

PRESSURE SENSORS

- Type DAI with mA or V Output
- Type DTAI with mA or V Output + Temperature Sensor



OPERATION & MAINTENANCE MANUAL

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1. INTRODUCTION

Gräff Pressure Transmitters are precise measuring probes which obtain measuring accuracy and long life span only if they are properly handled. These operating instructions should be studied carefully before installing the sensor, thus ensuring a trouble-free operation. Nevertheless, should you encounter any difficulties, please feel free to contact our service technicians, who will be happy to offer any assistance.

2. OPERATING RANGE & FIELD OF APPLICATION

Gräff Pressure Transmitters are designed exclusively for measuring and monitoring the pressure of liquid, dough-like, or pasty materials at high temperatures, provided the medium is homogeneous.

The installation location must be selected so that the maximum differential pressure does not exceed 2% of the Transmitter's measuring range, relative to the membrane surface.

The temperature of both the sensing element and the electronics must remain within the limits specified in the technical data during operation. Exceeding the permissible operating temperature, even briefly, may impair the Transmitter's safety function. If this occurs, the Transmitter must be inspected by the manufacturer.

Any use outside the operating range described above is considered improper use.

3. DANGER AREAS

There is a risk of burns across the entire heated area of the Pressure Transmitter. Incorrect assembly or disassembly of the sensor while the system is pressurised can cause hot material to escape at high pressure, posing a serious hazard.

4. WASTE DISPOSAL

Gräff Pressure Transmitters are mercury-free, so they can be disposed of through standard metal recycling channels.



5. TRANSPORT & STORAGE

Gräff Pressure Transmitters are shipped individually packaged, with the front diaphragm protected by a cap to prevent mechanical damage. This protective cap should always be re-fitted for any form of interim storage.

6. GENERAL

Please read this manual carefully and completely before installing the Transmitter. Any damage caused by non-compliance with the operation and maintenance manual voids all warranty claims. We admit no liability for consequential damage.

Warranty:

For the sensor we grant a warranty of 12 months from the date of purchase.

The warranty includes free rectification of defects verifiably caused by the use of faulty materials or poor workmanship. The defective device shall be returned to the manufacturer immediately after the defect has become known together with original sales receipt and fault description.

The right to further claims shall be reserved.

The liability for defects does not cover natural wear and tear and transport damages as well as damages due to non-compliance with the installation instructions, local installation regulations or improper installation.

The manufacturer shall not be liable for any damages not arising on the delivered item itself, especially not for indirect damages, consequential damages, or property damages.

We shall reserve the right to repair, rectify, or replace the defective goods or refund the purchase price.

Unauthorised removal of our marking (serial number) negates the warranty.

This product is manufactured by:

Gäff GmbH
Temperature Measurement & Control Technology
Bonner Strasse 54
D-53842 Troisdorf



7. CLEANING / MAINTENANCE

To clean the membrane, sealing surface, and thread, the Transmitter must be heated to at least the melting temperature of the plastic in that area. The membrane and sealing surface can be cleaned with a soft cloth, while the thread may be cleaned using a small brass brush.

Never touch the membrane during this process.

8. INSTALLING / UNINSTALLING

Installing

When installing the Pressure Transmitter, ensure that the sensor bore matches the dimensions specified in Section 11. The fit can be verified using a test pin. Before installation, apply a heat-resistant grease to the Transmitter thread. If the machine component containing the bore is still at operating temperature, allow the Transmitter to warm up before installation. Failing to do so may cause the sensor to seize due to thermal expansion. When screwing the Transmitter into place, ensure it does not tilt or snag in the bore. Apply turning force only to the hexagonal shaft. The Transmitter head must not be rotated relative to the shaft.

Starting torque for 1/2-20 UNF = 30Nm (max.)

Starting torque for M18 x 1.5 = 50Nm (max.)

Uninstalling

The Pressure Transmitter must be removed while the system is heated to at least the plastic's melting temperature. During removal, ensure that the membrane does not come into contact with any surfaces. As with installation, apply all turning force only to the hexagonal shaft. The Transmitter head must not be rotated relative to the shaft. The most common cause of failure for this type of Pressure Transmitter is membrane damage caused by contact with molten material during installation or removal. Even minor damage can impair Transmitter performance. If any visible damage is present on the membrane, the Transmitter must be inspected by the manufacturer before further use.

9. CONNECTIONS & COMMISSIONING

Once the Pressure Transmitter has been installed as outlined in Section 8, the electrical connection must be made according to the pin assignment provided on the following page. Gräff Pressure Transmitters are fitted with high-quality, robust plug connectors. If soldering the connecting cable is required, it must be carried out with great care to avoid signal transmission faults. We recommend using pre-assembled cables from Gräff, which are available from stock.

Before commissioning, the Transmitter must be calibrated to the associated evaluation system. Calibration must be performed with the system heated and unpressurised. The procedure is described below.

After installation and once the Pressure Transmitter has reached operating temperature, the zero point must be adjusted using the AUTO ZERO function.

The AUTO ZERO function is activated by briefly connecting the designated lines (see pin assignment).

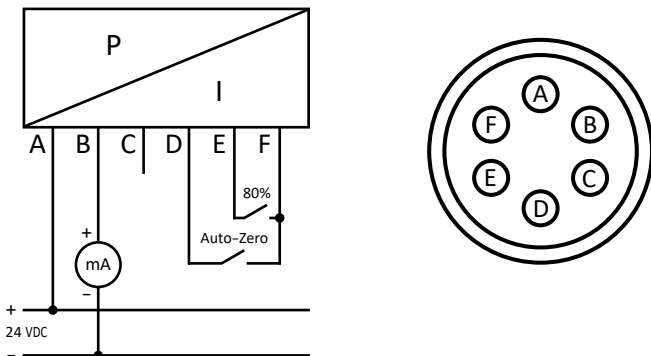


The integrated amplifier will thereafter transmit the starting value of its output scale (0V @ 0-10V, 0mA @ 0-20mA, and 4mA @ 4-20mA) output signal. Function is suppressed if the output signal is more than 5% of the maximum value.

Afterwards an 80% inspection of the output signal can be performed. All corresponding leads wires need to be connected for this procedure (see wiring diagram). The pressure sensor will now supply a signal which is according to 80% of the measuring value.

Electrical wiring configuration: **2-Wire sensor (4-20mA)**

Connector type: **PT02A-10-6P**

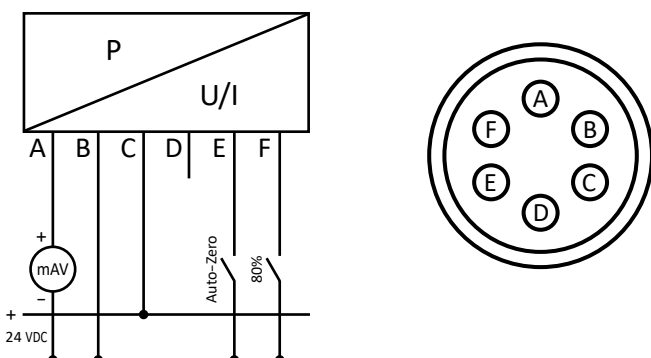


Pin	Function	Colour Coding
A	Supply / Signal +	YELLOW
B	Supply / Signal -	GREY
C	N/A	WHITE
D	Auto-Zero	GREEN
E	80%	BROWN
F	Auto-Zero / 80%	PINK

Pins D and F are utilised for the activation of the Auto-Zero function. The zero point is hereby merely shifted. The signal amplification is not affected, as it is shifted linear to the zero point. In order to generate the 80% signal, pins E and F must be connected.

Electrical wiring configuration: **3-Wire sensor (0-10V, 0/4-20mA)**

Connector type: **PT02A-10-6P**



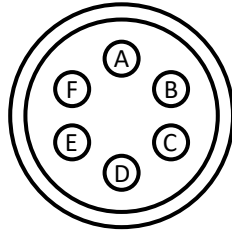
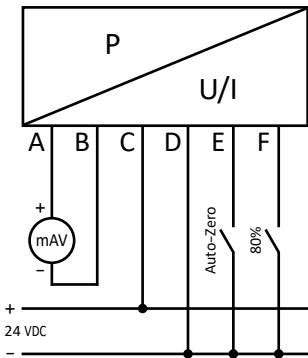
Pin	Function	Colour Coding
A	Signal +	YELLOW
B	Supply / Signal / Auto-Zero -	GREY
C	Supply +	WHITE
D	N/A	GREEN
E	Auto-Zero	BROWN
F	80%	PINK

In order for the Auto-Zero function to be activated, pins E and B have to be connected with each other. Only the zero point is shifted. The signal amplification remains untouched, as it shifts linear to the zero point. In order to generate the 80% signal, pins F and B must be connected.



Electrical wiring configuration: **4-Wire sensor** (0-10V, 0/4-20mA)

Connector type: **PT02A-10-6P**



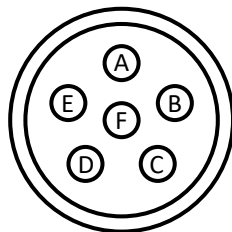
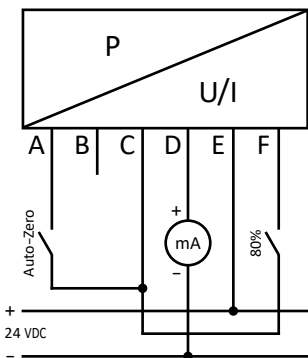
Pin	Function	Colour Coding
A	Signal +	YELLOW
B	Signal / Auto-Zero - *	GREY
C	Supply +	WHITE
D	Supply / Auto-Zero - *	GREEN
E	Auto-Zero	BROWN
F	80%	PINK

* Pins B and D are connected internally

In order to activate the Auto-Zero function, pins A, C and D must be connected. Only the zero point is shifted. The signal amplification remains in place as it shifts linear to the zero point. In order to generate the 80% signal, pins F, C and D must be connected.

Electrical wiring configuration: **2-Wire sensor [Version 98]** (4-20mA)

Connector type: **PT02A-98-P**



Pin	Function	Colour Coding
A	Auto-Zero	YELLOW
B	N/A	GREY
C	Auto-Zero / 80% - *	WHITE
D	Supply - *	GREEN
E	Supply +	BROWN
F	80%	PINK

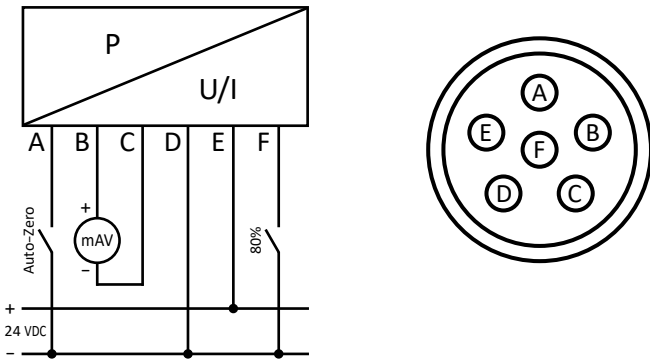
* Pins C and D are connected internally

In order to activate the Auto-Zero function, pins A and C must be connected. Only the zero point is shifted. The signal amplification remains in place as it shifts linear to the zero point. In order to generate the 80% signal, pins F and C must be connected.



Electrical wiring configuration: **4-Wire sensor [Version 98]** (0-10V, 0/4-20mA)

Connector type: **PT02A-98-P**



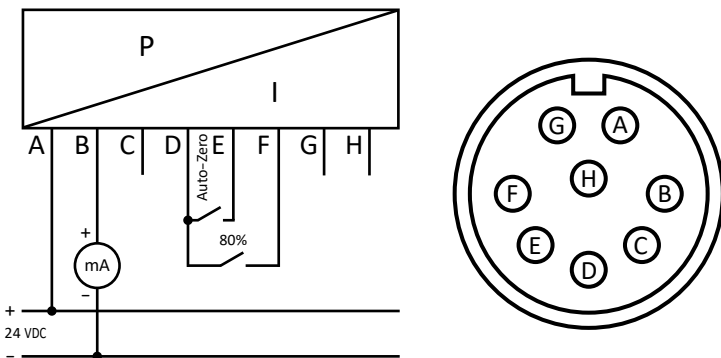
Pin	Function	Colour Coding
A	Auto-Zero	YELLOW
B	Signal +	GREY
C	Signal / Auto-Zero - *	WHITE
D	Supply / Auto-Zero - *	GREEN
E	Supply +	BROWN
F	80%	PINK

* Pins C and D are connected internally

In order to activate the Auto-Zero function, pins A, C and D must be connected. Only the zero point is shifted. The signal amplification remains in place as it shifts linear to the zero point. In order to generate the 80% signal, pins F, C and D must be connected.

Electrical wiring configuration: **2-Wire sensor** (4-20mA)

Connector type: **PC06A-12-8P**



Pin	Function	Colour Coding
A	Supply / Signal +	YELLOW
B	Supply / Signal -	GREY
C	N/A	WHITE
D	Auto-Zero / 80%	GREEN
E	Auto-Zero	BROWN
F	80%	PINK
G	N/A	N/A
H	N/A	N/A

Pins D and E are utilised for the activation of the Auto-Zero function. Only the zero point is shifted. The signal amplification remains in place as it shifts linear to the zero point. In order to generate the 80% signal, pins D and F must be connected.



10. TECHNICAL DATA

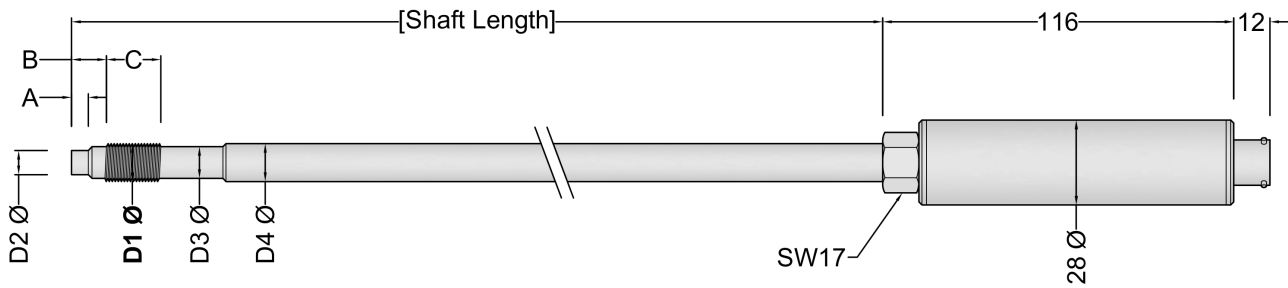
Pressure range:	50 – 2000 Bar, 750 – 10,000 PSI
Supply voltage:	12 – 36V [DC]
Output signal:	4 – 20mA, 0 – 10V, 2 – 10V
Bridge resistance:	350 Ω
Insulation Resistance:	1000 MΩ @ 50C°
Calibration point:	80% of measuring range
Accuracy:	≤ ± 0.50% FSO
Maximum load:	150% of measuring range
Zero deviation with temperature variations at the diaphragm:	≤ ± 0.003% from final value / C°
Zero deviation with temperature variations at the measuring head:	≤ ± 0.003% from final value / C°
EMC:	Electromagnetic disturbances and electromagnetic susceptibility according to EN 61326
Housing Material:	Stainless Steel [1.4571]
Diaphragm Material:	Stainless Steel (with high flexible special non-stick coating)
Capillary Extension Material:	Stainless Steel
Storage Temperature:	-20°C to 125°C
Maximum Temperature (Diaphragm):	300°C (No filling fluid) / 450°C (NaK filling fluid)
Maximum Temperature (Measuring Head):	125°C
Relative Humidity:	20% to 95% condensation
Maximum Overload Pressure:	2x final value
Calibration Point:	80% of final value
Maximum calibration deviation:	5% of final value
Reproducibility:	± 0.10% of final value
Filling Liquid:	Mercury free, Silicone free, NaK free*
Ingress Protection:	Housing = IP65, Plug = IP55

**Unless specified otherwise*

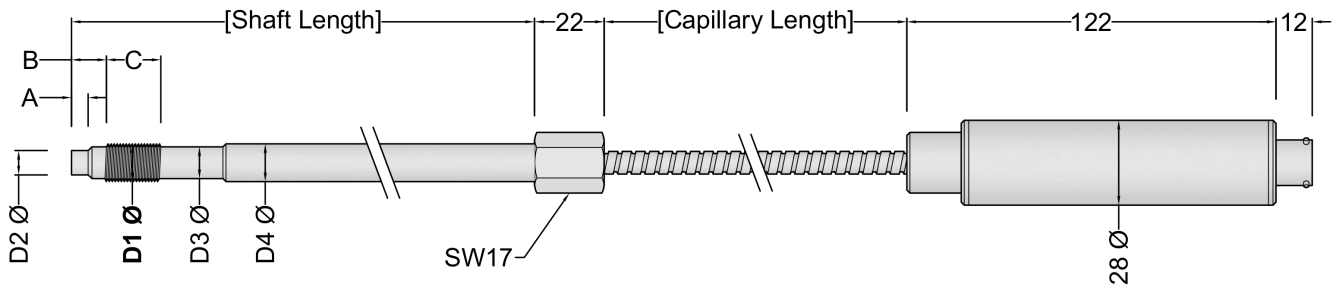
11. DIMENSIONS

D1	D2	D3	D4	A	B	C
M18 x 1.5	10.1 \varnothing [+0.05]	16.1 \varnothing [+0.1]	20.0 \varnothing [+0.2]	6.1 [-0.1]	4.0 [-0.2]	25.0
½" UNF 2A	7.9 \varnothing [+0.05]	10.7 \varnothing [+0.1]	13.0 \varnothing [+0.2]	5.7 [-0.1]	3.2 [-0.2]	19.0

Fixed Shaft



Flexible Shaft



Flexible Shaft + Thermocouple

