DATA SHEET

T 7032 EN

Type 3430 Pneumatic Indicating Controller for Pressure
Type 3432 Controller Station and Type 3435 Transmitter Module

Series 430

CE

Application

Pressure controller for process engineering and industrial applications for liquids, gases and vapors. Set point ranges **from 0 to 1.6 bar through 0 to 40 bar**.

The controller directly measures the pressure of the process medium, compares the measured variable to the set point and produces a pneumatic control signal of 0.2 to 1.0 bar (3 to 15 psi). The required supply pressure of 1.4 bar (20 psi) or an operating air pressure from 2.0 to 12 bar (30 to 180 psi). The controllers consist of a controller station, a controller module with the required control mode and a transmitter module corresponding to the pressure set point.

Special features

- Controller and control valve form a unit to directly measure the pressure to be controlled which is easy to service and low in price.
- Set point, controlled variable, system deviation and output pressure are visible at a glance; all required adjusters and switches can be operated on the front panel.
- Controller module for PI or PID control action.
- Housing suitable for wall, pipe and panel mounting (front frame 192 x 228 mm), optionally with lockable door of transparent plastic (IP 65).

Versions

Type 3430 Indicating Controller for Pressure consisting of a Type 3432 Controller Station, a Type 3433 or Type 3434 Controller Module and a Type 3435 Transmitter Module

Fixed set point controller (Fig. 1 and Fig. 2) · With bourdon tube measuring unit for set point range between 0 to 1.6 bar through 0 to 40 bar

Can be equipped with ...
Supply pressure regulator for operating air pressure from 2.0 to 12 bar

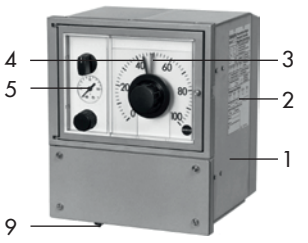

Fig. 1: *Type 3430 Indicating Controller for Pressure with Type 3432-02 Controller Station*

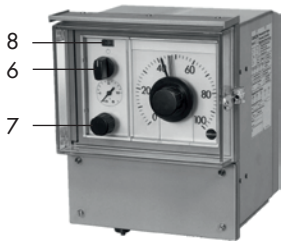

Fig. 2: *Type 3430 Indicating Controller for Pressure with Type 3432-02 Controller Station (with lockable door and protective roof)*

1 Controller station
2 Label
3 Set point adjuster with set point display (w)
4 Controlled variable display
5 Output signal display (y)
6 Manual/automatic switch
7 Adjuster for manual mode
8 Differential pressure indicator for bumpless manual/automatic switchover
9 Pressure connection

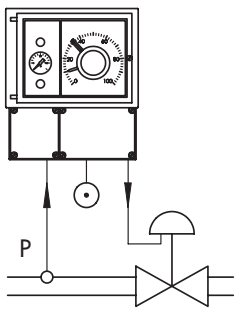

Fig. 3: *Pressure control with fixed set point controller*

SAMSON AKTIENGESELLSCHAFT · Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507 · samson@samsongroup.com · www.samsongroup.com

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Principle of operation (see Fig. 4)

The Series 430 Pneumatic Controllers with their modular design can be used in all kinds of automation applications.

The pressure controllers consist of a Type 3432 Controller Station (as the basic module) with a Type 3433 or Type 3434 Controller Module with the required control mode and a Type 3435 Transmitter Module.

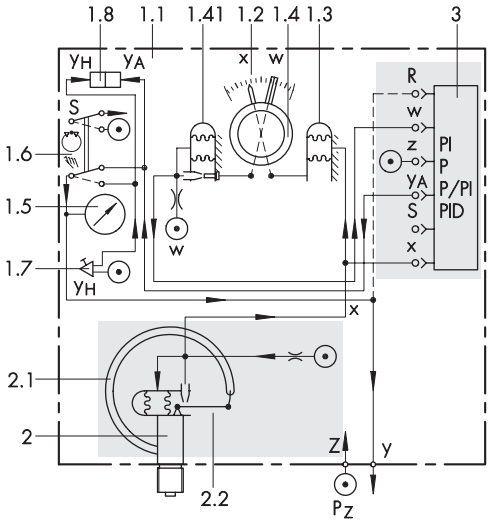
The pressure p of the process medium is fed to the transmitter module (2) where it creates a movement at the bourdon tube measuring system (2.1). The servo system (2.2) converts this movement into a pneumatic signal (controlled variable x), which is proportional to the pressure p. This signal is fed to the bellows measuring system of the controlled variable display (1.3) and the controller module (3).

The controller station (fixed set point controller) includes a scale (1.2), controlled variable display (1.3), set point adjuster (1.4) and plug-in connections for a controller module (3). These pneumatic connections are self-sealing when the module is unplugged. The controlled variable signal x produces a deflection on the bellows measuring system of the controlled variable display (1.3) which is transmitted to the pointer over a gear mechanism. The set point (reference variable w) can be adjusted on a scale (1.2) at the controller front. The position of the set point adjuster (1.4) is transmitted to the set point calibrator over a gear mechanism. This servo system (2.2) converts the adjusted set point into a pneumatic set point signal (w), which is fed to the controller module. The controller module compares the controlled variable signal and the set point signal (x and w) and produces an output signal y_A based on the system deviation and the adjusted control parameters. The output signal is connected to the output pressure display (1.5) and output port y.

However, the Type 3432-02 Controller Station additionally contains a manual/automatic switch (1.6), adjuster for manual mode (1.7) and differential pressure indicator (1.8). When the switch is in the AUTOMATIC position, the output signal display (1.5) and output port y are connected to the automatic output signal y_A. In MANUAL, the output signal display and output port y are connected to the manual output signal y_H set at the adjuster (1.7). A bumpless transfer from manual to automatic mode is possible when y_A and y_H are the same on the differential pressure indicator.

The controller stations can be equipped with suitable controller modules, e.g. Type 3434 for common PI pressure control, Type 3433 for PI or PID control. Details on controller and additional modules in Data Sheets ▶ T 7040 and ▶ T 7041.

They are also available with supply pressure regulator (Fig. 4, below). In this case, the device is suited for connection to an operating air pressure from 2.0 to 12 bar. The additional supply pressure regulator reduces and controls the operating pressure (p_B) to the required supply pressure (p_Z) of 1.4 bar or 20 psi. The operating principle of this supply pressure regulator is similar to that of Type 3708-5003 described in Data Sheet ▶ T 8545.



Version with supply pressure regulator (1.9):

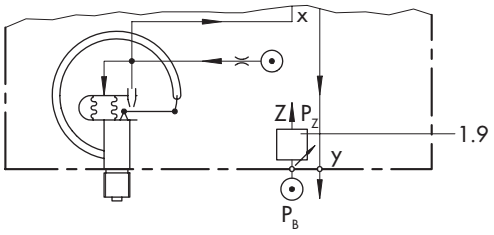


Fig. 4: *Schematic drawing of fixed set point controller for pressure with Type 3432-02 Controller Station*

1	**Controller station**
1.1	Housing with door
1.2	Dial plate
1.3	Controlled variable display with pointer, gear mechanism and bellows measuring system
1.4	Set point adjuster with pointer, gear mechanism and set point calibrator (1.41); follower controllers: set point display only
1.5	Output pressure display
1.6	Manual/automatic switch
1.7	Adjuster for manual mode
1.8	Differential pressure indicator for bumpless manual/automatic switchover
1.9	Supply pressure regulator
2	**Transmitter module for pressure**
2.1	Bourdon tube
2.2	Pneumatic servo system
3	**Controller module**

Table 1: *Controller station versions*

Controller station	**Type 3432-**	**02**	
Fixed set point controller		•	
Equipped with ...			
Set point adjuster		•	
Set point display		•	
Controlled variable and output signal display		•	
Manual/automatic switch		•	
Manual adjuster and differential pressure indicator		•	
Transmitter module		•	
Controller module	Type 3433-…		•
	Type 3434-…	•	
Can additionally be equipped with ...			
Type 3708-5003 Supply Pressure Regulator		•	
Door IP 65, with conductive coating		•	

Table 2: *Technical data*

Type 3435 Transmitter Module				
Measuring range (set point range)	bar	0 to 1.6 · 0 to 2.5 · 0 to 4.0 · 0 to 6.0 · 0 to 10 · 0 to 16 · 0 to 25 · 0 to 40		
	psi	0 to 24 · 0 to 36 · 0 to 60 · 0 to 90 · 0 to 150 · 0 to 240 · 0 to 360 · 0 to 600		
Overloadable up to ...		1.25 times the upper measuring range value		
Ultimate strength up to		Twice the upper measuring range value (max. 63 bar at 0 to 40 bar)		
Characteristic		Deviation from terminal-based conformity: ≤0.3 % Hysteresis: ≤0.5 % · Dead band: ≤0.1 %		
	Influence in %	Ambient temperature: ≤0.04 %/°C · Supply air: ≤0.25 %/0.1 bar Overload up to permissible value: <1 %		
Max. process medium temperature		60 °C		
Type 3432 Controller Station				
Controlled variable display		Measuring range 0.2 to 1.0 bar (3 to 15 psi) · Accuracy class 1.6 · Scale length 212 mm		
Set point adjustment		Output 0.2 to 1.0 bar (3 to 15 psi) · Scale length 212 mm · Accuracy class 1.6		
Adjuster for manual mode		Output 0.2 to 1.0 bar (3 to 15 psi) · Max. 0.02 to 1.35 bar · Max. air delivery > 1.5 m_n^3/h		
Can be equipped with ...				
Controller module [1]	**Type**	**3434-2**	**3433-2**	**3433-3**
	Controller action	PI	PI	PID
	Proportional-action coefficient K_P	1 to 20	0.2 to 20	
	Reset time T_n	0.05 to 20 min	0.03 to 50 min	
	Derivative-action time T_V	–	0.01 to 10 min · Derivative-action gain of x: ≈10	
Output		0.2 to 1 bar (3 to 15 psi) · Max. 0.02 to 1.35 bar		
Supply air	Standard version	Supply air 1.4 ±0.1 bar (20 ±1.5 psi) · Air consumption <0.6 m_n^3/h		
	Version with Type 3708-5003 Supply Pressure Regulator	Operating air 2.0 to 12 bar (30 to 180 psi) · Air consumption < 0.75 m_n^3/h		
Air quality acc. to ISO 8573-1		Maximum particle size and density: Class 3 · Oil content: Class 2 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected		
Permissible ambient temperature		–20 to 60 °C (–40 to 60 °C on request)		
Degree of protection		IP 40 · Front panel with optional door: IP 65		
Pressure Equipment Directive		2014/68/EU, Article 4.3 (sound engineering practice)		
Total weight (approx. kg)		6		
Materials				
Housing		Die-cast aluminum, plastic-coated		
Bourdon tube, process fluid connection		CrNiMo steel 1.4404 (316L)		

[1] ▶ T 7040 and ▶ T 7041

Temperature decoupling · Type 3435 Transmitter Module

For the measurement of steam, the Type 3435 Transmitter Module must be used together with a siphon filled with water before start-up to decouple the temperature.
For the measurement of liquids and gases above 60 °C, use a siphon to decouple the temperature or install a correspondingly long capillary tube.
To decouple the temperature, a diaphragm seal can be mounted onto the Type 3435 Transmitter Module.

Use in hazardous areas

The Type 3430 Controller is suitable for use in hazardous areas of Zone 1 and 2 without its own EC-type examination certificate. A EC-type examination certificate according to 2014/34/EU (ATEX Directive) is not required for the controller. Installed explosion-protected modules have their own EC-type examination certificate.

Pressure measurement of flammable process media

For pressure measurements of flammable process media falling into explosion groups IIA, IIB and IIC, install type-approved flame arresters into the measuring line.

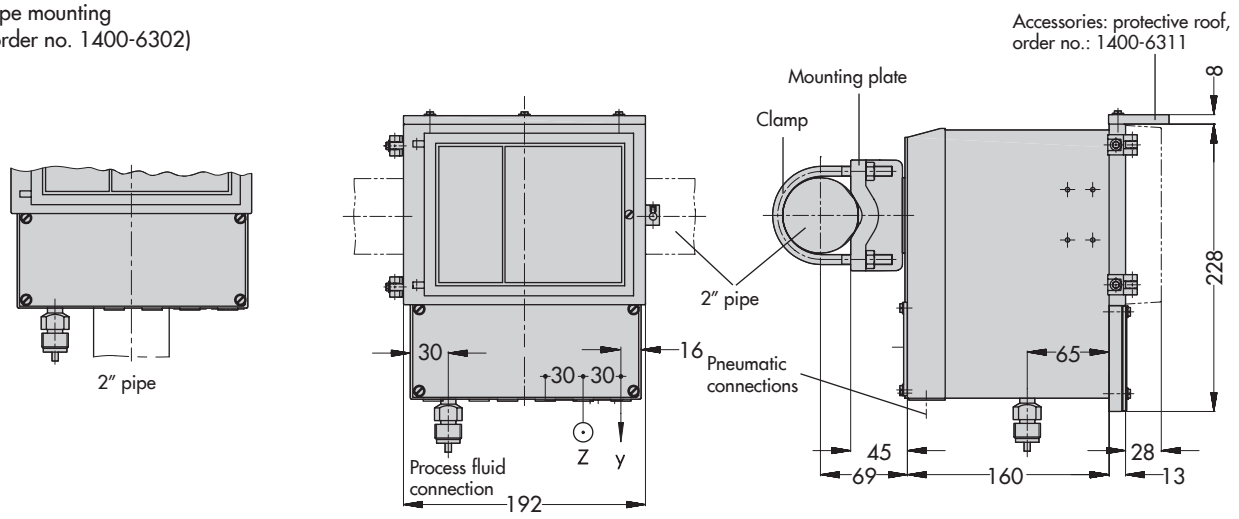
Version with diaphragm seal

A diaphragm seal is used to separate the process medium and the transmitter's pressure measuring element.
A capillary tube is used to connect the diaphragm seal to the pressure measuring element (bourdon tube) of the Type 3435 Transmitter Module. The inside space between the diaphragm seal and pressure measuring element is filled with a pressure-transmitting fluid (filler liquid). The elastic diaphragm and filler liquid transmit the medium pressure to the bourdon tube.

▶ Table 3 for technical data and Fig. 6 to Fig. 8 for dimensions.

Dimensions in mm

Pipe mounting
(order no. 1400-6302)



Wall mounting
(order no. 1400-6301)

Panel mounting
Order no.: 1400-6300
Panel mounting:
188^{+1} x 225^{+1} mm
Distance between center lines with door approx. 235 mm
Close-to-close arrangement in rows (without door) according to IEC 61554 (DIN 43700)

Connections

8/9	Z	Supply
38	y	Manipulated variable

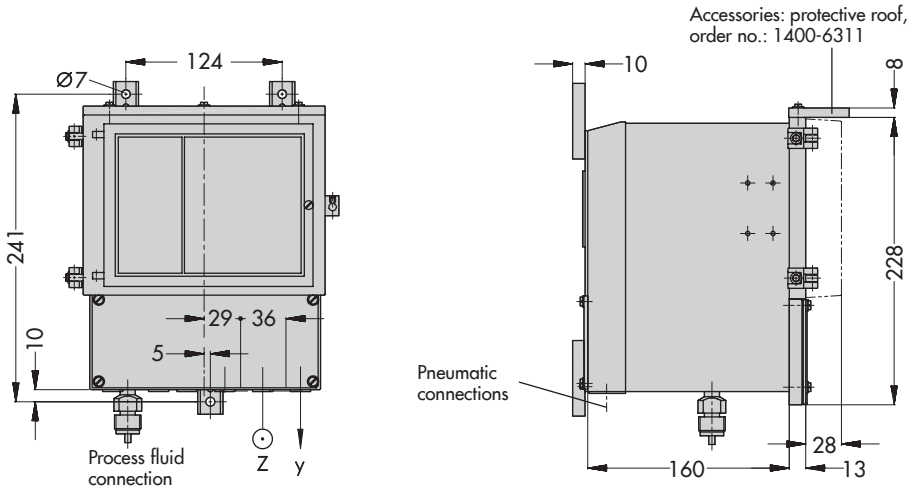


Fig. 5: *Dimensions*

Dimensions in mm

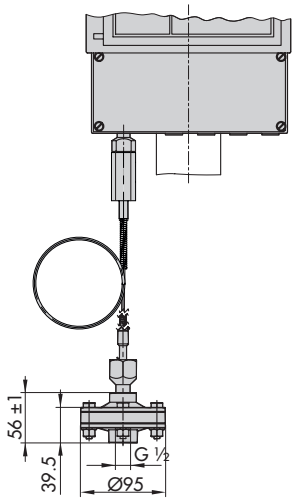


Fig. 6: *Diaphragm seals for general use*

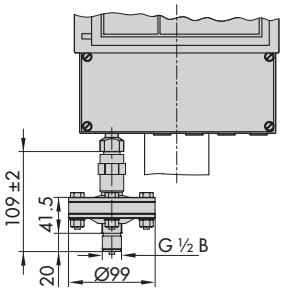


Fig. 7: *Diaphragm seals for use with oxygen*

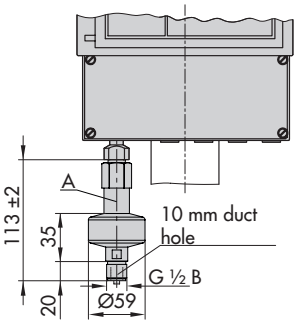


Fig. 8: *Diaphragm seals for use with flammable gases*

Installation and connections
The following mounting positions are possible (see Fig. 5):

Pipe mounting With mounting part and clamp for attachment to a vertical or horizontal 2″ pipe · Order no. 1400-6302

Wall mounting With 3 brackets for attachment to a wall · Order no. 1400-6301

Panel mounting With 4 fastening elements (C style, DIN 43835) for attachment to the control panel · Cut-out for panel mounting 188^{+1}x255^{+1} mm · Distance between center lines with door approx. 235 mm · Close-to-close arrangement in rows (without door) according to IEC 61554 (DIN 43700) · Order no. 1400-6300

Mounting orientation Controller station mounted in the upright position

Pneumatic connections (output and supply air) Tapped holes G ⅛ according to DIN EN ISO 228-1

Process fluid connection Connection nipple G ½ according to DIN EN ISO 228-1

Table 3: *Technical data · Diaphragm seals for general use · Oxygen · Flammable gases*

Diaphragm seal for …		General use	Gaseous oxygen, measuring ranges up to 25 bar	Flammable gases, compliant with NACE MR 0175
Style		Top and bottom sections fastened together, inside diaphragm	Top and bottom sections fastened together, inside diaphragm	Top and bottom sections, diaphragm welded together, inside diaphragm
Process fluid connection		G ½ female thread	G ½ B male thread	G ½ B male thread [3]
Pressure rating		PN 100 [2]	PN 40 [1]	PN 250 [2]
Top section material		CrNiMo steel 1.4404 (316L)		
Material of wetted components	Bottom section with process fluid connection	Titanium 3.7035	CrNiMo steel 1.4404 (316L)	
	Diaphragm	Titanium 3.7035	CrNiMo steel 1.4435 (316L)	
	Gasket	PTFE	FPM (Viton VR1)	–
Filler liquid		Silicone oil AK 50	Halocarbon FO1 (6.3)	Silicone oil FA2
Cleaning		Standard	Free of oil and grease, DIN EN 12300-O2, A.2 and A.3	Standard
Attachment		Using 2 m capillary tube, CrNiMo steel	Direct	
Temperature range of medium		–35 to +150 °C	–20 to +60 °C	
Flame arrester		–		Adapt-FS flame arrester according to DIN EN ISO 16852, explosion protection: IIG IIC, EC type examination certificate: PTB 12 ATEX 4001 X
Weight		4.5 kg	1.8 kg	1.0 kg

[1] Max. 30 bar medium pressure
[2] Max. medium pressure depending on the measuring range of the Type 3435 Transmitter Module
[3] Without centering spigot, with 10 mm duct borehole

Ordering text

Type 3430 Pneumatic Indicating Controller for Pressure, consisting of:

- Type 3432-02 Controller Station
- Type 3434-2, Type 3433-2 or Type 3433-3 Controller Module
- With/without Type 3708-0003 Supply Pressure Regulator
- With or without transparent door, IP 65, lockable or screw closure
- Type 3435 Transmitter Module (measuring range 0 to 1.6, 2.5, 4, 6, 10, 16, 25, 40 bar or 0 to 24, 36, 60, 90, 150, 240, 360, 600 psi)

Accessories

- For wall mounting (1400-6301)
- For pipe mounting (1400-6302)
- For panel mounting (1400-6300)
- Protective roof for front panel (1400-6311)