

Flow Regulator Type 42-36 E

with additional electric actuator

Type 5824, Type 5825, Type 3374 and Type 3274



Type 42-36 E Flow Regulator
with Type 5825 Actuator



Type 42-36 E Flow Regulator with
Type 3374 Actuator

Fig. 1 · Flow regulators

Mounting and Operating Instructions

EB 3018 EN

Edition December 2010



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Definitions of the signal words used in these instructions

CAUTION!

indicates a hazardous situation which, if not avoided, may result in injury.

NOTICE

indicates a property damage message.

Note: *Supplementary explanations, information and tips*

General safety instructions



- ▶ *The regulator devices must be installed, started up and serviced by fully trained and qualified personnel only, observing the accepted industry codes and practices. Make sure employees or third persons are not exposed to any danger.
All safety instructions and warnings in these instructions, particularly those concerning installation, start-up and maintenance must be observed.*
- ▶ *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 relevant standards.*
- ▶ *The regulator complies with the requirements of the European Pressure Equipment Directive 97/23/EC. The declaration of conformity issued for a valve bearing the CE marking includes information on the applied conformity assessment procedure.
The declaration of conformity can be provided on request.*
- ▶ *For appropriate operation, make sure that the regulator is only used in applications where the operating pressure and temperatures do not exceed the operating values based on the sizing data submitted in the order.*
- ▶ *Note that the manufacturer does not assume any responsibility for damage caused by external forces or any other external factors.*
- ▶ *Any hazards which could be caused in the regulator by the process medium or operating pressure are to be prevented by means of appropriate measures.*
- ▶ *Proper shipping and appropriate storage are assumed.*

Typetesting



*The Types 5825, 3374 and 3274 Electric Actuators with fail-safe action are typetested in conjunction with the Type 2423 Valve according to DIN EN 14597 by TÜV (German Technical Inspectorate).
Register numbers available on request.*

1 Design and principle of operation

The device combinations consist of a Type 42-36 Flow Regulator and a Type 5824/5825, Type 3374 or Type 3274 Electric Actuator (depending on the nominal valve size).

Version

Type 42-36 E · Flow regulator DN 15 to 250 consisting of a Type 2426 Diaphragm Actuator and a Type 2423 E Valve (balanced by a bellows or a diaphragm) with orifice (restriction) to adjust the flow rate set point. The regulator can be installed in the flow pipe or return flow pipe.

The valves are equipped with an adapter for connection to the electric actuator. This allows the control signal from an electric control device to be applied to change the position of the orifice in order to attain additional temperature control.

The listed flow rate set point ranges (Figs. 2, 4, 6 and 7) are based on water at an upper differential pressure of 0.2 or 0.5 bar.

Note: *The mounting and operating instructions for the basic regulators listed in Table 1 apply.*

Table 1 · Technical data

Electric Actuator Type ...	Mounting and Operating Instructions
3274	EB 8340 EN
5824 or 5825	EB 5824 EN
3374	EB 8331-1 EN
Regulator Type ...	
42-36	EB 3015 EN

2 Installation

2.1 Mounting position

Install the regulators in horizontal pipelines. Make sure the medium flows through the valve in the direction indicated by the arrow.

The electric actuator must be located above the valve body. When insulating the valve (DN 15 to 50), do not insulate the electric actuator and the coupling nut as well! Make sure the permissible ambient temperature is not exceeded, especially at the actuator stem. If necessary, install an intermediate insulating piece (order no. 1990-1712) to protect the actuator. The insulation should not go further than approx. 25 mm above the top of the valve body.

2.2 Additional installation units

2.2.1 Strainer

A strainer installed in the flow pipe prevents foreign matter and dirt particles in the medium from entering the regulator. The SAMSON product range includes the Type 2 N/2 NI Strainer (refer to Data Sheet T 1015 EN).

- ▶ Make sure the direction of medium flow corresponds with the direction indicated by the arrow on the strainer.
- ▶ The filter element must be suspended downwards or at the side in steam applications
- ▶ Remember to leave enough space to remove the filter element.

2.2.2 Shut-off valve

Install a hand-operated shut-off valve both upstream of the strainer and at the outlet of the return flow pipe to be able to shut down the plant for cleaning and maintenance, and when the plant is not used for longer periods of time.

2.2.3 Pressure gauge

To monitor the pressures in the plant, install a pressure gauge both upstream and downstream of the regulator.

Check the installed strainer (e.g. by measuring the pressure drop) afterwards.
Clean the strainer, if necessary.

- ▶ **Pressure test** · Make sure that the diaphragm actuator is not damaged by the test pressure. The maximum permissible pressure in the actuator must not be exceeded. Interrupt external control lines connected to the actuator.

3 Start-up

Refer to Fig. 3 on page 8, Fig. 5 on page 10 and Fig. 8 on page 14.

First start up the regulator after mounting all the components, e.g. valve, actuator and control lines.

Before start-up, check the actuator to ensure it is connected properly.

How to proceed:

- ▶ Fill the plant slowly on start-up. Make sure the orifice (2.7) is open (∩: open orifice). If necessary, use the electric actuator to open the orifice.
- ▶ Open control lines.
- ▶ **Rinsing the plant** · After filling the plant, first completely open the consumers and rinse the pipeline at full flow rate for several minutes with an open orifice (2.7).

CAUTION!

The electric actuators are designed for use in electrical power installations. Strictly observe the relevant safety regulations for wiring and maintenance work.

*Do **not** remove the covers under any circumstances when making adjustments on live parts!*

NOTICE

Depressurize the sections of the plant that are connected to the control lines prior to removing or installing the regulator. If this is not possible, shut off the control lines.

Protect the regulator against frost if it is used to control freezing media.

Only use disconnecting devices that are protected against accidental or inadvertent reconnection.

Only remove actuators with fail-safe action "Actuator stem extends" after the actuator has been disconnected from the power supply.

3.1 Set point adjustment

Set point adjustment on the Type 42-36 Regulator is described in EB 3015 EN.

The set point for the flow rate can either be adjusted when the electric actuator is mounted or before it is mounted.

- ▶ Adjust the set point for the flow rate at the orifice (2.7) on the valve.
Turn **counterclockwise** ⤴ to open the orifice.
Turn clockwise ⤵ to close the orifice.

Additional ways of adjustment at the electric actuator are described in the corresponding mounting and operating instructions (Table 1 on page 4).

In addition to the descriptions in the mounting and operating instructions of the basic devices, observe the instructions described in sections 3.1.1 to 3.1.3 to adjust the flow rate.

3.1.1 DN 15 to 50 with Type 5824 or Type 5825 Actuator

Adjustment without actuator (Fig. 3)

1. Close orifice (2.7). To do this, loosen the locking screw (2.6) and turn the set point adjuster (2.3) clockwise as far as it will go.
2. Determine the turns required to achieve the desired flow rate from the adjustment diagrams (Fig. 2).
3. Based on a closed orifice, adjust the flow rate set point by turning the orifice counterclockwise by the corresponding number of turns.

Flow rate set point ranges for water · Type 2423 E · Balanced by a bellows

Set point ranges in m ³ /h	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
Upper differential pressure at the restriction $\Delta p_{\text{restriction}} = 0.2 \text{ bar}$	0.5 to 2	0.5 to 3	0.8 to 3.5	2 to 7	3 to 11	3 to 16
Upper differential pressure at the restriction $\Delta p_{\text{restriction}} = 0.5 \text{ bar}$	0.8 to 3	0.8 to 4.5	1.2 to 5.3	3 to 9.5	4.5 to 16	4.5 to 24

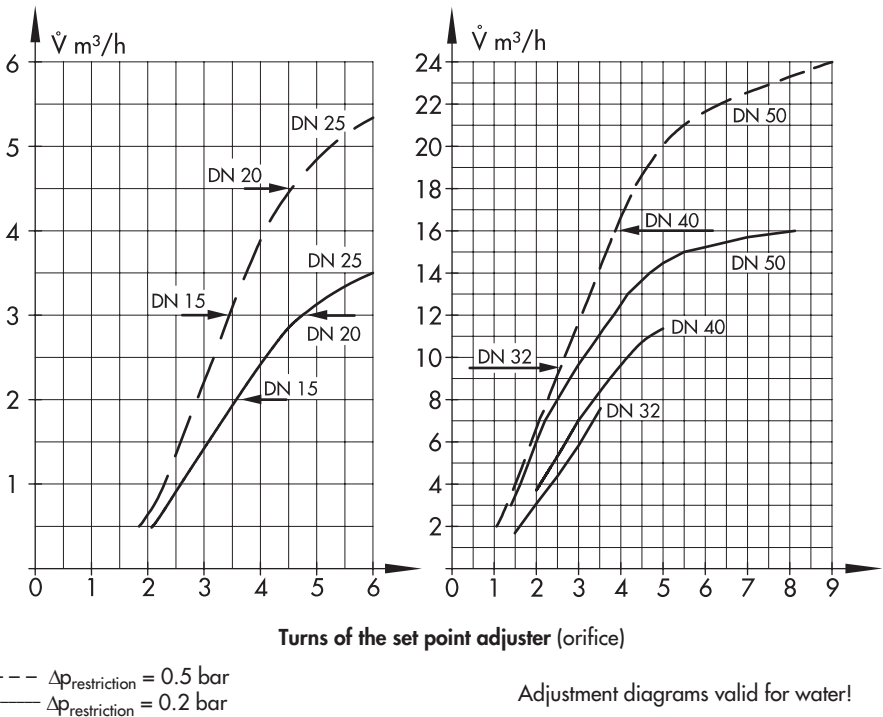


Fig. 2 · Adjustment diagrams for Type 2423 E balanced by a bellows, DN 15 to 50

4. Check the flow rate and correct it if necessary. Secure the adjustment with the locking screw (2.6).
5. Retract the actuator and place it on the orifice connection and fasten it using the coupling nut (tightening torque: 20 Nm).

Adjustment with Type 5824/5825 Actuator (Fig. 3)

- ▶ Refer to EB 5824 EN for more details on the electric actuator

With Type 5824 Actuator

1. Retract the actuator stem by turning the handwheel counterclockwise or by applying the appropriate control signal from the control device.
2. Continue as described for adjustment without actuator in steps 1 to 5.

With Type 5825 Actuator

1. Switch the control device to manual operating mode. Adjust the control signal so that the actuator stem retracts all the way and the spring mechanism is compressed.

If there is no control signal, the actuator can be adjusted using the manual override. For manual adjustment, remove the front cover. Insert a 4 mm hexagonal wrench into the red actuating shaft and turn it counterclockwise. Turn it only counterclockwise and only up to the point where the torque switch in the actuator is activated.

Once the solenoid has been released, the spring mechanism pushes the actuator stem back into its fail-safe position.

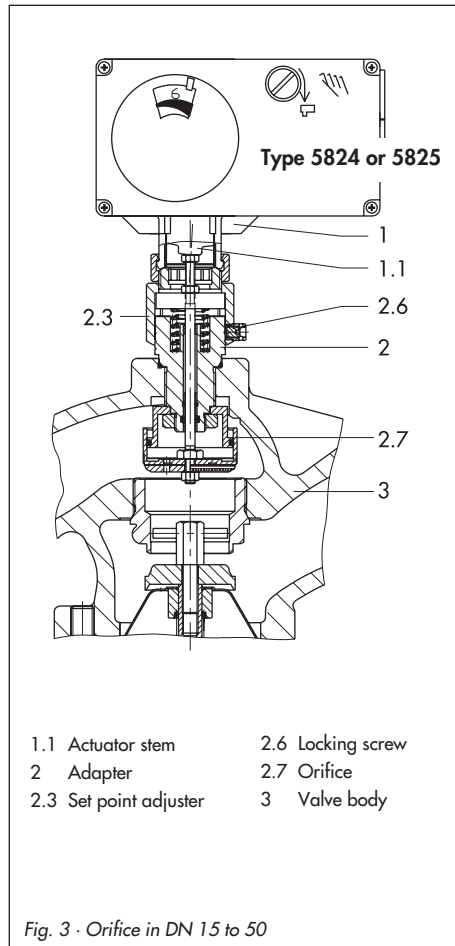


Fig. 3 · Orifice in DN 15 to 50

3. Continue as described for adjustment without actuator in steps 1 to 5.

3.1.2 DN 65 to 100 with Type 3374 Actuator

Adjustment without actuator (Fig. 5)

1. Thread the lock nut (2.2) upwards on the threaded rod (2.1).
2. Close orifice (2.7). To do this, loosen the locking screw (2.6) and turn the set point adjuster (2.3) clockwise as far as it will go.
3. Determine the turns required to achieve the desired flow rate from the adjustment diagrams (Fig. 4).

Flow rate set point ranges for water · Type 2423 E · Balanced by a bellows

Set point ranges in m ³ /h	DN 65	DN 80	DN 100
Upper differential pressure at the restriction $\Delta p_{\text{restriction}} = 0.2 \text{ bar}$	5 to 28	7 to 35 ¹⁾	10 to 63
Upper differential pressure at the restriction $\Delta p_{\text{restriction}} = 0.5 \text{ bar}$	7.5 to 40	10 to 55	15 to 90

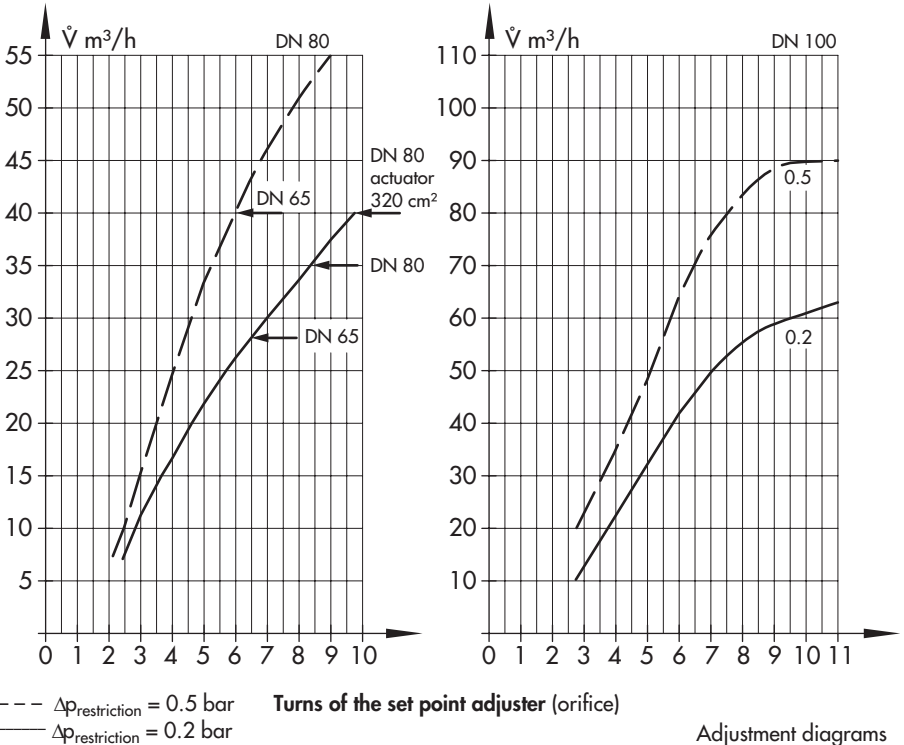


Fig. 4 · Adjustment diagrams for Type 2423 E balanced by a bellows, DN 65 to 100

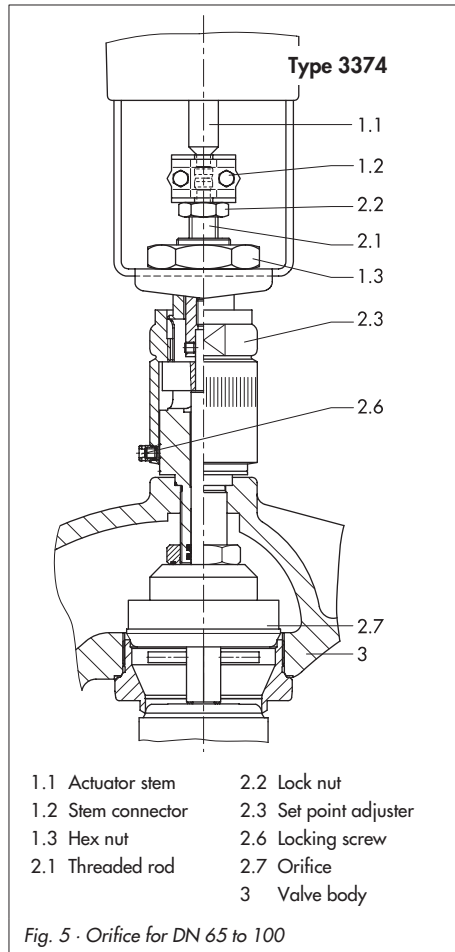
4. Turn the set point adjuster (2.3) counterclockwise by the corresponding number of turns.
5. Thread the lock nut (2.2) clockwise as far as it will go onto the threaded rod (2.1). The orifice opens until the adjusted set point is reached.
6. Check the flow rate and correct it if necessary. Secure the adjustment with the locking screw (2.6).
7. Retract the actuator stem (1.1) using the manual override. Place the actuator on the orifice connection. Secure it by tightening the hex nut (1.3) to 150 Nm.
8. Extend the actuator stem all the way to the threaded rod (2.1) using the manual override.
9. Position the stem connector (1.2) and screw tight.
10. Thread the lock nut (2.2) all the way to the top toward the stem connector (1.2) and lock or secure in place.

Adjustment with Type 3374 Actuator

(Fig. 5)

► **For more details on the Type 3274 Actuator, refer to EB 8331-1 EN**

1. Extend the actuator stem (1.1) all the way to close the orifice (2.7) using the manual override (4 mm hexagon wrench) or by applying an electric control signal . The lock nut (2.2) must be threaded upward against the stem connector (1.2).
2. Loosen the locking screw (2.6). Turn the set point adjuster (2.3) clockwise all the way (close the orifice).



3. Determine the turns required to achieve the desired flow rate from the adjustment diagrams. Turn the set point adjuster (2.3) counterclockwise the required number of turns (to open the orifice).

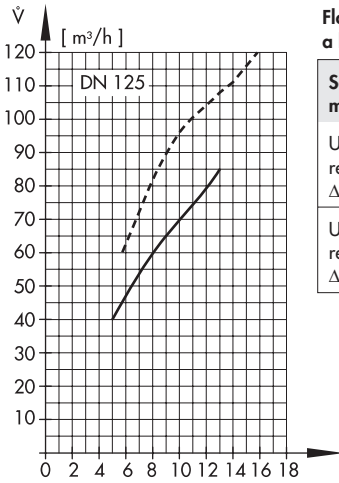
4. Secure the adjustment with the locking screw (2.6).

Manual changes or changes in the control signal to retract actuator stem now cause the orifice to open until the adjusted set point is reached.

3.1.3 DN 125 to 250 with Type 3274 Actuator

Adjustment without actuator (Fig. 8)

1. Thread the lock nut (2.2) toward the top to the head of the threaded rod (2.1).
2. Press the threaded rod (2.1) downward to close the orifice.
3. Loosen the locking screw (2.6). Turn the set point adjuster (2.3) until the scale reading 0 matches the red groove mark (2.5).
4. Thread the lock nut (2.2) downward against the set point adjuster (2.3). Do not twist the threaded rod. Hold the threaded rod (2.1) stationary at the flattened spot using a wrench.
5. Determine the required scale value for the desired flow rate using the adjustment diagrams on page 12 and 13.
6. Turn the hex nut on the set point adjuster (2.3) until the previously determined scale reading matches the red groove mark (2.5) on the reference ring.
7. Check the flow rate using a flow meter (integrated in the heat meter) and readjust it, if necessary.
8. Secure the adjustment by tightening and leading the locking screw (2.6).
9. Thread the lock nut (2.2) on the threaded rod (2.1) upward toward the head.
10. Extend the actuator stem (1.1) manually. Place the actuator on the yoke and screw tight.
11. Position the stem connector (1.2) and screw tight.
12. Thread the lock nut all the way to the top toward the stem connector and lock in place.



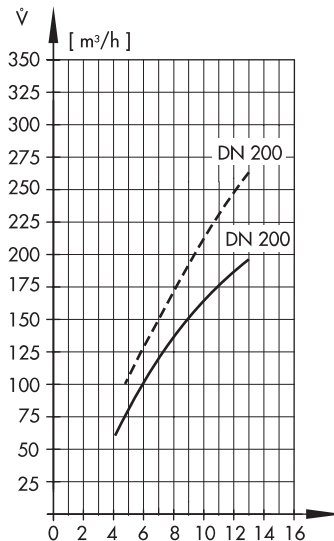
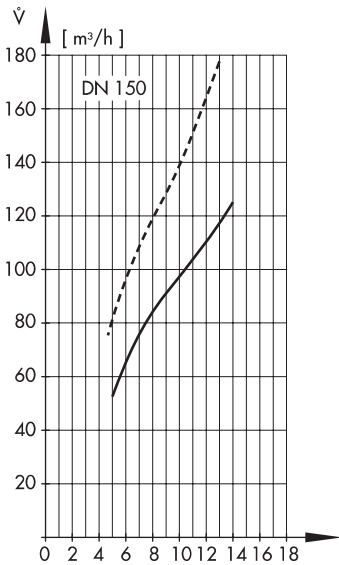
Flow rate set point ranges for water · Type 2423 E · Balanced by a bellows

Set point ranges in m ³ /h	DN 125	DN 150	DN 200	DN 250
Upper diff. press. at restriction $\Delta p_{\text{restriction}} = 0.2 \text{ bar}$	40 to 80	50 to 120	70 to 180	90 to 220
Upper diff. press. at restriction $\Delta p_{\text{restriction}} = 0.5 \text{ bar}$	60 to 120	75 to 180	100 to 260	120 to 300

--- $\Delta p_{\text{restriction}} = 0.5 \text{ bar}$
 — $\Delta p_{\text{restriction}} = 0.2 \text{ bar}$

Turns of the set point adjuster (orifice)

Adjustment diagrams for DN 250 available on request!



Turns of the set point adjuster (orifice)

Adjustment diagrams valid for water!

Fig. 6 · Adjustment diagrams for Type 2423 E **balanced by a bellows**, DN 125 to 250

Adjustment with Type 3274 Actuator (Fig. 8)

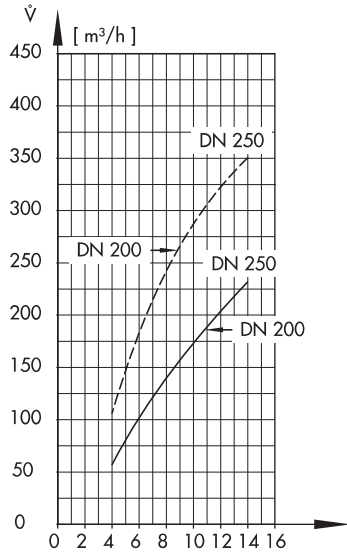
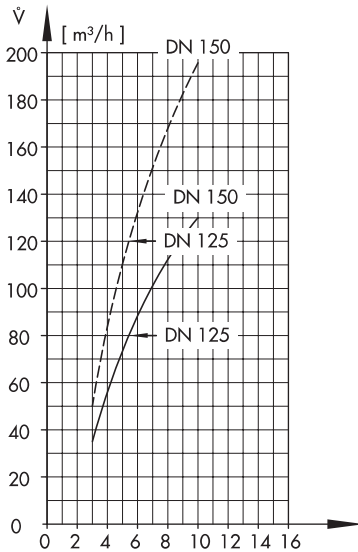
▶ Refer to EB 8340 EN for more details on the Type 3274 Electric Actuator

1. Close orifice. To do so, extend the actuator stem (1.1) of the actuator (1) by pressing the release button of the electric
2. Remove the stem connector (1.2) and retract the actuator stem all the way using the override function.

override (or of the control device, if set to manual position) all the way to close the orifice (2.7).

Flow rate set point ranges for water · Type 2423 E · Balanced by a diaphragm

Set point ranges in m ³ /h	DN 125	DN 150	DN 200	DN 250
Upper differential pressure at the restriction $\Delta p_{\text{restriction}} = 0.2 \text{ bar}$	40 to 80	50 to 120	70 to 180	90 to 220
Upper differential pressure at the restriction $\Delta p_{\text{restriction}} = 0.5 \text{ bar}$	60 to 120	75 to 200	100 to 260	120 to 350



Turns of the set point adjuster (orifice)

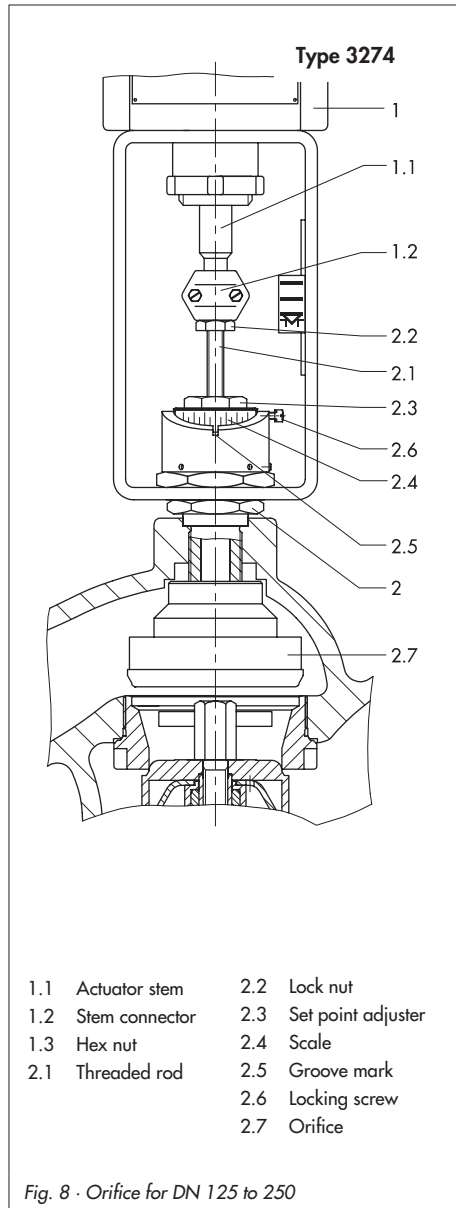
DN 125, DN 150 · A = 320 cm²
 $\Delta p_{\text{restriction}} = 0.2 \text{ bar}$ · Balanced by a diaphragm

DN 200, DN 250 · A = 640 cm²
 $\Delta p_{\text{restriction}} = 0.2 \text{ bar}$ · Balanced by a diaphragm

Adjustment diagrams valid for water!

Fig. 7 · Adjustment diagrams for Type 2423 E **balanced by a diaphragm**, DN 125 to 250

3. Thread the lock nut (2.2) downward against the set point adjuster (2.3). Do not twist the threaded rod. Hold the threaded rod (2.1) stationary at the flattened spot using a wrench.
4. Determine the required scale value for the desired flow rate using the adjustment diagrams (Figs. 6 and 7).
5. Loosen the locking screw (2.6). Turn the hex nut on the set point adjuster (2.3) until the previously determined scale reading matches the red groove mark (2.5) on the reference ring.
6. Check the flow rate using a flow meter (integrated in the heat meter) and readjust it, if necessary.
7. Secure the adjustment by tightening and leading the locking screw (2.6).
8. Extend the actuator stem (1.1) all the way using the override function.
9. Position the stem connector (1.2) and screw tight.
10. Slightly retract the actuator stem so that the lock nut (2.2) can move. Turn the lock nut upward in the direction of the stem connector and lock or secure into place.



4 Customer service

Should any malfunctions or any defect occur, SAMSON's After-Sales Service is prepared to help you.

Addresses of SAMSON subsidiaries, agencies and service centers are listed in the product catalogs and in the Internet at www.samson.de.

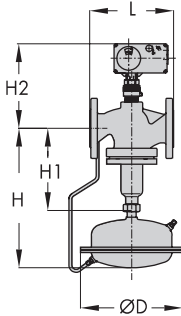
To allow SAMSON to find the fault and to have an idea of the installation situation, specify the following details (refer to the nameplate):

- ▶ Type and nominal size
- ▶ Order number and model number
- ▶ Upstream and downstream pressure
- ▶ Flow rate in m³/h
- ▶ Min. and max. flow rates
- ▶ Has a strainer been installed?
- ▶ Sketch of the installation

5 Dimensions and weights

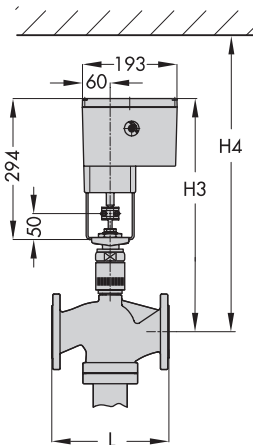
Dimensional diagrams · Type 2423 E Valve balanced by a bellows · DN 15 to 250

DN 15 to 50



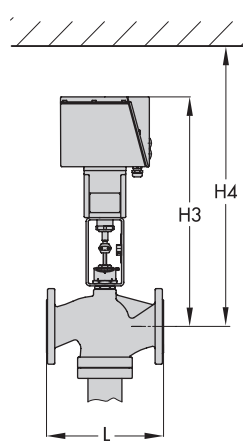
Type 42-36 E with
Type 5824/5825 Actuator

DN 65 to 100



Type 42-36 E with
Type 3374 Actuator

DN 125 to 250



Type 42-36 E with
Type 3274 Actuator

Fig. 9 · Dimensions of regulators, Type 2423 E Valve balanced by a bellows

Table 2 · Dimensions in mm and weights in kg · Type 2423 E Valve balanced by a bellows

Nominal size	DN	15	20	25	32	40	50	65	80	100	125	150	200	250
Length L		130	150	160	180	200	230	290	310	350	400	480	600	730
Height H1		225						300	355	460	590	730		
Height H2	Other materials	220			240			-						
	Forged steel 1.4571	218	-	240	-	260	266	-						
Height H3		-						520	540	680	710	775	805	
Height H4		-						820	890	830	860	975		
Type 42-36 E Flow Regulator														
Height H		390						465	520	625	765	895		
Diaphragm actuator		∅ D = 225 mm, A = 160 cm ² 2)									∅ D = 285 mm, A = 320 cm ² 3)			
Weight for PN 16 1) in kg		13.5	14	15	21.5	22	24.5	51	56	71	135	183	437	497

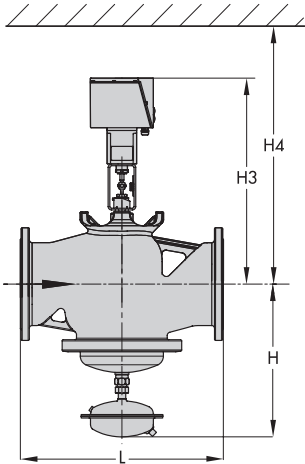
1) +10 % for cast steel PN 40 and spheroidal graphite iron PN 25

2) Optionally with actuator A = 320 cm² for DN 65 to 100. For regulators with double adapter (see T 3019 EN) for DN 65 to 100, actuator 320 cm² recommended

3) Optionally with actuator A = 640 cm² and ∅ D = 390 mm

Dimensional diagrams · Type 2423 E Valve balanced by a diaphragm · DN 125 to 250

Type 42-36 E with Type 3274 Electrohydraulic Actuator



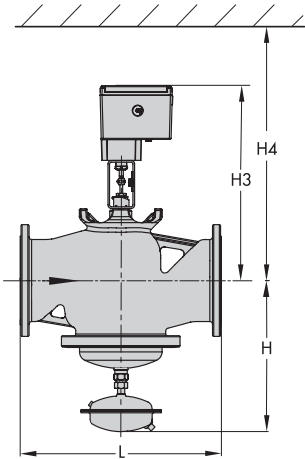
Dimensions in mm and weights in kg

With Type 3274 Actuator

Nominal size DN	125	150	200	250
Length L	400	480	600	730
Height H	450	475	545	545
Height H3	680	710	825	825
Height H4	830	860	975	975
Weight ¹⁾ , approx. kg	100	120	300	320

¹⁾ Based on cast iron (EN-JL1040), other materials +10 %

Typ 42-36 E with Type 3374 Electric Actuator



Dimensions in mm and weights in kg

With Type 3374-15 Actuator

Nominal size DN	125	150	200	250
Length L	400	480	600	730
Height H	450	475	545	545
Height H3	510	595	660	690
Height H4	860	950	1010	940
Weight ¹⁾ , approx. kg	90	110	290	310

¹⁾ Based on cast iron (EN-JL1040), other materials +10 %

Fig. 10 · Dimensions of regulators, Type 2423 E Valve balanced by a diaphragm

6 Technical data

Table 3 · Technical data · Valves · All pressures (gauge) in bar

Type 2423 E Valve · Balanced by a bellows														
Nominal size	DN	15	20	25	32	40	50	65	80	100	125	150	200	250
Nominal pressure	PN 16, 25 and 40 (acc. to DIN EN 12516-1)													
Max. medium temperature	150 °C													
Max. ambient temperature	50 °C													
Set point (upper differential pressure at restriction)	0.2 bar · 0.5 bar													
Type 2423 E Valve · Balanced by a diaphragm														
Nominal size	DN 125 to 250													
Nominal pressure	PN 16, 25 and 40 (acc. to DIN EN 12516-1)													
Max. medium temperature	150 °C													
Max. ambient temperature	50 °C													
Set point (upper differential pressure at restriction)	0.2 bar · 0.5 bar													

Table 4 · K_{VS} coefficients, z values and max. permissible differential pressures

Type 2423 E Valve · Balanced by a bellows														
Nominal size DN	15	20	25	32	40	50	65	80	100	125	150	200	250	
Travel	10 mm					16 mm				22 mm				
K_{VS} coefficient	4	6.3	8	16	20	32	50	80	125	190	280	420	500	
z value	0.65	0.6	0.55		0.45	0.4		0.35				0.3		
Max. perm. diff. pressure Δp	25 bar						20 bar		16 bar		12 bar	10 bar		
Type 2423 E Valve · Balanced by a diaphragm														
Nominal size DN					125			150			200			250
K_{VS} coefficient in m ³ /h	35 mm travel				250			380			650			800
z value							0.35				0.3			
Max. perm. diff. pressure Δp							12 bar				10 bar			



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