							3	1,2			
	2 digital outputs									4	1,2			
	2 digital outputs	4 ... 20 mA	1 analogue output							5	1,2			
		0 ... 10 V	1 analogue output							6	1,2			
Electrical connection [2]	M12x1 without digital output										0			
	M12x1 NPN										1			
	M12x1 PNP										2			
Pressure connection	Inside thread	$^{7}/_{16}$ -20 SAE										A	0	1
		G ¼ with O-ring sealing FPM spez.										1	0	1
		¼ -18 NPT										D	0	1
	Outside thread	$^{7}/_{16}$ -20 UNF										2	0	1
		¼ -18 NPT										3	0	1
		G ¼ sealed at back DIN 3852-E with profile seal ring FPM spez.										4	0	1
		R ¼ acc. EN 10226										7	0	1

Accessories [3]

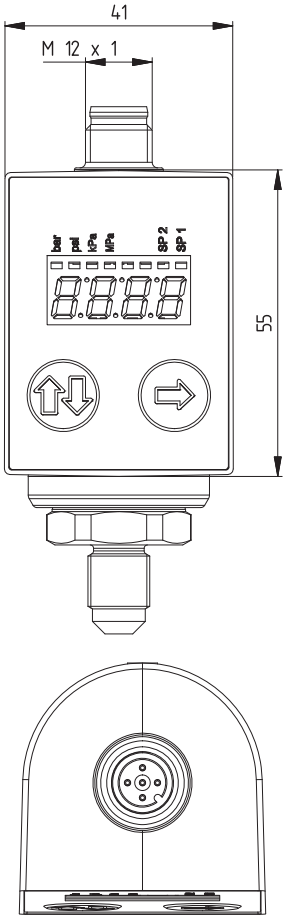
			Order Number
Mounting bracket with screw			118716
Heat sink with outside thread G ½ - inside thread G ¼			105073
Heat sink with outside thread G ¼ - inside thread G ¼			105074
Straight-wire box for connector M12x1 with cable	5-pole	200 cm	114564
Straight-wire box for connector M12x1 with cable (with UL-admission)	5-pole	200 cm	118099
Calibration certificate (available for analogue output, only)			104551

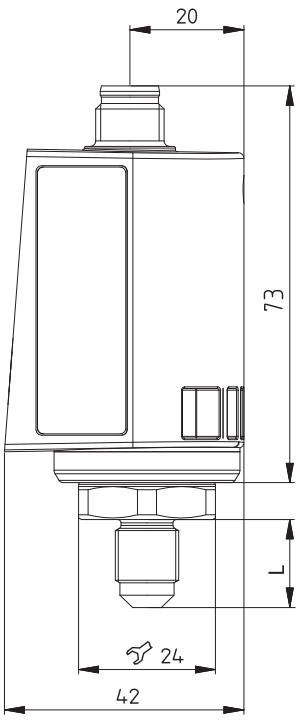
[1] Other pressure on request

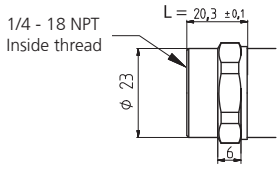
[2] Delivery without female connector

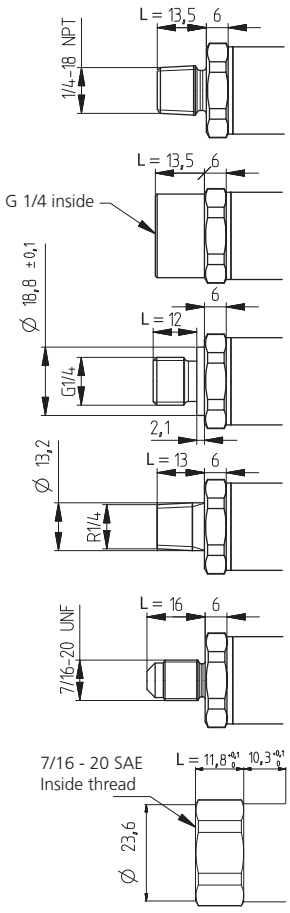
[3] Accessories supplied loose

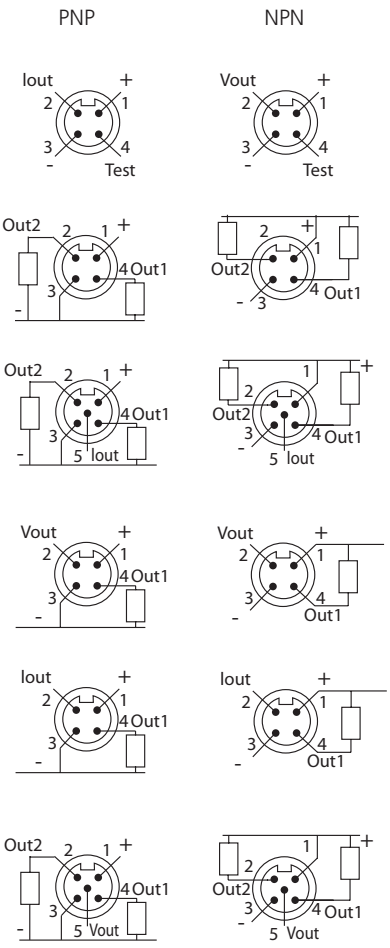
Dimensions in mm / Electrical connections





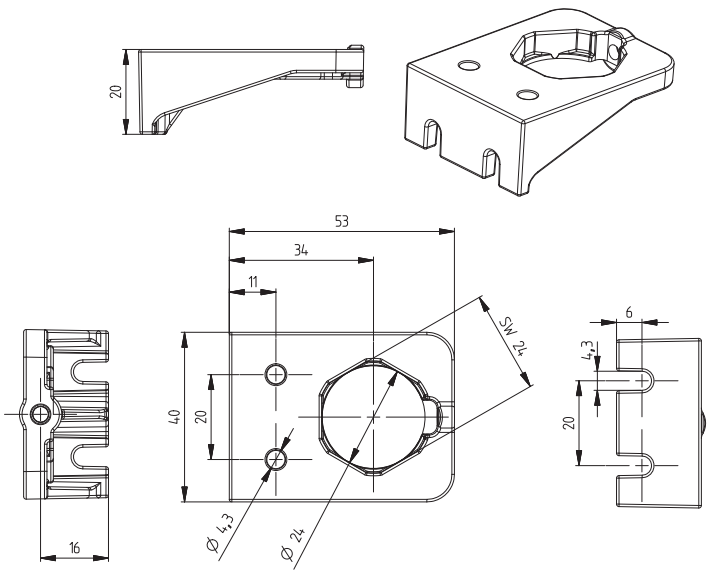




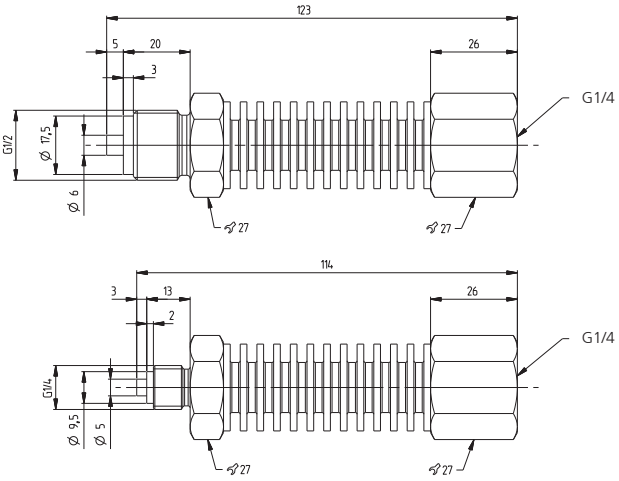


Pin	Colour
1	brown
2	white
3	blue
4	black
5	grey

Mounting bracket



Heat sink



Relative pressure transmitter type 550 for mobile hydraulic

Pressure range
0 ... 100 – 600 bar

The pressure transmitter type 550 meets the highest requirements for mobile hydraulic applications. This sensor is available with protection standard IP67 or IP69K. The standard pressure orifice prevents damage due to pressure peaks.

The compact and rugged design meets the requirement of shock- and vibration stability according Kfz-norm ISO 16750. The pressure transmitter type 550 guarantees highest EMC stability according to various Kfz regulations with test level up to 100V/m.

The measuring cell is based upon the Huba Control developed thick film technology on stainless steel and is fully hermetically welded .

- Compact and rugged construction for high operating reliability
- Welded construction – no elastomer seals
- Excellent EMC capacity
- Negligible temperature influence on accuracy

Technical Overview

Pressure range

Relative	0 ... 100 – 600 bar

Operating conditions

Medium		Liquids and gases
Temperature	Medium	-40 ... +125 °C
	Ambient	-40 ... +100 °C
	Storage	-50 ... +100 °C
Tolerable overload	≤ 400 bar	3 x fs
	600 bar	2.5 x fs
Rupture pressure	≤ 400 bar	6 x fs
	600 bar	4 x fs

Materials

Case		Stainless steel 1.4404 / AISI 316 L
Plug accommodation		Polyarylamide 50% GF UL 94 V-0
Materials in contact with the medium	Pressure connection	Stainless steel 1.4404 / AISI 316 L
	Sensor	Stainless steel

Elektrical overview

	Output	Power supply	Load	Current consumption
2 wire	4 ... 20 mA	7.5 ... 33 VDC	$< \frac{\text{supply voltage} - 7.5\ V}{0.02\ A}$ [Ohm]	< 23 mA
3 wire	0 ... 5 V	7 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
	0 ... 10 V	12 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
	ratiom. 10 ... 90%	5 VDC ± 10%	>10 kOhm / < 100 nF	< 7 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			
Insulation voltage				500 VDC

Protection class

Protection class III

Dynamic response

Response time	< 2 ms (10 ... 90%, typ. 1 ms)
Load cycle	< 100 Hz

Elektrical connection	Protection standard
Kostal SLK 2.8 coding A	IP 69K
AMP-JPT	IP 67
AMP Superseal 1.5	IP 67
Deutsch DT04-3P	IP 67
Metri Pack 150 P2S Series	IP 67
M12x1	IP 67

Pressure connection

Outside thread	7/16 - 20 UNF
	¼ -18 NPT
	G¼ sealed at back DIN 3852-E with profile seal FPM (-30 ... +135 °C)
	M14x1.5 sealed at back DIN 3852-E with profile seal FPM (-30 ... +135 °C)
	R ¼ acc. EN 10226

Installation arrangement

Unrestricted

Tests / Admissions

	Noise immunity / Noise emission	Noise immunity automotive guideline	Noise emission automotive guideline
Electromagnetic compatibility	ISO 13766 - earth-moving equipment	ISO 11452-2, HF (Field), 100 V/m (200 ... 2000 MHz)	CISPR25
	DIN EN 13309 - construction equipment	ISO 11452-4, HF (BCI), 100 mA (20 ... 400 MHz)	
	DIN ISO 14982 - agriculture and forestry	ISO 10605, ESD, ±8 kV contact, ±15 kV air	
	Automotive guideline ECE R10 [1]	ISO 7637-2, puls [2], test level 4 [3]	
	Automotive guideline 2004/104/EG [1]	ISO 16750-2, Load Dump, 155 V (1 Ω, 300 ms)	
	EN 61326-2-3 - pressure transducer		
Shock acc. ISO 16750-3	50 *g*, 11 ms, half sine wave, 1000x / axis		
Vibration acc. ISO 16750-3	Test VI (12 g, sinusodial 18 g random vibration)		
cULus	acc. 61010-1		

Weight

~ 90 g

Packaging (Please state on order)

Single packaging in cardboard	accessories integrated
Multiple packaging in cardboard (25 pcs)	

Accuracy

Parameter		Unit	
Characteristic line acc. IEC 61298-2 [4,5]		% fs	± 0.5
Resolution		% fs	0.1
Thermal characteristic [6]	max.	% fs/10K	± 0.2
Long term stability acc. IEC 61298-2	max.	% fs	± 0.5

Test conditions: 25 °C, 45% rF

[1] E1 approval for customer specific type on request
[2] Puls 1, 2a, 2b, 3a, 3b
[3] Pressure sensor for 12 V and 24 V power system (0 ... 5 V, 0 ... 10 V and 4 ... 20 mA)
[4] incl. zero point, full scale, linearity, hysteresis and repeatability
[5] Considering EMC interference < ±1.5% fs
[6] -15 ... 85 °C

Order code selection table in bar

			1	2	3	4	5	6	7	8	9	10	11
		550.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... 100 bar		9	4	1	S	0						
	0 ... 160 bar		9	4	2	S	0						
	0 ... 250 bar		9	4	3	S	0						
	0 ... 400 bar		9	5	4	S	0						
	0 ... 600 bar ▲ Full scale signal at these pressure		9	5	5	S	0						
Output / power supply	0 ... 5 V	7 ... 33 VDC						1					
	0 ... 10 V	12 ... 33 VDC						2					
	4 ... 20 mA	7.5 ... 33 VDC						3					
	10 ... 90% ratiom.	5 VDC ±10%						7					
Electrical connection [2]	Kostal SLK 2.8 coding A							7	1				
	AMP-JPT								2				
	AMP Superseal 1.5								3				
	Deutsch DT04-3P								4				
	Metri Pack 150 P2S Series								5				
	M12x1	*2w: IN=1 / OUT=3* *3w: IN=1 / OUT=4 / GND=3*							S				
		2w: IN=1 / OUT=4 *3w: IN=1 / OUT=3 / GND=4*							M				
Pressure connection [1]	Outside thread	$^{7}/_{16}$-20 UNF								2	2	1	
		¼ -18 NPT								3	2	1	
		G ¼ sealed at back DIN 3852-E with profile seal FPM								4	2	1	
		M14x1.5 sealed at back DIN 3852-E with profile seal FPM								6	2	1	
		R ¼ acc. EN 10226								7	2	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 50bar/Out1...8V)												W

Order code selection table in psi

			1	2	3	4	5	6	7	8	9	10	11
		550.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... 1000 psi		9	D	1	S	0						
	0 ... 2000 psi		9	D	2	S	0						
	0 ... 3000 psi		9	D	3	S	0						
	0 ... 5000 psi		9	E	4	S	0						
	0 ... 7500 psi ▲ Full scale signal at these pressure		9	E	5	S	0						
Output / power supply	0 ... 5 V	7 ... 33 VDC						1					
	0 ... 10 V	12 ... 33 VDC						2					
	4 ... 20 mA	7.5 ... 33 VDC						3					
	10 ... 90% ratiom.	5 VDC ±10%						7					
Electrical connection [2]	Kostal SLK 2.8 coding A							7	1				
	AMP-JPT								2				
	AMP Superseal 1.5								3				
	Deutsch DT04-3P								4				
	Metri Pack 150 P2S Series								5				
	M12x1	*2w: IN=1 / OUT=3* *3w: IN=1 / OUT=4 / GND=3*							S				
		2w: IN=1 / OUT=4 *3w: IN=1 / OUT=3 / GND=4*							M				
Pressure connection [1]	Outside thread	$^{7}/_{16}$-20 UNF								2	2	1	
		¼ -18 NPT								3	2	1	
		G ¼ sealed at back DIN 3852-E with profile seal FPM								4	2	1	
		M14x1.5 sealed at back DIN 3852-E with profile seal FPM								6	2	1	
		R ¼ acc. EN 10226								7	2	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 650psi/Out1...8V)												W

Order code selection table in MPa

			1	2	3	4	5	6	7	8	9	10	11
		550.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... 10 MPa		9	K	1	S	0						
	0 ... 16 MPa		9	K	2	S	0						
	0 ... 25 MPa		9	K	3	S	0						
	0 ... 40 MPa		9	L	4	S	0						
	0 ... 60 MPa ▲ Full scale signal at these pressure		9	L	5	S	0						
Output / power supply	0 ... 5 V	7 ... 33 VDC						1					
	0 ... 10 V	12 ... 33 VDC						2					
	4 ... 20 mA	7.5 ... 33 VDC						3					
	10 ... 90% ratiom.	5 VDC ±10%						7					
Electrical connection [2]	Kostal SLK 2,8 coding A							7	1				
	AMP-JPT								2				
	AMP Superseal 1.5								3				
	Deutsch DT04-3P								4				
	Metri Pack 150 P2S Series								5				
	M12x1	*2w: IN=1 / OUT=3* *3w: IN=1 / OUT=4 / GND=3*							S				
		2w: IN=1 / OUT=4 *3w: IN=1 / OUT=3 / GND=4*							M				
Pressure connection [1]	Outside thread	$^{7}/_{16}$-20 UNF								2	2	1	
		¼ -18 NPT								3	2	1	
		G ¼ sealed at back DIN 3852-E with profile seal FPM								4	2	1	
		M14x1.5 sealed at back DIN 3852-E with profile seal FPM								6	2	1	
		R ¼ acc. EN 10226								7	2	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 5MPa/Out1...8V)												W

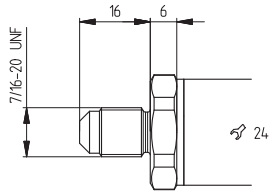
Accessories

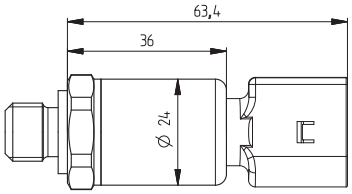
Accessories supplied loose

	Order Number
Set - Female connector AMP JPT 2 wire (3 wire with 1 dummy plug)	110442
Set - Female connector AMP JPT 3 wire	108767
Calibration certificate	104551

[1] Other pressure ranges and pressure connections on request [2] Delivery without female connector

Dimensions in mm / Electrical connections

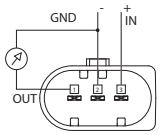




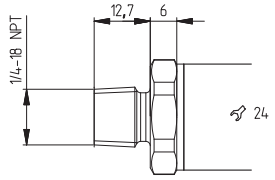
Kostal SLK 2.8

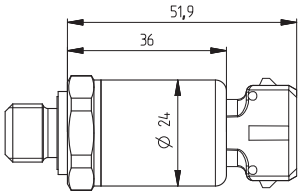
2 wire

3 wire

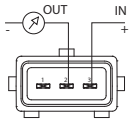


3 (IN) 1 (OUT) 2 (GND)

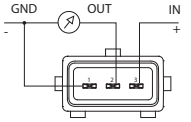




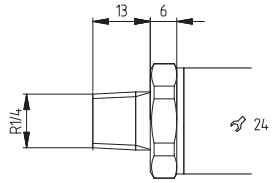
AMP JPT

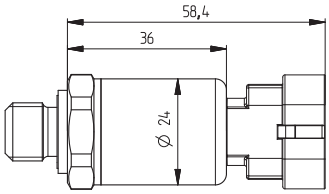


3 (IN) 2 (OUT)

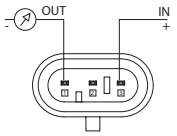


3 (IN) 2 (OUT) 1 (GND)

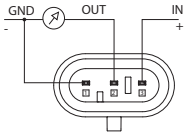




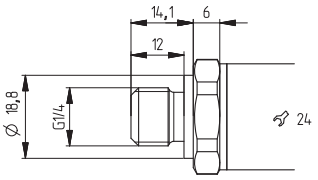
AMP Superseal 1.5

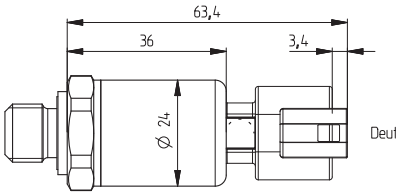


3 (IN) 1 (OUT)

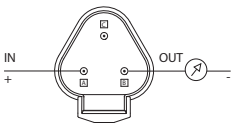


3 (IN) 2 (OUT) 1 (GND)

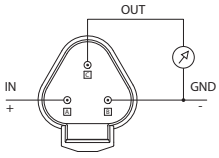




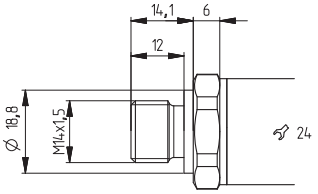
Deutsch DT04-3P

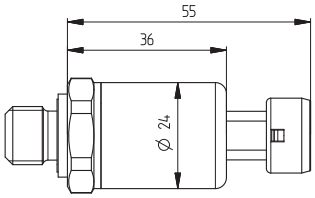


A (IN) B (OUT)

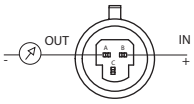


A (IN) C (OUT) B (GND)

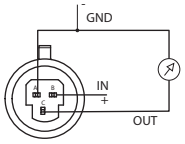




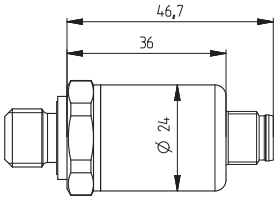
Metri Pack
Series 150 P2S



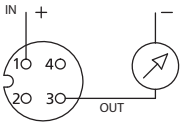
B (IN) A (OUT)



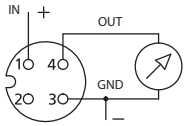
B (IN) C (OUT) A (GND)



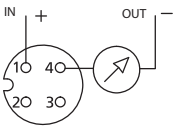
M12x1



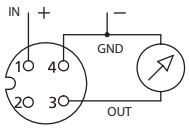
1 (IN) 3 (OUT)



1 (IN) 4 (OUT) 3 (GND)



1 (IN) 4 (OUT)



1 (IN) 3 (OUT) 4 (GND)

Relative and absolute pressure transmitter type 558 for mobile application

Pressure range
0 ... 6 – 60 bar

The pressure transmitter type 558 meets the highest requirements for the industry and vehicle manufacturing. This sensor is available with protection standard IP67 or IP69K.
The optional pressure orifice prevents damage due to pressure peaks.

The compact and rugged design meets the requirement of shock- and vibration stability according Kfz-norm ISO 16750. The pressure transmitter type 558 guarantees highest EMC stability according to various Kfz regulations with test level up to 100V/m.

This sensor utilises a ceramic technology, developed by Huba Control and for the last 20 years, in millions of applications.

- Compact and rugged construction for high operating reliability
- Wide choice of connections available
- Excellent EMC capacity
- Negligible temperature influence on accuracy

Technical Overview

Pressure range

Relative	0 ... 10 – 60 bar
Absolute	0 ... 6 bar

Operating conditions

Medium			Liquids and gases
Temperature	Medium	FPM	-40 ... +125 °C
		EPDM	-40 ... +125 °C
		NBR	-20 ... +125 °C
	Ambient		-40 ... +100 °C
	Storage		-50 ... +100 °C
Zulässige Überlast / Berstdruck			2.5 x FS

Materials

Pressure connection		Stainless steel 1.4404 / AISI 316L
Plug accommodation		Polyarylamide 50% GF UL 94 V-0
Materials in contact with the medium	Pressure connection	Stainless steel 1.4404 / AISI 316L
	Sensor	Ceramic Al_2O_3 (96%)
	Sealing material	EPDM, NBR, FPM

Elektrical overview

	Output	Power supply	Load	Current consumption
2 wire	4 ... 20 mA	7.5 ... 33 VDC	$< \frac{\text{supply voltage - 7.5 V}}{0.02\ A}$ [Ohm]	< 23 mA
3 wire	0 ... 5 V	7 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
	0 ... 10 V	12 ... 33 VDC	>10 kOhm / < 100 nF	< 7 mA
	ratiom. 10 ... 90%	5 VDC ± 10%	>10 kOhm / < 100 nF	< 7 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			
Insulation voltage				500 VDC

Protection class

Protection class III

Dynamic response

Response time	< 2 ms (10 ... 90%, typ. 1 ms)
Load cycle	< 100 Hz

Elektrical connection	Protection standard
Kostal SLK 2.8 Codierung A	IP 69K
AMP-JPT	IP 67
AMP Superseal 1.5	IP 67
Deutsch DT04-3P	IP 67
Metri Pack 150 P2S Series	IP 67
M12x1	IP 67

Pressure connection

Outside thread	$^{7}/_{16}$ - 20 UNF
	¼ -18 NPT
	G¼ sealed at back DIN 3852-E with profile seal FPM (-30 ... +135 °C)
	M14x1.5 sealed at back DIN 3852-E with profile seal FPM (-30 ... +135 °C)
	R ¼ acc. EN 10226

Installation arrangement

Unrestricted

Tests / Admissions

	Noise immunity / Noise emission	Noise immunity automotive guideline	Noise emission automotive guideline
Electromagnetic compatibility	ISO 13766 - earth-moving equipment	ISO 11452-2, HF (Field), 100 V/m (200 ... 2000 MHz)	CISPR25
	DIN EN 13309 - construction equipment	ISO 11452-4, HF (BCI), 100 mA (20 ... 400 MHz)	
	DIN ISO 14982 - agriculture and forestry	ISO 10605, ESD, ±8 kV contact, ±15 kV air	
	Automotive guideline ECE R10 [1]	ISO 7637-2, puls [2], test level 4 [3]	
	Automotive guideline 2004/104/EG [1]	ISO 16750-2, Load Dump, 155 V (1 Ω, 300 ms)	
	EN 61326-2-3 - pressure transducer		
Shock acc. ISO 16750-3	50 *g*, 11 ms, half sine wave, 1000x / axis		
Vibration acc. ISO 16750-3	Test VI (12 g, sinusodial 18 g random vibration)		
cULus	acc. 61010-1		

Weight

~ 90 g

Packaging (Please state on order)

Single packaging in cardboard	accessories integrated
Multiple packaging in cardboard (25 pcs)	

Accuracy

Parameter		Unit	
Characteristic line acc. IEC 61298-2 [4),5)]		% fs	± 0.5
Resolution		% fs	0.1
Thermal characteristic [6)]	max.	% fs/10K	± 0.2
Long term stability acc. IEC 61298-2	max.	% fs	± 0.5

Test conditions: 25 °C, 45% rF

[1)] E1 approval for customer specific type on request
[2)] Puls 1, 2a, 2b, 3a, 3b
[3)] Pressure sensor for 12 V and 24 V power system (0 ... 5 V, 0 ... 10 V and 4 ... 20 mA)
[4)] incl. zero point, full scale, linearity, hysteresis and repeatability
[5)] Considering EMC interference < ±1.5% fs
[6)] -15 ... 85 °C

Order code selection table in bar

				1	2	3	4	5	6	7	8	9	10	11
			558.	X	X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative			9										
	Absolute			8										
Pressure range [1]	0 ... 6 bar			8	1	7								
	0 ... 10 bar			9	3	0								
	0 ... 16 bar			9	3	1								
	0 ... 25 bar			9	3	2								
	0 ... 40 bar			9	3	3								
	0 ... 60 bar			9	4	0								
Sealing material	EPDM	Ethylene propylene					1	0						
	NBR	Butadiene Acylonitrile					2	0						
	FPM	Fluoro elastomer					5	0						
Output / Power supply	0 ... 5 V	7 ... 33 VDC							1					
	0 ... 10 V	12 ... 33 VDC							2					
	4 ... 20 mA	7.5 ... 33 VDC							3					
	10 ... 90% ratiom.	5 VDC ±10%							7					
Electrical connection [2]	Kostal SLK 2.8 coding A								7	1				
	AMP-JPT									2				
	AMP Superseal 1.5									3				
	Deutsch DT04-3P									4				
	Metri Pack 150 P2S Series [3]									5				
	M12x1	*2w: IN=1 / OUT=3*	*3w: IN=1 / OUT=4 / GND=3*							S				
		2w: IN=1 / OUT=4	*3w: IN=1 / OUT=3 / GND=4*							M				
Pressure connection [1]	Outside thread	$^{7}/_{16}$-20 UNF									2			
		¼ -18 NPT									3			
		G ¼ sealed at back DIN 3852-E with profile seal FPM									4			
		M14x1.5 sealed at back DIN 3852-E with profile seal FPM									6			
		R ¼ acc. EN 10226									7			
Pressure orifice	without											0	1	
	with											2	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 50bar/Out1...8V)													W

Order code selection table in psi

				1	2	3	4	5	6	7	8	9	10	11
			558.	X	X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative			9										
	Absolute			8										
Pressure range [1]	0 ... 100 psi			8	B	7								
	0 ... 150 psi			9	C	0								
	0 ... 200 psi			9	C	1								
	0 ... 300 psi			9	C	2								
	0 ... 500 psi			9	C	3								
	0 ... 750 psi			9	D	0								
Sealing material	EPDM	Ethylene propylene					1	0						
	NBR	Butadiene Acylonitrile					2	0						
	FPM	Fluoro elastomer					5	0						
Output / Power supply	0 ... 5 V	7 ... 33 VDC							1					
	0 ... 10 V	12 ... 33 VDC							2					
	4 ... 20 mA	7.5 ... 33 VDC							3					
	10 ... 90% ratiom.	5 VDC ±10%							7					
Electrical connection [2]	Kostal SLK 2.8 coding A								7	1				
	AMP-JPT									2				
	AMP Superseal 1.5									3				
	Deutsch DT04-3P									4				
	Metri Pack 150 P2S Series [3]									5				
	M12x1	*2w: IN=1 / OUT=3*	*3w: IN=1 / OUT=4 / GND=3*							S				
		2w: IN=1 / OUT=4	*3w: IN=1 / OUT=3 / GND=4*							M				
Pressure connection [1]	Outside thread	$^{7}/_{16}$-20 UNF									2			
		¼ -18 NPT									3			
		G ¼ sealed at back DIN 3852-E with profile seal FPM									4			
		M14x1.5 sealed at back DIN 3852-E with profile seal FPM									6			
		R ¼ acc. EN 10226									7			
Pressure orifice	without											0	1	
	with											2	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 650psi/Out1...8V)													W

Accessories

Accessories supplied loose

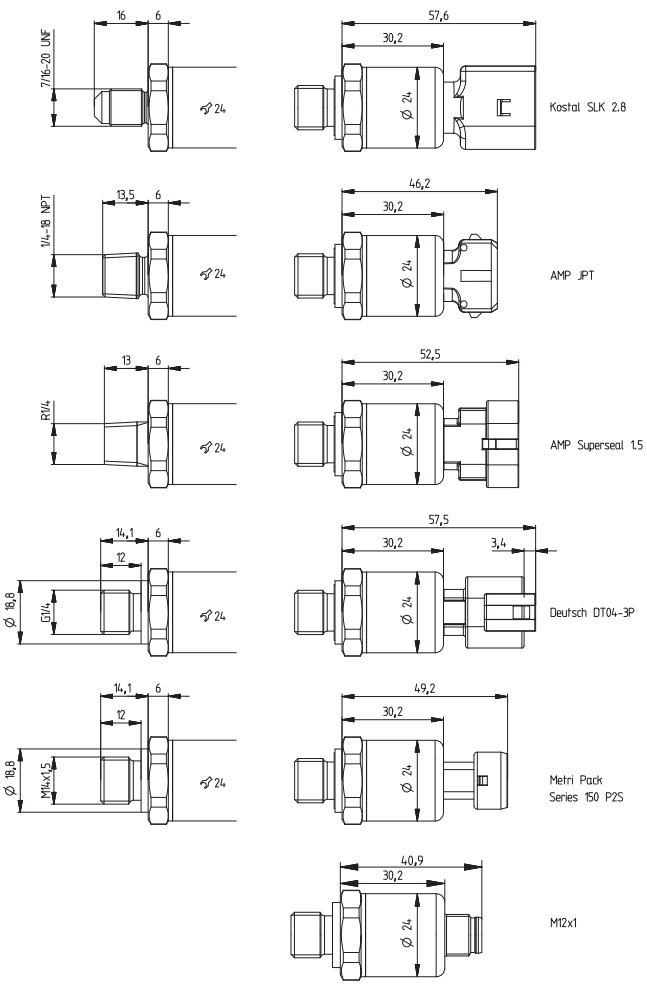
	Order Number
Set - Female connector AMP JPT 2 wire (3 wire with 1 dummy plug)	110442
Set - Female connector AMP JPT 3 wire	108767
Calibration certificate	104551

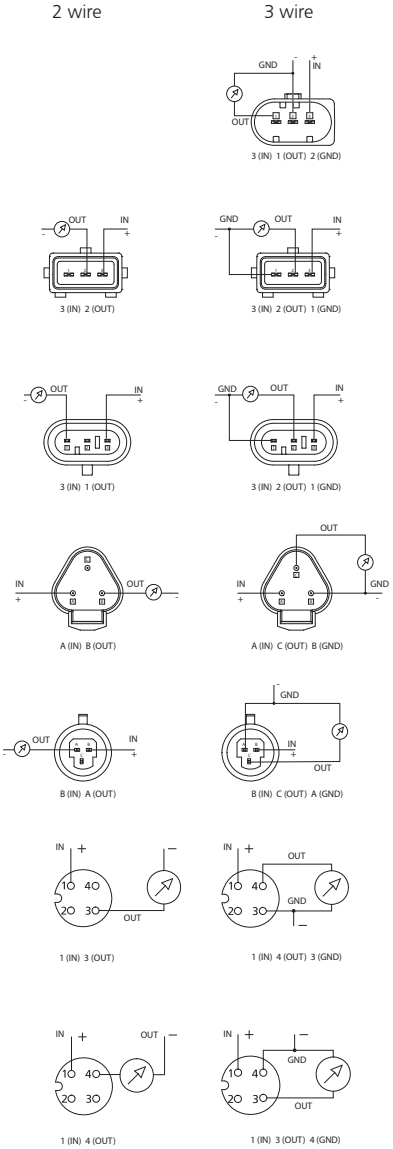
[1] Other pressure ranges and pressure connections on request [2] Delivery without female connector [3] For pressure ranges ≤ 16 bar (200psi, 1.6 MPa / relative) only possible if deareation through the cable is assured

Order code selection table in MPa

			1	2	3	4	5	6	7	8	9	10	11
			558.	X	X	X	X	X	X	X	X	X	X	X
Pressure mode	Relative		9										
	Absolute		8										
Pressure range [1]	0 ... 0.6 MPa		8	G	7								
	0 ... 1 MPa		9	H	0								
	0 ... 1.6 MPa		9	H	1								
	0 ... 2.5 MPa		9	H	2								
	0 ... 4 MPa		9	H	3								
	0 ... 6 MPa		9	K	0								
Sealing material	EPDM	Ethylene propylene				1	0						
	NBR	Butadiene Acylonitrile				2	0						
	FPM	Fluoro elastomer				5	0						
Output / Power supply	0 ... 5 V	7 ... 33 VDC						1					
	0 ... 10 V	12 ... 33 VDC						2					
	4 ... 20 mA	7.5 ... 33 VDC						3					
	10 ... 90% ratiom.	5 VDC ±10%						7					
Electrical connection [2]	Kostal SLK 2.8 coding A							7	1				
	AMP-JPT								2				
	AMP Superseal 1.5								3				
	Deutsch DT04-3P								4				
	Metri Pack 150 P2S Series [3]								5				
	M12x1	*2w: IN=1 / OUT=3* *3w: IN=1 / OUT=4 / GND=3*							S				
		2w: IN=1 / OUT=4 *3w: IN=1 / OUT=3 / GND=4*							M				
Pressure connection [1]	Outside thread	$^{7}/_{16}$-20 UNF								2			
		¼ -18 NPT								3			
		G ¼ sealed at back DIN 3852-E with profile seal FPM								4			
		M14x1.5 sealed at back DIN 3852-E with profile seal FPM								6			
		R ¼ acc. EN 10226								7			
Pressure orifice	without										0	1	
	with										2	1	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 5MPa/Out1...8V)												W

Dimensions in mm / Electrical connections





[1] Other pressure ranges and pressure connections on request [2] Delivery without female connector [3] For pressure ranges ≤ 16 bar (200psi, 1.6 MPa / relative) only possible if deareation through the cable is assured

Relative and absolute pressure transmitter type 680

Pressure range
0 ... 0.1 – 1000 bar

The pressure transmitters of type 680 with piezoresistive measuring elements have compensated, calibrated and amplified sensor signals which are available as standard voltage or current outputs.
The transmitter housing is available with various pressure and electrical connections.
Manufactured from stainless steel, its welded construction provides a watertight seal. With its sophisticated building block system, individual designs to meet specific
applications are possible.

- Effective overload protection due to chemically eteched chip diaphragm and specially designed glass gland
- Fast and affordable customer specific solutions due to building block system, even for small quantities
- Compact construction with SMD technology enhances operational reliability in the presence of shock and vibration
- Welded construction provides 100% sealing against media

Technical overview

Pressure type [1]	
Relative and absolute	0 ... 25 bar
Overpressure	> 25 ... 1000 bar

Overload	
At Pressure ranges 0.1 ... 2 bar	3x pressure range, min. 3 bar
At Pressure ranges > 2 ... 600 bar	3x pressure range, max. 850 bar
At Pressure ranges > 600 ... 1000 bar	1500 bar

Rupture pressure	
At Pressure ranges 0.1 ... 2 bar	> 200 bar
At Pressure ranges > 2 ... 600 bar	> 850 bar
At Pressure ranges > 600 ... 1000 bar	> 1500 bar

Medium	
Permissible medium	liquids and gases

Material	
Pressure connection, diaphragm, case	stainless steel 1.4435 (316L) (Titanium or Hastelloy C on request)
Sealing material	FPM (other on request)

Temperature [2]	
Medium temperature	-40 ... +150 °C
Ambient temperature	-40 ... +125 °C
Storage temperature	-40 ... +125 °C

Output and power supply [3] [4]	output	power supply	permissible load [5]
3-wire	0 ... 5 V	12 ... 30 VDC	> 10 kOhm
	0 ... 10 V	12 ... 30 VDC	> 10 kOhm
2-wire	4 ... 20 mA	9 ... 33 VDC	$\frac{\text{supply voltage - 9V}}{0.02\ A}$ [Ohm] max.
2-wire **(Ex)**	4 ... 20 mA	9 ... 28 VDC	$\frac{\text{supply voltage - 9V}}{0.02\ A}$ [Ohm] max.

Ex-Version	gas	dust
Ex-Admission (Depending on execution, see valid ATEX certificate)	II 1G Ex ia IIB/IIC T3 ... T6	II 1D Ex iaD 20 IP6x T145 ... T70 °C
Standards	EN 60079-0 / EN 60079-11	EN 61241-0 / EN 61241-11

Temperature class Ex-Version	T6	T4	T3
Ambient temperature Ta	-40 ... +50 °C	-40 ... +85 °C	-40 ... +125 °C
Medium temperature	-40 ... +50 °C	-40 ... +110 °C	-40 ... +150 °C

Electrical connection	
Cable	PUR, PE or Teflon in variable lengths [6]
Connector [7]	DIN EN 175301-803-A / Lumberg RSF 4 / RSF 50 / Binder 723

Pressure connection	
Inside thread	G ¼ [1]
Outside thread	G ¼, G ½ [1]

Tests / Admissions	norm	character	level
Mechanical load	EN 60068-2-6	vibration	10 *g* (4 ... 2000 Hz, oscillation ± 10 mmpp)
	EN 60068-2-27	shock	100 *g* (pulse duration 6 ms)
Interference emit	EN 55022	emitted interference, class B	< 30 dBµV/m (0.03 ... 1 GHz)
Interference resistance	EN 61000-4-2	discharge static electricity	8 kV contact-, 15 kV air discharge
	EN 61000-4-3	electromagnetic radiation	10 V/m, 0.08 ... 2.7 GHz, 80% AM 1 kHz, 3s
	EN 61000-4-4	fast transients (burst)	4 kV
	EN 61000-4-5	impulse voltage (surge)	Line-Line 0.5 kV/42 Ohm, Line-Earth 1 kV/42 Ohm
	EN 61000-4-6	grid-bound electromagnetic blockage	10 V, 0.15 ... 80 MHz, 80% AM 1 kHz, 3s

Packaging	
Single packaging	carton padded cellular material

Weight	
Cable version (2 m)	~ 250 g
Connector version	~ 150 g

Accuracy

	total error band [*] [±%fs] per pressure ranges [bar]				
	0.1 ... 0.5	> 0.5 ... 2	> 2 ... 100	> 100 ... 600	> 600 ... 1000
Characteristic line deviation [±%FS] 0.25 or 0.1 (typ./ max.) 0 ... +70 °C	1.0 / 1.5	0.7 / 1.0	0.7 / 1.0	0.7 / 1.0	0.7 / 1.0
(typ./ max.) -25 ... +100 °C	2.0 / 2.5	1.0 / 1.5	1.0 / 1.5	1.0 / 1.5	1.0 / 1.5
Characteristic line deviation [±%FS] 0.05 (typ. / max.) 0 ... +70 °C	–	0.3 / 0.5	0.3 / 0.5	–	–
(typ. / max.) -25 ... +100 °C	–	0.75 / 1.0	0.75 / 1.0	–	–

[*] total error band incl. characteristic line deviation, temperature error zero point and operating range, hysteresis and repeatability at max. signal range.

[1] See order code selection table. Other on request
[2] Compensated temperature range see order code selection table
[3] Short circuit proof with polarity reversal protection
[4] Influence from the supply voltage types < 0.05% fs
[5] Influence permissible load < 0.05% fs
[6] Standard length 2 m
[7] Delivery without female connector

Order code selection table

					1	2	3	4	5	6	7	8	9	10
				680.	X	X	X	X	X	X	X	X	X	X
Pressure type	Relative				8									
	Absolute				7									
	Overpressure				6									
Pressure range [1]	0 ... 100 mbar					0	0							
	0 ... 160 mbar					0	1							
	0 ... 250 mbar					0	2							
	0 ... 400 mbar					0	3							
	0 ... 600 mbar					0	4							
	0 ... 1 bar					0	5							
	0 ... 1.6 bar					0	6							
	0 ... 2.5 bar					0	7							
	0 ... 4 bar					0	8							
	0 ... 6 bar					0	9							
	0 ... 10 bar					1	0							
	0 ... 16 bar					1	1							
	0 ... 25 bar					1	2							
	0 ... 40 bar				6	1	3							
	0 ... 60 bar				6	1	4							
	0 ... 100 bar				6	1	5							
	0 ... 160 bar				6	1	6							
	0 ... 250 bar				6	1	7							
	0 ... 400 bar				6	1	8							
	0 ... 600 bar				6	1	9							
	0 ... 1000 bar				6	2	0							
Output / power supply	0 ... 5 V	12 ... 30 VDC						0						
	0 ... 10 V	12 ... 30 VDC						1						
	4 ... 20 mA	9 ... 33 VDC						3						
	4 ... 20 mA	9 ... 28 VDC	intrinsically safe version [2] [3]					4						
Characteristic line deviation	≤ ± 0.25% fs								1					
	≤ ± 0.10% fs (≤ 600 bar fs)								2					
	≤ ± 0.05% fs (≥ 0.5 bar ... ≤ 100 bar fs)							3,4	3		0,1,2,3			
Temperature range	0 ... + 70 °C compensated, medium temperature permissible: -40 ... +125 °C									0				
	-25 ... + 100 °C compensated, medium temperature permissible: -40 ... +125 °C									1				
	-25 ... + 100 °C compensated, medium temperature permissible: -40 ... +150 °C									2				
	-40 ... + 125 °C compensated, medium temperature permissible: -40 ... +125 °C									3				
	Ex T6 (Ta: -40 ... +50 °C) 0 ... +70 °C compensated (medium temperature permissible: - 40 ... + 50 °C)							4		4				
	Ex T4 (Ta: -40 ... +85 °C) -25 ... +100 °C compensated (medium temperature permissible: - 40 ... + 110 °C)							4		5				
	Ex T3 (Ta: -40 ... +125 °C) -25 ... +100 °C compensated (medium temperature permissible: - 40 ... + 150 °C)							4		6				
Electrical connection	Connector	Fig. 1 Binder 723	5 pin	IP 67							0			
		Fig. 2 DIN EN 175301-803-A		IP 65							1			
		Fig. 3 Lumberg	4 pin RSF 4	IP 20							2			
		Fig. 4 Lumberg	5 pin RSF 50	IP 68	6,7						3			
	Cable [4]	Fig. 5 PUR		IP 67							4			
		Fig. 6 PUR with kink guard		IP 67							5			
		Fig. 5 Teflon		IP 67							9			
Pressure connection	Inside thread	Fig. 10 G ¼										0	0	
	Outside thread	Fig. 11 G ¼										0	1	
		Fig. 12 G ¼ manometer DIN 16288										0	2	
		Fig. 13 G ½										0	3	
		Fig. 14 G ½ diaphragm at front										0	4	
		Fig. 15 G ½ diaphragm flush with front										0	5	
		Fig. 16 G ½ manometer DIN 16288										0	6	
Version														N

[1] Other pressure ranges on request

[2] II 1G Ex ia IIB/IIC T3...T6 / II 1D Ex iaD 20 IP6x T145...T70°C (Depending on execution, see valid ATEX certificate)

[3] Indicate correct medium

[4] Length of cable 2 m (other lengths on request)

Dimensions in mm / Electrical connections

Fig. 10

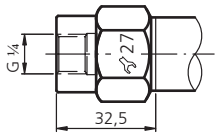


Fig. 11

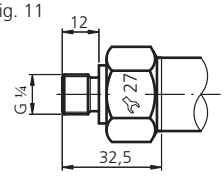
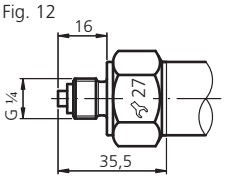


Fig. 12



Version for medium temperature up to +125 °C

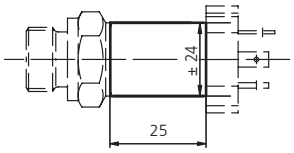
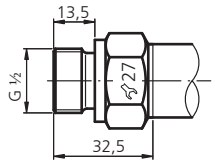


Fig. 13



Version for medium temperature > +125 ... max. +150 °C

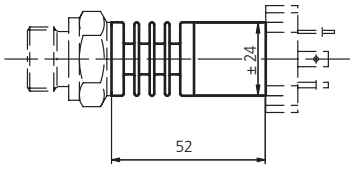


Fig. 14

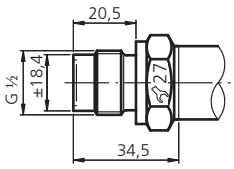


Fig. 15

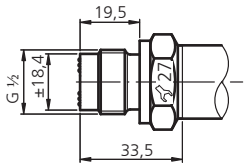
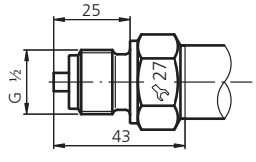


Fig. 16



Pin / Colour	2-wire	3-wire
1		
1	OUT	OUT
3	IN	IN
4		GND
2		
1	IN	IN
2	OUT	OUT
3		GND
3		
1		GND
3	OUT	OUT
4	IN	IN
4		
1	OUT	OUT
3	IN	IN
4		GND
5		
white	IN	IN
yellow	OUT	GND
brown		OUT

Fig. 1

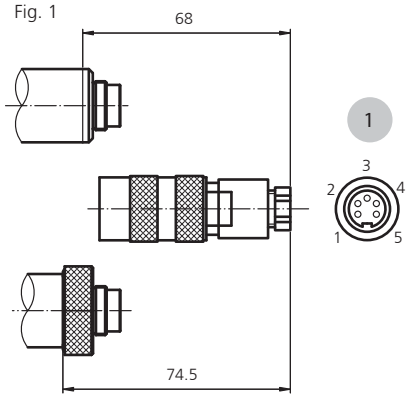


Fig. 2

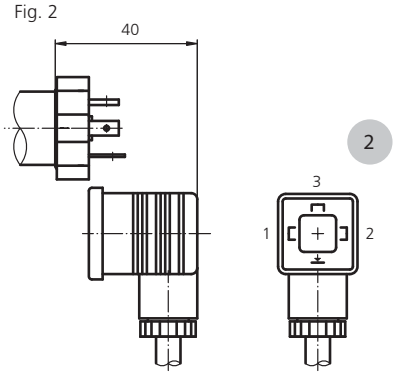


Fig. 3

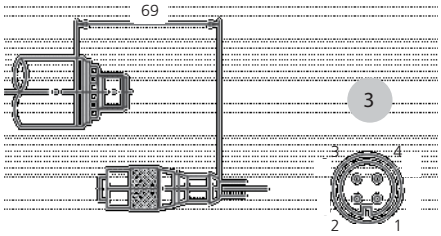


Fig. 4

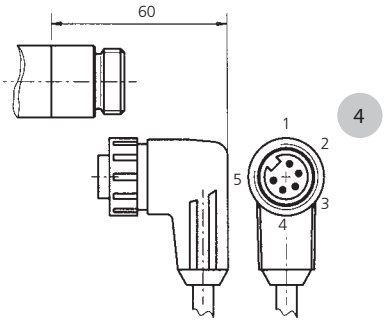


Fig. 5

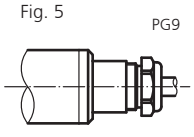
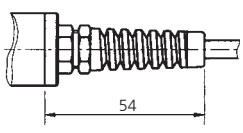


Fig. 6



OEM Relative and differential pressure transmitter type 401

Pressure range
0 ... 3 – 8 mbar

Type 401 pressure transmitters sense ultra fine changes in air pressure and are designed to provide optimum control. The dual component diaphragm with it's unique geometry, gives highly sensitive operation and excellent repeatability, even in the range below 20 Pascal.

- Special development for optimize of combustion mixture in gas boilers
- With the special diaphragm geometry inherently stable
- Ideal dimensioning for high sensitivity and with long term stability
- Excellent repeatability even in the lower pressure range (< 20 Pascal)

Technical overview

Pressure range

Relative and differential	0 ... 3 – 8 mbar

Operating conditions

Medium		Air and neutral gases
Temperature	Medium / ambient	0 ... +70 °C
	Storage	-40 ... +70 °C
Tolerable overload on one side		25 mbar
		100 mbar short period at room temperature
Rupture pressure		200 mbar
Leak rate		< 5 cm^3/h (Air), at nominal pressure

Materials in contact with the medium

Case	Polycarbonate (PC)
Diaphragm	LSR (Liquid Silicon Rubber)
Sensor	Ceramic Al_2O_3

Electrical overview

Output		0.5 ... 4.5 V
Power supply		10.4 ... 18 VDC [1]
Load		> 15 kOhm (to GND)
Current consumption	At nominal pressure without load	< 8 mA
Polarity reversal protection		Mechanically protected
Electronical compatibility	The product is designed exclusively for installation in equipment. The customer is responsible for CE conformity.	

Dynamic response

Response time	< 10 ms
Load cycle	< 10 Hz

Protection standard

IP 00

Electrical connections

3 pole plug connector RAST 2.5

Pressure connection

Pipe Ø 6.2 mm

Mounting instruction

Installation arrangement	Diaphragm horizontal (recommend)	Presssure connections facing downward
	Diaphragm vertical (on request)	Pressure connections lateral, signal approx. 13 Pa below actual pressure
Mounting		Snap mounting in sheet steel (thickness 1 and 2 mm)
		Mounting bracket type A / type B

Tests / Admissions

DVGW according to DIN EN 1854	CE-0085BM0306

Weight

~ 45 g

Packaging

Cardboard boxes with blister pack inserts (returnable).

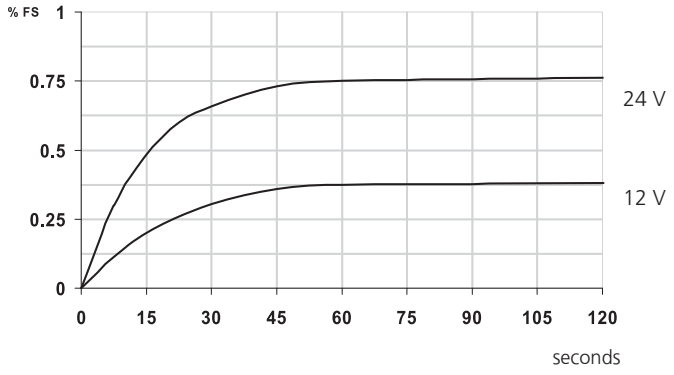
Ordering batches quantities / Transport volumes

Pieces	Varaint	Length (cm)	Width (cm)	Height (cm)	Weight (kg)	Blister (20 pcs)
1440	12 Box on euro-palette	120	80	93	134	72
120	1 Box	59	39	26	9.5	6

Accuracy

Parameter		Unit	
Tolerance zero point [2]	max.	% fs	± 0.5
Tolerance full scale [2]	max.	% fs	-1.5 /+0.5
Resolution		% fs	0.1
Total of linearity, hysteresis and repeatability	max.	% fs	± 0.3
Long term stability acc. to DIN EN 60770		% fs	± 1.0
TC zero point [3]	typ.	% fs/10K	± 0.2
TC zero point [3]	max.	% fs/10K	± 0.3
TC sensitivity [3]	typ.	% fs/10K	± 0.1

Signal drift



[1] Power supply possible up to 28 VDC (with higher Power up drift see diagram) [2] For changing diaphragm position from horizontal to vertical, approx. -0.13 mbar. [3] TC = Temperature coefficient

Order code selection table

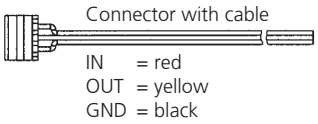
		Order number								
Pressure range	0 ... 3 mbar	4	0	1	.	9	3	0	0	0
	0 ... 5 mbar	4	0	1	.	9	5	0	0	0
	0 ... 8 mbar	4	0	1	.	9	8	0	0	0

▲ Full scale signal at these pressure

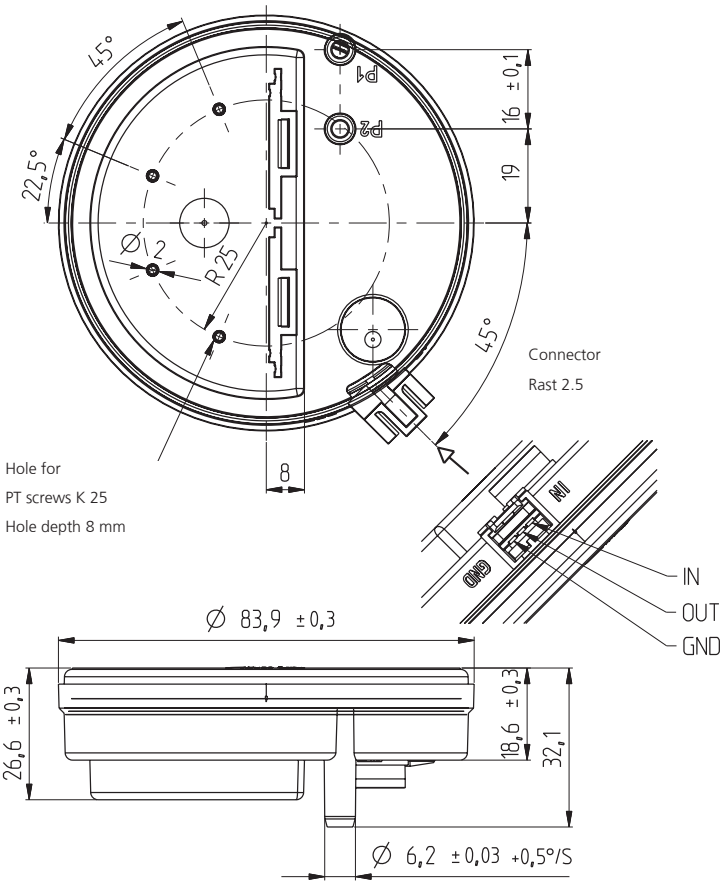
Accessories [1]

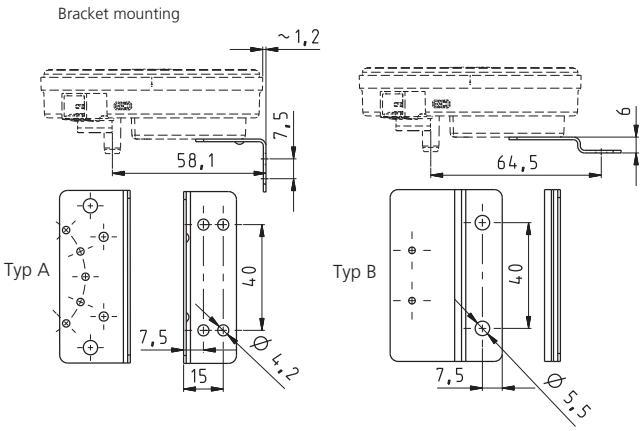
		Order number
Bracket type A		100295
Bracket type B		100098
Special screws for fastening transmitter to bracket (2 screws per transmitter required)		102976
Orifice for pulsed pressure		100251
Connector with cable Rast 2.5	30 cm	111668
Connector with cable Rast 2.5	110 cm	101817
Connector with cable Rast 2.5	150 cm	112282
Calibration certificate		104551

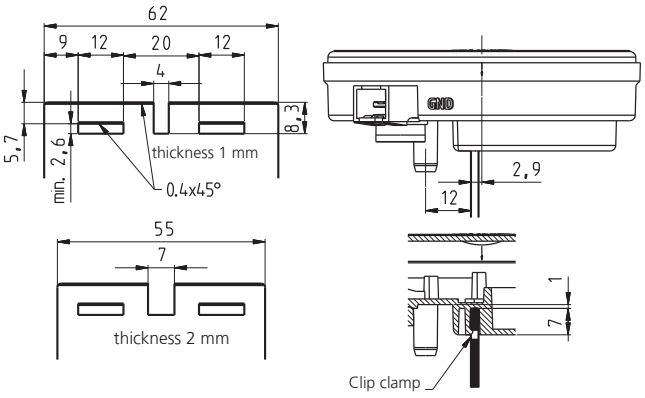
AMP connector [2]	Manufacture's Part No.	Colour	for flexible wire
	3-829868-3	grey	7 x 0.20 mm = 0.22 mm² or 12 x 0.20 mm = 0.35 mm²
	1-966194-3	beige	7 x 0.25 mm = 0.35 mm²



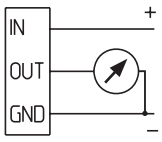
Dimensions in mm / Electrical connections







Other dimensions as per «Thickness 1 mm»



[1] Accessories supplied loose

[2] To be ordered separately from original manufacturer. Further information can be found in the manufacturer specification No. 114-18049.49 zu finden.

Relative and differential pressure transmitter type 402

Pressure range
0 ... 3 – 50 mbar

Type 402 pressure transmitters are ideally suited to measuring fine air flow in air conditioning systems, and fine pressures in the environmental / medical technology sectors.
Individually ranged sensors ensure optimum accuracy and long term stability of measurement. Location is quick and easy, either via a mounting plate or directly onto a PCB.

- Attractive price / performance ratio
- Excellent synergy of diaphragm technology and ceramic elements
- Special adapter for top-hat rail mounting
- Direct pcb mounting with simple snap-on system

Technical Overview

Pressure range		
Relative and differential		0 ... 3 – 50 mbar
Operating conditions		
Medium		Air and neutral gases
Temperature	Medium / ambient	0 ... +70 °C
	Storage	-30 ... +70 °C
Tolerable overload		100 mbar
Rupture pressure	at room temperature	200 mbar
	at 70 °C	150 mbar
Materials in contact with the medium		
Case construction		Polycarbonate (PC) / Polyamide (PA)
Diaphragm		Silicone
Sensor		Ceramic Al_2O_3 (96%)
Electrical overview		
Output		0.5 ... 4.5 V
Power supply		10.2 ... 33.0 VDC
Load		> 15 kOhm (to GND)
Current consumption		< 8 mA
Polarity reversal protection	Connector and pcb version	mechanically protected
Electromagnetic compatibility	The product is designed exclusively for installation in equipment. The customer is responsible for CE conformity.	
Dynamic response		
Response time		< 10 ms
Load cycle		< 10 Hz
Protection standard		
IP 00		
Electrical connections		
Solderable pin in circuit board		
3 pole onnector RAST 2.5		
Adapter plate		Mounted and soldered
Pressure connection		
Pipe Ø 6.2 mm		
Mounting instruction		
Installation arrangement	Diaphragm vertical	Presssure connections facing downward
	Diapgragm horizontal	Pressure connection P1 upwards
Mounting		Snap fitting [1]
		Adapter
		Mounting bracket
Weight		
~ 28 g		
Packaging		
Single packaging in cardboard boxes		
Multiple packaging in cardboard boxes with blister pack inserts		(25 pcs)

Accuracy

Parameter		Unit	0 .. 3 mbar	0 ... 5 mbar	0 ... 10 mbar	0 ... 30 mbar	0 ... 50 mbar
Tolerance zero point [2]	max.	% fs	± 0.9	± 0.9	± 0.9	± 0.9	± 0.9
Tolerance full scale [2]	max.	% fs	± 1.3	± 1.3	± 1.3	± 0.7	± 0.7
Resolution		% fs	0.1	0.1	0.1	0.1	0.1
Total of linearity, hysteresis and repeatability	max.	% fs	± 1.0	± 1.0	± 0.6	± 0.6	± 0.6
Long term stability acc. to DIN EN 60770		% fs	± 1.0	± 1.0	± 1.0	± 1.0	± 1.0
TC zero point [3]	typ.	% fs/10K	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
TC zero point [3]	max.	% fs/10K	± 0.4	± 0.4	± 0.4	± 0.4	± 0.4
TC sensitivity [3]	typ.	% fs/10K	+ 0.3	+ 0.3	+ 0.2	± 0.2	± 0.2
TC sensitivity [3]	max.	% fs/10K	± 0.6	+ 0.5	+ 0.4	± 0.4	± 0.4

Test conditions: 25 °C, 45% RH, power supply 12 VDC
TC z.p. / TC s. 0 ... +70 °C

[1] max. 1.6 mm thickness

[2] For changing diaphragm position from horizontal to vertical, approx. -0.13 mbar.

[3] TC = Temperature coefficient

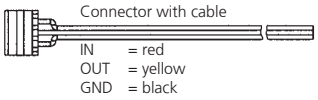
Order code selection table

		1	2	3	4	5	6	7
	402.	X	X	X	X	X	X	X
Pressure range [1]	0 ... 3 mbar	9	1					
	0 ... 5 mbar	9	2					
	0 ... 10 mbar	9	3					
	0 ... 30 mbar	9	4					
	0 ... 50 mbar	9	5					
	▲ Full scale signal at these pressure							
Adjusting position [2]	Diaphragm vertical			0				
	Diaphragm horizontal			1				
Diaphragm	Silicone				0			
Output / power supply	0.5 ... 4.5 V 10.2 ... 33 VDC					0		
Electrical connection	Print version						1	
	Connector version Rast 2.5						2	
	Print version, mounted and soldered on adapter plate						3	
Pressure connection	Pipe Ø 6.2 mm							1

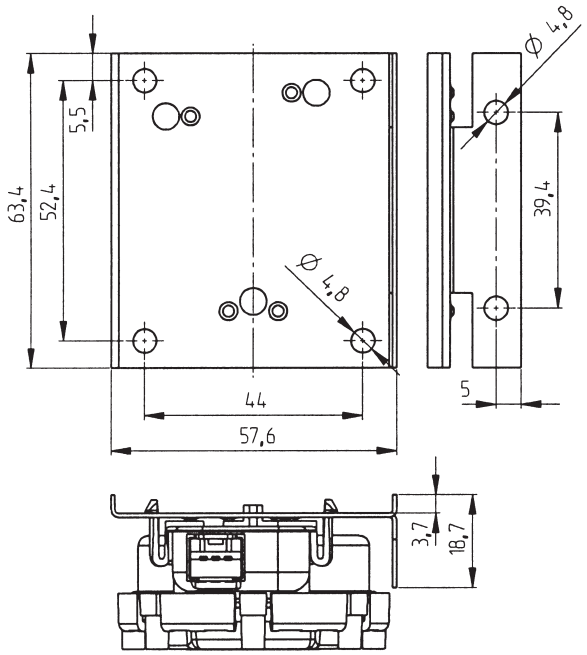
Accessories [3]

		Order number
Fixing screw for wall thickness 1 – 2 mm	Length of screw 6 mm (min. required 2 pcs)	102976
Fixing screw for wall thickness 4.1 – 6 mm	Length of screw 10 mm (min. required 2 pcs)	112213
Connector Rast 2.5 with cable (110 cm)		101817
Base plate for rail mounting suitable for bearing rail TS 35		110656
Bracket		108222
Calibration certificate		104551

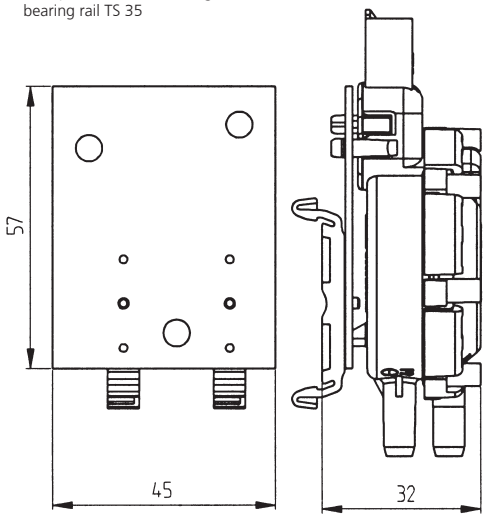
AMP connector [4]	Manufacturer's Part No.	Colour	for flexible wire
	3-829868-3	grey	7 x 0.20 mm = 0.22 mm² or 12 x 0.20 mm = 0.35 mm²
	1-966194-3	beige	7 x 0.25 mm = 0.35 mm²



Mounting Bracket



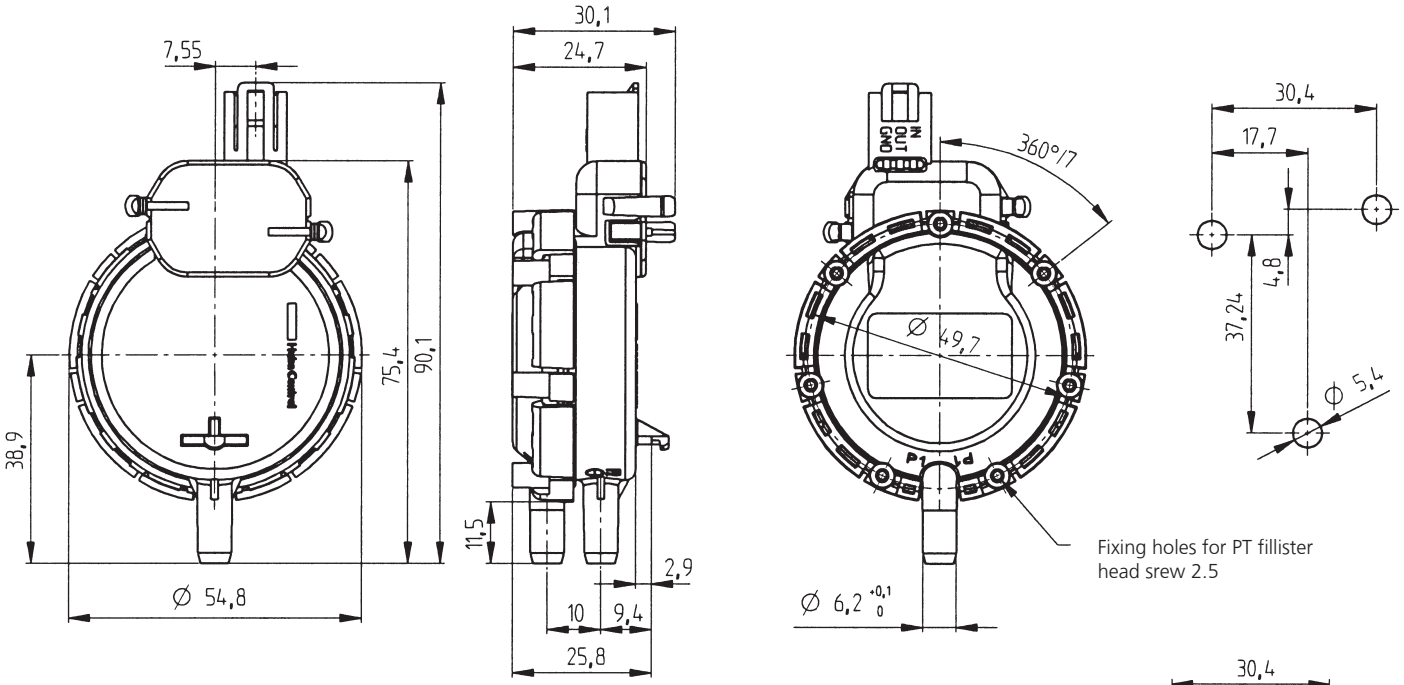
Base plate for rail mounting suitable for bearing rail TS 35



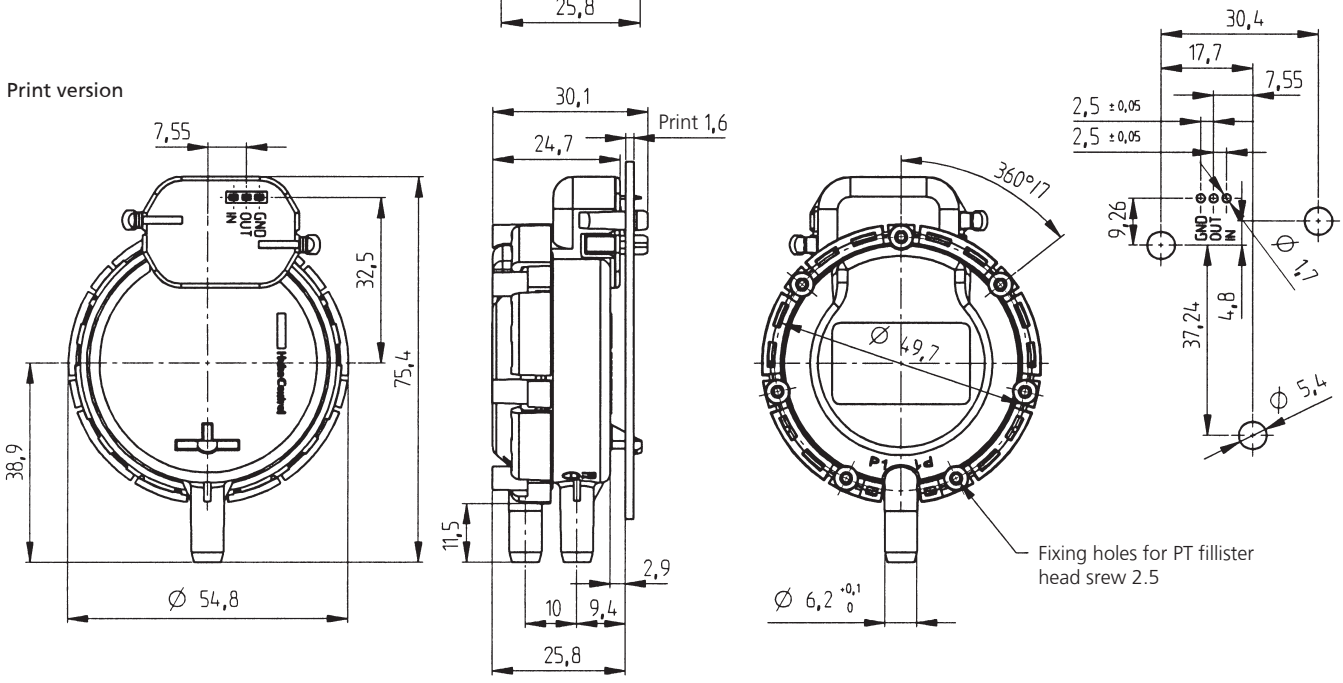
[1] Other pressure range on request
[2] For changing diaphragm position from horizontal to vertical, approx. -0.13 mbar.
[3] Accessories supplied loose
[4] To be ordered separately from original manufacturer. Further information can be found in the manufacturer specification No. 114-18049.

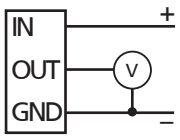
Dimensions in mm / Electrical connections

Connector version



Print version





OEM Relative and differential pressure transmitter type 403

Pressure range
0 ... 3 – 8 mbar

Type 403 pressure transmitters sense ultra-fine changes in gas pressure for use in air / gas ratio control systems. All materials used are compatible with flammable gas.
When used in combination with our type 401 pressure transmitter, the optimum air / gas ratio can be achieved.

- Special development for optimize of combustion mixture in gas boilers
- With the special diaphragm geometry inherently stable due to homogeneous manufacture
- Ideal dimensioning for high sensitivity and with long term stability
- Excellent repeatability even in the lower pressure range (< 20 Pascal)

Technical overview

Pressure range

Relative and differential	0 ... 3 – 8 mbar

Operating conditions

Medium		Air, neutral and burnable gases
Temperature	Medium / ambient	0 ... +70 °C
	Storage	-40 ... +70 °C
Tolerable overload on one side		25 mbar
		100 mbar short period at room temperature
Rupture pressure		200 mbar
Leak rate		< 5 cm³/h (Air), at measuring range

Materials in contact with the medium

Case	Polycarbonate (PC)
Diaphragm	NBR (NBR admission for burnable gas)
Sensor	Ceramic Al_2O_3

Electrical overview

Output		0.5 ... 4.5 V
Power supply		10.4 ... 18 VDC [1]
Load		> 15 kOhm (to GND)
Current consumption	At nominal voltage without load	< 8 mA
Polarity reversal protection		Mechanically protected
Electromagnetic compatibility	The product is designed exclusively for installation in equipment. The customer is responsible for CE conformity.	

Dynamic response

Response time	< 10 ms
Load cycle	< 10 Hz

Protection standard

IP 00

Electrical connections

3 pole connector RAST 2.5

Pressure connection

Pipe Ø 6.2 mm

Mounting instruction

Installation arrangement	Diaphragm horizontal (Recommend)	Presssure connections facing downward
	Diaphragm vertical (on request)	Pressure connections lateral, signal approx. 13 Pa below actual pressure
Mounting		Snap mounting in sheet steel (thickness 1 and 2 mm)
		Mounting bracket type A / type B

Tests / Admissions

CE-0085BP0459 acc. EG gas equipment directive (2009/142/EG)
acc. norm DIN EN 1854 certificated by DVGW

Before initial operation resp. gas supply make sure that in case of breach of the pressure transmitters case at 1.5 fold max. admissible incoming pressure not more thank 70 dm³/h will be able to leak!

Weight

~ 45 g

Packaging

Cardboard boxes with blister pack inserts (returnable).

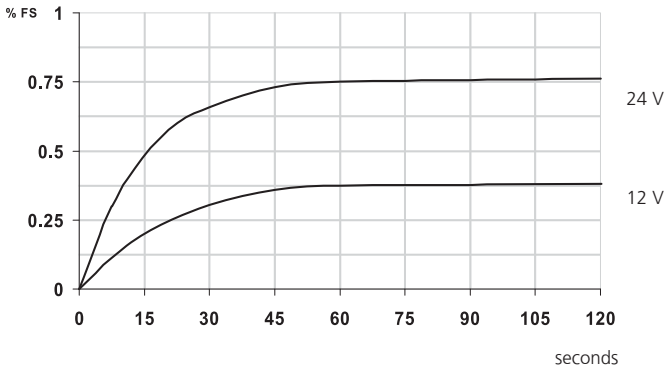
Ordering batches quantities / Transport volumes

Pieces	Varaint	Length (cm)	Width (cm)	Height (cm)	Weight (kg)	Blister (20 pcs)
1440	12 Box on euro-palette	120	80	93	134	72
120	1 Box	59	39	26	9.5	6

Accuracy

Parameter		Unit	
Tolerance zero point [2]	max.	% fs	± 0.5
Tolerance full scale [2]	max.	% fs	-1.5 /+0.5
Resolution		% fs	0.1
Total of linearity, hysteresis and repeatability	max.	% fs	± 0.3
Long term stability acc. to DIN EN 60770		% fs	± 1.0
TC zero point [3]	typ.	% fs/10K	± 0.2
TC zero point [3]	max.	% fs/10K	± 0.3
TC sensitivity [3]	typ.	% fs/10K	± 0.1

Signal drift



[1] Power supply possible up to 28 VDC (with higher Power up drift see diagram)
[2] For changing diaphragm position from horizontal to vertical, approx. -0.13 mbar.
[3] TC = Temperature coefficient

Order code selection table

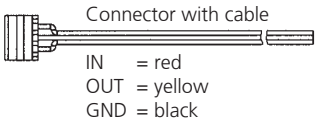
		Order number								
Pressure range	0 ... 3 mbar	4	0	3	.	9	3	0	0	0
	0 ... 5 mbar	4	0	3	.	9	5	0	0	0
	0 ... 8 mbar	4	0	3	.	9	8	0	0	0

▲ Full scale signal at these pressure

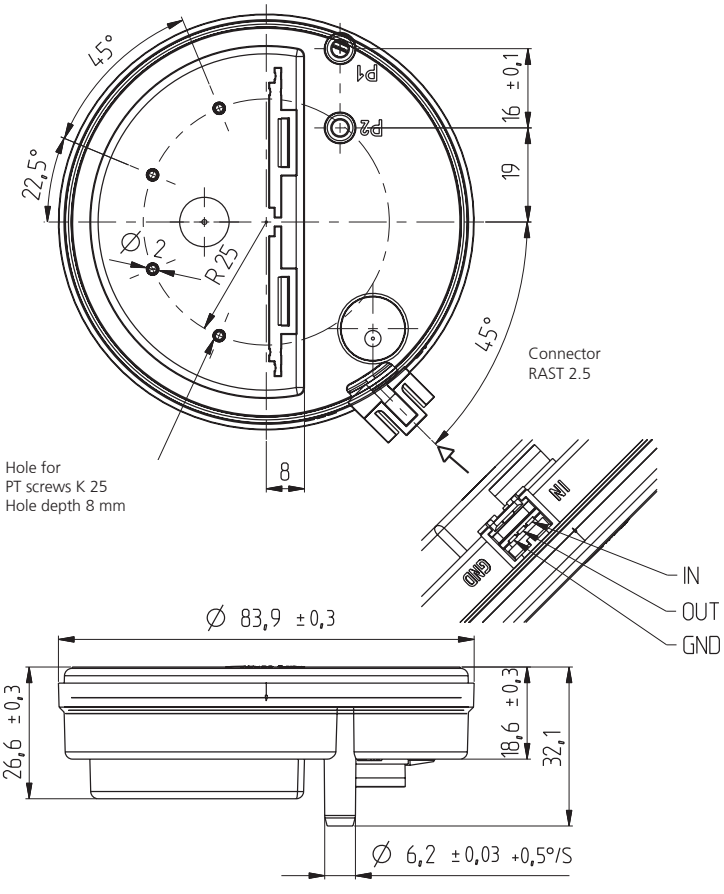
Accessories [1]

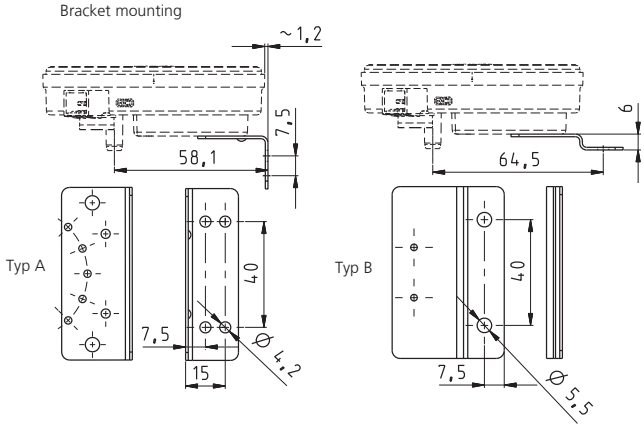
		Order number
Bracket type A		100295
Bracket type B		100098
Special screws for fastening transmitter to bracket (2 screws per transmitter required)		102976
Orifice for pulsed pressure		100251
Connector with cable RAST 2.5	30 cm	111668
Connector with cable RAST 2.5	110 cm	101817
Connector with cable RAST 2.5	150 cm	112282
Calibration certificate		104551

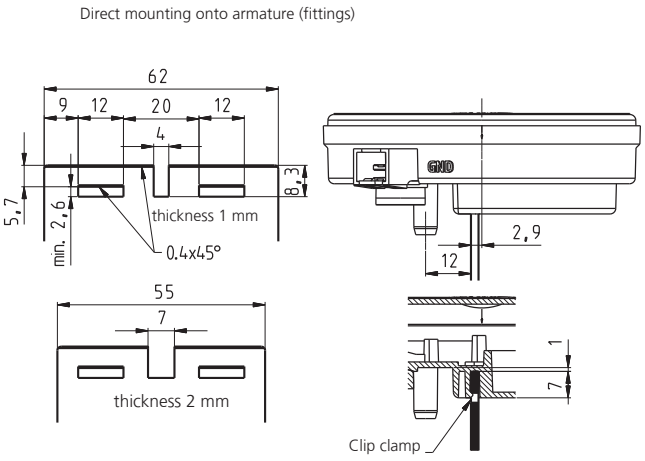
AMP connector [2]	Manufacture's Part No.	Colour	for flexible wire
	3-829868-3	grey	7 x 0.20 mm = 0.22 mm² or 12 x 0.20 mm = 0.35 mm²
	1-966194-3	beige	7 x 0.25 mm = 0.35 mm²



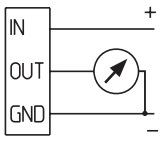
Dimensions in mm / Electrical connections







Other dimensions as per «Thickness 1 mm»



[1] Accessories supplied loose

[2] To be ordered separately from original manufacturer. Further information can be found in the manufacturer specification No. 114-18049.49

Relative and differential pressure transmitter type 652

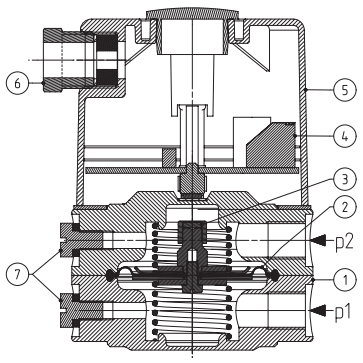
Pressure range
0 ... 50 – 1000 mbar

Type 652 pressure transmitters are ideally suited to the continuous monitoring of liquid or level, (especially in heating technology).
Their especially rugged construction allows a single port overpressure of up to 20 bar, depending upon pressure range.

- High overpressure safety margin 10/20 bar on P1
- 3 standardised output signals for direct Processing in control / monitoring systems
- Functionally simple, rugged mechanics with high operating reliability
- Attractive price / performance ratio
- Also for slightly aggressive liquids and gases

Technical overview

Pressure range		
Relative and differential		0 ... 50 – 1000 mbar
Operating conditions		
Medium		Liquids and neutral gases
Temperature	NBR-based	0 ... +80 °C
	FPM	-10 ... +80 °C
	EPDM	-10 ... +80 °C
	Q (Silicone)	-40 ... +80 °C
	Storage	-40 ... +80 °C
Tolerable overload (P1 > P2)	≤ 200 mbar	10 bar
	≥ 500 mbar	20 bar
Rupture pressure	30 bar	
Materials in contact with the medium		
Diaphragm		NBR-based
		EPDM
		FPM
		Silicon
Case		Anodized aluminium
		Brass
		Brass chemical nickel-plated
Other components		X14CrMoS17 1.4104
		X5CrNi18-10 1.4301
		X10CrNi18-8 1.4310
		X2CrNiMoN 1.4462
		Steel category A2 for screws
		Polyacetate-C, Polyamide
Electrical overview		
Output (3 wire)		0 ... 10 V
		0 ... 20 mA
		4 ... 20 mA
Power supply		20 ... 30 VDC / 24 VAC +15% / -10%
Load	Current load	≤ 300 Ohm
	Voltage load	≥ 10 kOhm
Current consumption	0 ... 10 V	35 mA
	0 ... 20 mA	max. 55 mA
	4 ... 20 mA	max. 55 mA
Polarity reversal protection	Short circuit proof and with polarity reversal protection	
Dynamic response		
Response time		< 10 ms
Load cycle		< 10 Hz
Protection standard		
With plastic cover (PG9)		IP 65
Electrical connection		
Screw terminals		
Pressure connection (P1 > P2)		
Inside thread		G ⅛
Straight screwed connection	Zinc plated steel with NBR seal for pipe (Ø 6 mm)	G ⅛
Screwed Socket	CuZn nickel plated for tube(Ø 6 mm)	G ⅛
Installation arrangement		
Unrestricted. Recommendation:The transmitter is calibrated in the factory with the diaphragm positoned vertically. In the case of liquid media vent screw up, i.e. pressure connection down		
Tests / Admissions		
Electromagnetic compatibility		CE conformity acc. EN 61326-2-3
Weight		
With aluminium pressure case		~ 394 g
With brass pressure case		~ 1030 g
Packaging		
Single packaging in cardboard		



Legend to cross-section drawing

1 Pressure case
2 Diaphragm
3 Permanent magnet
4 Electronics
5 Cover
6 PG9 Union
7 Vent
P1 Higher pressure / lower vacuum
P2 Lower pressure / higher vacuum

Accuracy

Parameter		Unit	
Tolerance zero point	max.	% fs	± 1.0
Tolerance full scale	max.	% fs	± 1.0
Resolution		% fs	0.2
Total of linearity, Hysteresis and repeatability	max.	% fs	± 1.5
TC zero point [1]	max.	% fs/10 K	± 0.8
TC sensitivity [1]	typ.	% fs/10 K	± 0.3
TC sensitivity [1]	max.	% fs/10 K	± 0.6

Test conditions: 25 °C, 45% RH, power supply 24 VDC

Order code selection table

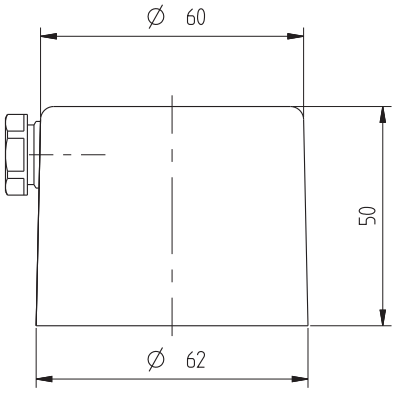
			1	2	3	4	5	6	7	8	9	10	11
	652.		X	X	X	X	X	X	X	X	X	X	X
Pressure ranges [2]	0 ... 50 mbar		9	0									
	0 ... 100 mbar		9	1									
	0 ... 200 mbar		9	2									
	0 ... 500 mbar		9	3									
	0 ... 1000 mbar		9	4									
Output [3]	0 ... 10 V				0								
	0 ... 20 mA				1								
	4 ... 20 mA				4								
Linearity	± 1.5% FS					1							
Power supply (IN)	20 ... 30 VDC / 24 VAC +15% / -10%						0						
Electrical connection	Screw terminals (Protection class with cover IP 65)							0					
Pressure connections	Inside thread G ⅛								0				
	Straight screwed connection G ⅛	for pipe (Ø 6 mm)							1				
	Screwed socket G ⅛	for tube (Ø 6 mm)							2				
Pressure case	Anodized aluminium black									0			
	Brass									1			
	Nickel-plated brass									2			
Diaphragme	NBR-based										0		
	FPM										1		
	EPDM										2		
	Q (Silicon)										3		
Mounting	Without mounting bracket											0	0
	With mounting bracket type A											0	1
	With mounting bracket type B											0	2

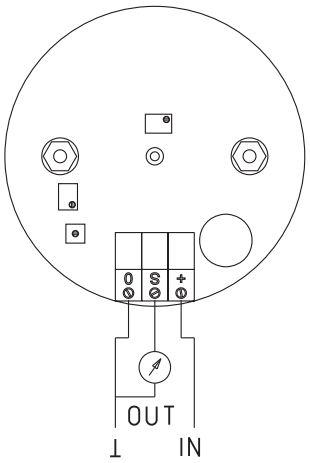
Accessories [4]

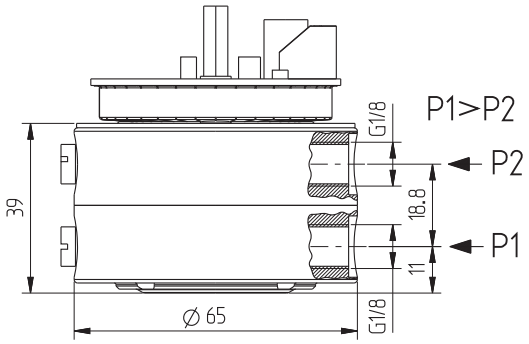
		Order number
Mounting bracket type A		100996
Mounting bracket type B		100997
Straight screwed connection G ⅛	for pipe (Ø 6 mm)	105860
Screwed Socket G ⅛	for tube (Ø 6 mm)	108239
Calibration certificate		104551

[1] TC = Temperature coefficient
[2] Other pressure range on request
[3] Other output signals on request
[4] Accessories supplied loose

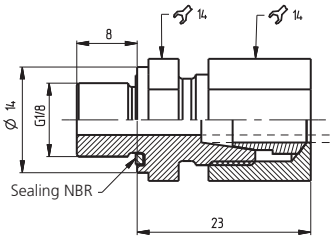
Dimensions in mm / Electrical connections



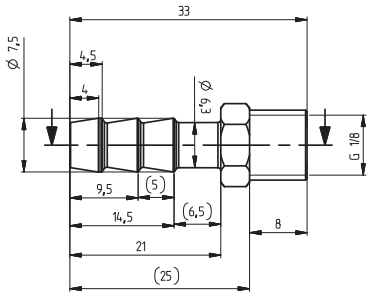




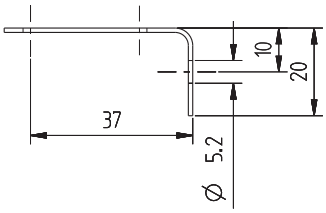
Straight screwed connector G ⅛



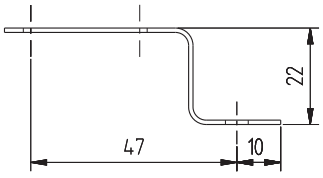
Screwed Socket G ⅛

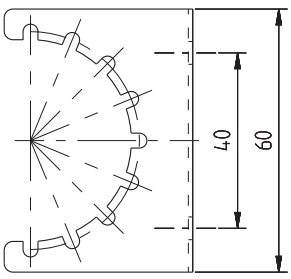


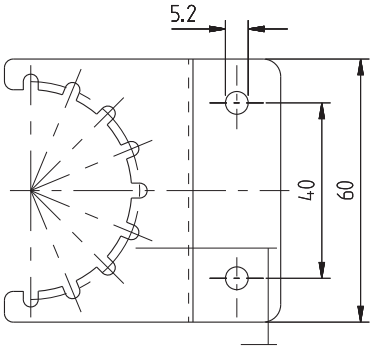
Mounting bracket type A



Mounting bracket type B







Volume flow transmitter type 679

Measuring range
-1 ... 1 mbar / 0 ... 0.3 – 50 mbar

The volume flow transmitter type 679 have Bi-direction pressure ranges. Variable measurement of pressure, flow or velocity of flow is available.

Special sensors developed for each pressure range guarantee a physically precise and long term stable measurement.
The diversity of versions ensure the use in many various applications in HVAC or for fine measurement in the industry or medical sector.

- With LCD-Display
- Adjustable measurement range
- Switchable output signals
- Resettable Zero Point (Reset button)
- Full scale adjustable
- Application at over and low pressure range possible
- Fast, easy mounting.
  Housing incorporates integral bracket for wall or ceiling mounting
- Adjustable k-Factor for flow and velocity

Technical overview

Measuring range

Flow and velocity for following pressure ranges	-1 ... 1 mbar / 0 ... 0.3 – 50 mbar

Operating conditions

Medium			Air and neutral gases
Temperature		Medium / ambient	0 ... +70 °C
		Storage	-10 ... +70 °C
		No condensation	
Tolerable overload on one side	Application at over pressure range	≤ 3 mbar P1 = 50 mbar	P2 = 4 mbar
		> 3 mbar P1 = 100 mbar	P2 = 4 mbar
	Application at under pressure range	≤ 3 mbar P1 = -4 mbar	P2 = -50 mbar
		> 3 mbar P1 = -4 mbar	P2 = -100 mbar
Rupture pressure		ambient temperature	2 x overload
		70 °C	1.5 x overload

Materials in contact with medium

Sensor	Ceramic Al_2O_3 (96%)
Diaphragm	Silicone
Housing	Polycarbonat PC

Electrical overview

	Output [1]	Power supply [1]	Load	Current consumption [2]
2 wire	4 ... 20 mA	8.0 ... 33 VDC	$< \frac{\text{supply voltage - 8 V}}{0.02\ A}$ [Ohm]	< 20 mA
3 wire	0 ... 10 V	13.5 ... 33 VDC / 24 VAC ±15%	> 10 kOhm	< 10 mA
	0 ... 20 mA	13.5 ... 33 VDC / 24 VAC ±15%	< 500 Ohm	< 30 mA
	4 ... 20 mA	13.5 ... 33 VDC / 24 VAC ±15%	< 500 Ohm	< 30 mA
	0 ... 5 V [3]	6.5 ... 33 VDC / 24 VAC ±15%	> 10 kOhm	< 10 mA
Filter			Response time switchable by	off / 0.2s / 1s / 5s / 20s
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			

Dynamic response

Response time	< 20 ms
Load cycle	< 10 Hz

Protection standard

Without cover	IP 00
With cover	IP 54
	IP 65

Display

LCD Display	Double spaced	per 8 digit alphanumeric
	At additional backlight LCD-Display	30 mA current consumption

Ranges of adjustment

The zero piont is adjustable by reset button.
The Full scale is adjustable by DIP-Switch and additional by the turbopoti.
Display adjustable between flow and velocity.

	Pressure	Flow:	Velocity:
Available units:	mbar, Pa, mmWS, kPa, hPa, inH_2O	m^3/s, m^3/h, cfm, L/s	m/s, fpm

Parameters are adjustable by customer

Pressure ranges in grades; stepless adjustable with Turbo-Poti / output signals / Unit / Output signal and additional 0 ... 5 V / filter (off / 0.2s / 1s / 5s / 20s) / k-Factor adjustable 0.0001 ... 9999 / backlight (off / 5min / on)

Electrical connection

Screw terminals for wire and stranded conductors up to 1.5 mm^2
Cable gland with built-in strain relief PG11

Pressure connection

Connection pipe	Ø 6.2 mm

Mounting instructions

Installation arrangement	Recommendation:	Vertical, with pressure connections downwards
Mounting		Mounting bracket (integrated in case)

Tests / Admissions

UL	
Electromagnetic compatibility	CE-conformity acc. EN 61326-2-3

Weight

~ 100 g

Packaging

Single packaging in cardboard	
Multiple packaging	20 / 40 / 120

Accuracy

Parameters		Unit	±0.5 mbar	0 ... 1 mbar	0 ... 3 mbar	0 ... 5 mbar	0 ... 10 - 50 mbar
Tolerance zero point	max.	% FS	±1.0	±1.0	±0.7	±0.7	±0.7
Tolerance full scale	max.	% FS	±1.0	±1.0	±0.7	±0.7	±0.7
Resolution		% FS	0.2	0.2	0.1	0.1	0.1
Total of linearity, hysteresis and repeatability	max.	% FS	±1.0	±1.0	±1.0	±1.0	±0.6
Long therm stability acc. DIN EN 60770		% FS	±1.0	±1.0	±1.0	±1.0	±1.0
TC-Zero point [4]	typ.	% FS/10K	±0.2	±0.2	±0.2	±0.1	±0.1
TC-Zero point [4]	max.	% FS/10K	±1.0	±1.0	±0.5	±0.4	±0.4
TC sensitivity [4]	typ.	% FS/10K	±0.3	±0.3	±0.2	±0.1	±0.1
TC sensitivity [4]	max.	% FS/10K	±0.6	±0.6	±0.5	±0.5	±0.2

- no additional root-extracted errors
- For changing diaphragm position, compensable with zero point reset

Test conditions: 25 °C, 45% rF, Power supply 24 VDC
TC z.p. / TC z.p. 0 ... 70 °C

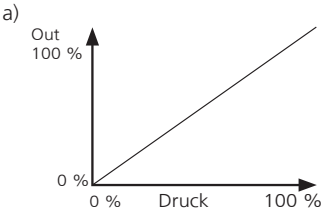
[1] Adjustable by DIP-Switch
[2] At nominal pressure
[3] Additional adjustable by software
[4] TC = Temperature coefficient

Order code selection table

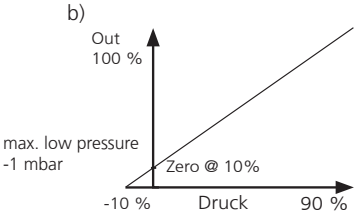
						1	2	3	4	5	6	7	8	9	10
						679.	X	X	X	X	X	X	X	X	X	X
Pre-adjustment	max. range					9									
Signal range selectable	Pressure range of 0 % to 100% FS			(diagram a)			1								
	Pressure range of -10 % to 90% FS			(diagram b)			2								
	Pressure range of -100 % to 100% FS			(diagram c)			3								
Pressure range selectable	**mbar (hPa)**	**Pa**	**mmWS**	**inH$_2$O**											
	0 ...0.3/**0.5**	30/**50**	3/**5**	0.1/**0.2**	1)			0							
	0 ... 0.3/0.5/**1**	30/50/**100**	3/5/**10**	0.1/0.2/**0.3**	2)			1							
	0 ... 0.5/1/**3**	50/100/**300**	5/10/**30**	0.3/0.5/**1**	1)			2							
	0 ... 1/3/**5**	100/300/**500**	10/30/**50**	0.5/1/**2**	1)			3							
	0 ... 3/5/**10**	300/500/**1000**	30/50/**100**	1/2/**3**	1)			4							
	0 ... 5/10/**16**	500/1000/**1600**	50/100/**160**	2/3/**5**	1)			5							
	0 ... 10/16/**25**	1000/1600/**2500**	100/160/**250**	3/5/**10**	1)			6							
	0 ... 16/25/**50**	1600/2500/**5000**	160/250/**500**	5/10/**20**	1)			7							
Unit	mbar								0	2	6				
	Pa								2	2	6				
	mmWS								3	2	6				
	hPa								4	2	6				
	kPa								5	2	6				
	inH$_2$O								6	2	6				
	m^3/s	mbar							8	3					
		Pa							9	3					
	m^3/h	mbar							E	3					
		Pa							F	3					
	cfm	inH$_2$O							K	3					
	L/s	mbar							M	3					
		Pa							N	3					
	m/s	mbar							S	3					
		Pa							T	3					
	fpm	inH$_2$O							Y	3					
Output signal	Linear with filter (transposable)									2	6				
	Square root extracted with filter (transposable)									3					
Output / power supply	0 ... 10 V	13.5 ... 33 VDC / 24 VAC ± 15 %		(3-Leiter)							1				
	0 ... 20 mA	13.5 ... 33 VDC / 24 VAC ± 15 %		(3-Leiter)							3				
	4 ... 20 mA	13.5 ... 33 VDC / 24 VAC ± 15 %		(3-Leiter)							4				
		8.0 ... 33 VDC		(2-Leiter)							5				
	at delivery no pre-adjustment									2	6				
Option	with display in pressure unit chosen above											1			
	with display in %fs											2			
Pressure connection / pressure orifices	Connection pipe Ø 6.2 mm	without pressure orifices											1		
		pressure orifices on P1											2		
		pressure orifices on P2											3		
		pressure orifices on P1 and P2											4		
Accessories / connection Kit	IP 54	without												0	
		with connection kit (metal), 90° angled including tube 2 m long (Fig. 1)												1	
		with connection kit (plastic), straight including tube 2 m long (Fig. 2)												2	
	IP 65	without												3	
		with connection kit (metal), 90° angled including tube 2 m long (Fig. 1)												4	
		with connection kit (plastic), straight including tube 2 m long (Fig. 2)												5	
Pressure range variation (optinal)	Indicate W and state range on order (e.g.: W0 ... + 8mbar/OUT1...6V)						1								W

Range of characteristic line

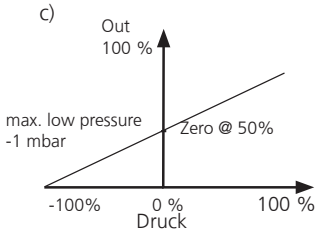
a)



b)



c)



Accessories [3]

		Bestellnummer
Connection kit for vent duct (metal), 90° angled	including tube 2 m long (Fig. 1)	104312
Connection kit for vent duct (plastic), straight	including tube 2 m long (Fig. 2)	100064
DIN-rail mounting adaptor (Fig. 3)		112854
Calibration certificate		104551

[1] minimal operating pressure = -50 Pa

[2] minimal operating pressure = -100 Pa

[3] Accessories supplied loose

Dimensions in mm / Electrical connections

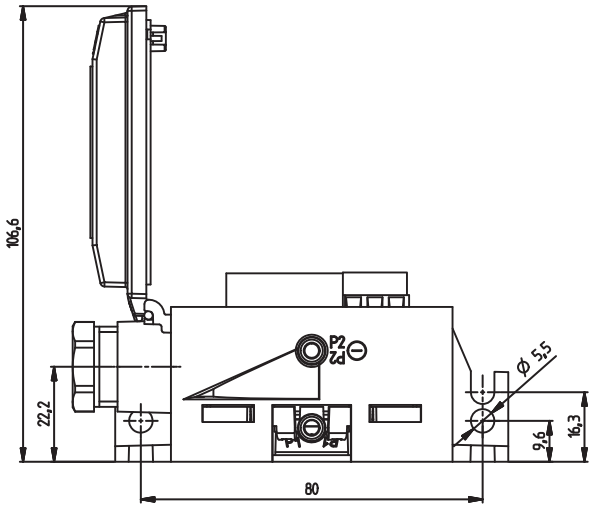


Fig. 1

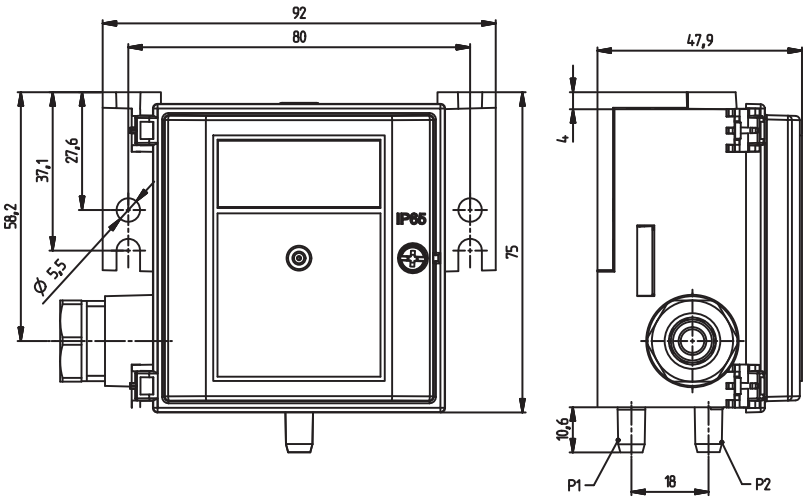


Fig. 2

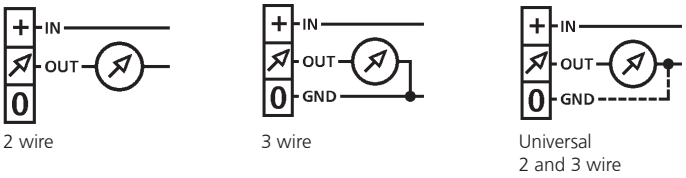
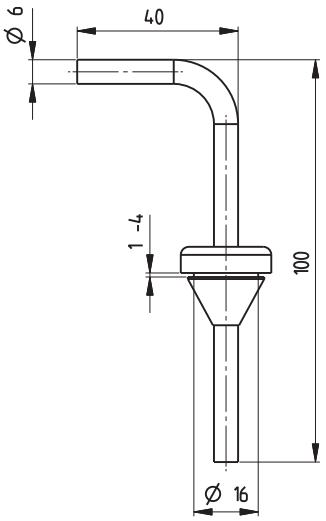
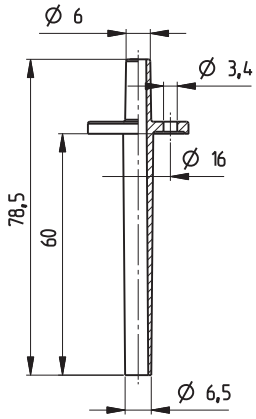
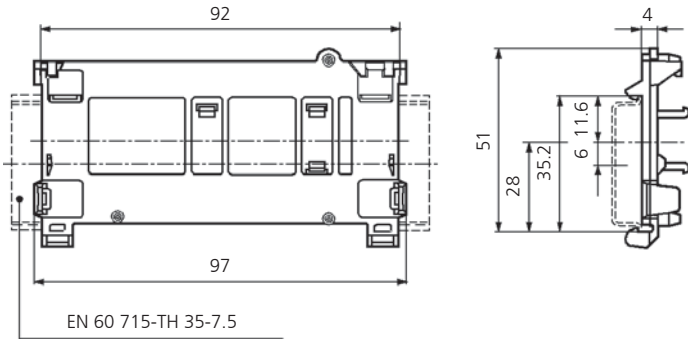


Fig. 3







Relative and differential pressure transmitter type 692

Pressure range
0 ... 0.1 – 25 bar

Type 692 pressure transmitters have a unique, well proven ceramic technolgy. There are variety of pressure and electrical connections available, together with several stanadardised output signals. The wide variety of options makes these transmitters ideal for applications across a broad spectrum of industries.

- Very low temperature sensitivity
- High resistance to extreme temperatures
- No mechanical creepage
- Modular system and choice of materials to suit individual applications

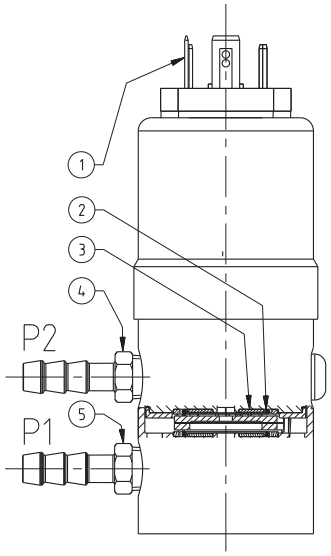
Technical overview

Pressure range		
Relative and differential		0 ... 0.1 – 25 bar
Operating conditions		
Medium		Liquids and neutral gases
Temperature	Medium / ambient	-15 ... +85 °C
	Storage	-40 ... +85 °C
Tolerable overload on one side		See order code selection table
System pressure	≤ 6 bar	25 bar
	≥ 10 bar	50 bar
Rupture pressure		1.5x system pressure
Materials		
Case		Stainless steel 1.4305 / AISI 303
Materials in contact with the medium	Pressure connection	Stainless steel 1.4305 / AISI 303, PVDF, CuZn nickel plated
	Sensor	ceramic Al_2O_3 (96%)
	Sealing material	FPM, EPDM, NBR, MVQ

Electrical overview

	Output	Power supply	Load	Current consumption (at nominal pressure)
2 wire	4 ... 20 mA	11 ... 33 VDC	$< \frac{\text{supply voltage - 11 V}}{0.02\ \text{A}}$ [Ohm]	< 20 mA
3 wire	0 ... 5 V	11 ... 33 VDC / 24 VAC ±15%	>10 kOhm	< 5 mA
	0 ... 10 V	18 ... 33 VDC / 24 VAC ±15%	>10 kOhm	< 5 mA
	ratiom. 10 ... 90%	5 VDC ±5%	>10 kOhm	< 5 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			

Dynamic response	
Response time	< 5 ms
Load cycle	< 50 Hz
Protection standard	
IP 65	
Electrical connection	
Connector DIN EN 175301-803-A	
Connector DIN EN 60130-9	
Cable 1.5 m	PG7
Pressure connection	
Pressure tube tip	Ø 4 mm
	Ø 6 mm
Screw fitting	Ø 6 mm
	Ø 8 mm
Outside thread	$^{7}/_{16}$-20 UNF
	G ⅛
Inside thread	⅛ -27 NPT
	G ⅛
Mounting instruction	
Installation arrangement	Unrestricted
Mounting	Mounting bracket
Tests / Admissions	
Electromagnetic compatibility	CE conformity acc. EN 61326-2-3
Weight	
~ 430 g	
Packaging	
Single packaging in cardboard	accessories included



Legend to cross-section drawing

1 Electrical connection
2 Seals
3 Ceramic element
4 P2 Pressure connection (lower pressure)
5 P1 Pressure connection (higher pressure)

Accuracy

Parameter		Unit	Versions with overload on one side ≤ 2x nominal pressure	Versions with overload on one side ≤ 3x nominal pressure	Versions with overload on one side ≤ 7.5x nominal pressure
Tolerance zero point	max.	% fs	± 0.4	± 0.75	± 1.25
Tolerance full scale	max.	% fs	± 0.4	± 0.75	± 1.25
Resolution		% fs	0.1	0.15	0.25
Total of linearity, hysteresis and repeatability	max.	% fs	± 0.5	± 0.75	± 1.25
Long term stability acc. to DIN EN 60770		% fs	± 0.5	± 0.5	± 0.5
TC zero point [1]	max.	% fs/10K	See order code selection table	See order code selection table	See order code selection table
TC sensitivity [1]	max.	% fs/10K	± 0.15	± 0.23	± 0.38

Test conditions: 25 °C, 45% RH, Power supply 24 VDC
TC z.p. / TC s. -15 ... +80 °C

Order code selection table

692. X X X X X X X X X X

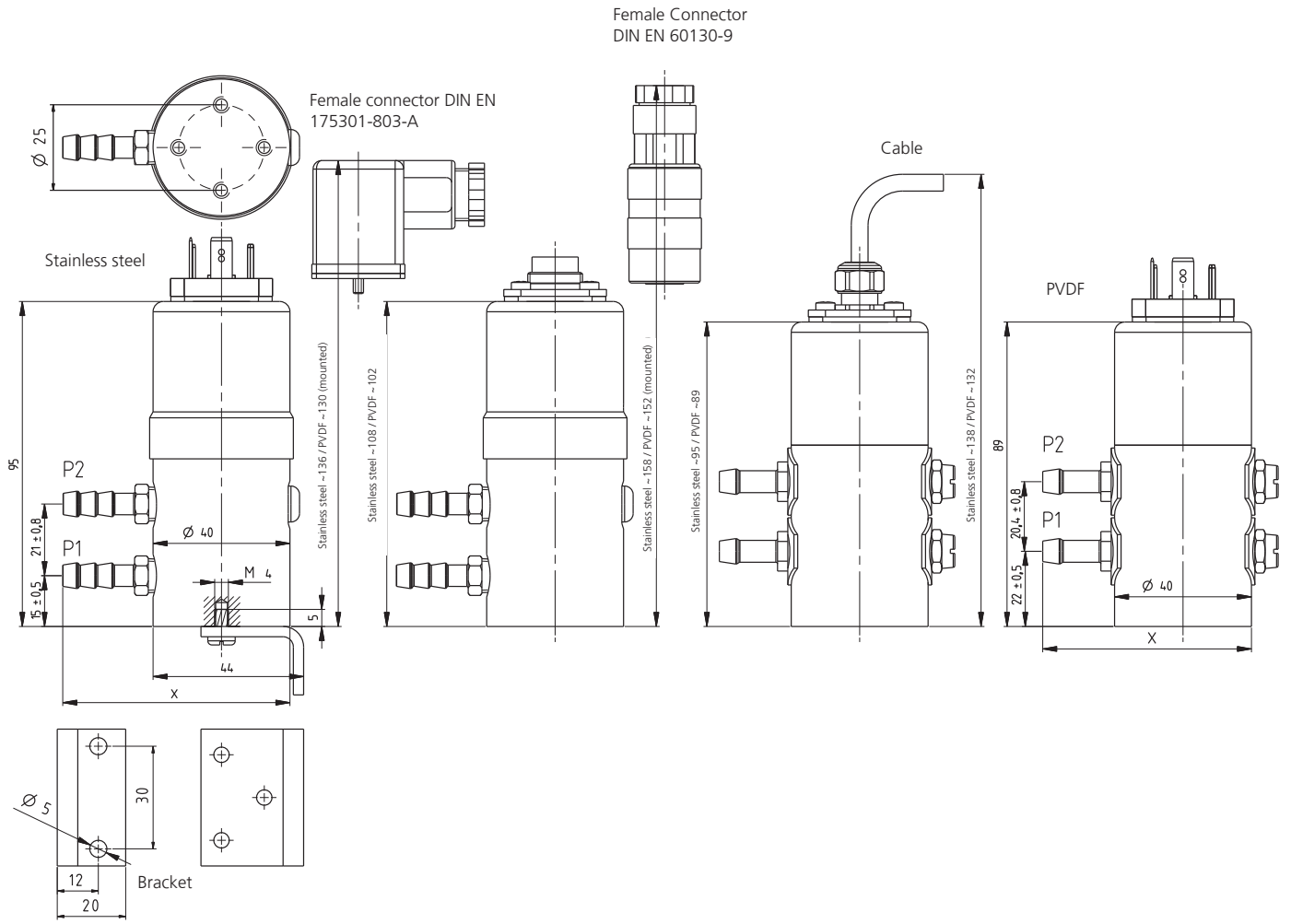
		Tolerable overload on one side P1		P2	TC z.p. (fs/10K)	1	2	3	4	5	6	7	8	9	10
Pressure range [2]	0 ... 0.1 bar	max. 0.6 bar	(6 x Nominal pressure)	0.6 bar	± 1.2 %	9	0	0							
	0 ... 0.2 bar	max. 1.2 bar	(6 x Nominal pressure)	1.2 bar	± 1.2 %	9	0	2							
	0 ... 0.2 bar	max. 0.6 bar	(3 x Nominal pressure)	0.6 bar	± 0.6 %	9	4	0							
	0 ... 0.25 bar	max. 1.2 bar	(4.8 x Nominal pressure)	1.2 bar	± 1.0 %	9	0	3							
	0 ... 0.25 bar	max. 0.6 bar	(2.4 x Nominal pressure)	0.6 bar	± 0.5 %	9	4	1							
	0 ... 0.3 bar	max. 0.6 bar	(2 x Nominal pressure)	0.6 bar	± 0.4 %	9	0	1							
	0 ... 0.4 bar	max. 1.2 bar	(3 x Nominal pressure)	1.2 bar	± 0.6 %	9	0	4							
	0 ... 0.4 bar	max. 2 bar	(5 x Nominal pressure)	2 bar	± 1.0 %	9	0	5							
	0 ... 0.5 bar	max. 1.2 bar	(2.4 x Nominal pressure)	1.2 bar	± 0.5 %	9	0	6							
	0 ... 0.5 bar	max. 3 bar	(6 x Nominal pressure)	3 bar	± 0.8 %	9	0	7							
	0 ... 0.6 bar	max. 1.2 bar	(2 x Nominal pressure)	1.2 bar	± 0.4 %	9	0	8							
	0 ... 0.6 bar	max. 3 bar	(5 x Nominal pressure)	3 bar	± 0.7 %	9	0	9							
	0 ... 1 bar	max. 2 bar	(2 x Nominal pressure)	2 bar	± 0.4 %	9	1	1							
	0 ... 1 bar	max. 5 bar	(5 x Nominal pressure)	5 bar	± 1.0 %	9	1	2							
	0 ... 1.6 bar	max. 3.2 bar	(2 x Nominal pressure)	3.2 bar	± 0.4 %	9	1	3							
	0 ... 1.6 bar	max. 12 bar	(7.5 x Nominal pressure)	12 bar	± 1.0 %	9	1	4							
	0 ... 2.5 bar	max. 5 bar	(2 x Nominal pressure)	5 bar	± 0.4 %	9	1	5							
	0 ... 2.5 bar	max. 12 bar	(4.8 x Nominal pressure)	12 bar	± 0.6 %	9	1	6							
	0 ... 4 bar	max. 8 bar	(2 x Nominal pressure)	8 bar	± 0.4 %	9	1	7							
	0 ... 4 bar	max. 12 bar	(3 x Nominal pressure)	12 bar	± 0.5 %	9	1	8							
	0 ... 6 bar	max. 12 bar	(2 x Nominal pressure)	12 bar	± 0.4 %	9	1	9							
	0 ... 10 bar	max. 20 bar	(2 x Nominal pressure)	20 bar	± 0.4 %	9	3	0							
	0 ... 16 bar	max. 32 bar	(2 x Nominal pressure)	32 bar	± 0.4 %	9	3	1							
	0 ... 25 bar	max. 50 bar	(2 x Nominal pressure)	50 bar	± 0.4 %	9	3	2							
	▲ Fullscale signal at these pressures														
Sealing material	FPM	Fluoro elastomer							0						
	EPDM	Ethylene propylene							1						
	NBR	Butadiene Acrylonitrile							2						
	MVQ	Silicone polymer							3						
Adjustment	Factory									0					
Output / power supply	0 ... 5 V	11 ... 33 VDC / 24 VAC ±15%									0				
	0 ... 10 V	18 ... 33 VDC / 24 VAC ±15%									1				
	4 ... 20 mA	11 ... 33 VDC									7				
	ratiom. 10 ... 90%	5 VDC ±5%									9				
Electrical connection	Cable 1.5 m, PG7											0			
	Connector [3]	DIN EN 175301-803-A										1			
		DIN EN 60130-9										3			
Pressure connection	Inside thread	Stainless steel ⅛ -27 NPT or PVDF G ⅛											0		
	Hose connection	CuZn nickel plated		for tube inside Ø 4 mm									1		
		Stainless steel 1.4571 / AISI 316Ti		for tube inside Ø 4 mm									E		
		CuZn nickel plated		for tube inside Ø 6 mm									2		
		PVDF		for tube inside Ø 6 mm									3	2	
		Stainless steel 1.4571 / AISI 316Ti		for tube inside Ø 6 mm									D		
	Screw fitting	CuZn nickel plated		for pipe outside Ø 6 mm									4		
		Stainless steel 1.4305 / AISI 303		for pipe outside Ø 6 mm									5		
		PVDF		for pipe outside Ø 6 mm									8	2	
		CuZn nickel plated		for pipe outside Ø 8 mm									6		
		Stainless steel 1.4305 / AISI 303		for pipe outside Ø 8 mm									7		
		PVDF		for pipe outside Ø 8 mm									9	2	
	Outside thread	7/16 -20 UNF CuZn nickel plated											A		
	Adapter inside	G ⅛ Stainless steel 1.4305 / AISI 303											B		
	Adapter outside	G ⅛ CuZn nickel plated with union nut											C		
Case	Stainless steel1.4305 / AISI 303													1	
	PVDF all ranges up to 6 bar max., overload on one side and system pressure max. 12 bar													2	
	Stainless steel with pressure tip orifice													4	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 8bar/OUT1...6V)														W

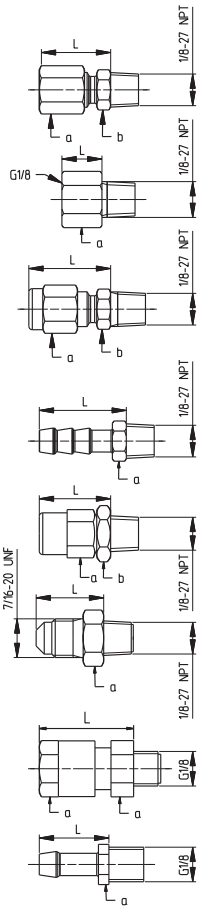
Accessories

		Order number
Female connector DIN EN 175301-803-A with seal	IP 65, when installed and screwed	103510
Female connector DIN EN 60130-9	IP 65, when installed and screwed	103524
Mounting bracket incl. screws		101999
Calibration certificate		104551

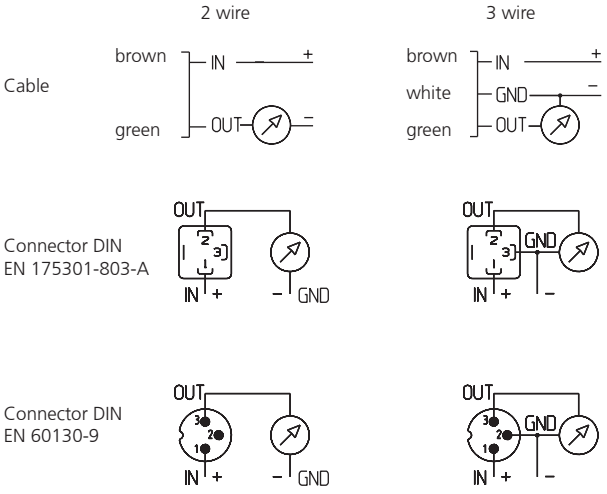
[1] TC = Temperature coefficient
[1] Other pressure range on request
[2] Delivery without female connector

Dimensions in mm / Electrical connections





Stainless steel 1.4305 AISI 303	Screw fitting for pipe outside Ø 6	L~24 X~65	a=10 b=12
	Screw fitting for pipe outside Ø 8	L~26 X~67	a=12 b=14
Stainless Steel 1.4305 AISI 303	Inside thread G ⅛	L~12 X~53	a=14
CuZn nickel plated	Screw fitting for pipe outside Ø 6	L~24 X~65	a=10 b=12
	Screw fitting for pipe outside Ø 8	L~25 X~66	a=12 b=14
CuZn nickel plated Stainless steel 1.4571 AISI 316Ti	Hose connection for tube Ø 4	L~20 X~61	a=10
	Hose connection for tube Ø 6	L~25 X~66	a=10
CuZn nickel plated	Outside thread G ⅛	L~20 X~61	a=10 b=12
CuZn nickel plated	Outside thread $^{7}/_{16}$-20 UNF	L~18 X~59	a=14
PVDF	Screw fitting for pipe Ø 6	L~20 X~61	a=12
	Screw fitting for pipe Ø 8	L~23 X~64	a=14
PVDF	Hose connection for tube Ø 6	L~20 X~61	a=10



Relative and differential pressure module type 698

Pressure range
-5 ... 5 mbar / 0 ... 1 – 10000 mbar

The pressure modules type 698 are suitable for monitoring pressure and flow in air conditioning systems and in the laboratory sector.
The module is optionally available with a 3 digit LED display, two limit value switches (potential free) as well as a square root extraction.

- Rugged measured value detector, owing to outstanding synergy obtained by combining diaphragm technology with a cermaic element
- High overpressure safety margin, even in the lowest pressure range
- Easy to install and commission
- No maintenance required
- High Protection standard

Technical overview

Pressure range

Relative	-1 ... 0 bar
	0 ... 10 bar
Differential	-5 ... 5 mbar
	0 ... 500 mbar

Operating conditions

Medium			Air and neutral gases
Temperature		Medium	0 ... +70 °C
		Ambient	-10 ... +70 °C
		Storage	-40 ... +70 °C
Tolerable overload on one side	Differential pressure	0 ... 50 mbar	100 mbar
	Relative pressure	0.1 ... 10 bar	3x fs [1]
Rupture pressure	Differential pressure	0 ... 50 mbar	200 mbar
		100 ... 500 mbar	5x fs
	Relative pressure	0.1 ... 10 bar	3x fs [1]

Materials in contact with the medium

Pressure connections	PVC
Hose connection	Silicone / PA
Diaphragm	Silicone / Al_2O_3 (96%) / Silicium
Sensor housing	PA, PC, Ultem
Sealing material	NBR
Sensor	Al_2O_3 (96%) / Silicium

Electrical overview

Output (Selectable by customer)		0 ... 10 V
		0 ... 20 mA
		4 ... 20 mA
Power supply		17 ... 33 VDC
		24 VAC
		115 VAC
		230 VAC
Tolerable load	0 ... 10 V	> 2 kOhm
	0 ... 20 mA / 4 ... 20 mA	< 500 Ohm
Current consumption		< 4 VA
Polarity reversal protection	Extra-low voltage	Each connection is protected against crossover up to max. power supply
	Low voltage	230 VAC / 115 VAC only on supply terminals, transformer short-circuit

Dynamic response

Response time	< 20 ms
Load cycle	< 10 Hz

Protection standard

IP 65

Limit switches

Two potential free change over contacts adjustable over the full range (Adjustment with potentionmeter).

Contact rating	250 VAC / 6A
Switching hysteresis	~ 1% fs fixed

Electrical connection

Screw terminals for 1.5 mm^2

Pressure connection

Connection pipe (conical)	Ø 4 ... 7 mm
Quick fitting	Ø 3.9 mm / M6x0.75

Display

LED, 3 digit

Mounting instruction

Installation arrangement	Unrestricted [2]
Mounting	Fixing holes integrated in housing

Tests / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3

Weight

24 VDC, without display	~ 440 g
230 VAC, with diplay	~ 640 g

Packaging

Single packaging in cardboard

[1] max. 14 bar at 20 °C and max. 7 bar at 70 °C [2] Positional error versions with full scale ≤ 50 mbar = 0.13 mbar

Accuracy

Parameter		Unit	-0.5 … +0.5 mbar 0 … 1 mbar	-5 … +5 mbar 0 … 3 – 500 mbar	-1 … 0 bar 0 … 1 – 6 bar
Tolerance zero point	max.	% fs	±1.0	±0.7	±0.7
Tolerance full scale	max.	% fs	±1.0	±0.7	±0.7
Resolution		% fs	0.2	0.1	0.1
Total of linearity, hysteresis and repeatability		% fs	±2.5	±1.0	±1.0
Long term stability acc. DIN EN 60770		% fs	±1.0	±1.0	±0.5
TC zero point [1]	max.	% fs/10K	±1.0	±0.5	±0.3
TC sensitivity [1]	max.	% fs/10K	±0.6	±0.5	±0.2

With root-extracted output (2 … 100 % pressure)
Absolute error: (% of full scale)

0 ... 1 mbar

$$\text{max. } \pm 0.6 \sqrt{\frac{p_{FS}}{p}} + 1.5$$

0 ... 3 mbar - 6 bar

$$\text{max. } \pm 0.3 \sqrt{\frac{p_{FS}}{p}} + 1.5$$

TC zero point: % fs/10 K [1]

$$\text{max. } \pm 0.6 \sqrt{\frac{p_{FS}}{p}} + 1.5$$

Test conditions:
25 °C, 45 % RH, power supply 24 VDC
TC z.p. / TC s. -10 … +50 °C

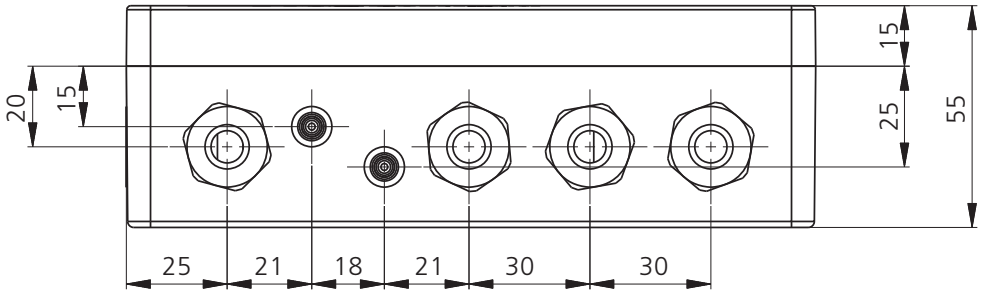
Order code selection table

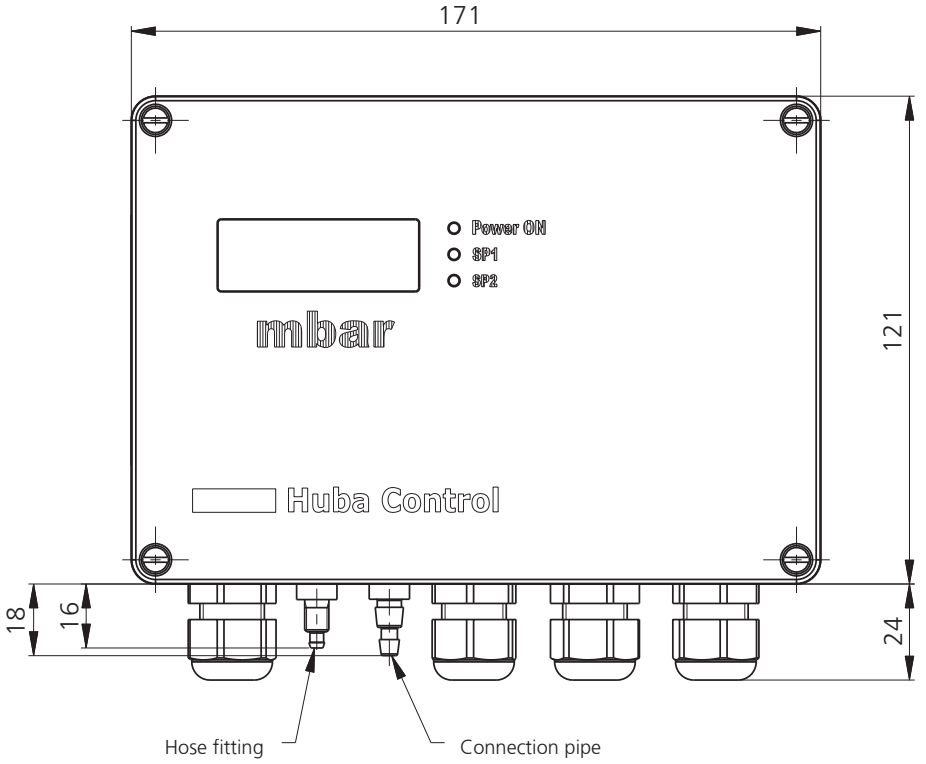
			1	2	3	4	5	6	7	8	9	10
	698.		X	X	X	X	X	X	X	X	X	X
Version	without limit switches		0									
	with limit switches		1									
Pressure range	-5 … + 5 mbar	Differential pressure		0	0				0			
	-0.5 … + 0.5 mbar	Differential pressure		0	1				0			
	-0.5 … + 1 mbar	Differential pressure		0	2				0			
	-0.5 … + 3 mbar	Differential pressure		0	3				0			
	-0.5 … + 5 mbar	Differential pressure		0	4				0			
	0 … + 1 mbar	Differential pressure		0	5							
	0 … + 3 mbar	Differential pressure		0	6							
	0 … + 5 mbar	Differential pressure		0	7							
	0 … + 10 mbar	Differential pressure		0	8							
	0 … + 30 mbar	Differe-ntial pressure		1	0							
	0 … + 50 mbar	Differential pressure		1	1							
	0 … + 100 mbar	Differential pressure		1	2							
	0 … + 200 mbar	Differential pressure		1	3							
	0 … + 500 mbar	Differential pressure		1	4							
	-1 … + 0 bar	Relative pressure		1	6				0		1	
	0 … + 1 bar	Relative pressure		1	7						1	
	0 … + 1.6 bar	Relative pressure		1	8						1	
	0 … + 2.5 bar	Relative pressure		1	9						1	
	0 … + 4 bar	Relative pressure		2	0						1	
	0 … + 6 bar	Relative pressure		2	1						1	
	0 … + 10 bar	Relative pressure		2	2						1	
Pressure unit [2]	mbar / bar					0						
	Pa	for pressure ranges ≤ 10 mbar				1						
	kPa	for pressure ranges 3 mbar … 6 bar				2						
	MPa	for pressure ranges 2.5 bar … 10 bar				3						
Power supply	17 … 33 VDC / 24 VAC ±15%						0					
	24 VAC	galvanically isolated					1					
	115 VAC	galvanically isolated					2					
	230 VAC	galvanically isolated					3					
Output	0 … 10 V							0				
	0 … 20 mA							1				
	4 … 20 mA							2				
Square root extraction	Without root extraction								0			
	With root extraction								1			
Display	Without display									0		
	In pressure unit chosen above								0	1		
	With display in %									2		
Pressure connection	Connection pipe										0	
	Quick fitting										1	
Installation arrangement	Horizontal											0
	Vertical											1

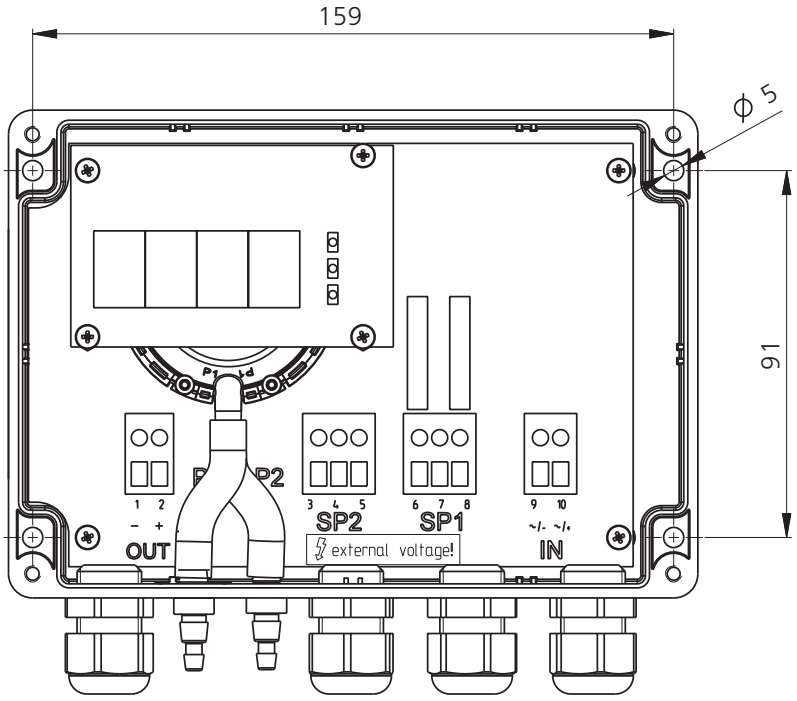
[1] TC = Temperature coefficient

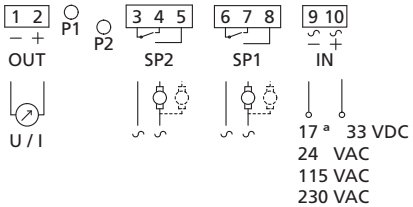
[2] Other pressure units on request

Dimensions in mm / Electrical connections









Relative, and differential pressure transmitter type 699

Pressure range
-1 ... 1 mbar / 0 ... 0.3 – 50 mbar

The type 699 transmitters are available in switchable pressure ranges and with or without display. The full-version includes customer specific adjustment possibilities. Especially developed sensors for each pressure range ensure accurate long term stable measurement and the large variety of options provide the perfect platform for use in air conditioning technology as well as for fine measurement in the industrial and medical environment.

- Available with or without LCD display
- Adjustable measurement range
- Switchable output signals
- Switchable response curve (linear or root-extracted)
- Resettable Zero Point (Reset button)
- Full scale adjustable
- Attractive price / performance ratio
- Application at over and low pressure range possible
- Fast, easy mounting. Housing incorporates integral bracket for wall or ceiling mounting

Technical overview

Pressure range

Relative and differential	-1 ... 1 mbar / 0 ... 0.3 – 50 mbar

Operating conditions

Medium			Air and neutral gases
Temperature		Medium / ambient	0 ... +70 °C
		Storage	-10 ... +70 °C
		No condensation	
Tolerable overload on one side	Application at over pressure range	≤ 3 mbar	P1 = 50 mbar P2 = 4 mbar
		> 3 mbar	P1 = 100 mbar P2 = 4 mbar
	Application at under pressure range	≤ 3 mbar	P1 = -4 mbar P2 = -50 mbar
		> 3 mbar	P1 = -4 mbar P2 = -100 mbar
Rupture pressure		ambient temperature	2 x overload
		70 °C	1.5 x overload

Materials in contact with medium

Sensor	Ceramic Al_2O_3 (96%)
Diaphragm	Silicone
Housing	Polycarbonat PC

Electrical overview

	Output [1]	Power supply [1]	Load	Current consumption [2]
2 wire	4 ... 20 mA	8.0 ... 33 VDC	$< \frac{\text{supply voltage - 8 V}}{0.02\ A}$ [Ohm]	< 20 mA
3 wire	0 ... 10 V	13.5 ... 33 VDC / 24 VAC ±15%	> 10 kOhm	< 10 mA
	0 ... 20 mA	13.5 ... 33 VDC / 24 VAC ±15%	< 500 Ohm	< 30 mA
	4 ... 20 mA	13.5 ... 33 VDC / 24 VAC ±15%	< 500 Ohm	< 30 mA
	0 ... 5 V [3]	6.5 ... 33 VDC / 24 VAC ±15%	> 10 kOhm	< 10 mA
Filter			Response time switchable by	off / 0.2s / 1s / 5s / 20s
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.			

Dynamic response

Response time		< 20 ms
Load cycle		< 10 Hz

Protection standard

Without cover	IP 00
With cover	IP 54
	IP 65

Display

LCD Display	Double spaced	per 8 digit alphanumeric
	At additional backlight LCD-Display	30 mA current consumption
Module MODBUS		RTU RS-485

Ranges of adjustment

The zero piont is adjustable by reset button.
The Full scale is adjustable by DIP-Switch and additional by the turbopoti.

Adjustability

Optional version with self configurable parameters (see order code selection table)

Electrical connection

Screw terminals for wire and stranded conductors up to 1.5 mm²
Cable gland with built-in strain relief PG11

Pressure connection

Connection pipe	Ø 6.2 mm

Mounting instructions

Installation arrangement	Recommendation:	Vertical, with pressure connections downwards
Mounting		Mounting bracket (integrated in case)

Tests / Admissions

UL	
Electromagnetic compatibility	CE-conformity acc. EN 61326-2-3

Weight

Without display	~ 90 g
With display	~ 100 g

Packaging

Single packaging in cardboard	
Multiple packaging	20 / 40 / 120

Accuracy

Parameter		Unit	±0.5 mbar	0 ... 1 mbar	0 ... 3 mbar	0 ... 5 mbar	0 ... 10 - 50 mbar
Tolerance zero point	max.	% fs	±1.0	±1.0	±0.7	±0.7	±0.7
Tolerance zero full scale	max.	% fs	±1.0	±1.0	±0.7	±0.7	±0.7
Resolution		% fs	0.2	0.2	0.1	0.1	0.1
Total of linearity, hysteresis and repeatability	max.	% fs	±1.0	±1.0	±1.0	±1.0	±0.6
Long therm stability acc. to DIN EN 60770		% fs	±1.0	±1.0	±1.0	±1.0	±1.0
TC zero point [4]	typ.	% fs/10K	±0.2	±0.2	±0.2	±0.1	±0.1
TC zero point [4]	max.	% fs/10K	±1.0	±1.0	±0.5	±0.4	±0.4
TC sensitivity [4]	typ.	% fs/10K	±0.3	±0.3	±0.2	±0.1	±0.1
TC sensitivity [4]	max.	% fs/10K	±0.6	±0.6	±0.5	±0.5	±0.2

- no additional root-extracted errors
- For changing diaphragm position, compensable with zero point reset

Test conditions: 25 °C, 45% rF, Power supply 24 VDC
TC z.p. / TC z.p. 0 … 70 °C

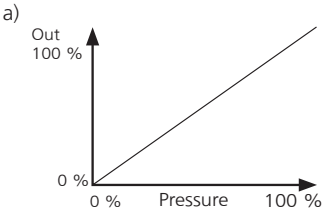
[1] Adjustable by DIP-Switch
[2] At nominal pressure
[3] Additional adjustable by software (with LCD-Display only)
[4] TC = Temperature coefficient

Order code selection table

						1	2	3	4	5	6	7	8	9	10
						699.	X	X	X	X	X	X	X	X	X	X
Pre-adjustment	max. range					9									
	middle range					B									
	min. range					C									
Signal range selectable	Pressure range of 0 % to 100% fs					1									
	Pressure range of -10 % to 90% fs						2								
	Pressure range of -100 % to 100% fs						3								
Pressure range selectable	**mbar (hPa)**	**Pa**	**mmWS**	**inH_2O**											
	0 ...0.3/**0.5**	30/**50**	3/**5**	0.1/**0.2**	1)			0							
	0 ... 0.3/0.5/**1**	30/50/**100**	3/5/**10**	0.1/0.2/**0.3**	2)			1							
	0 ... 0.5/1/**3**	50/100/**300**	5/10/**30**	0.3/0.5/**1**	1)			2							
	0 ... 1/3/**5**	100/300/**500**	10/30/**50**	0.5/1/**2**	1)			3							
	0 ... 3/5/**10**	300/500/**1000**	30/50/**100**	1/2/**3**	1)			4							
	0 ... 5/10/**16**	500/1000/**1600**	50/100/**160**	2/3/**5**	1)			5							
	0 ... 10/16/**25**	1000/1600/**2500**	100/160/**250**	3/5/**10**	1)			6							
	0 ... 16/25/**50**	1600/2500/**5000**	160/250/**500**	5/10/**20**	1)			7							
Pressure unit	mbar								0						
	hPa								4						
	Pa								2						
	kPa								5						
	mmWS								3						
	inH_2O								6						
Output signal / adjustment	Linear	without Filter		dual DIP-Switch						1		0			
		with Filter (transposable)		tenfold DIP-Switch						2					
	Square root extracted	without Filter		dual DIP-Switch						4		0			
		with Filter (transposable)		tenfold DIP-Switch						3					
Output / power supply	0 ... 10 V	13.5 ... 33 VDC / 24 VAC ± 15 %		(3 wire)							1				
	0 ... 20 mA	13.5 ... 33 VDC / 24 VAC ± 15 %		(3 wire)							3				
	4 ... 20 mA	13.5 ... 33 VDC / 24 VAC ± 15 %		(3 wire)							4				
		8.0 ... 33 VDC		(2 wire)							5				
	Output signal complimentary selectabel, at delivery no pre-adjustment					9				2	6				
Option	without display											0			
	with display in pressure unit chosen above											1			
	with display in % fs											2			
	with module MODBUS									2,3	1	3			
Pressure connection / Pressure orifices	Connection pipe Ø 6.2 mm		without pressure orifice										1		
			pressure orifice on P1										2		
			pressure orifice on P2										3		
			pressure orifice on P1 and P2										4		
Accessories Connection kit	IP 54	without												0	
		with connection kit (metal), 90° angled including tube 2 m long (Fig. 1)												1	
		with connection kit (plastic), straight including tube 2 m long (Fig. 2)												2	
	IP 65	without												3	
		with connection kit (metal), 90° angled including tube 2 m long (Fig. 1)												4	
		with connection kit (plastic), straight including tube 2 m long (Fig. 2)												5	
Pressure range variation (optinal)	Indicate W and state range on order (e.g.: W0 ... + 8mbar/OUT1...6V)					9	1								W

Range of characteristic line

a)



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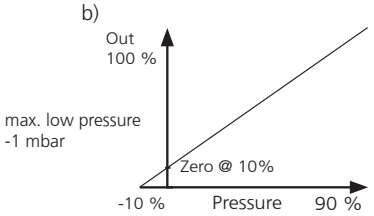

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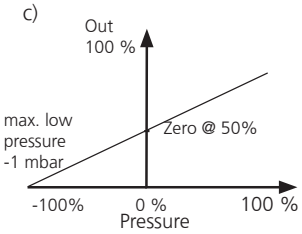


Depending on the version parameters are adjustable by customer

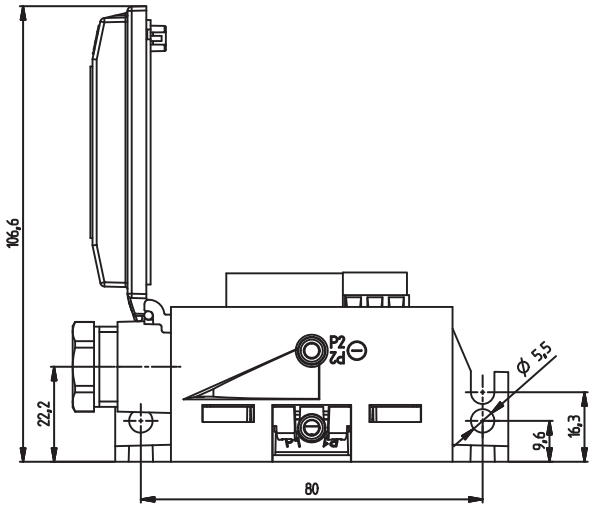
Version	**Variable parameters**
Dual DIP-Switch	Pressure ranges in grades
Tenfold DIP-Switch	Pressure ranges in grades; stepless adjustable with Turbo-Poti / output signals / filter (off / on) / response curve (linear / root extracted)
Tenfold DIP-Switch with Display	Pressure ranges in grades; stepless adjustable with Turbo-Poti / pressure units / pressure range character / output signals; additional 0 ... 5 V / filter (off / 0.2s / 1s / 5s / 20s) / response curve (linear / root extracted) / backlight (off / 5min / on)

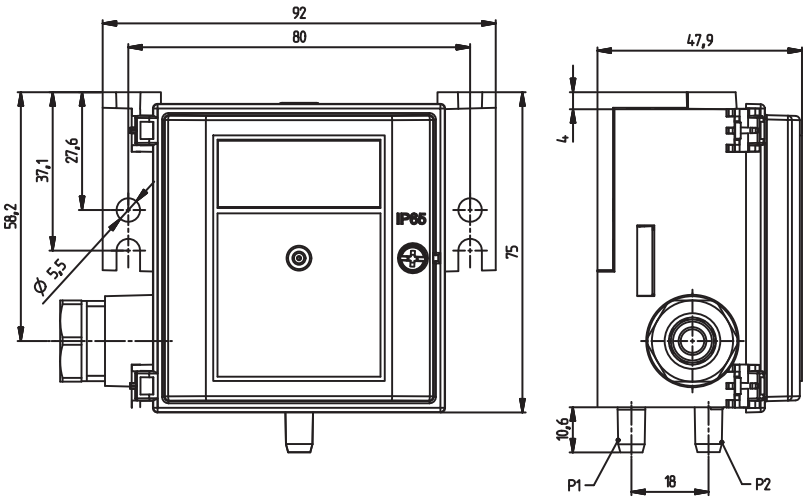
Accessories 3)

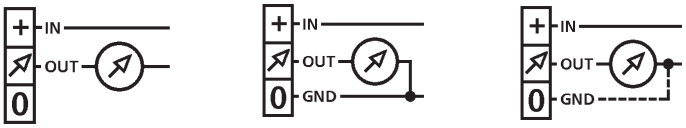
		Order number
Connection kit for vent duct (metal), 90° angled	including tube 2 m long (Fig. 1)	104312
Connection kit for vent duct (plastic), straight	including tube 2 m long (Fig. 2)	100064
DIN-rail mounting adaptor (Fig. 3)		112854
Module MODBUS		117305
Calibration certificate		104551

1) minimal operating pressure = -50 Pa
2) minimal operating pressure = -100 Pa
3) Accessories supplied loose

Dimensions in mm / Electrical connections







2 wire | 3 wire | Universal 2 and 3 wire

Fig. 1

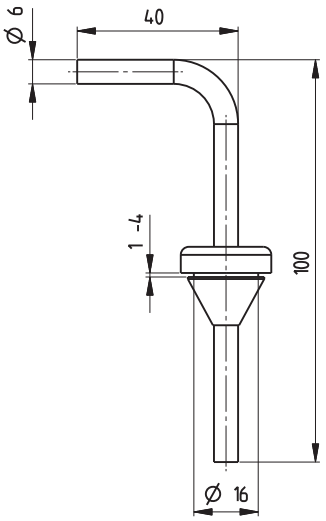


Fig. 2

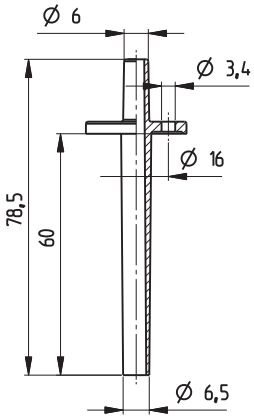
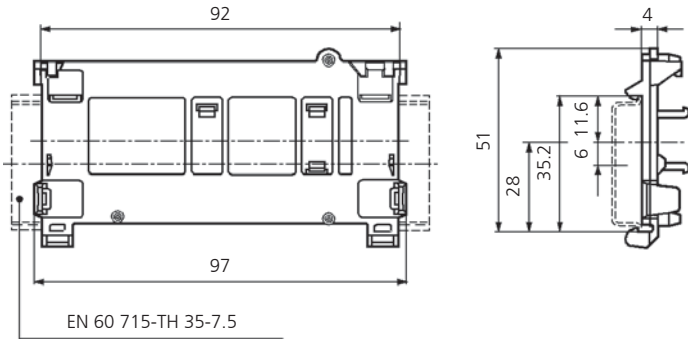


Fig. 3



Level sensing pressure transmitter type 711

Pressure range
0 ... 0.1 - 16 bar

The level sensing pressure transmitters of type 711 with a relative pressure measuring cell have an adjusted and amplified sensor signal. Cable length from 3 to 300 meters as well as ex-versions and versions with drinking water approval are available.

- with drinking water approval available
- Ex-version availabe
- Sea water resistant
- All versions with high accuracy
- Large variety of cable length (3 to 300 m)
- Low pressure ranges

Technische Daten

Pressure range		
Relative		0 ... 0.1 - 16 bar
Operating conditions		
Medium		Fuel oil, ultra-light [1] SN 181 160-2
		Fuel oil, heavy [1] SN 181 160-2
		Diesel oil [1]
		Benzine [1]
		Sea water
		Drinking water (with EPDM O-ring))
Temperature	Medium and ambient [2]	-10 ... +80 °C
	Storage	-40 ... +80 °C
Overload		see order code selection table
Materials in contact with medium		
Case		Stainless steel 1.4404 / AISI 316L
		Stainless steel 1.4539 / AISI 904L
Sensor		Ceramic Al_2O_3 (99.6%)
Cable		PE / FEP
Cable grommet		PPE / ETFE
Protection cover		PPE / ETFE
Sealing material		FPM / EPDM / FFPM

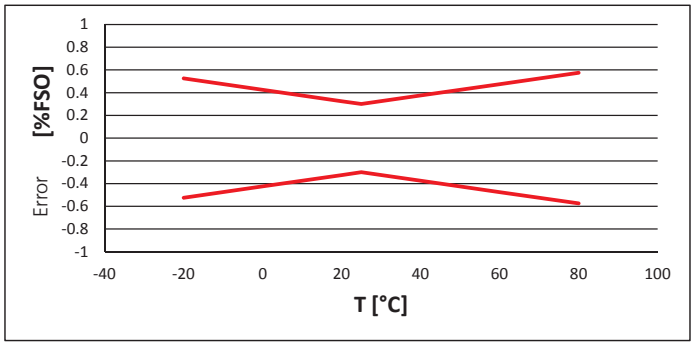
Electrical overview

	Output	Power supply	Load	Current consumption
2 wire	4 ... 20 mA	10 ... 33 VDC (with Ex - 10 ... 30 VDC)	$< \frac{\text{power supply - 10 V}}{0.02\ A}$ [Ohm]	< 22 mA
Polarity reversal protection		Short circuit proof and protected against polarity reversal.		
Overvoltage protection				36 VDC
Electric strength towards case				500 VDC

Protection class	
Protection class III	
Dynamic response	
Response time	< 0.1 s
Protection standard	
IP 68, continuous immersion at max. overload (see order code selction table)	
Runtime	
Time starts at the moment of application of minimal supply voltage	< 1 s
Electrical connection	
Cable	length 3 ... 300 m
Test / Admissions	
Electromagnetic compatibility	CE conform acc. EN 61326-2-3
Drinking water approval	DVGW, KTW, ACS [3]
Shipbuilding	Germanischer Lloyd [3]
	American Bureau of Shipping [3]
	Bureau Veritas [3]
	Det Norske Veritas [3]
	Lloyd`s Register [3]
UL [3]	UL 61010-1
EAC [3]	
Ex-protection	
IECEx SEV 12.006 [3]	Ex ia IIC T4 Ga
SEV 12 ATEX 0138 [3]	II 1 G Ex ia IIC T4 Ga
Weight	
Niveau transmitter	~ 375 g
Cable	~ 80 g/m
Packaging	
Single packaging	

Genauigkeit

Parameter	Unit	
Characteristic line [4] (at 25 °C)	% fs	± 0.3
Resolution	% fs	0.1
Thermal characteristic [5]	% fs/10K	± 0.05



[1] Ex-protection to attention! [2] non-congealing media [3] Admisson applied [4] incl. zero point, full scale, linearity, hysteresis and repeatability) [5] at -20 ... +80 °C

Order code selection table

			1	2	3	4	5	6	7	8	9	10	11
	711.		X	X	X	X	X	X	X	X	X	X	X
		overload											
Pressure range [1]	0 ... 0.1 bar	1 bar	9	0	1								
	0 ... 0.2 bar	1 bar	9	0	2								
	0 ... 0.3 bar	1 bar	9	0	3								
	0 ... 0.4 bar	2 bar	9	0	4								
	0 ... 0.5 bar	2 bar	9	0	5								
	0 ... 0.6 bar	2 bar	9	1	0								
	0 ... 1.0 bar	5 bar	9	1	1								
	0 ... 2.0 bar	10 bar	9	1	3								
	0 ... 4.0 bar	20 bar	9	1	5								
	0 ... 6.0 bar	20 bar	9	1	7								
	0 ... 10.0 bar	30 bar	9	3	0								
	0 ... 16.0 bar	40 bar	9	3	1								
	▲ Full scale signal at these pressures												
Sealing material	FPM	Fluoro-elastomer				0							
	EPDM	Ethylene propylene (for drinking water)				1							
	FFPM	Perfluorkautschuk				2							
Output / power supply	4 ... 20 mA	10 ... 33 VDC (with Ex: 10 ... 30 VDC)					0						
Electrical connection [2]	Cable	3 m						0	1				
		5 m						0	2				
		7 m						0	3				
		10 m						0	4				
		15 m						0	5				
		20 m						0	6				
		25 m						0	7				
		30 m						0	8				
		40 m						0	9				
		50 m						1	0				
		60 m						1	1				
		70 m						1	2				
		80 m						1	3				
		90 m						1	4				
		100 m						1	5				
		125 m						1	6				
		150 m						1	7				
		175 m						1	8				
		200 m						1	9				
		225 m						2	0				
		250 m						2	1				
		275 m						2	2				
		300 m						2	3				
Cable material	PE	(for drinking water)								0			
	FEP									1			
Case material	Stainless steel 1.4404 / AISI 316L										0		
	Stainless steel 1.4539 / AISI 904L (recommend sea water)										1		
Admission	without											0	
	Ex protection											1	
	Drinking water approval					1				0		2	
ressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 3bar/OUT10...16mA)												W

Accessories

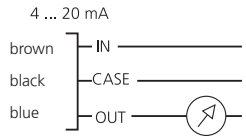
(In the delivery incl. - Level tranmitter with plastik protection cover, humidity protection element and operating instruction)

	Order number
Cable hanger	118835
Connection box	118836
Protection cage (Edelstahl 1.4404 / AISI 316L)	118837
Protection cover PPE for PE cable (pack of 10)	118838
Protection cover ETEF for FEP cable (pack of 10)	118839
Humidity protection element (pack of 10)	119217
Calibration certificate	104551

[1] Other pressure range on request

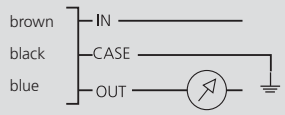
[2] Other cable length on request

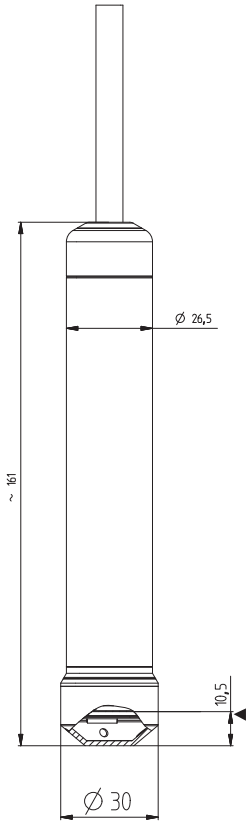
Electrical connections / Dimensions in mm



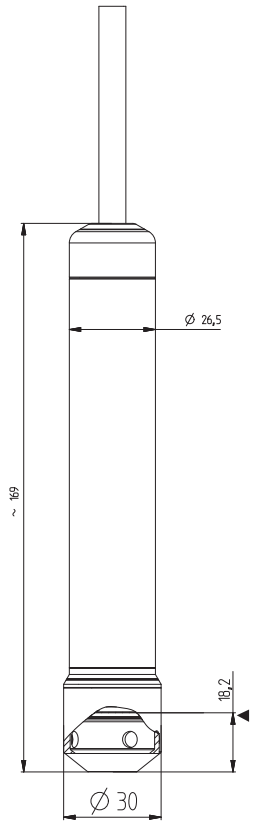
Device design with explosion protection:
4 ... 20 mA

The grounding connection is conductively connected to the transmitter housing.





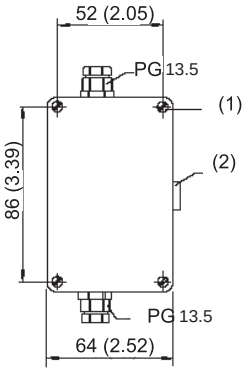
Sensor with protection cover

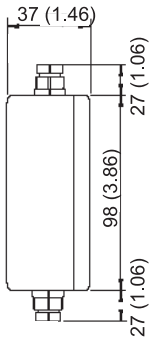


Sensor with protection cage for waste water

◄ - Measurement reference height

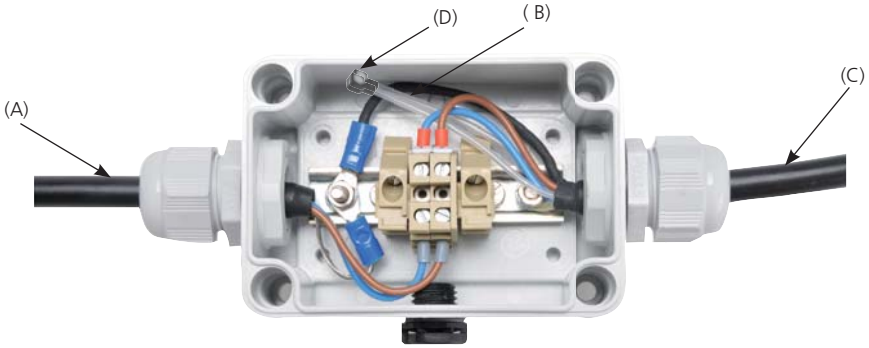
Connection box



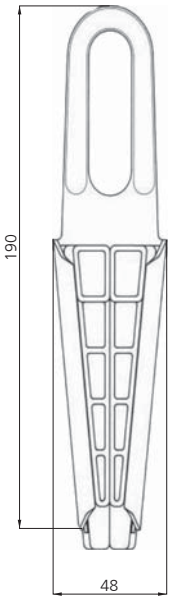


(1) Mounting hole
(2) Vent valve

(A) Measuring value process
(B) Vent pipes
(C) to the transmitter
(D) Humidity protection element



Cable hanger



hot-dip galvanized steel – PA6 glass fibre reinforced

Cable Ø 5.5 ... 9.5

Level sensing relative and absolute pressure transmitter type 712

Pressure range
0 ... 0.3 - 3 bar

The level sensing pressure transmitter Type 712 is manufactured using an relative or absolute pressure measuring cell with an adjusted and amplified sensor signal and is available with various cable lengths from 2 to 30 meters. The Type 712 offers Ex protection as well as versions with integrated temperature measurement.

In addition to voltage and current outputs the Type 712 is available with ratiometric outputs.

- suitable for drinking water
- intrinsically safe execution with voltage- and current output
- suitable for fitting in 1-inch pipe
- with integrated temperature measurement

Technical overview

Pressure range		
Relative		0.0 ... 0.3 – 2.5 bar
Absolute		0.8 ... 1.4 – 3.0 bar
Operating conditions		
Medium		Fuel oil, ultra-light [1] SN 181 160-2
		Fuel oil, heavy [1] SN 181 160-2
		Diesel oil [1]
		Benzine [1]
		Drinking water (with EPDM O-ring)
Temperature	Medium and ambient [2]	-20 ... +80 °C
	Storage	-40 ... +80 °C
Overload		3x fs; max. 3 bar at 0.3 bar version
Materials in contact with medium		
Case		Stainless steel 1.4404 / AISI 316L
Sensor		Ceramic Al_2O_3
Cable		PE-HD
Protection cover		PPE
Sealing material		FPM, EPDM (for drinking water)

Electrical overview

	Output	Power supply	Load	Current consumption
2 wire	4 ... 20 mA	10 ... 30 VDC	$< \frac{\text{Power supply - 7 V}}{0.02\ A}$ [Ohm]	< 20 mA
3 wire	0 ... 10 V	12 ... 30 VDC	>10 kOhm / < 100 nF	< 5 mA
	ratiom. 10 ... 90%	5 VDC ±10%	> 5 kOhm / < 100 nF	< 3 mA
4 wire (with temperature)	ratiom. 10 ... 90%	5 VDC ±10%	> 5 kOhm / < 100 nF	< 3 mA
Polarity reversal protection	Short circuit proof and protected against polarity reversal.			
Temperature output				> 1 MOhm

Dynamic response	
Response time	< 2 ms
Protection standard	
IP 68	
Runtime	
Time starts at the moment of application of minimal supply voltage	< 10 ms
Electrical connection	
Cable PE-HD	length 2, 5, 10, 15, 20, 30 m
Test / Admissions	
Electromagnetic compatibility	CE-conform acc. to EN 61326-2-3
Drinking water approval	ACS
Drinking water verification certificate for plastic parts	KTW
	W270
	WRAS
Ex-protection	
IECEx SEV 12.006	Ex ia IIC T4 Ga
SEV 12 ATEX 0138	II 1 G Ex ia IIC T4 Ga
Weight	
Without cable	~ 200 g
Packaging	
Single packaging	

Accuracy

Standard

Parameter		Unit	
Max. deviation [3] at 25 °C		% fs	± 0.8
Resolution [4]		% fs	0.1
Thermal characteristic [5], [6]		% fs/10K	± 0.2
Long term stability acc. IEC EN 60770-1	max.	% fs	± 0.25

Higher accuracy (only with ratiometric execution and pressure range ≥ 1 bar)

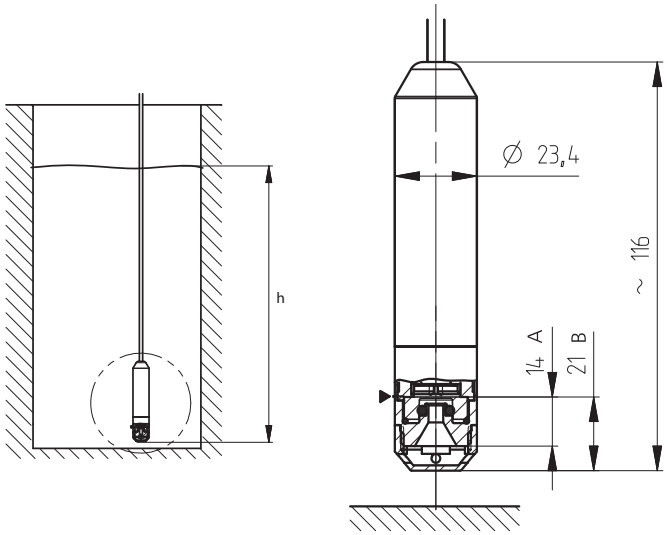
Parameter		Unit	
Max. deviation at Compensated temperature range [3] at -10 ... +60 °C		% fs	± 0.5
Resolution		% fs	0.1
Long term stability acc. IEC EN 60770-1	max.	% fs	± 0.25

[1] Ex-protection to attention!
[2] non-congealing media
[3] incl. zero point, full scale, linearity, hysteresis and repeatability)
[4] pressure range 0.3 bar < 0.2 % fs
[5] at -20 ... +80 °C
[6] 0.3 bar-type with output 4 ... 20 mA = ±0.5% fs/10K

Order code selection table

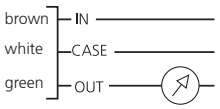
				1	2	3	4	5	6	7	8	9	10
Order code selection table			712.	X	X	X	X	X	X	X	X	X	X
Pressure mode	Absolute			8									
	Relative			9									
	Absolute with higher accuracy			C				1,2					
	Relative with higher accuracy			D				1,2					
Pressure range [1]			Pmax.										
	0.0 ... 0.3 bar	relative pressure	4.5 bar	9	1	3							
	0.0 ... 1.0 bar	relative pressure	4.5 bar	9,D	1	1							
	0.0 ... 1.6 bar	relative pressure	6.0 bar	9,D	1	2							
	0.0 ... 2.5 bar	relative pressure	9.0 bar	9,D	1	4							
			Max measurable level (for water depending on the locations weather)										
	0.8 ... 1.4 bar	absolute pressure	4.5 bar 3.5 ... 6.7 mWs	8	1	1							
	0.8 ... 2.0 bar	absolute pressure	6.0 bar 9.6 ... 12.8 mWs	8,C	1	2							
	0.8 ... 3.0 bar	absolute pressure	9.0 bar 20.0 ... 23.0 mWs	8,C	1	4							
	▲ Full scale signal at these pressures ❶ ❷ ❶ P_{BARO} = 1060 mbar (high pressure on sea level) ❷ P_{BARO} = 740 mbar (low pressure at 2000 meters above sea level)												
Sealing material	FPM	Fluoro-elastomer					0						
	EPDM	Ethylene propylene (for drinking water)					1						
Output / power supply	4 ... 20 mA	10 ... 30 VDC						0					
	ratiom. 10 ... 90%	5 VDC ±10%						1					
	ratiom. 10 ... 90%	5 VDC ±10%	(with temperature)					2					
	0 ... 10 V	12 ... 30 VDC						3				0	
Electrical connection [2]	Cable	2 m							0				
		5 m							1				
		10 m							2				
		15 m							3				
		20 m							4				
		30 m							5				
Protection cover	without protection cover									2	0		
	with protection cover									2	1		
Ex-protection	without ex-protection											0	
	with ex-protection											4	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 2bar/OUT0...10V)												W

Dimensions in mm / Electrical connections

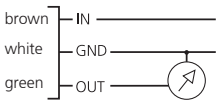


h - Fluid level
► - Measurement reference height
A - Distance from protection cover to the position of measuring diaphragm
B - distance from beginning of thread to the position of measuring diaphragm (versions without protection cover)

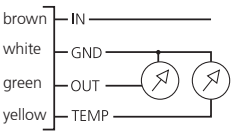
4 ... 20 mA



ratiom. 10 ... 90%, 0 ... 10 V

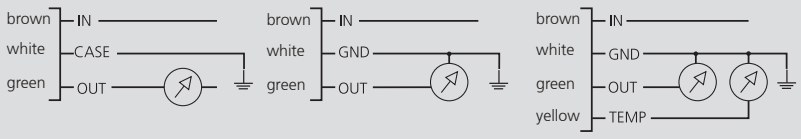


ratiom. 10 ... 90% with temperature



Device design with explosion protection: 4 ... 20 mA
The grounding connection is conductively connected to the level transmitter housing. The ground conductor of level transmitter must be connected to the equipotential bonding system of the plant.

Device design with explosion protection: ratiom. 10 ... 90%
The electronic GND is connected with a 1MΩ resistor to the level transmitter housing. The GND conductor of level transmitter must be connected to the equipotential bonding system of the plant.



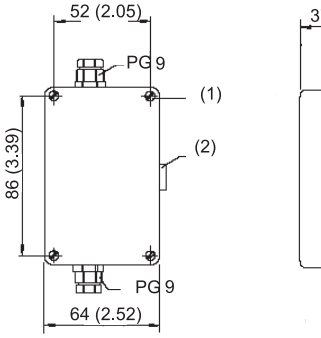
[1] Other pressure range on request

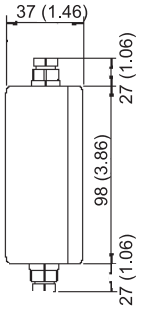
[2] Other cable length on request

Accessories

	Order number
Cable hanger	118026
Connection box	118027
Test adapter	118028
Protection cover (pack of 10)	118067
Humidity protection element (pack of 10)	118068
Additional weight	118093
Calibration certificate	104551

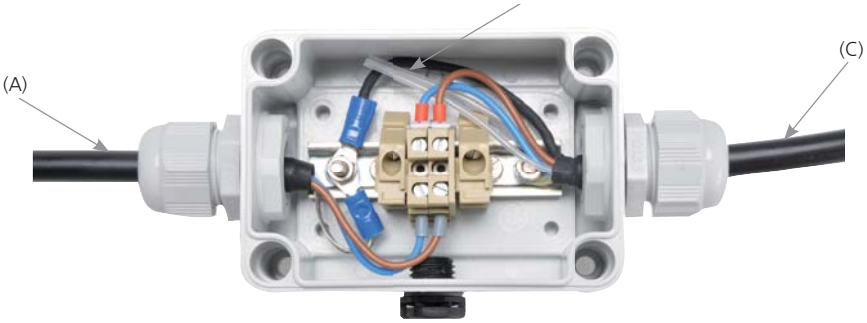
Connection box





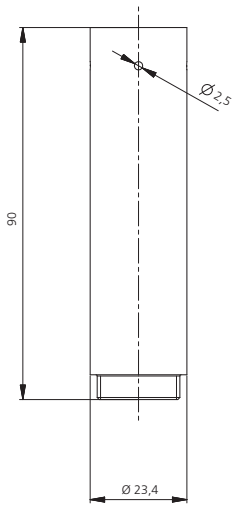
(1) Mounting hole
(2) Vent valve

(A) Measuring value process
(B) Vent pipes
(C) to the transmitter

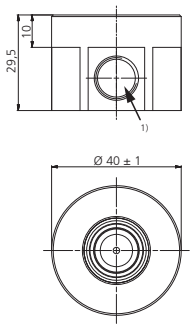


Additional weight

~200 g

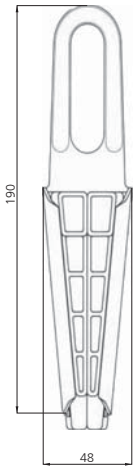


Protection cover



1) Inside thread Iso 228/1-G ¼ A

Cable hanger



hot-dip galvanized steel –
PA6 glass fibre reinforced

Cable Ø 4.5 ... 6.5

Calculation of level

General level with relative pressure sensor:

$$h = \frac{\Delta p}{\rho \cdot g}$$

General level with absolute pressure sensor:

$$h = \frac{P_{TS} - P_{Baro}}{\rho \cdot g}$$

which

$$P_{TS} = \frac{U_{TS} - U_{TS\_NP}}{U_{TS\_EW} - U_{TS\_NP}} \cdot \left(P_{TS\_EW} - P_{TS\_NP}\right) + P_{TS\_NP}$$

and

$$P_{Baro} = \frac{U_{Baro} - U_{Baro\_NP}}{U_{Baro\_EW} - U_{Baro\_NP}} \cdot \left(P_{Baro\_EW} - P_{Baro\_NP}\right) + P_{Baro\_NP}$$

Using a second level sensor as barometric air pressure sensor

For level sensor with current output use nominal signal values for I_{TS} ... instead of variables U_{TS} ... (resp. I_{Baro} ... instead of U_{Baro} ...)

Simplification of formula for level sensor with ratiometric output:

$$P_{TS} = \frac{U_{TS} - 0.1 \cdot U_{IN}}{0.8 \cdot U_{IN}} \cdot \left(P_{TS\_EW} - P_{TS\_NP}\right) + P_{TS\_NP}$$

$$P_{Baro} = \frac{U_{Baro} - 0.1 \cdot U_{IN}}{0.8 \cdot U_{IN}} \cdot \left(P_{Baro\_EW} - P_{Baro\_NP}\right) + P_{Baro\_NP}$$

Using a second level sensor as barometric air pressure sensor

Legend:

h	level [m]	ρ	density of media [kg/m³]
		g	acceleration of fall 9.80665 [m/s²]
Δp	measured relative pressure [Pa]		
P_{TS}	measured pressure of level sensor [Pa]	U_{TS}	signal on level sensor output [V or mA]
P_{BARO}	measured pressure of barometer [Pa]	U_{BARO}	Signal on barometer output [V or mA]
P_{TS_NP}	minimal nominal pressure of level sensor [Pa]	U_{TS_NP}	minimal nominal signal of level sensor [V or mA]
P_{TS_EW}	maximum nominal pressure of level sensor [Pa]	U_{TS_EW}	maximum nominal signal of level sensor [V or mA]
P_{BARO_NP}	minimal nominal pressure of barometer [Pa]	U_{BARO_NP}	minimal nominal signal of barometer [V or mA]
P_{BARO_EW}	maximum nominal pressure of barometer [Pa]	U_{BARO_EW}	maximum nominal signal of barometer [V or mA]

Specification temperature output

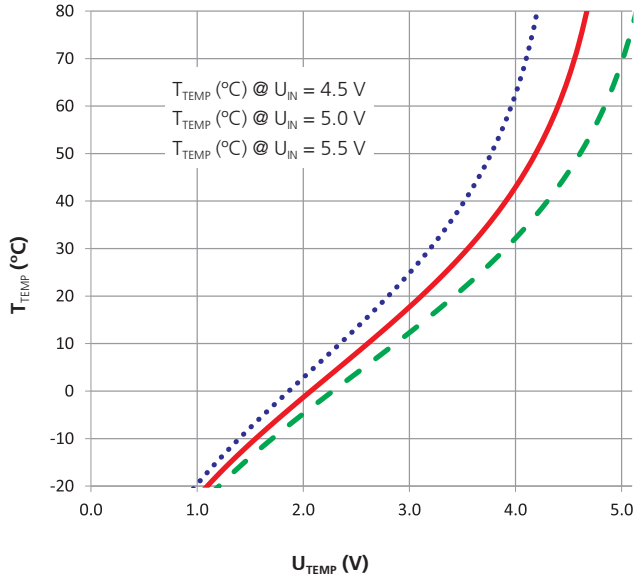
$$T_{TEMP} = T_0 + 1 \Big/ \left(a + b \cdot \ln\left(R \cdot \left[\frac{U_{IN}}{U_{TEMP}} - 1\right]\right) + c \cdot \ln\left(R \cdot \left[\frac{U_{IN}}{U_{TEMP}} - 1\right]\right)^3\right)$$

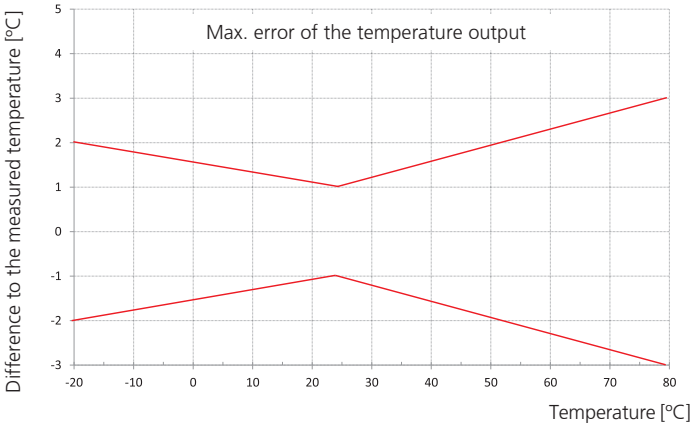
a = 0.001204001
b = 0.000208775
c = 0.000000294

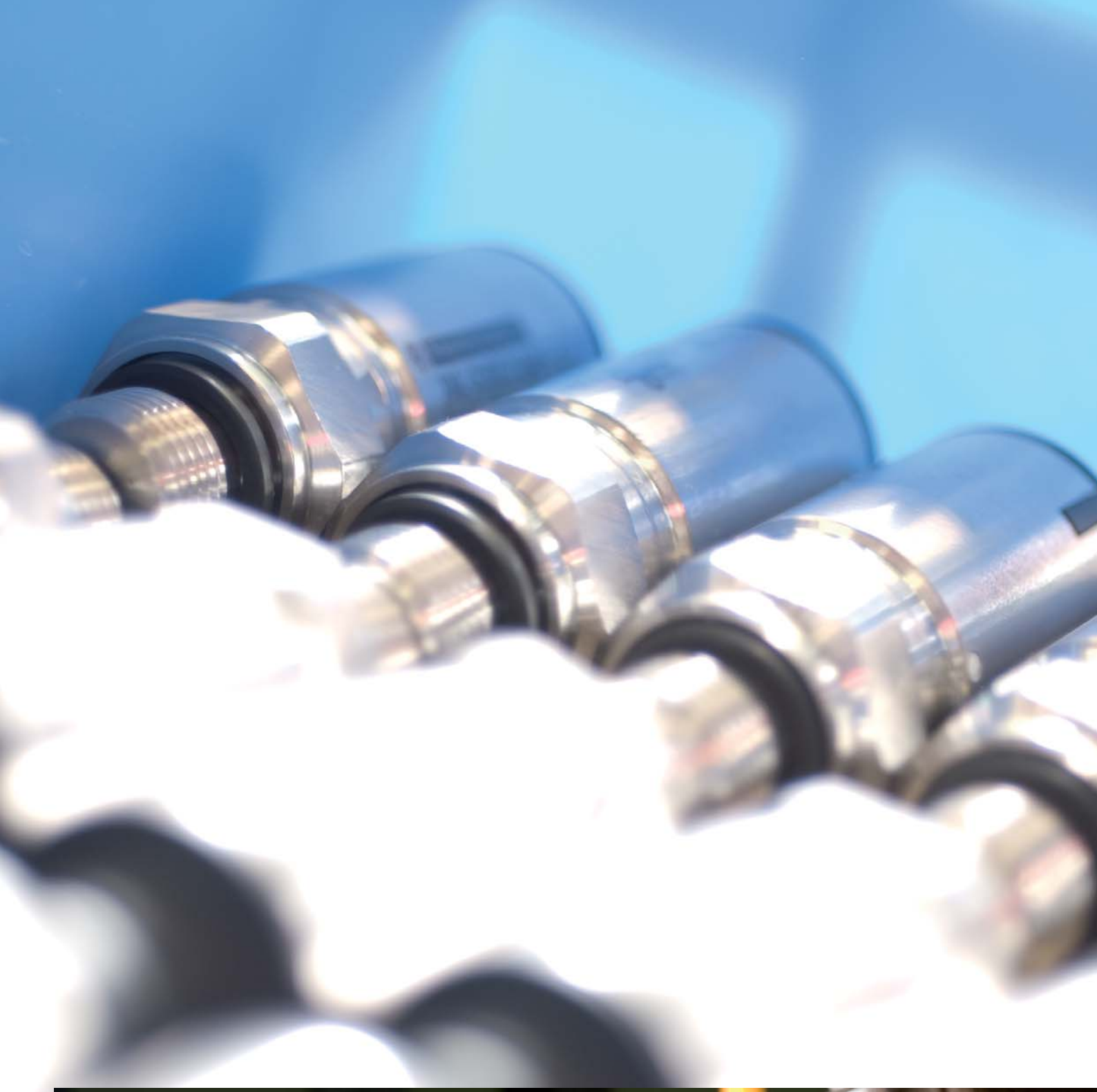
T_{TEMP}	Temperature NTC [°C]
T_0	-273.15 [°C]

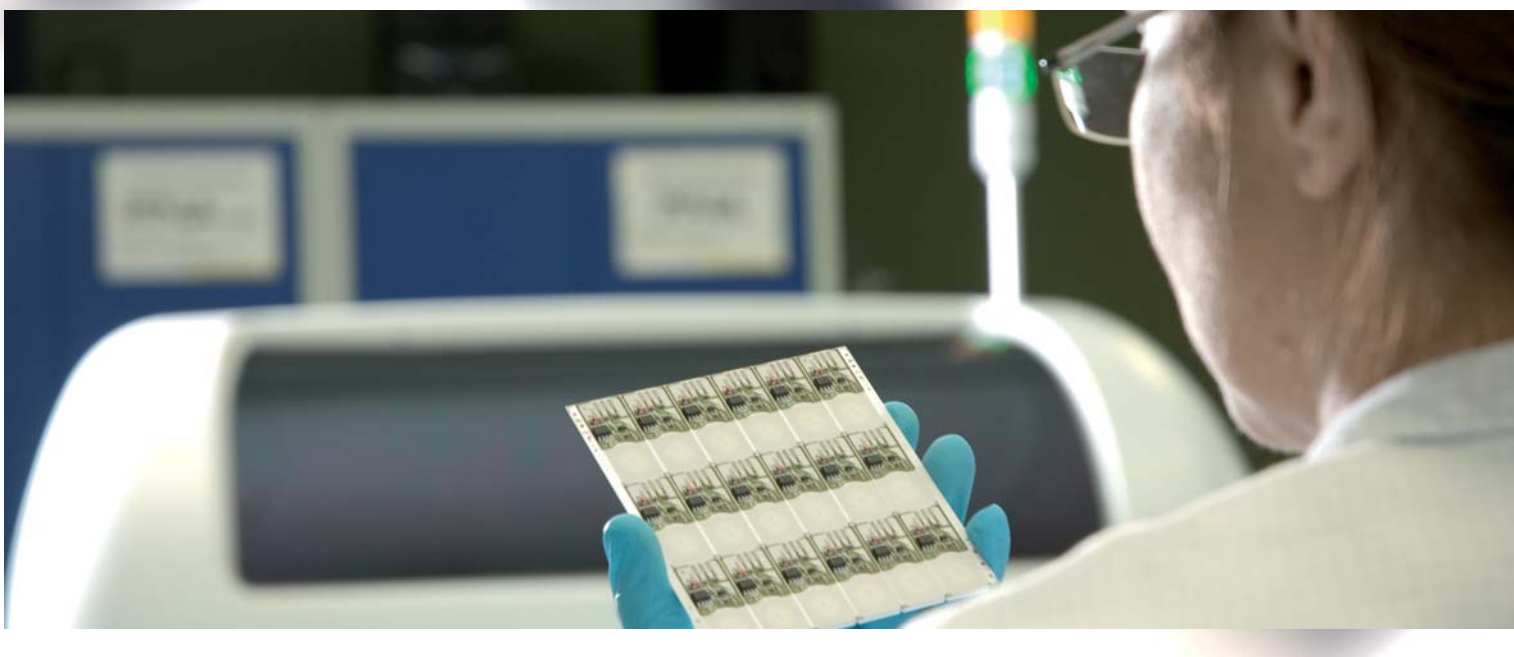
U_{TEMP}	Voltage NTC [V]
R	20'000 [Ω]
U_{IN}	4.5 ... 5.5 [V]

$T_{TEMP} = f(U_{TEMP})$









Relative pressure switch type 521

Pressure range
0 ... 2.5 – 600 bar

The compact type 521 pressure switch is based upon the Huba Control developed thick film technology where the pressure measuring cell is fully welded.

Switching points set in factory are available both N/C and N/O function. Various electrical and pressure connections are available to suit given applications.

- Compact, rugged construction
- Welded without sealing parts
- Saving time by quick cable mounting by the customer with swift connector
- Large selection of connections available.

Technical overview

Pressure range		
Relative		0 ... 2.5 – 600 bar

Operating conditions		
Medium		Liquids, gases and refrigerants (incl. ammonia)
Temperature	Medium	-40 ... +135 °C
	Ambient	-30 ... +85 °C
	Storage	-50 ... +100 °C
Tolerable overload	≤ 6 bar	5 x FS
	> 6 bar	3 x FS (max. 1500 bar)
Rupture pressure	≤ 6 bar	10 x FS
	> 6 bar	6 x FS (max. 2500 bar)

Materials		
Pressure Connection		Stainless steel 1.4404 / AISI 316L (inside thread Schrader 1.4305 / AISI 303 only)
Plug accommodation		Polyarylamide 50% GF UL 94 V-0
Materials in contact with medium	Pressure connection	Stainless steel 1.4404 / AISI 316L (inside thread Schrader 1.4305 / AISI 303 only)
	Sensor	Stainless steel

Electrical overview		
Output		Semiconductor (open collector)
Switching contact		High-Side Switch (PNP) N/C contact or N/O contact
Switch load		High-Side Switch (PNP) max. 200 mA
Power supply		7 ... 33 VDC
Current consumption		< 4 mA
Insulation voltage		500 VDC

Protection class
Protection class III

Dynamic response	
Response time	< 2 ms, 1 ms typ.
Load cycle	< 100 Hz

Adjustment of switching points (factory set)	
Upper switching point	8 ... 100% fs
Lower switching point	5 ... 97% fs
Hysteresis	≥ 3 % fs

Protection standard
IP 67

Electrical connection
Swift connector without or with cable 1.5 m
Connector M12x1

Pressure connection		
Inside thread	$^{7}/_{16}$ - 20 UNF	without or with Schrader
	G ¼	with O-Ring seal FPM (-30 ... +135 °C)
	½ -14 NPT	≤ 60 bar
Outside thread	M20x1.5	sealed at front and manometer (combi)
	$^{7}/_{16}$ - 20 UNF	
	¼ -18 NPT	
	G ¼	sealed at back DIN 3852-E with Profile seal ring in FPM (-30 ... +135 °C)
	R ¼	EN 10226
	G ½	sealed at back and manometer (combi) with Profile seal ring in FPM (-30 ... +135 °C)
	G ½	sealed at front

Installation arrangement
Unrestricted

Tests / Admissions	
Electromagnetic compatibility	CE conformity acc. EN 61326-2-3 and 50121-3-2
Shock acc. IEC IEC 68-2-27	100 g, 11 ms half sine wave, all 6 directions, free fall from 1 m on concrete (6x)
Constant shock acc. IEC 68-2-29	40 g for 6 ms, 1000x all 3 directions
Vibration acc. IEC 68-2-6	20 g, 15 ... 2000 Hz, 15 ... 25 Hz with amplitude ± 15 mm, 1 Octave/min. all 3 directions, 50 constant load

Weight
~ 90 g

Packaging (Please state on order)	
Single packaging in cardboard	accessories integrated
Multiple packaging in cardboard (25 pcs)	

Accuracy

Parameter		Unit	
Switching points [1]		% fs	± 0.5
Resolution		% fs	0.1
Thermal characteristic [2]	max.	% fs/10K	± 0.2
Long term stability acc. IEC EN 60770-1	max.	% fs	± 0.25

Test conditions: 25°C, 45% RH, power supply 24 VDC

[1] typ. ; max. 1.0% fs (incl. hysteresis and repeatability)

[2] -15 ... 85 °C

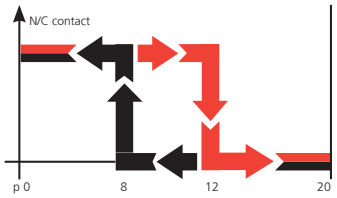
Order code selection table in bar

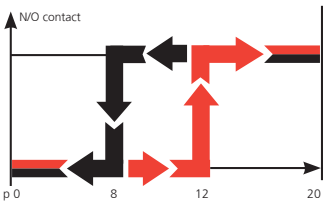
			1	2	3	4	5	6	7	8	9	10	11
			521.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... 2.5 bar			9	1	4								
	0 ... 4 bar			9	1	5								
	0 ... 6 bar			9	1	7								
	0 ... 10 bar			9	3	0								
	0 ... 16 bar			9	3	1								
	0 ... 25 bar			9	3	2								
	0 ... 40 bar			9	3	3								
	0 ... 60 bar			9	4	0								
	0 ... 100 bar			9	4	1								
	0 ... 160 bar			9	4	2								
	0 ... 250 bar			9	4	3								
	0 ... 400 bar			9	5	4								
	0 ... 600 bar			9	5	5								
Version	standard					S	0							
	for oxygen applications					S	1							
Switching contact	Contact N/O	High-Side-Switch PNP						1						
	Contact N/C	High-Side-Switch PNP						2						
Electrical connection	Swift connector								0					
	Connector M12x1 [2]								3					
	Swift connector with cable 1.5 m								L					
Pressure connection [3]	Inside thread	$^{7}/_{16}$-20 UNF Schrader								0		N		
		$^{7}/_{16}$-20 UNF								K		1		
		G ¼ with O-Ring seal FPM								1		1		
		⅛ -14 NPT (≤ 60 bar)								D		1		
	Outside thread	M20x1.5 sealed at front and manometer (combi)								E		1		
		$^{7}/_{16}$ -20 UNF								2		1		
		¼ -18 NPT								3		1		
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM								4		1		
		R ¼ acc. to EN 10226								7		1		
		G ½ sealed at back and manometer with Profile seal ring in FPM								8		1		
		G ½ sealed at front								9		1		
Version	without pressure tip orifice (Inclusive pressure tip orifice from 100 bar on)										0			
	with pressure tip orifice										2			
Material pressure connection	Stainless steel 1.4305 / AISI 303											N		
	Stainless steel 1.4404 / AISI 316L											1		
Switching points	Indicate W and state switching points on order (e.g.: W100/60bar)												W	

Accessories

			Order number
Swift connector			107359
Straight-wire box for connector M12x1	3-pole		114570
Straight-wire box for connector M12x1 with cable	3-pole	200 cm	114605
Corner-wire box for connector M12x1 with cable	3-pole	200 cm	114604
Corner-wire box for connector M12x1	3-pole		106975
Mounting bracket with screw			118716
Calibration certificate			104551

Function

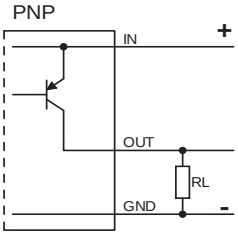




N/C contact: When pressure is applied ($p_0 \rightarrow p_{max}$) the switch will disconnect the applied load as soon as the upper switching point is reached. As the pressure falls ($p_{max} \rightarrow p_0$) the switch will connect the load as soon as the lower switching point is reached.

N/O contact: When pressure is applied ($p_0 \rightarrow p_{max}$) the switch will connect the applied load as soon as the upper switching point is reached. With a fall in pressure ($p_{max} \rightarrow p_0$) the switch will disconnect the load as soon as the lower switching point is reached.

Example: p_{fs} 20 bar
Upper switching point 12 bar
Lower switching point 8 bar
max. switching load 100 mA



[1] Other pressure ranges on request
[2] Delivery without female connector
[3] Other pressure connections on request

Order code selection table in psi			1	2	3	4	5	6	7	8	9	10	11
			521.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... 30 psi			9	B	4								
	0 ... 60 psi			9	B	5								
	0 ... 100 psi			9	B	7								
	0 ... 200 psi			9	C	1								
	0 ... 300 psi			9	C	2								
	0 ... 500 psi			9	C	3								
	0 ... 750 psi			9	D	0								
	0 ... 1000 psi			9	D	1								
	0 ... 2000 psi			9	D	2								
	0 ... 3000 psi			9	D	3								
	0 ... 5000 psi			9	E	4								
	0 ... 7500 psi			9	E	5								
Version	standard					S	0							
	for oxygen applications					S	1							
Switching contact	Contact N/O	High-Side-Switch PNP						1						
	Contact N/C	High-Side-Switch PNP						2						
Electrical connection	Swift connector								0					
	Connector M12x1 [2]								3					
	Swift connector with cable 1.5 m								L					
Pressure connection [3]	Inside thread	$^{7}/_{16}$-20 UNF Schrader								0		N		
		$^{7}/_{16}$-20 UNF								K		1		
		G ¼ wiht O-Ring seal FPM								1		1		
		½ -14 NPT (≤ 750 psi)								D		1		
	Outside thread	M20x1.5 sealed at front and manometer (combi)								E		1		
		$^{7}/_{16}$ -20 UNF								2		1		
		¼ -18 NPT								3		1		
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM								4		1		
		R ¼ acc. to EN 10226								7		1		
		G ½ sealed at back and manometer with Profile seal ring in FPM								8		1		
		G ½ sealed at front								9		1		
Version	without pressure tip orifice (Inclusive pressure tip orifice from 750 psi on)										0			
	with pressure tip orifice [2]										2			
Material pressure connection	Stainless steel 1.4305 / AISI 303											N		
	Stainless steel 1.4404 / AISI 316L											1		
Switching points	Indicate W and state switching points on order (e.g.: W1000/400psi)												W	

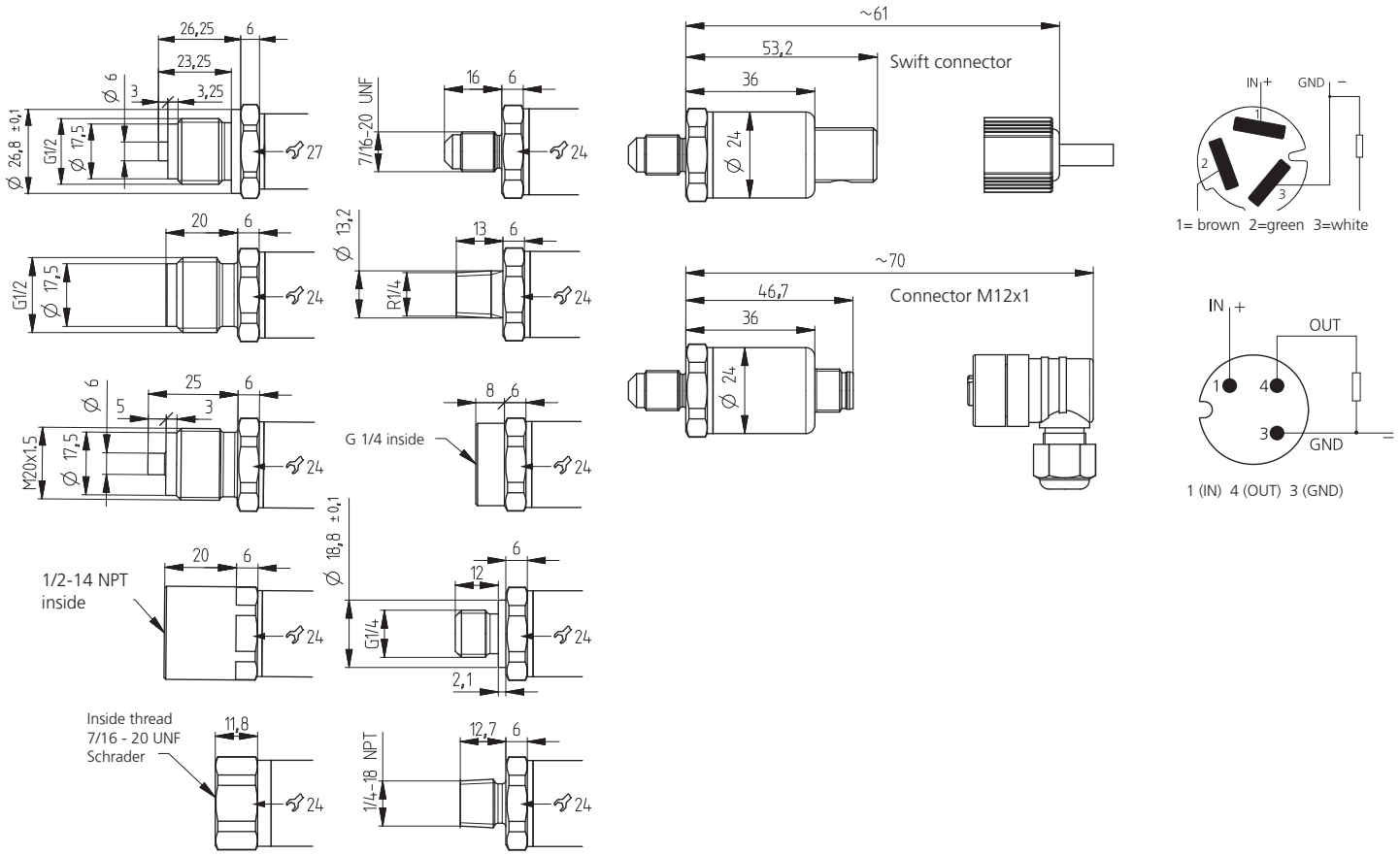
Order code selection table in MPa			1	2	3	4	5	6	7	8	9	10	11
			521.	X	X	X	X	X	X	X	X	X	X	X
Pressure range [1]	0 ... 0.25 MPa			9	G	4								
	0 ... 0.4 MPa			9	G	5								
	0 ... 0.6 MPa			9	G	7								
	0 ... 1 MPa			9	H	0								
	0 ... 1.6 MPa			9	H	1								
	0 ... 2.5 MPa			9	H	2								
	0 ... 4 MPa			9	H	3								
	0 ... 6 MPa			9	K	0								
	0 ... 10 MPa			9	K	1								
	0 ... 16 MPa			9	K	2								
	0 ... 25 MPa			9	K	3								
	0 ... 40 MPa			9	L	4								
	0 ... 60 MPa			9	L	5								
Version	standard					S	0							
	for oxygen applications					S	1							
Switching contact	Contact N/O	High-Side-Switch PNP						1						
	Contact N/C	High-Side-Switch PNP						2						
Electrical connection	Swift connector								0					
	Connector M12x1 [2]								3					
	Swift connector with cable 1.5 m								L					
Pressure connection [3]	Inside thread	$^{7}/_{16}$-20 UNF Schrader								0		N		
		$^{7}/_{16}$-20 UNF								K		1		
		G ¼ wiht O-Ring seal FPM								1		1		
		½ -14 NPT (≤ 6 MPa)								D		1		
	Outside thread	M20x1.5 sealed at front and manometer (combi)								E		1		
		$^{7}/_{16}$ -20 UNF								2		1		
		¼ -18 NPT								3		1		
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM								4		1		
		R ¼ acc. to EN 10226								7		1		
		G ½ sealed at back and manometer with Profile seal ring in FPM								8		1		
		G ½ sealed at front								9		1		
Version	without pressure tip orifice (Inclusive pressure tip orifice from 10 MPa on)										0			
	with pressure tip orifice [2]										2			
Material pressure connection	Stainless steel 1.4305 / AISI 303											N		
	Stainless steel 1.4404 / AISI 316L											1		
Switching points	Indicate W and state switching points on order (e.g.: W10/5MPa)												W	

[1] Other pressure ranges on request

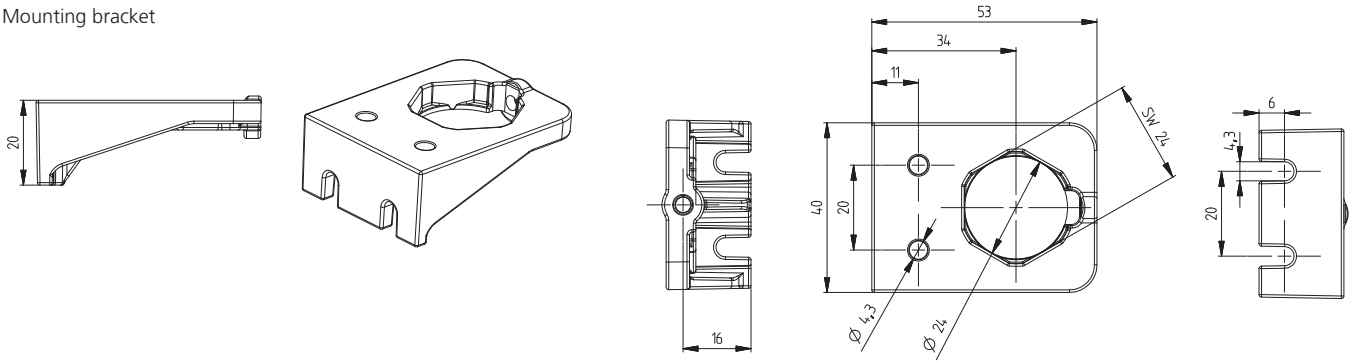
[2] Delivery without female connector

[3] Other pressure connections on request

Dimensions in mm / Electrical connections



Mounting bracket



Relative and absolute pressure switch type 529

Pressure range
-1 ... 0 – 60 bar

The compact type 529 pressure switch is based upon the Huba Control developed unique ceramic technology used for the last 20 years in millions of applications.

Switching points set in factory are available both N/C and N/O function. Various electrical and pressure connections are available to suit given applications.

- Compact, rugged construction
- Negligible temperature influence on accuracy
- Large selection of connections available.
- Saving time by quick cable mounting by the customer with swift connector

Technical overview

Pressure range		
Relative		-1 ... 0 – 60 bar
Absolute		0 ... 1 – 16 bar
Operating conditions		
Medium		Liquids and gases
Temperature	Medium	FPM -15 ... +125 °C
		EPDM -40 ... +125 °C
		NBR -20 ... +100 °C
		MVQ -40 ... +125 °C
	Ambient	-30 ... +85 °C
	Storage	-50 ... +100 °C
Tolerable overload / Rupture pressure	≤ 4 bar	3.0 x fs
	> 4 bar	2.5 x fs
Materials		
Pressure Connection		Stainless steel 1.4404 / AISI 316L
Plug accommodation		Polyarylamide 50% GF UL 94 V-0
Materials in contact with medium	Pressure connection	Stainless steel 1.4404 / AISI 316L
	Sensor	Ceramic Al_2O_3 (96%)
	Sealing material	FPM, EPDM, NBR, MVQ
Electrical overview		
Output		Semiconductor (open collector)
Switching contact	High-Side Switch (PNP)	N/C contact or N/O contact
Switch load	High-Side Switch (PNP)	max. 200 mA
Power supply		7 ... 33 VDC
Current consumption		< 4 mA
Insulation voltage		500 VDC
Protection class		
Protection class III		
Dynamic response		
Response time		< 2 ms, 1 ms typ.
Load cycle		< 100 Hz
Adjustment of switching points (factory set)		
Upper switching point		8 ... 100% fs
Lower switching point		5 ... 97% fs
Hysteresis		≥ 3 % fs
Protection standard		
IP 67		
Electrical connection		
Swift connector without or with cable 1.5 m		
Connector M12x1		

Pressure connection		
Inside thread	G ¼	with O-Ring seal FPM (-30 ... +135 °C)
	½ -14 NPT	
	$^{7}/_{16}$ - 20 UNF	
Outside thread	$^{7}/_{16}$ - 20 UNF	
	¼ -18 NPT	
	G ¼	sealed at back DIN 3852-E with Profile seal ring in FPM (-30 ... +135 °C)
	R ¼	EN 10226
	G ½	sealed at back and manometer (combi) with Profile seal ring in FPM (-30 ... +135 °C)
	M20x1.5	sealed at front and manometer (combi)
	G ½	sealed at front

Installation arrangement	
Unrestricted	
Tests / Admissions	
Electromagnetic compatibility	CE conformity acc. EN 61326-2-3 and EN 50121-3-2
Shock acc. IEC IEC 68-2-27	100 g, 11 ms half sine wave, all 6 directions, free fall from 1 m on concrete (6x)
Constant shock acc. IEC 68-2-29	40 g for 6 ms, 1000x all 3 directions
Vibration acc. IEC 68-2-6	20 g, 15 ... 2000 Hz, 15 ... 25 Hz with amplitude ± 15 mm, 1 Octave/min. all 3 directions, 50 constant load
Weight	
~ 90 g	
Packaging (Please state on order)	
Single packaging in cardboard	accessories integrated
Multiple packaging in cardboard (25 pcs)	

Accuracy

Parameter		Unit	
Switching points [1]		% fs	± 0.5
Resolution		% fs	0.1
Thermal characteristic [2]	max.	% fs/10K	± 0.2
Long term stability acc. IEC EN 60770-1	max.	% fs	± 0.25

Test conditions: 25°C, 45% RH, power supply 24 VDC

[1] typ. ; max. 1.0% fs (incl. hysteresis and repeatability)

[2] -15 ... 85 °C

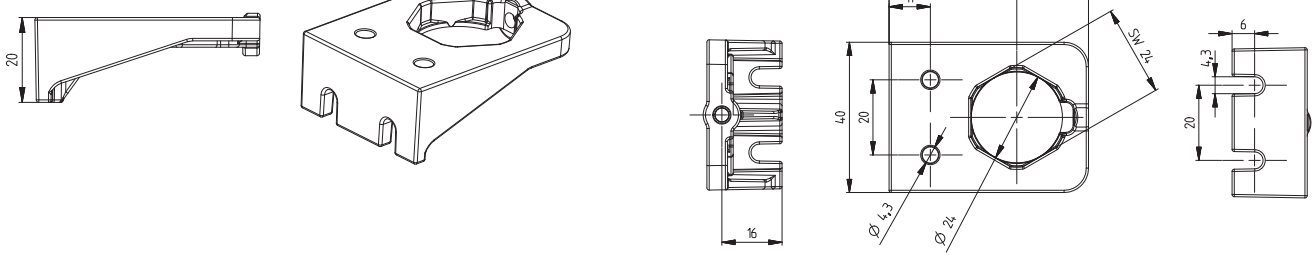
Order code selection table in bar

			1	2	3	4	5	6	7	8	9	10	11
			529.	X	X	X	X	X	X	X	X	X	X	X
Pressure range (relative) [1]	-1 ... 0 bar			9	0	1								
	0 ... 1 bar			9	1	1								
	0 ... 1.6 bar			9	1	2								
	0 ... 2.5 bar			9	1	4		0						
	0 ... 4 bar			9	1	5		0						
	0 ... 6 bar			9	1	7		0						
	0 ... 10 bar			9	3	0		0						
	0 ... 16 bar			9	3	1		0						
	0 ... 25 bar			9	3	2		0						
	0 ... 40 bar			9	3	3		0						
	0 ... 60 bar			9	4	0		0						
Pressure range (absolute) [1]	0 ... 1 bar			8	1	1								
	0 ... 1.6 bar			8	1	2								
	0 ... 2.5 bar			8	1	4								
	0 ... 4 bar			8	1	5								
	0 ... 6 bar			8	1	7								
	0 ... 10 bar			8	3	0								
	0 ... 16 bar			8	3	1								
Sealing material	FPM	Fluoro elastomer				0							
	EPDM	Ethylene propylene				1							
	NBR	Butadiene Acylonitrile				2							
	MVQ	Silicone polymer				3							
Application	standard						0						
	for oxygen applications					0	1						
Switching contact	Contact N/O	High-Side-Switch PNP						1					
	Contact N/C	High-Side-Switch PNP						2					
Electrical connection	Swift connector								0				
	Connector M12x1 [2]								3				
	Swift connector with cable 1.5 m								L				
Pressure connection [3]	Inside thread	G ¼ with O-Ring seal FPM								1			
		½ -14 NPT								D			
		7/16 -20 UNF								K			
	Outside thread	7/16 -20 UNF								2			
		¼ -18 NPT								3			
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM								4			
		R ¼ acc. to EN 10226								7			
		G ½ sealed at back and manometer with Profile seal ring in FPM								8			
		M20x1.5 sealed at front and manometer (combi)								E			
		G ½ sealed at front								9			
Version	without pressure tip orifice										1	1	
	with pressure tip orifice										2	1	
Switching points	Indicate W and state switching points on order (e.g.: W40/30bar)												W

Accessories

			Order number
Swift connector			107359
Straight-wire box for connector M12x1	3-pole		114570
Straight-wire box for connector M12x1 with cable	3-pole	200 cm	114605
Corner-wire box for connector M12x1 with cable	3-pole	200 cm	114604
Corner-wire box for connector M12x1	3-pole		106975
Mounting bracket with screw			118716
Calibration certificate			104551

Mounting bracket

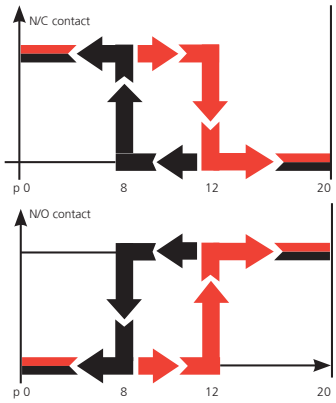


[1] Other pressure ranges on request

[2] Delivery without female connector

[3] Other pressure connections on request

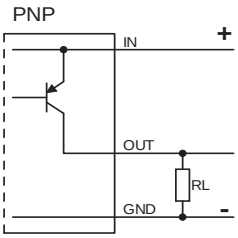
Function



N/C contact: When pressure is applied ($p_0 \rightarrow p_{max}$) the switch will disconnect the applied load as soon as the upper switching point is reached. As the pressure falls ($p_{max} \rightarrow p_0$) the switch will connect the load as soon as the lower switching point is reached.

N/O contact: When pressure is applied ($p_0 \rightarrow p_{max}$) the switch will connect the applied load as soon as the upper switching point is reached. With a fall in pressure ($p_{max} \rightarrow p_0$) the switch will disconnect the load as soon as the lower switching point is reached.

Example: p_{fs} 20 bar
Upper switching point 12 bar
Lower switching point 8 bar
max. switching load 100 mA



Order code selection table in psi

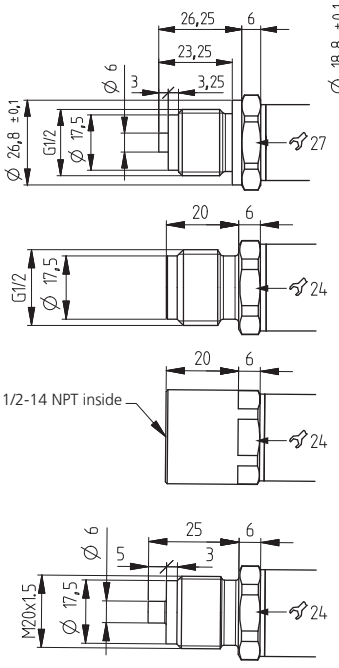
			1	2	3	4	5	6	7	8	9	10	11
			529.	X	X	X	X	X	X	X	X	X	X	X	X
Pressure range (relative) [1]	-30 ... 0 "hg			9	B	0								
	0 ... 15 psi			9	B	1								
	0 ... 20 psi			9	B	2								
	0 ... 30 psi			9	B	4		0						
	0 ... 60 psi			9	B	5		0						
	0 ... 100 psi			9	B	7		0						
	0 ... 150 psi			9	C	0		0						
	0 ... 200 psi			9	C	1		0						
	0 ... 300 psi			9	C	2		0						
	0 ... 500 psi			9	C	3		0						
	0 ... 750 psi			9	D	0		0						
Pressure range (absolute) [1]	0 ... 15 psi			8	B	1								
	0 ... 20 psi			8	B	2								
	0 ... 30 psi			8	B	4								
	0 ... 60 psi			8	B	5								
	0 ... 100 psi			8	B	7								
	0 ... 150 psi			8	C	0								
	0 ... 200 psi			8	C	1								
Sealing material	FPM	Fluoro elastomer				0							
	EPDM	Ethylene propylene				1							
	NBR	Butadiene Acylonitrile				2							
	MVQ	Silicone polymer				3							
Application	standard						0						
	for oxygen applications					0	1						
Switching contact	Contact N/O	High-Side-Switch PNP						1					
	Contact N/C	High-Side-Switch PNP						2					
Electrical connection	Swift connector								0				
	Connector M12x1 [2]								3				
	Swift connector with cable 1.5 m								L				
Pressure connection [3]	Inside thread	G ¼ with O-Ring seal FPM								1			
		½ -14 NPT								D			
		$^{7}/_{16}$ -20 UNF								K			
	Outside thread	$^{7}/_{16}$ -20 UNF								2			
		¼ -18 NPT								3			
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM								4			
		R ¼ acc. to EN 10226								7			
		G ½ sealed at back and manometer with Profile seal ring in FPM								8			
		M20x1.5 sealed at front and manometer (combi)								E			
		G ½ sealed at front								9			
Version	without pressure tip orifice										1	1	
	with pressure tip orifice										2	1	
Switching points	Indicate W and state switching points on order (e.g.: W30/16psi)												W

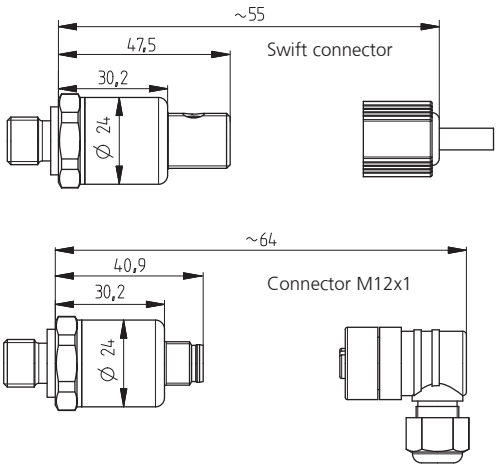
[1] Other pressure ranges on request
[2] Delivery without female connector
[3] Other pressure connections on request

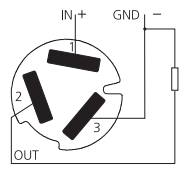
Order code selection table in MPa

			1	2	3	4	5	6	7	8	9	10	11
			529.	X	X	X	X	X	X	X	X	X	X	X
Pressure range (relative) [1]	-0.1 ... 0 MPa		9	G	0								
	0 ... 0.1 MPa		9	G	1								
	0 ... 0.16 MPa		9	G	2								
	0 ... 0.25 MPa		9	G	4		0						
	0 ... 0.4 MPa		9	G	5		0						
	0 ... 0.6 MPa		9	G	7		0						
	0 ... 1 MPa		9	H	0		0						
	0 ... 1.6 MPa		9	H	1		0						
	0 ... 2.5 MPa		9	H	2		0						
	0 ... 4 MPa		9	H	3		0						
	0 ... 6 MPa		9	K	0		0						
Pressure range (absolute) [1]	0 ... 0.1 MPa		8	G	1								
	0 ... 0.16 MPa		8	G	2								
	0 ... 0.25 MPa		8	G	4								
	0 ... 0.4 MPa		8	G	5								
	0 ... 0.6 MPa		8	G	7								
	0 ... 1 MPa		8	H	0								
	0 ... 1.6 MPa		8	H	1								
Sealing material	FPM	Fluoro elastomer				0							
	EPDM	Ethylene propylene				1							
	NBR	Butadiene Acylonitrile				2							
	MVQ	Silicone polymer				3							
Application	standard						0						
	for oxygen applications					0	1						
Switching contact	Contact N/O	High-Side-Switch PNP						1					
	Contact N/C	High-Side-Switch PNP						2					
Electrical connection	Swift connector								0				
	Connector M12x1 [2]								3				
	Swift connector with cable 1.5 m								L				
Pressure connection [3]	Inside thread	G ¼ with O-Ring seal FPM								1			
		½ -14 NPT								D			
		7/16 -20 UNF								K			
	Outside thread	7/16 -20 UNF								2			
		¼ -18 NPT								3			
		G ¼ sealed at back DIN 3852-E with Profile seal ring in FPM								4			
		R ¼ acc. to EN 10226								7			
		G ½ sealed at back and manometer with Profile seal ring in FPM								8			
		M20x1.5 sealed at front and manometer (combi)								E			
		G ½ sealed at front								9			
Version	without pressure tip orifice										1	1	
	with pressure tip orifice										2	1	
Switching points	Indicate W and state switching points on order (e.g.: W4/1.2MPa)												W

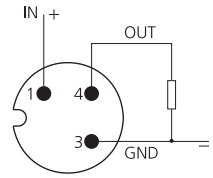
Dimensions in mm / Electrical connections







1= brown 2=green 3=white



1 (IN) 4 (OUT) 3 (GND)

[1] Other pressure ranges on request

[2] Delivery without female connector

[3] Other pressure connections on request

Relative and differential pressure switch type 604

Pressure range
0.2 ... 3 – 50 mbar

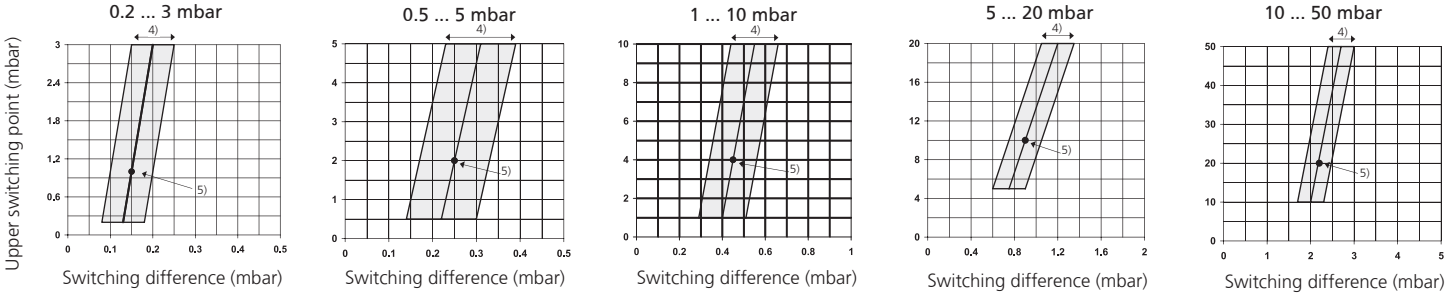
The type 604 pressure switch is used as a Δp flow switch in ventilation ducts for the control of filters and fans, and in primary and secondary control systems for the control of air dampers.
The 604 pressure monitoring switches are also ideally suited to protect heating coils from overheating and for monitoring industrial air cooling circuits.

- Easy to install
- Combi-bracket for vertical or horizontal installation
- User friendly snap cover
- Case geometry allows easy cable lead-in
- Cable strain relief integrated in PG11
- High adjustment accuracy through individual laser etched scale
- Long-term stability of switching points through trapezoidal bead diaphragm
- Multi-layer gold plated contact

Technical overview

Pressure range		
Relative and differential		0.2 ... 3 – 50 mbar
Operating conditions		
Medium		Air and neutral gases
Temperature	Medium / ambient	-30 ... +85 °C
	Storage	-40 ... +85 °C
Tolerable overload on one side	-30 ... +75 °C	75 mbar
	-30 ... +85 °C	50 mbar
Materials in contact with the medium		
Sensor		Silicon LSR [1]
Case		PC 10% GF
Cover		PC
Electrical overview		
Switching load[2]	Resistive load	5 A at 250 VAC
		4 A at 30 VDC
	Inductive [3]	0.8 A at 250 VAC
		0.7 A at 30 VDC
Contact system	Changeover switch	
Service life	mechanical	> 10^6 switching cycles
Protection standard		
Without cover		IP 00
With cover		IP 54 / IP 65
Repeatability		
Setting range 0.2 ... 3 mbar	between	± 0.025 mbar
Setting range 0.5 ... 5 mbar	between	± 0.05 mbar
Setting range 1 ... 10 mbar	between	± 0.05 mbar
Setting range 5 ... 20 mbar	between	± 0.05 mbar
Setting range 10 ... 50 mbar	between	± 0.15 mbar
Electrical connection		
Screw terminals		
AMP connectors		6.3 mm
		4.8 mm
Pressure connections		
Pipe		Ø 6.2 mm
Inside thread		G ⅛
Installation arrangement		
Recommendation (Factory set)	Vertical, pressure connections facing downwards	
	Horizontal, cover facing downwards – Switching points approx. 11 Pa lower than on scale	
	Horizontal, cover facing upwards – Switching points approx. 11 Pa higher than on sclae	
Tests / Admissions		
UL		MFHX2/8 or XAAK2/8
DVGW		acc. to DIN EN 1854
EC type examination certificate		CE-0085AP0974
Electromagnetic compatibility		CE conformity acc. to EN 61326-2-3
Low voltage directive		2006/95/EC
Gas appliance directive		2009/142/EC
Weight		
Without bracket		~ 93 g
With combi-bracket type C		~ 143 g
Packaging (Please state on order)		
Single packaging in cardboard		
Multiple packaging in cardboard		20 pcs
		100 pcs
		320 pcs

Setting ranges



[1] at 200 °C tempered, free of gas emissions
[2] Multi-layer contact (suitable for DDC)
[3] 6-fold starting current cos φ 0.6)
[4] Tolerance switching difference
[5] Factory-setting

Compact A/C set (standard)

Consisting of switch with hose connection Ø 6.2 mm, scale in mbar, screw terminals, multi-layer contact up to 5 A (suitable for DDC), combi-bracket type C and hose connection set, single packaging.

Setting range (mbar)	Connection set	Order number
0.2 ... 3 mbar	Fig. 1 (Metal)	604.9000001
0.5 ... 5 mbar	Fig. 1 (Metal)	604.9100001
1 ... 10 mbar	Fig. 1 (Metal)	604.9200001
0.2 ... 3 mbar	Fig. 2 (Plastic)	604.9000002
0.5 ... 5 mbar	Fig. 2 (Plastic)	604.9100002
1 ... 10 mbar	Fig. 2 (Plastic)	604.9200002
10 ... 50 mbar	Fig. 2 (Plastic)	604.9500002

Order code selection table

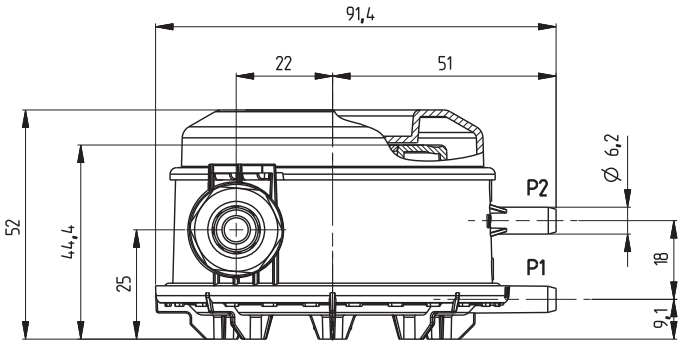
					1	2	3	4	5	6	7	8
					604.	X	X	X	X	X	X	X	X
Version	Standard version				9							
	UL version				S							
	ETL version				E							
Setting range	0.2 ... 3 mbar	20 ... 300 Pa	0.08 ... 1.2 inH$_2$O	0.08 ... 1.2 inWC		0						
	0.5 ... 5 mbar	50 ... 500 Pa	0.2 ... 2 inH$_2$O	0.2 ... 2 inWC		1						
	1 ... 10 mbar	100 ... 1000 Pa	0.4 ... 4 inH$_2$O	0.4 ... 4 inWC		2						
	5 ... 20 mbar	500 ... 2000 Pa	2 ... 8 inH$_2$O	2 ... 8 inWC		4						
	10 ... 50 mbar	1000 ... 5000 Pa	4 ... 20 inH$_2$O	4 ... 20 inWC		5						
Scale [1]	Scale in mbar						0					
	Scale in Pa						1					
	Scale in inH$_2$O						2					
	Scale in inWC						6					
	Without Scale	(rating plate in mbar)					3					
	Without Scale	(rating plate in Pa)					4					
	Without Scale	(rating plate in inH$_2$O)					5					
	Without Scale	(rating plate in inWC)					7					
Pressure connections	Pipe Ø 6.2 mm	without pressure tip orifice						0				
	Pipe Ø 6.2 mm	with pressure tip orifice on P2						1				
	Inside thread G ⅛	without pressure tip orifice						2				
	Inside thread G ⅛	with pressure tip orifice on P2						3				
Electronical connection	Screw terminals								0			
	AMP connector 6.3 mm								1			
	AMP connector 4.8 mm								2			
Cover / Bracket	With cover	combi bracket type C	IP 54							0		
	With cover	bracket type A	IP 54							1		
	With cover	bracket type B	IP 54							2		
	With cover	without bracket	IP 54							3		
	Without cover	combi bracket type C								5		
	Without cover	bracket type A								6		
	Without cover	bracket type B								7		
	Without cover	without bracket								8		
	With cover	combi bracket type C	IP 65		9					A		
	With cover	bracket type A	IP 65		9					B		
	With cover	bracket type B	IP 65		9					C		
	With cover	without bracket	IP 65		9					D		
Connection kit	Without										0	
	With connection set (metal), 90° angled		incl. tube 2 m long (Fig. 1)								1	
	With connection set (plastic), straight		incl. tube 2 m long (Fig. 2)								2	
Switching points (optional)	Two factory set switching points		(please specify on order)									W
	One factory set switching point high		(please specify on order)									R
	One factory set switching point low		(please specify on order)									U

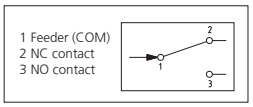
Accessories

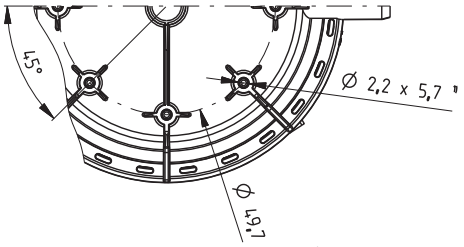
		Order number
Connection kit for vent duct (metal), 90° angled	including tube 2 m long (Fig. 1)	104312
Connection kit for vent duct (plastic), straight	including tube 2 m long (Fig. 2)	100064
Bracket type A		100295
Bracket type B		100098
Combi-bracket type C		100106
Attachment ring		110005
Attachment ring close		110006
Special screws for fastening bracket to switch	(2 screws per switch required)	102976
Fastening clip for bracket A, B, C or direct mounting	for wall thickness 0.8 ... 1.1 mm	100294
	for wall thickness 1.8 ... 2.1 mm	100293
Calibration certificate		104551

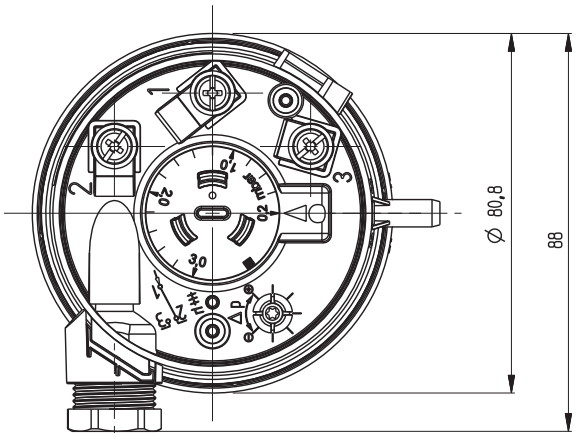
[1] For customer specific calibration without scale and with fixed scale

Dimensions in mm / Electrical connections







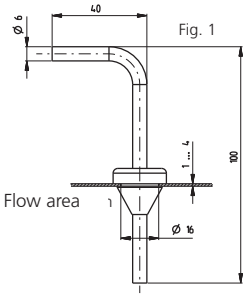


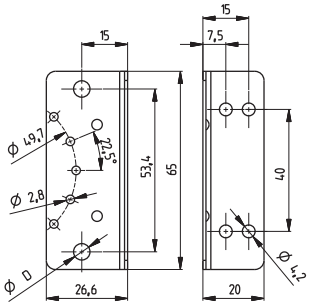
1) Hole for PT screws KA25

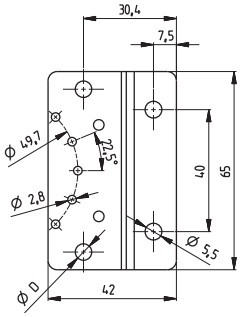
Bracket type A

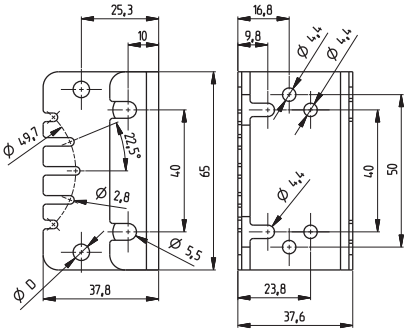
Bracket type B

Combi-bracket type C

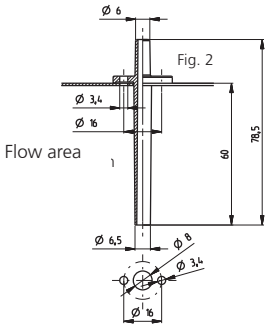


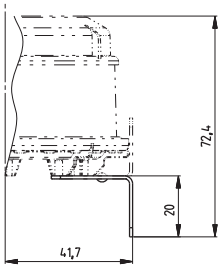


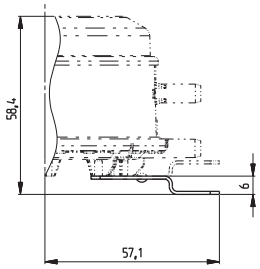


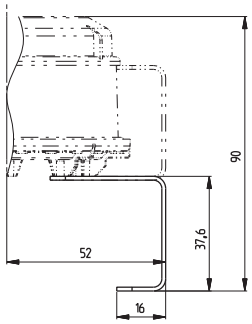


Ø D = 5.1 + 0.1 Holes for fastening clip





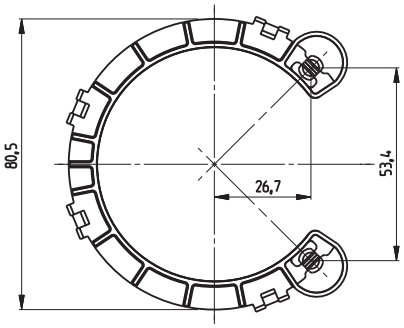


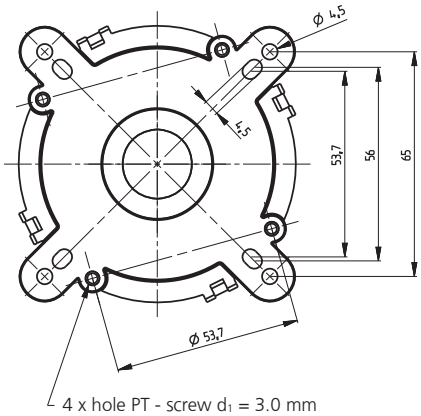


Fastening clip (mounted)

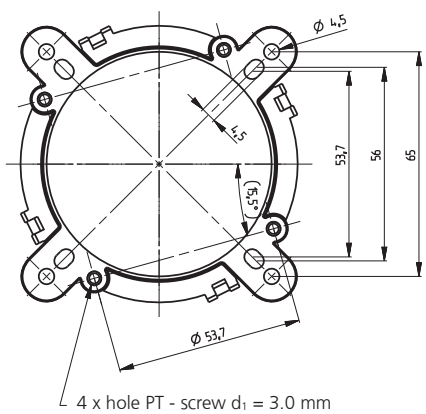
Mounting adaptor ring close (mounted)

Mounting adaptor ring (mounted)





4 x hole PT - screw d_1 = 3.0 mm



4 x hole PT - screw d_1 = 3.0 mm

OEM Relative and differential pressure switch type 605

Pressure range
20 ... 400 Pa

Type 605 pressure switches are specially developed for use in gas fired heating systems. There are more than 40 million switches in use worldwide. Produced on a fully automated production line. High setting accuracy and repeatability, combined with excellent reliability characterise a quality of switch above the industry norm.

- Fitting of the switch – Fast mounting with snap bracket system
- Adjusting security
- High contact strength (typically 10 cN)
  – Essentially less susceptibility to polution of contact
- Roll operation of contact surface
  – Less sensitive to contact polution through self cleaning effect
- Diaphragm design / material
  – Better long term stability achieved though the use of a 2 component silicon diaphragm.
  – Unique trapezoid diaphragm design provides for a better contact release and therefore a more accurate switching point

Technical overview

Pressure range		
Relative and differential		20 ... 400 Pa [1]
Operating conditions		
Medium		Air and neutral gases
Temperature [2]	Medium / ambient	-30 ... +110 °C
	Storage	-30 ... +110 °C
Tolerable overload on one side	< +85 °C	5000 Pa
	+85 ... +110 °C	1500 Pa
Smallest turn on pressure of 20 Pa [3]		Smallest switching differential 8 Pa
Materials in contact with the medium		
Sensor		Silicone LSR
Case		PC Lexan 500R [4]
Electrical overview		
Switching load		See Nominal loading limits
Contact system	Changeover switch	
Service life	Mechanically	> 10^6 switching cycles
Protection standard		
Not mounted		IP 00
With contact safety guard		IP 30
With cover, without seal		IP 54
With cover and seal		IP 65
Reproducibility		
Between		± 1 Pa
Electrical connection		
AMP connector [5]		6.3 mm
		4.8 mm
Pressure connections		
Pipe		Ø 6.2 mm
Orifice installed for damping pulsating pressure at P1, P2 (option)		
Mounting instructions		
Installation arrangement		Please indicate installation arrangement
Mounting		With several brackets
		Fastening clip for quick mounting
Tests / Admissions		
UL		MFHX2/8 or XAAK2/8
DVGW		acc. to DIN EN 1854
EC type examination certificate		CE-0085AP0974
Electromagnetic compatibility		CE conformity acc. to EN 61326-2-3
Low voltage directive		2006/95/EC
Gas appliance directive		2009/142/EC
Weight		
Without accessories		~ 60 g
Packaging		
Multiple packaging in cardboard		300 pieces
		1200 pieces

Adjustable switching differences

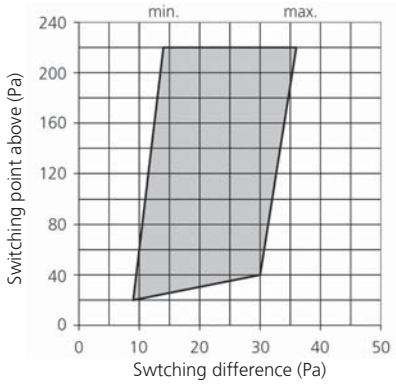
Switching difference adjustment only inside shaded area:

Example: Upper switching point 220 pascal.
Switching difference between 14 and 36 pascal.

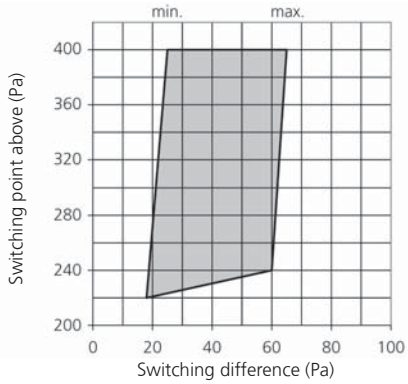
Example: Upper switching point 40 pascal.
Switching difference between 9 and 30 pascal.

Example: Upper switching point 20 pascal,
smallest switching difference 8 pascal.

20 - 220 Pa

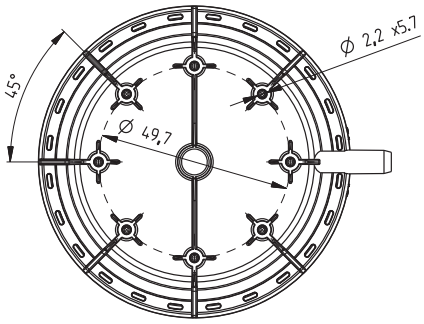


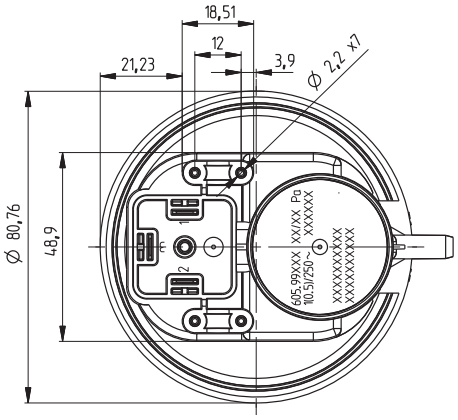
220 - 400 Pa

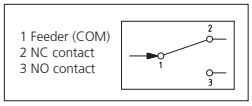


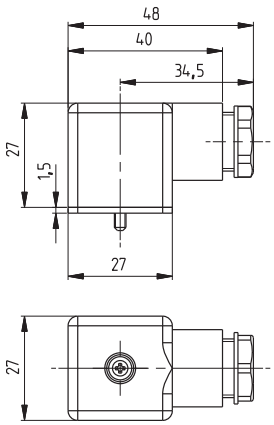
[1] Higher pressures on request
[2] Higher temperatures on request
[3] Switching differential is factory-set
[4] Fiberglass reinforced plastic 10% GF
[5] According to DIN 46244

Dimensions in mm / Electrical connections

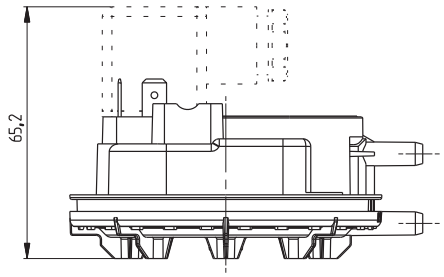


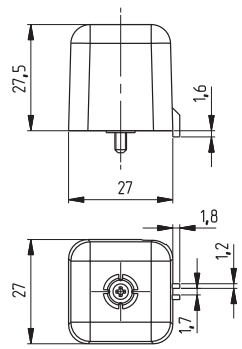




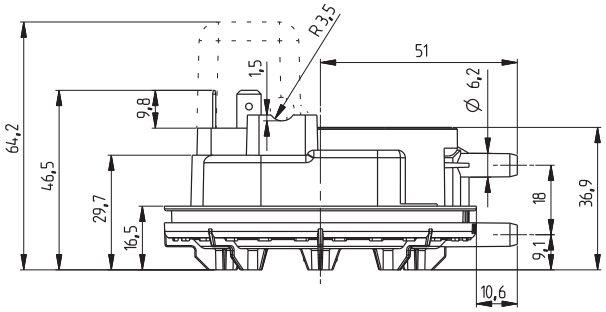


Cover with / without sealing
and PT screw

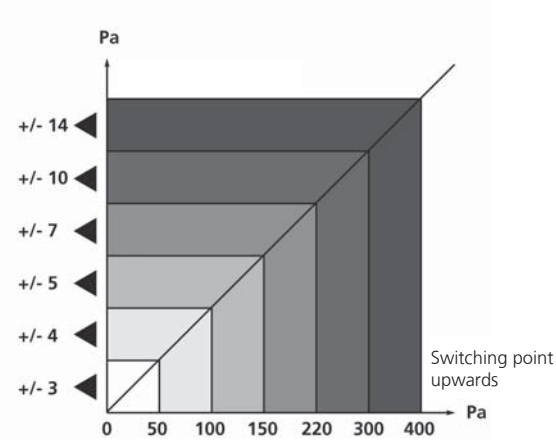




Contact safety guard with PT srew
Cable exit AMP1 or AMP2



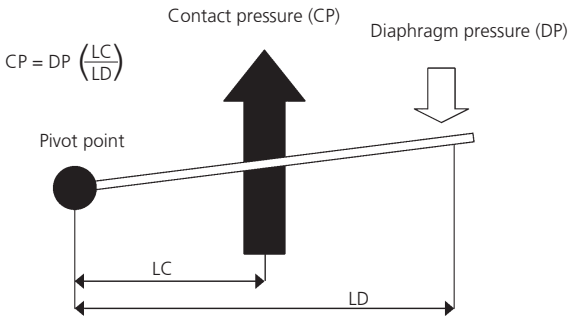
Tolerance of switching point



Switching point
upwards

The principle of high contact pressure

Simplified representation of the new DPS 605 contact system. The high contact pressure results form the optimized length ratios of LC and LD.



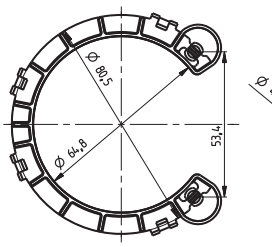
LC = Length of contact lever
LM = Length of diaphragm lever

Accessories

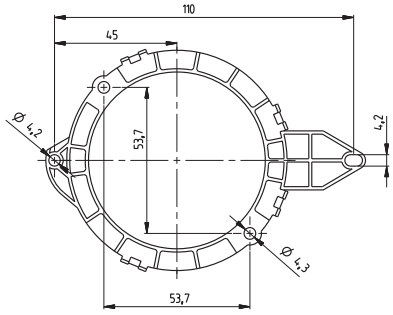
supplied loose

		Order number
Cover with seal and PT screw		100306
Cover without seal and PT screw		100307
Cover with PT screw and cable output AMP-1		100297 + 102981 (PT screw)
Cover with PT screw and cable output AMP-2		100298 + 102981 (PT screw)
Fastening clip	Thickness of sheet metal 0.8 ... 1.1 mm	100294
	Thickness of sheet metal 1.8 ... 2.1 mm	100293
Fastening clip (with mounting holes)		106790
Bracket type A		100295
Bracket type B		100296
Mounting plate		106707
Mounting adaptor small		111223
Mounting adaptor large		112985
Calibration certificate		104551

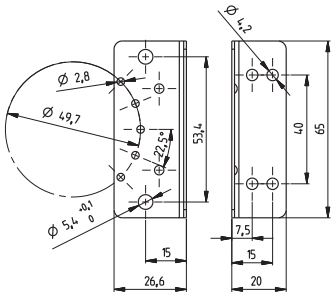
Fastening clip
(Dimensions in mounted state)



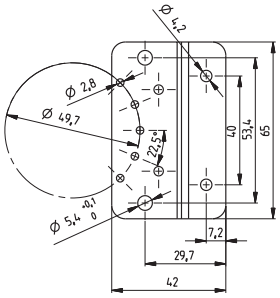
Fastening clip
(with mounting holes)

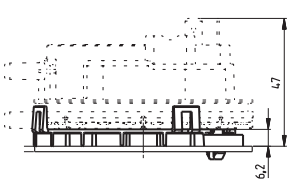


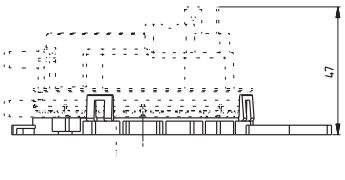
Bracket type A

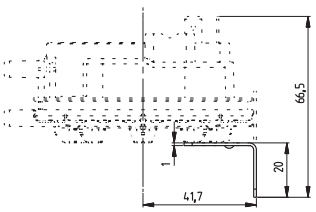


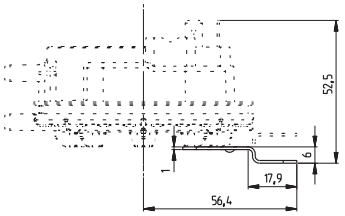
Bracket type B



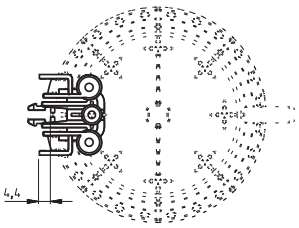




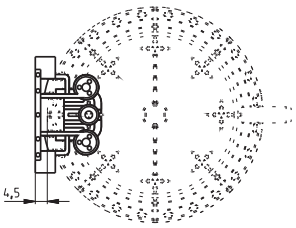




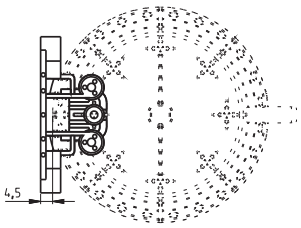
Mounting plate

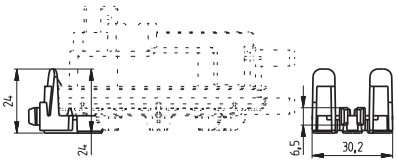


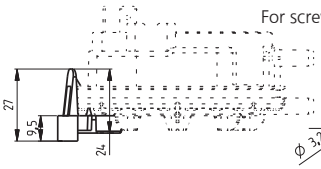
Mounting adaptor small



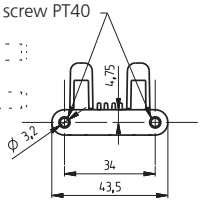
Mounting adaptor large

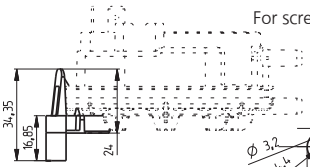




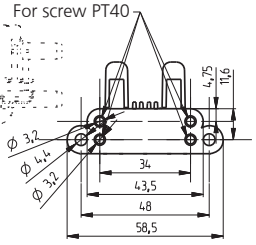


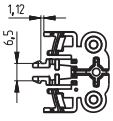
For screw PT40

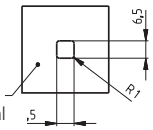




For screw PT40



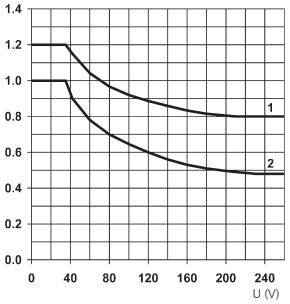




Thickness of sheet metal
0.8mm

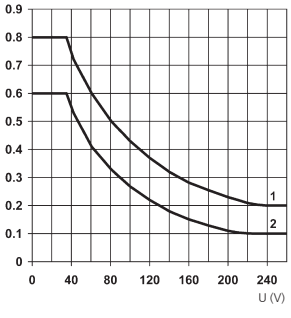
Nominal loading limits

for AC



1 = ohmic
2 = inductive (cosφ 0.7)

for DC



1 = ohmic
2 = inductive
Can also be operated with TTL-load

Relative and differential pressure switch type 610

Pressure range
-1 ... -320 mbar / 1 ... 500 mbar

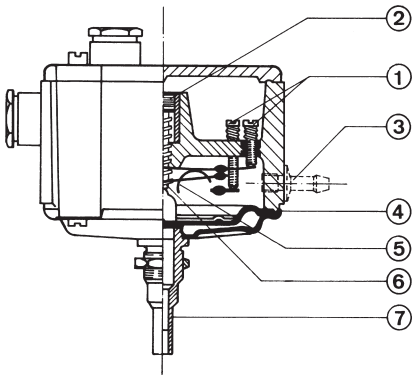
Type 610 pressure switches are especially suited to the monitoring of non-flammable gases in general industrial equipment.

Exemplary accuracy is maintained throughout the high pressure range of this switch.

- High accuracy (especially the upper pressure ranges with 17 ideally designed pressure range incrementations)
- Ease of accurate adjustment by customer
- Repeatability of switching points up to < ±0.1 mbar
- Rugged mechanics with high operating reliability and switching capacities up to 10 A

Technical overview

Pressure range			
Relative			1 ... 500 mbar
Negative			-1 ... -320 mbar
Operating conditions			
Medium			Air and neutral gases
Temperature		NBR	0 ... +80 °C
		FPM	-10 ... +80 °C
		EPDM	-10 ... +80 °C
		Q (Silicone)	-40 ... +80 °C
		Storage	-40 ... +80 °C
Tolerable overload			See order code selection table
Lowest turn-on pressure			≥ 1 mbar
Lowest swiching difference			≥ 0.5 mbar
Materials			
Case			Duroplast
Materials in contact with the medium	Diaphragm		NBR based
			EPDM
			FPM
			Silicone
	To base Inox and diaphragm		Inox 1.4301, 1.4305, 1.4310, 1.4104
	To base, galvanized sheet steel and Diaphragm		Inox 1.4310, brass, aluminium
	To base, nickel-plated brass and Diaphragm		Inox 1.4301, 1.4310
	With medium in pressure chamber P2:		Brass, nickel plated brass, CuSn, Bakelit
			PF-PH, polyamide and polyacetale, AgCdO,
			NBR, galvanized steel
Electrical overview			
Nominal voltage			250 VAC
Nominal current for resistive loading			1 A 10 A
Nominal current for motor loading			0.5 A 3 A
Contact system			Changeover contact
Service life			mechanically 10^6 switching cycles
Protection standard			
IP 30			IP 65 on request
Repeatability			
±5% of the switching point with diaphragm NBR / Silicone			minimum ± 0.1 mbar
±10% of the switching point with diaphragm FPM / EPDM			minimum ± 0.2 mbar
Electrical connection			
Screw terminals			
Tab connectors (AMP)			6.3 mm
Cable gland PG9 (not part of scope of delivery / see accessories)			
Pressure **connection**			
Pipe Ø 6mm and thread			G ¼
			M12x1
Installation arrangement			
Pressure connections downwards			
Remark: By changing the mounting position the switching points also change. The adjustment ranges are in relation with the mounting position.			
Weight			
~ 260 g			
Packaging			
Single packaging in cardboard			



Legend to cross-section drawing

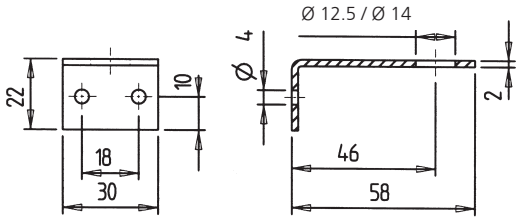
1 Adjustment of switching difference
2 Adjustment of switching points
3 Connection for differential pressure
4 Diaphragm
5 Switchover contact element
6 Compression spring
7 Pressure or vacuum connection

Order code selection table

					1	2	3	4	5
					610.	X	X	X	X	X
Pressure mode	Relative				9				
	Differential				5				
	Negative				6				
	Negative differential				7				
Pressure range [1]		p max.	pt [2]	Switching capacity 250 VAC					
	1 ... 4 mbar	30 mbar	50 mbar	1 A	9,5	0		0	
	4 ... 30 mbar	70 mbar	100 mbar	1 A	9,5	1			
	8 ... 70 mbar	70 mbar	100 mbar	1 ... 10 A	9,5	2			
	7 ... 25 mbar	70 mbar	100 mbar	1 ... 10 A	9,5	3			
	10.5 ... 45 mbar	70 mbar	100 mbar	1 ... 10 A	9,5	4			
	28.5 ... 120 mbar	350 mbar	500 mbar	1 ... 10 A	9,5	5			
	30 ... 160 mbar	350 mbar	500 mbar	1 ... 10 A	9,5	6			
	50 ... 300 mbar	600 mbar	1000 mbar	1 ... 10 A	9,5	7			
	65 ... 500 mbar	600 mbar	1000 mbar	1 ... 10 A	9,5	8			
	-1 ... -2 mbar	-30 mbar	-50 mbar	1 A	6	0		0	
	-2 ... -7.5 mbar	-30 mbar	-50 mbar	1 A	6	1			
	-4.8 ... -11.5 mbar	-70 mbar	-100 mbar	6 A	6,7	2			
	-8 ... -20 mbar	-70 mbar	-100 mbar	6 A	6,7	3			
	-18 ... -47 mbar	-350 mbar	-500 mbar	6 A	6,7	4			
	-42 ... -80 mbar	-350 mbar	-500 mbar	6 A	6,7	5			
	-80 ... -200 mbar	-600 mbar	-1000 mbar	6 A	6,7	6			
	-180 ... -320 mbar	-600 mbar	-1000 mbar	6 A	6,7	7			
Pressure connection / pressure case	Hose connection ø 6 mm and	G ¼	Galvanized sheet steel				2		
		G ¼	Inox sheet steel				3		
		G ¼	Nickel plated brass				4		
		M12x1	Inox sheet steel				5		
		M12x1	Galvanized sheet steel				6		
		M12x1	Nickel plated brass				7		
Diaphragm material	NBR based							0	
	FPM							2	
	EPDM							4	
	Q (Silicone)							6	
Switching points (optional)	Two factory set switching points		(please specify on order e.g.: W10/8mbar)						W
	One factory set switching point high		(please specify on order e.g.: U25mbar)						R
	One factory set switching point low		(please specify on order e.g.: R50mbar)						U

Accessories [3]

	Order number
Mounting bracket with hole Ø 12.5 mm for M12x1	104259
Mounting bracket with hole Ø 14 mm for G ¼	102872
Connector set (Tab connectors AMP)	103479
Cable gland PG9	103559
Calibration Certificate	104551

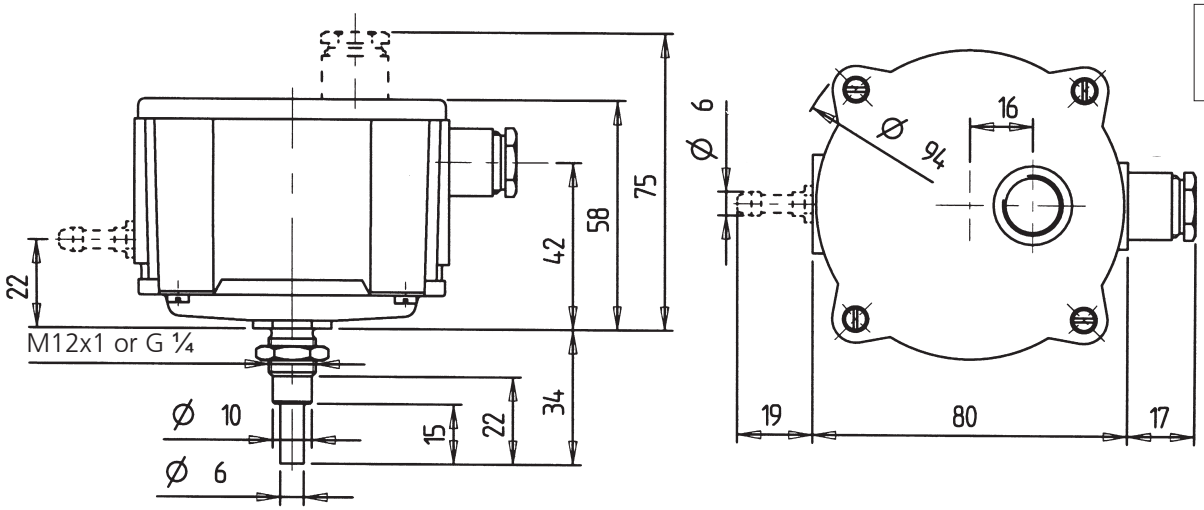


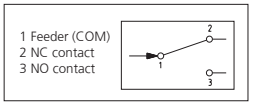
[1] Other pressure range on request

[2] pt = test pressure

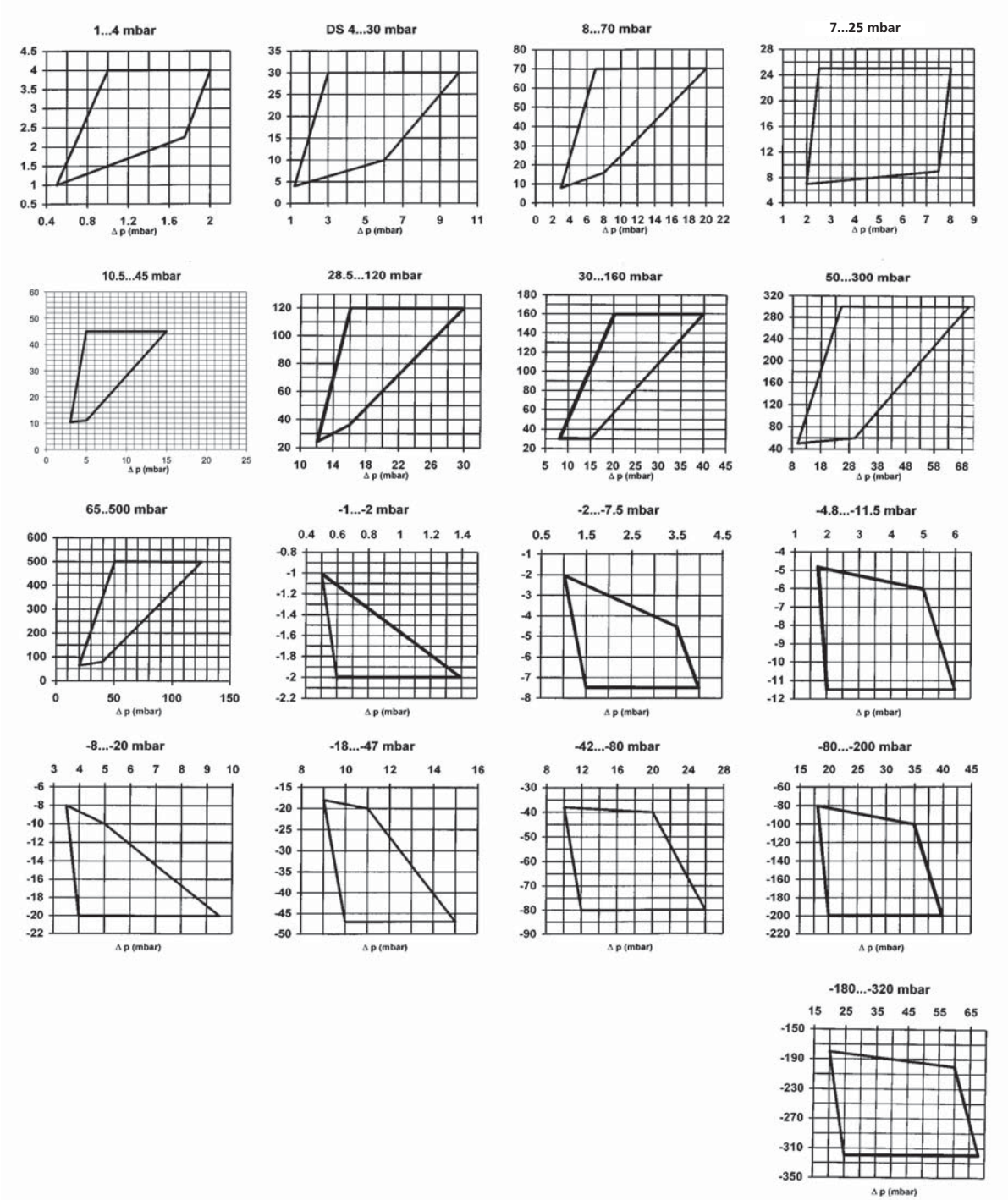
[3] Accessories supplied loose

Dimensions in mm / Electrical connections





Setting ranges



Relative pressure switch type 620/625

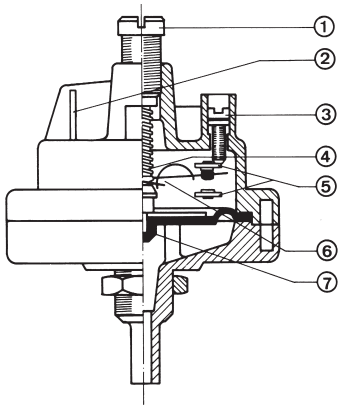
Pressure range
-4 ... -900 mbar / 2 ... 6000 mbar

Type 620 and 625 pressure switches, with 13 pressure ranges, are suitable for liquids and gases. Body materials are available in plastic, brass and aluminium, with a choice of NBR, FPM, EPDM and silicone diaphragms.
Very high precision through finely tuned measurement stages and high long term stability. Rugged design and especially suitable for use in general industrial equipment
construction, process technology and food automation.

- High accuracy by 13 ideally designed pressure range increments
- Switching differences adjustable
- High long term stability with reproducibility of switching points up to < ± 0.3 mbar
- Customer specific switching points adjustable in factory
- Rugged industrial switch with excellent Price / performance ratio

Technical overview

Pressure range		
Relative		2 ... 6000 mbar
Negative		-4 ... -900 mbar
Operating conditions		
Medium		Liquids and nuetral gases
Temperature	NBR based	0 ... +80 °C
	FPM	-10 ... +80 °C
	EPDM	-10 ... +80 °C
	Q (Silicone)	-40 ... +80 °C
	Ambient	+65 °C
	Storage	-40 ... +80 °C
Tolerable overload		See order code selection table
Lowest turn-on pressure		2 mbar
Lowest swiching difference		1 mbar
Materials		
Case		Fibreglass reinforced plastic
Materials in contact with the medium	Diaphragm	NBR based
		EPDM
		FPM
		Silicone
	Base type 620	ABS or PA
	Base type 625	Aluminium, nickel plated brass
	Other components	X 5 CrNi 18-10, 1.4301
		Polyacetate (only at negative)
Electrical overview		
Nominal voltage		250 VAC
Nominal current for resistive loading		1 A 6 A
Nominal current for motor loading		0.5 A 3 A
Contact system		Changeover contact
Service life		Mechanically 10^6 switching cycle [1]
Protection standard		
Without cover		IP 00
With cover [2]		IP 54
Repeatability		
±5% of the switching point	With diaphragm NBR based / Silicone	minimum ±0.3 mbar
±10% of the switching point	With diaphragm FPM / EPDM	minimum ±0.6 mbar
Electrical connections		
Screw terminals (Option)		
Tab connectors (AMP)		6.3 mm
Cable gland PG 11		with cover
Pressure connections		
Type 620	Inside / outside thread	M5 / M12x1
	Connection pipe / thread	Ø 6 mm / M12x1
Type 625	Thread with counternut	M12x1 (CuZ nickel plated), G ⅛, G ¼
Installation arrangement		
For switching points calibrated in the factory		Indicate installation arrangement.
Remark: By changing the mounting position the switching points also change. The adjustment ranges are in relation with the mounting position.		
Weight		
Type 620		~ 70 g
Type 625	with aluminium base	~ 100 g
	with base brass	~ 200 g
Packaging		
Single packaging in cardboard boxes		



Legend to cross-section drawing

1 Switching point setting
2 AMP tab connectors
3 Switching difference setting
4 Compression spring
5 Changeover contact
6 Contact element
7 Diaphragm

[1] The permitted switching difference has to be respected

[2] For installation arrangement electrical connections upward

Order code selection table 620.

					1	2	3	4	5
		p max.	pt [2]	Switching capacity 250 VAC	X	X	X	X	X
Pressure range [1]	2 ... 8 mbar	30 mbar	50 mbar	1 A	9	1			
	6 ... 75 mbar	300 mbar	500 mbar	1 A	9	2			
	12.5 ... 80 mbar	300 mbar	500 mbar	6 A	9	3			
	12.5 ... 200 mbar	300 mbar	500 mbar	1 A	9	4			
	25 ... 220 mbar	300 mbar	500 mbar	6 A	9	5			
Pressure connection / pressure case	Hose connection Ø 6 mm and M12x1		ABS	... +70 °C			0		
			PA 66	... +80 °C			1		
	Inside thread M5 and M12x1		ABS	... +70 °C			2		
			PA 66	... +80 °C			3		
Diaphragm material	NBR based							0	
	FPM							2	
	EPDM							4	
	Q (Silicone)							6	
Switching points (optional)	Two factory set switching points		(please specify on order)						W
	One factory set switching point high		(please specify on order)						R
	One factory set switching point low		(please specify on order)						U

Order code selection table 625.

					1	2	3	4	5
					X	X	X	X	X
Pressure mode	Relative				9				
	Negative				6				
		p max.	pt [2]	Switching capacity 250 VAC					
Pressure range [1]	2 ... 8 mbar	30 mbar	50 mbar	1 A	9	0			
	6 ... 75 mbar	300 mbar	500 mbar	1 A	9	1			
	12.5 ... 80 mbar	300 mbar	500 mbar	6 A	9	2			
	12.5 ... 200 mbar	300 mbar	500 mbar	1 A	9	3			
	25 ... 220 mbar	300 mbar	500 mbar	6 A	9	4			
	80 ... 2000 mbar	6000 mbar	10000 mbar	1 A	9	5			
	120 ... 2200 mbar	6000 mbar	10000 mbar	6 A	9	6			
	1000 ... 6000 mbar	6800 mbar	10000 mbar	6 A	9	7			
	-4 ... -30 mbar	-50 mbar	-100 mbar	1 A	6	1			
	-15 ... -80 mbar	-300 mbar	-500 mbar	1 A	6	2			
	-30 ... -150 mbar	-300 mbar	-500 mbar	6 A	6	3			
	-50 ... -600 mbar	-1000 mbar	-1000 mbar	6 A	6	4			
	-100 ... -900 mbar	-1000 mbar	-1000 mbar	6 A	6	5			
Pressure connection / pressure case	G ⅛	Aluminium					1		
		Brass					B		
	M12x1	Aluminium					2		
	G ¼	Brass					3		
		Aluminium					4		
		Nickel plated brass 5µm					A		
Diaphragm material	NBR based							0	
	FPM							2	
	EPDM							4	
	Q (Silicone)							6	
Switching points (optional)	Two factory set switching points		(please specify on order)						W
	One factory set switching point high		(please specify on order)						R
	One factory set switching point low		(please specify on order)						U

Accessories [3]

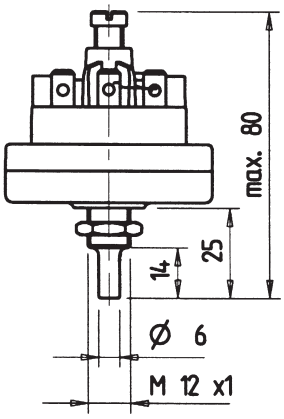
	Order number
Cover of PG11 on the side	105836
Mounting bracket with hole Ø 12.5 mm for M12	104259
Mounting bracket with hole Ø 14 mm for G ¼	102872
Connector set (Tab connectors AMP)	103479
Screw clamps set	103491
Calibration certificate	104551

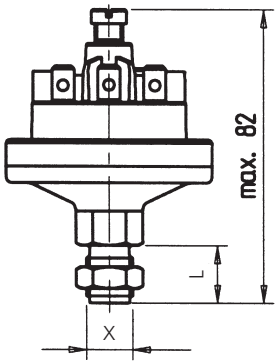
[1] Other pressure ranges on request

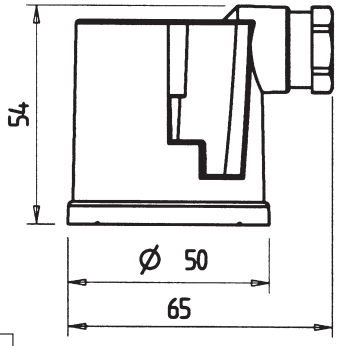
[2] pt = test pressure

[3] Accessories supplied loose

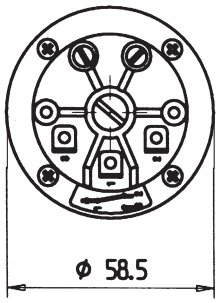
Dimensions in mm / Electrical connections

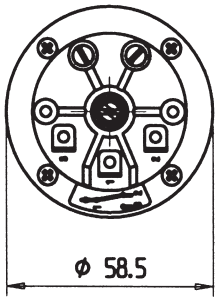


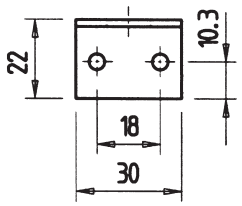


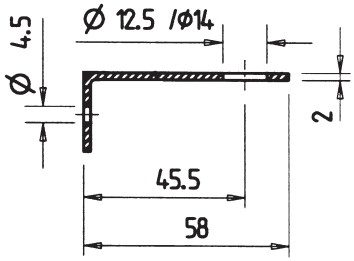


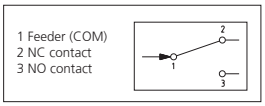
X	L
G ¼	16
G ⅛	16
M12X1	14

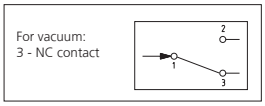






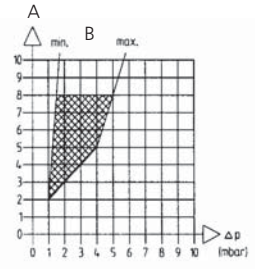




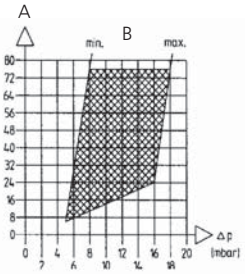


Setting ranges

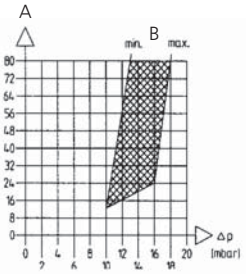
2 ... 8 mbar



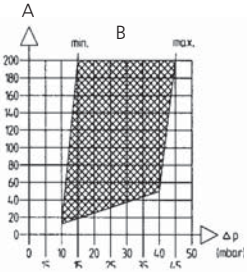
6 ... 75 mbar



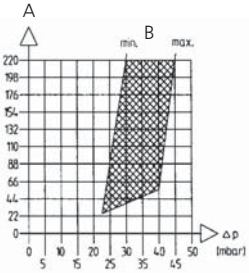
12.5 ... 80 mbar



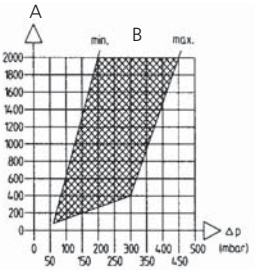
12.5 ... 200 mbar



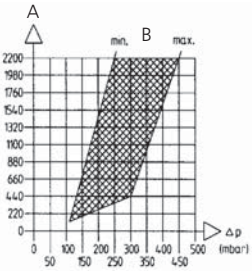
25 ... 220 mbar



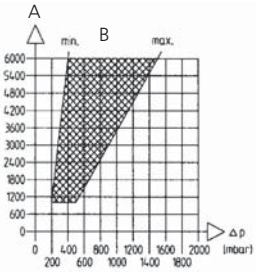
80 ... 2000 mbar



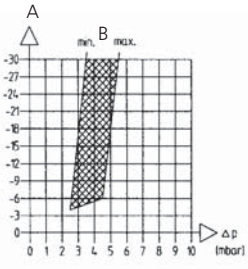
120 ... 2200 mbar



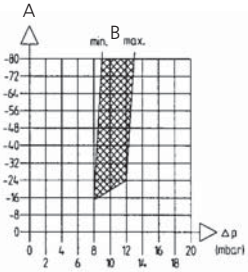
1000 ... 6000 mbar



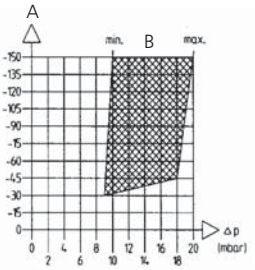
– 4 ... – 30 mbar



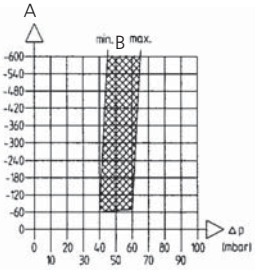
– 15 ... – 80 mbar



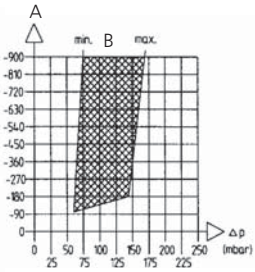
– 30 ... – 150 mbar



– 50 ... – 600 mbar



– 100 ... – 900 mbar



A Upper switching point (mbar)

B Distance between contacts

Relative and differential pressure switch type 630

Pressure range
6 ... 5500 mbar

Differential pressure, vacuum and overpressure switches of type series 630 are suitable for monitoring neutral and slightly aggressive liquids and gases. Switching element isolated from medium.
Ideal for use as flow monitor in sanitary piping/ heating installations or for level monitoring in general in process technology applications. Extremely rugged construction with high functionality due to10/20 bar safety margin in both pressure chambres.

- High overpressure safety margin at both connections (P1 + P2) up to 10/20 bar
- Funcionally simple, rugged mechanics with high operating reliability
- Also for slightly aggressive liquids and gases
- Repeatability up to < ± 0.4 mbar

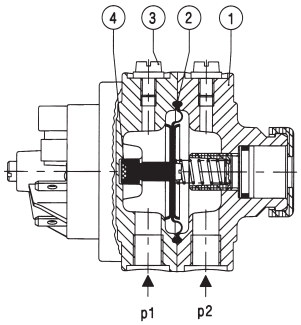
Technical overview

Pressure range		
Relative und differential		6 ... 5500 mbar
Operating conditions		
Medium		Liquids and neutral gases
Temperature	NBR-based	0 ... +80 °C
	FPM	-10 ... +80 °C
	EPDM	-10 ... +80 °C
	Q (Silicone)	-40 ... +80 °C
	Ambient	+65 °C
	Storage	-40 ... +80 °C
Tolerable overload (P1 > P2)	Pressure range ≤ 200 mbar	10 bar
	Pressure range > 200 mbar	20 bar
Lowest turn-on pressure		≥ 6 mbar
Smallest switching difference		≥ 3 mbar
Materials in contact with the medium		
Diaphragm		NBR based
		EPDM
		FPM
		Silicone
Case		Anodized aluminium
		Brass
		Brass chemically nickel plated
Other components		X14CrMoS17 1.4104
		X5CrNi18-10 1.4301
		X10CrNi18-8 1.4310
		Steel category A2 for screws
		Polyacetate-C, Polyamide

Contact material / Loading		
Nominal voltage, type of current		250 VAC
Nominal current for resistive loading		1 A
Nominal current for motor loading		0.5 A
Contact system		Changeover contact
Service life	Mechanically	10^6 switching cycles [1]
Protection standard		
Without cover		IP 00
With cover (PG11) [2]		IP 54
With cover (PG9) [3]		IP 65
Repeatability		
±5% of the switching point	with diaphragm NBR-based / silicone	minimum ±0.4 mbar
±10% of the switching point	with diaphragm FPM / EPDM	minimum ±0.8 mbar
Electrical connections		
Screw terminals (Option)		
Tab connectors (AMP) 6.3 mm		
Cable gland PG9 / PG11		with cover
Pressure connections		
Thread		G ⅛
Straight screwed connection	Zinc plated steel with NBR seal for pipe (Ø 6 mm)	G ⅛
Screwed Socket	CuZn nickel plated for tube (Ø 6 mm)	G ⅛
Mounting instructions		
For switching points calibrated in the factory		Indicate installation arrangement
In case of liquid media		Connections down

Remark: By changing the mounting position the switching points also change. The adjustment ranges are in relation with the mounting position.

Weight	
With aluminium base	~ 380 g
With base brass / nickel-plated brass	~ 1000 g
Packaging	
Single packaging in cardboard boxes	



Legend to cross-section drawing

1 Pressure case
2 Diaphragm
3 Vent
4 Permanent magnet
P1 Higher pressure / lower vacuum
P2 Lower pressure / higher vacuum

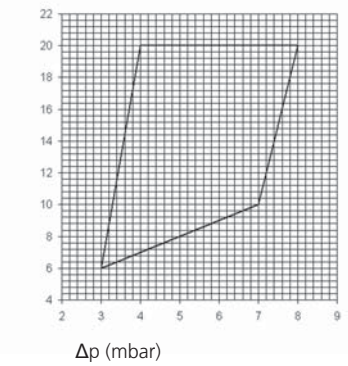
[1] Admissible switching difference has to be concidered [2] For installation arrangement electrical connections upward [3] With O-Ring

Order code selection table

			1	2	3	4	5	6	7
	630.		X	X	X	X	X	X	X
Presssure range [1]	6 ... 20 mbar		9	1					
	15 ... 60 mbar		9	2					
	40 ... 200 mbar		9	3					
	150 ... 1000 mbar		9	4					
	1 ... 3 bar		9	5					
	2 ... 5.5 bar		9	6					
Contact material	AgCdO				0				
Pressure case	Anodized aluminium, black					0			
	Brass					1			
	Nickelplated brass					2			
	Anodized aluminium, black	with straight screwed connection G1/8 for pipe ø 6 mm				3			
	Brass	with straight screwed connection G1/8 for pipe ø 6 mm				4			
	Nickel plated brass	with straight screwed connection G1/8 for pipe ø 6 mm				5			
	Anodized aluminium, black	with screwed socket G⅛ for tube ø 6 mm				6			
	Brass	with screwed socket G⅛ for tube ø 6 mm				7			
	Nickel-plated brass	with screwed socket G⅛ for tube ø 6 mm				8			
Diaphragm material	NBR						0		
	FPM						1		
	EPDM						2		
	Q (silicone)						3		
Cover PG9 on side / Bracket	Without cover	without bracket						0	
		with bracket type A						1	
		with bracket type B						2	
	With cover (plastic) (Fig.1) (PG11)	without bracket						3	
		with bracket type A						4	
		with bracket type B						5	
	With spec. cover (Fig.2) (PG9)	without bracket						6	
		with bracket type A						7	
		with bracket type B						8	
Switching points (optional)	Two factory set switching points	(please specify on order e.g.: W10/8mbar)							W
	One factory set switching point high	(please specify on order e.g.: R25mbar)							R
	One factory set switching point low	(please specify on order e.g.: U100mbar)							U

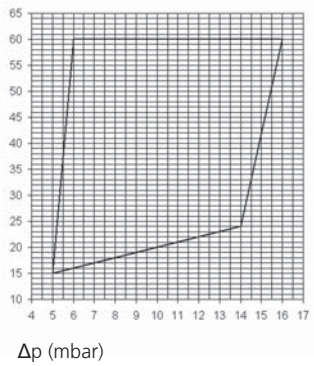
Setting ranges

6 ... 20 mbar



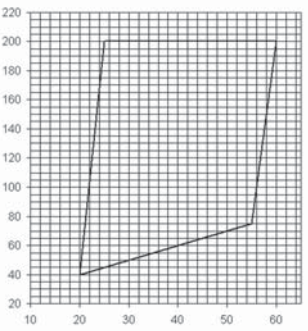
Δp (mbar)

15 ... 60 mbar



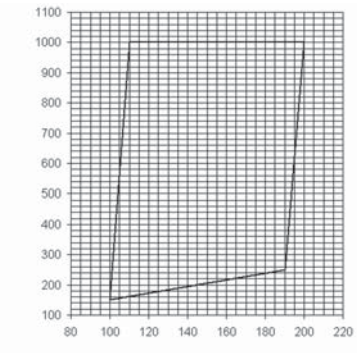
Δp (mbar)

40 ... 200 mbar



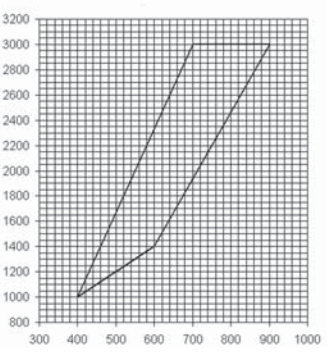
Δp (mbar)

150 ... 1000 mbar



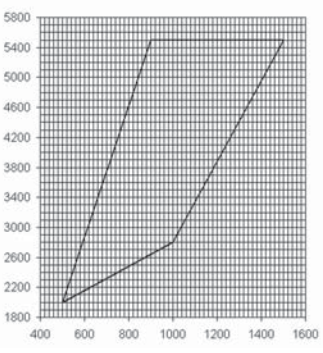
Δp (mbar)

1000 ... 3000 mbar (1... 3 bar)



Δp (mbar)

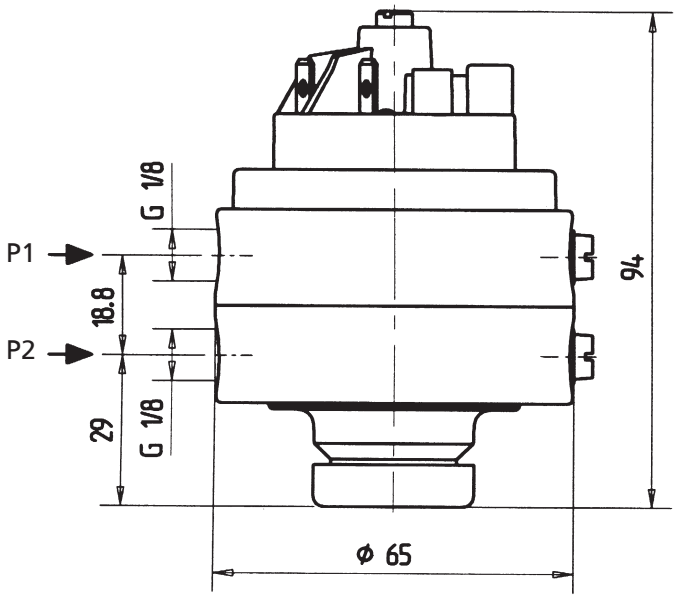
2000 ... 5500 mbar (2 ... 5.5 bar)



Δp (mbar)

[1] Other pressure range on request

Dimensions in mm / Electrical connections



1 Feeder (COM)
2 NO contact
3 NC contact

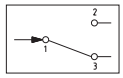


Fig. 1

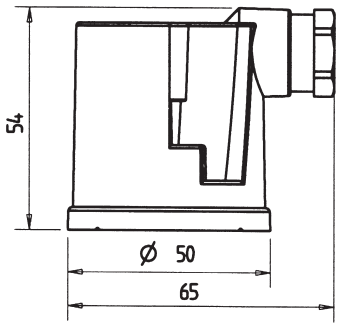
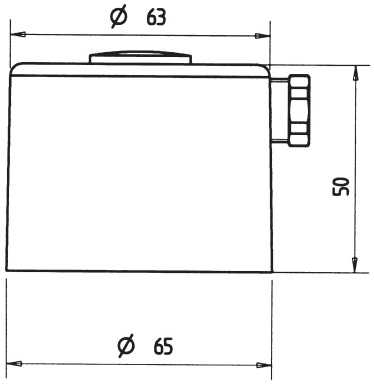
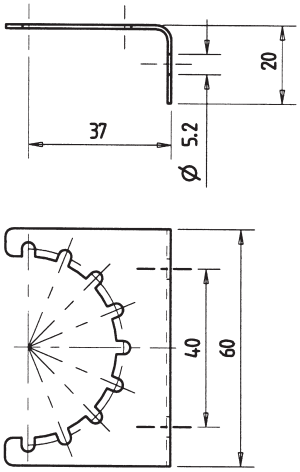


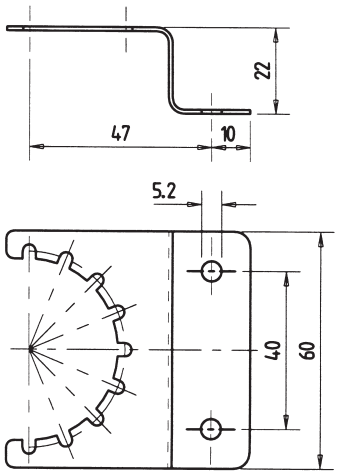
Fig. 2



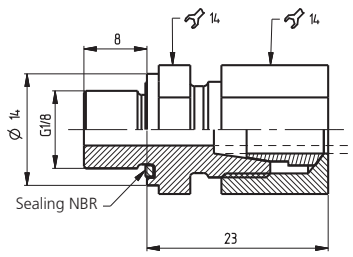
Type A



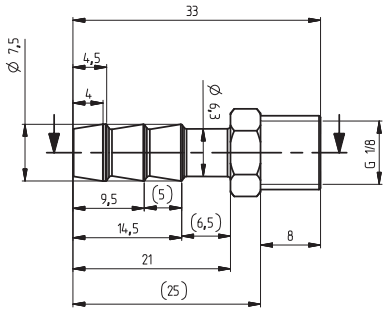
Type B



Straight screwed connector G ⅛



Screwed Socket G ⅛



OEM Relative pressure measuring cell 509

Pressure range
0 ... 2.5 – 250 bar

Type 509 pressure measuring cells are based on ceramic technology developed by Huba Control, and used for the last 15 years in millions of applications.
Due to the robust design of the ceramic cell there are no significant changes in the sensor characteristics when mounted by the customer.The pressure measuring cells are delivered either factory set or with TK zero point adjustment. You can choose between various versions including temperature measurement.

- Negligible temperature influence on accuracy
- No customer specific adjustment of zero point and temperature compensation necessary
- Easy mounting
- Overload secure up to rupture pressure

Technical Overview

Pressure range		
Relative		0 ... 2.5 – 250 bar
Operating conditions		
Medium		Liquids and neutral gases
Temperature	FPM	-15 ... +125 °C
	NBR	-25 ... +85 °C
	FPM spec.	-30 ... +150 °C
	Storage	-40 ... +130 °C
	in packaging	-40 ... +65 °C
Temperature influences in range -30 ... +125 °C	Zero point	max. ± 0.2% fs/10K with TC adjustment
		max. ± 1% fs/10K without TC adjustment
	Span	-0.12 ±0.1% fs/10K
Overload / Rupture pressure [1]	≤ 4 bar	3 x fs
	≥ 6 bar	2.5 x fs
Humidity protection		AHT, 20 days acc. DIN EN ISO 6270-2
Material in contact with the medium		
Sensor		Ceramic Al_2O_3 (96%)
Sealing material		FPM, NBR, FPM spec.
Electrical data		
Bridge impedance		10 kOhm ±20%
Power supply		3 ... 30 VDC
Insulation voltage		2000 VDC
ESD-handling		Necessary
Electromagnetic compatibility	The product is designed exclusively forinstallation in equipment. The customer is responsible for CE conformity.	
Dynamic response		
Response time		< 1 ms
Load cycle		< 100 Hz
Electrical connector		
Bondpads (AgPd) RAST 1.27		
Flexible connector RAST 2.54		Length 66 mm
		Length 28 mm
Pin connector		Length 9 mm
		Length 13 mm
Pin connector with temperature measuring (NTC 10kOhm ± 3%, ß = 3800 K ± 3%)		Length 9 mm
		Length 13 mm
Assembly / housing		
According to recommendation of Huba Control with special assembly instructions		
Weight		
~ 5 g		
Packaging (multiple)		
Cells with bondpads / Pin connector in covering box		5 Blister (96 pcs.) 480 pcs.
Cells with flexible connector in covering box		5 Blister (80 pcs.) 400 pcs.

Accuracy

Parameter		Unit	
Zero point		mV / V	0.2 ± 0.2
Span at nominal pressure		mV / V	2.5 ± 1.5
Resolution		% fs	0.1
Linearity (BFSC)	max.	% fs	± 0.3
Hysteresis and repeatability	max.	% fs	± 0.2
Long term stability acc. to DIN EN 60770		% fs	± 0.5

[1] Higher overload / higher rupture pressure on request

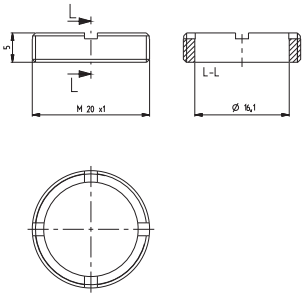
Order code selection table

			509.	1 X	2 X	3 X	4 X	5 X
Relative pressure	axial sealed			9				
	radial sealed			R				
Pressure range [1]	0 ... 2.5 bar				1	4		
	0 ... 4 bar				1	5		
	0 ... 6 bar				1	7		
	0 ... 10 bar				3	0		
	0 ... 16 bar				3	1		
	0 ... 25 bar				3	2		
	0 ... 40 bar				3	3		
	0 ... 60 bar				4	0		
	0 ... 100 bar			9	4	1		
	0 ... 160 bar			9	4	2		
	0 ... 250 bar			9	4	3		
	▲ Full scale signal at these pressure							
Adjustment	Factory adjusted only zero point and TC [2] zero point						1	
	Factory adjusted only zero point						2	
Electrical connection	Bondpads						1	G
	Flex connection	Length: 28mm					1	K
		Length: 66mm					1	L
	Pin connection	Length: 9mm					2	M
		Length: 13mm					2	N
	Pin connection with temperature measuring	Length: 9mm					2	O
		Length: 13mm					2	P

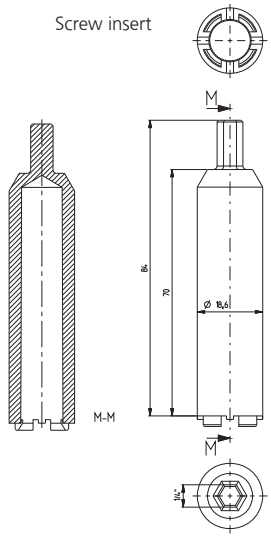
Accessories [3]

		Order number
O-ring FPM	≤ 60 bar	105598
O-ring NBR	≤ 60 bar	105145
O-ring FPM spec.	≤ 60 bar	109338
O-ring FPM	≥ 100 bar	105285
O-ring NBR	≥ 100 bar	104952
O-ring FPM spec.	≥ 100 bar	102321
Back-up ring teflon	≥ 100 bar	114660
Clam screw M20x1		112151
Screw insert for clamp screw		112187

Clamp screw

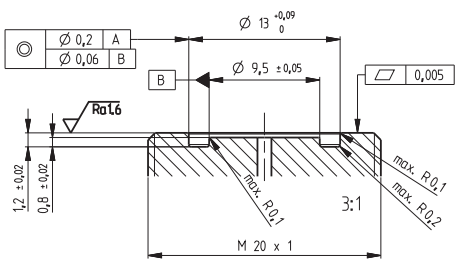


Screw insert

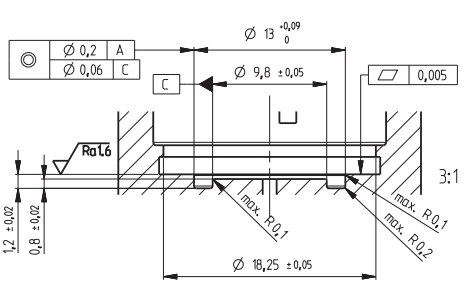


Recommended groove dimensions for o-ring Ø 10 x 1.5

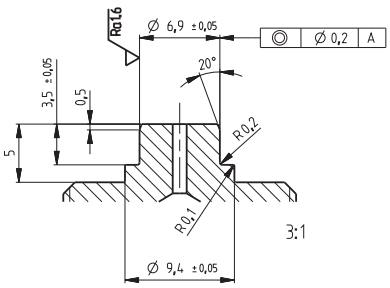
Mounting axial seal at front of unit



Mounting axial sealedat back of unit



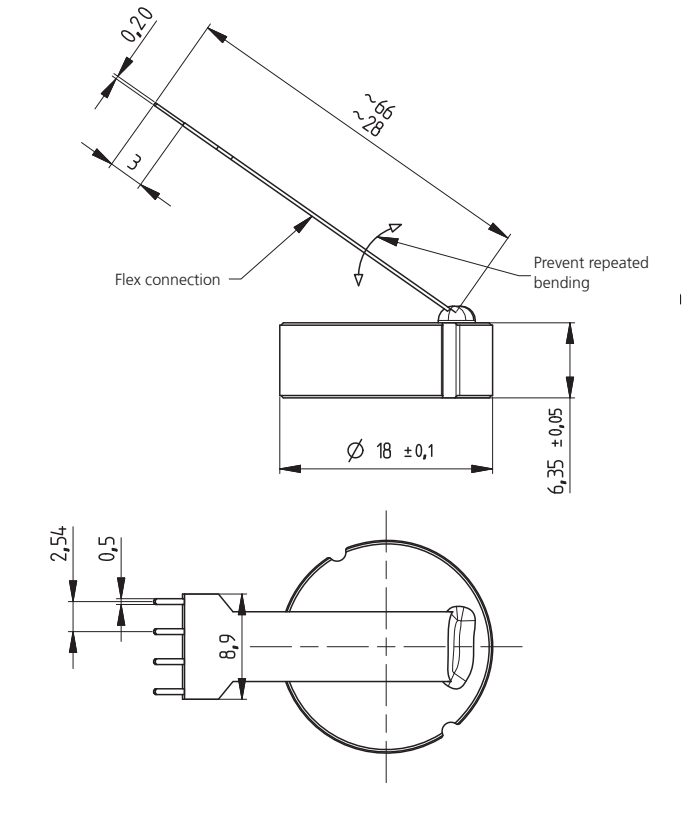
Mounting radial seal



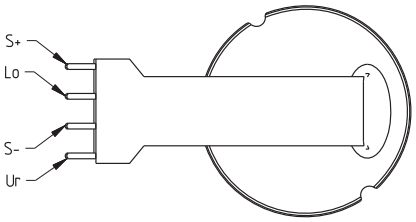
[1] Other pressure range on request
[2] TC = Temperature coefficient
[3] Accessories supplied loose

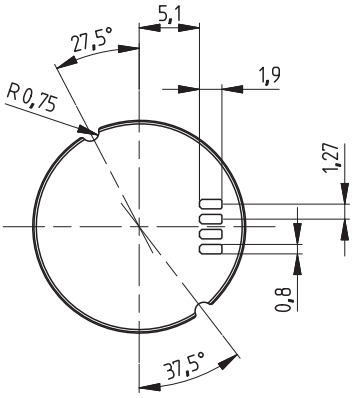
Dimensions in mm / Elecrtical connections

Flex connection

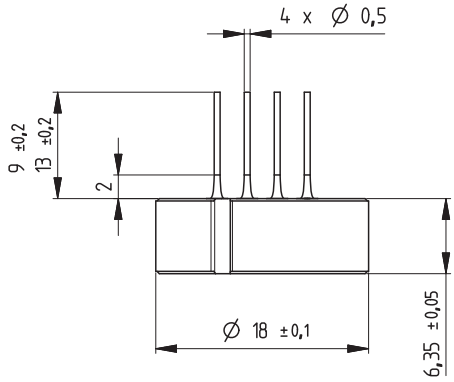


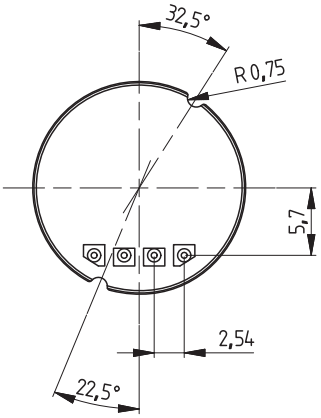
Bondpads

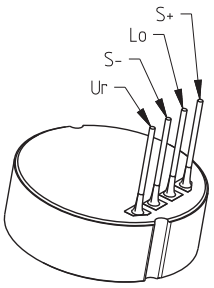




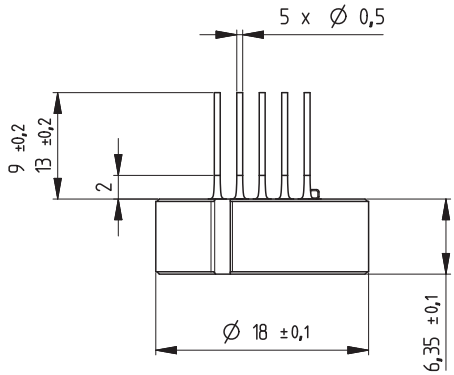
Pin connection 4 Pins

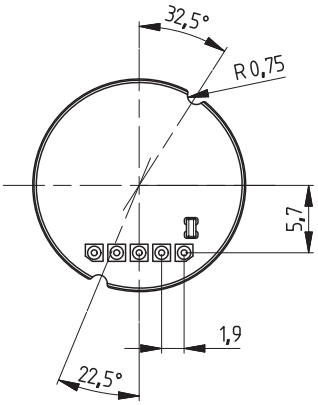


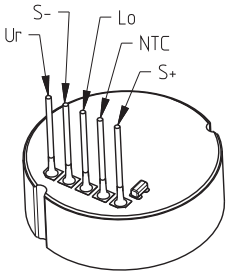




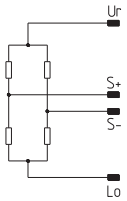
Pin connection 5 Pins with temperature measuring



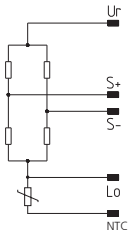




without NTC

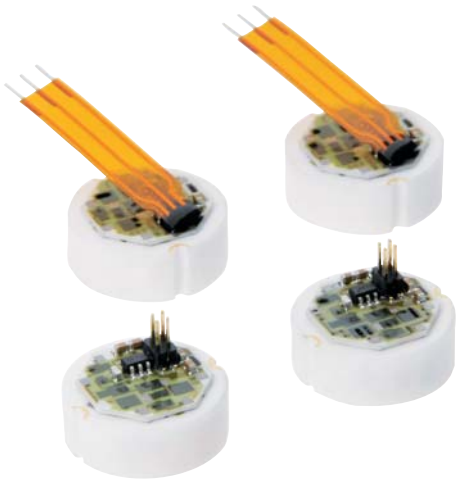


with NTC



OEM Relative and absolute pressure measuring cell type 513

Pressure range
-1 ... 0 – 600 bar



Type 513 pressure measuring cells have an adjusted, amplified sensor signal. They are especially suitable for high volume OEM applications.

The unique integrated electronics allow installation without the need for temperature and pressure adjustment by the customer.

- Integrated amplifier electronics
- No customer specific adjustment necessary
- Excellent EMC capacity by reinforcement on measuring cell
- Easy and quick fitting
- Negligible temperature influence on accuracy

Technical overview

Pressure range [1]		
Relative		-1 ... 0 – 600 bar
Absolute		0 ... 1 – 25 bar

Operating conditions		
Medium		Liquids and gases
Temperature	FPM	-15 ... +125 °C
	NBR	-25 ... +85 °C
	FPM spec.	-30 ... +150 °C
	Storage	-40 ... +130 °C
	in packaging	-40 ... +65 °C
Temperature influences at range -30 ... +125 °C	TC-zero point [2]	max. ± 0.15% fs/10K
	TC-full scale [2]	max. ± 0.15% fs/10K
Overload / rupture pressure [3]	≤ 4 bar	3 x fs
	> 4 bar	2.5 x fs
	> 60 bar	2.0 x fs
Humidity protection (optional)		KFW, 20 days acc. DIN 50017

Material in contact with the medium	
Measuring cell	Ceramic Al_2O_3 (96%)
Sealing material	FPM, NBR, FPM spec.

Electrical overview		
Output	with full scale adjustment	ratiom. 10 ... 90%
	without full scale adjustment	ratiom. 10 ... 60% ±1.2 V
Power supply		5 VDC ±5%
Load		> 10 kOhm / < 100 nF
Current consumption	At nominal pressure without load	< 4 mA
ESD-handling		Necessary
Electromagnetic compatibility	The product ist designed exclusively for installation in equipment which complies with EU directives. The customer is responsible for CE conformity.	

Dynamic response	
Response time	< 2 ms, typ. 1 ms
Load cycle	< 100 Hz

Electrical connections
Connector RAST 1.27
Flex connection RAST 2.54

Installation arrangement
According to recommendation of Huba Control with special assembly instructions

Weight
~ 5 g

Packaging (multi packaging)		
With connector in covering box	5 Blisters 96 pcs each	(= 480 pcs)
With flex connection in covering box	5 Blisters 80 pcs each	(= 400 pcs)

Accuracy

Parameter	Unit	
Tolerance zero point with full scale adjustment	% fs	± 0.5
Tolerance full scale with full scale adjustment	% fs	± 0.5
Tolerance zero point without full scale adjustment	V	0.5 ± 0.02
Tolerance full scale without full scale adjustment	V	3.0 ± 1.2
Resolution	% fs	0.1
Total of linearity, hysteresis and repeatability max.	% fs	± 0.3
Barometric sensor max.	% fs/10K	± 0.5
Long term stability acc. to DIN EN 60770	% fs	± 0.5

[1] Other pressure ranges on request
[2] TC = Temperature coefficient
[3] Higher overload / higher rupture pressure on request

Order code selection table

513.

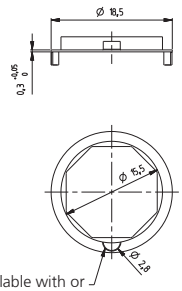
				1	2	3	4	5	6
				X	X	X	X	X	X
Pressure mode	Relative			9					
	Absolute (≤ 60 bar)			8					
Pressure range	-1 ... 0 bar			9	0	0			
	0.8 ... 1.4 bar	barometric sensor		8	1	0			
	0 ... 1 bar				1	1			
	0 ... 1.6 bar				1	2			
	0 ... 2.5 bar				1	4			
	0 ... 4 bar				1	5			
	0 ... 6 bar				1	7			
	0 ... 10 bar				3	0			
	0 ... 16 bar				3	1			
	0 ... 25 bar				3	2			
	0 ... 40 bar			9	3	3			
	0 ... 60 bar			9	4	0			
	0 ... 100 bar			9	4	1			
	0 ... 160 bar			9	4	2			
	0 ... 250 bar			9	4	3			
	0 ... 400 bar			9	5	4			
	0 ... 600 bar			9	5	5			
	▲ Full scale signal at these pressure								
Adjustment (Factory adjusted)	only zero point and full scale						0		
	only zero point			9			1		
Output / power supply	ratiom. 10 ... 90%	with connector	without humidity protection				0	4	
		with connector	with humidity protection				0	F	
		with flexible connector	without humidity protection				0	H	
		with flexible connector	with humidity protection				0	J	
	ratiom. 10 ... 60% ±1.2 V	with connector	without humidity protection	9			1	8	
		with connector	with humidity protection	9			1	G	
		with flexible connector	without humidity protection	9			1	I	
		with flexible connector	with humidity protection	9			1	K	
Pressure range variation (optional)	Indicate W and state range on order (e.g.: W0... + 5bar/OUT1...3.5V)						0		W

Accessories

Accessories supplied loose

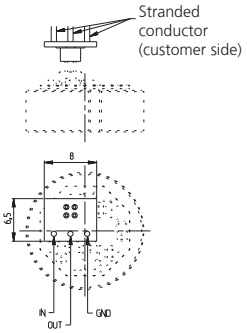
		Order number
O-ring FPM	≤ 60 bar	105598
O-ring NBR	≤ 60 bar	105145
O-ring FPM spec.	≤ 60 bar	109338
O-ring FPM	≥ 100 bar	105285
O-ring NBR	≥ 100 bar	104952
O-ring FPM spec.	≥ 100 bar	102321
Backup-ring	≥ 100 bar	114660
Positioning ring (PPS)	≤ 160 bar	107397
Positioning ring without cam (PPS)	≤ 160 bar	107926
Positioning ring (metal)	> 160 bar	107383
Connection print (connector couterpart)		109225
Clamping Screw M20x1		112151
Screw insert for Clamping Screw		112187

Positioning ring

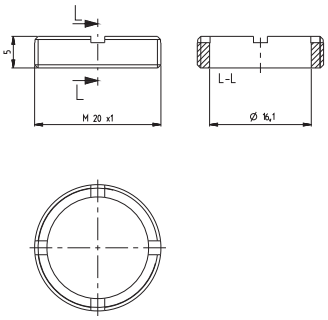


available with or without Positioning cam

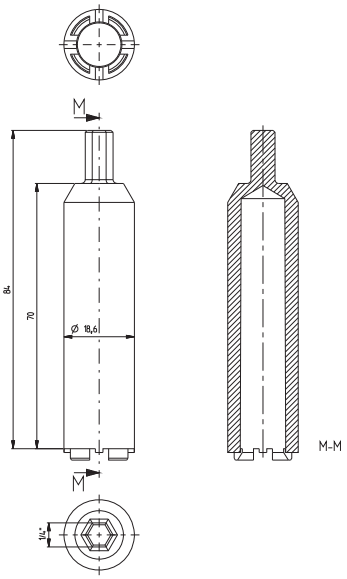
Connection print



Clamping Screw

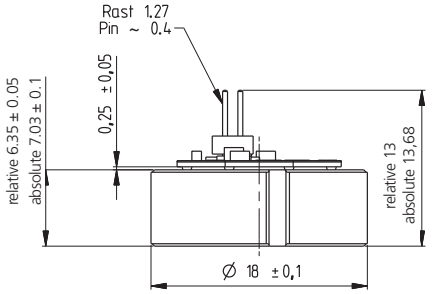


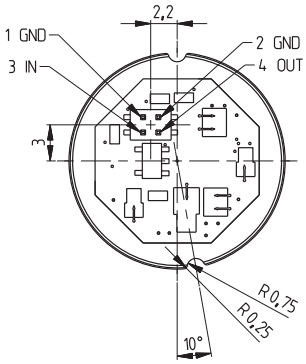
Screw insert



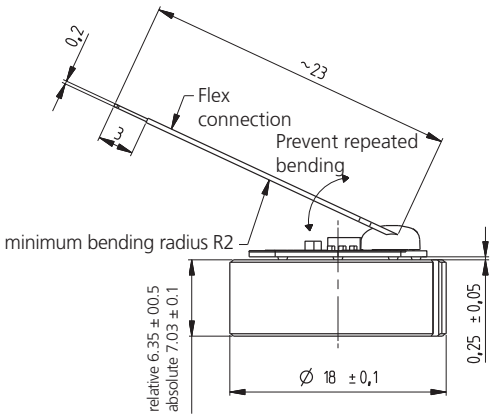
Dimensions in mm / Electrical connections

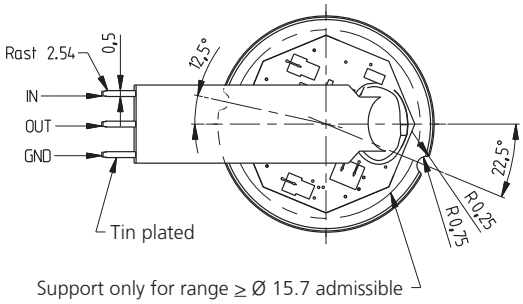
Connection with connector

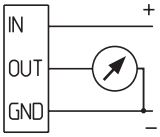




Connetions with flex cable







OEM Absolute pressure measuring cell type 513 barometric sensor

Pressure range
0.8 ... 1.4 bar

This pressure measuring cell, barometric adjusted with protection case is suitable for plug mounting on PCB. The output signal is linear, temperature compensated and amplified. The robust construction guarantees a long term stable measuring result.

- Integrated amplifier electronics
- No customer specific adjustment necessary
- Excellent EMC capacity by reinforcement on measuring cell
- Easy and quick fitting
- Plastic case for direct mounting

Technical overview — Order number 513.B1024

Pressure range

Absolute	0.8 ... 1.4 bar

Operating conditions

Medium		Air and neutral gases
Temperature	Medium / ambient	-25 ... +85 °C
	Storage without packaging	-40 ... +130 °C
	Storage in packaging	-40 ... +65 °C
Temperature influences at range -30 ... +125 °C	TC-zero point [1]	max. ±0.15% fs/10K
	TC-full scale [1]	max. ±0.15% fs/10K
Overload / rupture pressure		3 x fs

Material in contact with the medium

Measuring cell	Ceramic Al_2O_3 (96%)
Case	PC (Polycarbonat)

Electrical overview

Output	Power supply	Load	Current consumption
ratiom. 10 ... 90%	5 VDC ±5%	> 10 kOhm / < 100 nF	< 4 mA
Adjustment			Factory adjustment zero point and full scale
Electromagnetic compatibility	The product is designed exclusively for installation in equipment which complies with EU directives. The customer is responsible for CE conformity.		

Dynamic response

Response time	< 2 ms, typ. 1 ms
Load cycle	< 100 Hz

Electrical connections

Connector RAST 1.27

Installation arrangement

Unrestricted

Weight

7 g

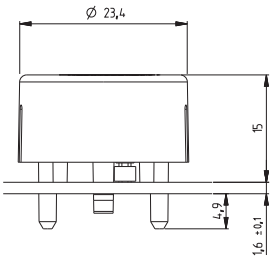
Packaging (multi packaging)

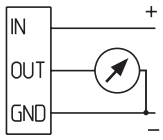
In covering box 4 Blisters 35 pcs each	140 pcs

Accuracy

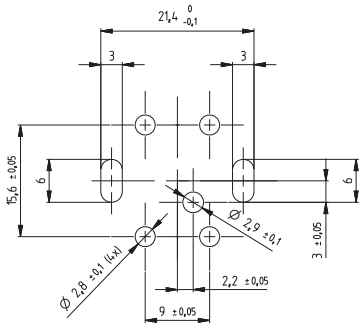
Parameter	Unit	
Tolerance zero point with full scale adjustment	% fs	± 0.5
Tolerance full scale without full scale adjustment	% fs	± 0.5
Resolution	% fs	0.1
Total of linearity, hysteresis and repeatability max.	% fs	± 0.5
Long term stability acc. to DIN EN 60770	% fs	± 0.5

Dimensions in mm / Electrical connections

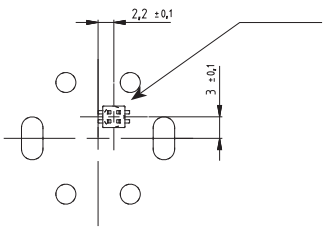




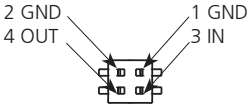
Drilling plan print:



Assembling material for socket



2x2 pin
supplier: Leonhardy GmbH
Article Number: 57-C63.020021



[1] TC = Temperature coefficient

OEM Flow sensor type 200 for liquid media

Flow range
0.5 ... 150 l/min

Nominal diameters
DN 6 / 8 / 10 / 15 / 20 / 25

Temperature measurement
-40 ... +125 °C

The flow sensor type 200 is based on the Kármán vortex trail. Vortex trail principle and is available in various options with and without temperature measurement. With no moving parts the flow sensor is not sensitive to debris, has marginal pressure loss and high accuracy.

- Low cost product with high levels of accuracy
- Temperature non-sensitive measuring principle
- Excellent media resistance (measuring element not in contact with the media)
- Wide application temperature range
- Marginal loss of pressure
- Measuring element not sensitive to debris
- Direct temperature measurement in the medium with PT1000 or NTC
- Drinking water approval KTW, W270, WRAS, ACS

Technical overview

Flow measurement

Measuring principle		Vortex	Piezoelectric sensor element
Measuring range			0.5 ... 150 l/min
Nominal diameters			DN 6 / 8 / 10 / 15 / 20 / 25
Accuracy at < 50% fs (water)			< 1% fs
Accuracy at > 50% fs (water)			< 2% measuring value
Response time	Immediately Therefore suitable for spigot use.	Signal delay Response time	< 100 ms < 5 ms

Temperature measurement (≥ DN 8)

Measuring principle	Resistance			PT1000 NTC
PT1000	Measuring range			-40 ... +125 °C
	Accuracy	Class B DIN EN 60751	@ T = 0 °C @ T ≠ 0 °C	± 0.3 K ± 0.3 K ± 0.005 * T
NTC	Measuring range			-40 ... +125 °C
	Accuracy	NTC 10 kOhm @ 25 °C β = 4050	@ T = +25 °C @ T < +25 °C @ T > +25 °C	± 0.7 K ± 0.7 K ± 0.025 * T ± 0.7 K ± 0.050 * T
Temperature influences		Self-heating at temperature sensor Conduction resistance to connector		1 K/mW 0.8 Ohm

Operating conditions

Medium	Suitable for heating circuit water with the usual additives Drinking water		Other medium on request
Temperature		Media Ambient Storage	< +125 °C -15 ... +85 °C -30 ... +85 °C
Max pressure and medium temperature		(for lifetime) (for lifetime) (for 600 hours) (for 2 hours) (max. test pressure)	12 bar at +40 °C 6 bar at +100 °C 4 bar at +125 °C 4 bar at +140 °C 18 bar at +40 °C
Cavitation	The following equation is valid to prevent cavitation:		$P_{abs\_oulet} / P_{difference} > 5.5$

Materials in contact with medium (FDA-conform)

Sensor paddle	ETFE
Case with damming body	PA6T/6I (40% GF)
Sealing material	FPM EPDM (perox.)

Electrical overview

Power supply		U_{IN}	5 VDC ±5%
Output flow (Q)	Frequency Square pulse signal	$U_{OUT\_Q\_Frequency}$	< 0.1 ... > 4.75 V
Output temperature (T)	Resistant signal	$R_{OUT\ PT1000}$ $R_{OUT\ NTC}$	PT1000 class B DIN EN 60751 NTC 10 kOhm @ 25 °C; β = 4050
Electrical connection and protection class	Connector RAST 2.5 / 2.54 Connector M12x1		IP 20 IP 65
Load against GND or IN			> 10 kOhm / < 10 nF
Current consumption I_{IN} load free		standard raised noise resistant	< 6 mA < 10 mA

Weight

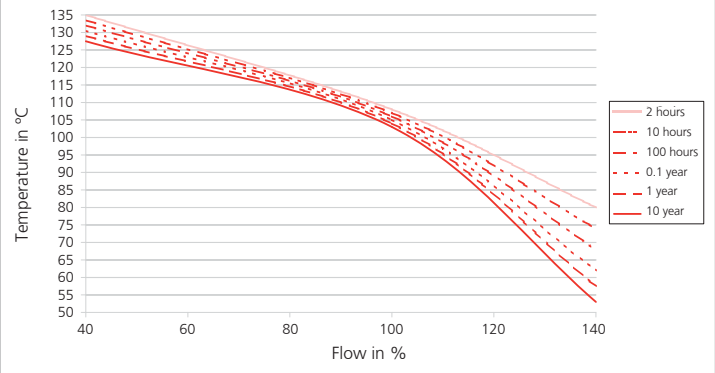
DN 6 / 8	~ 47 g
DN 10	~ 57 g
DN 15	~ 68 g
DN 20	~ 92 g
DN 25	~ 100 g

Test / Admissions

Electromagnetic compatibility	acc. to EN 61326-2-3 (no protection at surge)
Drinking water approval	WRAS Plastic parts with KTW and W270 approval ACS

Packaging (multiple packaging)	Connection copper tube	Outside thread K	Outside thread G
DN 6	–	Blister 30x	Blister 30x
DN 8 / 10	Blister 30x	Blister 30x	Blister 30x
DN 15	Blister 30x	Blister 30x	Blister 20x
DN 20	Blister 20x	Blister 20x	Blister 15x
DN25	–	Blister 15x	Blister 15x

Minimum life span on high flow rate and high temperature



Nominal diameters dependent variables

Nominal diameters	Tube connection	Measuring range	Quantity per pulse @ 50% fs	Flow rate	Frequency range	Q_0	K_f	Pressure drop [1), 2)]
DN 6	K	0.5 ... 10 l/min	0.386 ml	0.074 ... 1.474 m/s	27 ... 426 Hz	-0.14	0.0238	240 * Q^2
	G							
DN 8	K	0.9 ... 15 l/min	0.638 ml	0.133 ... 2.210 m/s	30 ... 384 Hz	-0.3	0.0398	85.00 * Q^2
	G		0.631 ml		30 ... 388 Hz		0.0394	
	N		0.614 ml		31 ... 399 Hz		0.0383	
DN 10	K	1.8 ... 32 l/min	1.399 ml	0.265 ... 4.716 m/s	24 ... 379 Hz	-0.2	0.0850	22.50 * Q^2
	G		1.370 ml		24 ... 387 Hz		0.0832	
	N		1.384 ml		24 ... 383 Hz		0.0841	
DN 10	K	2.0 ... 40 l/min	1.403 ml	0.295 ... 5.895 m/s	26 ... 473 Hz	-0.2	0.0850	22.50 * Q^2
	G		1.373 ml		26 ... 483 Hz		0.0832	
	N		1.388 ml		26 ... 478 Hz		0.0841	
DN 15	K	3.5 ... 50 l/min	3.047 ml	0.290 ... 4.145 m/s	20 ... 272 Hz	-0.2	0.1843	6.70* Q^2
	G		3.016 ml		20 ... 275 Hz		0.1824	
	N		3.077 ml		20 ... 270 Hz		0.1861	
DN 20	K	5.0 ... 85 l/min	6.213 ml	0.265 ... 4.509 m/s	14 ... 227 Hz	-0.3	0.3757	2.50 * Q^2
	G		6.125 ml		14 ... 230 Hz		0.3701	
	N		6.208 ml		14 ... 227 Hz		0.3751	
DN 25	K	9.0 ... 150 l/min	12.412 ml	0.283 ... 4.709 m/s	12 ... 201 Hz	-0.2	0.7467	0.92 * Q^2
	G		12.251 ml		12 ... 204 Hz		0.7370	

Characteristic line formula frequency output

$$Q_v = K_f * f + Q_0$$

Formula quantity per pulse [litres/pulse]

$$\frac{\text{quantity}}{\text{pulse}} = \frac{Q_v * K_f}{60 * (Q_v - Q_0)}$$

(Influence of viscosity for media other than water - see page 8)

Legend

Q_v	Volume flow rate	[l/min]
Q_0	Axis intercept	[l/min]
K_f	Coefficient frequency output	[(l/min) / f]
f	Frequency	[Hz]
$\frac{\text{quantity}}{\text{pulse}}$	Quantity per pulse	$\frac{\text{litres}}{\text{pulse}}$

[1)] incl. 3xDi inlet and outlet side

[2)] Pv in Pa; Q in l/min

Order code selection table

200.

						1	2	3	4	5	6	7
Version	Flow					9						
	Flow and temperature (PT1000)					8			1			
	Flow and temperature (NTC)					7			1			
Nominal diameters / flow range	DN 6	0.5 ... 10 l/min.				9	0	6	1			K,G
	DN 8	0.9 ... 15 l/min.				0	8	1				
	DN 10	1.8 ... 32 l/min.					1	0				
	DN 10	2.0 ... 40 l/min.					1	1				
	DN 15	3.5 ... 50 l/min.					1	5				
	DN 20	5.0 ... 85 l/min.					2	0				
	DN 25	9.0 ... 150 l/min.					2	5				K,G
Output / power supply	Frequency output, 0 ... 5 VDC (Square pulse signal)			5 VDC	standard	9			0			
	Frequency output, 0 ... 5 VDC (Square pulse signal)			5 VDC	raised noise resistant				1			
Electrical connection	3-pole connector	RAST 2.5				9				0		
	2x3-pole connector	RAST 2.5				7,8			1	1		
	3-pole connector	RAST 2.5	(condensation protection)			9				2		
	2x3-pole connector	RAST 2.5	(condensation protection)			7,8			1	3		
	3-pole circular connector	M12x1	(condensation protection)			9			1	4		
	5-pole circular connector	M12x1	(condensation protection)			7,8			1	5		
Sealing material	EPDM	Ethylene propylene rubber (peroxidically cross-linked)									1	
	FPM [1]	Fluoro elastomer									2	
Tube connection	Plastic PA6T/6I	connection copper tube (max. DN 20)										N
		outside thread K (see dimension diagram)										K
		outside thread G (see dimension diagram)										G

Accessories [2]

					Order number
Connection kit [3] DN 8, 10 with copper tube					113775
Connection kit [3] DN 8, 10 with adapter Rp ⅜		Stainless steel 1.4305/AISI 303			113776
Connection kit [3] DN 15 with copper tube					113777
Connection kit [3] DN 15 with adapter Rp ½		Stainless steel 1.4305/AISI 303			113778
Connection kit [3] DN 20 with copper tube					113779
Connection kit [3] DN 20 with adapter Rp ¾		Stainless steel 1.4305/AISI 303			113780
Connector RAST 2.5 with cable		3-pole	30 cm		111668
Connector RAST 2.5 with cable		3-pole	110 cm		101817
Straight-wire box for connector M12x1 with cable		3-pole	200 cm		114605
Corner-wire box for connector M12x1 with cable		3-pole	200 cm		114604
Connector RAST 2.54 with cable		2x3 pole	110 cm	(with temperature)	114629
Straight-wire box for connector M12x1 with cable		5-pole	200 cm	(with temperature)	114564
Corner-wire box for connector M12x1 with cable		5-pole	200 cm	(with temperature)	114563
Straight-wire box for connector M12x1 screwing terminal		5-pole			115024
Clip for DN 8,10					112116
Clip for DN 15					110941
Clip for DN 20					112122
O-Ring for DN 8, DN 10	EPDM	ø 13.95 x 2.62	Copper tube and adapter		112124
O-Ring for DN 15	EPDM	ø 17.86 x 2.62	Copper tube and adapter		112265
O-Ring for DN 20	EPDM	ø 21.89 x 2.62	Copper tube and adapter		112723
O-Ring for DN 25	EPDM	ø 31 x 3	(as a replacement, already assembled)		112792
Connection copper tube for DN 8, 10	L=150 mm				112121
Connection copper tube for DN 15	L=150 mm				112211
Connection copper tube for DN 20	L=150 mm				112306
Adapter for DN 8 und DN 10	Rp ⅜	Stainless steel 1.4305/AISI 303			112655
Adapter for DN 15	Rp ½	Stainless steel 1.4305/AISI 303			112660
Adapter for DN 20	Rp ¾	Stainless steel 1.4305/AISI 303			112661

AMP connector [4]	Manufacturers order number		Colour	for flexible wire
	3-829868-3	grey	7 x 0.20 mm = 0.22 mm²	
			12 x 0.20 mm = 0.35 mm²	
	1-966194-3	beige	7 x 0.25 mm = 0.35 mm²	

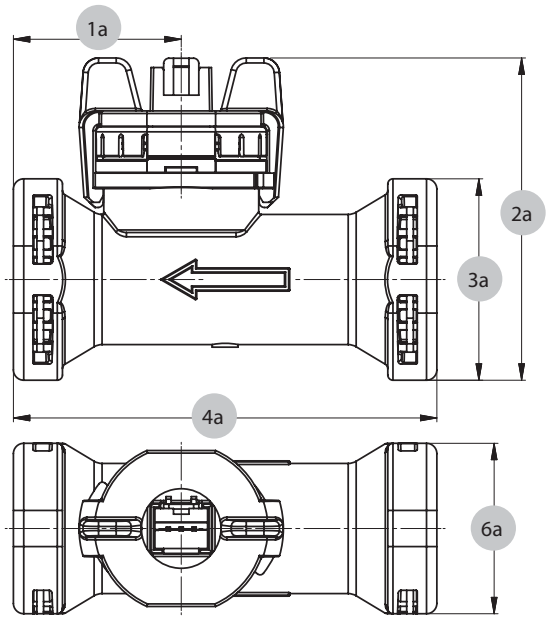
[1] No drinking water approval

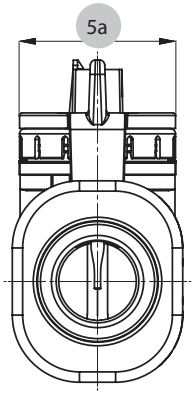
[2] Accessories supplied loose

[3] Connection set includes: 2x Clip, 2x Copper tube or Adapter and 2x O-Ring

[4] To order seperately directly from the manufacturer. Find further information in the manufacturers specification no. 114 18049

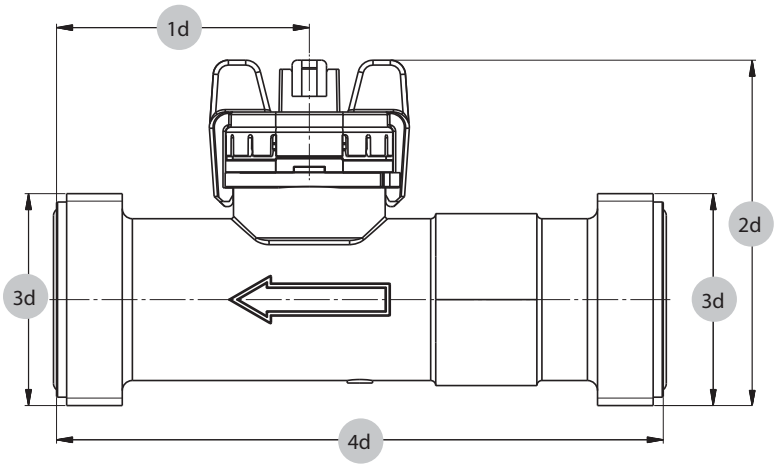
Dimension diagram DN 8, 10, 15, 20

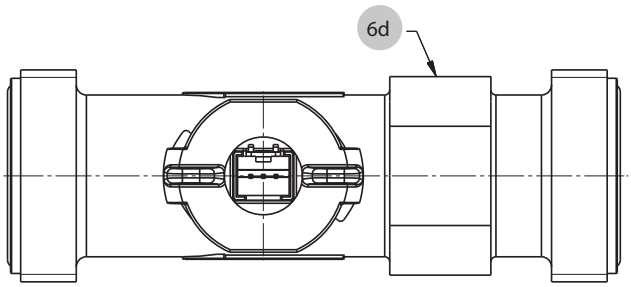


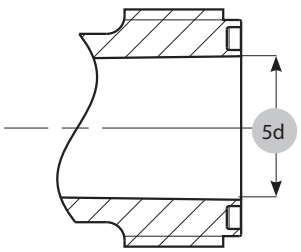


	1a	2a	3a	4a	5a	6a
DN8	29.5	59.0	32.9	72	30.2	28.9
DN10	32.5	57.3	32.9	77	30.2	28.9
DN15	32.5	62.4	39.0	82	30.2	33.0
DN20	39.3	66.3	43.0	105	30.2	37.4

Dimension diagram DN 6, 8, 10, 15, 20, 25

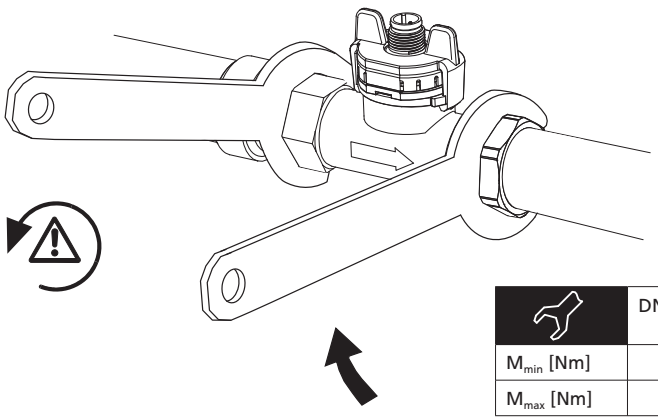






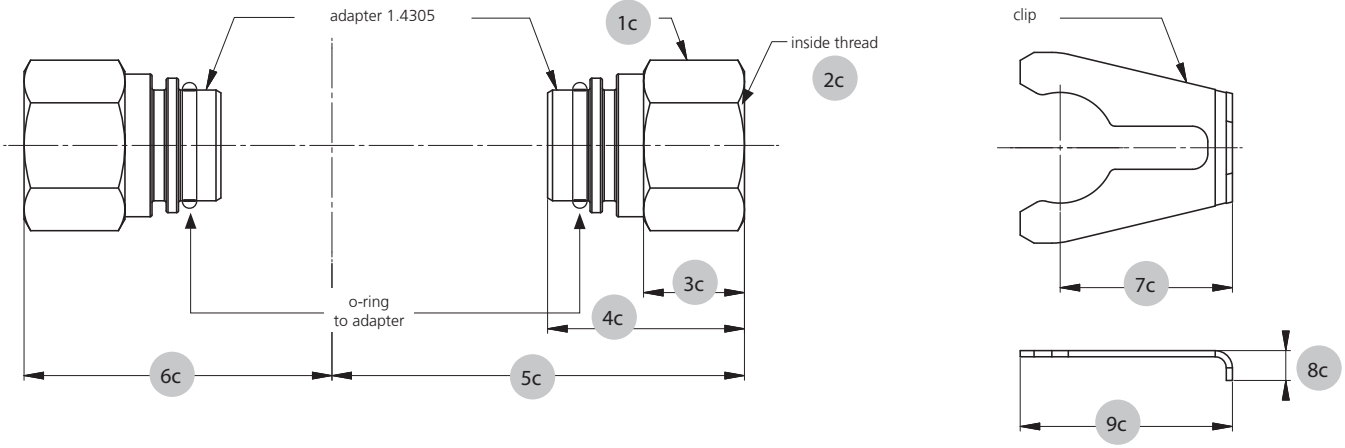
		1d	2d	3d	4d	5d	6d
DN6	K	43.7	53.0	G ½	77	11.5	12
DN6	G	48.2	55.7	G ¾	86	11.5	12
DN8	K	43.7	53.0	G ½	77	11.5	12
DN8	G	48.2	55.7	G ¾	86	11.5	12
DN10	K	35.0	51.3	G ½	81	11.5	19
DN10	G	39.5	54.1	G ¾	90	11.5	19
DN15	K	36.6	56.1	G ¾	87	16	22
DN15	G	41.6	59.5	G 1	97	16	22
DN20	K	36.6	61.5	G 1	105	20	27
DN20	G	42.6	65.8	G 1¼	117	20	27
DN25	K	50.0	68.3	G 1¼	120	26	34
DN25	G	56.0	71.3	G 1½	132	26	34

Admissible locking torque



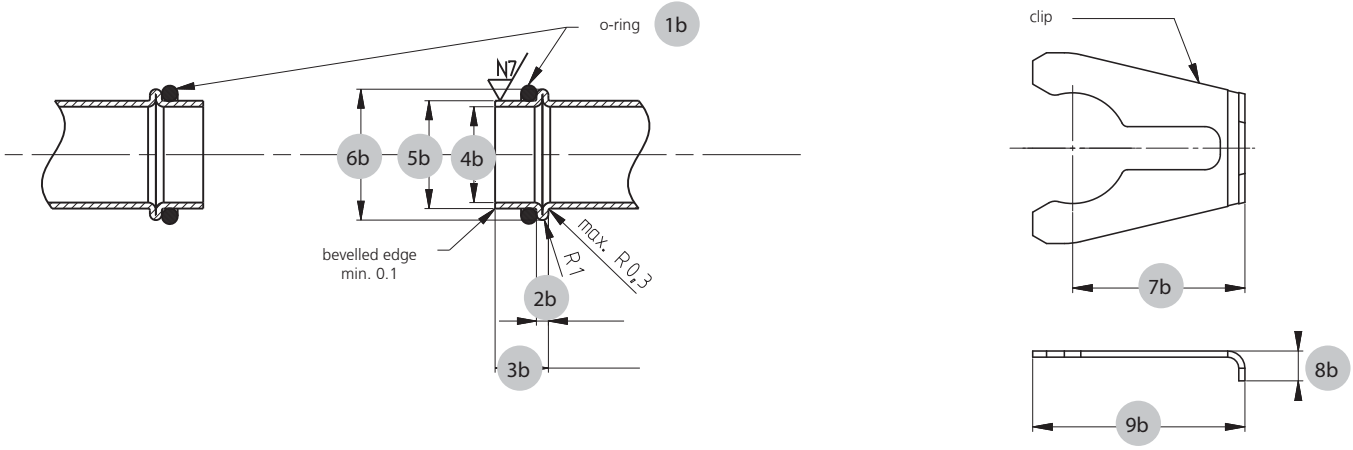
	DN6/8/10 G ½	DN6/8/10 G ¾	DN15 G ¾	DN15 G1	DN20 G1	DN20 G1 ¼	DN25 G1 ¼	DN25 G1 ½
M_{min} [Nm]	1	1	1	2	2	2.5	2.5	2.5
M_{max} [Nm]	12	12	12	12	12	15	15	15

Accessories DN 8, 10, 15, 20



	1c	2c	3c	4c	5c	6c	7c	8c	9c
DN8	22	Rp ⅜ EN 10226 lenght min. 9	14.0	29	57.65	44.65	24.5	6.00	30.8
DN10	22	Rp ⅜ EN 10226 lenght min. 9	14.0	29	59.65	47.55	24.5	6.00	30.8
DN15	24	Rp ½ EN 10226 length min. 11.5	16.4	32	67.05	50.05	28.0	7.30	34.5
DN20	30	Rp ¾ EN 10226 lenght min. 13	18.5	38	82.25	58.85	28.0	8.00	34.5

Geometry of customers connection tube DN 8, 10, 15, 20

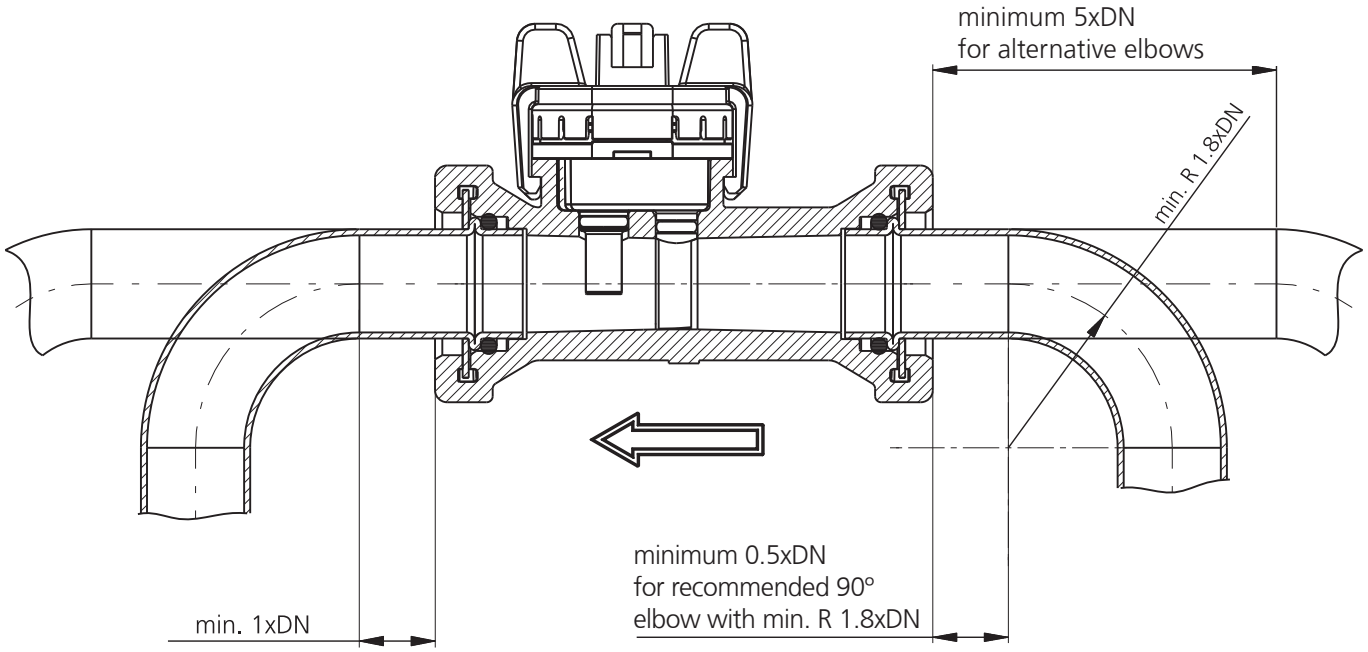


	1b	2b	3b	4b	5b	6b	7b	8b	9b
DN8	ø 13.95x2.62	2 ± 0.2	8.9 ± 0.2	ø 13 ± 0.2	ø 15.00 ± 0.08	ø 18.88 ± 0.1	24.5	6.00	30.8
DN10	ø 13.95x2.62	2 ± 0.2	8.9 ± 0.2	ø 13 ±0.2	ø 15.00 ± 0.08	ø 18.88 ± 0.1	24.5	6.00	30.8
DN15	ø 17.86x2.62	2 ± 0.2	8.9 ± 0.3	ø 16 ± 0.2	ø 18.00 $^{+0.08}_{-0.06}$	ø 21.85 ± 0.1	28.0	7.30	34.5
DN20	ø 21.89x2.62	2 ± 0.2	12.9 ± 0.3	ø 20 ± 0.2	ø 22.00 $^{+0.08}_{-0.06}$	ø 25.85 ± 0.1	28.0	8.00	34.5

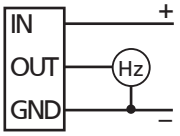
Tube mounting instructions

Consider the following to ensure the correct function of the sensor.

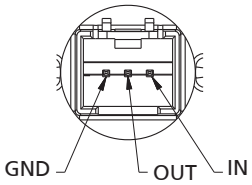
- Only diameter changes from large to small are allowed.
- Avoid repeated elbows in the same level at entryside

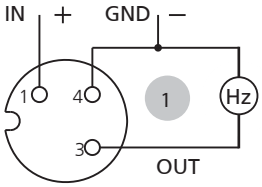


Electrical connections

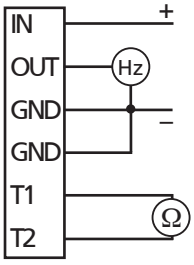


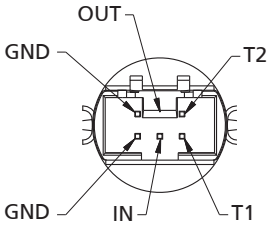
RAST 2.5 without temperature output



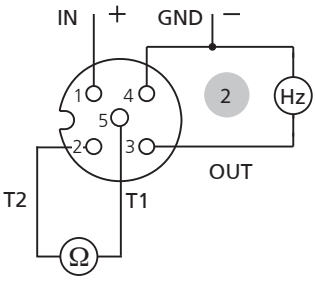


Connector M12x1 without temperature output





Connector 2x3-poles with temperature output



Connector M12x1 with temperature output

Pin		Colour
1	1	brown
3		blue
4		black
1	2	brown
2		white
3		blue
4		black
5		gray

Flow sensor type 210 for liquid media

Flow range
0.5 ... 150 l/min

Nominal diameters
DN 6 / 8 / 10 / 15 / 20 / 25

Temperature measurement
-40 ... +125 °C

In comparison to the OEM flow sensor (type 200), the type 210 is available with an increased range of power supply and output signals all with and without temperature measurement. With no moving parts the flow sensor is not sensitive to debris, has marginal pressure loss and high accuracy.

- Flow measuring with voltage, current or frequency output
- Temperature non-sensitive measuring principle
- Excellent media resistance (measuring element not in contact with the media)
- CE conformity
- Wide application temperature range
- Marginal loss of pressure
- Measuring element not sensitive to debris
- Direct temperature measurement in the medium
- Drinking water approval
  KTW, W270, WRAS, ACS

Technical overview

Flow measurement

Measuring principle			Vortex	Piezoelectric sensor element
Measuring range				0.5 ... 150 l/min
Nominal diameters				DN 6 / 8 / 10 / 15 / 20 / 25
Accuracy at < 50% fs (water)			< 1% fs	
Accuracy at > 50% fs (water)			< 2% measuring value	
Response time	Immediately Therefore suitable for spigot use.		Frequency output	Signal delay < 100 ms Response time < 5 ms
			Analogue output	Signal delay < 2 s Response time < 500 ms

Temperature measurement (≥ 8 DN)

Measuring principle	Resistance			PT1000
PT1000	Measuring range			-40 ... +125 °C
	Accuracy	class B DIN EN 60751	@ T = 0 °C	± 0.3 K
			@ T ≠ 0 °C	± 0.3 K ± 0.005 * T
0 ... 10 V		Measuring range		-25 ... +125 °C
		Accuracy		± 0.5 K ± 0.005 * T
		Calculation temperature		$T(°C) = \frac{+150\ °C}{10\ V} * U_{OUT\_T} - 25\ °C$
Temperature influences		Self-heating at temperature sensor		1 K/mW
		Conduction resistance to connector		0.8 Ohm

Operating conditions

Medium	Suitable for heating circuit water with the usual additives Drinking water		Other medium on request
Temperature		Media	< +125 °C
		Ambient	-15 ... +85 °C
		Storage	-30 ... +85 °C
Max. pressure and medium temperature		(for lifetime)	12 bar at +40 °C
		(for lifetime)	6 bar at +100 °C
		(for 600 hours)	4 bar at +125 °C
		(for 2 hours)	4 bar at +140 °C
		(max. test pressure)	18 bar at +40 °C
Cavitation	The following equation is valid to prevent cavitation:	$P_{abs\ outlet} / P_{difference} > 5.5$	

Materials in contact with medium (FDA-conform)

Sensor paddle	ETFE
Case with damming body	PA6T/6I (40% GF)
Sealing material	EPDM (perox.)
	FPM

Electrical overview			Frequency output	Voltage output	Current output
Power supply		U_{IN}	4.75 ... 33 VDC	11.5 ... 33 VDC	8 ... 33 VDC
Output flow (Q)	Frequency square pulse signal $U_{OUT\_Q\_frequency}$		< 0.5 ... > U_{IN} - 0.5 V	–	–
	Analogue signal	U_{OUT_Q} or I_{OUT}	–	0 ... 10 V	4 ... 20 mA
Output temperature (T)	Resistant signal	$R_{OUT\ PT1000}$		PT1000 class B DIN EN 60751	
	Voltage signal	U_{OUT_T}	–	0 ... 10 V	–
Electrical connection and protection class			M12x1 (IP 65)	M12x1 (IP 65)	M12x1 (IP 65)
Load agianst GND or IN			< 1 mA / < 100 nF	< 6 mA / < 100 nF [1]	< (U_{IN} - 8 V) / 20 mA
Current consumption load free (I_{IN})			< 2mA	< 5 mA	–
Electrical reliability	Short circuit, reverse voltage and external voltage protected within the admissible supply voltage.				

Weight

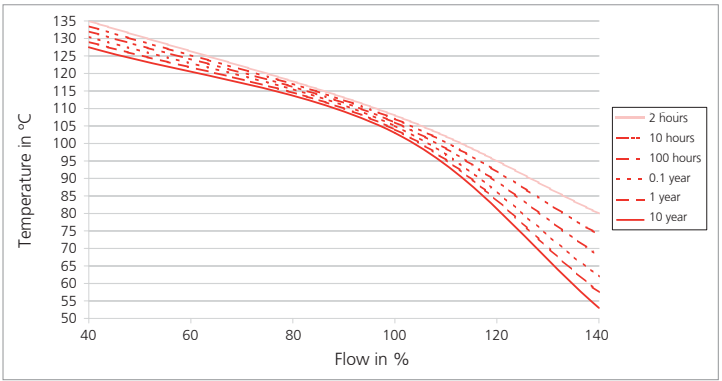
DN 6 / 8	~ 47 g
DN 10	~ 57 g
DN 15	~ 68 g
DN 20	~ 92 g
DN 25	~ 100 g

Test / Admissions

Electromagnetic compatibility	CE conformity acc. to EN 61326-2-3
Drinking water approval	WRAS
	Plastic parts with KTW and W270 approval
	ACS

Packaging (multiple packaging)	Connection copper tube	Outside thread K	Outside thread G
DN 6	–	Blister 30x	Blister 30x
DN 8 / 10	Blister 30x	Blister 30x	Blister 30x
DN 15	Blister 30x	Blister 30x	Blister 20x
DN 20	Blister 20x	Blister 20x	Blister 15x
DN25	–	Blister 15x	Blister 15x

Minimum life span on high flow rate and high temperature



[1] against GND only

Nominal diameters dependent variables

Nominal diameters	Tube connection	Measuring range	Quantity per pulse @ 50% fs	Flow range	Frequency range	Q_0	K_f	K_U	K_I	Pressure drop [1), 2)]
DN 6	K	0.5 ... 10 l/min	0.386 ml	0.074 ... 1.474 m/s	28 ... 427 Hz	-0.14	0.0238	1.0	0.625	240 * Q^2
	G									
DN 8	K	0.9 ... 15 l/min	0.638 ml	0.133 ... 2.210 m/s	30 ... 384 Hz	-0.3	0.0398	1.5	0.938	85.00 * Q^2
	G		0.631 ml		30 ... 388 Hz		0.0394			
	N		0.614 ml		31 ... 399 Hz		0.0383			
DN 10	K	1.8 ... 32 l/min	1.399 ml	0.265 ... 4.716 m/s	24 ... 379 Hz	-0.2	0.0850	3.2	2.000	22.50 * Q^2
	G		1.370 ml		24 ... 387 Hz		0.0832			
	N		1.384 ml		24 ... 383 Hz		0.0841			
DN 10	K	2.0 ... 40 l/min	1.403 ml	0.295 ... 5.895 m/s	26 ... 473 Hz	-0.2	0.0850	4.0	2.500	22.50 * Q^2
	G		1.373 ml		26 ... 483 Hz		0.0832			
	N		1.388 ml		26 ... 478 Hz		0.0841			
DN 15	K	3.5 ... 50 l/min	3.047 ml	0.290 ... 4.145 m/s	20 ... 272 Hz	-0.2	0.1843	5.0	3.125	6.70* Q^2
	G		3.016 ml		20 ... 275 Hz		0.1824			
	N		3.077 ml		20 ... 270 Hz		0.1861			
DN 20	K	5.0 ... 85 l/min	6.213 ml	0.265 ... 4.509 m/s	14 ... 227 Hz	-0.3	0.3754	8.5	5.313	2.50 * Q^2
	G		6.125 ml		14 ... 230 Hz		0.3701			
	N		6.208 ml		14 ... 227 Hz		0.3751			
DN 25	K	9.0 ... 150 l/min	12.412 ml	0.283 ... 4.709 m/s	12 ... 201 Hz	-0.2	0.7467	15	9.375	0.92 * Q^2
	G		12.251 ml		12 ... 204 Hz		0.7370			

Characteristic line formula frequency output
$Q_V = K_f * f + Q_0$

Characteristic line formula voltage output
$Q_V = K_U * U_{OUT}$

Characteristic line formula current output
$Q_V = K_I * (I_{OUT} - 4\ mA)$

Formula quantity per pulse [litres/pulse]
$$\frac{\text{quantity}}{\text{pulse}} = \frac{Q_V * K_f}{60 * (Q_V - Q_0)}$$

(Influence of viscosity for media other than water - see page 8)

Legend

Q_V	Volume flow rate	[l/min]
Q_0	Axis intercept	[l/min]
K_f	Coefficient frequency output	[(l/min) / ƒ]
K_U	Coefficient voltage output	[(l/min) / V]
K_I	Coefficient current output	[(l/min) / ƒ]
ƒ	Frequency	[Hz]
U_{OUT}	Voltage	[V]
I_{OUT}	Current	[mA]
quantity / pulse	Quantity per pulse	litres / pulse

[1)] incl. 3xDi inlet and outlet side

[2)] Pv in Pa; Q in l/min

Order code selection table

			1	2	3	4	5	6	7
	210.		X	X	X	X	X	X	X
Version	Flow		9				4		
	Flow and temperature (PT1000)		8				5		
	Flow and temperature (0 ... 10 V)		6			3	5		
Nominal diameters and flow range	DN 6	0.5 ... 10 l/min.	9	0	6				K,G
	DN 8	0.9 ... 15 l/min.		0	8				
	DN 10	1.8 ... 32 l/min.		1	0				
	DN 10	2.0 ... 40 l/min.		1	1				
	DN 15	3.5 ... 50 l/min.		1	5				
	DN 20	5.0 ... 85 l/min.		2	0				
	DN 25	9.0 ... 150 l/min.		2	5				K,G
Output / power supply	Frequency output (Square pulse signal)	4.75 ... 33 VDC	8,9			2			
	Analogue signal 0 ... 10 V	11.5 ... 33 VDC				3			
	Analogue signal 4 ... 20 mA	8 ... 33 VDC	8,9			4			
Electrical connection	Connector M12x1	2- or 3-pole (condensation protection)	9				4		
		4- or 5-pole (condensation protection)	8,6				5		
Sealing material	EPDM	Ethylene propylene rubber (peroxidically cross-linked)						1	
	FPM [1]	Fluoro elastomer						2	
Tube connection	Plastic PA6T / 6I	connection copper tube (max. DN 20)							N
		outside thread K (see dimension diagram)							K
		outside thread G (see dimension diagram)							G

Accessories [2]

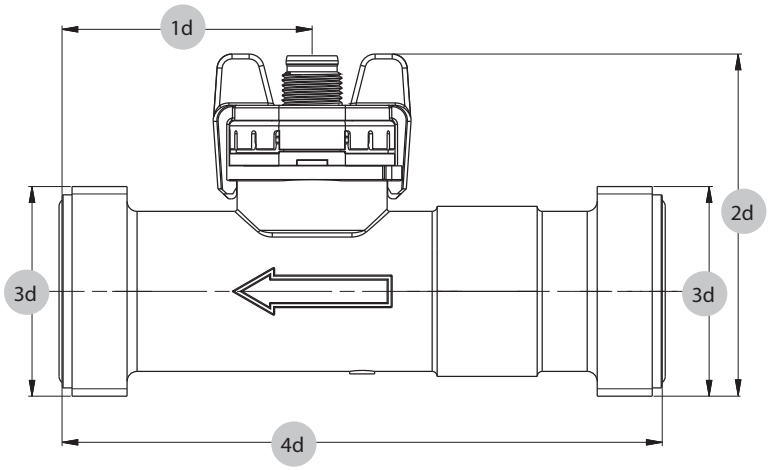
					Order number
Connection kit [3] DN 8, 10 with copper tube					113775
Connection kit [3] DN 8, 10 with adapter Rp ⅜			Stainless steel 1.4305/AISI 303		113776
Connection kit [3] DN 15 with copper tube					113777
Connection kit [3] DN 15 with adapter Rp ½			Stainless steel 1.4305/AISI 303		113778
Connection kit [3] DN 20 with copper tube					113779
Connection kit [3] DN 20 with adapter Rp ¾			Stainless steel 1.4305/AISI 303		113780
Straight-wire box for connector M12x1 with cable			3-pole	200 cm	114605
Corner-wire box for connector M12x1 with cable			3-pole	200 cm	114604
Straight-wire box for connector M12x1 with cable			5-pole	200 cm (with temperature)	114564
Corner-wire box for connector M12x1 with cable			5-pole	200 cm (with temperature)	114563
Straight-wire box for connector M12x1 screwing terminal			5-pole		115024
Clip for DN 8,10					112116
Clip for DN 15					110941
Clip for DN 20					112122
O-Ring for DN 8, DN 10	EPDM	ø 13.95 x 2.62	Copper tube and adapter		112124
O-Ring for DN 15	EPDM	ø 17.86 x 2.62	Copper tube and adapter		112265
O-Ring for DN 20	EPDM	ø 21.89 x 2.62	Copper tube and adapter		112723
O-Ring for DN 25	EPDM	ø 31 x 3	(as a replacement, already assembled)		112792
Connection copper tube for DN 8, 10		L=150 mm			112121
Connection copper tube for DN 15		L=150 mm			112211
Connection copper tube for DN 20		L=150 mm			112306
Adapter for DN 8 und DN 10	Rp ⅜		Stainless steel 1.4305/AISI 303		112655
Adapter for DN 15	Rp ½		Stainless steel 1.4305/AISI 303		112660
Adapter for DN 20	Rp ¾		Stainless steel 1.4305/AISI 303		112661

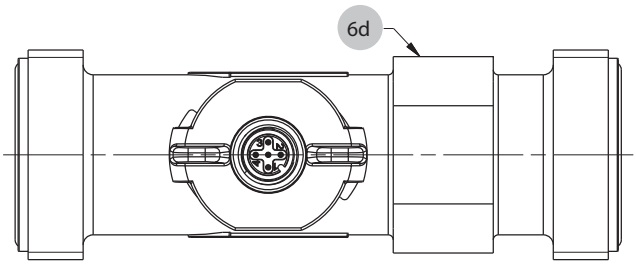
[1] No drinking water approval

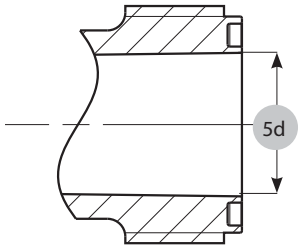
[2] Accessories supplied loose

[2] Connection set includes: 2x Clip, 2x Copper tubes or Adapter and 2x O-Ring

Dimension diagram DN 6, 8, 10, 15, 20, 25

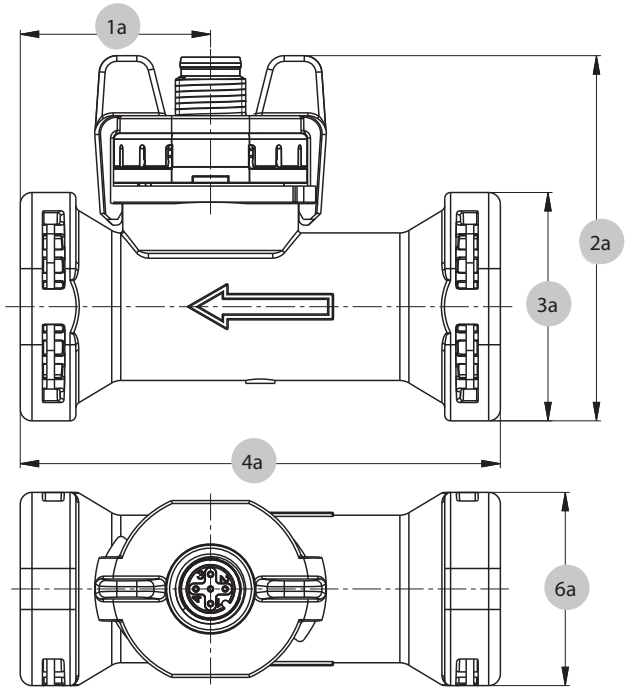


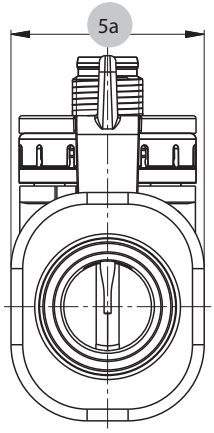




		1d	2d	3d	4d	5d	6d
DN6	K	43.7	53.0	G ½	77	11.5	12
DN6	G	48.2	55.7	G ¾	86	11.5	12
DN8	K	43.7	53.0	G ½	77	11.5	12
DN8	G	48.2	55.7	G ¾	86	11.5	12
DN10	K	35.0	51.3	G ½	81	11.5	19
DN10	G	39.5	54.1	G ¾	90	11.5	19
DN15	K	36.6	56.1	G ¾	87	16	22
DN15	G	41.6	59.5	G 1	97	16	22
DN20	K	36.6	61.5	G 1	105	20	27
DN20	G	42.6	65.8	G 1¼	117	20	27
DN25	K	50.0	68.3	G 1¼	120	26	34
DN25	G	56.0	71.3	G 1½	132	26	34

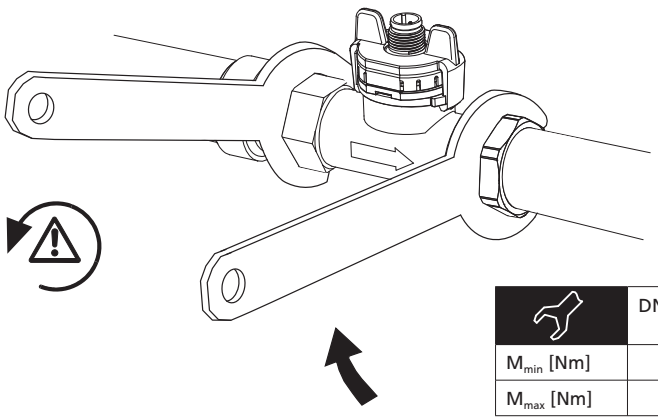
Dimension diagram DN 8, 10, 15, 20





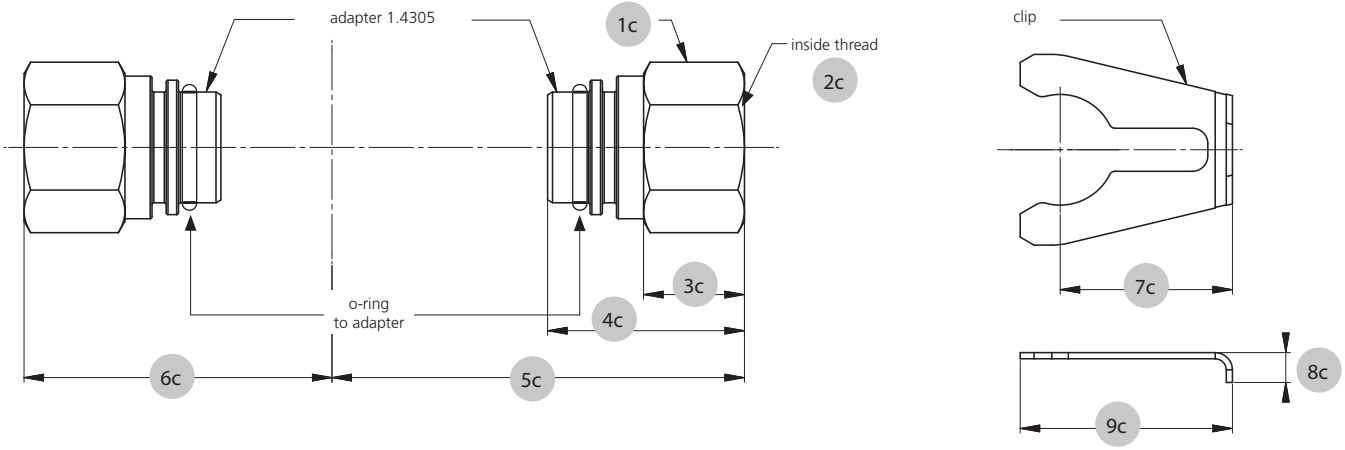
	1a	2a	3a	4a	5a	6a
DN8	29.5	59.0	32.9	72	30.2	28.9
DN10	32.5	57.3	32.9	77	30.2	28.9
DN15	32.5	62.4	39.0	82	30.2	33.0
DN20	39.3	66.3	43.0	105	30.2	37.4

Admissible locking torque



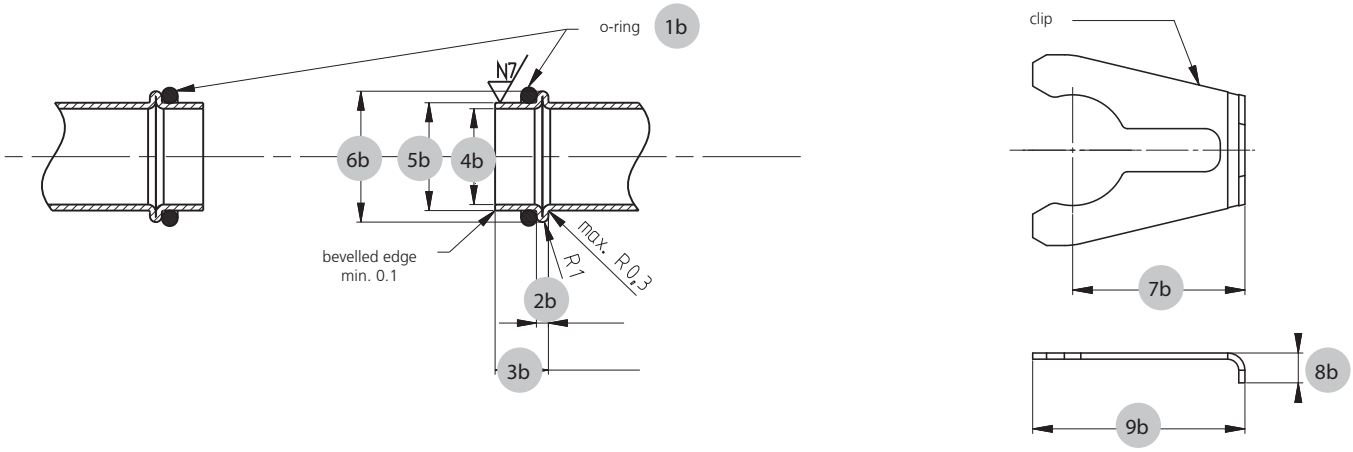
	DN6/8/10 G ½	DN6/8/10 G ¾	DN15 G ¾	DN15 G1	DN20 G1	DN20 G1 ¼	DN25 G1 ¼	DN25 G1 ½
M_{min} [Nm]	1	1	1	2	2	2.5	2.5	2.5
M_{max} [Nm]	12	12	12	12	12	15	15	15

Accessories DN 8, 10, 15, 20



	1c	2c	3c	4c	5c	6c	7c	8c	9c
DN8	22	Rp ⅜ EN 10226 lenght min. 9	14.0	29	57.65	44.65	24.5	6.00	30.8
DN10	22	Rp ⅜ EN 10226 lenght min. 9	14.0	29	59.65	47.55	24.5	6.00	30.8
DN15	24	Rp ½ EN 10226 length min. 11.5	16.4	32	67.05	50.05	28.0	7.30	34.5
DN20	30	Rp ¾ EN 10226 lenght min. 13	18.5	38	82.25	58.85	28.0	8.00	34.5

Geometry of customers connection tube DN 8, 10, 15, 20

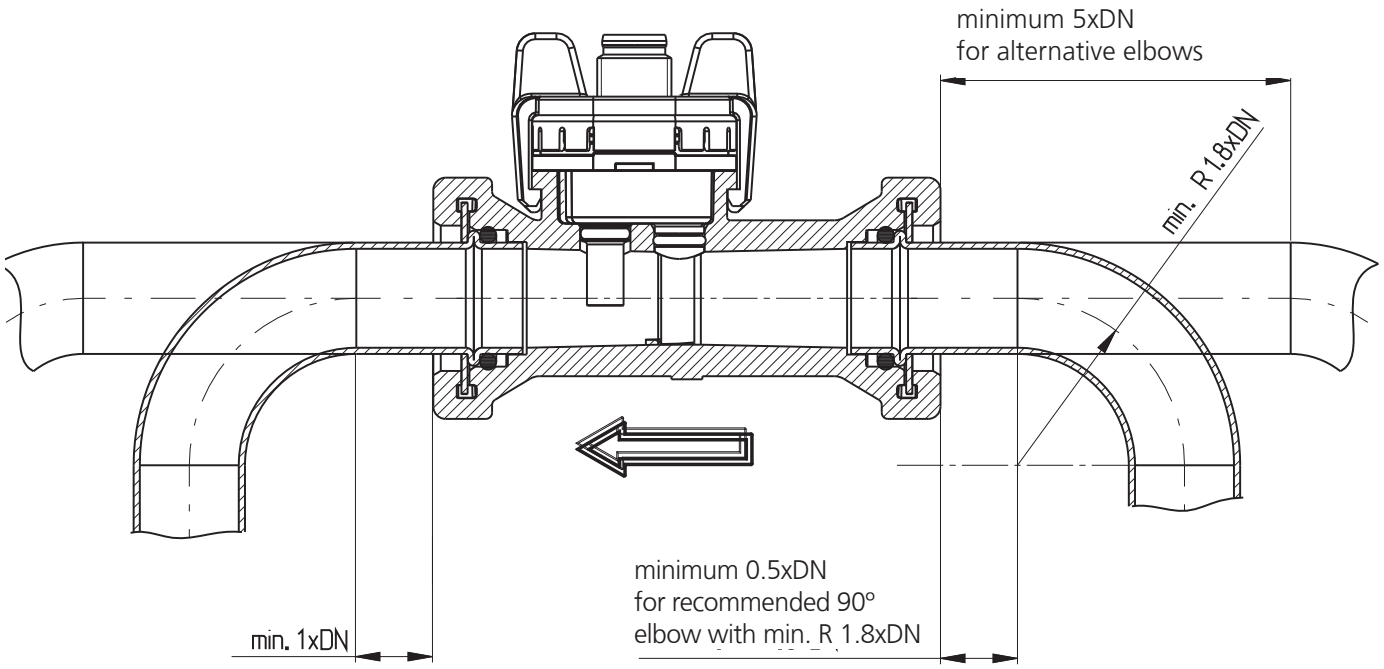


	1b	2b	3b	4b	5b	6b	7b	8b	9b
DN8	ø 13.95x2.62	2 ± 0.2	8.9 ± 0.2	ø 13 ± 0.2	ø 15.00 ± 0.08	ø 18.88 ± 0.1	24.5	6.00	30.8
DN10	ø 13.95x2.62	2 ± 0.2	8.9 ± 0.2	ø 13 ±0.2	ø 15.00 ± 0.08	ø 18.88 ± 0.1	24.5	6.00	30.8
DN15	ø 17.86x2.62	2 ± 0.2	8.9 ± 0.3	ø 16 ± 0.2	ø 18.00 $^{+0.08}_{-0.06}$	ø 21.85 ± 0.1	28.0	7.30	34.5
DN20	ø 21.89x2.62	2 ± 0.2	12.9 ± 0.3	ø 20 ± 0.2	ø 22.00 $^{+0.08}_{-0.06}$	ø 25.85 ± 0.1	28.0	8.00	34.5

Tube mounting instructions

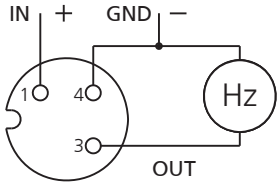
Consider the following to ensure the correct function of the sensor.

- Only diameter changes from large to small are allowed.
- Avoid repeated elbows in the same level at entryside

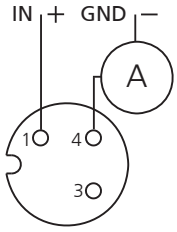


Electrical connection

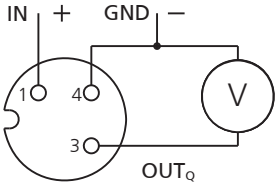
Connector M12x1 without temperature measurement (1)



Frequency output



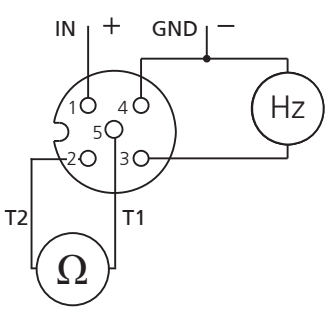
current output



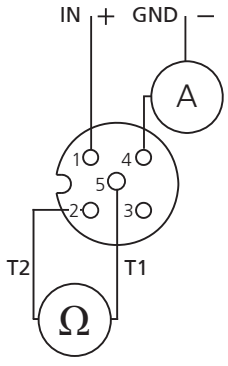
voltage output

Pin		Colour
1		brown
3	1	blue
4		black
1		brown
2		white
3	2	blue
4		black
5		gray

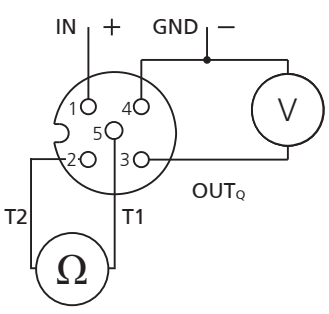
Connector M12x1 with temperature measurement (2)



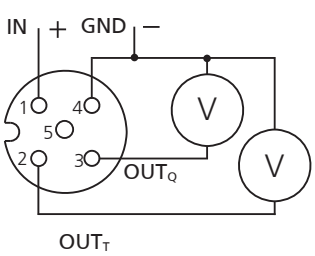
frequency output
with PT1000



current output
with PT1000



voltage output
with PT1000



voltage output with
temperature output 0 ...10 V

Flow sensor type 230 for liquid media

Flow range
1.8 ... 150 l/min

Nominal diameters
DN 10 / 15 / 20 / 25

Temperature measurement
-40 ... +125 °C

The flow sensor type 230 is based on the Kármán vortex trail. You can choose between various versions as integrated temperature measurement.

The type 230 has a rugged construction of red brass.
With no moving parts the flow sensor is not sensitive to debris, has marginal pressure loss and high accuracy.

- Flow measuring with voltage, current or frequency output
- Temperature non-sensitive measuring principle
- Excellent media resistance (measuring element not in contact with the media)
- CE conformity
- Wide application temperature range
- Marginal loss of pressure
- Measuring element not sensitive to debris
- Direct temperature measurement in the medium
- Drinking water approval
  KTW, W270, WRAS, ACS

Technical Overview

Flow measurement

Measuring principle			Vortex	Piezoelectric sensor element
Measuring range				1.8 ... 150 l/min
Nominal diameters				DN 10 / 15 / 20 / 25
Accuracy at < 50% fs (water)			< 1% fs	
Accuracy at > 50% fs (water)			< 2% measuring value	
Response time	Immediately Therefore suitable for spigot use.		Frequency output	Signal delay < 100 ms Response time < 5 ms
			Analogue output	Signal delay < 2 s Response time < 500 ms

Temperature measurement

Measuring principle	Resistance			PT1000
PT1000	Measuring range			-40 ... +125 °C
	Accuracy	class B DIN EN 60751	@ T = 0 °C	± 0.3 K
			@ T ≠ 0 °C	± 0.3 K ± 0.005 * T
0 ... 10 V		Measuring range		-25 ... +125 °C
		Accuracy		± 0.5 K ± 0.005 * T
		Calculation temperature		$T(°C) = \frac{+150\ °C}{10\ V} * U_{OUT\_T} - 25\ °C$
Temperature influences		Self-heating at temperature sensor		1 K/mW
		Conduction resistance to connector		0.8 Ohm

Operating conditions

Medium	Suitable for heating circuit water with the usual additives Drinking water		Other medium on request
Temperature		Media	≤ +125 °C
		Ambient	-15 ... +85 °C
		Storage	-30 ... +85 °C
Max. pressure and medium temperature		(for lifetime)	12 bar at +40 °C
		(for lifetime)	6 bar at +100 °C
		(for 600 hours)	4 bar at +125 °C
		(for 2 hours)	4 bar at +140 °C
		(max. test pressure)	18 bar at +40 °C
Cavitation	The following equation is valid to prevent cavitation:	$P_{abs\ outlet} / P_{difference} > 5.5$	

Materials in contact with medium (FDA-conform)

Sensor paddle	ETFE
Case	Red brass / PA6T/6I (40% GF)
Sealing material	EPDM (perox.) (for drinking water) FPM

Electrical overview

			Frequency output	Voltage output	Current output
Power supply		U_{IN}	4.75 ... 33 VDC	11.5 ... 33 VDC	8 ... 33 VDC
Output	Frequency square pulse signal	$U_{OUT\_Q\_frequency}$	< 0.5 ... > U_{IN} - 0.5 V	–	–
Flow (Q)	Analogue signal	U_{OUT_Q} or I_{OUT}	–	0 ... 10 V	4 ... 20 mA
Output	Resistant signal	$R_{OUT\ PT1000}$	PT1000 class B DIN EN 60751		
temperature (T)	Voltage signal	U_{OUT_T}	–	0 ... 10 V	–
Electrical connection and protection class			M12x1 (IP 65)	M12x1 (IP 65)	M12x1 (IP 65)
Load agianst GND or IN			< 1 mA / < 100 nF	< 6 mA / < 100 nF [1]	< (U_{IN} - 8 V) / 20 mA
Current consumption load free (I_{IN})			< 2mA	< 5 mA	–
Electrical reliability	Short circuit, reverse voltage and external voltage protected within the admissible supply voltage.				

Weight

DN 10	outside thread L	~ 230 g
DN 15	outside thread A	~ 240 g
	outside thread L	~ 310 g
DN 20	outside thread A	~ 340 g
	outside thread L	~ 440 g
DN 25	outside thread A	~ 510 g
	outside thread L	~ 600 g

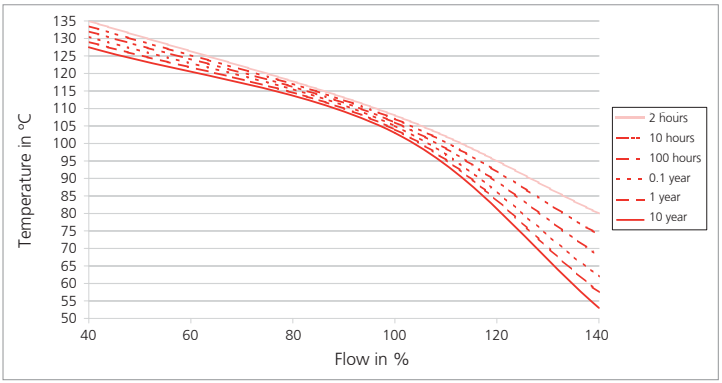
Test / Admissions

Electromagnetic compatibility	CE conformity acc. to EN 61326-2-3
Drinking water approval	WRAS, ACS Plastic parts with KTW and W270 approval

Packaging

Single packaging

Minimum life span on high flow rate and high temperature



[1] against GND only

Nominal diameters dependent variables

Nominal diameters	Tube connection	Measuring range	Quantity per pulse @ 50% fs	Flow range	Frequency range	Q_0	K_f	K_U	K_I	Pressure drop [1), 2)]
DN 10	L	1.8 ... 32 l/min	1.378 ml	0.265 ... 4.716 m/s	24 ... 385 Hz	-0.2	0.0858	3.2	2.000	22.50 * Q^2
DN 10	L	2.0 ... 40 l/min	1.381 ml	0.295 ... 5.895 m/s	26 ... 480 Hz	-0.2	0.0858	4.0	2.000	22.50 * Q^2
DN 15	A	3.5 ... 50 l/min	2.998 ml	0.290 ... 4.145 m/s	20 ... 277 Hz	-0.2	0.1813	5.0	3.125	6.70* Q^2
	L		2.975 ml		21 ... 279 Hz		0.1799			
DN 20	A	5.0 ... 85 l/min	6.109 ml	0.265 ... 4.509 m/s	14 ... 231 Hz	-0.2	0.3691	8.5	5.313	2.50 * Q^2
	L		6.057 ml		14 ... 233 Hz		0.3660			
DN 25	A	9.0 ... 150 l/min	12.114 ml	0.283 ... 4.709 m/s	13 ... 206 Hz	-0.2	0.7288	15	9.375	0.92 * Q^2
	L		12.143 ml				0.7305			

Characteristic line formula frequency output
$Q_V = K_f * f + Q_0$

Characteristic line formula voltage output
$Q_V = K_U * U_{OUT}$

Characteristic line formula current output
$Q_V = K_I * (I_{OUT} - 4\ mA)$

Formula quantity per pulse [litres/pulse]
$$\frac{\text{quantity}}{\text{pulse}} = \frac{Q_V * K_f}{60 * (Q_V - Q_0)}$$

(Influence of viscosity for media other than water - see page 5)

Legend

Q_V	Volume flow rate	[l/min]
Q_0	Axis intercept	[l/min]
K_f	Coefficient frequency output	[(l/min) / f]
K_U	Coefficient voltage output	[(l/min) / V]
K_I	Coefficient current output	[(l/min) / f]
f	Frequency	[Hz]
U_{OUT}	Voltage	[V]
I_{OUT}	Current	[mA]
$\frac{\text{quantity}}{\text{pulse}}$	Quantity per pulse	$\frac{\text{litres}}{\text{pulse}}$

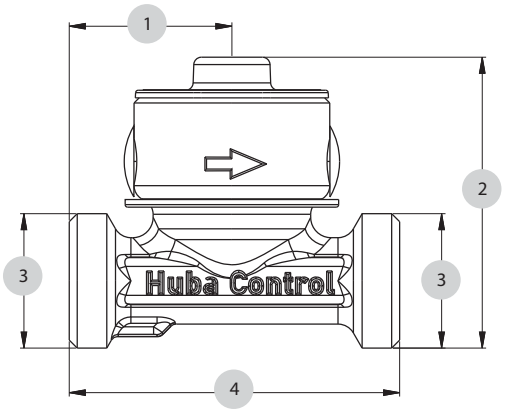
Order code selection table

			1	2	3	4	5	6	7
		230.	X	X	X	X	X	X	X
Version	Flow		9				4		
	Flow and temperature (PT1000)		8				5		
	Flow and temperature (0 ... 10 V)		6				5		
Nominal diameters and flow range	DN 10	1.8 ... 32 l/min.		1	0				L
	DN 10	2.0 ... 40 l/min.		1	1				L
	DN 15	3.5 ... 50 l/min.		1	5				
	DN 20	5.0 ... 85 l/min.		2	0				
	DN 25	9.0 ... 150 l/min.		2	5				
Output and power supply	Frequency output (Square pulse signal)	4.75 ... 33 VDC	8,9			2			
	Analogue signal 0 ... 10 V	11.5 ... 33 VDC				3			
	Analogue signal 4 ... 20 mA	8 ... 33 VDC	8,9			4			
Electrical connection	Connector M12x1	2- or 3-pole (condensation protection)	9				4		
		4- or 5-pole (condensation protection)	8,6				5		
Sealing material	EPDM	Ethylene propylene rubber (peroxidically cross-linked)						1	
	FPM [3)]	Fluoro elastomer						2	
Red brass body	Red brass armature outside thread	A (see dimension diagram)							A
		L (see dimension diagram)							L

Accessories [4)]

				Order number
Straight-wire box for connector M12x1 with cable	3-pole	200 cm		114605
Corner-wire box for connector M12x1 with cable	3-pole	200 cm		114604
Straight-wire box for connector M12x1 with cable	5-pole	200 cm	(with temperature)	114564
Corner-wire box for connector M12x1 with cable	5-pole	200 cm	(with temperature)	114563
Straight-wire box for connector M12x1 screwing terminal				115024

Dimension diagram DN 10, 15, 20, 25



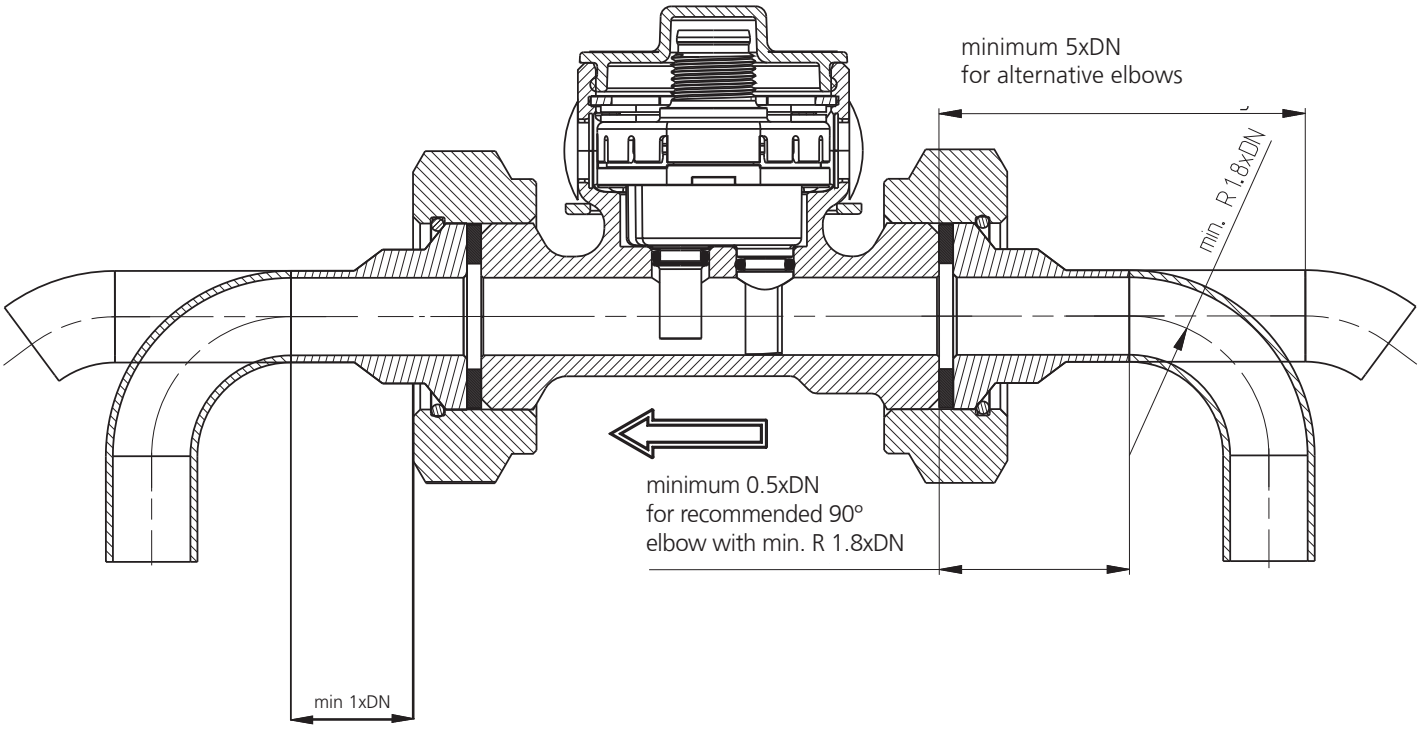
		1	2	3	4
DN10	L	32	57.22	G ¾	65
DN15	A	40	59.22	G ¾	75
DN15	L	40	62.65	G 1	75
DN20	A	49	64.62	G 1	86
DN20	L	49	68.95	G 1¼	86
DN25	A	70	71.45	G 1¼	109
DN25	L	70	74.40	G 1½	109

[1)] incl. 3xDi inlet and outlet side
[2)] Pv in Pa; Q in l/min
[3)] No drinking water approval
[4)] Accessories supplied loose

Tube mounting instructions

Consider the following to ensure the correct function of the sensor.

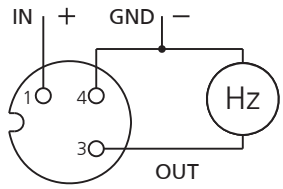
- Only diameter changes from large to small are allowed.
- Avoid repeated elbows in the same level at entryside



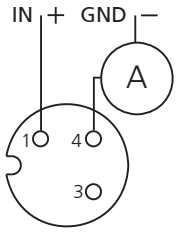
Electrical connection

Connector M12x1 without temperature measurement

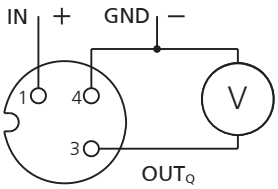
1



Frequency output



current output

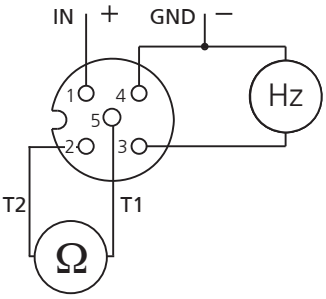


voltage output

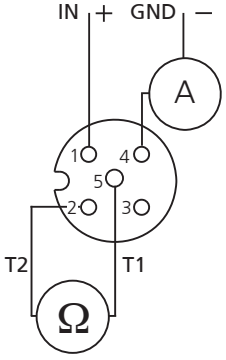
Pin		Colour
1	1	brown
3		blue
4		black
1	2	brown
2		white
3		blue
4		black
5		gray

Connector M12x1 with temperature measurement

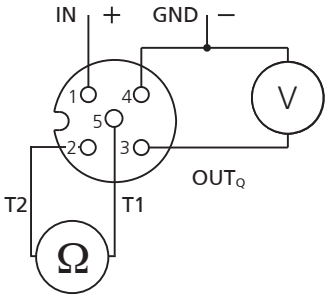
2



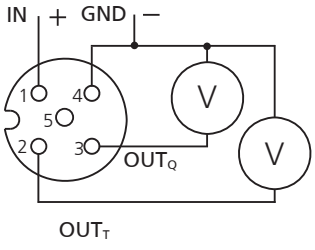
Frequency output
with PT1000



current output
with PT1000



voltage output
with PT1000



voltage output with
temperature output 0 ...10 V

OEM Flow sensor type 235 for liquid media

Flow range
1.8 ... 240 l/min

Nominal diameters
DN 10 / 32

Temperature measurement
-40 ... +125 °C

The type 235 is based on the type 200 but incorporates a brass housing. The flow sensor type 235 is based on the Kármán vortex trail. You can choose between various versions as integrated temperature measurement. With no moving parts the flow sensor is not sensitive to debris, has marginal pressure loss and high accuracy.

- Low cost product with high levels of accuracy
- Temperature non-sensitive measuring principle
- Excellent media resistance (measuring element not in contact with the media)
- Wide application temperature range
- Marginal loss of pressure
- Measuring element not sensitive to debris
- Direct temperature measurement in the medium with PT1000 or NTC
- Drinking water approval KTW, W270, WRAS, ACS

Technical Overview

Flow measurement

Measuring principle		Vortex	Piezoelectric sensor element
Measuring range			1.8 ... 240 l/min
Nominal diameters			DN 10 / 25
Accuracy at < 50% fs (water)			< 1% fs
Accuracy at > 50% fs (water)			< 2% measuring value
Response time	Immediately Therefore suitable for spigot use.	Signal delay Response time	< 100 ms < 5 ms

Temperature measurement

Measuring principle	Resistance			PT1000 NTC
PT1000	Measuring range			-40 ... +125 °C
	Accuracy	Class B DIN EN 60751	@ T = 0 °C @ T ≠ 0 °C	± 0.3 K ± 0.3 K ± 0.005 * T
NTC	Measuring range			-40 ... +125 °C
	Accuracy	NTC 10 kOhm @ 25 °C β = 4050	@ T = +25 °C @ T < +25 °C @ T > +25 °C	± 0.7 K ± 0.7 K ± 0.025 * T ± 0.7 K ± 0.050 * T
Temperature influences		Self-heating at temperature sensor Conduction resistance to connector		1 K/mW 0.8 Ohm

Operating conditions

Medium	Suitable for heating circuit water with the usual additives Drinking water		Other medium on request
Temperature		Media Ambient Storage	< +125 °C -15 ... +85 °C -30 ... +85 °C
Max pressure and medium temperature		(for lifetime) (for lifetime) (for 600 hours) (for 2 hours) (max. test pressure)	12 bar at +40 °C 6 bar at +100 °C 4 bar at +125 °C 4 bar at +140 °C 18 bar at +40 °C
Cavitation	The following equation is valid to prevent cavitation:		$P_{abs\_oulet} / P_{difference} > 5.5$

Materials in contact with medium (FDA-conform)

Sensor paddle	ETFE
Case with damming body	Brass (CuZn40PbZ), PA6T/6I (40% GF)
Sealing material	EPDM (perox.) (for drinking water) FPM

Electrical overview

Power supply		U_{IN}	5 VDC ±5%
Output flow (Q)	Frequency Square pulse signal	$U_{OUT\_Q\_Frequency}$	< 0.1 ... > 4.75 V
Output temperature (T)	Resistant signal	$R_{OUT\ PT1000}$ $R_{OUT\ NTC}$	PT1000 class B DIN EN 60751 NTC 10 kOhm @ 25 °C; β = 4050
Electrical connection and protection class		Connector RAST 2.5 / 2.54 Connector M12x1	IP 20 IP 65
Load against GND or IN			> 10 kOhm / < 10 nF
Current consumption I_{IN} load free		Version OEM Version standard	< 6 mA < 10 mA

Weight

DN 10 with thread K	~ 170 g
DN 10 with thread G	~ 250 g
DN 32	~ 650 g

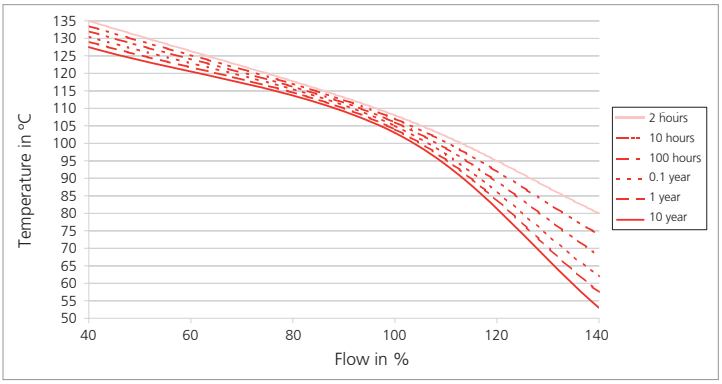
Test / Admissions

Electromagnetic compatibility	acc. to EN 61326-2-3 (no protection at surge)
Drinking water approval	WRAS, ACS Plastic parts with KTW and W270 approval

Packaging

Single packaging
Multiple packaging

Minimum life span on high flow rate and high temperature



Nominal diameters dependent variables

Nominal diameters	Tube connection	Measuring range	Quantity per pulse @ 50% fs	Flow rate	Frequency range	Q_0	K_f	Pressure drop [1), 2)]
DN 10	K	1.8 ... 32 l/min	1.416 ml	0.265 ... 4.716 m/s	23 ... 374 Hz	-0.2	0.0860	22.50 * Q^2
DN 10	G		1.386 ml		24 ... 380 Hz		0.0847	
DN 10	K	2.0 ... 40 l/min	1.419 ml	0.295 ... 5.895 m/s	26 ... 467 Hz	-0.2	0.0860	22.50 * Q^2
DN 10	G		1.386 ml		26 ... 479 Hz		0.0840	22.50 * Q^2
DN 32	K	14 ... 240 l/min	27.513 ml	0.290 ... 4.974 m/s	9 ... 145 Hz	-1.47	1.671	0.25 * Q^2

Characteristic line formula frequency output

$$Q_V = K_f * f + Q_0$$

Formula quantity per pulse [litres/pulse]

$$\frac{\text{quantity}}{\text{pulse}} = \frac{Q_V * K_f}{60 * (Q_V - Q_0)}$$

Legend

Q_V	Volume flow rate	[l/min]
Q_0	Axis intercept	[l/min]
K_f	Coefficient frequency output	[(l/min) / f]
f	Frequency	[Hz]
$\frac{\text{quantity}}{\text{pulse}}$	Quantity per pulse	$\frac{\text{litres}}{\text{pulse}}$

Order code selection table

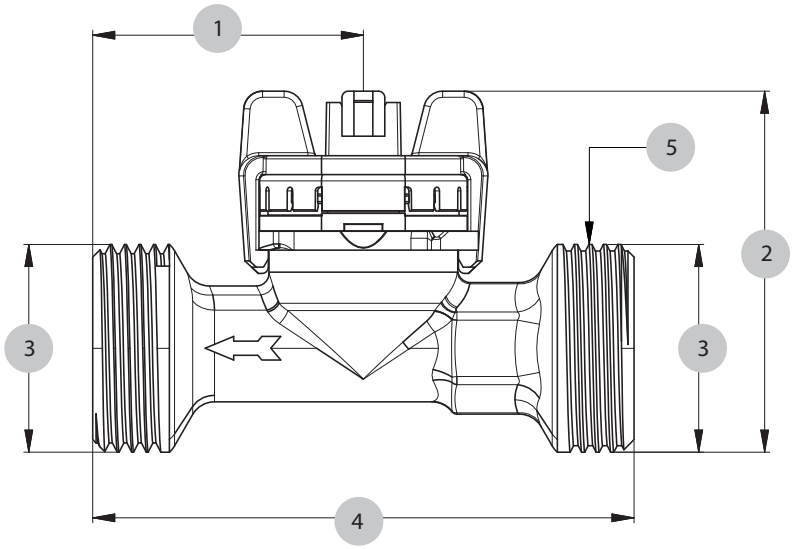
					1	2	3	4	5	6	7
				235.	X	X	X	X	X	X	X
Version	Flow				9						
	Flow and temperature (PT1000)				8			1			
	Flow and temperature (NTC)				7			1			
Nominal diameters and flow range	DN 10	1.8 ... 32 l/min.				1	0				
	DN 10	2.0 ... 40 l/min.				1	1				
	DN 32	14.0 ... 240 l/min.				3	2				K
Output / power supply	Frequency output, 0 ... 5 VDC (Square pulse signal)		5 VDC	OEM	9			0			
	Frequency output, 0 ... 5 VDC (Square pulse signal)		5 VDC	Standard				1			
Electrical connection	3-pole connector	RAST 2.5			9				0		
	2x3-pole connector	RAST 2.5			7,8			1	1		
	3-pole connector	RAST 2.5	(condensation protection)		9				2		
	2x3-pole connector	RAST 2.5	(condensation protection)		7,8			1	3		
	3-pole circular connector	M12x1	(condensation protection)		9			1	4		
	5-pole circular connector	M12x1	(condensation protection)		7,8			1	5		
Sealing material	EPDM	Ethylene propylene rubber (peroxidically cross-linked)								1	
	FPM [3)]	Fluoro elastomer								2	
Tube connection	Brass with outside thread	K (DN 10 - G ½ , DN32 - G 1 ½)									K
		G (DN 10 - G 1)									G

Accessories [4)]

				Order number
Connector RAST 2.5 with cable	3-pole	30 cm		111668
Connector RAST 2.5 with cable	3-pole	110 cm		101817
Straight-wire box for connector M12x1 with cable	3-pole	200 cm		114605
Corner-wire box for connector M12x1 with cable	3-pole	200 cm		114604
Connector RAST 2.5 with cable	2x3 pole	110 cm	(with temperature)	114629
Straight-wire box for connector M12x1 with cable	5-pole	200 cm	(with temperature)	114564
Corner-wire box for connector M12x1 with cable	5-pole	200 cm	(with temperature)	114563
Straight-wire box for connector M12x1 screwing terminal	5-pole			115024

[1)] incl. 3xDi inlet and outlet side
[2)] Pv in Pa; Q in l/min
[3)] No drinking water approval
[4)] Accessories supplied loose

Dimension diagram DN 10, 32

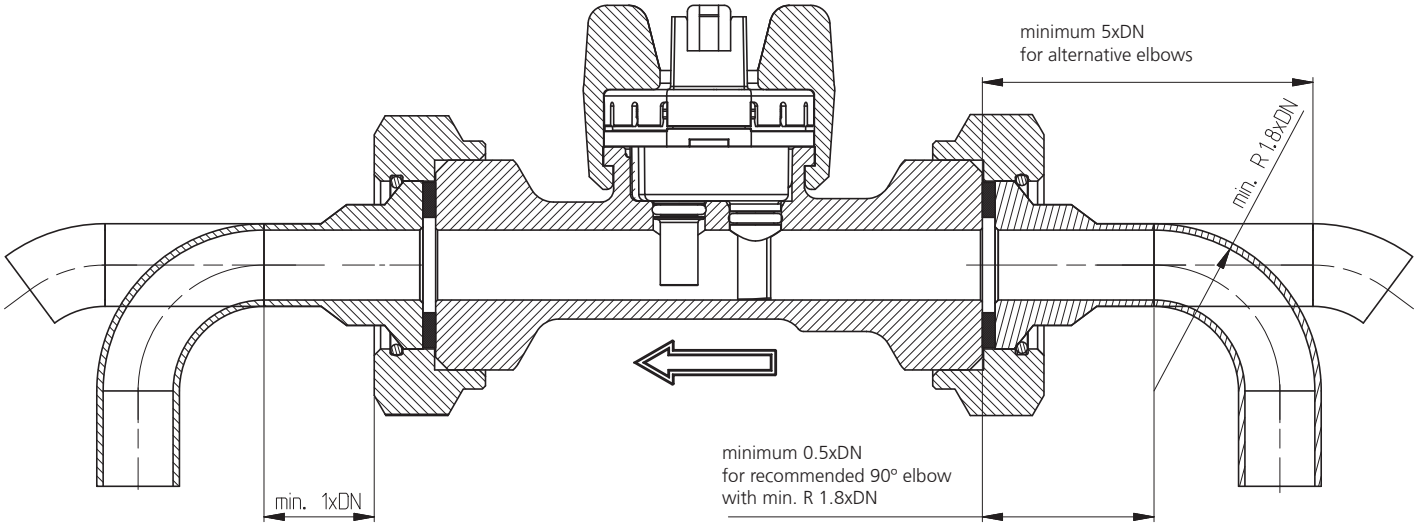


	1	2	3	4	5
DN10	43	57.3	G ½ / G 1	86	19
DN32	50	74.9	G 1 ½	134	41

Tube mounting instructions

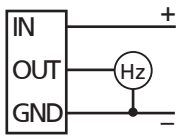
Consider the following to ensure the correct function of the sensor.

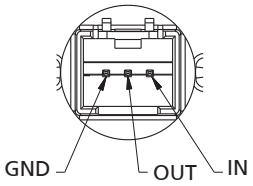
- Only diameter changes from large to small are allowed.
- Avoid repeated elbows in the same level at entryside



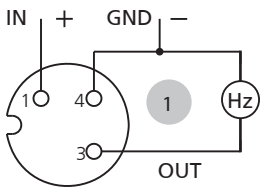
Electrical connections

RAST 2.5 without temperature output



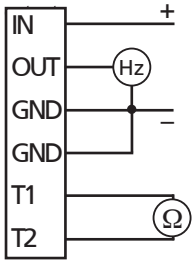


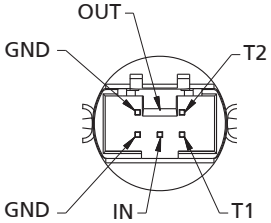
Connector M12x1 without temperature output



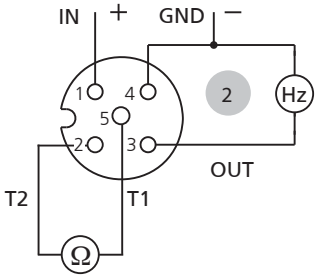
Pin		Colour
1	1	brown
3		blue
4		black
1	2	brown
2		white
3		blue
4		black
5		gray

Connector 2x3-poles with temperature





Connector M12x1 with temperature output



Flow sensor type 236 for liquid media

Flow range
1.8 ... 240 l/min

Nominal diameters
DN 10 / 32

Temperature measurement
-40 ... +125 °C

The type 236 is based on the type 210 but incorporates a brass housing. The Vortex Sensor type 236 has a rugged construction of brass connection. This flow sensor is available with a larger variety concerning power supply and outputs.

You can choose between various versions as integrated temperature measurement. With no moving parts the flow sensor is not sensitive to debris, has marginal pressure loss and high accuracy.

- Flow measuring with voltage, current or frequency output
- Temperature non-sensitive measuring principle
- Excellent media resistance (measuring element not in contact with the media)
- CE conformity
- Wide application temperature range
- Marginal loss of pressure
- Measuring element not sensitive to debris
- Direct temperature measurement in the medium
- Drinking water approval KTW, W270, WRAS, ACS

Technical Overview

Flow measurement

Measuring principle			Vortex	Piezoelectric sensor element
Measuring range				1.8 ... 240 l/min
Nominal diameters				DN 10 / 25
Accuracy at < 50% fs (water)			< 1% fs	
Accuracy at > 50% fs (water)			< 2% measuring value	
Response time	Immediately Therefore suitable for spigot use.	Frequency output	Signal delay Response time	< 100 ms < 5 ms
			Analogue output	Signal delay < 2 s Response time < 500 ms

Temperature measurement

Measuring principle	Resistance			PT1000
PT1000	Measuring range			-40 ... +125 °C
	Accuracy	class B DIN EN 60751	@ T = 0 °C	± 0.3 K
			@ T ≠ 0 °C	± 0.3 K ± 0.005 * T
0 ... 10 V		Measuring range		-25 ... +125 °C
		Accuracy		± 0.5 K ± 0.005 * T
		Calculation temperature		$T\,(°C) = \frac{+150\,°C}{10\,V} * U_{OUT\_T} - 25\,°C$
Temperature influences		Self-heating at temperature sensor		1 K/mW
		Conduction resistance to connector		0.8 Ohm

Operating conditions

Medium	Suitable for heating circuit water with the usual additives Drinking water		Other medium on request
temperature		Media	≤ +125 °C
		Ambient	-15 ... +85 °C
		Storage	-30 ... +85 °C
Max. pressure and medium temperature		(for lifetime)	12 bar at +40 °C
		(for lifetime)	6 bar at +100 °C
		(for 600 hours)	4 bar at +125 °C
		(for 2 hours)	4 bar at +140 °C
		(max. test pressure)	18 bar at +40 °C
Cavitation	The following equation is valid to prevent cavitation:	$P_{abs\ outlet} / P_{difference} > 5.5$	

Materials in contact with medium (FDA-conform)

Sensor paddle	ETFE
Case with damming body	Brass (CuZn40PbZ), PA6T/6I (40% GF)
Sealing material	EPDM (perox.) (for drinking water) FPM

Electrical overview

			Frequency output	Voltage output	Current output
Power supply		U_{IN}	4.75 ... 33 VDC	11.5 ... 33 VDC	8 ... 33 VDC
Output	Frequency square pulse signal	$U_{OUT\_Q\_frequency}$	< 0.5 ... > U_{IN} - 0.5 V	–	–
Flow (Q)	Analogue signal	U_{OUT_Q} or I_{OUT}	–	0 ... 10 V	4 ... 20 mA
Output	Resistant signal	$R_{OUT\ PT1000}$		PT1000 class B DIN EN 60751	
temperature (T)	Voltage signal	U_{OUT_T}	–	0 ... 10 V	–
Electrical connection and protection class			M12x1 (IP 65)	M12x1 (IP 65)	M12x1 (IP 65)
Load agianst GND or IN			< 1 mA / < 100 nF	< 6 mA / < 100 nF [1)]	< (U_{IN} - 8 V) / 20 mA
Current consumption load free (I_{IN})			< 2mA	< 5 mA	–
Electrical reliability	Short circuit, reverse voltage and external voltage protected within the admissible supply voltage.				

Weight

DN 10 with thread K	~ 170 g
DN 10 with thread G	~ 250 g
DN 32	~ 650 g

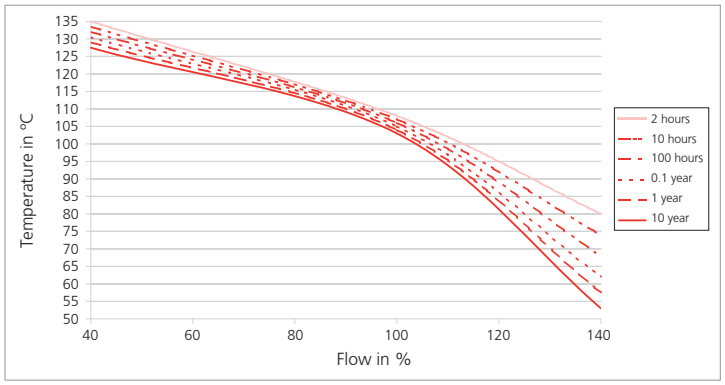
Test / Admissions

Electromagnetic compatibility	CE conformity acc. to EN 61326-2-3
Drinking water approval	WRAS, ACS Plastic parts with KTW and W270 approval

Packaging

Single packaging
Multiple packaging

Minimum life span on high flow rate and high temperature



Nominal diameters dependent variables

Nominal diameters	Tube connection	Measuring range	Quantity per pulse @ 50% fs	Flow range	Frequency range	Q_0	K_f	K_U	K_I	Pressure drop [1), 2)]
DN 10	K	1.8 ... 32 l/min	1.416 ml	0.265 ... 4.716 m/s	23 ... 374 Hz	-0.2	0.0860	3.2	2.000	22.50 * Q^2
DN 10	G	1.8 ... 32 l/min	1.386 ml		24 ... 380 HZ		0.0847			22.50 * Q^2
DN 10	K	2.0 ... 40 l/min	1.419 ml	0.295 ... 5.895 m/s	26 ... 467 Hz	-0.2	0.0860	4.0	2.500	22.50 * Q^2
DN 10	G	2.0 ... 40 l/min	1.386 ml		26 ... 479 Hz		0.0840			22.50 * Q^2
DN 32	K	14 ... 240 l/min	27.513 ml	0.290 ... 4.974 m/s	9 ... 145 Hz	-1.47	1.64710	24	15.000	0.25 * Q^2

Characteristic line formula frequency output
$Q_V = K_f * f + Q_0$

Characteristic line formula voltage output
$Q_V = K_U * U_{OUT}$

Characteristic line formula current output
$Q_V = K_I * (I_{OUT} - 4\ mA)$

Formula quantity per pulse [litres/pulse]
$$\frac{\text{quantity}}{\text{pulse}} = \frac{Q_V * K_f}{60 * (Q_V - Q_0)}$$

Legend

Q_V	Volume flow rate	[l/min]
Q_0	Axis intercept	[l/min]
K_f	Coefficient frequency output	[(l/min) / f]
K_U	Coefficient voltage output	[(l/min) / V]
K_I	Coefficient current output	[(l/min) / f]
f	Frequency	[Hz]
U_{OUT}	Voltage	[V]
I_{OUT}	Current	[mA]
quantity / pulse	Quantity per pulse	litres / pulse

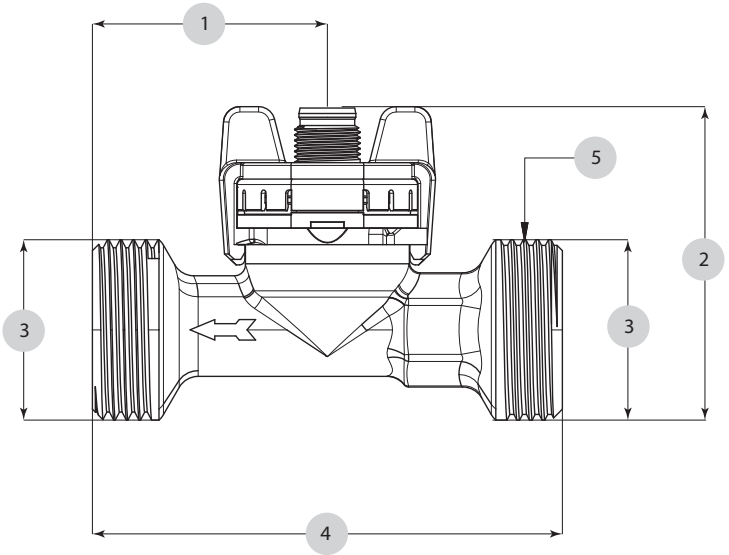
Order code selection table

			1	2	3	4	5	6	7
			236.	X	X	X	X	X	X	X
Version	Flow		9				4		
	Flow and temperature (PT1000)		8				5		
	Flow and temperature (0 ... 10 V)		6			3	5		
Nominal diameters and flow range	DN 10	1.8 ... 32 l/min.		1	0				
	DN 10	2.0 ... 40 l/min.		1	1				
	DN 32	14.0 ... 240 l/min.		3	2				K
Output and power supply Electrical connection	Frequency output (Square pulse signal)	4.75 ... 33 VDC	8,9			2			
	Analogue signal 0 ... 10 V	11.5 ... 33 VDC				3			
	Analogue signal 4 ... 20 mA	8 ... 33 VDC	8,9			4			
	Connector M12x1	2- or 3-pole (condensation protection)	9				4		
	Connector M12x1	4- or 5-pole (condensation protection)	8,6				5		
Sealing material	EPDM	Ethylene propylene rubber (peroxidically cross-linked)						1	
	FPM [3)]	Fluoro elastomer						2	
Tube connection	Brass with outside thread	K (DN 10 - G ½ , DN32 - G 1 ½)							K
		G (DN 10 - G 1)							G

Accessories [4)]

				Order number
Straight-wire box for connector M12x1 with cable	3-pole	200 cm		114605
Corner-wire box for connector M12x1 with cable	3-pole	200 cm		114604
Straight-wire box for connector M12x1 with cable	5-pole	200 cm	(with temperature)	114564
Corner-wire box for connector M12x1 with cable	5-pole	200 cm	(with temperature)	114563
Straight-wire box for connector M12x1 screwing terminal	5-pole			115024

Dimension diagram DN 10, 32



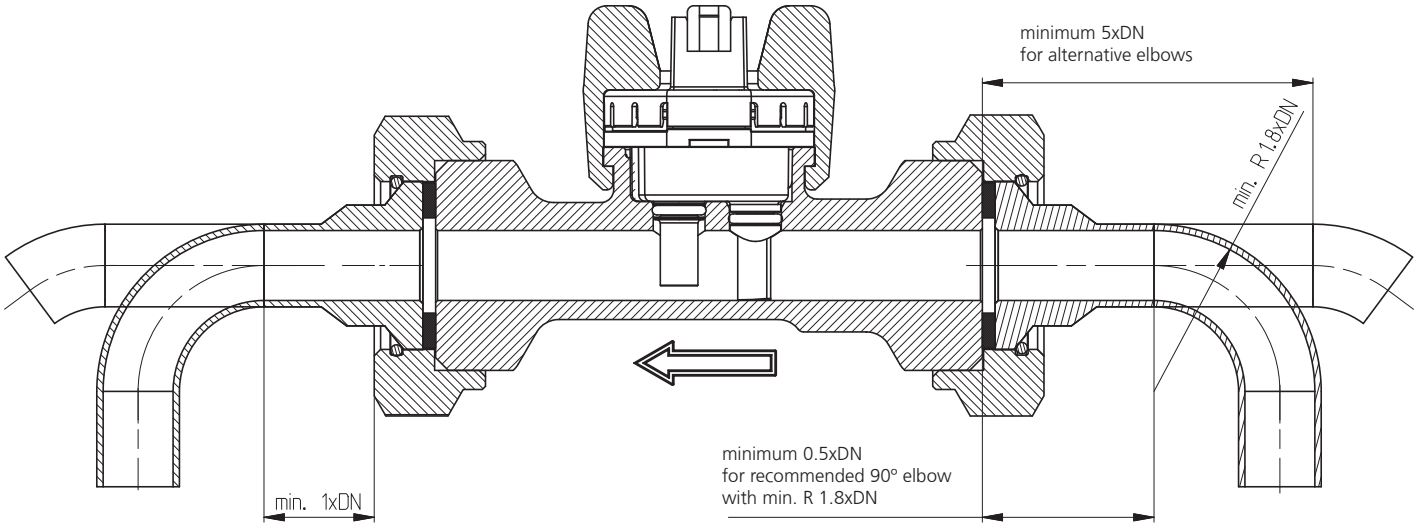
	1	2	3	4	5
DN10	43	57.3	G ½ / G 1	86	19
DN32	50	74.9	G 1 ½	134	41

[1)] incl. 3xDi inlet and outlet side
[2)] Pv in Pa; Q in l/min
[3)] No drinking water approval
[4)] Accessories supplied loose

Tube mounting instructions

Consider the following to ensure the correct function of the sensor.

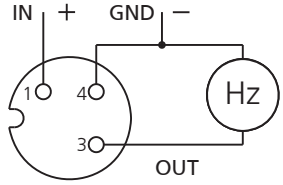
- Only diameter changes from large to small are allowed.
- Avoid repeated elbows in the same level at entryside



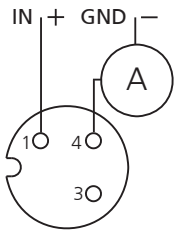
Electrical connection

Connector M12x1 without temperature measurement

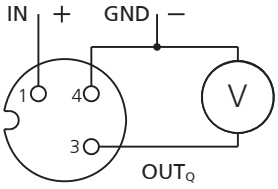
1



Frequency output



current output

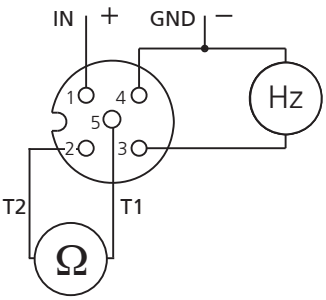


voltage output

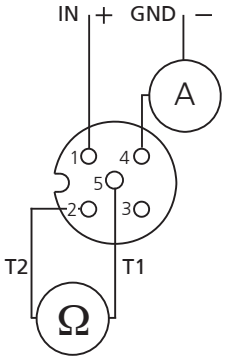
Pin		Colour
1		brown
3	1	blue
4		black
1		brown
2		white
3	2	blue
4		black
5		gray

Connector M12x1 with temperature measurement

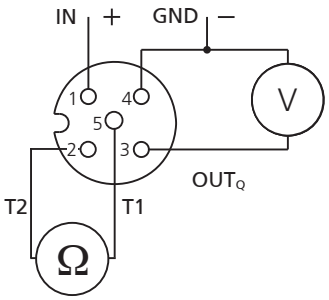
2



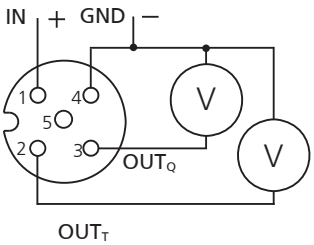
Frequency output
with PT1000



current output
with PT1000



voltage output
with PT1000

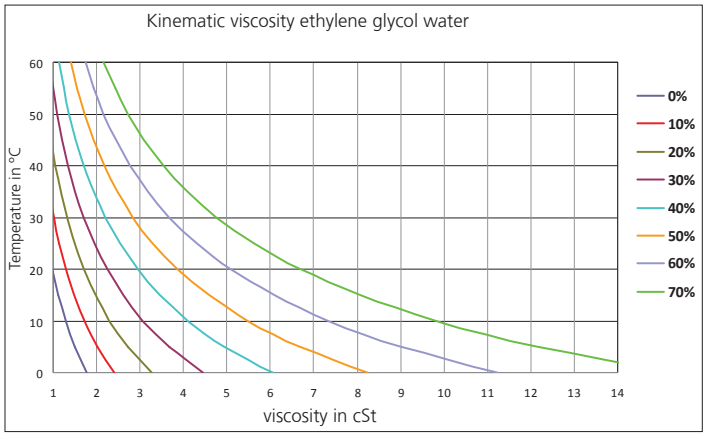


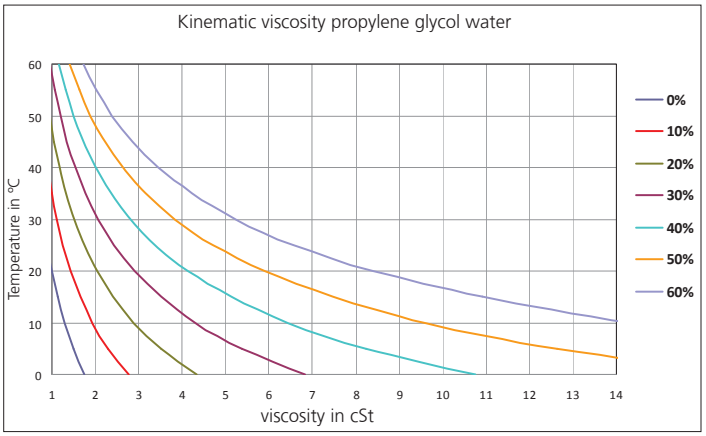
voltage output with
temperature output 0 ...10 V

Influence of glycol

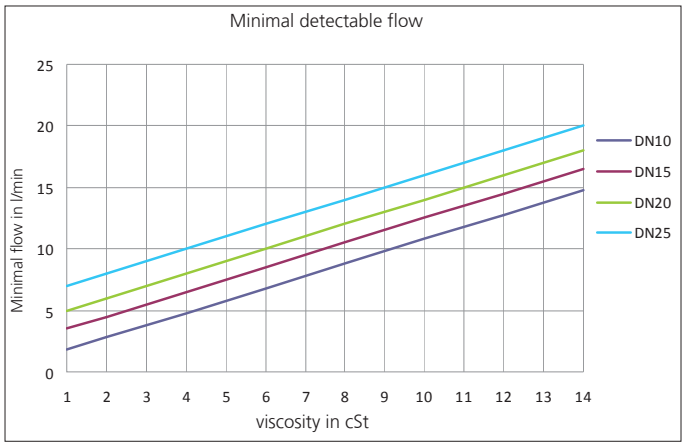
With the following definitions we are able to correct the influence of media with higher viscosity than water (= media viscosity > 1.8 cST) in order to reach a measuring accuracy of 3% fs in the range of 1.8 - 4 cST and of 4% in the range of 4 - 14 cSt (υ = viscosity in cSt).

Definition of viscosity of glycol-water-compound

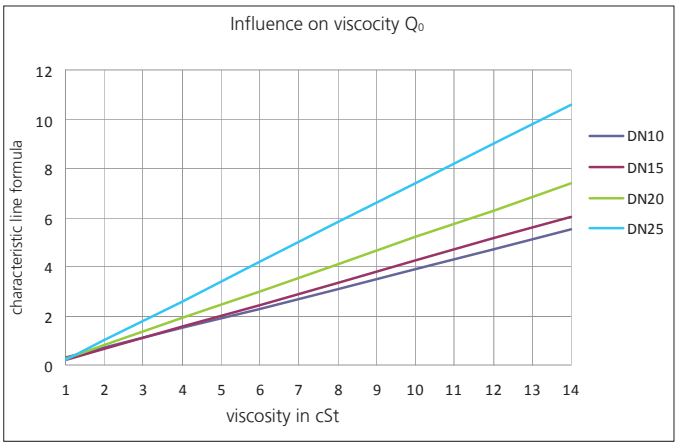




Definition of respond threshold Q_{min}



Definition of characteristic line formula $Q_V = k_f * f + Q_0$



Formula respond threshold Q_{min} in l/min

< DN 10 not possible

DN 10: $Q_{min} = \upsilon + 0.8$

DN 15: $Q_{min} = \upsilon + 2.5$

DN 20: $Q_{min} = \upsilon + 4.0$

DN 25: $Q_{min} = \upsilon + 6.0$

Formula characteristic line for $Q \geq Q_{min}$ in l/min

< DN 10 not possible

Frequency output:

DN10: $Q = 0.0832 * f - 0.40\upsilon + 0.20$

DN15: $Q = 0.1843 * f - 0.45\upsilon + 0.25$

DN20: $Q = 0.3754 * f - 0.55\upsilon + 0.25$

DN25: $Q = 0.7467 * f - 0.80\upsilon + 0.60$

Conversion table for the most important pressure units

	bar	mbar	Pa	hPa	kPa	MPa	mmH_2O	$inchH_2O$	mmHg	inchHg	psi
bar	1	1'000	100'000	1'000	100	0,1	10'197,2	401,463	750,062	29,5300	14,5038
mbar	0,001	1	100	1	0,1	0,0001	10,1972	0,401463	0,750062	0,0295300	0,0145038
Pa	0,00001	0,01	1	0,01	0,001	0,000001	0,101972	0,0040146	0,0075006	0,0002953	0,0001450
hPa	0,001	1	100	1	0,1	0,0001	10,1972	0,401463	0,750062	0,0295300	0,0145038
kPa	0,01	10	1'000	10	1	0,001	101,972	4,01463	7,50062	0,295300	0,145038
MPa	10	10'000	1'000'000	10'000	1'000	1	101'972	4'014,63	7'500,62	295,300	145,038
mmH_2O	0,0000981	0,0980665	9,80665	0,0980665	0,009807	0,0000098	1	0,0393701	0,0735559	0,0028959	0,0014223
$inchH_2O$	0,0024909	2,49089	249,089	2,49089	0,249089	0,0002491	25,4000	1	1,86832	0,0735559	0,0361273
mmHg	0,0013332	1,33322	133,322	1,33322	0,133322	0,0001333	13,5951	0,535240	1	0,0393701	0,0193368
inchHg	0,0338639	33,8639	3'386,39	33,8639	3,38639	0,0033864	345,316	13,5951	25,4000	1	0,491154
psi	0,0689476	68,9476	6894,76	68,9476	6,89476	0,0068948	703,070	27,6799	51,7149	2,03602	1

Example: 1MPa = 10'000 hPa

	bar	mbar	Pa	hPa	kPa	MPa	mmH_2O	$inchH_2O$	mmHg	inchHg	psi
bar	1	1'000	100'000	1'000	100	0,1	10'197,2	401,463	750,062	29,5300	14,5038
mbar	0,001	1	100	1	0,1	0,0001	10,1972	0,401463	0,750062	0,0295300	0,0145038
Pa	0,00001	0,01	1	0,01	0,001	0,000001	0,101972	0,0040146	0,0075006	0,0002953	0,0001450
hPa	0,001	1	100	1	0,1	0,0001	10,1972	0,401463	0,750062	0,0295300	0,0145038
kPa	0,01	10	1'000	10	1	0,001	101,972	4,01463	7,50062	0,295300	0,145038
MPa	~~10~~	~~10'000~~	~~1'000'000~~	10'000	1'000	1	101'972	4'014,63	7'500,62	295,300	145,038
mmH_2O	0,0000981	0,0980665	9,80665	0,0980665	0,009807	0,0000098	1	0,0393701	0,0735559	0,0028959	0,0014223
$inchH_2O$	0,0024909	2,49089	249,089	2,49089	0,249089	0,0002491	25,4000	1	1,86832	0,0735559	0,0361273
mmHg	0,0013332	1,33322	133,322	1,33322	0,133322	0,0001333	13,5951	0,535240	1	0,0393701	0,0193368
inchHg	0,0338639	33,8639	3'386,39	33,8639	3,38639	0,0033864	345,316	13,5951	25,4000	1	0,491154
psi	0,0689476	68,9476	6894,76	68,9476	6,89476	0,0068948	703,070	27,6799	51,7149	2,03602	1

Example: 1 bar = 401.463 $inchH_2O$

	bar	mbar	Pa	hPa	kPa	MPa	mmH_2O	$inchH_2O$	mmHg	inchHg	psi
bar	~~1~~	~~1'000~~	~~100'000~~	~~1'000~~	~~100~~	~~0,1~~	~~10'197,2~~	401.463	750,062	29,5300	14,5038
mbar	0,001	1	100	1	0,1	0,0001	10,1972	0,401463	0,750062	0,0295300	0,0145038
Pa	0,00001	0,01	1	0,01	0,001	0,000001	0,101972	0,0040146	0,0075006	0,0002953	0,0001450
hPa	0,001	1	100	1	0,1	0,0001	10,1972	0,401463	0,750062	0,0295300	0,0145038
kPa	0,01	10	1'000	10	1	0,001	101,972	4,01463	7,50062	0,295300	0,145038
MPa	10	10'000	1'000'000	10'000	1'000	1	101'972	4'014,63	7'500,62	295,300	145,038
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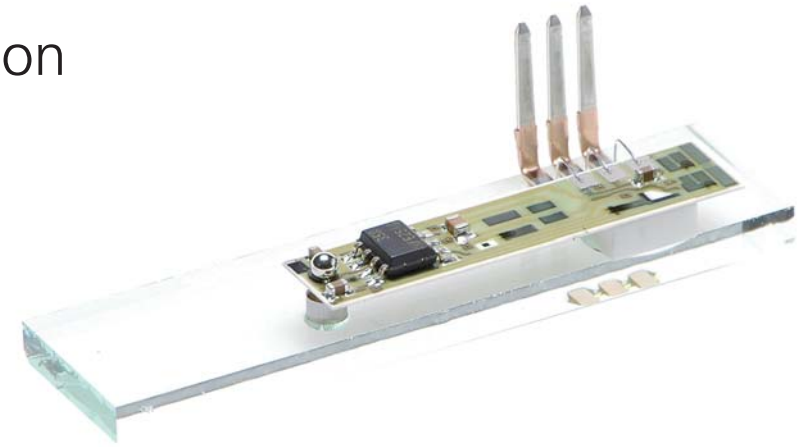
inchHg	0,0338639	33,8639	3'386,39	33,8639	3,38639	0,0033864	345,316	13,5951	25,4000	1	0,491154
psi	0,0689476	68,9476	6894,76	68,9476	6,89476	0,0068948	703,070	27,6799	51,7149	2,03602	1

Cantilever Beam force cell type 410

Measuring range
0 ... 53 – 265 Centi-Newton



The type 410 measures force with the cantilever beam by an integrated piezo-resistive wheatstone bridge with front-end amplification circuit.

It uses hybrid thick film technology which guarantees an excellent stability and a long operating life. The special design of the force cell ensure batch production and with fully automated assembly an ideal performance to cost ratio for high quantities.

- Compact construction for a wide range of industrial applications
- Ideal for OEM batches in high quantities
- High resistance to temperatures
- No mechanical aging
- No mechanical creep

Technical overview

Measuring pressure
0 ... 53 – 265 Centi-Newton

Operating conditons

Temperature		Medium / ambient	0 ... +70 °C
		Storage	-10 ... +70 °C
Tolerable overload			< 1000 cN

Electrical overview

Output	The signal varies ratiometrically with supplied voltage.		
	The non-ratiometrical value of the output signal is with a change of power supply of ± 5%:		typ. 0.5 % fs
			max. 1.0 % fs
Power supply		Factory calibration	5 VDC
Load			$R_L \geq 50$ kOhm ; $C_L \leq 10$ nF
Current consumption	At 50 kOhm Load / 5 VDC power supply		< 3 mA
Electromagnetic compatibility	The product is designed exclusively for installation in equipment. The customer is responsible for CE conformity.		

Dynamic response

Response time	< 1 ms
Load cycle	< 1000 Hz

Protection standard
IP 00

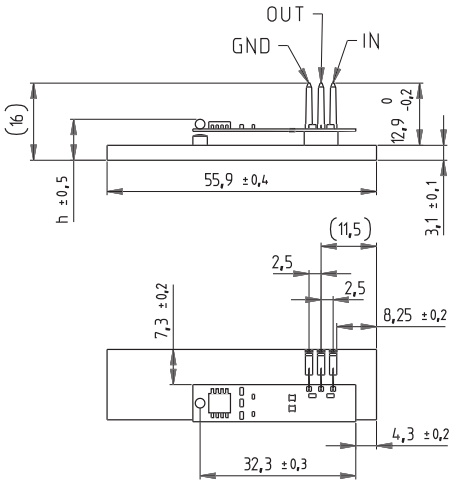
Electrical connection
PIN connector, RAST 2.5

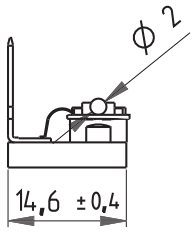
Mounting instruction
Fix the force sensor on the base plate (glass) ensuring there is no mechanical stress..

Weight
~ 7.1 g

Packaging
Multiple packaging in cardboard boxes with blister pack inserts (40 pcs [1])

Dimensions in mm / Electrical connections





	Mass h
53 cN	8.40
160 cN	8.60
265 cN	8.74

Accuracy

Parameter		Unit	
Tolerance zero point	max.	% fs	± 2.0
Tolerance full scale	max.	% fs	± 30.0
Resolution		% fs	0.1
Total of linearity, hysteresis and repeatability	max.	% fs	± 0.2
Long term stability acc. to DIN EN 60770		% fs	± 0.5
TC zero point [2]	max.	% fs/10K	± 0.3
TC sensitivity [2]	max.	% fs/10K	± 0.1

Order code selection table

		1	2	3	4	5
	410.	X	X	X	X	X
Measuring range	0 ... 53 cN	9	2			
	0 ... 160 cN	9	4			
	0 ... 265 cN	9	5			
Output / power supply	0.3 ... 2.8 V 5 VDC			1		
Electrical connection	PIN connection, RAST 2.5				1	
Compensation	With temperature compensated					1

[1] Minimal order quantity

[2] TC = Temperature coefficient

Digital indicator type 800

Pressure range
0 ... 800 bar
Indicator in mbar / bar

Type 800 digital indicators are equipped with a 4 digit display, as well as optional switch and analogue outputs. The sensor signal is evaluated and indicated as pressure by the digital display. The programming of the limit value output can be executed with the buttons on the front or via a data cable from a computer.

- Ease of use
- All adjustments are possible from the front of unit
- Limit value switching points pre-adjustable without application of pressure
- Transmitter power supply from indicating device saves cabling
- Electrically isolated signal transmission direct to measurement value acquisition system or to PLC controllers

Technical overview

Pressure range [1]
0 ... 800 bar

Temperature		
Temperature coefficient	Zero drift	typ. 30 ppM/°C
	Amplification drift	typ. 25 ppM/°C
Ambient temperature		-5 ... +45 °C
Max. air humidity		95% non condensing

Electrical overview			
Output [2]	Max. signal current cable lenght	Max. load current	Relay contacts
0 ... 20 mA 4 ... 20 mA 0 ... 10 VDC	2000 m, 2 wire	500 Ohm (≙ 10 V / 20 mA)	Loading 1 A / 230 VAC at ohmic load
Power supply	20 ... 253 VAC or VDC	50/60 Hz	
Transmitter supply 2 wire			24 VDC, max. 25 mA
Input [3]			0 ... 10 VDC
			0 ... 5 VDC
			0 ... 20 mA
			4 ... 20 mA
Power consumption			4 ... 7.0 W at 230 VAC

Accuracy	
At 23 °C ambient temperature	± 0.1 %
Repeatability	± 0.1 %
Long term stability (after 3 months)	± 0.1 %
Hysteresis (Factory-sides)	± 5 parts

Type of connection		
Screw terminal	3 + 8 pole	for 800.8
	3 + 6 + 8 pole	for 800.7

Indicator				
LED red	4 digits	mbar / bar	character height 14.2 mm	Range -1999 ... 9999

Limit values	Adjustment of limit values	Limit value indicating	Indicating of limit value status
Both limit values adjustable within the whole range.	with buttons on the front	with buttons on the front	Each with a red LED

Protection class	
without protection cover	IP 40
with protection cover	IP 54

Fastening
with 2 quick connect couplings

Weight
~ 200 g

[1] Special pressure ranges on request
[2] Special outputs on request
[3] Special inputs on request

Order code selection table

		1	2	3	4	5	6	7
	800.	X	X	X	X	X	X	X
Type	Without limit value switch	8						
	With 2 limit value switches	7						
Pressure range	0 … 0.5 mbar		0	0				
	*0 … 1 mbar		0	1				
	*0 … 1.6 mbar		0	2				
	0 … 2 mbar		0	3				
	*0 … 2.5 mbar		0	4				
	0 … 3 mbar		0	5				
	0 … 3.2 mbar		0	6				
	*0 … 4 mbar		0	7				
	0 … 5 mbar		0	8				
	*0 … 6 mbar		0	9				
	0 … 8 mbar		1	0				
	*0 … 10 mbar		1	1				
	*0 … 16 mbar		1	2				
	0 … 20 mbar		1	3				
	*0 … 25 mbar		1	4				
	0 … 30 mbar		1	5				
	0 … 32 mbar		1	6				
	*0 … 40 mbar		1	7				
	0 … 50 mbar		1	8				
	*0 … 60 mbar		1	9				
	0 … 80 mbar		2	0				
	*0 … 100 mbar		2	1				
	*0 … 160 mbar		2	2				
	0 … 200 mbar		2	3				
	*0 … 250 mbar		2	4				
	0 … 300 mbar		2	5				
	0 … 320 mbar		2	6				
	*0 … 400 mbar		2	7				
	0 … 500 mbar		2	8				
	*0 … 600 mbar		2	9				
	0 … 800 mbar		3	0				
	*0 … 1 bar		3	1				
	*0 … 1.6 bar		3	2				
	0 … 2 bar		3	3				
	*0 … 2.5 bar		3	4				
	0 … 3 bar		3	5				
	0 … 3.2 bar		3	6				
	*0 … 4 bar		3	7				
	0 … 5 bar		3	8				
	*0 … 6 bar		3	9				
	0 … 8 bar		4	0				
	*0 … 10 bar		4	1				
	*0 … 16 bar		4	2				
	0 … 20 bar		4	3				
	*0 … 25 bar		4	4				
	0 … 30 bar		4	5				
	0 … 32 bar		4	6				
	*0 … 40 bar		4	7				
	0 … 50 bar		4	8				
	*0 … 60 bar		4	9				
	0 … 80 bar		5	0				
	*0 … 100 bar		5	1				
	*0 … 160 bar		5	2				
	0 … 200 bar		5	3				
	*0 … 250 bar		5	4				
	0 … 300 bar		5	5				
	0 … 320 bar		5	6				
	*0 … 400 bar		5	7				
	0 … 500 bar		5	8				
	*0 … 600 bar		5	9				
	0 … 800 bar		6	0				
Power supply	20 ... 253 VAC or VDC				0			
Input	0 … 10 VDC					0		
	0 … 5 VDC					1		
	0 … 20 mA					2		
	4 … 20 mA					3		
Output	0 … 20 mA						0	
	4 … 20 mA						1	
	0 … 10 VDC						2	
Version								N

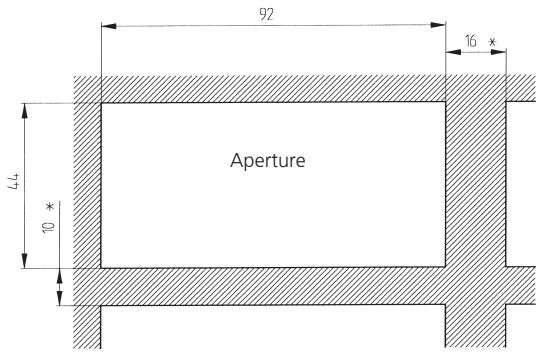
Accessories [2]

	Order number
Protection cover	800.100
Data cable	800.200

[1] Pressure range acc. to DIN 16128

[2] Accessories supplied loose

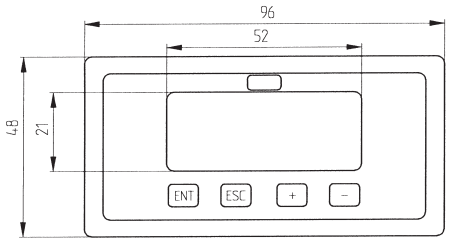
Dimensions in mm

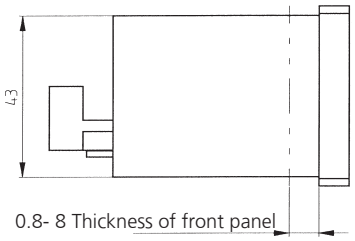


* min. spacing between indicating devices

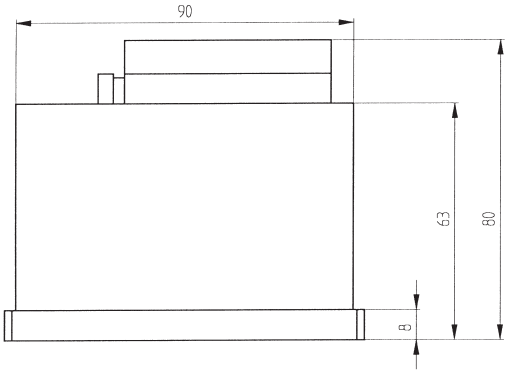
Lug marking:

1 = Auxiliary power: AC ~/DC (+)
2 = Auxiliary power: AC ~/DC (-)
3 = Auxiliary power: PE
4 = Output signal (+)
5 = Output signal (-)
6 = Output signal PE
7 = Free
8 = Two-wire sensor power supply +24V
9 = Input signal (-)
10 = Input signal voltage (+)
11 = Input signal current (+)
12 = Limit value 1, NO contact
13 = Limit value 1, Change-over contact
14 = Limit value 1, NC contact
15 = Limit value 2, NO contact
16 = Limit value 2, Change-over contact
17 = Limit value 2, NC contact





0.8- 8 Thickness of front panel



LCD Display type 801

Type 801 digital indicators are compatible with all sensors with DIN plug EN 175301-803-A.
Independent of the mounting position of the sensor, the display can be rotated to give the ideal reading position. The 801 has a 3 digit liquid-crystal display which is adjustable by the customer, or available factory set.

- Portable plug-in indicator
- Irrespective of the installation arrangement of your transducer the display module can be rotated and turned to give the ideal reading-position
- Protection class IP 65 with screw-fastened DIN EN 175301-803 connectors

Technical overview

Temperature			
Ambient			0 ... +60 °C
Storage			-20 ... +75 °C
Electrical overview			
Current consumption	0 ... 5 V / 0 ... 10 V / 0 ... 20 mA		< 4 mA
	4 ... 20 mA		voltage drop 8 V
Signal / power supply [1]	3 wire	0 ... 5 V	11 ... 33 VDC, 24 VDC ± 15 %
		0 ... 10 V	18 ... 33 VDC, 24 VAC ± 15 %
	2 wire	4 ... 20 mA	8 ... 33 VDC
Internal resistance		0 ... 5 V	> 100 kOhm
		0 ... 10 V	> 100 kOhm
		0 ... 20 mA	< 50 Ohm
Dynamic response			
Response time			< 5 ms
Accuracy			
Typically at ambient temperature 23 °C			≤ ± 2 digit typ.
Long term stabiltity (after 1 year)			≤ ± 2 digit typ.
TC zero point [2]			≤ ± 0.2 digit/K typ.
TC sensitivity [2]			≤ ± 0.2 digit/K typ.
Electrical connection			
Connector DIN EN 175301-803			
Display			
Liquid crystal		3 digit	character height 9.4 mm

Indication capabilities (All intermediate values steplessly adjustable)	
Lowest value	highest value
-1.00	9.00
.000	.900
0.00	9.00
00.0	90.0
000	900

Protection standard
IP 65 with seals and fastened connectors. To maintain the protection standard, avoid constantly twisting the individual modules.

Calibration
Factory calibration (indicate on order).
Calibration by the customer using two 10- turn potentiometers (zero point and end value) and DIP switches to position the decimal point.

Case construction
Polyamid

Wheigt
~ 95 g

Test / Admissions	
Electromagnetic compatibilty	CE conformity according EN 61326-2-3.

Order code selection table

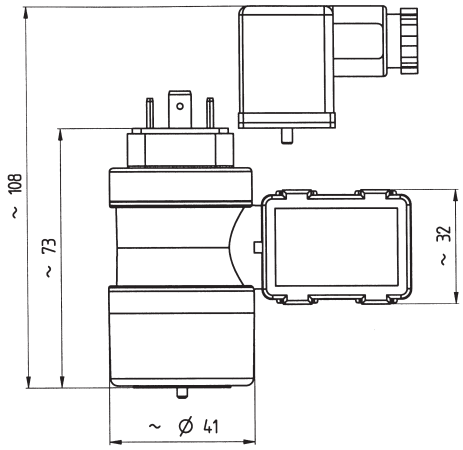
801.	1	2	3	4
		X	X	X	X

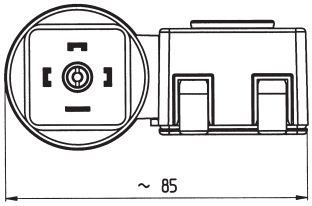
Signal / power supply	0 ... 5 V	11 ... 33 VDC/24 VAC ± 15%	0			
	0 ... 10 V	18 ... 33 VDC/24 VAC ± 15%	1			
	0 ... 20 mA	18 ... 33 VDC	2			
	4 ... 20 mA	8 ... 33 VDC	3			
Display unit (Text on display)	without text (adhesive labels for units enclosed, loose)			0		
	mbar			1		
	bar			2		
	kg / cm²			3		
	Inch H2O			4		
	psi			5		
	kPa			6		
Factory adjustment	without factory setting				0	
	with factory setting (state on order)	Example: 0 Volt Indication 00.0 10 Volt Indication 10.0				
	Note: Always indicate 3 places and decimal point (– before 1st place)				1	W

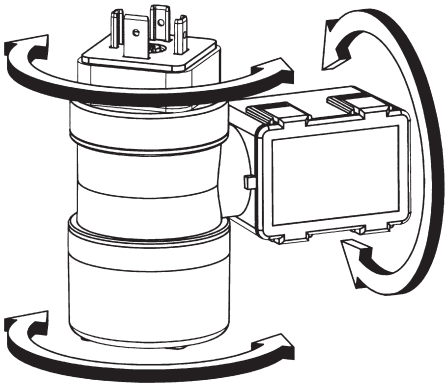
[1] Short circuit-proof and protected against polarity reversal. Each connection against other with max. supply voltage.

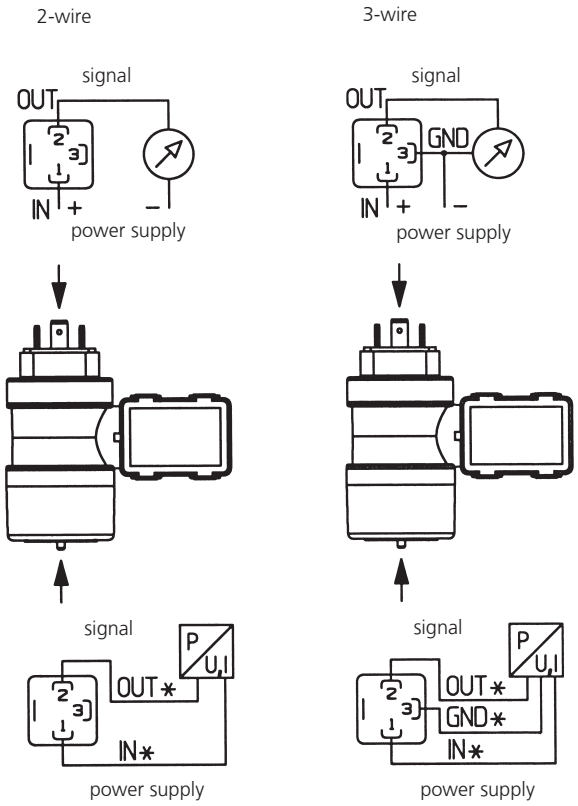
[2] TC = Temperature coefficient

Dimensions in mm / Electrical connections









When used with Huba transmitters the supply voltage is 19 ... 40 VDC for 4 ... 20 mA, 2-wire versions

maximum permitted additional load $< \frac{\text{Uin [V]} - 19}{0.02}$ [Ohm]

Huba Control

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