

Pneumatic Transmitters for Temperature



Type 812-1



Type 812-1 with fixed sensor



Type 812-1, sensor with capillary tube

Fig. 1 · Type 812-1

Mounting and Operating Instructions

EB 7575 EN

Edition June 2004

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General safety instructions



- ▶ *Assembly, start-up and operation of this device may only be performed by trained and experienced personnel familiar with the product. According to these mounting and operating instructions, trained personnel is referred to as individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.*
- ▶ *Proper transportation and storage of the device are assumed.*

1 Principle of operation

These instruments are used to measure temperatures in pneumatic control systems and to convert the measured value into a pneumatic standardized signal of 0.2 to 1.0 bar. The sensor of the transmitter is either fixed to the transmitter or connected with the measuring system over a capillary tube, depending on the version.

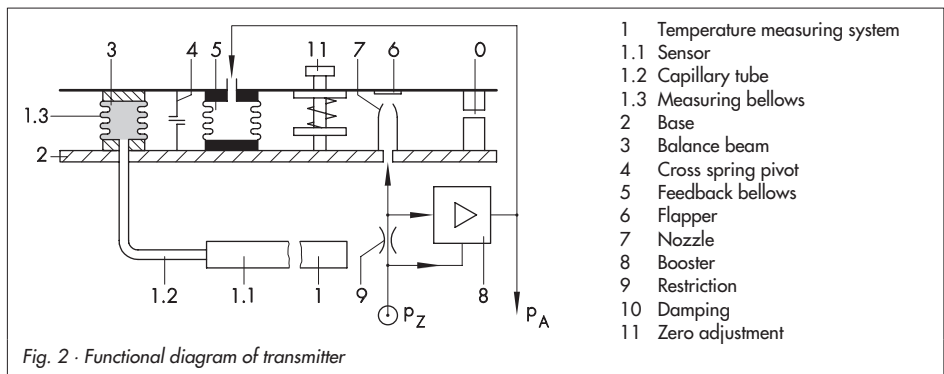
The temperature of the process medium produces a pressure proportional to the temperature in the gas-filled sensor (1). This pressure acts on the measuring bellows (1.3) creating a force which is measured at the balance beam (3) and converted into a pneumatic signal (p_A).

The supply air p_Z flows through the booster (8), passes on to the restriction (9) and the nozzle (7) and finally hits the flapper (6). Increasing temperature causes the flapper to come closer to the nozzle. As a result, the output pressure p_A supplied to the bellows (5) rises until the equilibrium is reached again, i.e. until the output signal reaches a value proportional to the temperature.

Zero is adjusted using the adjustment screw (11).

1.1 Versions

Model no.	3812- X X X X		
Type of sensor			
Bulb sensor	1		
Air sensor	2		
Food processing sensor	3		
Sensor version			
3 m capillary tube		1	
3 m protected capillary tube		2	
6 m capillary tube		3	
6 m protected capillary tube		4	
Fixed bulb sensor		5	
Span	50 °C		2
	100 °C		3
	200 °C		4
Connection/output			
1/8 NPT / 0.2...1 bar			0
1/8 NPT / 3...15 psi			1
G 1/8 / 0.2...1 bar			2
G 1/8 / 3...15 psi			3



1.2 Technical data

Measuring span °C	50	100	200
Measuring limit °C	-40 to +300		
Overrange limit °C	350	350	500
Supply air	1.4 ± 0.1 bar (20 ± 1.5 psi)		
Output	0.2...1 bar (3...15 psi)		
Air delivery	Max. 2 m _n ³ /h		
Consumption	0.1 m _n ³ /h in steady state		
Load characteristic	0.8 m _n ³ /h, reversing error < 0.1 %		
Deviation from terminal-based linearity	0.6 % at terminal-based conformity		
Hysteresis	< 0.2 %		
Influence	Supply air: 0.12 % / 0.1 bar		
Pressure at the sensor	< 0.4 % / 0.1 bar	< 0.2 % / 0.1 bar	< 0.1 % / 0.1 bar
Ambient temperature	< 0.06 % / °C	< 0.03 % / °C	
Permissible ambient temperature	-40 to +90 °C		
Length of capillary tube	3 or 6 m		

2 Installation

2.1 Version with fixed bulb sensor

Install the transmitters in such a way that the temperature sensor (1.1) lies as horizontal as possible and that the pneumatic connections face downwards.

In case a different mounting position must be used, the lower measuring range value may become shifted.

Readjust zero using the zero screw as described in section 3.1, if necessary. The measuring span remains unaffected by a different mounting position.

No matter what mounting position is used, the bulb sensor with its effective length of

300 mm must be immersed completely in the process medium that is to be measured.

2.2 Version with sensor connected by a capillary tube

A bracket is supplied to mount the transmitter to mount to a wall. Mount the device as horizontal as possible with the pneumatic connections at the side.

A mounting part (order no. 1089-0101) is required if the transmitter is to be mounted to a pipe. See drawing on page 7.

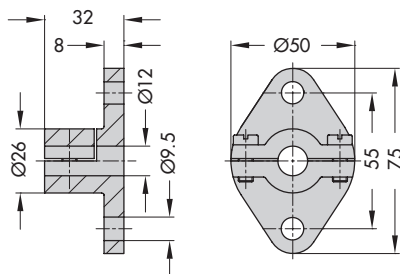
The temperature sensor can be installed in any position as required. The bulb sensor with its effective length of 300 mm must be immersed completely in the process medium that is to be measured.

Clamping flange

For wall mounting, e.g. unpressurized tanks, ducts, etc.

Order no. 1090-9547

Attach flange using two screws to the wall and the temperature sensor using two other screws to the flange.

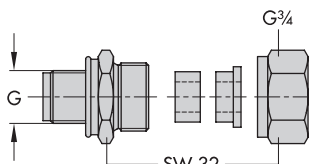


Screw gland (PN 10)

G 1/2 Order no. 1080-4881

G 3/4 Order no. 1080-4882

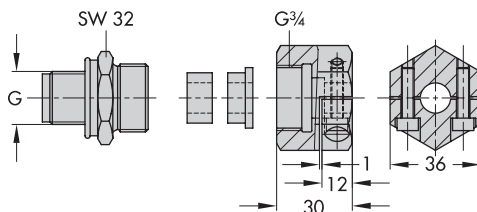
Seal in screw fitting, insert sensor with screw gland and coupling nut.
Screw tight coupling nut.



Screw gland (PN 40)

G 1/2 Order no. 1080-4884

G 3/4 Order no. 1080-4885



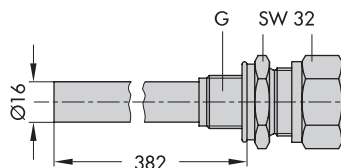
Thermowell with thread (PN 63)

G 1/2 Order no. 1080-4888

G 3/4 Order no. 1080-4889

Use a thermowell in applications where the nominal pressure is exceeded, corrosive media are used or in plants that are to remain in operation while the sensor is replaced.

Insert sensor until it touches the bottom of the thermowell. Screw tight coupling nut.



Thermowell for welding-in (PN 63)

Order no. 1080-4890

Insert sensor until it touches the bottom of the thermowell. Screw tight coupling nut.

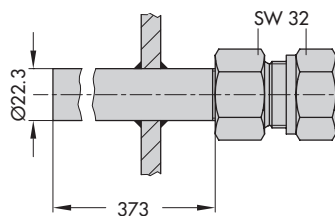


Fig. 3 · Mounting parts for sensor

2.2.1 Capillary tube

Route the capillary tube, making sure it does not get damaged. The smallest bending radius should not be smaller than 50 mm.

Any capillary tube that is not used should be rolled up, but never bent or shortened.

The capillary tube should not be exposed to any large temperature fluctuations.

2.3 Installing the sensor

To install the sensor, a coupling sleeve with R ½ or R ¾ female thread, depending on the sensor version, must be used to screw in or seal in one of the mounting parts illustrated in Fig. 3.

The mounting parts for the sensor must be ordered separately. They are not included in the scope of the transmitter delivery.

2.4 Pneumatic connections

The air connections are designed as threaded bores with NPT 1/8 (G 1/8) thread.

Conventional screw fittings for pipes or plastic hoses may be used.

Note!

The supply air must be dry and free of oil and dust. Observe the maintenance instructions of the upstream pressure reducing station.

Thoroughly blow through the air lines before connecting them.

3 Operation

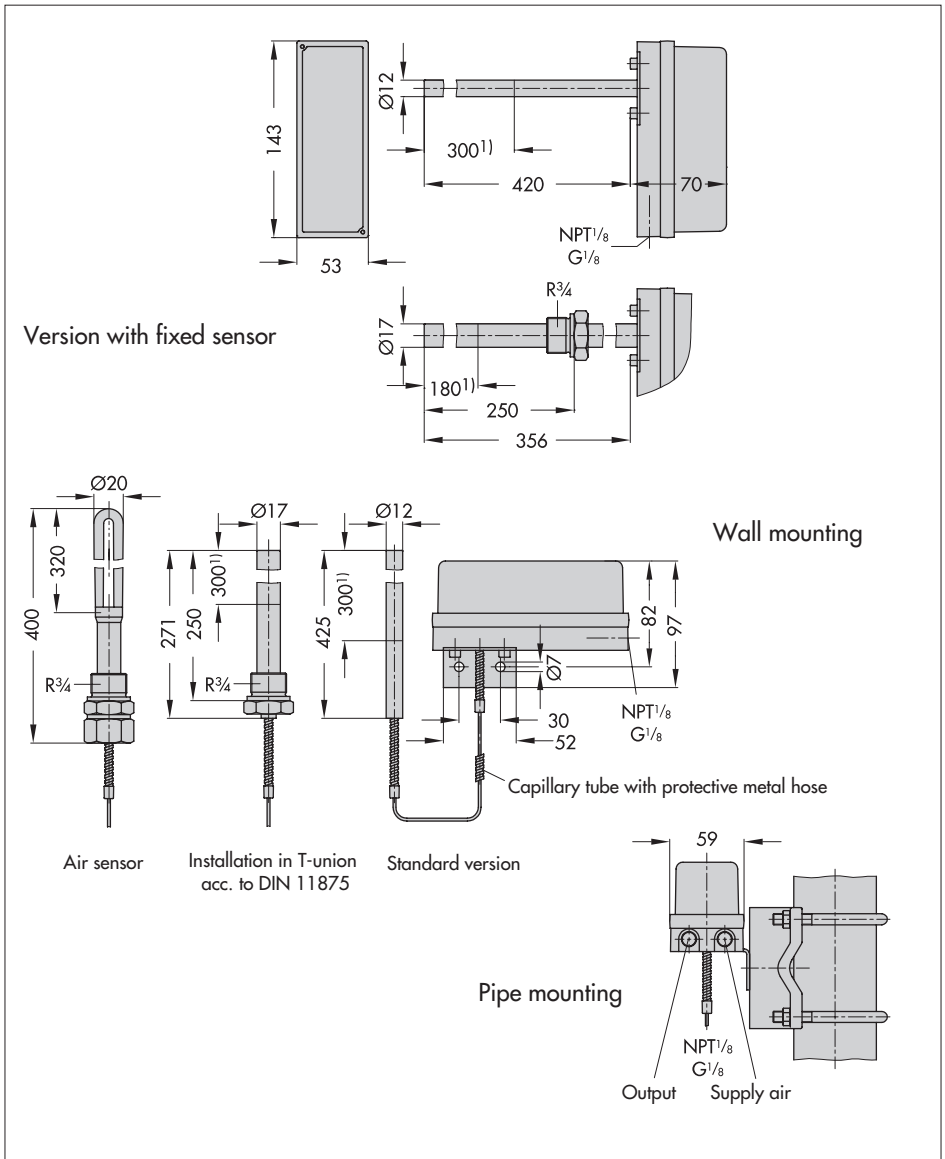
The measuring range specified in the order (see nameplate) is already set at the factory and cannot be changed.

Depending on the mounting position though, zero (lower range value) can be re-adjusted.

3.1 Zero correction

- 1 Remove the cover from the transmitter.
- 2 Connect a pressure gauge at the pneumatic output and apply a supply air of 1.4 ± 0.1 bar to the supply air input.
- 3 Produce a temperature at the temperature sensor that corresponds with the lower range value of the transmitter, e.g. 50 °C at a measuring range of +50 to +150 °C.
- 4 Set the supply air. The pressure gauge must indicate a pressure of 0.2 bar. If this value is incorrect, readjust the zero adjustment (11) accordingly.

4 Dimensions in mm





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S/Z 2004-07