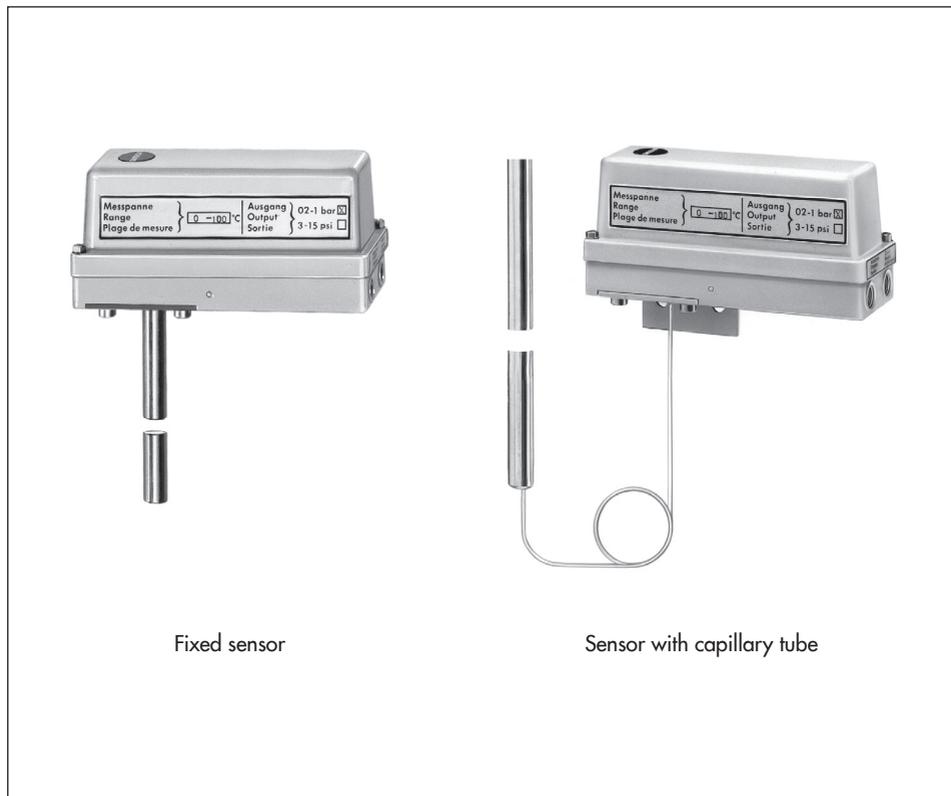


MOUNTING AND OPERATING INSTRUCTIONS



EB 7575 EN

Translation of original instructions



Fixed sensor

Sensor with capillary tube

Type 3812 Pneumatic Transmitter for Temperature Pneumatic Transmitters

Edition February 2020

Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

- For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- If you have any questions about these instructions, contact SAMSON's After-sales Service (aftersaleservice@samsongroup.com).



The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at www.samsongroup.com > **Downloads** > **Documentation**.

Definition of signal words

DANGER

Hazardous situations which, if not avoided, will result in death or serious injury

WARNING

Hazardous situations which, if not avoided, could result in death or serious injury

NOTICE

Property damage message or malfunction

Note

Additional information

Tip

Recommended action

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1 General safety instructions

- The device must be mounted, started up or serviced by fully trained and qualified personnel only; the accepted industry codes and practices are to be observed. Make sure employees or third parties are not exposed to any danger.
- According to these mounting and operating instructions, trained personnel refers to 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.
- To ensure appropriate use, only use the device in applications where the operating pressure and temperatures do not exceed the specifications used for sizing the device at the ordering stage.
- The manufacturer does not assume any responsibility for damage caused by external forces or any other external factors.
- Any hazards that could be caused in the regulator by the process medium, operating pressure or by moving parts are to be prevented by taking appropriate precautions.
- Proper transport, storage, installation, operation, and maintenance are assumed.
- SAMSON does not assume any liability for damage caused when the device is not used as intended.

2 Process medium and scope of application

Instrument for use in pneumatic control systems for measuring temperatures and converting the measured value into a standardized pneumatic signal from 0.2 to 1.0 bar or 3 to 15 psi. Suitable for liquids, gases or vapors at temperatures from -40 to $+300$ °C.

2.1 Transportation and storage

Transport and store within permissible ambient temperature range (-40 to $+90$ °C). Protect the transmitter against adverse influences, such as shocks, dirt or moisture.

3 Design and principle of operation

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 medium temperature creates a pressure proportional to the temperature in the gas-filled sensor (1.1). 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).

An increase in temperature causes the flapper to come closer to the nozzle. As a result, the output pressure p_A applied to the feedback bellows (5) rises until a new equilibrium is reached, i.e. until the output signal reaches a value proportional to the temperature.

Zero is adjusted at the adjustment screw (11).

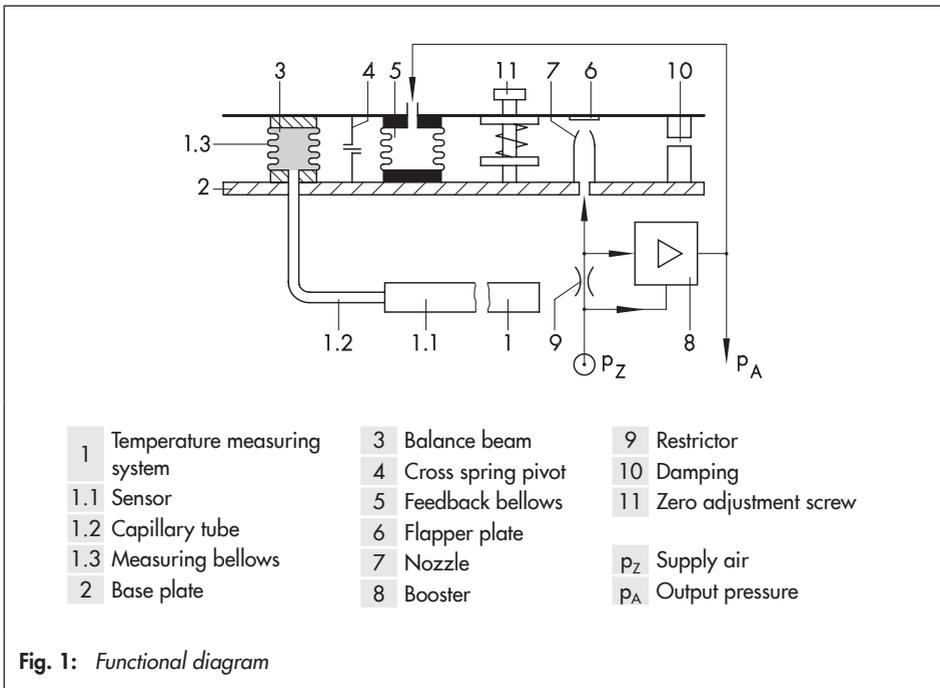


Fig. 1: Functional diagram

4 Installation

See section 8 on page 11.

4.1 Version with fixed bulb sensor

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

If a different mounting position is used, the lower measuring range value might be shifted.

Readjust zero using the zero adjustment screw (11) as described in Chapter 5.1. The measuring span remains unaffected by a different mounting position.

Regardless of which mounting position is used, the bulb sensor with its effective length of 300 mm must be completely immersed in the process medium that is to be measured.

4.2 Version with capillary sensor

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

Pipe mounting requires a special mounting bracket (order no. 1089-0101).

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

4.3 Capillary tube

Route the capillary tube ensuring that it does not get damaged. The smallest bending radius must not be smaller than 50 mm.

Any capillary tube that is not used must be rolled up. Do not bend or shorten it.

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

4.4 Installing the sensor

To install the sensor, a coupling sleeve with R ½ or R ¾ female thread must be used at the point of measurement depending on the sensor version. Screw or seal one of the mounting parts shown in Fig. 3 into this sleeve.

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

4.5 Pneumatic connections

The pneumatic connections are designed as a bore with ⅛ NPT (G ⅛) thread.

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

i Note

The supply air is dry as well as free of oil and dust. Read the maintenance instructions for upstream pressure reducing stations. Blow through all air pipes and hoses thoroughly before connecting them.

5 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 readjusted.

5.1 Zero point calibration

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 $+150\text{ °C}$.
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 screw (11) accordingly.

6 Versions

The transmitter is configured according to the specified order number.

Version	Order no.: 3812-	x	x	xx	xx	xx	0	0	0	x
Sensor type										
Bulb sensor		1								
Air sensor		2								
Sensor for food processing (T-union)		3								
Sensor version										
Capillary tube, 3 m			1							
Protected capillary tube, 3 m			2							
Capillary tube, 6 m			3							
Protected capillary tube, 6 m			4							
Bulb sensor, fixed			5							
Measuring span										
50 °C				0	0					
100 °C				1	0					
200 °C				1	1					
Output signal										
0.2 to 1 bar					0	1				
3 to 15 psi					0	2				
Connection										
G 1/8							0	1		
1/8 NPT							0	2		
Measuring range										
-20 to +30 °C										1
0 to +50 °C										2
0 to +100 °C										3
+50 to +150 °C										4
0 to +200 °C										5
Span 50 °C, lower range value between -40 and +150 °C										6 ¹⁾
Span 50 °C, lower range value between +150 and +250 °C										7 ¹⁾
Span 100 °C, lower range value between -40 and +200 °C										8 ¹⁾
Span 200 °C, lower range value between -40 and +100 °C										9 ¹⁾

¹⁾ Specify the measuring range that you require on ordering. The transmitter will then delivered with this measuring range.

7 Technical data

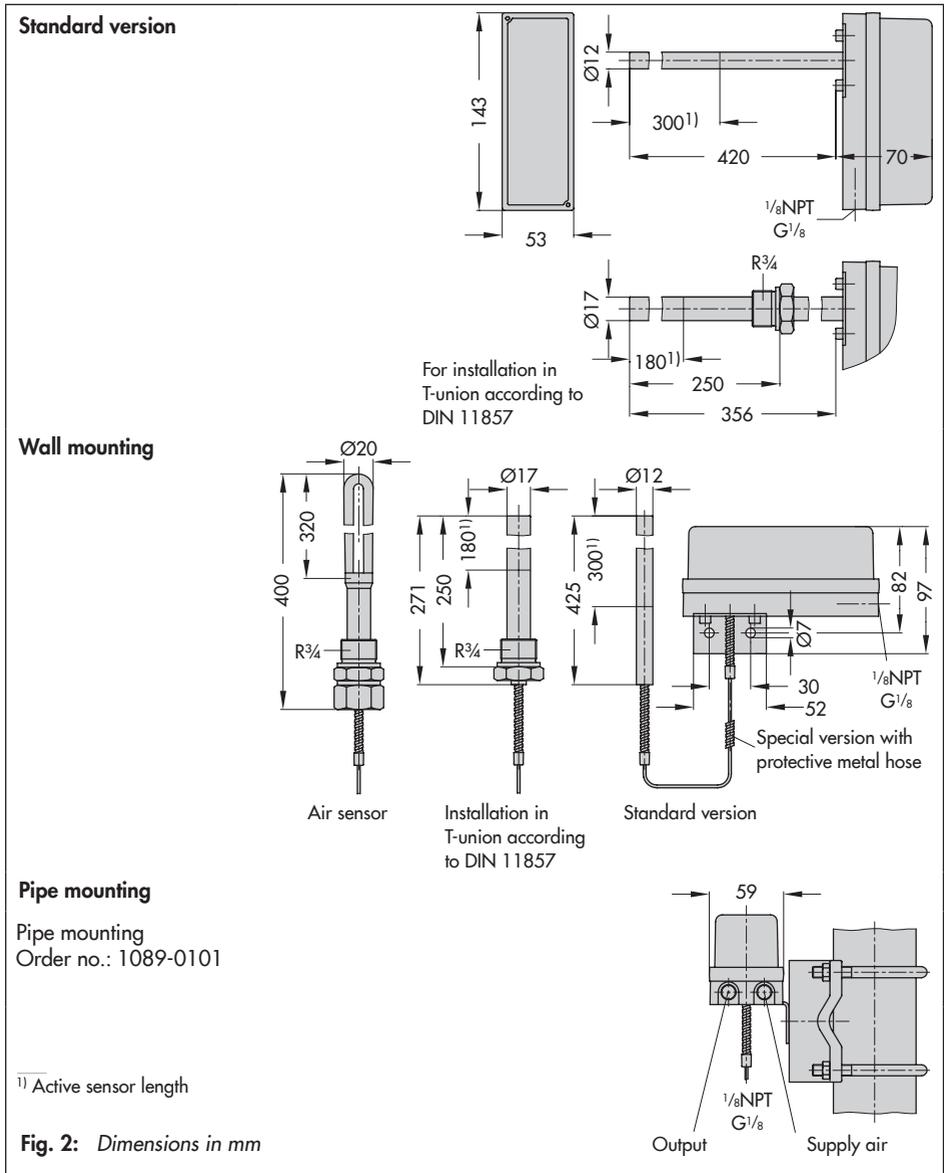
Table 1: *Technical data*

Measuring span	50 °C	100 °C	200 °C
Measuring range limits	-40 °C/+300 °C		
Overload limits	350 °C	350 °C	500 °C
Supply air	Supply air 1.4 ±0.1 bar (20 ±1.5 psi)		
Output	0.2 to 1.0 bar/3 to 15 psi		
Air output capacity	max. 2 m _n ³ /h		
Consumption	0.1 m _n ³ /h in steady-state condition		
Reversing error	< 0.3 %		
Deviation from terminal-based linearity	< 0.6 %		
Hysteresis	< 0.2 %		
Influence	Supply air: < 0.12 %/0.1 bar		
Pressure at the sensor	< 0.4 %/10 bar	< 0.2 %/10 bar	< 0.1 %/10 bar
Ambient temperature	< 0.06 %/K	< 0.03 %/K	
Permissible ambient temperature	-40 to +90 °C		
Capillary tube length	3 m or 6 m		

Table 2: *Materials · Material numbers according to DIN EN*

Type 3812	
Enclosure and cover	Die-cast aluminum AlSi12
Bellows	Bronze
Bellows fixture	Brass
Diaphragms	ECO (epichlorohydrine)
Seals and O-rings	Silicone
Sensor	Stainless steel 1.4571/1.4404
Sensor filling	Inert gas
Capillary tube	Stainless steel 1.4571/1.4404
Clamping flange, screw gland, thermowells	Stainless steel 1.4571/1.4404

8 Dimensions



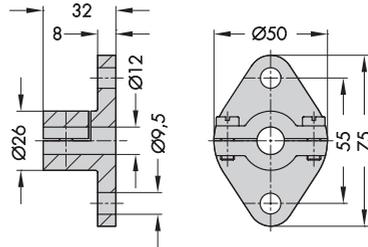
Dimensions

8.1 Accessories

Clamping flange

Clamping flange for wall mounting, e.g. on pressureless vessels, ducts etc.

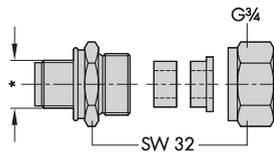
Order no.: 1090-9547



Screw gland PN 10

*) G $\frac{1}{2}$: order no. 1080-4881

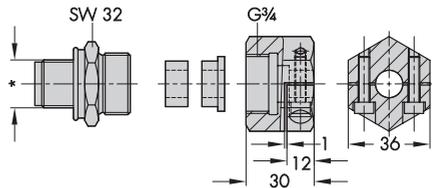
G $\frac{3}{4}$: order no. 1080-4882



Screw gland PN 40

*) G $\frac{1}{2}$: order no. 1080-4884

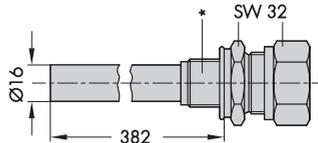
G $\frac{3}{4}$: order no. 1080-4885



Screw-in thermowell, CrNiMo steel, PN 63

*) G $\frac{1}{2}$: order no. 1080-4888

G $\frac{3}{4}$: order no. 1080-4889



Weld-in thermowell, CrNiMo steel, PN 63 Thermowell (CrNiMo steel) with flange DN 25 (without image) for PN 40 or PN 100

Details on request

Weld-in version:

Order no.: 1080-4890

Flange:

Order no.: 1080-4891 (PN 40)

Order no.: 1080-4892 (PN 100)

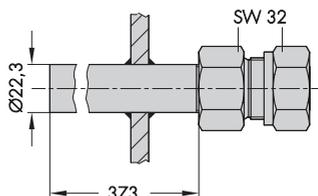


Fig. 3: Accessories

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