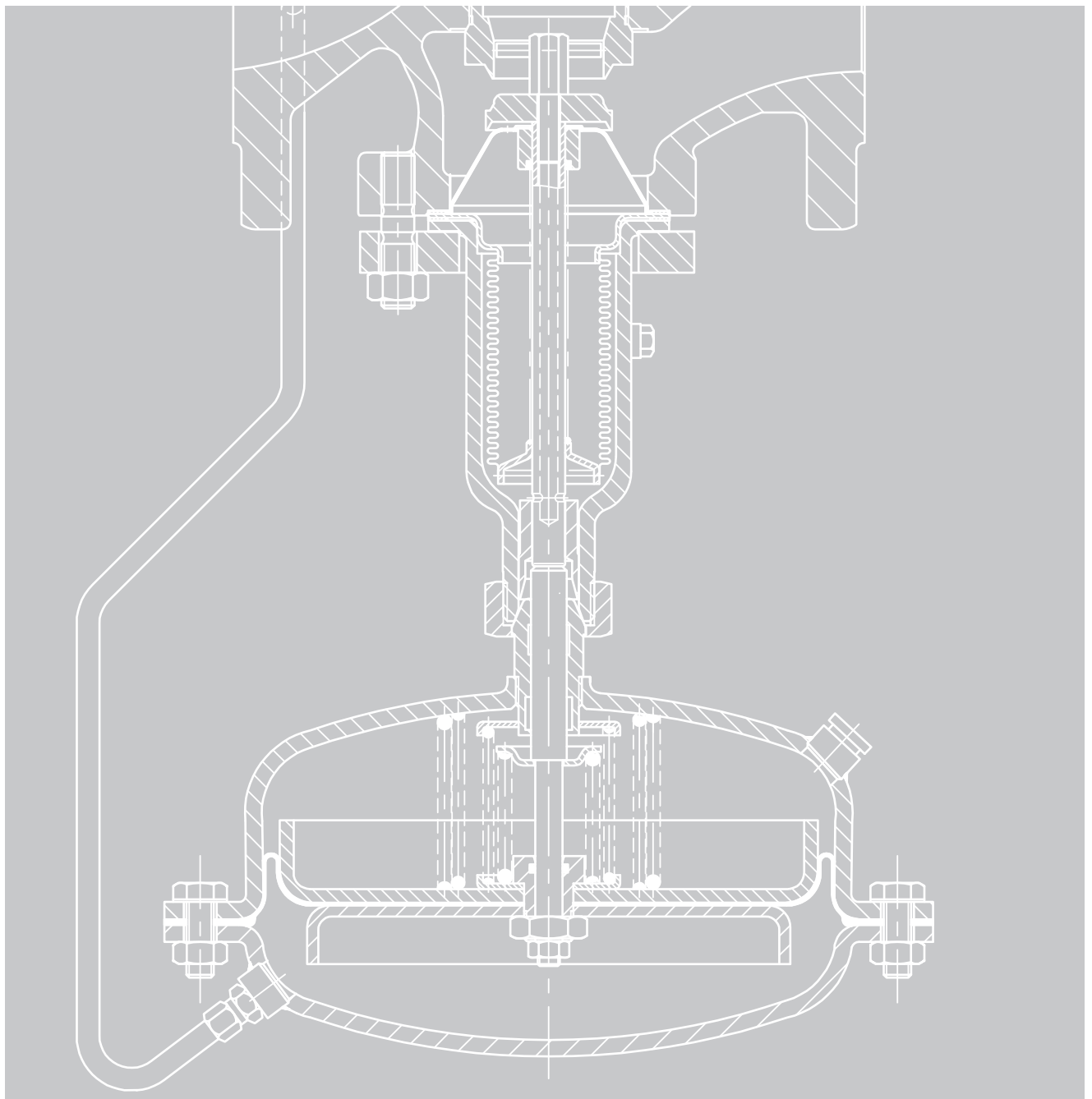


# Self-operated Differential Pressure and Flow Regulators

Series 42



PN 16 to PN 40  
DN 15 to DN 250  
Up to 220 °C





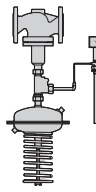
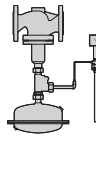


Edition October 2012

Information Sheet

T 3000 EN

## Overview · Series 42 Differential Pressure and Flow Regulators

|  |  |  |  |   |   |              |
|--|--|--|--|---|---|--------------|
| Valve  | Applicable for ...                         | Steam  | •  | •   | •   |              |
|  |  | Water and other liquids  | •  | •   | •   |              |
|  |  | Mineral oil  | •  | •   | •   |              |
|  |  | Air and other non-flammable gases  | •  | •   | •   | •            |
|  | Connection                                 | Globe valve with flanges   | •  | •   | •   | •            |
|  |  | Nominal size   | DN 15 to 250   | DN 15 to 100  |   | DN 15 to 250 |
|  |  | Nominal pressure   | PN 16 to 40  |   |   |              |
|  | Max. permissible temperature <sup>5)</sup> | 350 °C   |  |   |   |              |
|  | Pressure balanced                          | •  | •  | •   | •   |              |
|  | Unbalanced                                 |  |  |   |   |              |
| With force limiter <sup>1)</sup>               | •  | •  |  |   |   |              |
| Body material <sup>2)</sup>                    | Cast iron EN-JL 1040                       | •  | •  | •   | •   |              |
|  | Sph. graphite iron EN-JS 1049              | •  | •  | •   | •   |              |
|  | Cast steel 1.0619                          | •  | •  | •   | •   |              |
|  | Stainless steel 1.4408 <sup>6)</sup>       | •  | •  | •   | •   |              |
| Application                                    | Differential pressure $\Delta p$           | •  | •  | •   | •   |              |
|  | Flow rate                                  | Control  |  |   |   |              |
|  |  | Limitation   |  |   |   |              |
|  | Installation in                            | Flow pipe  |  | •   |   |              |
|  |  | Return flow pipe   | •  |   | •   |              |
|  | Set point <sup>3)</sup>                    | Fixed  |  | •   | •   |              |
|  |  | Adjustable   | •  |   |   | •            |
|  | $\Delta p$ (bar)                           | Min.   | 0.05   | 0.2   | 0.2   | 0.05         |
| Max.   |  | 10   | 0.5  | 0.5   | 10  |              |
| For details, see Data Sheet ...                |  | <br>A   B<br>Type 42-24<br>T 3003 EN | <br>A   B<br>Type 42-28<br>T 3003 EN | <br>Type 42-20<br>T 3007 EN | <br>Type 42-25<br>T 3007 EN |              |
| Regulators with additional temperature control |  | <br>Type 42-24 DoT<br>T 3019 EN     | <br>Type 42-28 DoT<br>T 3019 EN     |   |   |              |
| For details, see Data Sheet ...                |  |  |  |   |   |              |

<sup>1)</sup> The force limiter with internal excess pressure limiter in the actuator protects the seat and plug against damage on exceeding the permissible differential pressure.

<sup>2)</sup> Cast iron EN-JL 1040 only in PN 16 · Spheroidal graphite iron EN-JS 1049 only in PN 25

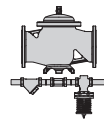
<sup>3)</sup> Temperature set points can be adjusted in all versions

<sup>4)</sup> Optionally also as a flow and pressure regulator

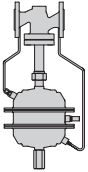

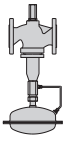
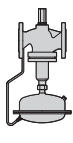


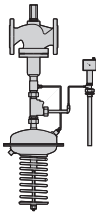
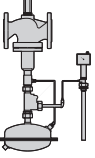
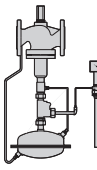
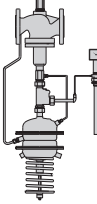
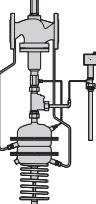
<sup>5)</sup> Higher temperatures on request

<sup>6)</sup> For some sizes also available of stainless forged steel 1.4571 (see associated data sheet)

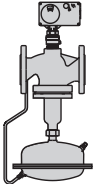
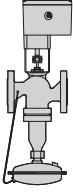
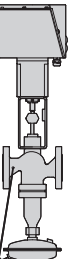
### Type 2334 Pilot-operated Universal Regulator

|   |  |
|---|--|
| <p><b>Application</b><br/>Pressure, differential pressure, flow rate, temperature regulator or combined regulators, optionally with additional electric actuator · Suitable for all applications listed</p> | <br><b>Type 2334</b><br>T 3210 EN |
| <p>Globe valve balanced by a bellows or a diaphragm · Pilot-operated by the process medium · Max. three pilot valves</p>  |  |

Continued

|  |  |   |   |  |   |   |
|--|--|---|---|--|---|---|
|  | •  | •   | •   | •  | •   | •   |
|  | •  | •   | •   | •  | •   | •   |
|  | •  | •   | •   | •  | •   | •   |
|  | •  | •   | •   | •  | •   | •   |
|  | •  | •   | •   | •  | •   | •   |
|  | DN 15 to 150   | DN 15 to 250  | DN 15 to 100  | DN 15 to 250   |   |   |
|  | PN 16 to 40  |   |   |  |   |   |
|  | 80 °C  | 220 °C  |   |  |   |   |
|  |  | •   | •   | •  | •   | •   |
|  | •  |   |   |  |   |   |
|  |  | •   | •   | •  | •   | •   |
|  | •  | •   | •   | •  | •   | •   |
|  | •  | •   | •   | •  | •   | •   |
|  | •  | •   | •   | •  | •   | •   |
|  | •  | •   | •   | •  | •   | •   |
|  |  | •   | •   | •  | •   | • 4)  |
|  | •  |   |   |  |   | •   |
|  | •  | •   | •   | •  | •   |   |
|  | •  |   | • (Δp)  |  |   |   |
|  |  | •   |   | •  | •   | •   |
|  | -  | 0.1   | 0.2   | -  | 0.1   | 0.1   |
|  | -  | 1.5   | 0.5   | -  | 5   | 5   |
|  |  |   |   |   |   |   |
|  | Type 42-10 RS<br>T 3009 EN   | Type 42-34<br>T 3013 EN   | Type 42-38<br>T 3013 EN   | Type 42-36<br>T 3015 EN  | Type 42-37<br>T 3017 EN   | Type 42-39<br>T 3017 EN   |
|  |  |  |  |  |  |  |
|  |  | Type 42-34 DoT<br>T 3019 EN   | Type 42-38 DoT<br>T 3019 EN   | Type 42-36 DoT<br>T 3019 EN  | Type 42-37 DoT<br>T 3019 EN   | Type 42-39 DoT<br>T 3019 EN   |

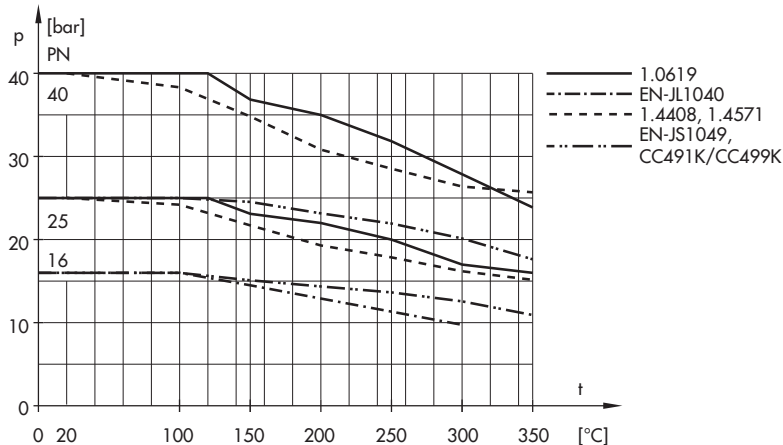
Combined regulators with additional electric actuator

|  |   |  |   |
|--|---|--|---|
| <p>Used for<br/><b>flow rate control V</b><br/>Refer to Data Sheet T 3018 EN for further details to the regulators with Type 5824/5825, Type 3374 and Type 3274 Actuators.</p> |  |  |  |
|  | <p><b>Type 42-36 E with Type 5824/5825 Electric Actuator</b></p>                    | <p><b>Type 42-36 E with Type 3374 Electric Actuator</b></p>                          | <p><b>Type 42-36 E with Type 3274 Electrohydraulic Actuator</b></p>                   |
| <p>Basic regulator Type 42-36</p>  | <p>Data Sheet T 3015 EN</p>   |  |   |

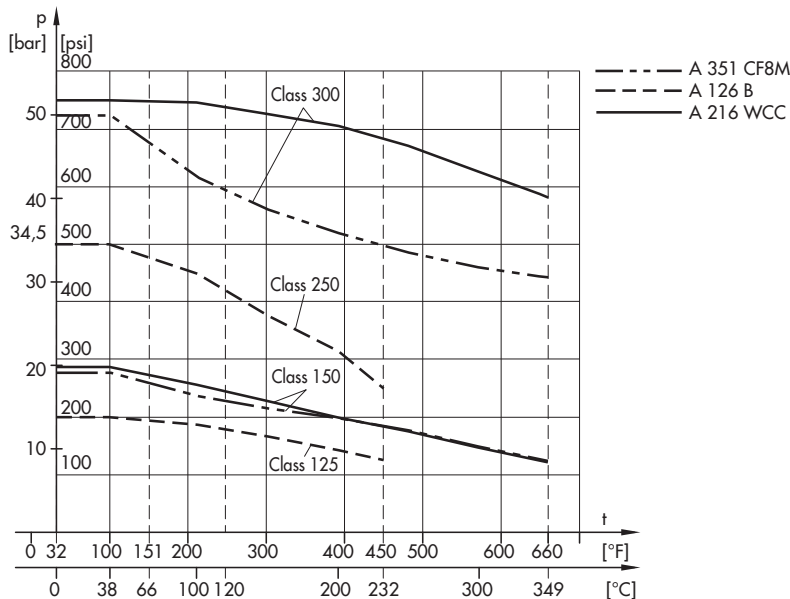
## Pressure-temperature diagrams

### Pressure-temperature diagram according to DIN

Diagrams for DIN materials are based on DIN EN 12516-1.  
Diagrams for materials according to US standards are based on ASME B16.1 and ASME B16.34.



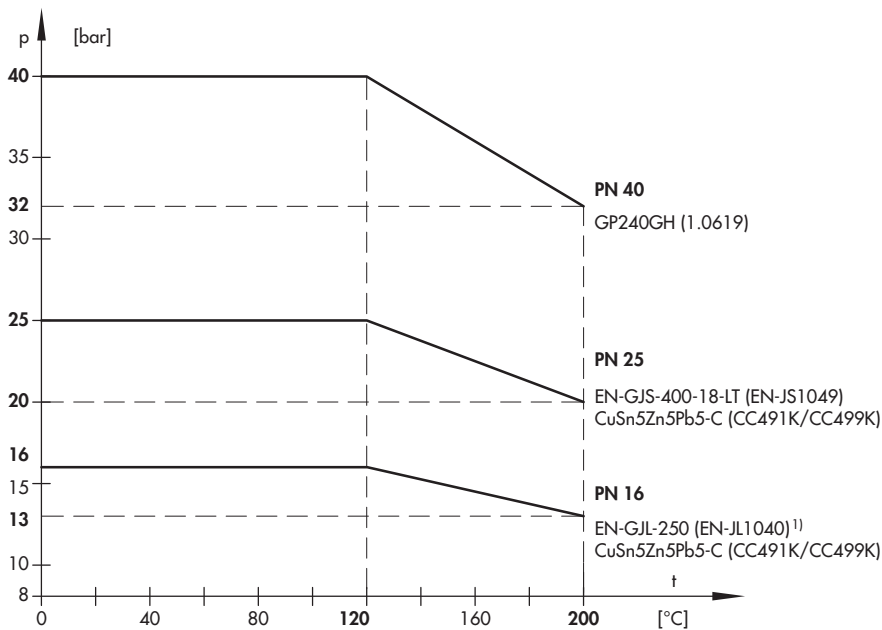
### Pressure-temperature diagram according to ANSI



The diagram below applies to the use of regulators for district heating (see DIN 4747-1)

### Pressure-temperature diagram acc. to DIN 4747-1 for selected materials

The materials for valves and connecting pieces must be suitable for sizing and the operating conditions.  
In this case, material is selected according to DIN 4747-1.  
Depending on the valve material, various pressure ratings are also permissible at different temperatures.



<sup>1)</sup> Permissible at network flow temperature  $\vartheta_{VN} \leq 130 \text{ °C}$   
 $\vartheta_{VN} > 130 \text{ °C}$  only up to DN  $\leq 100$

Fig. 1 · Pressure-temperature diagrams (material number according to DIN EN)

## Conversion factors

### K<sub>V</sub>S and C<sub>V</sub> coefficients

These flow coefficients are calculated exactly according to IEC 60534, Part 2-1 and Part 2-2. In addition, the ISA-S75.01-1-1985 standards and the VDI/VDE Guideline 2173 are applied. In most cases, it is sufficiently accurate to calculate the K<sub>V</sub> coefficient according to this guideline. The relevant equations are listed in Application Notes AB 04 EN.

$$K_{VS} = 0.86 \times C_V \quad K_{VS} \quad [\text{m}^3/\text{h}]$$
$$C_V = 1.17 \times K_{VS} \quad C_V \quad [\text{US gallons}/\text{min}]$$

### Pressure

$$1 \text{ pound}/\text{square inch} \quad [\text{lbs}/\text{in}^2 = \text{psi}] = 0.06895 \text{ bar}$$
$$1 \text{ bar} = 14.5 \text{ psi}$$

### Area

$$1 \text{ square inch} \quad [\text{sq.in}; \text{in}^2] = 6.452 \text{ cm}^2$$
$$1 \text{ cm}^2 = 0.155 \text{ in}^2$$

### Mass

$$1 \text{ pound} \quad [\text{lb}] = 0.4536 \text{ kg}$$
$$1 \text{ kg} = 2.2046 \text{ lb}$$

### Mass flow

$$1 \text{ pound per second} \quad [\text{lb}/\text{s}] = 0.4536 \text{ kg}/\text{s}$$
$$1 \text{ kg}/\text{s} = 2.2046 \text{ lb}/\text{s}$$

### Flow rate

$$1 \text{ US gallon per min} \quad [\text{US gal}/\text{min}] = 0.227 \text{ m}^3/\text{h}$$
$$1 \text{ m}^3/\text{h} = 4.4 \text{ US gal}/\text{min}$$

### Temperature

$$^\circ\text{F} = 9/5 \text{ }^\circ\text{C} + 32 \quad \cdot \quad ^\circ\text{C} = 5/9 (^\circ\text{F} - 32)$$

## Differential pressure and flow control · Regulators and their methods of control

The Series 42 Self-operated Differential Pressure and Flow Regulators consist of a valve with flanges and an actuator which closes or opens the valve when the differential pressure/flow rate increases.

The medium flows through the valve in the direction indicated by the arrow. The areas released by the valve plug influence the differential pressure/flow rate.

In pressure-balanced regulators, the plug is largely unaffected by pressure changes in the medium. This is achieved by using either valves balanced by a bellows or a diaphragm. In both cases, the forces created by the upstream and downstream pressures that act on the plug are balanced out.

The actuators can be equipped with force limiters to limit the force acting on the plug stem and protect the seat and plug against damage.

A similar effect is achieved by an excess pressure limiter integrated into the actuator. A bypass opens, if necessary, and balances the forces which prevents excessive positioning forces.

### Differential pressure control

Differential pressure regulators are used to maintain the differential pressure between two pipes at a constant value depending on the adjusted set point. They are designed for installation in the high-pressure or low-pressure pipe (flow or return flow pipe) of a district heating station, for example.

The differential pressure to be controlled acts on the operating diaphragm and is converted into a force, which moves the plug depending on the force of the set point springs (set point).

Depending on the regulator type, the set point is either adjusted at the set point adjuster or fixed by the installed set point spring.

External control lines transmit the high and low pressures.

### Flow control

The flow rate is determined according to the differential pressure method. This is achieved by a standard orifice plate in the pipe through which the medium flows or by an adjustable restriction integrated into the valve.

The areas released by the restriction and the valve plug influence the flow rate. In this case, the high pressure upstream of the restriction is transferred through the control line to the high-pressure side of the diaphragm, whereas the low pressure downstream of the restriction is transferred through a bore in the valve plug to the low-pressure side of the diaphragm.

When the pressure difference now acting on the operating diaphragm exceeds the differential pressure set point of the set point spring, i.e. the flow rate increases, the diaphragm moves together with the plug stem and the plug. The cross-sectional area of flow is reduced until the pressure drop created above the restriction and the preset differential pressure created to measure flow are identical.

Combined regulators applicable for differential pressure/pressure and flow control as well as regulators suitable for one or more of these control tasks are commonly used.

## Design · Principle of operation and application

Self-operated differential pressure and flow regulators are medium-controlled proportional regulators. Each deviation from the adjusted set point is assigned to a certain valve plug position.

The medium to be controlled delivers the necessary energy to adjust the valve. When the actual value deviates from the set point (set point  $\neq$  actual value), the released force moves the plug.

The differential pressure  $\Delta p$  to be controlled generates a force  $F_m$  at the diaphragm surface of the actuator which is proportional to the actual value (controlled variable  $x$ ). This force is compared to the spring force  $F_S$  (set point  $w$ ) at the plug stem. The spring force corresponds to the set point and can be adjusted at the set point adjuster. When the differential pressure  $\Delta p$  and thus the force  $F_m$  change, the plug stem is moved until  $F_m = F_S$ . With a predetermined diaphragm area  $A$ , the spring rate of the set point spring determines the rated travel and thus also the proportional-action coefficient  $K_p$  and the proportional band  $x_p$ .

The flow rate is controlled according to the differential pressure method.

The control accuracy and stability depend on the disturbances that occur. The regulators are designed in such a way that the effect of these disturbances is relatively small. Amongst other things, this is also achieved by balancing the plug with a metal bellows. As a result, the force acting on the plug, which depends on the upstream or differential pressure, is eliminated by an equal opposing force. In unbalanced versions, the disturbance effect is a force resulting from the cross-section of the seat and the differential pressure.

The regulators can be designed to function as:

- Differential pressure regulators
- Flow regulators
- Differential pressure and flow regulators
- Differential pressure limiters and flow limitation
- Differential pressure, flow and temperature regulators
- Combined differential pressure or flow regulators with additional electric actuator

### Fig. 2.1

Differential pressure regulator with closing actuator. This actuator closes the valve when the adjusted differential pressure set point is exceeded. The top of the diagram shows a closing actuator with an adjustable set point, the bottom an actuator with a fixed set point.

Actuators with a fixed set point determined by the set point spring are appropriately suitable for closed loops with a constant set point.

### Fig. 2.2

Differential pressure regulator with opening actuator. This actuator opens the valve when the differential pressure rises. The valve is closed when relieved of pressure ( $\Delta p = 0$ ).

### Fig. 2.3

Valve with metal bellows. The downstream pressure acts on the inner bellows surface, the upstream pressure acts on the outer bellows surface. As a result, the forces acting on the plug are

balanced, the plug is fully balanced and not affected by any pressure or flow rate changes in the process medium.

Thanks to the fully balanced valves, the Series 42 Regulators can be used for nominal sizes up to DN 250 and flow rates up to 520 m<sup>3</sup>/h.

### Fig. 2.4

Flow regulators are especially suitable for district heating supply systems. The measuring system is designed for a fixed differential pressure at the restriction of, for example, 0.2 bar.

The set point is adjusted at the restriction. As a result, the regulator operates with an adjustable orifice bore, i.e. with an opening ratio which is adapted to the set point.

### Fig. 2.5

Principle of flow control according to the differential pressure method. The differential pressure  $\Delta p_{\text{restriction}}$  generated at the restriction (orifice plate) is transferred to the diaphragm surface of the actuator. The difference between the force at the diaphragm and the spring force of the set point spring causes the plug position to change. For the flow rate, the differential pressure  $\Delta p_{\text{restriction}}$  acting on the restriction and the force  $F_m$  acting on the diaphragm, the following applies:

$$\dot{V} = K \times \sqrt{\Delta p_{\text{restriction}}} \hat{=} K \times \sqrt{F_m} \quad \text{or} \quad \dot{V}^2 = K' \times \Delta p \hat{=} K' \times F_m$$

$$\Delta p_{\text{restriction}} = \frac{F_m}{A}$$

|                                 |   |   |
|---------------------------------|---|---|
| $\dot{V}$                       | = | Flow rate   |
| $F_m$                           | = | Force at the diaphragm surface  |
| $\Delta p_{\text{restriction}}$ | = | Differential pressure generated at the restriction to measure the flow rate |
| $K, K'$                         | = | Constants   |
| $A$                             | = | Diaphragm area  |

### Figs. 2.6 and 2.7

Flow and differential pressure or pressure regulators. These regulators are equipped with two diaphragms. The top diaphragm is used to control the flow rate, the bottom diaphragm is used to control the differential pressure or pressure. The largest signal is used to actuate the valve.

Depending on the intended application, these regulators are equipped with the necessary control lines.

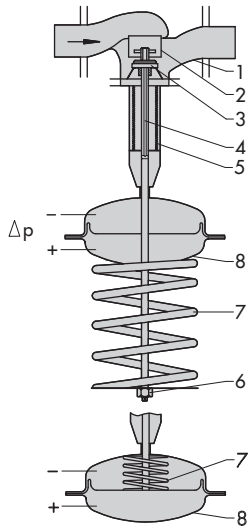


Fig. 2.1 · Differential pressure regulator with closing actuator and adjustable set point (top)/fixed set point (bottom)

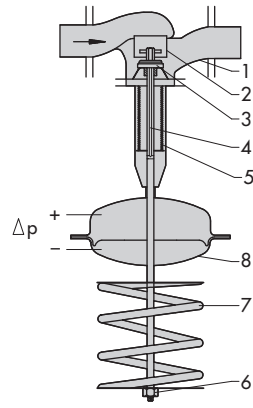


Fig. 2.2 · Differential pressure regulator with opening actuator and adjustable set point

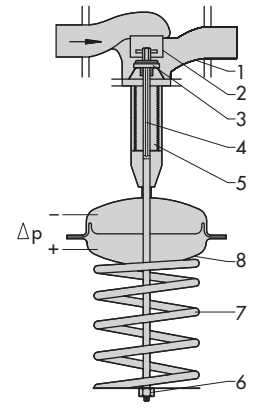


Fig. 2.3 · Differential pressure regulator with metal bellows for pressure balancing

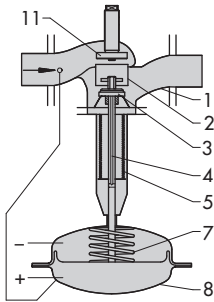


Fig. 2.4 · Flow regulator

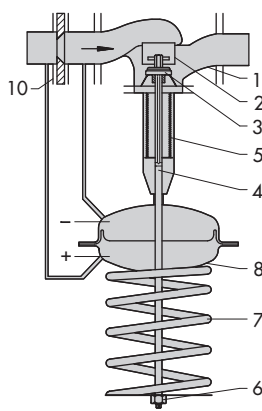


Fig. 2.5 · Differential pressure regulator used as flow regulator (with external orifice plate)

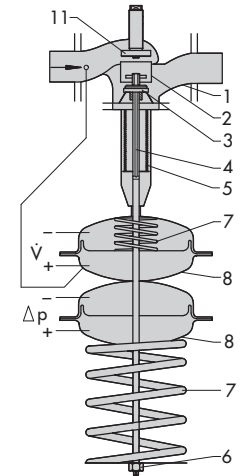


Fig. 2.6 · Flow and differential pressure regulator (flow pipe)

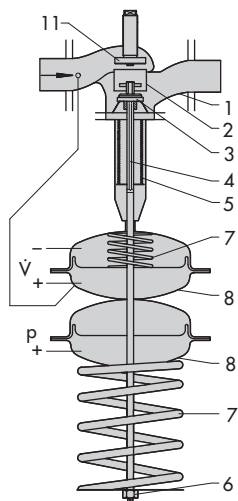


Fig. 2.7 · Flow and pressure regulator

**Legend**

- 1 Valve body
- 2 Seat
- 3 Plug
- 4 Plug stem
- 5 Balancing bellows
- 6 Set point adjuster
- 7 Set point spring
- 8 Actuator
- 10 Restriction (orifice)
- 11 Adjustable restriction

## Series 42 Self-operated Regulators

### Differential Pressure and Flow Regulators

SAMSON differential pressure and flow regulators are suitable for industrial, public and domestic applications, especially for district heating supply systems, for heating, ventilation and air-conditioning systems, for steam and heat generators, heat exchangers, energy supply units in power plants and chemical plants as well as for large pipeline systems.

- Low-noise and low-maintenance proportional regulators requiring no auxiliary energy
- Body optionally made of cast iron, spheroidal graphite iron, cast steel or cast stainless steel/forged steel
- Suitable for water, steam, air and other liquids or gases, provided they do not influence the properties of the operating diaphragm
- Special version for mineral oil/heat transfer oil
- Flanges

### Check Valve (Backflow Prevention)

**Type 42-10 RS** · With fixed set point

- Type 2421 RS Valve and Type 2420 RS Actuator
- Differential pressure regulator with opening actuator for installation in the flow pipe
- Regulator closes when the downstream pressure rises and when the upstream pressure rises to or above the level of the downstream pressure
- Single-seated valve without pressure balancing

#### Technical data

#### Data Sheet T 3009 EN

|                                  |              |
|----------------------------------|--------------|
| Nominal size                     |              |
| Type 42-10                       | DN 15 to 150 |
| Nominal pressure                 | PN 16 to 40  |
| Differential pressure set points |              |
| Type 42-10                       | 0.2 bar      |
| Temperature ranges               |              |
| Compressed air and nitrogen      | Up to 80 °C  |

### Differential Pressure Regulators

**Type 42-24 A** · **Type 42-24 B** · With adjustable set point

**Type 42-28 A** · **Type 42-28 B** · With fixed set point

- Type 2422 Valve and Type 2424/2428 Actuator
- Differential pressure regulator with closing actuator for installation in the return flow pipe (Type 42-24 A or Type 42-28 A)
- Single-seated valve balanced by a stainless steel bellows
- Types 42-24 B/42-28 B: preferable installed in the flow pipe. A distance piece separates the pressure in the valve from the pressure in the actuator
- Actuator with two diaphragms for increased safety

**Type 42-24 A** · **Type 42-24 B** · With adjustable set point

**Type 42-28 A** · **Type 42-28 B** · With fixed set point

- Actuator with force limiter and overload protection

#### Technical data

#### Data Sheet T 3003 EN

|                                  |                           |
|----------------------------------|---------------------------|
| Nominal size                     |                           |
| Type 42-24 A/B                   | DN 15 to 250              |
| Type 42-28 A/B                   | DN 15 to 100              |
| Nominal pressure                 | PN 16 to 40               |
| Differential pressure set points |                           |
| Type 42-24 A/B                   | 0.05 to 10 bar            |
| Type 42-28 A/B                   | 0.2 · 0.3 · 0.4 · 0.5 bar |
| Temperature ranges               |                           |
| Steam and liquids                | Up to 220 °C              |
| Liquids                          | Up to 150 °C              |
| Air and non-flammable gases      | Up to 80 °C               |



Fig. 3 · Series 42 Differential Pressure and Flow Regulators



## Differential Pressure Regulators

**Type 42-20** · With fixed set point

**Type 42-25** · With adjustable set point

- Type 2422 Valve and Type 2420/2425 Actuator
- Differential pressure regulator with opening actuator for installation in a bypass or short-circuit pipe
- Single-seated valve balanced by a stainless steel bellows or a diaphragm

| Technical data                   | Data Sheet T 3007 EN      |
|----------------------------------|---------------------------|
| Nominal size                     |                           |
| Type 42-20                       | DN 15 to 100              |
| Type 42-25                       | DN 15 to 250              |
| Nominal pressure                 | PN 16 to 40               |
| Differential pressure set points |                           |
| Type 42-20                       | 0.2 · 0.3 · 0.4 · 0.5 bar |
| Type 42-25                       | 0.05 to 10 bar            |
| Temperature ranges               |                           |
| Steam and liquids                | Up to 220 °C              |
| Liquids                          | Up to 150 °C              |
| Air and non-flammable gases      | Up to 80 °C               |

## Differential Pressure Limiters with Flow Limitation

**Type 42-38** · With fixed set point

**Type 42-34** · With adjustable set point

- Type 2423 Valve and Type 2424/2428 Actuator
- Actuator with force limiter and internal excess pressure limiter
- Differential pressure limiter with flow limitation and closing actuator for installation in the return flow pipe with indirectly connected transfer stations
- Single-seated valve balanced by a stainless steel bellows

| Technical data                   | Data Sheet T 3013 EN      |
|----------------------------------|---------------------------|
| Nominal size                     |                           |
| Type 42-38                       | DN 15 to 100              |
| Type 42-34                       | DN 15 to 250              |
| Nominal pressure                 | PN 16 to 40               |
| Differential pressure set points |                           |
| Type 42-38                       | 0.2 · 0.3 · 0.4 · 0.5 bar |
| Type 42-34                       | 0.1 to 1.5 bar            |
| Temperature ranges               |                           |
| Liquids                          | Up to 220 °C              |

## Flow Regulator

**Type 42-36**

- Type 2423 Valve and Type 2426 Actuator
- Flow regulator with closing actuator for installation in the flow or return flow pipe
- Single-seated valve balanced by a stainless steel bellows

| Technical data                           | Data Sheet T 3015 EN          |
|--|-------------------------------|
| Nominal size                             | DN 15 to 250                  |
| Nominal pressure                         | PN 16 to 40                   |
| Flow set point ranges                    | 0.05 to 520 m <sup>3</sup> /h |
| Differential pressure at the restriction | 0.2 or 0.5 bar                |
| Temperature ranges                       |                               |
| Steam and liquids                        | Up to 220 °C                  |
| Air and non-flammable gases              | Up to 80 °C                   |



Type 42-25  
Differential Pressure Regulator



Type 42-36  
Flow Regulator



Type 42-34  
Differential Pressure Limiter with  
Flow Limitation

Fig. 4 · Series 42 Differential Pressure and Flow Regulators

## Flow and Differential Pressure or Flow and Pressure Regulators

### Type 42-37 · Type 42-39

- Single-seated valve balanced by a stainless steel bellows or a diaphragm
- Type 42-37 Flow and Differential Pressure Regulator
- Type 2423 Valve and Type 2427 Actuator
- Flow and differential pressure regulator with closing actuator for installation in the return flow pipe of a district heating substation
- Flow set point adjustable at the restriction; differential pressure set point adjustable at the actuator
- Actuator with force limiter and overload protection

| Technical data                           | Data Sheet T 3017 EN          |
|--|-------------------------------|
| Nominal size                             | DN 15 to 250                  |
| Nominal pressure                         | PN 16 to 40                   |
| Flow set point ranges                    | 0.05 to 520 m <sup>3</sup> /h |
| Differential pressure at the restriction | 0.2 or 0.5 bar                |
| Differential pressure set points         | 0.1 to 10 bar                 |
| Temperature ranges<br>Liquids            | Up to 220 °C                  |

### Type 42-39 Flow and Differential Pressure or Pressure Regulator

- Type 2423 Valve with restriction and Type 2429 Actuator
- Flow and differential pressure or pressure regulator with closing actuator for installation in the flow pipe of a district heating substation
- Flow set point adjustable at the restriction; differential pressure or pressure set point adjustable at the actuator

| Technical data                                     | Data Sheet T 3017 EN          |
|--|-------------------------------|
| Nominal size                                       | DN 15 to 250                  |
| Nominal pressure                                   | PN 16 to 40                   |
| Flow set point ranges                              | 0.05 to 520 m <sup>3</sup> /h |
| Differential pressure at the restriction           | 0.2 or 0.5 bar                |
| Differential pressure or pressure set point ranges | 0.1 to 5 bar                  |
| Temperature ranges<br>Liquids                      | Up to 220 °C                  |

## Differential Pressure and Temperature Regulators

### Type 42-24 DoT · Type 42-28 DoT

- Differential pressure and temperature regulator with closing actuator for installation in the flow or return flow pipe
- Actuator with force limiter and internal excess pressure limiter

### Type 42-24 DoT

- Type 2422 Valve and double adapter with Type 2424 Actuator, adjustable set point and Type 2231/2232 Control Thermostat
- Single-seated valve balanced by a stainless steel bellows or a diaphragm

### Type 42-28 DoT

- Type 2422 Valve and double adapter with Type 2428 Actuator, fixed set point and Type 2231/2232 Control Thermostat
- Single-seated valve balanced by a stainless steel bellows

| Technical data   | Data Sheets T 3003 EN · T 3019 EN       |
|--|---|
| Nominal size<br>Type 42-24<br>Type 42-28                             | DN 15 to 250<br>DN 15 to 100            |
| Nominal pressure   | PN 16 to 40                             |
| Differential pressure set points<br>Type 42-24<br>Type 42-28         | 0.05 to 10 bar<br>0.2 · 0.3 · 0.4 · 0.5 |
| Type 2231/2232 Temperature Regulator<br>Set point ranges             | -10 to +250 °C                          |
| Temperature ranges<br>Steam and liquids<br>Liquids, air and nitrogen | Up to 220 °C<br>Up to 150 °C            |



Type 42-37 Flow and  
Differential Pressure  
Regulator



Type 42-39 Flow and Differential  
Pressure or Pressure Regulator



Type 42-28 DoT Differential Pressure  
and Temperature Regulator with  
Type 2232 Control Thermostat

Fig. 5 · Series 42 Differential Pressure and Temperature Regulators

## Differential Pressure, Flow and Temperature Regulators

### Type 42-34 DoT · Type 42-36 DoT · Type 42-37 DoT

#### Type 42-38 DoT · Type 42-39 DoT

- Single-seated valves balanced by a stainless steel bellows or a diaphragm

### Flow and Temperature Regulator

#### Type 42-36 DoT

- Flow and temperature regulator with closing actuator for installation in the flow and return flow pipe
- Type 2423 Valve and double adapter with Type 2426 Actuator and Type 2231/2232 Control Thermostat

### Differential Pressure, Flow and Temperature Regulator

#### Type 42-37 DoT

- Differential pressure, flow and temperature regulator with closing actuator for installation in the return flow pipe of a district heating substation
- Type 2423 Valve and double adapter with Type 2427 Actuator, adjustable set point and Type 2231/2232 Control Thermostat
- Actuator with force limiter and internal excess pressure limiter

### Flow and Differential Pressure or Pressure and Temperature Regulator

#### Type 42-39 DoT

- Same as 42-37 DoT, but with Type 2429 Actuator
- Regulator for installation in the flow pipe of a district heating substation

### Differential Pressure Limiters and Temperature Regulators with Flow Limitation

#### Type 42-34 DoT · Type 42-38 DoT

- For installation in the return flow pipe

#### Type 42 -34 DoT

- Type 2423 Valve and double adapter with Type 2424 Actuator, adjustable set point and Type 2231/2232 Control Thermostat
- Actuator with force limiter and internal excess pressure limiter

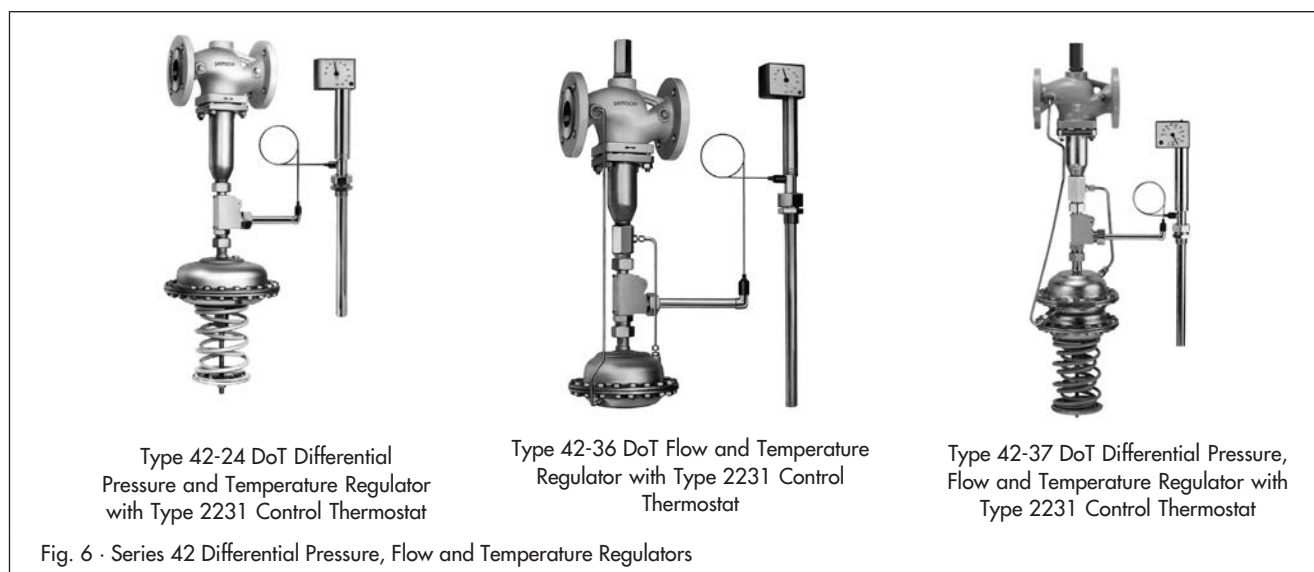
#### Type 42 -38 DoT

- Type 2423 Valve and double adapter with Type 2428 Actuator, fixed set point and Type 2231/2232 Control Thermostat
- Actuator with force limiter and internal excess pressure limiter

#### Technical data

Data Sheets T 3013 EN · T 3015 EN  
T 3017 EN · T 3019 EN

|   |                               |
|---|-------------------------------|
| Nominal size  |                               |
| Type 42-34  | DN 15 to 250                  |
| Type 42-36  | DN 15 to 250                  |
| Type 42-37  | DN 15 to 250                  |
| Type 42-38  | DN 15 to 100                  |
| Type 42-39  | DN 15 to 250                  |
| Nominal pressure  | PN 16 to 40                   |
| Differential pressure set points                        |                               |
| Type 42-34  | 0.1 to 1.5 bar                |
| Type 42-36  | –                             |
| Type 42-38  | 0.2 · 0.3 · 0.4 · 0.5 bar     |
| Type 42-37/Type 42-39                                   | 0.1 to 10 bar                 |
| Flow set point ranges                                   |                               |
| At 0.2/0.5 bar differential pressure at the restriction | 0.05 to 300 m <sup>3</sup> /h |
| Type 2231/2232 Temperature Regulator                    |                               |
| Set point ranges  | –10 to +250 °C                |
| Temperature ranges                                      |                               |
| Steam and liquids                                       | Up to 220 °C                  |
| Air and gases   | Up to 80 °C                   |



## Combined self-operated regulators for flow rate with additional electric actuator

- The valve closes as the flow rate rises and as the electric closing signal of the control equipment increases. The largest signal is used to actuate the valve. The control quality does not depend on the differential pressure across the valve.
- Typetested regulators are available; register no. available on request.
- The regulators are available with the following electric actuators:
  - **DN 15 to 50**  
Type 5824 or Type 5825 Electric Actuator
  - **DN 65 to 100**  
Type 3374 Electric Actuator
  - **DN 125 to 250**  
Type 3274 Electrohydraulic Actuator

**Type 5824 · Type 5825 · Type 3374 Electric Actuator**  
**Type 3274 Electrohydraulic Actuator**

**Technical data** **Data Sheets T 5824 EN · T 8331 EN**  
**T 8340 EN · T 3018 EN**

| Type                      | 5824 - .../<br>5825 - ...   | 3374 - ...            | 3274 - ...                 |
|---------------------------|-----------------------------|-----------------------|----------------------------|
| For valve sizes ...       | DN 15 to 50                 | DN 65 to 100          | DN 125 to 250              |
| Electrical connection     | 24 V, 50 Hz or 230 V, 50 Hz | 230 V, 50/60 Hz ±10 % |                            |
| Perm. ambient temperature | 0 to 50 °C                  | 5 to 60 °C            | -35 <sup>1)</sup> to 60 °C |

<sup>1)</sup> With heating

### Type 42-36 E

- Flow regulator with closing actuator for installation in the flow or return flow pipe
- Type 2423 Valve with restriction and Type 2426 Diaphragm Actuator

**Technical data** **Data Sheet T 3015 EN**  
**T 3018 EN**

|  |                               |
|--|-------------------------------|
| Nominal size   | DN 15 to 250                  |
| Nominal pressure   | PN 16 to 40                   |
| Flow set point ranges with upper differential pressure of 0.2 or 0.5 bar | 0.05 to 220 m <sup>3</sup> /h |
| Type 2231/2232 Temperature Regulator Set point ranges                    | -10 to +250 °C                |
| Temperature ranges Liquids   | Up to 150 °C                  |

### Pilot-operated universal regulators

**Type 2334 · Pressure, differential pressure, flow rate, temperature regulator or combined regulators, optionally with additional electric actuator**

- Single-seated globe valve with flanged end connections
- Wide control range and high useable rangeability at low pressure loss
- Suitable for district heating plants in accordance with DIN 4747-1 (requirements stipulated by AGFW (German District Heating Association) concerning components in house substations)

**Technical data** **Data Sheet T 3210 EN**

|                         |                          |
|-------------------------|--------------------------|
| Set point ranges        | Depending on pilot valve |
| Nominal size            | DN 65 to 400             |
| Nominal pressure        | PN 16 to 40              |
| Temperature ranges      |                          |
| Water and other liquids | Up to 150 °C             |
| Non-flammable gases     | Up to 80 °C              |

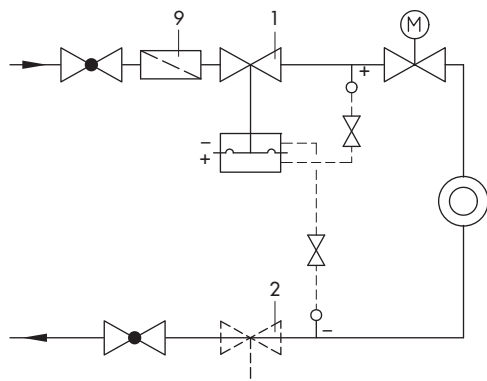


Type 42-36 E Flow Regulator with  
Type 5825 Actuator

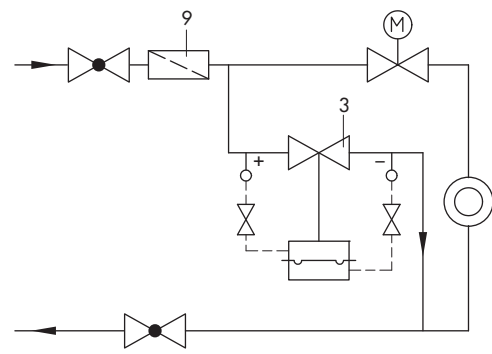


Type 42-36 E Flow Regulator with  
Type 3374 Actuator

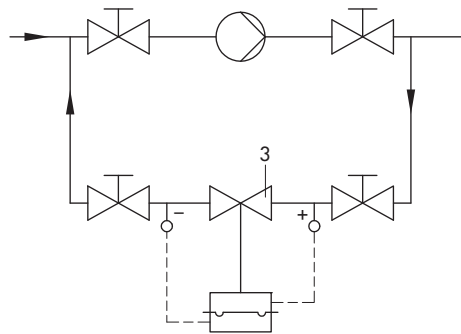
Fig. 7 · Combined regulators with additional electric actuator



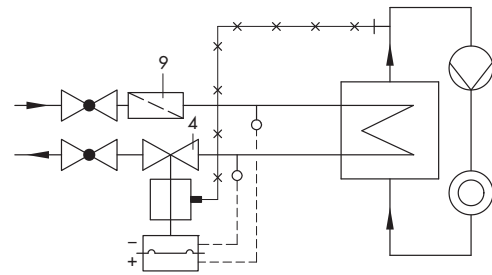
Differential pressure control in the flow or return flow pipe of a heating or cooling system



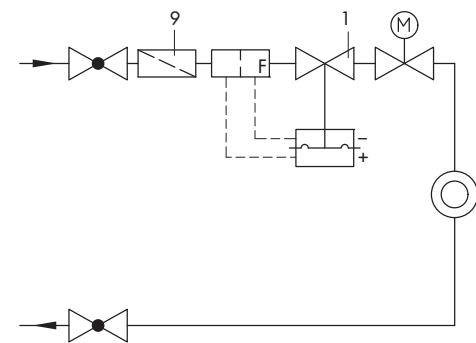
Differential pressure control in the short-circuit pipe of a heating or cooling system



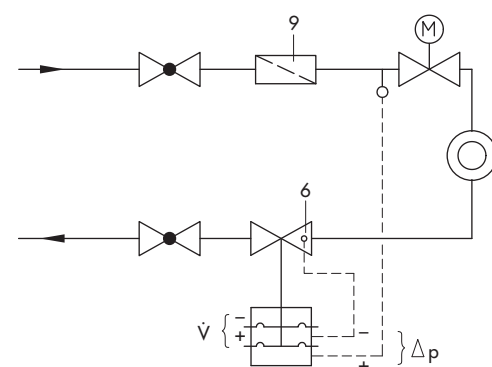
Differential pressure control in the bypass pipe of a centrifugal pump



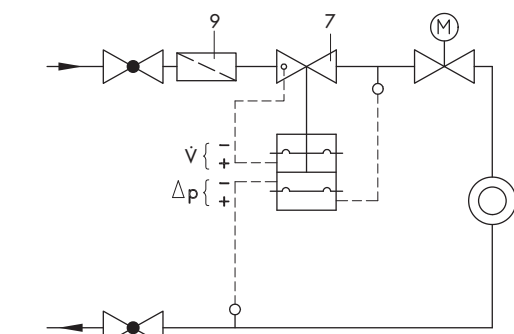
Differential pressure and temperature control



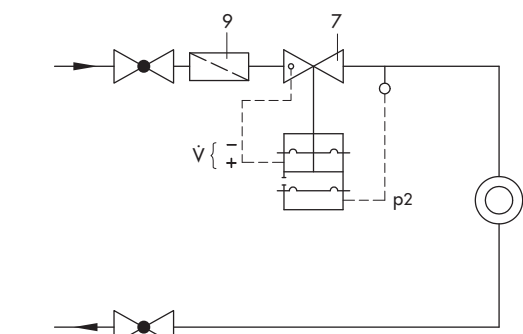
Flow rate control with external orifice plate



Combined flow rate and differential pressure control in the return flow pipe of a heating or cooling system



Combined flow rate and differential pressure control in the flow pipe of a heating or cooling system



Combined flow rate and pressure control

Legend for the figures

- 1 Type 42-24 B or 42-28 B
- 2 Type 42-24 A or 42-28 A
- 3 Type 42-20/42-25

- 4 Type 42-24 A/42-28 A DoT
- 6 Type 42-37
- 7 Type 42-39
- 9 SAMSON strainer

Fig. 8 · Typical applications







SAMSON AG · MESS- UND REGELTECHNIK  
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany  
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507  
Internet: <http://www.samson.de>

**T 3000 EN**

2012-12