MOUNTING AND OPERATING INSTRUCTIONS

EB 7030 EN

Translation of original instructions

Type 3432 Controller Station

- with Type 3435 Transmitter Module for pressure
- with Type 3436 Transmitter Module for temperature
- with Type 3438 Transmitter Module for temperature (Pt 100)
- for standardized signals

The version with lockable door and installed Type 3436 Transmitter Module for temperature is shown.

Type 3431 Controller Station

- for standardized signals

Type 3430 Pneumatic Indicating Controllers

Series 430

Edition May 2018

Ex certified

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 (aftersalesservice@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 > Service & Support > Downloads > Documentation***.

WARNING!
Damage to health relating to the REACH regulation.
If a SAMSON device contains a substance which is listed as being a substance of very high concern on the candidate list of the REACH regulation, this circumstance is indicated on the SAMSON delivery note.
Information on safe use of the part affected ▶ www.samsongroup.com/en/about-samson/material-compliance/reach-regulation.html.

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

1 General safety instructions 5

2 Application 6

3 Operation 6

3.1 Settings at the controller modules 6
3.1.1 Direction of action 6
3.1.2 Air output capacity 7
3.1.3 Proportional-action coefficient KP 8
3.1.4 Reset time Tn 8
3.1.5 Derivative-action time Tv 8
3.1.6 Operating point 8
3.2 Adjusting the limit contacts 9

4 Start-up and settings 10

4.1 Tuning the controller 10
4.2 Adjusting the operating point in P and PD controllers 11
4.3 Bumpless automatic/manual mode changeover 12
4.4 Bumpless changeover between internal or external set point 12
4.5 Readjusting the controller zero point 12

5 Design and principle of operation 13

5.1 Transmitter modules 14
5.2 Controller station 16
5.3 Controller modules 16
5.3.1 Type 3433 Controller Modules 16
5.3.2 Type 3434 Controller Module 20
5.4 Diaphragm seal 21
5.4.1 Mounting with diaphragm seal 21
5.4.2 Diaphragm seal for general use 22
5.4.3 Diaphragm seals for use with oxygen 22
5.4.4 Diaphragm seals for use with flammable gases 22
5.5 Additional units 25
5.5.1 Type 6112 i/p Converter 25
5.5.2 w_{int}/w_{ext} selector switch 25
5.5.3 Supply pressure regulator 25
5.5.4 Inductive limit contacts 26

6 Installation 26

6.1 Mounting 26
6.1.1 Changing scales 33
6.2 Installing the temperature sensor 33

7 Connections 36
7.1 Pneumatic connections 36
7.1.1 Connection examples 36
7.1.2 Adjusting the supply air in supply pressure regulators 37
7.2 Electrical connections 38
8 Maintenance 40
8.1 Checking the air supply 40
9 Conversion 41
9.1 Changing the controller function 41
9.2 Exchanging the transmitter module 44
9.3 Checking the controller function 44
10 Use in hazardous areas 45
10.1 Servicing explosion-protected devices 46
11 Technical data 47
12 Certificates 51

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 persons are not exposed to any danger.
- All safety instructions and warnings given in these mounting and operating instructions, particularly those concerning installation, start-up and maintenance, must be strictly observed.
- Devices with a CE marking have an EU declaration of conformity, which includes information about the applied conformity assessment procedure. The EU Declaration of Conformity is available on request.
- 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.
- Proper transport, storage, installation, operation and maintenance are assumed.

2 Application

The Series 430 Pneumatic Controllers are used for the automation of process and industrial plants.

The controllers measure directly the controlled variable (pressure, temperature, electric or pneumatic standardized signal), compare the measured value with the set point and issue a pneumatic control signal of 0.2 to 1 bar (3 to 15 psi).

A supply pressure of 1.4 bar ±0.1 bar (20 psi ±1.5 psi) or an operating air pressure of 2 to 12 bar (30 to 180 psi) with an installed supply pressure regulator is required.

3 Operation

3.1 Settings at the controller modules

The controller module in the station can be accessed after releasing the lock (4, Fig. 1) and opening the indicating unit (5).

The settings for direction of action (turnboard **A**) and air delivery (turnboard **B**) must be performed prior to start-up.

Unscrew the fastening screw (6) at the controller module, pull the module off its self-seal push-on fittings and lift it out of the controller station.

3.1.1 Direction of action

The direction of action for the control loop is set at the turnboard **A**, where the position of its arrow symbol according to the arrow symbol on the controller module determines the direction of action of the controller (Fig. 1).

◁▷ Arrow tips facing opposite directions:
Direction of action: increasing/decreasing
As the controlled variable x increases, the output pressure y falls.

▷▷ Arrow tips facing the same direction:
Direction of action: increasing/increasing
As the controlled variable x increases, the output pressure y increases.

Setting or changing the direction of action:

Undo the screw in turnboard **A** (Fig. 1) and lift it off together with the turnboard. If necessary, lever the board at the side. Do not lose the rubber seal.

➔ Turn the board by 90° so that the required arrow is aligned with the arrow on the base plate.

➔ Insert board and tighten the screw.

➔ Remount the controller module and fasten it in the controller station.

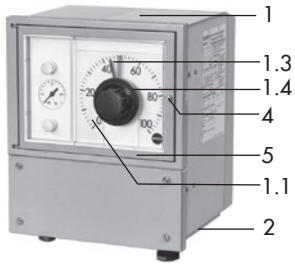
3.1.2 Air output capacity

(Type 3433 Controller Module only)

The position of turnboard **B** (Fig. 1) with its arrow symbol determines the air delivery to the feedback bellows. It can only be accessed after removing the comparator (3.1).

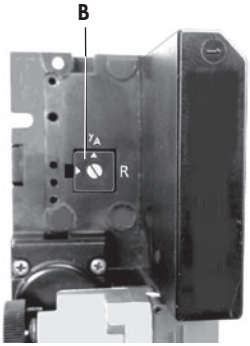
▷ **yA** Normal air delivery
Approx. 1 m_n^3/h per % of the system deviation

▷ **R** High air delivery
approx. 3 m_n^3/h per % of the system deviation (not with P or PD controller modules)

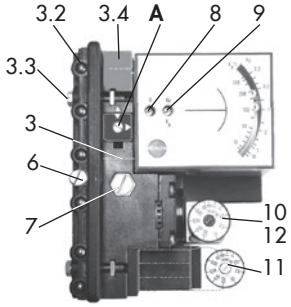


1 Controller station (Type 3432)
1.1 Dial plate
1.3 Controlled variable pointer
1.4 Set point adjuster
2 Transmitter module or base
3 Controller module
3.1 Comparator
3.2 Connecting plate
3.3 Hex screws
3.4 Screws (inside)
4 Lock
5 Indicating unit
6 Fastening screw
7 Restriction with filter
8 Zero adjuster
9 Kp adjuster
10 Tn adjuster
11 Tv adjuster (PD or PID controller only)
12 Operating point adjuster (P or PD controller only)

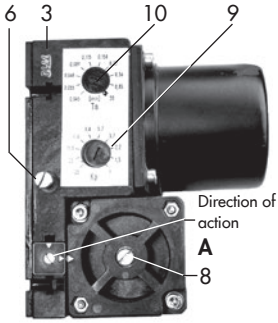
Turnboard
A Direction of action
B Air output capacity



Type 3433 Controller Module
View from the side without comparator



Type 3433-3 Controller Module (PID)



Type 3434-2 Controller Module (PI)

Fig. 1: *Turnboards and adjusters*

➔ Undo screws (3.3) and pull off the connecting plate (3.2) together with square nuts and bolts from the controller module.

➔ Unscrew the hexagonal socket head screws (3.4) at the side and lift the comparator (3.1) off the controller module.

Setting or changing the air delivery

➔ Undo the screw in turnboard B and lift it off together with the turnboard. If necessary, lever the board at the side. Do not lose the rubber seal.

➔ Turn the board so that the arrow is aligned with $\mathbf{y_A}$ or **R** on the controller module. Insert board and tighten the screw.

➔ Remount the controller module and fasten it in the controller station.

3.1.3 Proportional-action coefficient Kp

The setting of the Kp (adjuster 9) determines the controller gain and depends on the controlled system that is to be tuned (see section 4.1).

3.1.4 Reset time Tn

Controller versions with integral-action component require the reset time to be set at the adjuster (10). The setting depends on the controlled system that is to be tuned (see section 4.1).

3.1.5 Derivative-action time Tv

Controller versions with derivative-action component require the derivative-action time Tv to be set at the adjuster (11). The setting depends on the controlled system that is to be tuned (see section 4.1).

3.1.6 Operating point

Controller modules without integral-action component, such as P or PD controllers, have an operating point.

This can be adjusted at the operating point adjuster (12) between 0 and 100 %, which corresponds to 0.2 to 1 bar in Types 3433-1/-4/-5/-6 Controller Modules.

The setting depends on the output pressure y (see section 4.1).

The operating point of the Type 3434-1 Controller Module is fixed at 0.6 bar.

3.2 Adjusting the limit contacts

Only with controller station that have the optional inductive limit contacts.

Before adjustment, release the lock (4, Fig. 1) and open the indicating unit (5). The contacts can be accessed on the back of the device.

Use a screwdriver to move the proximity switches in the holders between 0 and 100 % on the scale until contact is made with the aid of a connected switching amplifier.

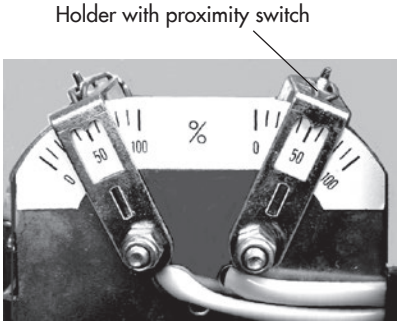


Fig. 2: *Limit contacts*

4 Start-up and settings

Before start-up of the control loop, check all devices to make sure that they are connected correctly, do not leak and function properly.

Release the lock (4) and open the indicating unit (5) to access the operating controls on the controller.

Check the turnboard to make sure the correct direction of action is set at the controller (see section 3.1.1).

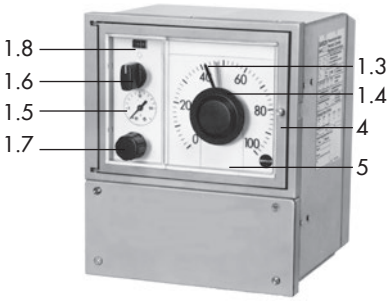
4.1 Tuning the controller

The controller needs to be tuned to the characteristics of the controlled system using the Kp and Tn and/or Tv adjusters at the controller module (Fig. 1). This ensures that the controller can maintain any system deviations for all set points caused by the disturbance variables to zero or at least minimize them.

The system must be started up manually when a controller station is fitted with a **manual/automatic switch** (1.6).

In most cases, a tuning test following the Ziegler and Nichols method is sufficient to tune the controller:

1. Apply supply air (1.4 ±0.1 bar).
2. Set the proportional-action coefficient Kp to a low value at the comparator.
3. Set the Tn restrictor to its maximum value and Tv to its lowest value (PI and PID controllers only).



1.3 Controlled variable pointer (red)
1.4 Set point adjuster (green)
1.5 Output pressure display
1.6 Manual/automatic switch
1.7 Manual output pressure adjuster
1.8 Differential pressure indicator
4 Lock
5 Indicating unit

Fig. 3: *Front view*

Setting for manual mode:

4. Set manual/automatic switch to **manual**.
5. Move the adjuster (1.7) for the control signal until the controlled variable (controlled variable pointer, 1.3) slowly starts to settle to the adjusted set point (set point adjuster, 1.4).

   After the differential pressure indicator (1.8) reads zero, set the switch (1.6) to **automatic**.

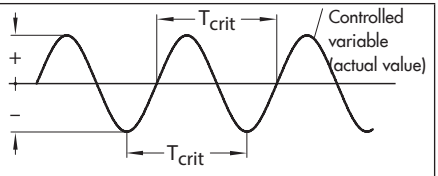
   Proceed as described in steps 6 to 7.

Setting for automatic mode:

4. Turn the adjuster (1.4) on the indicating unit to set the set point to the required value.

5. Briefly set the Tn restrictor to its minimum setting (fully open) to allow the red controlled variable pointer to move to the green set point pointer. Close the Tn restrictor again.
6. Starting from a low value, increase the proportional-action coefficient Kp until the controlled variable pointer shows an harmonic oscillation pattern of the controlled variable (uniform oscillation amplitudes as shown in Fig. 4).

   If oscillations do not arise with a large Kp setting, turn the rotary knob to slightly change the set point and then return it to its former setting. It may be necessary to increase the gain (Kp) slightly until an harmonic oscillation pattern arises.
7. Write down the adjusted value on the Kp scale you have just adjusted as the critical proportional-action coefficient Kp_{crit}. Use a stopwatch to time the oscillation time for one entire oscillation to find T_{crit} (PI and PID controllers only).



	Kp	Tn	Tv
P	0.50 · Kp_{crit}		
PI	0.45 · Kp_{crit}	0.85 · T_{crit}	
PID	0.59 · Kp_{crit}	0.50 · T_{crit}	0.12 · T_{crit}

Fig. 4: *Harmonic oscillation, tuning*

Multiply both values with the values in the table (Fig. 4) and set them as the favorable settings for Kp, Tn and Tv at the controller.

Should oscillations still occur despite these settings, slightly reduce Kp and increase Tn. Repeat these steps, if necessary, until the control loop shows a satisfactory performance.

Leave enough time in between settings to allow the controller to stabilize.

4.2 Adjusting the operating point in P and PD controllers

Type 3433 Controller Modules only

For P and PD controllers, after setting the proportional-action coefficient Kp, set the operating point instead of the reset time as described above.

When the system is in a steady-state condition, read the automatic output y_A of the controller at the display (1.5) and set this value directly at the operating point adjuster (12, Fig. 1) (setting values 0.2 to 1 bar = 0 to 100 %).

Continue to correct until the system deviation is zero. If the output pressure reading is unsteady, find the average value.

i ***Note***

After the set point is changed, the operating point must set again as described above. When the set point is often changed, adjust the operating point to 0.6 bar (e.g. 50 %, average value).

i Note

If a P/PI controller is switched to P action, completely open the Tn restrictor to ensure the operating point adjuster can take effect without delay.

Version with set-point-dependent operating point

This version does not need to be adjusted since the operating point automatically follows the set point w.

4.3 Bumpless automatic/ manual mode changeover

The bumpless switchover ensures that no pressure surges can reach the valve when the manual/automatic switch is activated as follows:

Changeover from automatic to manual

Use the adjuster (1.7) to adjust the manual output y_H until the differential pressure indicator (1.8) reads zero. Change the switch over to manual.

Differential pressure indicator

With Without deviation

Changeover from manual to automatic

If the system is to be controlled manually to the required value, the automatic output y_A must be adjusted at the set point adjuster (1.4) to match the manual output y_H.

Do not set the switch (1.6) to automatic until the differential pressure indicator (1.8) reads zero.

Afterwards, adjust the set point again to the required value.

4.4 Bumpless changeover between internal or external set point

For fixed set point and follow-up control modes, the Type 3432 Controller Station is fitted with a w_{int}/w_{ext} selector switch, a pressure adjuster and a differential pressure indicator (Fig. 12).

For bumpless changeover betwen set points, adjust the the pressure adjuster until the differential pressure indicator moves to zero.

4.5 Recalibrating the controller zero point

If deviations arise between the controlled variable and set point during operation, the zero point can be recalibrated by turning the zero screw on the back of the indicating unit (5) until the controlled variable and set point on the front display are the same again.

Deviations between the set point and the controlled variable can also be corrected at the zero adjuster (8, Fig. 1) of the controller module.

5 Design and principle of operation

The modular controllers represent a complete automation package consisting of a controller station, a controller module suitable for the respective task, and, possibly, a transmitter module as well as other additional equipment.

Indicating controllers with Type 3432 Controller Station are designed for installation of Type 3435 and Type 3436 Transmitter Modules for pressure or Type 3438 Transmitter Module for temperature with direct process fluid connection.

The Type 3431 Controller Station receives the controlled variable as a standardized signal from 0.2 to 1 bar or 3 to 15 psi. A current signal from 0/4 to 20 mA or 1 to 5 mA can also be supplied by an optional installed i/p converter.

The controller station can be fitted with a Type 3433 or Type 3434 Controller Module.

The Type 3433 Controller Module can be combined with Type 3437 Additional Modules [1] for pressure limitation, control mode changeover or bumpless manual/automatic switchover for special control tasks.

The controller station can optionally be equipped with a manual/automatic switchover, which consists of a selector switch, an adjuster for manual mode and a differential pressure indicator.

For use as combined fixed set point and follower controller, the controller station is fitted with an additional unit for w_{int}/w_{ext} switchover; for use as a follower controller with an additional pneumatic or electric input for external set point w_{ext} (e.g. 0.2 to 1 bar or 0/4 to 20 mA).

Additionally, one or two inductive limit contacts can be mounted on the indicating unit, which can be adjusted on a scale.

i Note

More details concerning the controller stations and the associated controller modules can be found in the corresponding data sheets.

- ▶ *T 7030 · Overview of pneumatic indicating controllers*
- ▶ *T 7032 · Pneumatic indicating controllers for pressure*
- ▶ *T 7034 · Pneumatic indicating controllers for temperature with capillary sensor*
- ▶ *T 7036 · Pneumatic indicating controllers for Pt 100 resistance thermometer*
- ▶ *T 7038 · Pneumatic indicating controllers for standardized signals*
- ▶ *T 7040 · Type 3433 Pneumatic Controller Modules and Type 3437 Additional Modules*
- ▶ *T 7041 · Type 3434 Pneumatic Controller Modules*
- ▶ *T 7045 · Type 6112 i/p Converter Modules*

[1] No longer available.

5.1 Transmitter modules

Type 3435 for pressure

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).

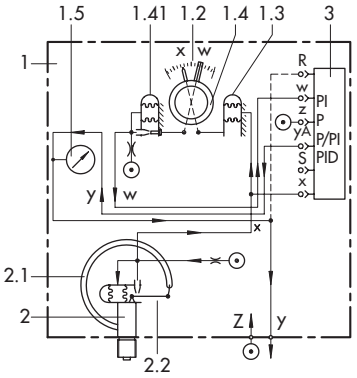
Type 3436 for temperature with capillary sensor

The temperature of the process medium produces a pressure proportional to the temperature in the gas-filled sensor (2.3) of the transmitter module. This pressure opposes a force at the beam (2.4) which is generated at the feedback bellows (2.6) by the output pressure p_A.

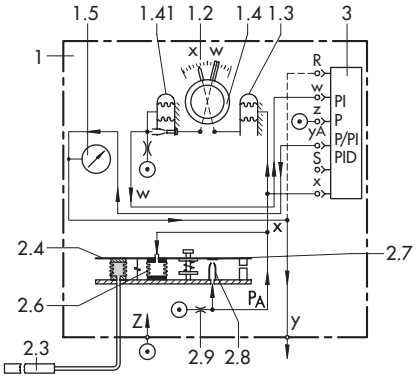
The supply air flows through the restrictor (2.9) and nozzle (2.8) onto the flapper plate (2.7). An increase in temperature causes the flapper plate to come closer to the nozzle. As a result, the output pressure p_A applied to the bellows (2.6) rises until a new equilibrium is reached, i.e. until the output signal reaches a value proportional to the temperature. The pneumatic standardized signal (controlled variable x) is fed to the bellows measuring system of the controlled variable display (1.3) and the controller module (3).

Type 3438 for temperature with Pt 100 resistance thermometer

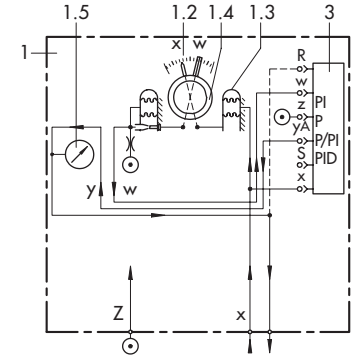
The Type 3438 Transmitter Module consists of an electric transmitter and a downstream i/p converter for connection to a Pt 100 resistance thermometer. The resistance value of the Pt 100 sensor is converted into a 4 to 20 mA current signal in the electric transmitter. Its output signal (4 to 20 mA) is converted into a pneumatic signal (0.2 to 1 bar) by the i/p converter. The output pressure proportional to the temperature is applied as a pneumatic signal (controlled variable x) to the bellows measuring system of the controlled variable display and controller module.



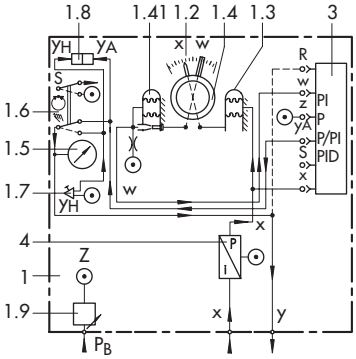
Type 3432 with Type 3435 Pneumatic Transmitter for pressure



Type 3432 with Type 3436 Transmitter for temperature



Type 3431 and Type 3432 for pneumatic standardized signals



Type 3432 with manual/automatic switch (1.6), supply pressure regulator (1.9) and i/p converter (4)

1 Controller station
1.2 Scale
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
1.5 Output pressure display
1.6 Manual/automatic switch
1.7 Adjuster for manual mode
1.8 Differential pressure indicator for bumpless man/auto switchover
1.9 Supply pressure regulator
2 Transmitter module
2.1 Bourdon tube measuring system
2.2 Pneumatic servo system
2.3 Temperature sensor
2.4 Balance beam
2.6 Feedback bellows
2.7 Flapper plate
2.8 Nozzle
2.9 Restrictor
3 Controller module
4 Type 6112 i/p Converter
–⊙ Supply 1.4 bar
p_A Output pressure
p_B Compressed air network

Fig. 5: *Functional drawings of the indicating controllers*

5.2 Controller station

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 w can be adjusted at the scale (1.2) on the front. The position of the set point adjuster (1.4) is transmitted to the set point calibrator over a gear mechanism.

This servo system (1.41) 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.

The controller station with manual/automatic switchover (Fig. 1 and Fig. 3) additionally contains a manual/automatic switch (1.6), adjuster for manual mode (1.7) and differential pressure indicator (1.8).

When the switch is positioned in the AUTOMATIC mode, the output pressure display (1.5) and output port y are connected to the automatic output signal y_A. In MANUAL mode, the output pressure display and output port y are connected to the manual output signal y_H set at the adjuster (1.7).

A bumpless switchover from manual to automatic mode is possible when y_A and y_H are the equal each other on the differential pressure indicator (1.8).

5.3 Controller modules

The controller modules are plug-in units. They are plugged into the self-sealing sockets of the controller station and held by a fastening screw.

5.3.1 Type 3433 Controller Modules

The controller modules consist of a comparator fitted with four metal bellows arranged in a square and a base plate with self-seal push-on fittings. The base plate accommodates the components required for the chosen function, such as relays and restrictors.

The components can be exchanged or upgraded, allowing the function to be changed at a later point in time (see section 9.1).

Type 3433-2 PI Controller (Fig. 6, top)

The controlled variable x and the set point w are transferred as pneumatic signals between 0.2 and 1 bar via **turnboard A** to the metal bellows w and x. When x is greater than w, the controlled variable bellows tilts the pivoted swashplate toward the set point bellows, causing the pressure downstream of the nozzle connected to the swashplate over a pin to rise. As a result, the output pressure y_A of the booster increases.

The output pressure is fed back via **turnboard B** to the bellows R2 onto the swashplate.

The position of the swashplate and the output pressure continue to change until the distance between nozzle and flapper plate is the same as initially and the output pressure

y_A assumes a value corresponding to the controlled variable x and the adjusted proportional-action coefficient Kp adjustable over a screw.

Outside of the controller module, the y_A is connected to R, allowing the output pressure y_A to be fed back to bellows R1 also over the port R and the adjustable Tn restrictor. As a result, the effects of the pressures in bellows R1 and R2 balance themselves out and the system deviation is eliminated.

If, after switchover to manual mode at the controller station, a switching pressure is applied to port S, the Tn start-up relay is activated and bypasses the Tn restrictor.

The **turnboard A** determines the direction of action of the controller. The direction of action is changed by turning the turnboard. See section 3.1.1.

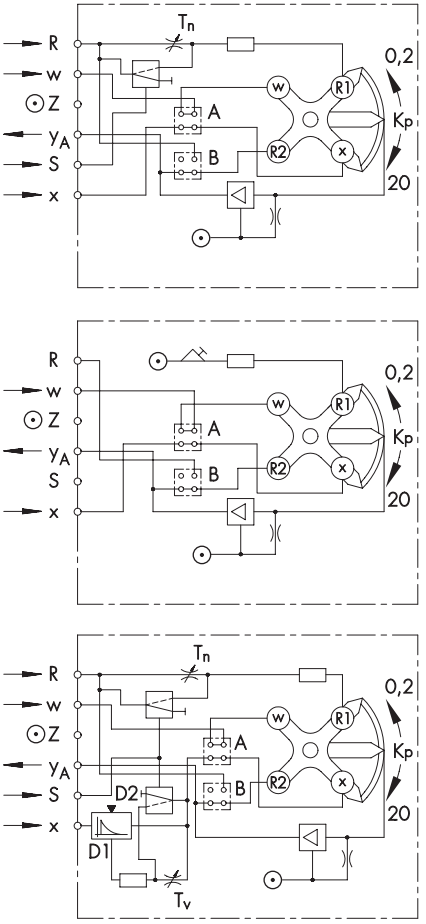
The **turnboard B** determines the air delivery to the feedback bellows.

In the delivered state, the turnboard B is set to y_A, i.e. the output pressure y_A is directly fed back to bellows R2. With this circuit arrangement, the controller provides normal air delivery and output pressure damping.

In the switching position to R, the output pressure y_A is fed back via port R to the bellows R1 and R2. As a result, the controller has a higher air delivery.

Practical application for long distances to the control valve, large connecting volumes and for fast controlled systems.

See section 3.1.2 on how to set or change the air delivery by turning the **turnboard B**.



R	Feedback	Turnboards	
R1/R2	Feedback bellows	A	Direction of action
⊙	Z = Supply air 1.4 bar	B	Air output capacity
YA	Output pressure		
S	Switching pressure		

Fig. 6: *Type 3433 Controller Modules*

Type 3433-2 PI Controller Module

The following controller module versions are almost identical to the Type 3433-2 PI Controller Module, except they are fitted with, for example an operating point adjuster, a derivative element or a selector switch, depending on the application.

Type 3433-1 P Controller Module

This module is largely identical to the Type 3433-2, except an operating point adjuster is used instead of the integral element.

Type 3433-3 PID Controller Module

This module is largely identical to the Type 3433-2. However, it contains an additional derivative element providing a derivative-action gain of approx. ten times in the input branch of the controlled variable x. The derivative-action time can be adjusted at the Tv restrictor.

Type 3433-4 PD Controller Module

This module is largely identical to the Type 3433-1. However, it contains a derivative element providing a rate gain of the input branch of the controlled variable x. It has a derivative-action gain of approx. ten times and a derivative-action time that can be adjusted at the Tv restrictor.

Type 3433-5 P/PI Controller Module

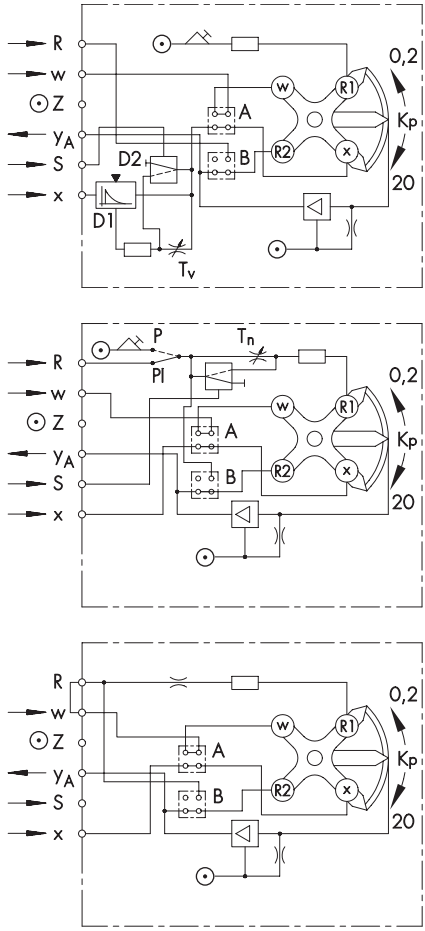
With P/PI selector switch, it can be used either as P controller with operating point setting or PI controller.

This module is designed in the same way as the PI and P controller modules.

The Type 3433-6 PD/PID Controller Module with PD/PID selector switch can be used either as PD or PID controller.

Type 3433-9 P Controller Module

With set point-dependent operating point, it is the same as Type 3433-1 P Controller Module, except the operating point changes proportionally to the set point w.



R	Feedback	Turnboards	
R1/R2	Feedback bellows	A	Direction of action
⊙	Z = Supply air 1.4 bar	B	Air output capacity
YA	Output pressure		
S	Switching pressure		

Fig. 7: *Type 3433 Controller Modules*

5.3.2 Type 3434 Controller Module

The controller modules feature a box-shaped comparator that operates according to the force-balance method. The proportional-action coefficient Kp can be adjusted at a restrictor within the range between 1 and 25.

Type 3434-2 PI Controller Module (Fig. 8)
The controlled variable x and the set point w are transferred as gauge pressures between 0.2 and 1 bar or 3 to 15 psi via **turnboard A** to the diaphragm chambers (R1 and R2). When x exceeds w, the force switch (23) is lowered and opens the plug.

The supply air flows into diaphragm chamber R2 and the output pressure y_A increases.

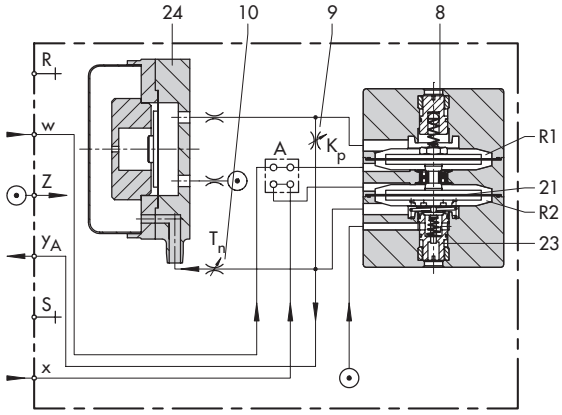
The output pressure is routed over the Tn restrictor (10) into the volume of the 1:1 booster (24), whose output pressure is fed back into the diaphragm chamber R1.

The pressures acting in the diaphragm chambers R1 and R2 equal each other.

The position of the force switch changes until the controller output pressure assumes a value assigned to the controlled variable x and the adjusted proportional-action coefficient Kp, i.e. until the system deviation is eliminated.

The proportional-action coefficient Kp is adjusted at the restrictor (9), while the reset time Tn is adjusted at the restrictor (10). The zero adjuster (8) is used to calibrate the controller module.

The **turnboard A** determines the direction of action of the controller. The direction of action is changed by turning the turnboard. See section 3.1.1.



8	Zero adjuster
9	Kp adjuster
10	Tn adjuster
21	Diaphragm
23	Force switch
24	Booster
R1	Diaphragm chamber R1
R2	Diaphragm chamber R2
A	Direction of action of turnboard

Fig. 8: *Type 3434-2 Controller Module*

Type 3434-1 P Controller Module
The design and principle of operation are almost identical to that of the Type 3434-2 PI Controller Module. However, the feedback element with Tn restrictor is replaced by a spring for fixed operating point adjustment at 0.6 bar.

5.4 Diaphragm seal

The use of a diaphragm seal mounted on to the Type 3430 Indicating Controller with Type 3435 Transmitter Module is required when the process medium must not come into direct contact with the pressure measuring element. In this setup, the elastic diaphragm of the diaphragm seal and filler liquid transmit the medium pressure to the bourdon tube. Depending on the version, the diaphragm seal is connected directly to the transmitter or over a capillary tube, depending on the version.

⚠ WARNING

For hazardous media, e.g. oxygen or flammable process media, the applicable regulations must be observed in addition to the general rules.

❗ *NOTICE*

Do not unscrew or loosen the mechanical connection (pneumatic indicating controller to the diaphragm seal), the diaphragm seal and the openings to fill it with filler liquid. Otherwise, the filler liquid will escape and the diaphragm seal system will no longer function.

5.4.1 Mounting with diaphragm seal

On using the Type 3430 Pneumatic Indicating Controller with diaphragm seal, observe the following points:

- ➔ On using a **diaphragm seal with capillary tube**, mount the device at the same height as the point of measurement. In this case, the height of the liquid column in the capillary tube is included in the measuring result. If this is not possible, a zero correction at the zero screw of the transmitter is necessary.
- ➔ On using a **diaphragm seal without capillary tube**, mount the device when gases or air are used as the process medium above the point of measurement and for vapors and liquids at the same height as the point of measurement.
- ➔ On installing the capillary tube, make sure that it is not bent or damaged. The smallest permissible bending radius is 50 mm.
- ➔ Protect the device and the capillary tube against considerable fluctuations in ambient temperature and dirt contamination.

5.4.2 Diaphragm seals for general use

See Fig. 9

The diaphragm seal in the version for general use is connected to the Type 3430 Pneumatic Indicating Controller over a capillary tube.

5.4.3 Diaphragm seals for use with oxygen

See Fig. 10

The diaphragm seal in the version for gaseous oxygen contains a filler liquid suitable for oxygen. The diaphragm seal is mounted directly to the Type 3430 Indicating Controller. The parts that come into contact with the process medium are subjected to a special cleaning procedure and are labeled *"Oxygen! Keep free of oil and grease*".

NOTICE

For oxygen service, observe the following points:

- *When used with gaseous oxygen, the maximum permissible pressure is 30 bar and the maximum permissible temperature is 60 °C.*
- *Slowly build up the pressure.*
- *Do not use oxygen to supply the indicating controller with pressure.*
- *Referenced documents: Oxygen Manual H 01 (Instructions and information on how to safely handle devices for oxygen service)* ▶ *H 01*

Note

The diaphragm seal has been cleaned and assembled under special conditions. The process fluid connection must not come into contact with oil or grease during installation.

5.4.4 Diaphragm seals for use with flammable gases

See Fig. 11

The diaphragm seal in the version for flammable gases consists of the flame arrester and diaphragm seal. The flame arrester allows connection to explosive atmospheres (Zone 0). The flame arrester prevents the propagation of flames on deflagration (subsonic combustion propagated through heat transfer) of explosive vapor/air or gas/air mixtures of explosion groups IIA, IIB and IIC from the transmitter into the pipeline. The flame arrester is located between the transmitter and the diaphragm seal (A).

NOTICE

For use with flammable gases, observe the following:

- *In potentially explosive atmospheres, the ambient temperature must not exceed +60 °C in the area surrounding the flame arrester.*
- *The ambient pressure must be between 0.8 and 1.1 bar (absolute pressure).*
- *Observe EC type examination certificate PTB 12 ATEX 4001 X (see section 12).*
- *Do not use flammable gases to supply the indicating controllers with pressure.*

On installing the Type 3430 Pneumatic Indicating Controller with diaphragm seal, observe the following points:

➔ To prevent gas migration into another zone, the attachment of the diaphragm seal to the process must meet stringent sealing requirements.

➔ *Plant operators must check for leakage at regular intervals.*

➔

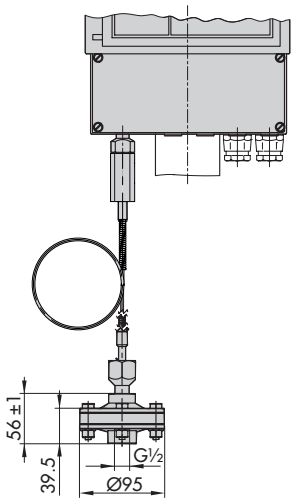


Fig. 9: *Diaphragm seals for general use*

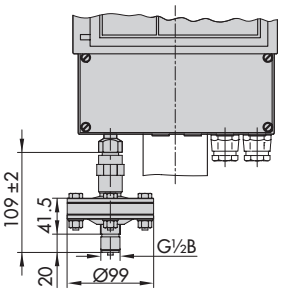


Fig. 10: *Diaphragm seals for use with oxygen*

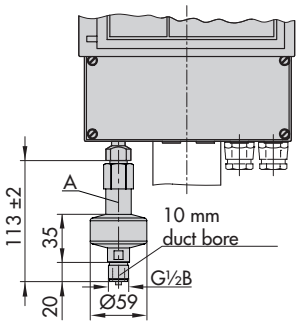


Fig. 11: *Diaphragm seals for use with flammable gases*

Table 1: *Diaphragm seals for general use, use with oxygen or 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 (see section 11)
3) Without centering spigot, with 10 mm duct borehole

5.5 Additional units

5.5.1 Type 6112 i/p Converter

External set point w_{ext} and/or controlled variable x can be provided by a current signal from 0/4 to 20 mA or 1 to 5 mA and converted into the pneumatic standardized signal from 0.2 to 1 bar by the i/p converter.

The additional unit with one or two converters is installed in the controller station and can only be used in conjunction with Type 3433 Controller Modules.

5.5.2 w_{int}/w_{ext} selector switch

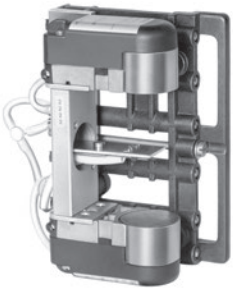
When combined as a fixed set point and follower controller, the indicating controller is fitted with a w_{int}/w_{ext} selector switch.

The associated set point adjuster and the differential pressure indicator allow the bumpless switchover after the differential pressure indicator reads zero (see section 4.4).

5.5.3 Supply pressure regulator

When a supply pressure regulator is installed in the Type 3432 Controller Station, it is suitable for connection to an operating air pressures from 2.0 to 12 bar.

The Type 3708-5003 Supply Pressure Regulator (configuration ID 1023317) reduces the operating air pressure to the required supply pressure of 1.4 bar.



Connecting plate with two i/p converters for controlled variable x and external set point

Adjuster for internal set point

w_{int}/w_{ext} selector switch

Supply pressure regulator

Fig. 12: *Additional equipment*

5.5.4 Inductive limit contacts

The inductive limit contacts indicate when the controlled variable x falls below and/or exceeds an adjustable limit.

The indicator shaft of the controlled variable x is fitted with two adjustable metal tags, which operate the associated proximity switches.

When the tag is located in the inductive field of the switch, the switch assumes a high impedance. When it leaves the field, it assumes a low impedance.

The proximity switches are mounted on adjustable holders. The required switching point can be adjusted by turning. See section 3.2.

6 Installation

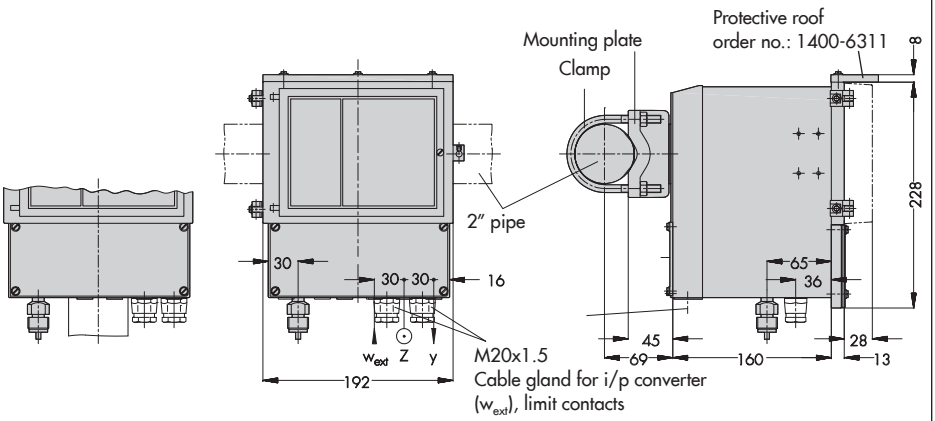
6.1 Mounting

Installation and connections
The following types of mounting in Table 2 are possible (see Fig. 13 and Fig. 17):

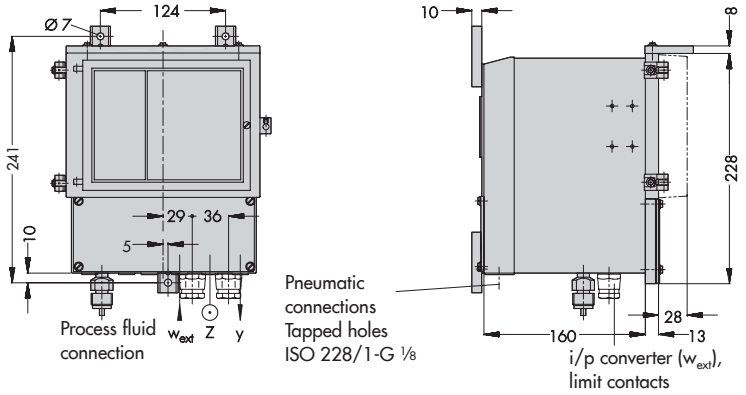
Table 2: *Types of mounting*

Pipe mounting	With mounting part and clamp for mounting to a vertical or horizontal 2″ pipe Mounting kit: order no. 1400-6302
Wall mounting	With three brackets for attachment to a wall Mounting kit order no.: 1400-6301
Panel mounting	With four fastening elements (IEC 61554) for attachment to the control panel Distance between center lines with door approx. 235 mm · Close-to-close arrangement in rows (without door) according to DIN 43700 **Type 3432** Cut-out for panel mounting 188^{+1}x255^{+1} mm Mounting kit order no.: 1400-6300 **Type 3431** Cut-out for panel mounting 188^{+1}x138^{+1} mm Mounting kit order no.: 1400-6303
Accessories: protective roof	Order no.: 1400-6311
Mounting position	Mount the controller station in the upright position.
Pneumatic connections	G ⅛ female thread according to DIN EN ISO 228-1 (26: input x | 27: input w_{ext} | 8/9: supply air Z | 38: output y)
Pneumatic indicating controllers for pressure	
Process fluid connection	G ½ male thread according to DIN EN ISO 228-1
Temperature decoupling	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.
Diaphragm seal	Instructions and special features are described in section 5.4
Pneumatic indicating controllers for temperature with capillary sensor	
Bulb sensor	Ø 12 mm, length 425 mm, active length 300 mm · The bulb sensor can be installed in any position. However, make sure its entire length is immersed in the process medium to be controlled. Choose a place of installation where neither overheating nor considerable dead times occur. Make sure no temperature fluctuations occur (ambient temperature approx. 20 °C). Install the capillary tube such that no mechanical damage can occur. The smallest permissible bending radius is 50 mm.
Sensor for air	Ø19.5 mm, 300 mm active length, G ¾ male thread, capillary tube same as bulb sensor.

Pipe mounting



Wall mounting

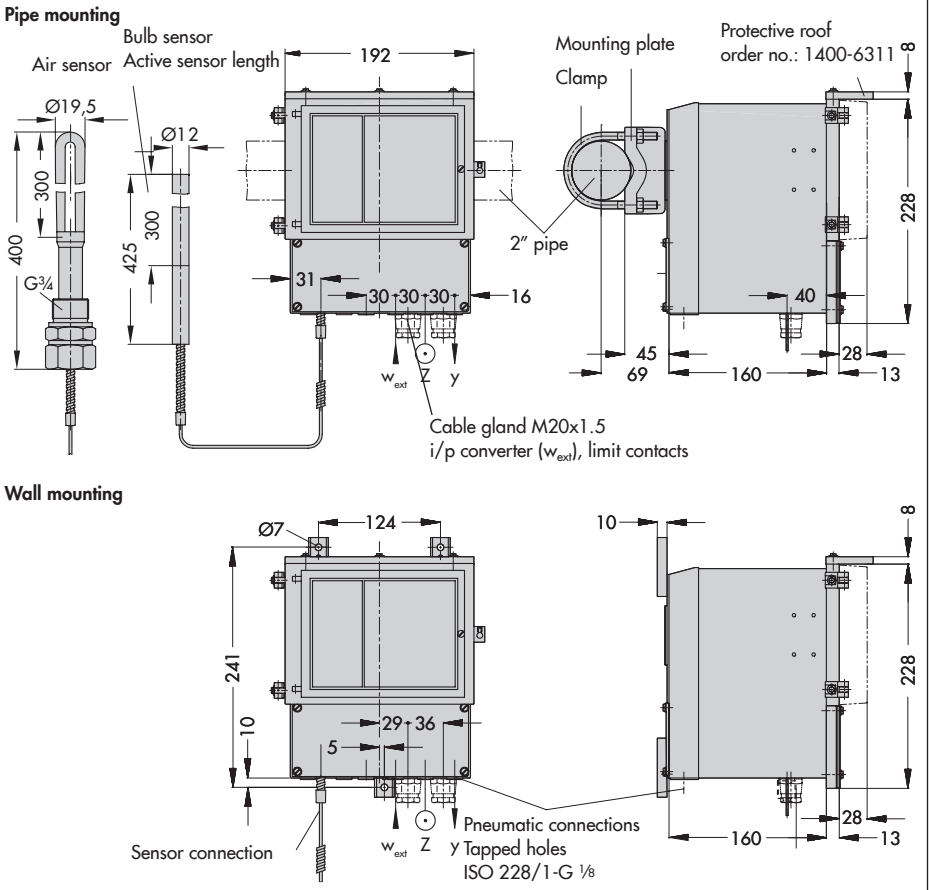


Connections

27	w_{ext}	Ext. set point
8/9	Z	Supply air
38	y	Output pressure

Dimensions of Type 3430 Indicating Controller for pressure Type 3432 Controller Station and Type 3435 Transmitter Module
Pipe and wall mounting,
panel mounting (see section 6.1 on page 26.)

Fig. 13: Type 3430 Pneumatic Indicating Controllers for pressure



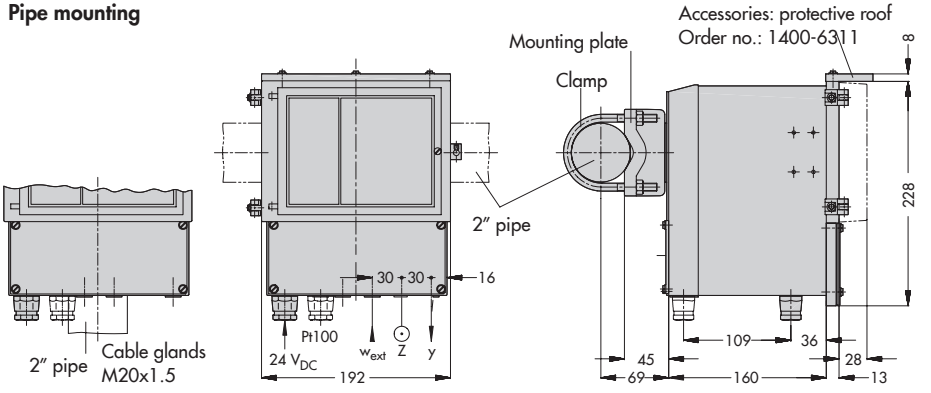
Connections

27	w_{ext}	Ext. set point
8/9	Z	Supply air
38	y	Output pressure

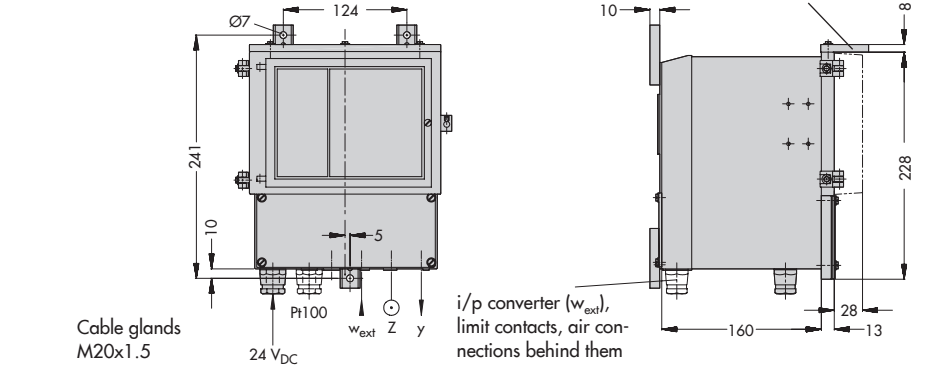
Dimensions of Type 3430 Indicating Controller for temperature with capillary sensor
Type 3432 Controller Station and Type 3436 Transmitter Module
Pipe and wall mounting,
panel mounting (see section 6.1 on page 26.)

Fig. 14: *Type 3430 Pneumatic Indicating Controllers for temperature with capillary sensor*

Pipe mounting



Wall mounting

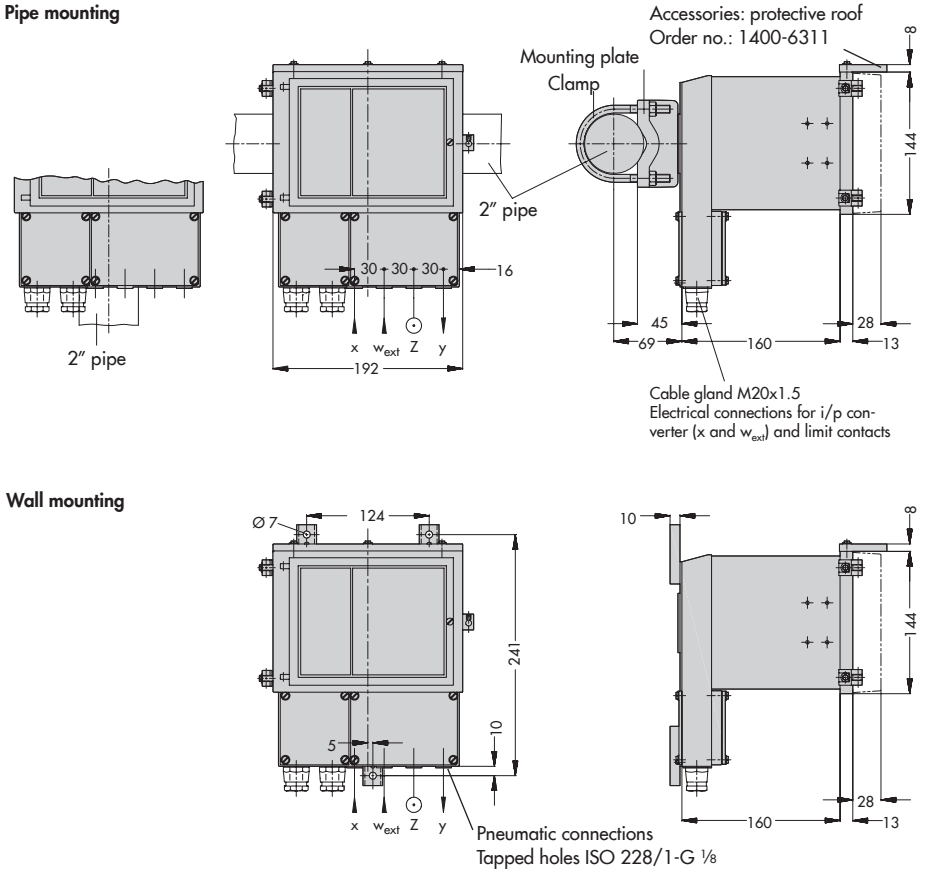


Dimensions of Type 3430 Indicating Controller for temperature with Pt 100 resistance thermometer
Type 3432 Controller Station and Type 3438 Transmitter Module
Pipe and wall mounting,
panel mounting (see section 6.1 on page 26.)

Connections

27	w_{ext}	Ext. set point
8/9	Z	Supply air
38	y	Output pressure

Fig. 15: *Type 3430 Indicating Controllers for temperature with Pt 100 resistance thermometer*



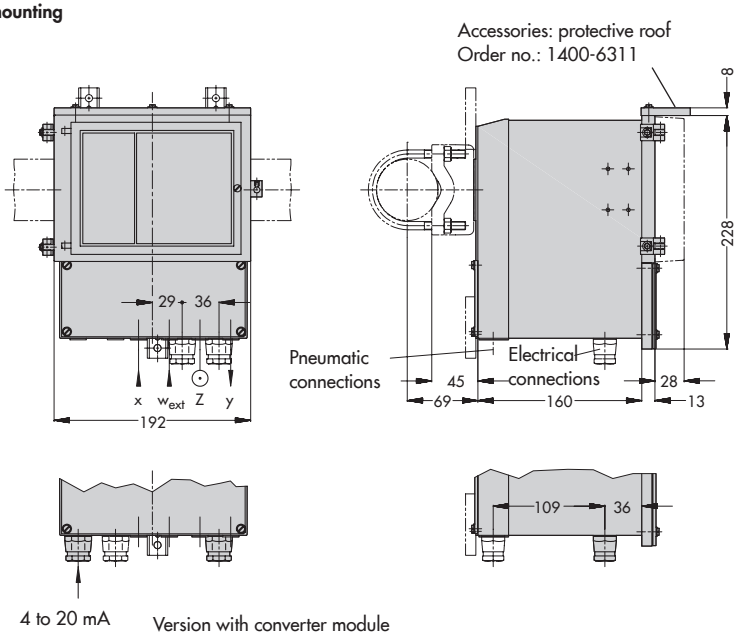
Connections

26	x	Controlled variable
27	w_{ext}	Ext. set point
8/9	Z	Supply air
38	y	Output pressure

Dimensions of Type 3430 Indicating Controller for standardized signals
Type 3431 Controller Station
Pipe and wall mounting,
panel mounting (see section 6.1 on page 26.)

Fig. 16: *Type 3430 Pneumatic Indicating Controller for Standardized Signals with Type 3431 Controller Station*

Pipe or wall mounting



Connections

26	x	Controlled variable
27	w_{ext}	Ext. set point
8/9	Z	Supply air
38	y	Output pressure

Dimensions of Type 3430 Indicating Controller for standardized signals
Type 3432 Controller Station
Pipe and wall mounting,
panel mounting (see section 6.1 on page 26.)

Fig. 17: *Type 3430 Pneumatic Indicating Controller for Standardized Signals with Type 3432 Controller Station*

6.1.1 Changing scales

After releasing the lock (4, Fig. 3), the scale can be pulled out of the back of the indicating unit and replaced with a special scale, if necessary.

The scale must match the measuring range of the upstream or integrated transmitter.

Adhesive strips for the tag inscription on the scale are located on the inside of the housing.

➔ Cut the adhesive strips to size and stick them on the scale.

6.2 Installing the temperature sensor

Controller station with Type 3436 Transmitter Module only

Bulb sensor with d = 12 mm, 425 mm long (300 mm active length)

– The bulb sensor may be installed in any position. Its entire active length must be immersed in the medium.
– Select a place of installation where overheating and noticeable idle times will not occur.
– The capillary tube must be run in such a way that large temperature fluctuations cannot occur (ambient temperature approx. 20 °C) and so it cannot be damaged.
– The smallest permissible bending radius is 50 mm.
– To install the sensor, a coupling sleeve with G ½ or G ¾ female thread must be fitted at the point of measurement. Screw or seal one of the mounting parts shown in Fig. 18 into this sleeve.

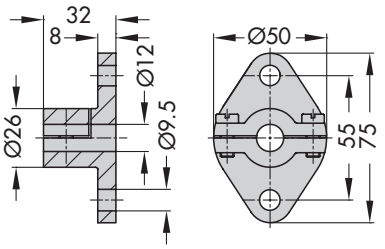
i ***Note***

The mounting parts for the sensor must be ordered separately. They are not included in the scope of the sensor delivery. Select accessories required for the operating conditions at the site of installation.

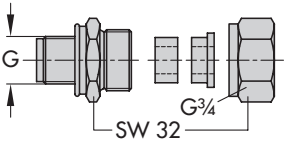
Fastening parts for bulb sensor d = 12 mm, 425 mm long, active length 300 mm

All wetted parts of the screw gland and thermowell are made of stainless steel 1.4404/1.4571

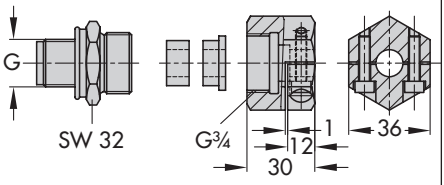
Clamping flange
for wall mounting, e.g. depressurized tanks, ducts etc.
Order no.: 1090-9547
Fasten the flange with two screws to the side and fasten the temperature sensor using two other screws in the flange.



Screw gland (PN 10)
G ½: order no. 1080-4881
G ¾: order no. 1080-4882
Apply sealant to the screw gland. Push in sensor with screw gland and coupling nut. Tighten coupling nut.



Screw gland (PN 40) with clamping nut
G ½: order no. 1080-4884
G ¾: order no. 1080-4885
Mount as described above, tighten clamping nut in place of the coupling nut.



Screw-in thermowell (PN 63)
G ½: order no. 1080-4888
G ¾: order no. 1080-4889
A thermowell is recommended on exceeding the pressure rating or with corrosive media or when the plant is to remain in operation on changing the sensor.
Push sensor as far as it will go into the thermowell and tighten coupling nut.

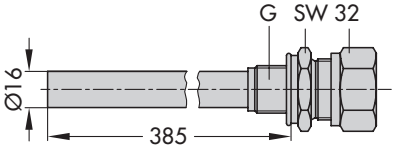
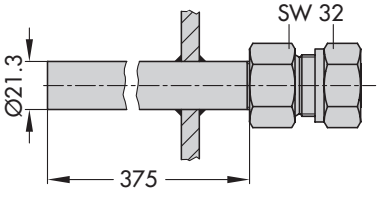


Fig. 18: *Dimensions · Mounting parts for bulb sensor*

Weld-in thermowell (PN 63)
Order no.: 1080-4890



Thermowell with flange DN 25 (PN 40, PN 100)
Order no.: 1080-4891 (PN 40)
1080-4892 (PN 100)

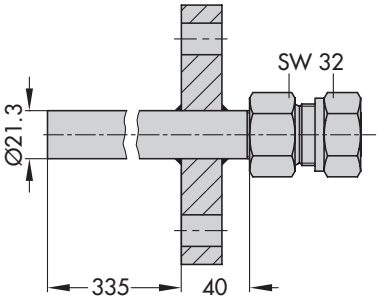


Fig. 18: *Dimensions · Mounting parts for bulb sensor*

7 Connections

7.1 Pneumatic connections

The pneumatic connections on the bottom of the device are designed as bores with ISO 228/1-G ⅛ thread. Customary fittings for tubing or plastic hoses can be used.

NOTICE

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.

The port/connection designations with the code numbers are cast onto the bottom of the housing. The adhesive label included with the controller station can also be stuck to the back of the housing.

38 Output y – Controller output signal to actuate the control valve or positioner

8/9 Supply – Supply air 1.4 ±0.1 bar or 2 to 12 bar in version with supply pressure regulator

27 Input w_{ext} – External set point. Port sealed in fixed set point controllers and open for the connection of the external set point in follower controllers

26 Input x – Controlled variable. Port sealed in pressure and temperature controllers (controlled variable measured by the transmitter module).

Port open in controllers for standardized signals.

7.1.1 Connection examples

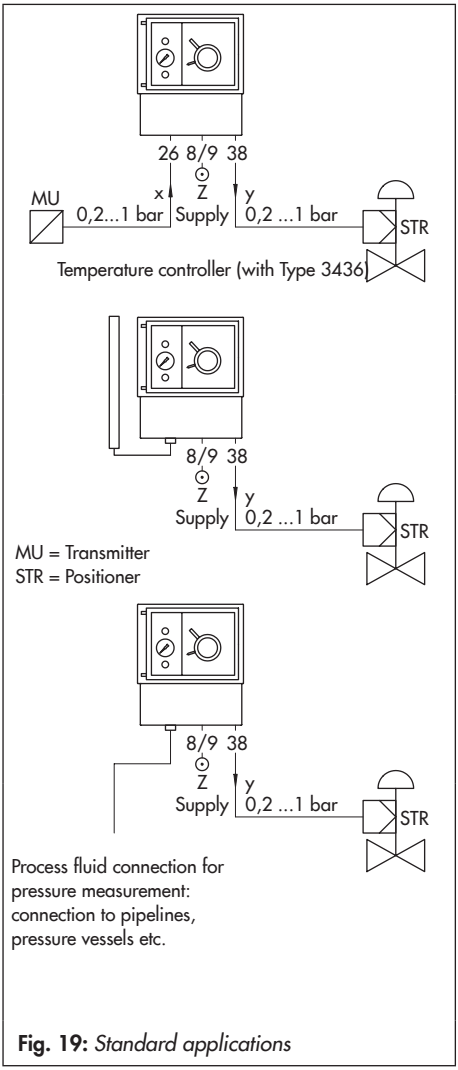


Fig. 19: *Standard applications*

7.1.2 Adjusting the supply air in supply pressure regulators

Only with Type 3432 Controller Station with pressure controllers

Hose connections for supply air, which are sealed by end caps, are located directly across the corners of the pressure controller on the bridge of the connecting plate (inside of the housing).

➔ Pull of the left end cap and use a hose to connect with a test pressure gauge provided on site.

➔ Controller stations with manual/automatic switchover have a test connection (yellow) on the inside of the indicating unit. Use the enclosed test connector (Fig. 20).

➔ Unscrew the cap off the supply pressure regulator. Undo the lock nut on the spindle. Adjust the spindle as follows:

➔ Turn the spindle clockwise (↻) to increase the supply air pressure and counterclockwise (↺) to reduce the supply air pressure.

➔ After the supply pressure at the test pressure gauge reads 1.4 ±0.1 bar or 20 ±1.5 psi, lock the spindle setting with the lock nut. Screw the cap back on.

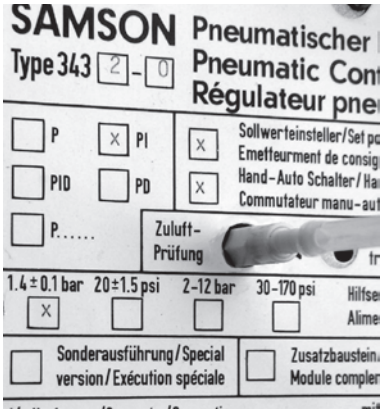


Fig. 20: *Test connection with test connector*

7.2 Electrical connections

Electrical connection only applies to the controller stations with additional i/p converter for controlled variable x, external set point w_{ext} and/or with inductive limit contacts.

For electrical installation, observe the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. In Germany, these are the VDE regulations and the accident prevention regulations of the employers' liability insurance.

⚠ WARNING

Incorrect electrical connection will render the explosion protection unsafe.
Do not loosen enameled screws in or on the housing.
Adhere to the terminal assignment specified in the certificate!

Adhere to the terminal assignment specified in the certificate. Switching the assignment of the electrical terminals may cause the explosion protection to become ineffective.

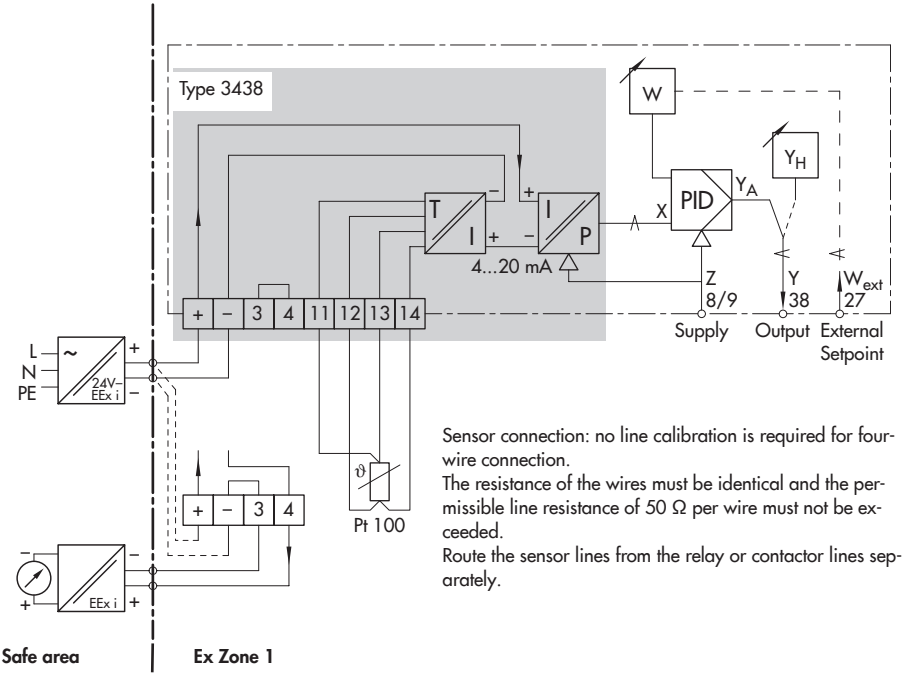


Fig. 21: *Electrical connection, Type 3430 Indicating Controller with Type 3438 Transmitter Module*

Installation, wiring, terminals, cable entries and other components that are relevant to explosion protection comply with EN 60079-0, EN 60079-11 and EN 60079-14 (IEC 60079-14). EN 60079-14 Explosive Atmospheres – Part 14: Electrical Installations Design, Selection and Erection

The maximum permissible values specified in the EC type examination certificates apply when interconnecting intrinsically safe electrical equipment (U_i or U_0, I_i or I_0, P_i or P_0, C_i or C_0 and L_i or L_0).

i ***Note***

Note on selecting cables and wires:
Observe Clause 12 of EN 60079-14 for installation of the intrinsically safe circuits.
Clause 12.2.2.7 applies when running multicore cables and wires with more than one intrinsically safe circuit.
Fit equipment used in ambient temperatures below –40 °C with metal cable entries.

The terminals on the base plate are accessible after unscrewing the front cover underneath the display.

The operation of the inductive limit contacts requires switching amplifiers in accordance with EN 60947-5-6 to be connected in the output circuit.

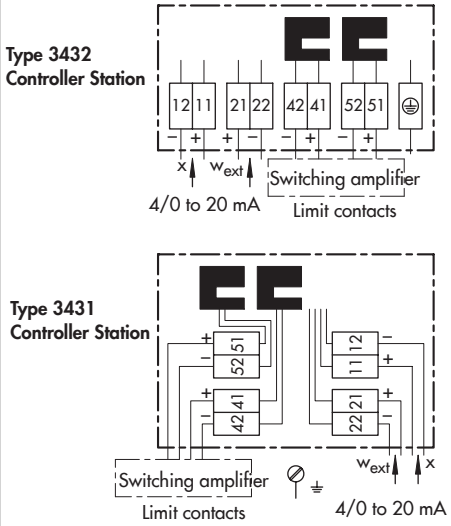


Fig. 22: *Connections of the i/p converters and inductive limit contacts*

8 Maintenance

8.1 Checking the air supply

The modules of the pneumatic controller are maintenance-free. We recommend checking the air supply depending on the operating periods. To guarantee trouble-free operation of the device, make sure that the supply air is always clean.

Check the air filter and separator installed in the upstream air reducing station regularly, depending on the operating periods. If necessary, when the performance worsens considerably, clean or replace the appropriate filters.

Type 3435 and Type 3436 Transmitter Modules

A grommet with filter is located in the supply air hose.

If the controlled variable reading fails, the filter must be cleaned or the grommet (order no. 1590-6410) replaced.

Type 3433 Controller Modules

If the controller module does not control properly or the output signal fails, unscrew the restriction with filter (7 in Fig. 1 and Fig. 23) located on left-hand side underneath the comparator. It may be necessary to unscrew and clean the filter or to replace it (order no. 1390-0183).

Filter in restriction: item no. 0550-0193

Filters in push-on fittings of the controller module: item no. 0550-0186

These two filters cannot be renewed.

In addition, the pneumatic connections on the bottom of the housing have filters with plastic rims (order no. 0550-0189) which can be removed for cleaning.

9 Conversion

9.1 Changing the controller function

The controller function can either be changed by exchanging the entire module (Type 3434-1 or Type 3434-2) or by converting or upgrading (Type 3433) the components, such as adjusters, restrictors or a derivative amplifier.

Type 3433 Controller Modules

Unscrew the fastening screw (6) at the controller module, pull the module off its self-seal push-on fittings and lift it out of the controller station. Undo screws (3.3) and pull off the connecting plate (3.2) together with square nuts and bolts from the controller module.

After unscrewing the inside M3 hexagonal socket head screws, the corresponding cover plates and adjusters can be removed or mounted.

P to PI: remove adjuster for operating point (12) and replace it with Tn restrictor (10).

P to P/PI: remove adjuster for operating point (12) and replace it with selector switch with adjuster for operating point (13) and Tn restrictor (10).

P to PD: unscrew cover plate (14.1). Remove O-ring (14.3) and insert two O-rings (14.4) in its place. Fasten derivative booster (14) in place.

Unscrew cover plate (11.1) and mount Tv restrictor (11).

P to PID: Same as for P to PD. In addition, replace adjuster (12) with Tn restrictor (10).

P controller with set-point-dependent operating point

Attach plate with restriction (15) in place of the adjuster for operating point (12).

i ***Note***

We recommend replacing old O-rings with new ones as well as replacing the filter in the restriction (7).

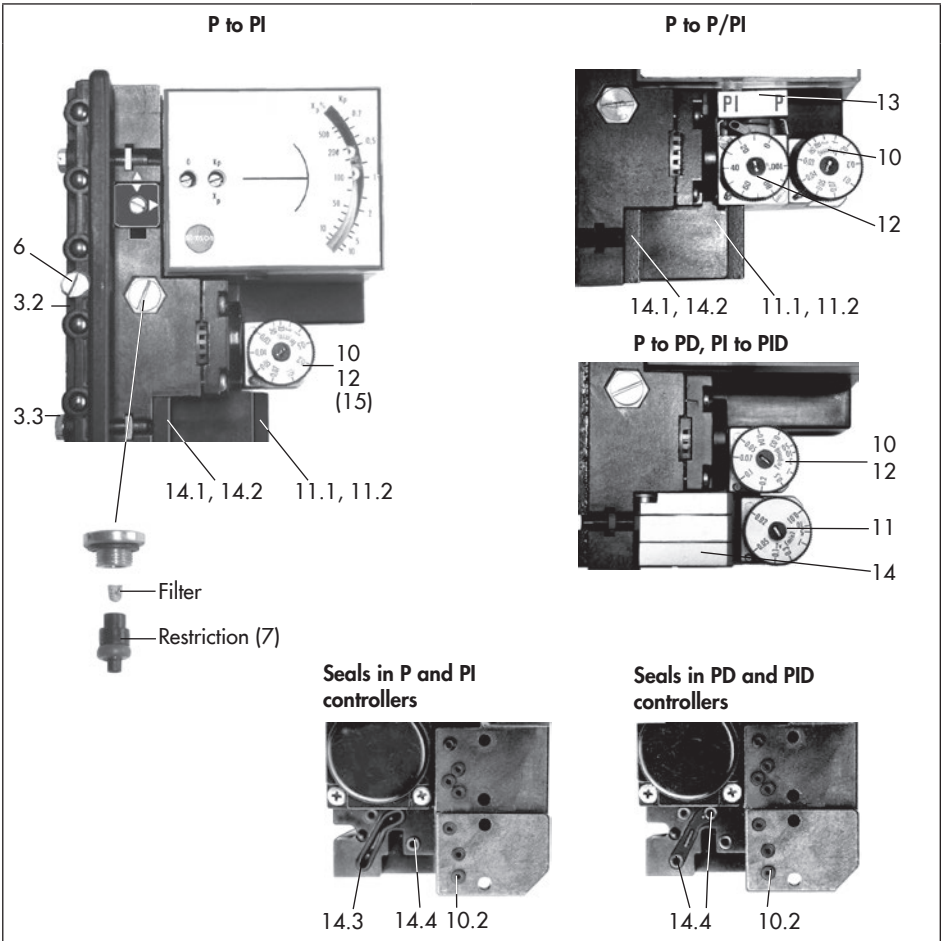


Fig. 23: *Changing the controller function in Type 3433*

Table 3: *Spare parts*

Part	Qty.	Designation	Order no.
7	1	Restriction with filter	1390-0183
10	1	Tn restrictor	1070-4584
10.1	2	M3 x 8 screws	8333-0479
10.2	3	O-rings 1.78 x 1.02	8421-0010
11	1	Tv restrictor	1070-4585
11.1	1	Cover plate	0360-1597
11.2	2	M3 x 8 screws	8333-0479
11.3	4	O-rings 2 x 1.5	8421-0023
12	1	Operating point adjuster 1.4 bar	1070-7550
12	1	Operating point adjuster 20 psi	1070-7551
12.1	2	M3 x 8 screws	8333-0479
12.2	4	O-rings 1.78 x 1.02	8421-0010
13	1	Selector switch for operating point adjuster	1080-6909
13.1	2	M3 x 30 screws	8333-0482
13.2	4	O-rings 1.78 x 1.02	8421-0010
14	1	Derivative amplifier	1080-6924
14.1 [1)]	1	Cover plate	0360-1598
14.2	1	M3x16 screw	8333-0476
14.3 [1)]	1	Molded seal for plate	0430-0992
14.4	4 (2)	O-rings 2 x 1.5	8421-0023
15	1	Plate with restriction for set point-dependent operating point	1590-1089

1) Required for P and PI controller. Not required for PD and PID controller.

9.2 Exchanging the transmitter module

The Type 3435 and Type 3436 Transmitter Modules are fastened to the Type 3432 Controller Station using six screws.

Two silicone hoses are used to connect the supply air Z and the controlled variable x.

The transmitter module can be replaced if the measuring unit is defective or to change the measuring range.

Contact SAMSON to order the new module specifying the sensor version and required measuring range. Also specify the data written on the nameplate of the old transmitter module.

1. Unscrew the front plant underneath the display. Detach the wiring in modules with electric additional units.
2. Pull the hoses for controlled variable x and supply air Z off the connecting plate of the housing.
3. Loosen the six fastening screws on the bottom of the controller station and lift off the transmitter module.
4. Mount the new transmitter in reverse order.

Do not confuse the hoses at x and Z on connecting the hoses.

The supply air hose is fitted with a grommet (order no. 1590-6410) with restriction and filter.

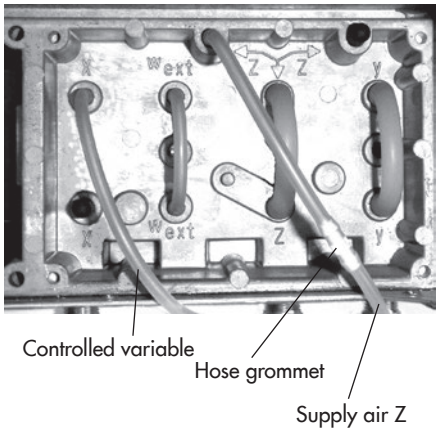


Fig. 24: *Connecting plate*

9.3 Checking the controller function

To check the controller, the controlled variable x and the output y must be bypassed at ports x and y on the controller station.

Perform the following settings:

➔ Turnboard **A** to increasing/decreasing > <

➔ Fully open Tn restriction (0.03 min)

➔ Fully close Tv restriction (0.01 min)

➔ Turn the set point adjuster to change the set point through its whole range.

The controlled variable pointer (red) and the output reading (small dial) follow the set point over the whole range when the controller functions properly.

10 Use in hazardous areas

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

⚠ WARNING

Risk of explosion

– *Installation and maintenance of the equipment within hazardous areas must be performed in such a way as to prevent electrostatic charging.*
– *Only use non-flammable media for pneumatic supply.*
– *Within hazardous areas of zone 21 or zone 22, the Type 6112 i/p Converter, inductive limit contacts, and Type 3438 Temperature Transmitter (TTH 200-E1H and Type 6112) must be connected to intrinsically safe circuits. The housing of the Type 3430 Indicating Controller does not meet the requirements of EN 60079-31 for type of protection Ex t (protected by enclosure).*

Conditions for use in hazardous areas:

– The control station is not labeled with the associated mark of approval for explosion-protected equipment.
– All installed explosion-protected modules have their own EU type examination certificate.
– The maximum permissible values specified in the associated type examination certificates apply when connecting to certified intrinsically safe circuits.
– Installation, wiring, terminals, cable entries and other components that are relevant to explosion protection comply with EN 60079-0, EN 60079-11 and EN 60079-14.
– The measuring current circuit of the type TTH200-E1H transmitter complies with type of protection "ia" and can be connected to sensors routed into zone 0. The transmitter itself must be installed in zone 1 or zone 2.
– To prevent static charging, the control station's transparent door and window have a conductive coating.
– Due to the plastic coating of the housing, action to avoid electrostatic charging according to TRGS 727 (Technical Rules for Hazardous Substances) must be taken when performing maintenance work.
– Connection to equipotential bonding system according to Clause 6.3 of EN 60079-14.

– For pressure measurements of flammable process media falling into explosion groups IIA, IIB and IIC, install type-approved flame arresters into the measuring line. For example, flame arrester by Armaturenbau GmbH, Adapt-FS, PTB 12 ATEX 4001 X (SAMSON order no. 8521-1002). Special conditions of use specified in the associated type examination certificate must be observed.
– No electrical components (such as i/p converters or inductive limit contacts) must be installed in the Type 3430 Pneumatic Indicating Controller with Type 3435 Pneumatic Transmitter Module for Pressure for pressure measurements of flammable media.
– Degree of mechanical strength and degree of protection (IP rating) depending on the operating conditions.
– The indicating controller must bear a label warning against the risk of electrostatic charging, which includes at least the following text:

! *NOTICE*

Installation and maintenance of the equipment within hazardous areas must be performed in such a way as to prevent electrostatic charging.

10.1 Servicing explosion-protected devices

If a part of the device on which the explosion protection is based needs to be serviced, the device must not be put back into operation until a qualified inspector has assessed it according to explosion protection requirements, has issued an inspection certificate or given the device a mark of conformity.

Inspection by a qualified inspector is not required if the manufacturer performs a routine test on the device before putting it back into operation. Document the passing of the routine test by attaching a mark of conformity to the device. Replace explosion-protected components only with original, routine-tested components by the manufacturer.

Devices that have already been used outside hazardous areas and are intended for future use inside hazardous areas must comply with the safety requirements placed on serviced devices. Before being used inside hazardous areas, test the devices according to the specifications for servicing explosion-protected devices.

11 Technical data

Type 3432 and Type 3431 Controller Stations									
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 [1]	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								
Inductive limit contacts	1 or 2 SC 3,5-NO-YE proximity switches acc. to EN 60947-5-6 (NAMUR), Ex II 2G Ex ia IIC T6 Gb (PTB 99 ATEX 2219X)								
Input x and w_{ext}	0.2 to 1.0 bar · 3 to 15 psi · 0/4 to 20 mA								
i/p converter for x and/or w_{ext} [2]	Input 0/4 to 20 mA (R_i = 200 Ω ±7.5 % at 20 °C/max. 250 Ω at 60 °C)								
Can be equipped with ...									
Controller module [3]	3434-1	3434-2	3433-1	3433-2	3433-3	3433-4	3433-5	3433-6	3433-9
Controller action	P	PI	P	PI [4]	PID [4]	PD	P/PI	PD/PID	P [5]
Proportional-action coefficient K_P	1 to 20		0.2 to 20 (0.4 to 40 on request)						
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						
Optionally with additional modules [3]	–		**3437-1** [6] Signal limiter		**3437-2** [6] Control mode selector switch		**3437-3** [6] Bumpless manual/automatic switchover		
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 supply pressure regulator	Operating air 2.0 to 12 bar (30 to 180 psi) · Air consumption < 0.75 m_n^3/h							
	Version with i/p converters	Air consumption per i/p converter for x or w_{ext} = 0.13 m_n^3/h							
Air quality acc. to ISO 8573-1	Max. 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								
Perm. ambient temperature	–20 to 60 °C (–40 to 60 °C on request)								
Degree of protection	IP 40, front with door: IP 65								

1) Version with follower controller: only set point display with 212 mm scale
2) Details in ▶ T 7045
3) Details in ▶ T 7040 and ▶ T 7041
4) Optionally with feedback limitation
5) With set-point-dependent operating point
6) No longer available

Pressure Equipment Directive	2014/68/EU, Article 4.3 (sound engineering practice)
Total weight (approx.)	6 kg

Type 3435 Transmitter Module	
Measuring range (set point range) in 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
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 % · Deviation from terminal-based conformity ≤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 3436 Transmitter Module				
Measuring ranges (standard)	–20 to 30 °C 0 to 50 °C	0 to 100 °C 50 to 150 °C	0 to 150 °C	0 to 200 °C
Special measuring ranges	150 to 250 °C	–40 to 200 °C	–40 to 150 °C	–40 to 100 °C
Lower range value	–40 to 150 °C			
Fixed measuring span	50 K	100 K	150 K	200 K
Overload limit	350 °C			
Permissible pressure at sensor	Without thermowell PN 16 · With thermowell PN 63 or 100			
Supply air	Supply air 1.4 ±0.1 bar (20 ±1.5 psi)			
Output	0.2 to 1.0 bar (3 to 15 psi)			
Deviation from terminal-based linearity	0.6 % with terminal-based conformity			
Hysteresis	<0.25 %			
Influence: Supply air	<0.25 %/0.1 bar			
Influence: Pressure at the sensor	<0.6 %/10 bar	<0.25 %/10 bar	<0.15 %/10 bar	
Influence: Ambient temperature	<0.6 %/°C	<0.03 %/°C		
Capillary tube	Length 3 or 6 m · With/without metal protective hose · Filling medium: Nitrogen			

i/p converter module		
Type 6112-02	No explosion protection	Input impedance 200 Ω and ~5.9 mH
Type 6112-22	With explosion protection	Intrinsically safe input current circuit [1] · Input impedance 200 Ω and ~0 mH [1]
Explosion protection		Ex II 2G Ex ia IIC T6 Gb according to EC type examination certificate PTB 00 ATEX 2021
Input		4 to 20 mA or 0 to 20 mA
Output		0.2 to 1 bar (max. 0.02 to 1.35 bar) or 3 to 15 psi (max. 0.3 to 18 psi)
Supply air		1.4 ±0.1 bar/20 ±1.5 psi · Air consumption <0.1 m_n^3/h
Characteristic Effects		Characteristic: Output linear to input Hysteresis ≤0.3 % · Deviation from terminal-based conformity ≤0.1 %
	Supply air	0.1 %/0.1 bar
	Ambient temperature	<0.03 %/°C
Permissible ambient temperature range		–20 to +60 °C [1]

[1] For details (e.g. on permissible temperatures, effective internal capacitance and inductance) refer to EC type examination

Type 3438 Transmitter Module		
Type 3438 · General specifications		
Design		**Type 3438** consisting of the interconnection of **TTH200-E1H** temperature transmitter with **Type 6112-22** i/p Module
Input	Sensor	Pt 100 resistance thermometer (RTD), DIN EN 60751 · Four-wire circuit, line resistance <50 Ω
	Measuring ranges	–30 to 60 °C, 0 to 40 °C, 0 to 100 °C, 0 to 150 °C, 0 to 200 °C, 0 to 400 °C, others on request
Output	Pneumatic	0.2 to 1 bar (3 to 15 psi)
	Electric	4 to 20 mA, max. load = $\frac{\text{(supply voltage} - 16.5\ \text{V)}}{0.022\ \text{mA}}$
Auxiliary power	Supply air	1.4 bar ±0.1 bar (20 psi ±1.5 psi)
	With explosion protection Without explosion protection	Two-wire supply: power supply lines = signal lines 16.5 to 28 V (25 V) DC, see EC type examination certificates 16.5 to 30 V DC
Explosion protection	Type TTH200-E1H	Ex II 2(1) G Ex [ia] ib IIC T6 Gb according to EC type examination certificate PTB 05 ATEX 2017 X
	Type 6112-22	Ex II 2G Ex ia IIC T6 Gb according to EC type examination certificate PTB 00 ATEX 2021
TTH200-E1H electric temperature transmitter		
Measuring current		0.3 mA
Current consumption		<3.5 mA
Maximum output current		23.6 mA
Error indication	Sensor failure	>22 mA
	Sensor short-circuit	<3.6 mA
	Sensor line breakage	<3.6 mA or >22 mA
	Supply voltage, reverse polarity protection	0 mA
Deviation from terminal-based linearity		≤0.1 % or ≤0.2 K (the largest of the two values always applies)
Ambient temperature influence		≤0.08 %/10 K for lower measuring range value and measuring span (based on 23 °C)
Effect of supply voltage		<0.001 %/V inside the permissible range of the supply voltage/load
Galvanic isolation of I/O		3.5 kV DC/2.5 kV AC (60 s)
Long-term stability		≤0.05 % or ≤0.05 K annually (the largest of the two values always applies)

12 Certificates

The ATEX certificates are included on the next pages.

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

TRANSLATION

(1) EC TYPE EXAMINATION CERTIFICATE

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**

(3) EC Type Examination Certificate Number

PTB 00 ATEX 2021

(4) Equipment: Model 6112-2... i/p- Module

(5) Manufacturer: SAMSON AG

(6) Address: Weismüllerstr. 3, D-60314 Frankfurt, Germany

(7) This equipment and any acceptable variations thereof are specified in the schedule to this certificate and the documents referred to therein.

(8) The Physikalisch-Technische Bundesanstalt, certified body number 0102 according to Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirement relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report: **PTB Ex 99-29418**

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with

EN 50014: 1997 **EN 50020: 1994**

10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) According to the Directive 94/9/EC, this EC TYPE EXAMINATION CERTFICATE relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of the equipment.

((12) The marking of the equipment shall include the following:

 **II 2 G EEx ia IIC T6**

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, 18 February 2000

(Signature) (Seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirektor

(13) # Schedule

(14) **EC Type Examination Certificate Number PTB 00 ATEX 2021**

(15) **Description of Equipment**

The model 6112-2... i/p Module is intended for attachment to i/p positioners, i/p pressure transmitters and i/p converter.

The device is intended for use inside and outside of hazardous areas.

The Model 6112-2... i/p Module is a passive two-terminal network which may be connected to any certified intrinsically safe circuits, provided the permissible maximum values of Ui, Ii and Pi are not exceeded.

The correlation between temperature classification, permissible maximum ambient temperature ranges and maximum short-circuit currents is shown in the table below:

Temperature class	Permissible ambient temperature range	Maximum short-circuit current
T6 T5 T4	-45 °C ... 60 °C -45 °C ... 70 °C -45 °C ... 80 °C	85 mA or 100 mA or 120 mA

Electrical data

Power supply..... Type of protection. Intrinsic safety EEx ia IIC only for connection to a certified intrinsically safe circuit

Maximum values:

Ui = 28 V
Ii = 100 mA or 85 mA resp.
Pi = 0,7 W

Ci = negligible, Li = negligible

(16) **Test report** **PTB Ex 00-29418**

(17) **Special conditions for safe use**

None

(18) **Essential Health and Safety Requirements**

In compliance with the standards specified above

Zertifizierungsstelle Explosionsschutz Braunschweig, 18 February 2000
By order

(Signature) (Seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirektor

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2021

(Translation)

Equipment: i/p-module, type 6112-2..

Marking: ⟨Ex⟩ **II 2 G EEx ia IIC T6**

Manufacturer: SAMSON AG Mess- und Regeltechnik

Address: Weismüllerstr. 3, 60314 Frankfurt, Germany

Description of supplements and modifications

The i/p-module of type 6112-2.. is mounted onto i/p-positioners, i/p-pressure transducers and i/p-converters. It is a passive two-terminal network that may be connected to all certified intrinsically safe circuits provided that the permissible maximum values for U_i, I_i and P_i are not exceeded.

In the future the i/p-module of type 6112-2.. may also be manufactured according to the test documents listed in the test report.

The state of the standards has been adapted. Further modifications have not been made.

The equipment is intended for the application inside and outside of hazardous areas.

For relationship between temperature class, permissible range of the ambient temperature and maximum short-circuit current, reference is made to the following table:

Temperature class	Permissible range of the ambient temperature	Maximum short-circuit current
T6	-45 °C ... 60 °C	85 mA or
T5	-45 °C ... 70 °C	100 mA or
T4	-45 °C ... 80 °C	120 mA

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

TRANSLATION

(1) EC TYPE EXAMINATION CERTIFICATE

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**

(3) EC Type Examination Certificate Number

PTB 00 ATEX 2021

(4) Equipment: Model 6112-2... i/p- Module

(5) Manufacturer: SAMSON AG

(6) Address: Weismüllerstr. 3, D-60314 Frankfurt, Germany

(7) This equipment and any acceptable variations thereof are specified in the schedule to this certificate and the documents referred to therein.

(8) The Physikalisch-Technische Bundesanstalt, certified body number 0102 according to Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirement relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report: **PTB Ex 99-29418**

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with

EN 50014: 1997 **EN 50020: 1994**

10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) According to the Directive 94/9/EC, this EC TYPE EXAMINATION CERTFICATE relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of the equipment.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) **EC-TYPE-EXAMINATION CERTIFICATE**

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 99 ATEX 2219 X

(4) Equipment: Slot-type initiators types SJ... and SC...

(5) Manufacturer: Pepperl + Fuchs GmbH

(6) Address: D-68307 Mannheim

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 99-29175.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997 **EN 50020:1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

Ex II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, December 22, 1999

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

(15) Description of equipment

The slot-type initiators of types SJ... and SC... are used to convert displacements into electrical signals.

The slot-type initiators may be operated with intrinsically safe circuits certified for categories and explosion groups [EEx ia] IIC or IIB resp. [EEx ib] IIC or IIB. The category as well as the explosion group of the intrinsically safe slot-type initiators depends on the connected supplying intrinsically safe circuit.

Electrical data

Evaluation and supply circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB
..... resp. EEx ib IIC/IIB
only for connection to certified intrinsically safe circuits
Maximum values:

type 1	type 2	type 3	type 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of slot-type intiators are shown in the table:

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

types	C_i	L_i	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for application in temperature class											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
SC2-N0...	150	150	72	87	100	65	80	100	40	55	75	23	38	54
SC3,5-N0-Y...	150	150	72	87	100	65	80	100	40	55	75	23	38	54
SC3,5...-N0...	150	150	73	88	100	66	81	100	45	60	89	30	45	74
SJ1,8-N-Y...	30	100	73	88	100	67	82	100	45	60	78	30	45	57
SJ2,2-N...	30	100	73	88	100	67	82	100	45	60	78	30	45	57
SJ2-N...	30	100	73	88	100	67	82	100	45	60	78	30	45	57
SJ3,5-...-N...	50	250	73	88	100	66	81	100	45	60	89	30	45	74
SJ3,5-H...	50	250	73	88	100	66	81	100	45	60	89	30	45	74
SJ5-...-N...	50	250	73	88	100	66	81	100	45	60	89	30	45	74
SJ5-K...	50	550	72	87	100	66	81	100	42	57	82	26	41	63
SJ10-N...	50	1000	72	87	100	66	81	100	42	57	82	26	41	63
SJ15-N...	150	1200	72	87	100	66	81	100	42	57	82	26	41	63
SJ30-N...	150	1250	72	87	100	66	81	100	42	57	82	26	41	63

(16) Test report PTB Ex 99-29175

(17) Special conditions for safe use

1. For the application within a temperature range of -60°C to -20 °C the slot-type initiators of types SJ... and SC... must be protected against damage due to impact by mounting into an additional housing.
2. The connection facilities of the slot-type initiators of types SJ... and SC... shall be installed as such that at least a degree of protection of IP20 according to IEC-publication 60529:1989 is met.
3. The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of slot-type initiators is shown in the table given under item (15) of this EC-type-examination certificate..
4. Inadmissible electrostatic charge of the plastic housing of the slot-type initiators of type SJ30-N..., has to be avoided (warning label on the device).

(18) Essential health and safety requirements

Met by the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, August 10, 1999

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

(Translation)

Equipment: Slot-type initiators, types SJ... and SC...

Marking: ⟨Ex⟩ **II 2 G EEx ia IIC T6**

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87, 68307 Mannheim, Germany

Description of supplements and modifications

The slot-type initiators of type series SJ... and SC... listed below may in future also be used in hazardous areas where equipment of catagory-1 is required.

The modifications exclusively concern the „Electrical data" (change of maximum permissible ambient temperatures for application as category-1 equipment, reduction of the intrinsically safe evaluation and supply circuit to category ia) as well as the marking of the slot-type initiators listed below.

SC2-N0...	SJ5-...-N...
SC3,5-N0-Y...	SJ5-K...
SC3,5...-N0...	SJ10-N...
SJ2-N...	SJ15-N...
SJ3,5-...-N...	SJ30-N...

For application as category-1 equipment the marking of the slot-type initiators listed above will be in the future:

⟨Ex⟩ **II 1 G EEx ia IIC T6**

The „Special conditions" are also valid for application as category-1 equipment without changes.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

Electrical data

Evaluation and supply circuit

type of protection Intrinsic Safety EEx ia IIC/IIB only for connection to certified intrinsically safe circuits Maximum values:

type 1	type 2	type 3	type 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of slot-type intiators are shown in the following table:

types	C_i	L_i	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for application in temperature class											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
SC2-N0...	150	150	55	67	95	48	60	88	23	35	63	6	18	46
SC3,5-N0-Y...	150	150	55	67	95	48	60	88	23	35	63	6	18	46
SC3,5...-N0...	150	150	56	68	96	49	61	89	28	40	68	13	25	53
SJ2-N...	30	100	56	68	96	49	61	89	28	40	68	13	25	53
SJ3,5-...-N...	50	250	56	68	96	49	61	89	28	40	68	13	25	53
SJ5-...-N...	50	250	56	68	96	49	61	89	28	40	68	13	25	53
SJ5-K...	50	550	55	67	95	48	60	88	25	37	65	9	21	49
SJ10-N...	50	1000	55	67	95	48	60	88	25	37	65	9	21	49
SJ15-N...	150	1200	55	67	95	48	60	88	25	37	65	9	21	49
SJ30-N...	150	1250	55	67	95	48	60	88	25	37	65	9	21	49

Test report: PTB Ex 03-23133

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, October 29, 2003

Sheet 2/2

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

(Translation)

Equipment: Slot-type initiators, types SJ... and SC...

Marking: Ⓔx **II 1 G EEx ia IIC T6**

Manufacturer: Pepperl + Fuchs GmbH

Address: Lilienthalstraße 200, 68307 Mannheim, Germany

Description of supplements and modifications

In the future the slot-type initiators, types SJ... and SC... may also be manufactured and operated according to the test documents listed in the assessment and test report.

The modifications concern the application of alternative casting compounds and materials for the type label as well as a different enclosure material and additional types of LEDs. The manufacturer's address changes as given above. Furthermore, the test specification is adapted to the current state of the standards which causes an alteration of the marking.

The marking will read in future:

Ⓔx **II 1 G Ex ia IIC T6** or Ⓔx **II 2 G Ex ia IIC T6**

The "Special Conditions" and all further specifications of the EC-type examination certificate including the 1st supplement apply without changes also to this 2nd supplement.

Applied standards

EN 60079-0:2006 **EN 60079-11:2007** **EN 60079-26:2007**

Assessment and test report: PTB Ex 11-20276

ZSEx10101e.dot

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Braunschweig, November 25, 2011

Dr.-Ing. U. Johannsmeier
Direktor und Professor

Sheet 1/1

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

3. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

(Translation)

Equipment: Slot-type inductive initiators, types SJ... and SC...

Marking: **II 1 G Ex ia IIC T6 or II 2 G Ex ia IIC T6**

Manufacturer: Pepperl+Fuchs GmbH

Address: Lilienthalstraße 200, 68307 Mannheim, Germany

Description of supplements and modifications

The modifications concern the consideration of the current state of the applied standards and – resulting from this – the marking of the slot-type inductive initiators of types SJ... and SC... as well as the internal construction (inclusion of further alternative casting resin materials).

The "electrical data", the "special conditions" as well as all other specifications apply without changes.

In the future the marking will read:

II 1 G Ex ia IIC T6...T1 Ga or II 2 G Ex ia IIC T6...T1 Gb

Applied standards

EN 60079-0:2012, EN 60079-11:2012, EN 60079-26:2007

Test report: PTB Ex 15-24247

ZSEx10101e b

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, April 15, 2015

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Sheet 1/1

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

4. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

(Translation)

Equipment: Slot-type initiators, types SL... and SC...

Marking: **II 1 G Ex ia IIC T6... T1 Ga or II 2 G Ex ia IIC T6...T1 Gb**

Manufacturer: Pepperl+Fuchs GmbH

Address: Lilienthalstraße 200, 68307 Mannheim, Germany

Description of supplements and modifications

The modifications concern the application of the new state of the standard EN 60079-0, the internal design as well as the extension of the EC-type examination certificate by type of protection Ex ia IIIC for the slot-type initiators of types SL... and SC... .

Resulting from this – the marking, the "Electrical Data" as well as the "Special Conditions" for the slot-type initiators of types SL... and SC... change.

In the future the marking will read:

II 1 G Ex ia IIC T6... T1 Ga or II 2 G Ex ia IIC T6...T1 Gb

resp.

II 1 D Ex ia IIIC T135°C Da

ZSEx1010te b

4. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

Electrical data

Evaluation and supply circuit ..... only for connection to certified intrinsically safe circuits
Ex ia IIC/IIB for EPL Ga

or Ex ia IIIC for EPL Da

or Ex ia IIC/IIB or Ex ib IIC/IIB for EPL Gb

or Ex ia IIIC or Ex ib IIIC for EPL Db

Maximum values:

type 1	type 2	type 3	type 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

Table 1

For relationship between type of connected circuit, maximum ambient temperature for the application as EPL-Ga equipment and temperature class as well as the effective internal reactances for the individual types of slot-type initiators, reference is made to the following Table 2:

Types	C_i	L_i	Type 1			Type 2			Type 3			Type 4		
			Maximum permissible ambient temperature in °C for application in temperature class											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
SC2-N0...	150	150	55	67	95	48	60	88	23	35	63	6	18	46
SC3,5-N0-Y...	150	150	55	67	95	48	60	88	23	35	63	6	18	46
SC3,5...-N0...	150	150	56	68	96	49	61	89	28	40	68	13	25	53
SJ2-N...	30	100	56	68	96	49	61	89	28	40	68	13	25	53
SJ3,5-...-N...	50	250	56	68	96	49	61	89	28	40	68	13	25	53
SJ5-...-N...	50	250	56	68	96	49	61	89	28	40	68	13	25	53
SJ5-K...	50	550	55	67	95	48	60	88	25	37	65	9	21	49
SJ10-N...	50	1000	55	67	95	48	60	88	25	37	65	9	21	49
SJ15-N...	150	1200	55	67	95	48	60	88	25	37	65	9	21	49
SJ30-N...	150	1250	55	67	95	48	60	88	25	37	65	9	21	49

Table 2

4. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

For relationship between type of connected circuit, maximum ambient temperature for the application as EPL-Gb equipment and temperature class as well as the effective internal reactances for the individual types of slot-type initiators, reference is made to the following Table 3:

Types	C_i	L_i	Type 1			Type 2			Type 3			Type 4		
			Maximum permissible ambient temperature in °C for application in temperature class											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
SC2-N0...	150	150	72	87	100	65	80	100	40	55	75	23	38	54
SC3,5-N0-Y...	150	150	72	87	100	65	80	100	40	55	75	23	38	54
SC3,5...-N0...	150	150	73	88	100	66	81	100	45	60	89	30	45	74
SJ1,8-N-Y...	30	100	73	88	100	67	82	100	45	60	78	30	45	57
SJ2,2-N...	30	100	73	88	100	67	82	100	45	60	78	30	45	57
SJ2-N...	30	100	73	88	100	67	82	100	45	60	78	30	45	57
SJ3,5-...-N...	50	250	73	88	100	66	81	100	45	60	89	30	45	74
SJ3,5-H...	50	250	73	88	100	66	81	100	45	60	89	30	45	74
SJ5-...-N...	50	250	73	88	100	66	81	100	45	60	89	30	45	74
SJ5-K...	50	550	72	87	100	66	81	100	42	57	82	26	41	63
SJ10-N...	50	1000	72	87	100	66	81	100	42	57	82	26	41	63
SJ15-N...	150	1200	72	87	100	66	81	100	42	57	82	26	41	63
SJ30-N...	150	1250	72	87	100	66	81	100	42	57	82	26	41	63

Table 3

For relationship between type of connected circuit, maximum ambient temperature for the application as EPL-Da or Db equipment as well as the effective internal reactances for the individual types of slot-type initiators, reference is made to the following Table 4:

Types	C_i	L_i	Type 1	Type 2	Type 3	Type 4
			Maximum permissible ambient temperature in °C			
	[nF]	[µH]				
SC2-N0...	150	150	100	100	75	54
SC3,5-N0-Y...	150	150	100	100	75	54
SC3,5...-N0...	150	150	100	100	89	74
SJ1,8-N-Y...	30	100	100	100	78	57
SJ2,2-N...	30	100	100	100	78	57
SJ2-N...	30	100	100	100	78	57
SJ3,5-...-N...	50	250	100	100	89	74
SJ3,5-H...	50	250	100	100	89	74
SJ5-...-N...	50	250	100	100	89	74
SJ5-K...	50	550	100	100	82	63
SJ10-N...	50	1000	100	100	82	63
SJ15-N...	150	1200	100	100	82	63
SJ30-N...	150	1250	100	100	82	63

Table 4

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

4. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

Special conditions for safe use

1. For the application within a temperature range of -60 °C to -20 °C the slot-type initiators, types SL... and SC... shall be protected against damage due to impact by mounting into an additional housing.
2. The connection facilities of the slot-type initiators, types SL... and SC...shall be installed as such that a minimum degree of protection of IP2X in accordance with EN 60529 is met.
3. For relationship between type of the connected circuit, maximum permissible ambient temperature and temperature class as well as the effective internal reactances for the individual types of slot-type initiators, reference is made to tables 1, 2 and 3 given in this 4. supplement to EC-type-examination certifcate PTB 99 ATEX 2219 X.
4. Inadmissible electrostatic charge of the plastic enclosures shall be avoided for the application of the following types of slot-type initiators according to the explosion groups and equipment categories specified in the following Table 5. When the respective types of slot-type initiators are applied in potentially explosive gas atmospheres a corresponding warning note shall be affixed on the slot-type initiators or near the slot-type initiators respectively. When these are applied in potentially explosive dust atmospheres the corresponding notes given in the operating instructions manual shall be considered.

Type	Group II (1 G)	Group II (2 G)	Group III (1D or 2D)
SJ5-K...	IIC	-	III
SJ10-N...	IIC	-	III
SJ15-N...	IIC	-	III
SJ30-N...	IIA/IIB/IIC	IIC	III
SC3,5...-N0...	-	-	III
SC3,5-N0-Y...	-	-	III
SJ1,8-N-Y...	-	-	III
SJ3,5-...-N...	-	-	III
SJ5-...-N...	-	-	III

Table 5

Applied standards

EN 60079-0: 2012 + A11:2013, EN 60079-11:2012

Test report: PTB Ex 16-25161

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, February 3, 2016

Dr.-Ing. U. Johannsmeier
Direktor und Professor

Sheet 4/4

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

(1) **EU-TYPE-EXAMINATION CERTIFICATE**

(Translation)

(2) Equipment or Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number:

PTB 05 ATEX 2017 X **Issue: 01**

(4) Product: Temperature measuring transducer, types TTH300-*1..., TTH200-*1..., TTF300-*1..., TTF200-*1... and TTR200-*1...

(5) Manufacturer: ABB Automation Products GmbH

(6) Address: Schillerstraße 72, 32425 Minden, Germany

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential Test Report PTB Ex 17-26148.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2012 + A11:2013 **EN 60079-11:2012**

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

II 1 G	**Ex ia IIC T6 Ga**	**or**
II 2 (1) G	**Ex [ia IIC Ga] ib IIC T6 Gb**	**or**
II 2 G (1D)	**Ex [ia IIIC Da] ib IIC T6 Gb**	

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, November 15, 2017
On behalf of PTB:

Dr.-Ing. F. Lienesch
Direktor und Professor

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(13) # SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 05 ATEX 2017 X, Issue: 01**

(15) Description of Product

The temperature measuring transducers of types TTH300-*1..., TTH200-*1..., TTF300-*1..., TTF200-*1... and TTR200-*1... are used in combination with sensors for the detection, amplification and transmission of measured values in intrinsically safe circuits. Resistance thermometers, thermo-couples or other sensors with defined resistance or direct voltage quantities may be connected alternatively to the input.

The modifications concern the extension of the EU-Type Examination Certificate to the temperature measuring transducer of type TTH200-*1 *.H (installation of the temperature measuring transducers of type TTH200-*1H.. into various single-chamber enclosures with / without indicator).

In the future the temperature measuring transducers of types TTF 350-*1..., TTR 300-*1 H.. as well as TTR 200-*1 H2.. are no longer subject matter of this EU-Type Examination Certificate. These types of temperature measuring transducers are no longer manufactured.

Furthermore the modifications include the introduction of a new **HW-Rev. 1.15** for temperature measuring transducer, type TTH 200-*1H.. .

Position 8 of the type code has been changed. A distinction between ATEX- and IECEx-version of the temperature measuring transducer does no longer exist.

Subject matter of this EU-Type Examination Certificate PTB 05 ATEX 2017 X, issue: 01 is also the adaption to the current state of the standards.

Hence, the EU-Type Examination Certificate comprises the temperature measuring transducers according to the following **type code**:

TTH 300-*1H.. :	temperature measuring transducer TTH 300-...., analog HART, Ex-variant two-channel, with HW-Rev. 1.06 and 1.07
TTH 200-*1H.. :	temperature measuring transducer TTH 200-...., analog HART, Ex-variant single-channel, with HW-Rev. 1.06,1.07, 1.12 and 1.15
TTR 200-*1 H.. :	Electronics system of TTH 200-*1H.. encapsulated in rail-mounting enclosure
TTF 200-*1 A.H :	TTH 200-*1H.. in single-chamber enclosure (AGLF)/ without indicator
TTF 200-*1 B.H :	TTH 200-*1H.. in single-chamber enclosure (AGSF)/ without indicator
TTF 200-*1 E.H :	TTH 200-*1H.. in single-chamber enclosure (AGLFD)/ with LCD-display HMI BS
TTF 200-*1 F.H :	TTH 200-*1H.. in single-chamber enclosure (AGSFD)/ with LCD-display HMI BS
TTF 300-*1 A.H :	TTH 300-*1H.. in single-chamber enclosure (AGLF)/ without indicator
TTF 300-*1 B.H :	TTH 300-*1H.. in single-chamber enclosure (AGSF)/ without indicator
TTF 300-*1 C.H :	TTH 300-*1H.. in single-chamber enclosure (AGLFD)/ with LCD-display HMI B

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 05 ATEX 2017 X, Issue: 01

TTF 300-*1 D.H : TTH 300-*1H.. in single-chamber enclosure (AGSFD)/ with LCD-display HMI B

Electrical data

The permissible range of the ambient temperature depends on the temperature class and the respective equipment protection levels as specified in the following table:

Temperature class	T6	T6	T4	T4
Temperature measuring transducer, type	TT*300-*1...	TT*200-*1...	TT*300-*1...	TT*200-*1...
Ambient temperature range, EPL Ga	-50 °C...+44 °C	-40 °C...+44 °C	-50 °C...+60 °C	-40 °C...+60 °C
Ambient temperature range, EPL Gb	-50 °C...+56 °C	-40 °C...+56 °C	-50 °C...+85 °C	-40 °C...+85 °C

Temperature measuring transducer: TT*200-*1...

Supply circuit ..... type of protection Intrinsic Safety Ex ia IIB / IIC
(terminals „+" and „-" or Ex ib IIB / IIC
or „+", „11", „-") for connection to certified intrinsically safe circuits

maximum input values:

U_i = 30 V
I_i = 130 mA
P_i = 0.8 W

HW-Rev.	1.06	1.07	1.12 / 1.15
C_i	5 nF	0.57 nF	0.57 nF
L_i	0.5 mH	0.5 mH	160 µH

Measuring circuit ..... type of protection Intrinsic Safety Ex ia IIC or Ex ia IIB
(terminals „1", „2", „3", „4") with the following maximum values:

HW-Rev.	1.06 / 1.07	1.12 / 1.15
U_o	6.5 V	6.5 V
I_o	25 mA	17.8 mA
P_o	38 mW	29 mW
characteristic	linear	linear
C_i	49 nF	118 nF
L_i	≈ 0	≈ 0

The maximum permissible external inductance and capacitance depend on the connected intrinsically safe circuit as follows:

passive sensors:

Type of protection	Ex ia	
	IIC	IIB
L_o	5 mH	5 mH
C_o	1.55 µF	8.75 µF

active sensors with the following maximum values:

U_o = 1.2 V
I_o = 50 mA
P_o = 60 mW

Type of protection	Ex ia	
	IIC	IIB
L_o	5 mH	5 mH
C_o	1.05 µF	6.15 µF

TTH 200-*1H..

Display- / service interface..... type of protection Intrinsic Safety Ex ia IIB / IIC
(plug connector) or Ex ib IIB / IIC
with the following maximum values:

U_o = 6.2 V
I_o = 65.2 mA
P_o = 101 mW
linear characteristic
$C_i \approx 0$
$L_i \approx 0$

Type of protection	Ex ia / ib	
	IIC	IIB
L_o	5 mH	5 mH
C_o	1.4 µF	8.9 µF

TTR 200-*1 H..

Display- / service interface..... type of protection Intrinsic Safety Ex ia IIB / IIC
(plug connector) or Ex ib IIB / IIC
with the following maximum values:

U_o = 6.2 V
I_o = 65.2 mA
P_o = 101 mW
linear characteristic

passive sensors:

Type of protection	Ex ia	
	IIC	IIB
L_o	5 mH	5 mH
C_o	1.55 µF	8.75 µF

active sensors with the following maximum values:

U_o = 1.2 V
I_o = 50 mA
P_o = 60 mW

Type of protection	Ex ia	
	IIC	IIB
L_o	5 mH	5 mH
C_o	1.05 µF	6.15 µF

Temperature measuring transducer: **TTH 300-*1H..**

Display- / service interface..... type of protection Intrinsic Safety Ex ia IIB / IIC
(plug connector) or Ex ib IIB / IIC
with the following maximum values:

U_o = 6.2 V
I_o = 65.2 mA
P_o = 101 mW
linear characteristic
$C_i \approx 0$
$L_i \approx 0$

Type of protection	Ex ia / ib	
	IIC	IIB
L_o	5 mH	5 mH
C_o	1.4 µF	8.9 µF

The measuring circuit is safely electrically isolated from the supply circuit and from the display / service interface up to total voltage of 30 V.

(16) Test Report PTB Ex 17-26148

(17) Specific conditions of use

1. The connection facilities of the temperature measuring transducers of types TTH 300-*1H../ TTH 200-*1H.. shall be installed as such, that the degree of protection IP 20 according to EN 60529 is met as a minimum.
2. Inadmissible electrostatic charge of the plastic housing of the temperature measuring transducers of types TTH 300-*1H../ TTH 200-*1H.. as well as TTR 200-*1 H.. shall be avoided and a warning label shall be provided on the equipment.
3. For the application as EPL Ga equipment the temperature measuring transducers of type TTF 300-*1 A.H, type TTF 300-*1 C.H, type TTF 200-*1 A.H or type TTF 200-*1 E.H shall be installed as such, that they are protected against strong impact or friction.

(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz — Braunschweig, November 15, 2017
On behalf of PTB:

Dr.-Ing. F. Lienesch
Direktor und Professor

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

(1) EU-TYPE EXAMINATION CERTIFICATE

(Translation)

(2) Equipment or Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number:

PTB 12 ATEX 4001 X **Issue: 1**

(4) Product: Pre-volume deflagration flame arrester, type Adapt-FS

(5) Manufacturer: ARMANO Messtechnik GmbH

(6) Address: Manometerstraße 5, 46487 Wesel-Ginderich, Germany

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential Test Report PTB Ex 19-48012.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN ISO 16852:2016, **DIN EN ISO 16852:2017**

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the protective system shall include the following:

Ex **II G IIC**

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, March 1, 2019

Dr.-Ing. D.-H. Frobese
Oberregierungsrat

ZSEx001e c

(13) # SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 12 ATEX 4001 X, Issue: 1**

(15) Description of Product

The pre-volume deflagration flame arrester of type Adapt-FS shall reliably prevent flashback in the case of a deflagration of gas/air- and vapour/air mixtures of explosion group IIC with a maximum experimental safe gap ≥ 0.3 mm in an upstream volume of max. 0.2 l.

Changes with respect to previous editions

The company Armaturenbau GmbH changes into ARMANO Messtechnik GmbH.

(16) Test Report PTB Ex 19-48012

The test report consists of 3 pages, 30 drawings, operating instructions manual (8 pages), list of documents (2 pages), extract from the Commercial Register (4 pages) and the marking (1 page).

Result: The pre-volume deflagration flame arrester described under (15) complies with the requirements to the performance of flame arresters according to EN ISO 16852:2016, DIN EN ISO 16852:2017.

(17) Specific conditions of use

When the unit is used as deflagration volume protection, the following conditions shall be complied with:

1. The unprotected volume shall not exceed 0.2 l.
2. At the screwed adapter, the maximum piping length on the non-protected side between a potential ignition source and the deflagration volume protection device shall not exceed 3×D = 45 mm.
3. The nominal connection width on the non-protected side may be max. G1/2 or DN 15.
4. The nominal connection width on the protected side may be max. G1/2 or DN 15.
5. The inflammable gases and vapours occurring during operation may be classified into explosion group IIC with a maximum experimental safe gap ≥ 0.3 mm.
6. The maximum permissible operating pressure shall not exceed 110 kPa.
7. The maximum operating temperature is 60 °C.
8. The protected side shall be observed.

The conditions listed above shall be included in the operating instructions manual provided for each pre-volume deflagration flame arrester of type Adapt-FS, and they shall be implemented by the operating company.

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 12 ATEX 4001 X, Issue: 1

(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Dr.-Ing. D.-H. Frobese
Oberregierungsrat

Braunschweig, March 1, 2019

EB 7030 EN

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2019-11-26 · English