Melt pressure transducer

Type 404450/4 ADM-35

Installation Instructions

40445000T94Z001K000

V1.00/EN/00321715

Content

Content

Warning symbols

DANGER!

This symbol indicates that personal injury caused by electrical shock may occur if the respective precautionary measures are not carried out.

WARNING!

This symbol in connection with the signal word indicates that personal injury may occur if the respective precautionary measures are not carried out.

CAUTION!

This symbol in connection with the signal word indicates that damage to assets or data loss will occur if the respective precautionary measures are not taken.

CAUTION!

This symbol indicates that components could be destroyed by electrostatic discharge (ESD = Electro Static Discharge) if the respective cautionary measures are not taken.

Only use the ESD packages intended for this purpose to return device inserts, assembly groups, or assembly components.

READ THE DOCUMENTATION!

This symbol, which is attached to the device, indicates that the associated **documentation for the device** must be **observed**. This is necessary to identify the nature of the potential hazard, and to take measures to prevent it.

Note symbols

NOTE!

This symbol refers to **important information** about the product, its handling, or additional use.

REFERENCE!

This symbol refers to **further information** in other sections, chapters, or manuals.

DISPOSAL!

At the end of its service life, the device and any batteries present do not belong in the trash! Please ensure that they are **disposed of** properly and in an **environmentally friendly** manner.

1 Safety information

NOTE!

All the necessary settings and possible interferences are described in the operating manual. If any difficulties should still arise during start-up, you are asked not to carry out any unauthorized interferences on the unit – you may invalidate the warranty claim.
Please get in touch with us.

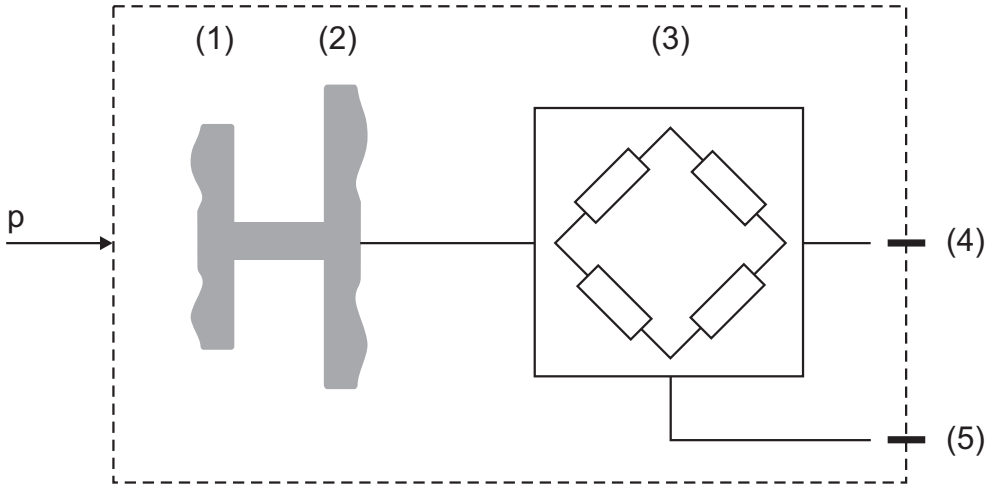
2.1 Brief description

The pressure transducer is used for pressure measurement and the remote transmission of measured values using standard signals.

The operating pressure on the membranes is transferred into the measuring head through a temperature-compensating liquid column. The expansion of the membrane in the measuring head is transferred to a full-bridge strain gage, which transforms the pressure into an electrical signal.

Areas of application include plastics processing, process engineering, and chemical plants.

2.2 Block diagram



1 Membrane (Einschraubteil)
2 Membrane (Messkopf)
3 DMS
4 Ausgangssignal
5 Hilfsspannung

2 General information

3.1 Order details

	(1)	**Basic type**
404450		Melt pressure transducer type 404450/4 ADM-35
	(2)	**Basic type extension**
000		With rigid thermowell
031		With capillary
999		Special version
	(3)	**Input**
464		0 bar to 100 bar relative pressure
467		0 to 400 bar relative pressure
468		0 to 600 bar relative pressure
469		0 bar to 1000 bar relative pressure
471		0 bar to 2000 bar relative pressure
510		0 bar to 50 bar relative pressure
511		0 bar to 200 bar relative pressure
512		0 bar to 800 bar relative pressure
999		Special measuring range for relative pressure
	(4)	**Output**
405		4 mA to 20 mA, 2-wire
432		2 mV/V
433		3.3 mV/V
450		CANopen
	(5)	**Process connection**
535		M18 (× 1.5), DIN 3852-1
592		1/2-20 UNF
	(6)	**Membrane material**
20		CrNi (stainless steel)
81		Inconel 2.4668
82		Hastelloy 2.4610
	(7)	**Filling medium**
17		Hg (mercury)
18		NAK (mercury-free)
	(8)	**Voltage supply**
15		DC 10 V
27		DC 11.5 to 30 V
	(9)	**Electrical connection**
35		Bendix circular connector
36		Round plug M12 × 1
69		Bendix coupling socket
70		Bendix coupling socket with 5 m cable
	(10)	**Extra codes**
000		None
620		Deviation from characteristic line 0.5%

3 Identifying the instrument version

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)
Order code		/		-		-		-		-		-		-		-		/	
Order example	404450	/	000	-	510	-	405	-	535	-	20	-	17	-	27	-	69	/	000

3.2 Accessories

Description	**Part no.**
Insert socket	
M18 × 1.5	00307887
1/2-20 UNF-2A	00307891
Cleaning tool	
M18 × 1.5	00310281
1/2-20 UNF-2A	00310280

3.3 Scope of delivery

1 device in the version ordered
1 installation instructions B 404450.4
Test report

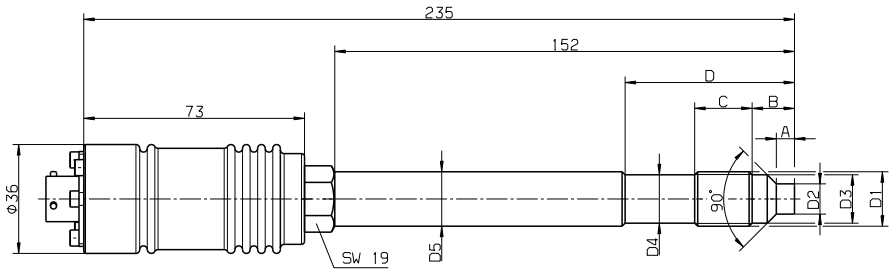
Screw-in element	Stainless steel, material-no. 1.4541
Measuring head	Aluminum, anodized
Pressure connection	M18 × 1.5 according to VDMA 24456 Or 1/2-20 UNF-2A
Pressure ranges	0 to 50 bar 0 bar to 100 bar 0 to 200 bar 0 to 400 bar 0 to 600 bar 0 to 800 bar 0 to 1000 bar 0 to 2000 bar
Load limit Up to 1000 bar Above 1000 bar	 1.5x end measuring value 1.2x end measuring value
Application area	Pressure range
Electrical connection	Bendix circular connector Standard On flange plug PT 02 A 10-6 Extra code 69 With coupling socket PT 06 W 10-6S
Voltage supply	According to the version ordered
Bridge resistance	350 Ω ±1 %
Deviation from characteristic line at tolerance band setting	1 % to 10 % of the pressure range
Output at end pressure value Standard for extra code 67	 2 mV/V 3.3 mV/V
Admissible ambient temperature Membranes Measuring head for extra code 134 Membranes Measuring head	 20 to 400 °C 100 °C 50 to 280 °C 85 °C
Reproducibility	0.2 %
Ambient temperature influence on the membranes Zero drift Measurement span drift on the measuring head Zero drift	 ±0.02 bar/K ±0.04 bar/K, deviating from a calibration temperature of 200 °C ±0.02 %
Measuring frequency range of the pressure signal	0 to 100 Hz
Leakage resistance	10000 MΩ
Calibration resistance	80% installed
Protection type	IP53

4 Technical data

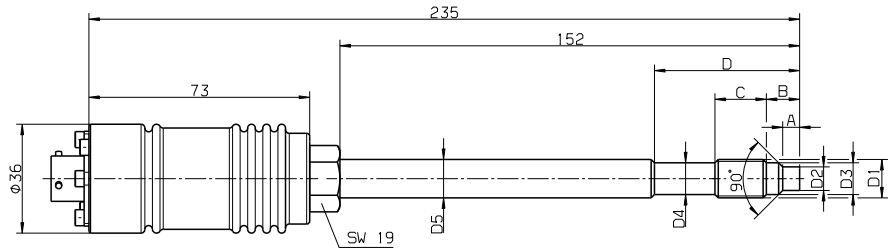
5.1 Dimensions

5.1.1 Melt pressure transducer with rigid thermowell, type 404450/000

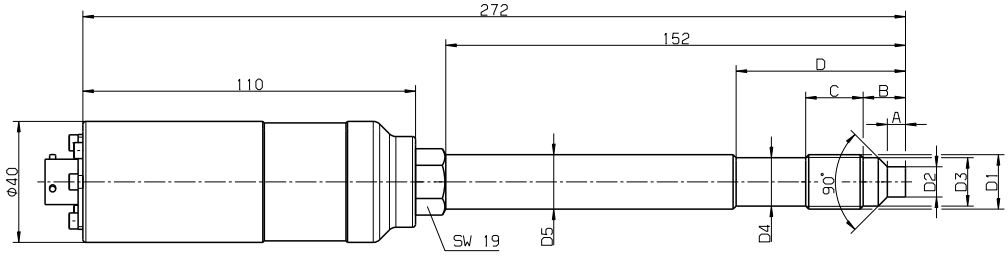
Type 404450/000-XXX-432(433) with process connection 535 (M18 × 1.5)



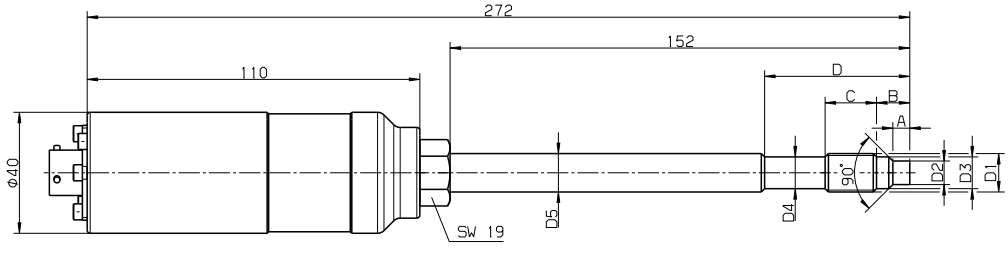
Type 404450/000-XXX-432(433) with process connection 592 (1/2-20 UNF)



Typ 404450/000-XXX-405 mit Prozessanschluss 535 (M18 × 1,5)

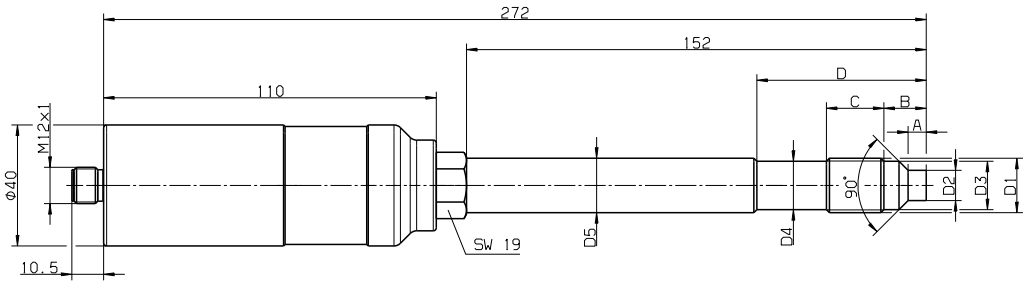


Type 404450/000-XXX-405 with process connection 592 (1/2-20 UNF)

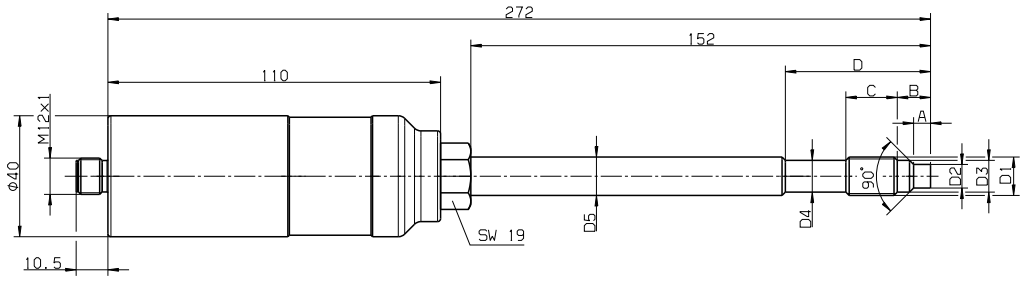


5 Mounting

Type 404450/000-XXX-450 with process connection 535 (M18 × 1.5)

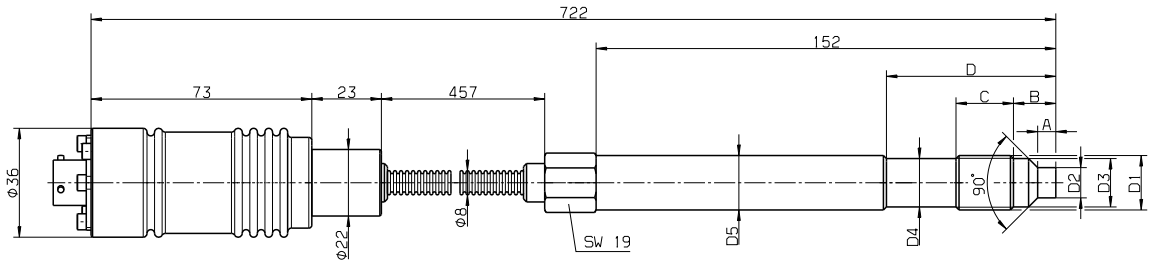


Type 404450/000-XXX-450 with process connection 592 (1/2-20 UNF)

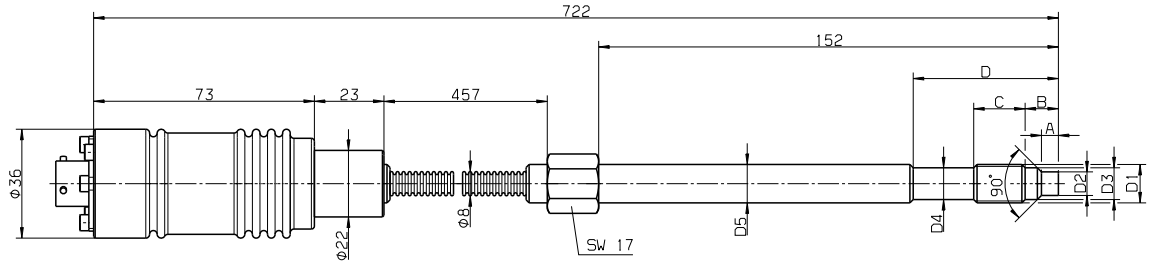


5.1.2 Melt pressure transducer with capillary, type 404450/031

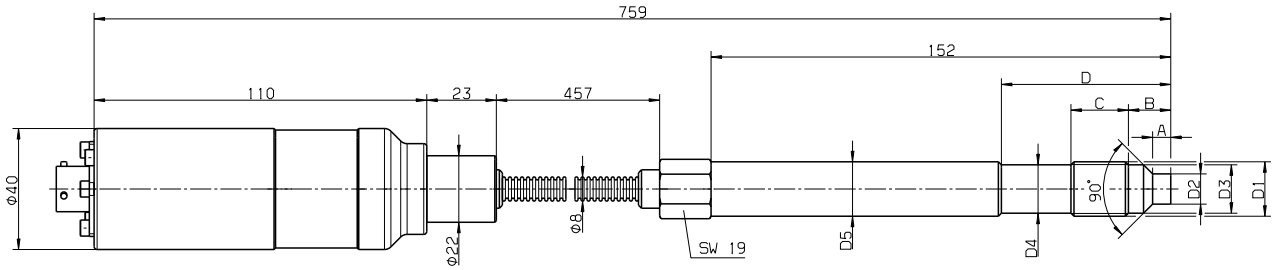
Type 404450/031-XXX-432(433) with process connection 535 (M18 × 1.5)



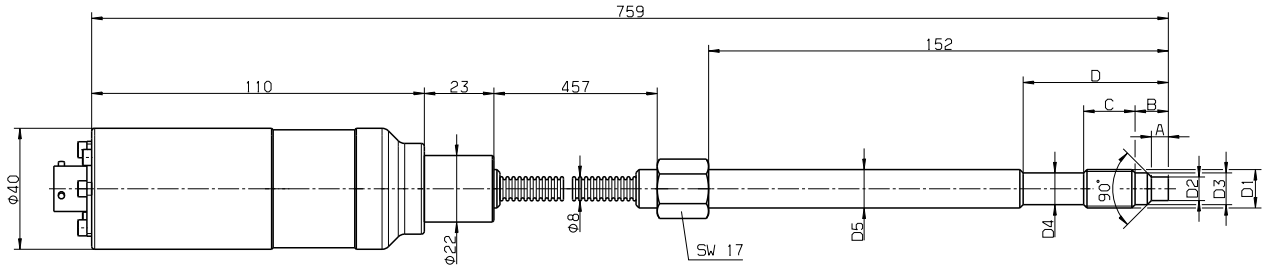
Type 404450/031-XXX-432(433) with process connection 592 (1/2-20 UNF)



Type 404450/031-XXX-405 with process connection 535 (M18 × 1.5)

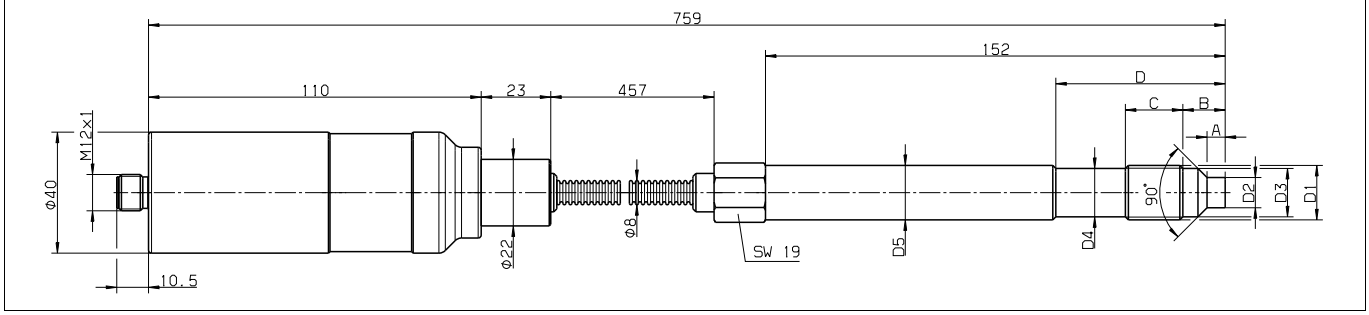


Type 404450/031-XXX-405 with process connection 592 (1/2-20 UNF)

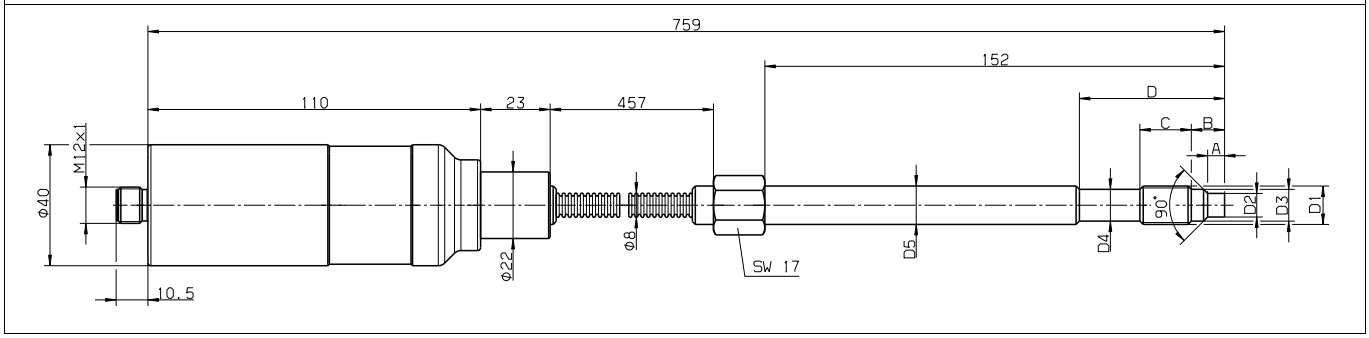


5 Mounting

Type 404450/031-XXX-450 with process connection 535 (M18 × 1.5)



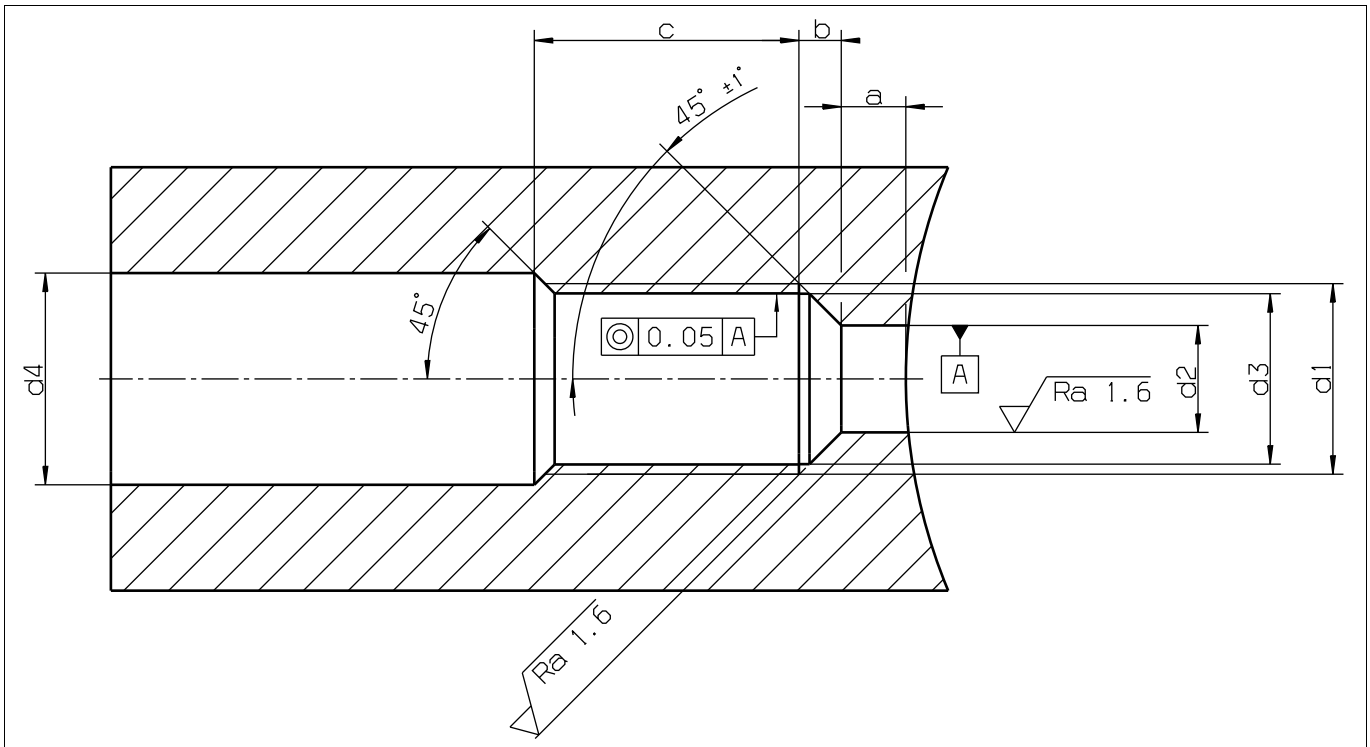
Type 404450/031-XXX-450 with process connection 592 (1/2-20 UNF)



5.1.3 Tolerance classes

Output	D1	D2	D3	D4	D5	A	B	C	D
2 mV/V (NTS 432)	M18 × 1.5 (NTS 535)	Ø 10	Ø 16	Ø 16	Ø 18	6	14	19	56
		0/-0.05	0/-0.1			0/-0.2			
3.33 mV/V (NTS 433)	1/2-20 UNF (NTS 592)	Ø 7.8	Ø 10.5	Ø 10.5	Ø 12.7	5.6	11	17	48
		0/-0.05	0/-0.05			-0.05/-0.15			
4 to 20 mA 2-wire circuit (NTS 405)	M18 × 1.5 (NTS 535)	Ø 10	Ø 16	Ø 16	Ø 18	6	14	19	56
		0/-0.05	0/-0.1			0/-0.2			
	1/2-20 UNF (NTS 592)	Ø 7.8	Ø 10.5	Ø 10.5	Ø 12.7	5.6	11	17	48
		0/-0.05	0/-0.05			-0.05/-0.15			
CANopen (NTS 450)	M18 × 1.5 (NTS 535)	Ø 10	Ø 16	Ø 16	Ø 18	6	14	19	56
		0/-0.05	0/-0.1			0/-0.2			
	1/2-20 UNF (NTS 592)	Ø 7.8	Ø 10.5	Ø 10.5	Ø 12.7	5.6	11	17	48
		0/-0.05	0/-0.05			-0.05/-0.15			

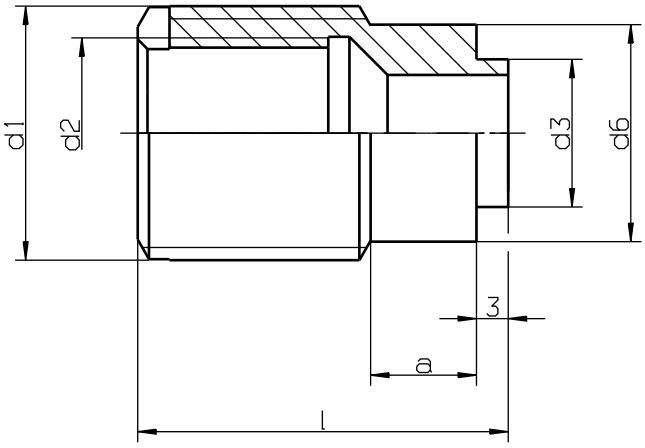
5.1.4 Mounting hole

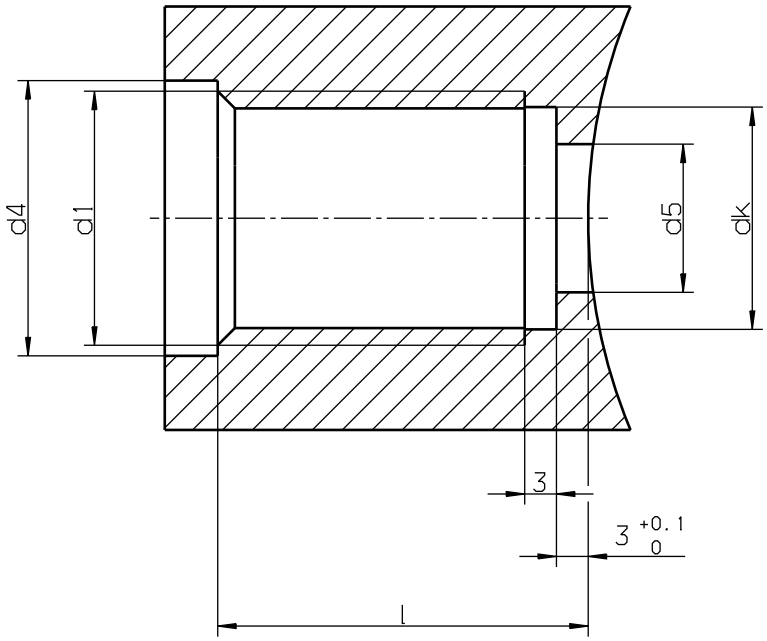


d_1	d_2	d_3	d_4	a	b	c
M18 × 1.5	Ø 10.1 +0.05/0	Ø 16.1 +0.1/0	Ø 20 +0.2/0	6.1 0/-0.1	4 0/-0.2	25
1/2-20 UNF 2A	Ø 7.9 +0.05/0	Ø 10.7 +0.1/0	Ø 13 +0.2/0	5.7 0/-0.1	3.2 0/-0.2	19

5.1.5 Insert socket

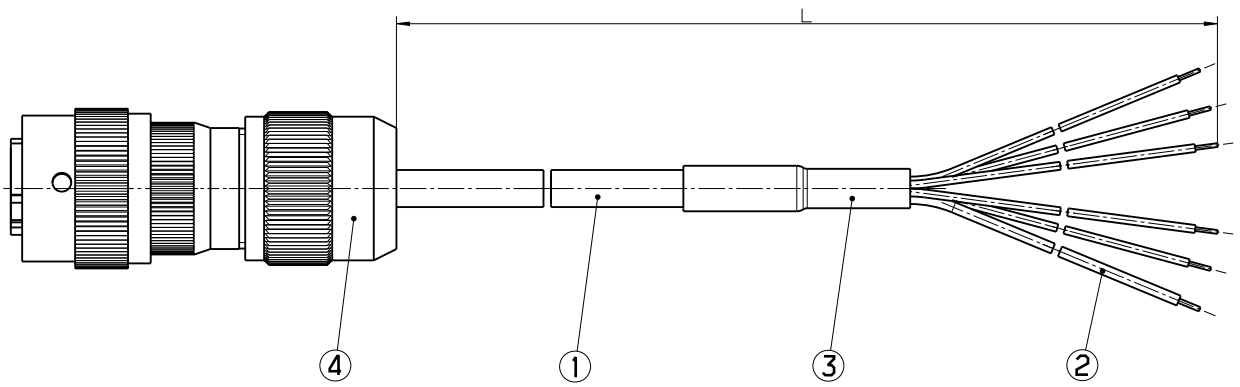
(Accessories; must be ordered separately)





d1	d2	d3	d4	d5	d6	dk	a	l
M16	1/2-20 UNF	Ø 9.95 0/-0.05	Ø 18	Ø 10 H7	Ø 13.5 0/-0.1	Ø 14	6	25
M24	M18 × 1.5	Ø 13.95 0/-0.05	Ø 26	Ø 14 H7	Ø 20.5 0/-0.1	Ø 21	10	35

5.1.6 Control cable



Pos.	L (Length in mm)	Part no.	NTS
1	5000	00312512	70
2	10000	00312517	-

5 Mounting

5.2 Insertion

Insertion

The threaded hole for the pressure transducer must be in accordance with chapter 5.1.4 „Mounting hole“, page 17. The dimensional accuracy of the hole should be checked with a gage or cleaning tool (chapter 7.1 „Maintenance“, page 23).

Before screwing in the pressure transducer, ensure that there are no pollutants or melt residues in the hole. The thread must be covered in a temperature-resistant protective agent (e. g. KORR-Kote). The pressure transducer must be screwed in until the sealing surface is attached, without using a wrench.

CAUTION!

Never screw a cold pressure transducer into a heated mounting hole. If the mounting hole is warm, the pressure transducer must also be warmed.

1. Screw in the pressure transducer by hand until the sealing surface is attached (45° surface).
2. Only use a torque wrench when tightening the pressure transducer.

Admissible torque:

1/2-20 UNF = 20 to 30 Nm

M18 × 1.5 = 40 to 50 Nm

5.3 Dismounting

CAUTION!

To avoid damaging the membranes, the pressure transducer should always be unscrewed from the mounting hole while it still warm.

General information

- Electrical connection for voltage supply and output signal using Bendix circular connector
- Flange plug PT 02 A 10-6 on the measuring head, suitable for coupling socket PT 06 W 10-6S
- Measuring line: Cu 5 × 0.25 mm^2 with shielding, sheath made from transparent PVC, outer diameter 5.6 mm
- Fixed receptacle RASC 0302 on the measuring head, suitable for standard connector F 0302

6.1 Constructive details

The pressure transducer consists of a screw-in element with pressure connection M18 × 1.5 according to VDMA 24456, and a measuring head with a plug connector for the electrical connection.

The screw-in element is made of stainless steel, material-no. 1.4541. The membranes are TiNi-coated. The measuring head is made of black anodized aluminum. Since the membrane bends with the incoming pressure, it is therefore thin and very sensitive.

6.2 Calibration

A calibration resistor is installed in the pressure transducer for calibration. When E and F short-circuit, the output signal amounts to 80 % of the measuring span.

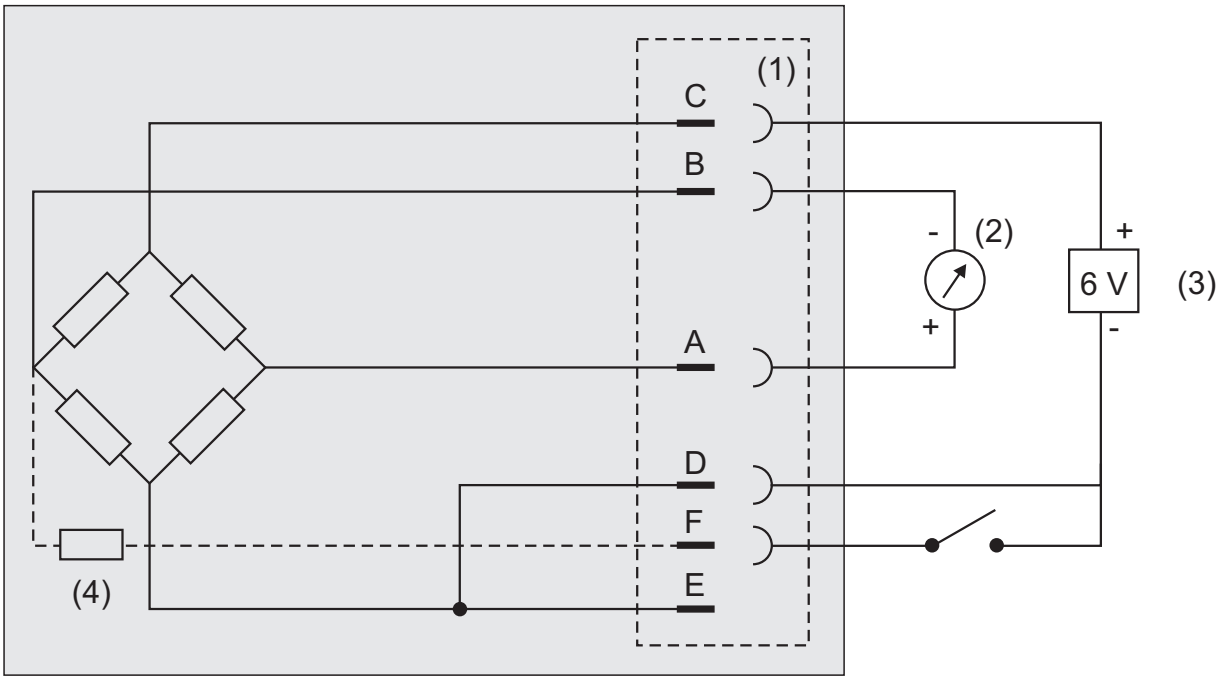
It is sensible to only set the zero point on the transducer once the installed pressure transducer has reached its operating temperature.

CAUTION!

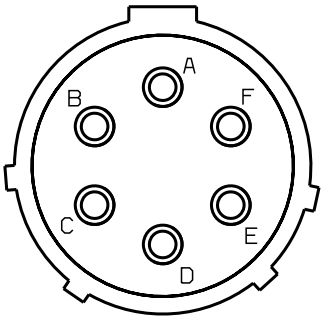
During calibration, pressure must not be applied to the pressure transducer.

6 Electrical connection

6.3 Connection diagram



(1) Flange plug PT 02 A 10-6
(2) Output signal mV
(3) Auxiliary voltage
(4) Calibration resistor only for an output of approx. 2 mV/V



A	Signal +	Yellow
B	Signal -	White
C	Supply +	Brown
D	Supply -	Green
E	Calibration -	Green
F	Calibration 80%	Gray
	Shielding	Black

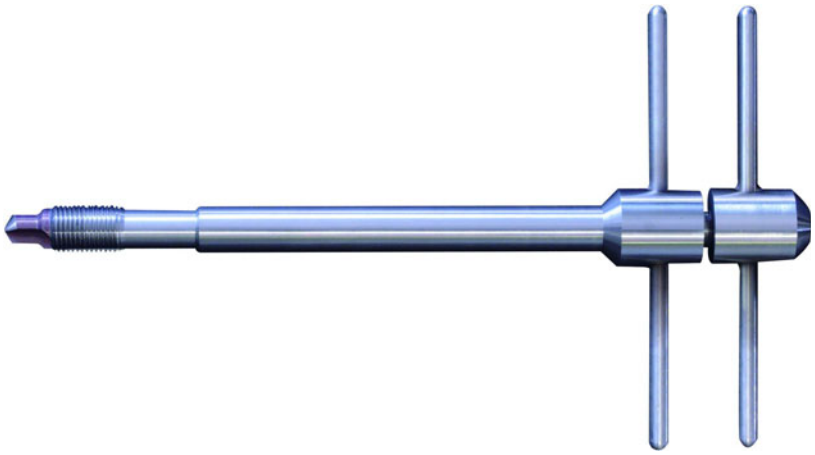
7.1 Maintenance

The pressure transducer must be cleaned regularly. While doing so, the membranes must never come into contact with any hard items. Cleaning must only be carried out with solvents, a soft cloth, or sponge.

Clean the mounting hole with a cleaning tool before each insertion, as a dirty mounting hole may damage the pressure transducer.

Cleaning tool

(Accessories; must be ordered separately)



Thread	Cleaning tool for mounting hole
M18 × 1.5 or	Part no. 00307887
1/2-20 UNF-2A	Part no. 00307891

The cleaning tool is a set comprising a combined trimming tool, with which the thread, sealing surface, and mounting hole can be cleaned.

The mounting hole should be cleaned with the cleaning tool before screwing in the pressure transducer. To do this, the cleaning tool is screwed and unscrewed until the sealing surface is attached.

7.2 Returns

NOTE!

In case of defects and abnormalities, please send the device with a completed declaration of decontamination to the manufacturer. Please find the declaration of decontamination on our website at: http://www.jumo.de/de_DE/support/produktservice/reparaturdienst.html

7 Maintenance, returns, possible errors

7.3 Possible errors

The hole with diameter d_2 has been manufactured too small	The membranes are compressed sideways, the zero point and measuring accuracy are distorted.
The hole has not been manufactured concentrically (d_1/d_2)	The membranes are compressed sideways, the zero point and measuring accuracy are distorted.
Borings/plastic residue in the hole	Damage to the fit size d_2 (grooves) on the pressure transducer
	May lead to damage to the membrane or sealing surface.
The hole is set too deep	The probe head protrudes in the channel and creates dead spots.
	This leads to thermal reduction of the material, which may, for example, quickly burn the hard PVC.
Damaged mounting thread	May cause the entire probe to seize up; unscrewing will then no longer be possible.
Insufficient heating at the measuring location during plant start-up	Adhesive plastic on the measuring membranes is pushed away and tears the membranes.
Overpressure/change in pressure load	The pressure transducer is temporarily loadable up to 150 % of the end pressure value, without affecting the measuring accuracy.
	In the event of a load change cycle, as is caused in the cylinder by the screw flights, for example, the operating life of the membranes is reduced. The length of time until damage occurs is difficult to predict, as this crucially depends on the frequency and the amplitude of the load cycle. Should this occur, please contact the manufacturer.
Cleaning the melting channel	If cleaning work is carried out in the melting channel, it is essential that the pressure transducer be disassembled to avoid damaging the membrane.
Adjusting and reworking the measuring membranes	The lower measuring membranes should neither be reworked (turned, sanded etc.) nor adjusted to the contour of the melting channel. This will damage the pressure transducer.

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