

Pneumatic Controller for Temperature

Type 301-1



Application

P controller for temperature control with pneumatic control valves

The device is used for temperature control at the measuring point. The controller compares the measured value sensed by the temperature sensor with the adjusted set point and issues a pneumatic standardized signal between 0.2 and 1 bar. This signal pressure acts on the attached pneumatic control valve. The required supply air pressure is 1.4 bar.

Special features

- Pneumatic P controller with fixed expansion bulb sensor
- Set point ranges from 0 to 200 °C or 100 to 300 °C
- Cost-effective and easy-to-service control equipment including no more than two units, controller and control valve (see Fig. 1)
- State of operation immediately recognizable thanks to clear indication of set point, supply pressure, and signal pressure
- Infinitely adjustable proportional band $X_p = 2$ to 20 %

Versions

Type 301-1 · Bulb sensor CrNiMo steel 1.4571 smooth without mounting parts (see Accessories), shaft length 400 mm · Set point ranges optionally 0 to 200 °C or 100 to 300 °C · P range $X_p = 2$ to 20 %

Accessories

Screw glands · CrNiMo steel thermowells · Clamping flange NPT 1/8 screw joints for pipe...

Note!

Further pneumatic controllers for temperature from SAMSON: **Series 430** · Indicating controllers for temperature with capillary sensor or Pt 100. For details refer to Information Sheet T 7030 EN.

Installation

- The controller can be installed in any desired position. Make sure the entire length of the sensor is immersed in the process medium.
- Install a thermometer near the controller to check the temperature.

Ordering text

Pneumatic Controller for Temperature Type 301-1
Set point range 0 to 200 °C/100 to 300 °C



Fig. 1 · Type 301-1 Pneumatic P Controller with Type 3241-1 Control Valve

Table 1 · Technical data · Material no. according to DIN EN
All pressures in bar (gauge)

Measuring system	Expansion bulb thermometer
Bulb sensor Material	Stainless steel 1.4571
Set point, infinitely adjustable	0 to 200 °C or 100 to 300 °C
Output Control signal y	Signal pressure 0.2 to 1 bar
Supply air pressure	1.4 ± 0.1 bar
Air consumption in steady state	0.25 m ³ /h
Max. air output	0.11 m ³ /h
Proportional band X_p	Infinitely adjustable 2 to 20 %
Temperature influence	0.03 %/°C
Perm. ambient temperature	-10 to +90 °C
Max. operating pressure at the sensor	60 bar

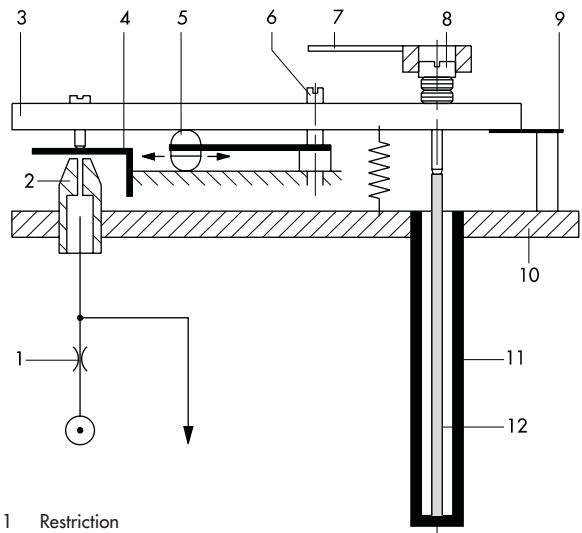
Principle of operation (Fig. 2)

The bulb expansion thermometer, consisting of invar rod (12) and outer steel tube (11), generates a travel that is proportional to the temperature. The travel motion moves the spring-loaded beam (3), thus changing the distance between nozzle (2) and flapper (4). The supply air p_s flows through the restriction (1) to the nozzle (2), hitting the flapper. The resulting output pressure p_A (signal pressure 0.2 to 1.0 bar) depends on the distance between flapper and nozzle and is hence proportional to the system deviation.

The set point is adjusted on the screw (8) connected to the set point indicator (8). The proportional band is set on the adjustment screw (6). The position of the red marking on the screw (6) indicates the adjusted operating direction.

Position in scale range : Signal pressure p_A increases as the controlled variable increases.

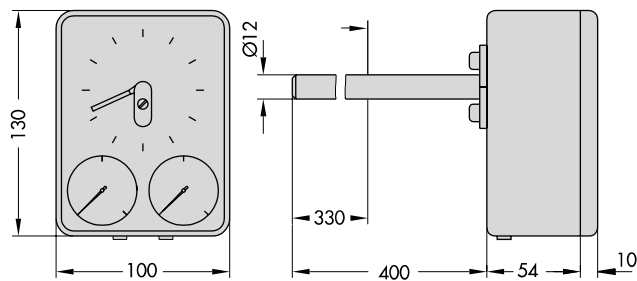
Position in scale range λ : Signal pressure p_A decreases as the controlled variable increases.



- | | |
|-------------------------------|------------------------------|
| 1 Restriction | 8 Adjustment screw set point |
| 2 Nozzle | 9 Spring bearing |
| 3 Beam | 10 Base plate |
| 4 Flapper | 11 Outer steel tube |
| 5 Ball | 12 Invar rod |
| 6 Adjustment screw X_p band | |
| 7 Set point indicator | |

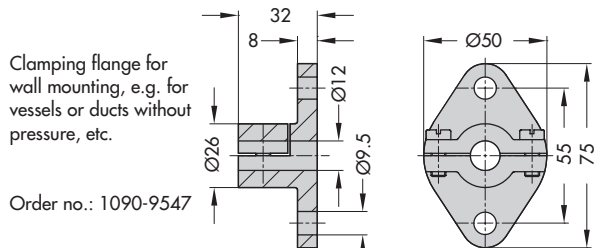
Fig. 2 · Principle of operation

Dimensions in mm and weights



NPT 1/8 air connections

Weight: approx. 2 kg



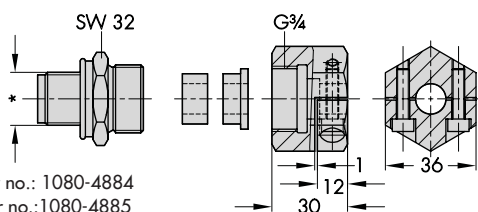
Clamping flange for wall mounting, e.g. for vessels or ducts without pressure, etc.

Order no.: 1090-9547

Clamping flange

*) G 1/2: order no.: 1080-4881
G 3/4: order no.: 1080-4882

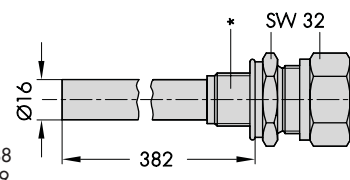
Screw gland (PN 10) for pressures up to 10 bar



*) G 1/2: order no.: 1080-4884
G 3/4: order no.: 1080-4885

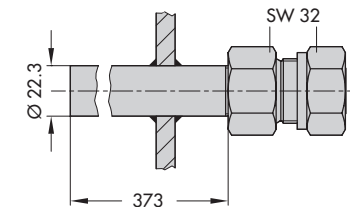
Screw gland (PN 40) for pressures up to 40 bar

Fig. 3 · Dimensions



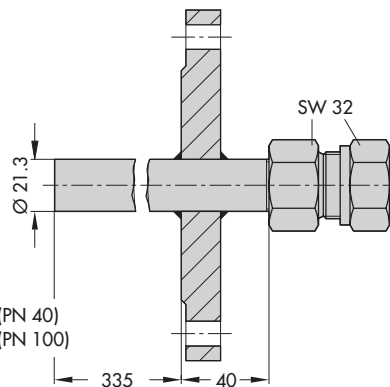
*) G 1/2: order no.: 1080-4888
G 3/4: order no.: 1080-4889

Screw-in thermowell (PN 63) for pressure up to 63 bar



Order no.: 1080-4890

Weld-in thermowell (PN 63) for pressures up to 63 bar



Order no.: 1080-4891 (PN 40)
Order no.: 1080-4892 (PN 100)

Thermowell with flange DN 25 for PN 40 or PN 100

Thermowell with screw gland for food processing according to DIN 11857 (PN 10) available on request

