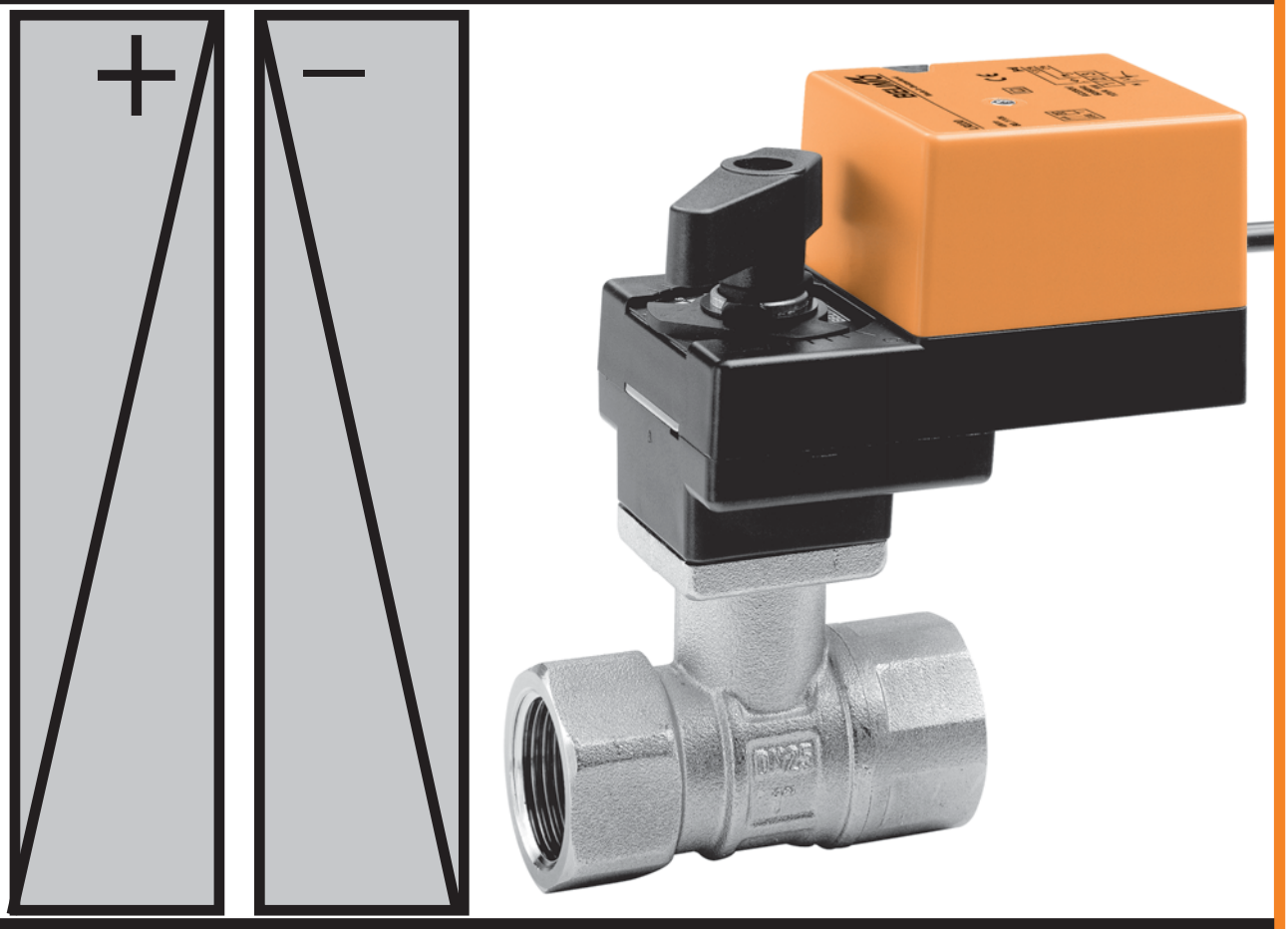
5. R-9

Product information

Ball valves with rotary actuators

R



5.R-.. Characterized control valves, open-close ball valves and rotary actuators

Characterized control valves DN 10...DN 80
- With equal-percentage characteristic
- For modulating control functions

Open-close ball valves DN 10...DN 80
- For shut-off or change-over functions

Rotary actuators
- For controls: open-close, 3-point or modulating

5.NR-.. Rotary actuators for mixing valves

- **For mixing valves up to DN 80**
- **For controls: 3-point, modulating**

Suitable mixing valves:
ESBE, Termonix, Pommerening, Dumserwerk, Lovato, Landis&Staefa, Oventrop, Meibes, Wita, Holter, Satchwell, Centra and other makes

Important notes

Using Belimo actuators

The actuators described in this publication are intended for use in the open and closed water circuits of heating, ventilating and air-conditioning systems. Use of the actuators with other liquid or gaseous fluids on request.

Flow rates

The recognized rules should be applied when determining the flow characteristic of final controlling elements.

Safety notes

TR.. (pages 14, 15, 22 and 23):

The housing may only be opened at the manufacturer‘s site. It does not contain any parts that can be replaced or repaired by the user.
If the cable has to be replaced, it is essential to ensure that the insulation is only stripped over a maximum length of 50 mm.

LR.. (pages 16, 26 and 27):

The housing may only be opened at the manufacturer‘s site. It does not contain any parts that can be replaced or repaired by the user.

NR.. (pages 17, 18, 24, 25 and 28):

The motor cable cannot be replaced. If the lead is damaged, the new connection should be made using the cable gland. Maximum stripped length of insulation: 50 mm.

NR24-3-S, NR230-3-S (pages 24 and 25):

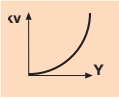
If the auxiliary switch cable has to be replaced, it is essential to ensure that the insulation is only stripped over a maximum length of 50 mm.

ENG-93001-93530-09.04 • Subject to modifications

Table of contents

ENG-93001-93530-09.04 • Subject to modifications

Characterized control valves and rotary actuators for modulating control



Technical characteristics of characterized control valves for modulating control of cold and hot water

Characteristic: equal percentage

For more technical data: refer to pages 8 and 9

Rated pressure: 4140 kPa (DN10…DN32)
2760 kPa (DN32…DN50)

Connection	Internal thread																							
k_{VS} [m³/h]	0.25	0.4	0.63	1	1.6	0.63	1	1.6	2.5	4	6.3	4	6.3	8.6	6.3	10	16	10	16	16	25	25	40
DN [mm]	10	10	10	10	10	15	15	15	15	15	15	20	20	20	25	25	25	32	32	40	40	50	50
2-way	R205K	R206K	R207K	R208K	R209K	R209	R210	R211	R212	R213	R214	R217	R218	R219	R222	R223	R224	R229	R231	R238	R239	R248	R249
3-way	R305K	R306K	R307K	R308K	–	R309	R310	R311	R312	R313	–	R317	R318	–	R322	R323	–	R329	R331	R338	–	R348	–

Connection	External thread																							
k_{VS} [m³/h]	0.25	0.4	0.63	1	1.6	0.63	1	1.6	2.5	4	6.3	4	6.3	8.6	6.3	10	16	10	16	16	25	25	40
DN [mm]	10	10	10	10	10	15	15	15	15	15	15	20	20	20	25	25	25	32	32	40	40	50	50
2-way	R405K	R406K	R407K	R408K	R409K	R409	R410	R411	R412	R413	R414	R417	R418	R419	R422	R423	R424	R429	R431	R438	R439	R448	R449
3-way	R505K	R506K	R507K	R508K	–	R509	R510	R511	R512	R513	–	R517	R518	–	R522	R523	–	R529	R531	R538	–	R548	–

Suitable rotary actuators, modulating, DC 0...10 V

- **TRD24-SR**, AC/DC 24 V
- **TR24-SR**, AC/DC 24 V
- **LR24-SR**, AC/DC 24 V
- **NR24-SR**, AC/DC 24 V
- **NRY24-SR**, AC/DC 24 V

Suitable rotary actuators, 3-point

- **TRD24-3**, AC 24 V
- **TR24-3**, AC 24 V
- **NR24-3**, AC 24 V
- **NR230-3**, AC 230 V

Suitable rotary actuators, emergency control function

- **LF24-SR**, AC/DC 24 V
- **AFR24-SR**, AC/DC 24 V

Connection	Flange PN 6													
k_{VS} [m³/h]	0.63	1	1.6	2.5	4	6.3	10	16	16	25	25	40	58	90
DN [mm]	15	15	15	15	15	20	25	32	40	40	50	50	65	80
2-way	R609R	R610R	R611R	R612R	R613R	R618R	R623R	R631R	–	R639R	–	R649R	R664R	R679R
3-way	R709R	–	R711R	–	R713R	R718R	R723R	R731R	R738R	–	R748R	–	–	–

Suitable rotary actuators, modulating, DC 0...10 V

- **TR24-SR**, AC/DC 24 V
- **LR24-SR**, AC/DC 24 V
- **NR24-SR**, AC/DC 24 V
- **NRY24-SR**, AC/DC 24 V

Suitable rotary actuators, 3-point

- **TR24-3**, AC/DC 24 V
- **NR24-3**, AC 24 V
- **NR230-3**, AC 230 V

Suitable rotary actuators, emergency control function

- **LF24-SR**, AC/DC 24 V
- **AFR24-SR**, AC/DC 24 V

ENG-93001-93530-09.04 • Subject to modifications

Open-close ball valves and rotary actuators for shut-off or change-over functions

Technical characteristics of open-close ball valves for cold and hot water

Rated pressure: 4140 kPa (DN15…DN32)
2760 kPa (DN32…DN50)

For more technical data: refer to pages 10 and 11

Connection	Internal thread						
k_{VS} [m³/h]	8.6	21	26	16	32	32	49
DN [mm]	15	20	25	32	32	40	50
2-way	R215	R220	R225	R230	R232	R240	R250
3-way	R315	R320	R325	R330	R332	R340	R350

Connection	External thread						
k_{VS} [m³/h]	8.6	21	26	16	32	32	49
DN [mm]	15	20	25	32	32	40	50
2-way	R415	R420	R425	R430	R432	R440	R450
3-way	R515	R520	R525	R530	R532	R540	R550

Suitable rotary actuators, 1-wire

- **LR24(-S)**, AC/DC 24 V
- **LR230(-S)**, AC 230 V
- **NR230-1-T**, AC 230 V

Suitable rotary actuators, 2-wire

- **TR24-3**, AC 24 V
- **NR24-3(-S)**, AC 24 V
- **NR230-3(-S)**, AC 230 V

Suitable rotary actuators, emergency control function

- **LF24(-S)**, AC/DC 24 V
- **LF230(-S)**, AC 230 V
- **AFR24(-S)**, AC 24 V
- **AFR230(-S)**, AC 230 V

Connection	Flange PN 6							
k_{VS} [m³/h]	8.6	21	26	32	32	49	160	160
DN [mm]	15	20	25	32	40	50	65	80
2-way	R615R	R620R	R625R	R632R	R640R	R650R	R665R	R680R
3-way	R715R	R720R	R725R	R732R	R740R	R750R	–	–

Suitable rotary actuators, 1-wire

- **LR24(-S)**, AC/DC 24 V
- **LR230(-S)**, AC 230 V

Suitable rotary actuators, 2-wire

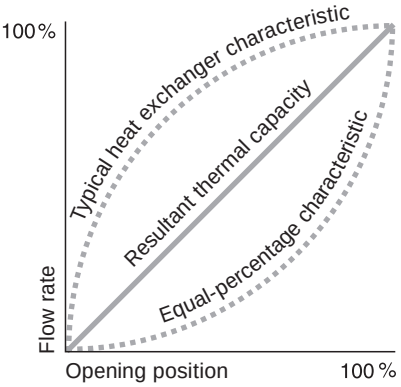
- **TR24-3**, AC 24 V
- **NR24-3(-S)**, AC 24 V
- **NR230-3(-S)**, AC 230 V

Suitable rotary actuators, emergency control function

- **LF24(-S)**, AC/DC 24 V
- **LF230(-S)**, AC 230 V
- **AFR24(-S)**, AC 24 V
- **AFR230(-S)**, AC 24 V

Ordinary ball valves are unsuitable as control devices

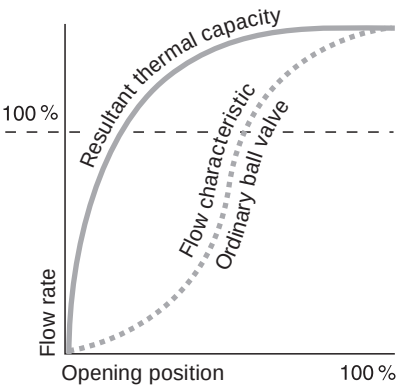
In order to ensure good stability of control, a hydraulic final controlling element must possess a flow characteristic that supplements the non-linear characteristic of the heat exchanger in the HVAC system.



Characteristics of an ideal hydraulic final controlling element

An equal-percentage valve characteristic is desirable in order to produce a linear relationship between the thermal output and the opening position of the final controlling element. This means that the flow rate increases very slowly as the final controlling element begins to open.

Unfortunately, this characteristic is severely distorted in ordinary ball valves.



Characteristic of an ordinary ball valve

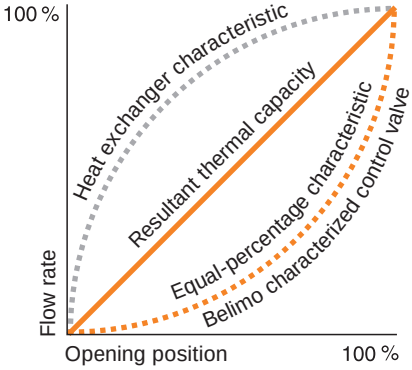
The reason for this is that an ordinary ball valve has an extremely high flow coefficient (k_{VS} value) compared with its nominal size, several times that of a comparable globe valve.

Therefore, an ordinary ball valve is not very suitable for performing control functions:

- Flow coefficient excessive due to the design
- Flow control inadequate in the part-load range

Belimo adds "characterized control" to ball valves

Belimo has succeeded in solving the problem of the distorted flow characteristic of ordinary ball valves.
A so-called "characterizing disc" in the inlet of the characterized control valve converts the valve's characteristic to the equal-percentage kind.
The side of the characterizing disc facing the ball is concave and in contact with the surface of the ball. Thus, the actual flow is regulated by the hole in the ball and by the V-shaped aperture in the characterizing disc.

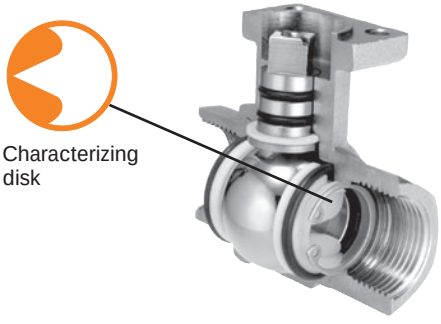


Characteristic of a Belimo characterized control valve

The k_{VS} value is reduced and corresponds approximately to that of a globe valve of comparable size. In order to avoid having to fit pipe reducers in the majority of cases, each valve size is also available with an appropriate choice of k_{VS} values.

Advantages of the Belimo characterized control valve

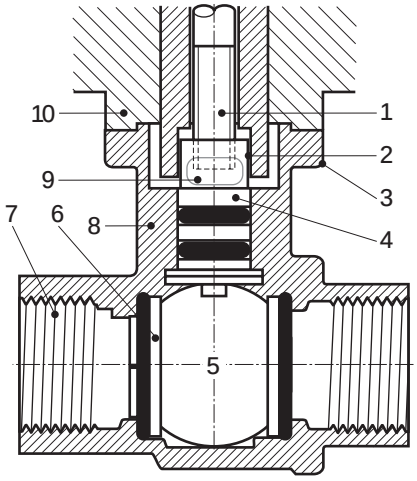
- Equal-percentage characteristic
- No initial jump in flow on opening
- Excellent stability of control thanks to the characterizing disk



- k_{VS} values similar to those of globe valves of comparable size
- Fewer pipe reducers needed
- Better part-load characteristics and less prone to vibration, greater stability of control
- Tight-sealing (2-way)

Elements of the characterized control valve

1 Simple direct mounting using a central screw. The rotary actuator can be mounted in four different positions
2 Square stem head for form-fit attachment of the rotary actuator
3 Identical mounting flange for all sizes
4 Stem with two O-ring seals for a long service life
5 Ball and stem made of stainless steel



6 Characterizing disc produces equal-percentage flow characteristic
7 Internal thread connection (ISO 7/1)
8 Forged fitting, nickel-plated brass body
9 Vent window to prevent the accumulation of condensation
10 Thermal decoupling of the actuator from the ball valve

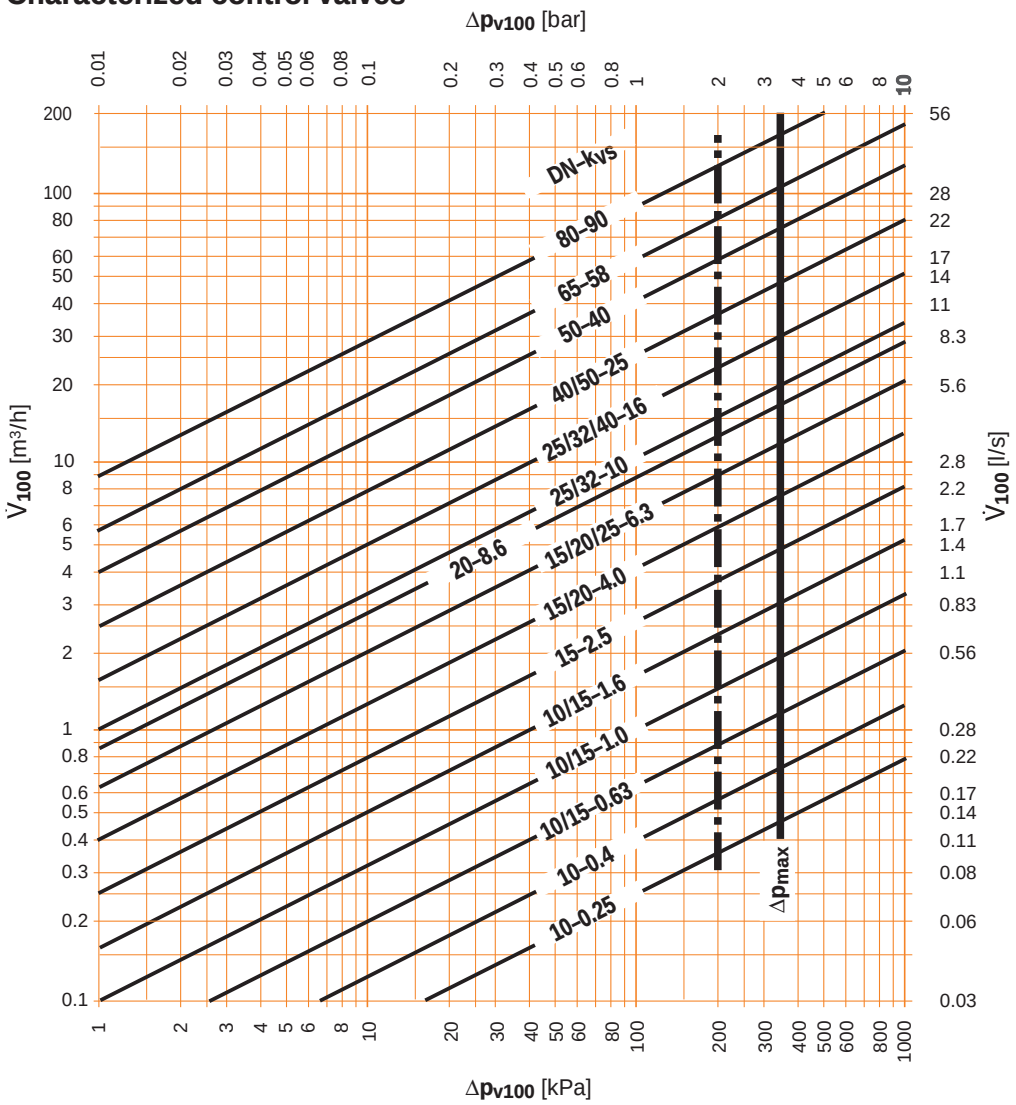
Optimum choice of k_{VS} valves of identical size

- Better controllability
- Lower installation costs

The Belimo range of characterized control valves includes 2-way and 3-way types. These are available in a variety of sizes and with a choice of k_{VS} values.
A characterized control valve is supplied as a unit complete with a suitable Belimo rotary actuator.

ENG-93001-93530-09.04 • Subject to modifications

Sizing diagram
Characterized control valves



Legend

——— Δp_{max}
Maximum permitted pressure difference for a long service life across control path A-AB referred to the whole range of opening

– · – · – Δp_{max}
For low-noise operation

Δp_{v100}
Pressure difference with ball valve fully open

$\dot{V}_{100}$
Nominal flow rate with Δp_{v100}

Formula k_{vs}

$$k_{vs} = \dot{V}_{100} \Big/ \sqrt{\frac{\Delta p_{v100}}{100}}$$

k_{VS} [m³/h]
$\dot{V}_{100}$ [m³/h]
Δp_{v100} [kPa]

Definition of Δp_S

Closing pressure at which the actuator can still seal the valve tightly allowing for the appropriate leakage rate

Sizing table
Open-close ball valves

					Connection	R2.. Internal thread R4.. External thread R6.. Flange		
Differential pressure Δp_{v100} [kPa]	0.1	1	3	10	**k_{VS}** [m³/h]	**DN** [mm]	2-way	3-way
Flow rate $\dot{V}_{100}$ [m³/h]	0.27	0.86	1.49	2.72	8.6	15	**R215 R415 R615R**	**R315 R515 R715R**
	0.66	2.1	3.6	6.6	21	20	**R220 R420 R620R**	**R320 R520 R720R**
	0.82	2.6	4.5	8.2	26	25	**R225 R425 R625R**	**R325 R525 R725R**
	0.51	1.6	2.77	5.06	16	32	**R230 R430**	**R330 R530**
	1.01	3.2	5.54	10.12	32	32	**R232 R432 R632R**	**R332 R532 R732R**
	1.01	3.2	5.54	10.12	32	40	**R240 R440 R640R**	**R340 R540 R740R**
	1.55	4.9	8.49	15.5	49	50	**R250 R450 R650R**	**R350 R550 R750R**
	5.05	16	27.73	50.63	160	65	**R665R**	–
	5.05	16	27.73	50.63	160	80	**R680R**	–

Selection

k_{VS} [m³/h]	DN mm	DN Inches	Type Internal thread	Type External thread	Type Flange	Suitable rotary actuators: Modulating DC 0...10 V	3-point	Emerg. control function
0.25	10	3/8"	R205K	R405K	–	TRD24-SR AC/DC 24 V	TRD24-3 AC 24 V	
0.4	10	3/8"	R206K	R406K	–			
0.63	10	3/8"	R207K	R407K	–			
1	10	3/8"	R208K	R408K	–			
1.6	10	3/8"	R209K	R409K	–			
0.63	15	1/2"	R209	R409	R609R	TR24-SR AC/DC 24 V	TR24-3 AC 24 V	
1	15	1/2"	R210	R410	R610R			
1.6	15	1/2"	R211	R411	R611R			
2.5	15	1/2"	R212	R412	R612R			
4	15	1/2"	R213	R413	R613R			
6.3	15	1/2"	R214	R414	R614R			
4	20	3/4"	R217	R417	R617R	LR24-SR AC/DC 24 V		
6.3	20	3/4"	R218	R418	R618R			
8.6	20	3/4"	R219	R419	R619R			
6.3	25	1"	R222	R422	R622R			
10	25	1"	R223	R423	R623R			
16	25	1"	R224	R424	R624R			
10	32	1 1/4"	R229	R429	–			
16	32	1 1/4"	R231	R431	R631R			
16	40	1 1/2"	R238	R438	R638R			
25	40	1 1/2"	R239	R439	R639R			
25	50	2"	R248	R448	R648R	NR(Y)24-SR AC/DC 24 V	NR24-3 AC 24 V	LF24-SR AC/DC 24 V
40	50	2"	R249	R449	R649R		NR230-3 AC 230 V	AFR24-SR AC/DC 24 V
58	65	2 1/2"	–	–	R664R			
90	80	3"	–	–	R679R			

Technical data

Flow media	Cold and hot water, Water with max. 50% volume of glycol
Temperature of medium	+5 °C...+110 °C (lower or higher temperatures on request)
Rated pressure p_s	See table below
Flow characteristic	Control path A–AB: equal percentage (to VDI/VDE 2173) DN 10...15* n(gl) = 3.2, optimized in opening range DN 20...50** n(gl) = 3.9, optimized in opening range
Rangeability	DN 10...15* Sv > 50 DN 20...50** Sv > 100
Leakage rate	Air bubble-tight (BO 1, DIN 3230 Part 3)
Pipe connector	R2.. internal thread to ISO 7/1 R4.. external thread to ISO 228/1 R6.. flange PN 6 to EN 1092/1
Differential pressure Δp_{max}	350 kPa (200 kPa for low-noise operation)
Closing pressure Δp_s	1400 kPa
Angle of rotation	90°(operating range 15°...90°)
Installation position	Upright to horizontal (in relation to the stem)
Maintenance	Maintenance-free
Materials	
Fitting	Forged, nickel-plated brass body
Valve cone	Stainless steel / R6.. chrome-plated brass
Seal	PTFE
Stem	Stainless steel / R6.. chrome-plated brass
Stem seal	EPDM
Flange ring	DN 15/20 Zinc-plated steel DN 25...80 Aluminum
Flange joint surface	Nickel-plated brass
Characterizing disk	TEFZEL

* Up to k_{vs} 2.5 ** And DN15 k_{vs} > 4

Type	Rated pressure p_s [kPa]
R205.. – R229	4140
R405.. – R429	4140
R231 – R249	2760
R431 – R449	2760
R609R – R679R	600

2-way characterized control valves DN 10...80

For modulating control of cold and hot water

Equal-percentage characteristic

Applications

- Water-side control of air handling apparatus in ventilation and air-conditioning systems
- Water-side control in heating systems

Mode of operation

The characterized control valve is operated by a rotary actuator. The actuators are controlled by a standard modulating or 3-point control system and move the ball of the valve – the throttling device – to the opening position dictated by the control signal.

Product features

Equal-percentage characteristic of the flow rate ensured by the integral characterizing disc.

Manual operation by lever after disengaging the gearing latch on the Type TR.., LR.. or NR.. rotary actuator (manual operation not possible with LF../AFR..).

Ordering

An order for an R2.. characterized control valve includes a suitable rotary actuator.

Ordering examples: (with NR24-SR)

a) R231 characterized control valve with NR24-SR
   – Rotary actuator fitted
   – Order code: R231+NR24-SR

b) R231 characterized control valve and NR24-SR
   – Rotary actuator supplied separately
   – Order code: R231/NR24-SR

Important

- **Sizing diagram for characterized control valves: page 7**
- **Dimensions: pages 12, 33, 34 and 36**
- **Installation instructions: pages 33, 34, 36**
- **Please note the information provided on pages 2 and 38 to 40 regarding use, installation, project design, commissioning and maintenance**
- **Pipe connectors can be supplied as an accessory: page 13**

ENG-93001-93530-09.04 • Subject to modifications

Selection

k_{VS} [m³/h]	DN mm	DN Inches	Type Internal thread	Type External thread	Type Flange	Suitable rotary actuators: Modulating DC 0...10 V	3-point	Emerg. control function
0.25	10	3/8"	R305K	R505K	–	TRD24-SR AC/DC 24 V	TRD24-3 AC 24 V	
0.4	10	3/8"	R306K	R506K	–			
0.63	10	3/8"	R307K	R507K	–			
1	10	3/8"	R308K	R508K	–			
0.63	15	1/2"	R309	R509	R709R	TR24-SR AC/DC 24 V	TR24-3 AC 24 V	
1	15	1/2"	R310	R510	–			
1.6	15	1/2"	R311	R511	R711R	LR24-SR AC/DC 24 V		
2.5	15	1/2"	R312	R512	–			
4	15	1/2"	R313	R513	R713R	NR(Y)24-SR AC/DC 24 V		
4	20	3/4"	R317	R517	–		NR24-3 AC 24 V	
6.3	20	3/4"	R318	R518	R718R		NR230-3 AC 230 V	
6.3	25	1"	R322	R522	–			LF24-SR AC/DC 24 V
10	25	1"	R323	R523	R723R			
10	32	1 1/4"	R329	R529	–			AFR24-SR AC/DC 24 V
16	32	1 1/4"	R331	R531	R731R			
16	40	1 1/2"	R338	R538	R738R			
25	50	2"	R348	R548	R748R			

Technical data

Flow media	Cold and hot water, Water with max. 50% volume of glycol
Temperature of medium	+5 °C...+110 °C (lower or higher temperatures on request)
Rated pressure p_s	See table below
Flow characteristic	Control path A–AB: equal percentage (to VDI/VDE 2173) DN 10...15* n(gl) = 3.2, optimized in opening range DN 20...50** n(gl) = 3.9, optimized in opening range Bypass B-AB: Linear, flow rate is 70% of k_{VS} value
Rangeability	DN 10...15* Sv > 50 DN 20...50** Sv > 100
Leakage rate	Control path A-AB: Air bubble-tight (BO 1, DIN 3230 Part 3) Bypass B-AB: Approx. 1...2% of kvs value (in relation to the highest value within the DN (e.g. R313)
Pipe connector	R3.. Internal thread to ISO 7/1 R5.. External thread to ISO 228/1 R7.. Flange PN 6 to EN 1092/1
Differential pressure Δp_{max}	350 kPa (200 kPa for low-noise operation)
Closing pressure Δp_s	1400 kPa
Angle of rotation	90° (operating range of control path A-AB 15°...90° bypass B-AB 15°...70°)
Installation position	Upright to horizontal (in relation to the stem)
Maintenance	Maintenance-free
Materials	
Fitting	Forged, nickel-plated brass body
Valve cone	Stainless steel / R7.. chrome-plated brass
Seal	PTFE
Stem	Stainless steel / R7.. chrome-plated brass
Stem seal	EPDM
Flange ring	DN 15/20 Zinc-plated steel DN 25...80 Aluminum
Flange joint surface	Nickel-plated brass
Characterizing disk	TEFZEL

* Up to k_{VS} 2.5 ** And DN15 k_{VS} > 4

Type	Rated pressure p_s [kPa]
R305.. – R329	4140
R505.. – R529	4140
R331 – R348	2760
R531 – R548	2760
R709R – R748R	600

3-way characterized control valves DN 10...50

For modulating control of cold and hot water

Equal-percentage characteristic

Applications

- Water-side control of air handling apparatus in ventilation and air-conditioning systems
- Water-side control in heating systems

Mode of operation

The characterized control valve is operated by a rotary actuator. The actuators are controlled by a standard modulating or 3-point control system and move the ball of the valve – the mixing device – to the opening position dictated by the control signal.

Product features

Equal-percentage characteristic of the flow rate ensured by the integral characterizing disc.

Manual operation by lever after disengaging the gearing latch on the Type TR.., LR.. or NR.. rotary actuator (manual operation not possible with LF../AFR..).

Ordering

An order for an R3.. characterized control valve includes a suitable rotary actuator.

Ordering examples: (with NR24-SR)

a) R318 characterized control valve with NR24-SR
   – Rotary actuator fitted
   – Order code: R318+NR24-SR

b) R318 characterized control valve and NR24-SR
   – Rotary actuator supplied separately
   – Order code: R318/NR24-SR

Important

- **Sizing diagram for characterized control valves: page 7**
- **Dimensions: pages 12, 33, 34 and 36**
- **Installation instructions: pages 33, 34, 36**
- **Please note the information provided on pages 2 and 38 to 40 regarding use, installation, project design, commissioning and maintenance**
- **Pipe connectors can be supplied as an accessory: page 13**

Selection

k_{VS} [m³/h]	DN mm	DN Inches	Type Internal thread	Type External thread	Type Flange	Suitable rotary actuators 1-wire	2-wire	Emergency control function
8.6	15	1/2"	**R215**	**R415**	**R615R**	**LR24(-S)** AC/DC 24 V, **LR230(-S)** AC 230 V, **NR230-1-T** AC 230 V	**TR24-3** AC 24 V, **NR24-3(-S)** AC 24 V, **NR230-3(-S)** AC 230 V	**LF24(-S)** AC/DC 24 V, **LF230(-S)** AC 230 V, **AFR24(-S)** AC 24 V, **AFR230(-S)** AC 230 V
21	20	3/4"	**R220**	**R420**	**R620R**			
26	25	1"	**R225**	**R425**	**R625R**			
16	32	1 1/4"	**R230**	**R430**	–			
32	32	1 1/4"	**R232**	**R432**	**R632R**			
32	40	1 1/2"	**R240**	**R440**	**R640R**			
49	50	2"	**R250**	**R450**	**R650R**			
160	65	2 1/2"	–	–	**R665R**			
160	80	3"	–	–	**R680R**			

Technical data

Flow media	Cold and hot water, Water with max. 50% volume of glycol
Temperature of medium	+5 °C...+110 °C (lower or higher temperatures on request)
Rated pressure p_s	See table below
Leakage rate	Air bubble-tight (BO 1, DIN 3230 Part 3)
Pipe connector	R2.. Internal thread to ISO 7/1 R4.. External thread to ISO 228/1 R6.. Flange PN 6 to EN 1092/1
Differential pressure Δp_{max}	1000 kPa (200 kPa for low-noise operation)
Closing pressure Δp_s	1400 kPa
Angle of rotation	90°
Installation position	Upright to horizontal (in relation to the stem)
Maintenance	Maintenance-free
Materials	
Fitting	Forged, nickel-plated brass body
Valve cone	Stainless steel / R6.. chrome-plated brass
Seal	PTFE
Stem	Stainless steel / R6.. chrome-plated brass
Stem seal	EPDM
Flange ring	DN 15/20 Zinc-plated steel DN 25...80 Aluminum
Flange joint surface	Nickel-plated brass

Type	Rated pressure p_s [kPa]
R215 – R230	4140
R415 – R430	4140
R232 – R250	2760
R432 – R450	2760
R615R – R680R	600

2-way open-close ball valves DN 15...80

Shut-off function and 2-point controls in cold and hot water circuits

Applications

For shutting off cold and hot water circuits in heating and ventilation systems on the water side or for 2-point control of these circuits.

Mode of operation

The open-close ball valve is operated by a rotary actuator. The rotary actuators are controlled by an open-close signal.

Product features

Manual operation by lever after disengaging the gearing latch on the Type TR.., LR.. or NR.. rotary actuator (manual operation not possible with LF../AFR..).

Ordering

An order for an R2.. open-close ball valve includes a suitable rotary actuator.

Ordering examples: (with NR230-3)

a) R240 open-close ball valve with NR230-3
   – Rotary actuator fitted
   – Order code: R240+NR230-3

b) R240 open-close ball valve and NR24-SR
   – Rotary actuator supplied separately
   – Order code: R240/NR230-3

Important

- **Sizing diagram for characterized control valves: page 7**
- **Dimensions: pages 12, 33, 34 and 36**
- **Installation instructions: pages 33, 34, 36**
- **Please note the information provided on pages 2 and 38 to 40 regarding use, installation, project design, commissioning and maintenance**
- **Pipe connectors can be supplied as an accessory: page 13**

ENG-93001-93530-09.04 • Subject to modifications

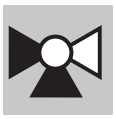
Selection

k_{VS}	DN		Type			Suitable rotary actuators								
						1-wire			2-wire			Emergency control function		
[m³/h]	mm	Inches	Internal thread	External thread	Flange	LR24(-S) AC/DC 24 V	LR230(-S) AC 230 V	NR230-1-T AC 230 V	TR24-3 AC 24 V	NR24-3(-S) AC 24 V	NR230-3(-S) AC 230 V	LF24(-S) AC/DC 24 V	LF230(-S) AC 230 V	AFR24(-S) AC 24 V	AFR230(-S) AC 230 V
8.6	15	1/2"	R315	R515	R715R										
21	20	3/4"	R320	R520	R720R										
26	25	1"	R325	R525	R725R										
16	32	1 1/4"	R330	R530	–										
32	32	1 1/4"	R332	R532	R732R										
32	40	1 1/2"	R340	R540	R740R										
49	50	2"	R350	R550	R750R										

Technical data

Flow media	Cold and hot water, Water with max. 50% volume of glycol
Temperature of medium	+5 °C...+110 °C (lower or higher temperatures on request)
Rated pressure p_s	See table below
Flow rate	Bypass B-AB: approx. 50% of k_{VS}
Leakage rate	Control path A-AB: air bubble-tight (BO 1, DIN 3230 Part 3) Bypass B-AB: 1% of k_{VS}
Pipe connector	R3.. Internal thread to ISO 7/1 R5.. External thread to ISO 228/1 R7.. Flange PN 6 to EN 1092/1
Differential pressure Δp_{max}	1000 kPa (200 kPa for low-noise operation)
Closing pressure Δp_s	1400 kPa
Angle of rotation	90°
Installation position	Upright to horizontal (in relation to the stem)
Maintenance	Maintenance-free
Materials	
Fitting	Forged, nickel-plated brass body
Valve cone	Stainless steel / R7.. chrome-plated brass
Seal	PTFE
Stem	Stainless steel / R7.. chrome-plated brass
Stem seal	EPDM
Flange ring	DN 15/20 Zinc-plated steel DN 25...80 Aluminum
Flange joint surface	Nickel-plated brass

Type	Rated pressure p_s [kPa]
R315 – R330	4140
R515 – R530	4140
R332 – R350	2760
R532 – R550	2760
R715R – R750R	600



3-way open-close ball valves DN 15...50

Change-over function and 2-point controls in cold and hot water circuits

Applications

For changing over cold and hot water circuits in heating and ventilation systems on the water side or for 2-point control of these circuits.

Mode of operation

The open-close ball valve is operated by a rotary actuator. The rotary actuators are controlled by an open-close signal.

Product features

Manual operation by lever after disengaging the gearing latch on the Type TR.., LR.. or NR.. rotary actuator (manual operation not possible with LF../AFR..).

Ordering

An order for an R2.. open-close ball valve includes a suitable rotary actuator.

Ordering examples: (with LR230)

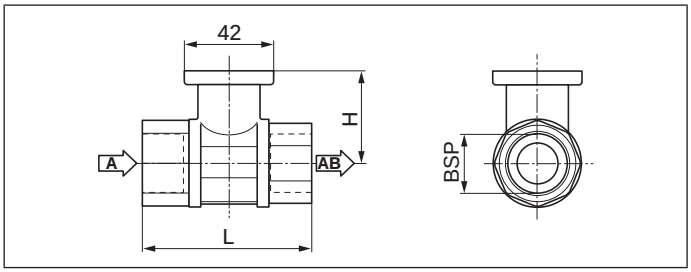
a) R315 open-close ball valve with LR230
   – Rotary actuator fitted
   – Order code: R315+LR230

b) R315 open-close ball valve and LR230
   – Rotary actuator supplied separately
   – Order code: R315/LR230

Important

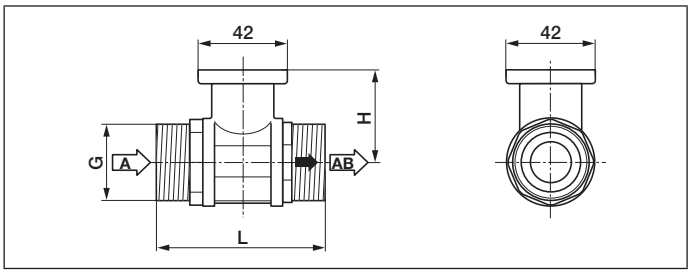
- **Sizing diagram for characterized control valves: page 7**
- **Dimensions: pages 12, 33, 34 and 36**
- **Installation instructions: pages 33, 34, 36**
- **Please note the information provided on pages 2 and 38 to 40 regarding use, installation, project design, commissioning and maintenance**
- **Pipe connectors can be supplied as an accessory: page 13**

2-way ball valves with internal thread



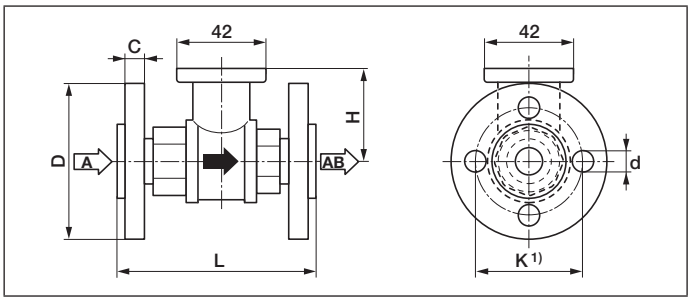
DN	Dimensions		Thread		Weight
	L	H	BSP	Max. screwing depth	
[mm]	[mm]	[mm]	[Inches]	[mm]	[kg]
10	52	35	3/8”	10	0.3
15	67	45	1/2”	13	0.4
20	78	47.5	3/4”	13	0.55
25	87	47.5	1”	17	0.7
32	105	47.5	1 1/4”	19	0.9
32	105	52	1 1/4”	19	1.05
40	111	52	1 1/2”	19	1.15
50	125	58	2”	22	1.8

2-way ball valves with external thread



DN	Dimensions		Thread	Weight
	L	H	G	
[mm]	[mm]	[mm]	[Inches]	[kg]
10	69	31.5	3/4”	0.4
15	74	44	1”	0.6
20	85.5	46	1 1/4”	0.8
25	84.5	46	1 1/2”	0.9
32	97.5	46	2”	1.1
32	102	50.5	2”	1.3
40	103	50.5	2 1/4”	1.4
50	115.5	56	2 3/4”	2.3

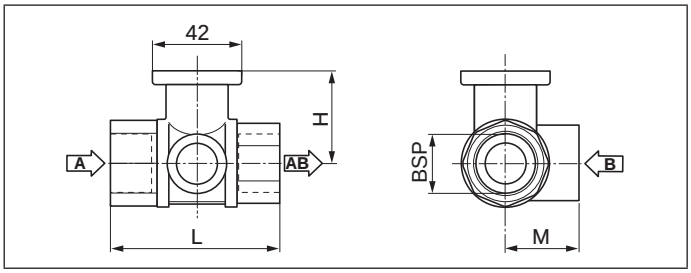
2-way ball valves with flanges



DN	Dimensions		Flange				Weight
	L	H	D	C	K	d	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
15	101.5	45	80	15	55	4 x 11	1.3
20	112	47.5	90	15	65	4 x 11	1.7
25	132	47.5	100	20	75	4 x 11.5	1.7
32	143.5	52	120	17	90	4 x 14	2.3
40	149.5	52	130	18	100	4 x 14	2.7
50	165	58	140	18	110	4 x 14	3.7
65	180.5	69	160	18	130	4 x 14	6.0
80	191.5	69	190	20.5	150	4 x 18	7.6

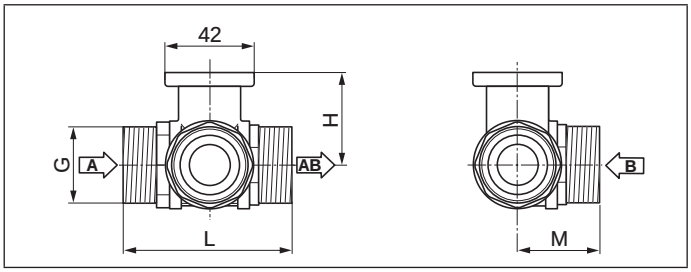
ENG-93001-93530-09.04 • Subject to modifications

3-way ball valves with internal thread



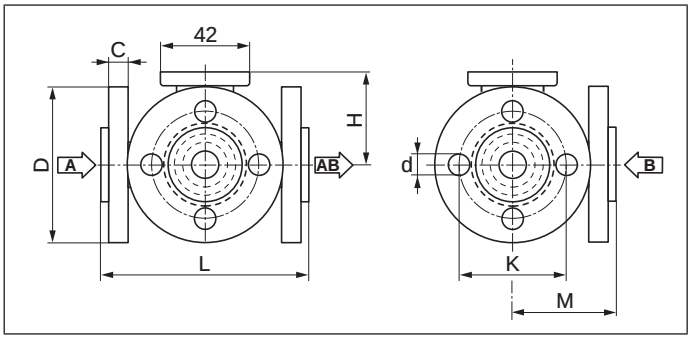
DN	Dimensions			Thread		Weight
	L	H	M	BSP	Max. screwing depth	
[mm]	[mm]	[mm]	[mm]	[Inches]	[mm]	[kg]
10	52	35	28	3/8"	10	0.35
15	67	45	39	1/2"	13	0.45
20	78	47.5	41.5	3/4"	13	0.6
25	87	47.5	45	1"	17	0.9
32	105	47.5	55.5	1 1/4"	19	1.2
32	105	52	55.5	1 1/4"	19	1.3
40	111	52	56	1 1/2"	19	1.5
50	125	58	68	2"	22	2.4

3-way ball valves with external thread



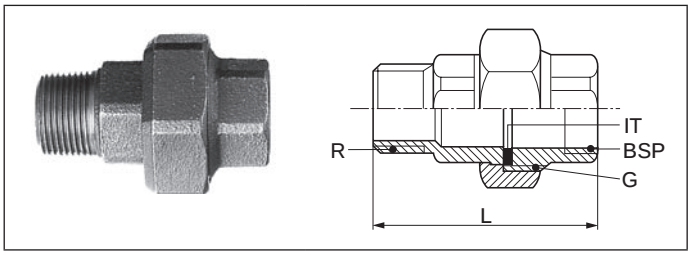
DN	Dimensions			Thread	Weight
	L	H	M	G	
[mm]	[mm]	[mm]	[mm]	[Inches]	[kg]
10	69	31.5	34	3/4"	0.4
15	74	44	38	1"	0.7
20	85.5	46	42.5	1 1/4"	1.0
25	84.5	46	47.5	1 1/2"	1.1
32	103.5	46	56	2"	1.7
32	108	50.5	56	2"	1.8
40	114	50.5	60.5	2 1/4"	2.3
50	131.5	56	71.5	2 3/4"	3.8

3-way ball valves with flanges



DN	Dimensions			Flange				Weight
	L	H	M	D	C	K	d	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
15	101.5	45	73	80	15	55	4 x 11	1.8
20	112	47.5	79	90	15	65	4 x 11	2.4
25	132	47.5	92	100	20	75	4 x 11.5	2.5
32	143.5	52	102.5	120	17	90	4 x 14	3.4
40	149.5	52	105	130	18	100	4 x 14	4
50	165	58	121	140	18	110	4 x 14	5.6

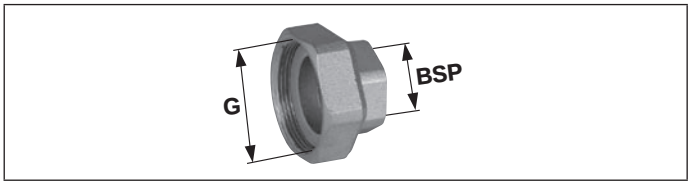
Pipe connectors (accessory)



Included in scope of delivery of ZR23..: 1 male part (**R** thread),
1 union nut (**G** thread),
1 female part (**BSP** thread),
1 flat gasket (**IT**)

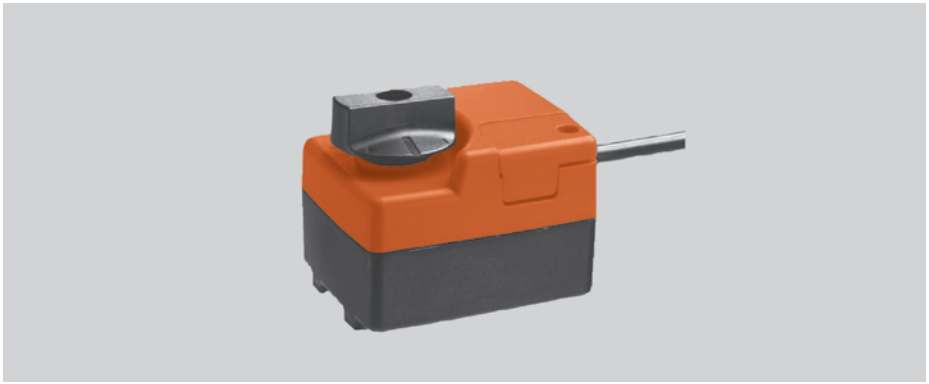
Type	DN	Dim. **L**	Weight
	[mm]	[mm]	[kg]
ZR2310	10	58	0.1
ZR2315	15	66	0.2
ZR2320	20	72	0.35
ZR2325	25	80	0.45
ZR2332	32	90	0.8
ZR2340	40	95	0.9
ZR2350	50	107	1.4

Pipe connectors for ball valve

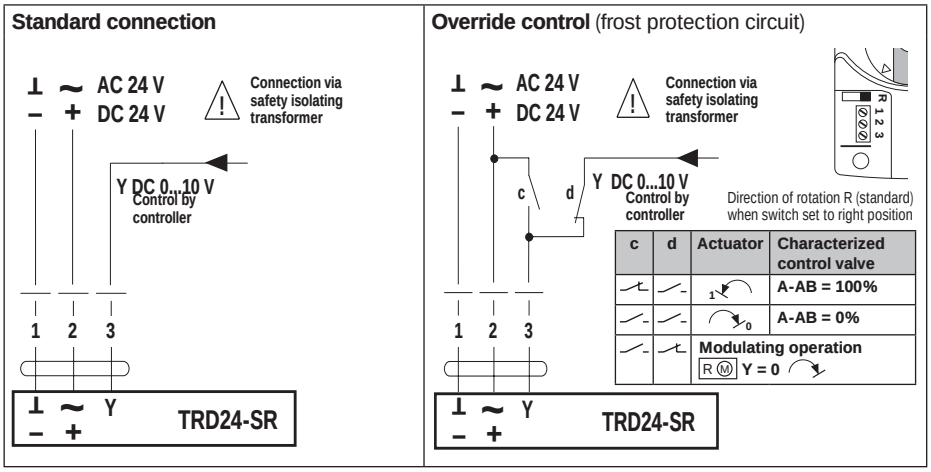


Included in scope of delivery of ZR45..: Female part, union nut, flat gasket

Type	DN	Dim. **G**	Dim. **BSP**
	[mm]		
ZR4510	10	G 3/4"	3/8"
ZR4515	15	G 1"	1/2"
ZR4520	20	G 1 1/4"	3/4"
ZR4525	25	G 1 1/2"	1
ZR4532	32	G 2"	1 1/4"
ZR4540	40	G 2 1/4"	1 1/2"
ZR4550	50	G 2 3/4"	2"



Wiring diagram



Technical data

Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
Power supply range	AC 19.2...28.8 V
For wire sizing	1 VA
Power consumption	0.5 W
Connection	Cable 1 m, 3 x 0.75 mm^2
Control	DC 0...10 V @ 100 kΩ input impedance
Operating range	DC 2...10 V for 0...100% ∢ (0...90º)
Manual operation	Temporary disengagement of gearing latch
Torque	min. 1.6 Nm (at nominal voltage)
Angle of rotation	90°
Running time	90 s
Sound power level	max. 35 dB (A)
Protection class	**III** Safety extra-low voltage
Degree of protection	IP 40
Ambient temperature range	-7...+50°C (together with ball valve)
Temperature of medium	+5...+100ºC (ball valve)
Non-operating temperature	–40...+80°C
Humidity test	To EN 60730-1
EMC	**CE** according to 89/336/EEC
LV Directive	**CE** according to 73/23/EEC
Mode of operation	Type 1 EN 60730-1
Maintenance	Maintenance-free
Weight	0.3 kg (without ball valve)

Rotary actuator for 2 and 3-way characterized control valves DN 10

Modulating actuator (AC/DC 24 V)

Control DC 0...10 V

Application

Operation of characterized control valves.

Mode of operation

Modulating control is effected by means of a standard 0…10 V DC control signal.

Product features

Simple direct mounting on the characterized control valve using only one screw. The mounting position in relation to the characterized control valve can be selected in 90° steps.

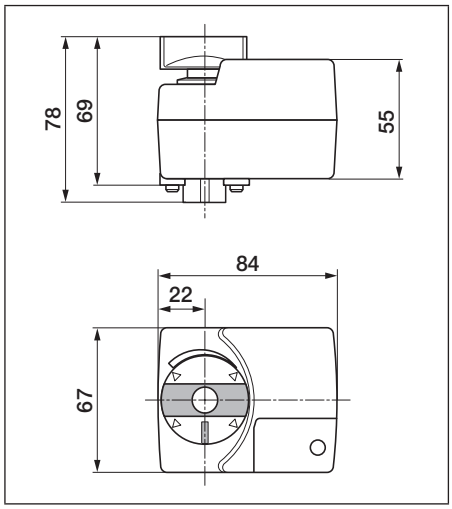
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Manual operation possible by lever (the gearing latch remains disengaged as long as the self-resetting lever is pressed).

Ordering examples:

a) TRD24-SR rotary actuator with R.. characterized control valve fitted
   – Order code: R..+TRD24-SR
b) TRD24-SR rotary actuator and R.. characterized control valve supplied separately
   – Order code: R../TRD24-SR
c) TRD24-SR rotary actuator packed loose
   – Order code: TRD24-SR

Dimensions [mm]



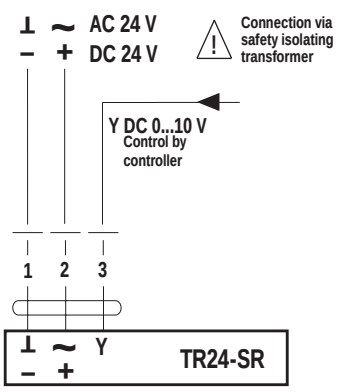
Important

- **Suitable characterized control valves: pages 8 and 9**
- **Use and safety: page 2**
- **Installation instructions: page 33**
- **Installation dimensions: page 33**

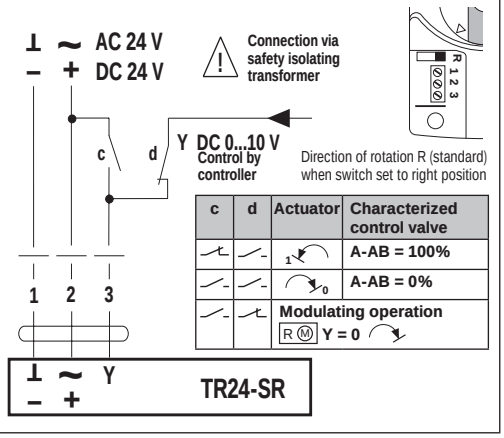
ENG-93001-93530-09.04 • Subject to modifications

Wiring diagram

Standard connection



Override control (frost protection circuit)



c	d	Actuator	Characterized control valve
			A-AB = 100%
			A-AB = 0%
			Modulating operation R Ⓜ Y = 0

Technical data

Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
Power supply range	AC 19.2...28.8 V
For wire sizing	1 VA
Power consumption	0.5 W
Connection	Cable 1 m, 3 x 0.75 mm^2
Control	DC 0...10 V @ 100 kΩ input impedance
Operating range	DC 2...10 V for 0...100% ◁ (0...90º)
Manual operation	Temporary disengagement of gearing latch
Torque	min. 2 Nm (at nominal voltage)
Angle of rotation	90°
Running time	90 s
Sound power level	max. 35 dB (A)
Protection class	**III** Safety extra-low voltage
Degree of protection	IP 40
Ambient temperature range	-7...+50°C (together with ball valve)
Temperature of medium	+5...+100ºC (ball valve)
Non-operating temperature	–40...+80°C
Humidity test	To EN 60730-1
EMC	**CE** according to 89/336/EEC
LV Directive	**CE** according to 73/23/EEC
Mode of operation	Type 1 EN 60730-1
Maintenance	Maintenance-free
Weight	0.3 kg (without ball valve)

Rotary actuator for 2 and 3-way characterized control valves DN 15

Modulating actuator (AC/DC 24 V)

Control DC 0...10 V

Application

Operation of characterized control valves.

Mode of operation

Modulating control is effected by means of a standard 0…10 V DC control signal.

Product features

Simple direct mounting on the characterized control valve using only one screw. The mounting position in relation to the characterized control valve can be selected in 90° steps.

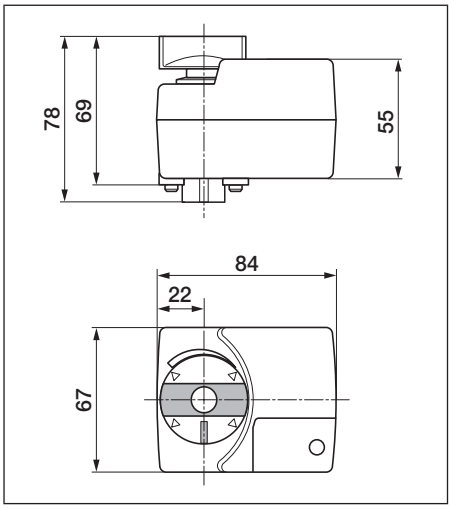
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Manual operation possible by lever (the gearing latch remains disengaged as long as the self-resetting lever is pressed).

Ordering examples:

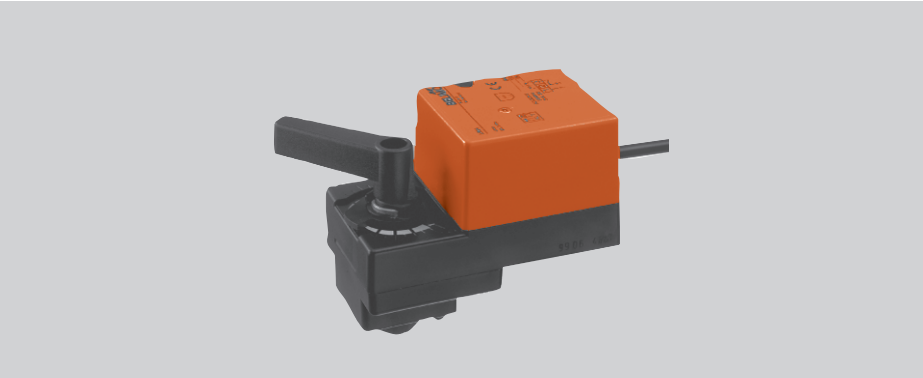
a) TR24-SR rotary actuator with R.. characterized control valve fitted
   – Order code: R..+TR24-SR
b) TR24-SR rotary actuator and R.. characterized control valve supplied separately
   – Order code: R../TR24-SR
c) TR24-SR rotary actuator packed loose
   – Order code: TR24-SR

Dimensions [mm]



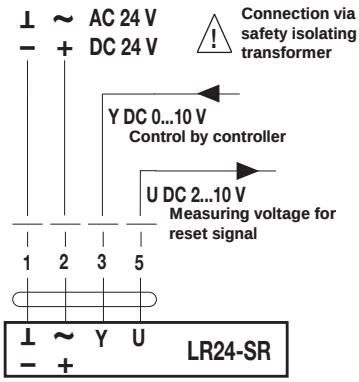
Important

- **Suitable characterized control valves: pages 8 and 9**
- **Use and safety: page 2**
- **Installation instructions: page 33**
- **Installation dimensions: page 33**

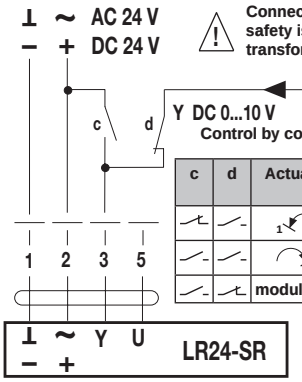


Wiring diagram

Standard connection



Override control (frost protection circuit)



c	d	Actuator	Characterized control valve
			A-AB = 100%
			A-AB = 0%
		modulating	operation

Technical data

Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
Power supply range	AC 19.2...28.8 V, DC 21.6...28.8 V
For wire sizing	4 VA
Power consumption	2 W
Connection	Cable 1 m, 4 x 0.75 mm^2
Control	DC 0...10 V @ 100 kΩ input impedance
Operating range	DC 2...10 V for 0...100% ∢ (0...90º)
Position feedback	DC 2...10 V (max. 1 mA) for 0....100% ∢ (0...90º)
Uni-rotation	± 5%
Manual operation	Pushbutton, self-resetting
Torque	min. 4 Nm (at nominal voltage)
Running time	80...110 s (0...4 Nm)
Sound power level	max. 35 dB (A)
Position indication	Scale plate 0...1
Protection class	**III** Safety extra-low voltage
Degree of protection	IP 40
Ambient temperature range	0...+50°C (together with ball valve)
Temperature of medium	+5...+100ºC (ball valve)
Non-operating temperature	–40...+80°C
Humidity test	To EN 60730-1
EMC	**CE** according to 89/336/EEC
Mode of operation	Type 1 EN 60730-1
Maintenance	Maintenance-free
Weight	0.55 kg (without ball valve)

Rotary actuator for 2 and 3-way characterized control valves DN 15...32

Modulating actuator (AC/DC 24 V)

Control DC 0...10 V

Application

Operation of characterized control valves.

Mode of operation

Modulating control is effected by means of a standard 0…10 V DC control signal.

Product features

Simple direct mounting on the characterized control valve using only one screw. The mounting position in relation to the characterized control valve can be selected in 90° steps.

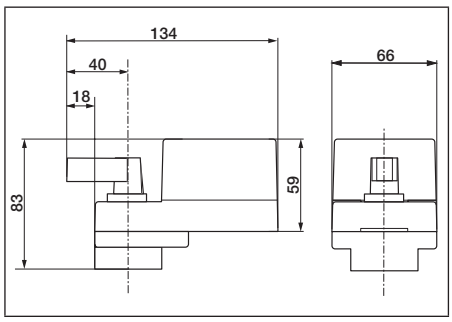
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Manual operation possible by lever (the gearing latch remains disengaged as long as the self-resetting lever is pressed).

Ordering examples:

a) LR24-SR rotary actuator with R.. characterized control valve fitted
   – Order code: R..+LR24-SR
b) LR24-SR rotary actuator and R.. characterized control valve supplied separately
   – Order code: R../LR24-SR
c) LR24-SR rotary actuator packed loose
   – Order code: LR24-SR

Dimensions [mm]



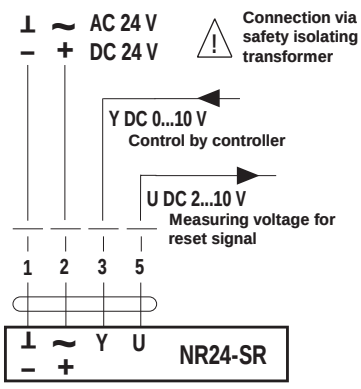
Important

- **Suitable characterized control valves: pages 8 and 9**
- **Use and safety: page 2**
- **Installation instructions: page 34**
- **Installation dimensions: page 34**

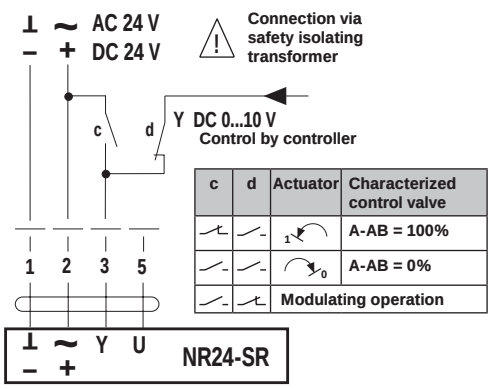
ENG-93001-93530-09.04 • Subject to modifications

Wiring diagram

Standard connection



Override control (frost protection circuit)



c	d	Actuator	Characterized control valve
		1	A-AB = 100%
		0	A-AB = 0%
			Modulating operation

Technical data

Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
Power supply range	AC 19.2...28.8 V, DC 21.6...28.8 V
For wire sizing	2.5 VA
Power consumption	1.5 W
Connection	Cable 1 m, 4 x 0.75 mm^2
Control	DC 0...10 V @ 100 kΩ input impedance
Operating range	DC 2...10 V for 0...100% ∢ (0...90º)
Position feedback	DC 2...10 V (max. 1 mA) for 0....100% ∢ (0...90º)
Uni-rotation	± 5%
Manual operation	Temporary and permanent disengagement of the gearing latch by means of the rotary knob on the housing
Torque	min. 10 Nm (at nominal voltage)
Running time	140 s
Sound power level	max. 35 dB (A)
Position indication	Scale plate 0...1
Protection class	**III** Safety extra-low voltage
Degree of protection	IP 40
Ambient temperature range	0...+50°C
Temperature of medium	+5...+120ºC (ball valve)
Non-operating temperature	–30...+80°C
Humidity test	To EN 60730-1
EMC	**CE** according to 89/336/EEC
Mode of operation	Type 1 EN 60730-1
Maintenance	Maintenance-free
Weight	0.5 kg (without ball valve)

Rotary actuator for 2 and 3-way characterized control valves DN 15...80

Modulating actuator (AC/DC 24 V)

Control DC 0...10 V

Application

Operation of characterized control valves.

Mode of operation

Modulating control is effected by means of a standard 0…10 V DC control signal. A synchronization process starts when the power supply is switched on. The actuator moves at high speed to the closed position ("closed" limit switch), where it is synchronized.

Product features

Simple direct mounting on the characterized control valve using only one screw. The mounting position in relation to the characterized control valve can be selected in 90° steps.

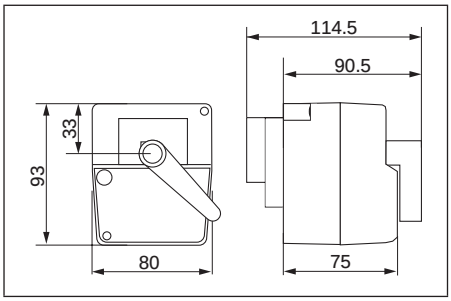
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Manual operation possible by lever (temporary disengagement of the gearing latch by pressing, permanent disengagement by means of the rotary knob on the housing).

Ordering examples:

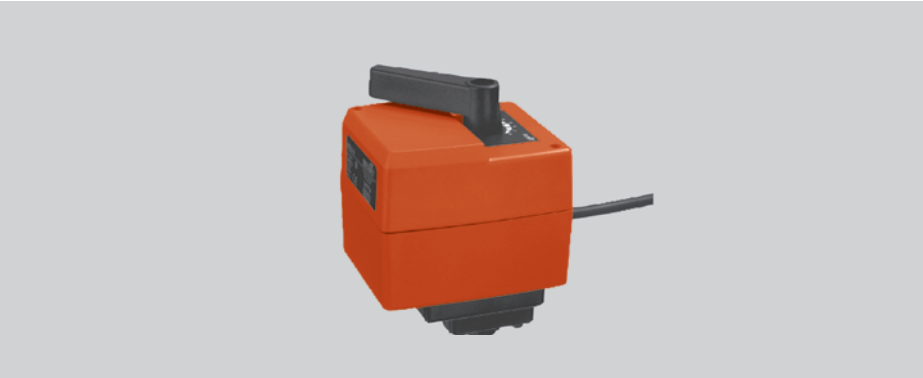
a) NR24-SR rotary actuator with R.. characterized control valve fitted
   – Order code: R..+NR24-SR
b) NR24-SR rotary actuator and R.. characterized control valve supplied separately
   – Order code: R../NR24-SR
c) NR24-SR rotary actuator packed loose
   – Order code: NR24-SR+WNR
   (WNR mounting kit for ball valve)

Dimensions [mm]

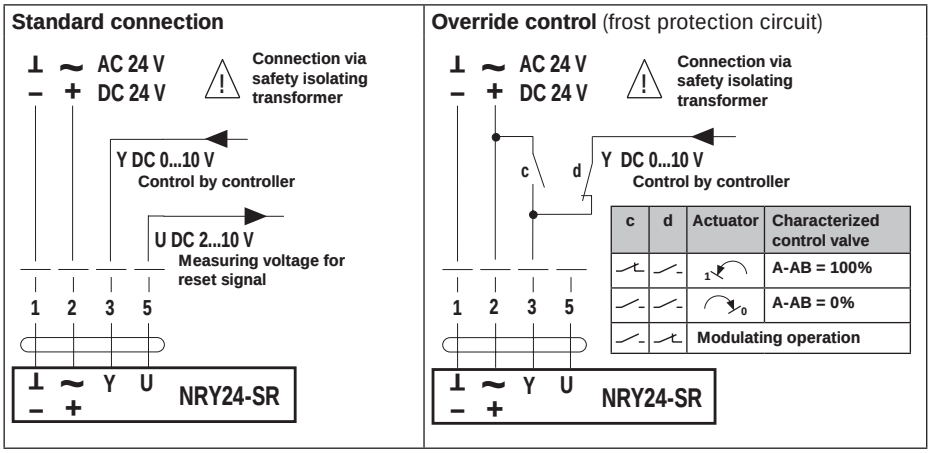


Important

- **Suitable characterized control valves: pages 8 and 9**
- **Use and safety: page 2**
- **Installation instructions: page 34**
- **Installation dimensions: page 34**



Wiring diagram



Technical data

Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
Power supply range	AC 19.2...28.8 V, DC 21.6...28.8 V
For wire sizing	4 VA
Power consumption	2.5 W
Connection	Cable 1 m, 4 x 0.75 mm^2
Control	DC 0...10 V @ 100 kΩ input impedance
Operating range	DC 2...10 V for 0...100% ∢ (15...90º)
Position feedback	DC 2...10 V (max. 1 mA) for 0....100% ∢ (15...90º)
Uni-rotation	± 5%
Manual operation	Temporary and permanent disengagement of the gearing latch by means of the rotary knob on the housing
Torque	min. 10 Nm (at nominal voltage)
Running time	35 s
Sound power level	max. 50 dB (A)
Position indication	Scale plate 0...1
Protection class	**III** Safety extra-low voltage
Degree of protection	IP 40
Ambient temperature range	0...+50°C
Temperature of medium	+5...+120ºC (ball valve)
Non-operating temperature	–30...+80°C
Humidity test	To EN 60730-1
EMC	**CE** according to 89/336/EEC
Mode of operation	Type 1 EN 60730-1
Maintenance	Maintenance-free
Weight	0.5 kg (without ball valve)

Rotary actuator for 2 and 3-way characterized control valves DN 15...80

Modulating actuator (AC/DC 24 V)

Control DC 0...10 V

Running time 35 s

Adjustable operating range

Locked-rotor protection

No override synchronization in case of power failure

Application

Operation of characterized control valves.

Mode of operation

Modulating control is effected by means of a standard 0…10 V DC control signal. A synchronization process starts when the power supply is switched on. The actuator moves to the closed position ("closed" limit switch), where it is synchronized.

Product features

Simple direct mounting on the characterized control valve using only one screw. The mounting position in relation to the characterized control valve can be selected in 90° steps.

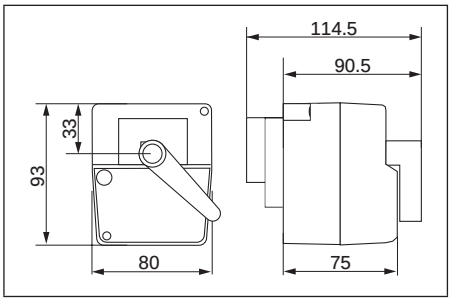
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Manual operation possible by lever (temporary disengagement of the gearing latch by pressing, permanent disengagement by means of the rotary knob on the housing).

Ordering examples:

a) NRY24-SR rotary actuator with R.. characterized control valve fitted
   – Order code: R..+NRY24-SR
b) NRY24-SR rotary actuator packed loose
   – Order code: NRY24-SR+WNR
   (WNR mounting kit for ball valve)

Dimensions [mm]

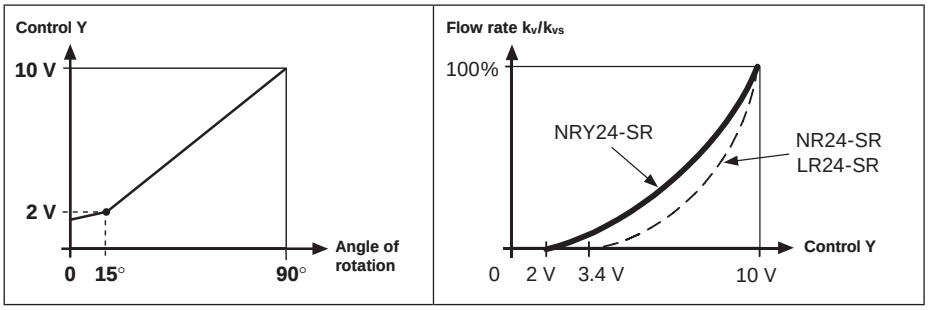


Important

- **Suitable characterized control valves: pages 8 and 9**
- **Use and safety: page 2**
- **Installation instructions: page 34**
- **Installation dimensions: page 34**

ENG-93001-93530-09.04 • Subject to modifications

Adjustable operating range



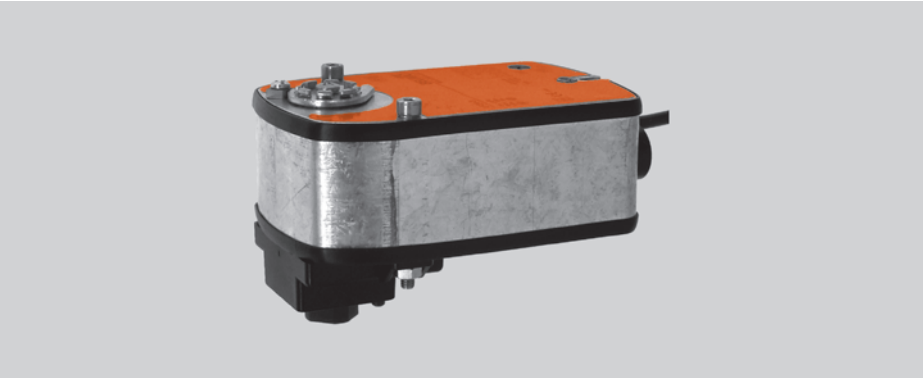
The actuator positions to 15° when Y control = approx. 1.9 V (operating range 2..10 V). The actuator opens the valve linearly from 15 to 90º between 2 and 10 V.
- (Y control = position feedback U = 2...10 V)

Locked-rotor protection

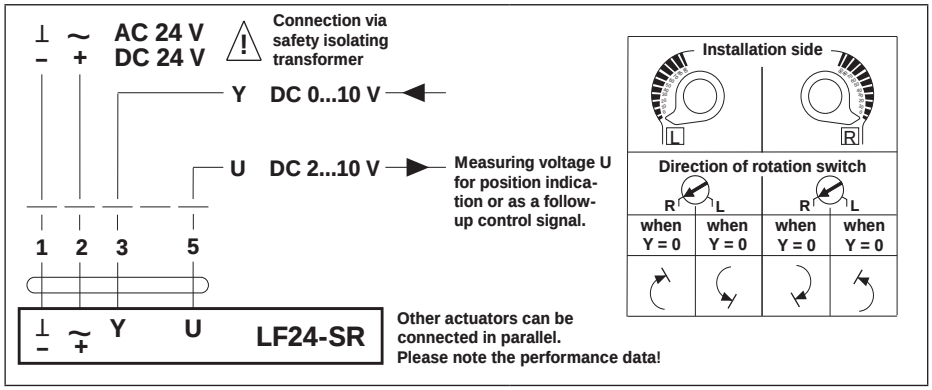
The actuator features a locked-rotor protection function. If the Y control value remains both unchanged and 20% below the start of the operating range (2 V) for 23 hours, the actuator opens the valve from 0 to 13° and then returns it to 0° again.
- (Characterized control valve A-AB = 0...15º = air bubble-tight)

No override synchronization

- The current position of the actuator is stored in case of a power failure. There is therefore no need to resynchronize when the power is restored.
- If the angle of rotation deviates > 10º, for instance due to a preceding manual override, the actuator is synchronized when the "closed" or "open" limit switch is reached.
- If the angle of rotation deviates <10º, the necessary correction is effected without synchronizing the actuator when the "closed" or "open" limit switch is reached.



Wiring diagram



Technical data

Nominal voltage	AC 24 V 50/60 Hz, DC 24 V	
Power supply range	AC 19.2...28.8 V, DC 21.6...28.8 V	
For wire sizing	5 VA (Imax 5.8 A @ 5 ms)	
Power consumption	When charging spring	2.5 W
	In holding position	1 W
Connection	Cable 1 m, 4 x 0.75 mm^2	
Control	DC 0...10 V @ 100 kΩ input impedance	
Operating range	DC 2...10 V for 0...100% ◁	
Position feedback	DC 2...10 V (max. 0.7 mA) for 0...100% ◁	
Direction of rotation	Motor	Reversible with L / R switch
	Spring return	Reversible by mounting L / R
Torque	Motor	min. 4 Nm (at nominal voltage)
	Spring return	min. 4 Nm
Angle of rotation	max. 95° (37...100% adjustable ◁ with integral, mechanical angle of rotation limiting)	
Running time	Motor	150 s
	Spring return	~20 s @ –20...50°C / max. 60 s @ –30°C
Sound power level	Motor	max. 30 dB (A)
	Spring return	~62 dB (A)
Service life	min. 60 000 safety positions	
Position indication	Mechanical	
Protection class	**III** Safety extra-low voltage	
Degree of protection	IP 54	
Ambient temperature range	–30...+50°C	
Temperature of medium	+5...+100°C (ball valve)	
Non-operating temperature	–40...+80°C	
Humidity test	To EN 60730-1	
EMC	**CE** according to 89/336/EEC	
Maintenance	Maintenance-free	
Weight	1.4 kg (without ball valve)	

Rotary actuator for 2 and 3-way characterized control valves DN 15...32 with emergency control function

Modulating actuator (AC/DC 24 V)

Control DC 0...10 V

Application

Operation of characterized control valves.

Mode of operation

Modulating control is effected by means of a standard 0…10 V DC control signal. The LF.. actuator moves the characterized control valve into the operating position while simultaneously charging the return spring. The characterized control valve is turned back into the safety position by the application of spring energy when the supply voltage is interrupted.

Product features

Simple direct mounting on the characterized control valve using only one screw. The mounting position in relation to the characterized control valve can be selected in 90° steps.

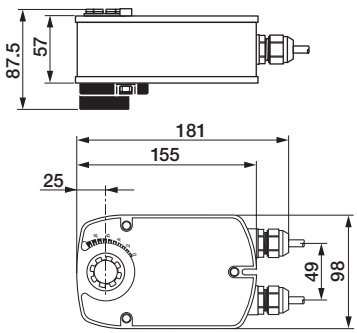
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Signalization: 0...100%, with adjustable auxiliary switch.

Ordering examples:

a) LF24-SR rotary actuator with R.. characterized control valves fitted
   – Order code: R..+LF24-SR
b) LF24-SR rotary actuator and R.. characterized control valves supplied separately
   – Order code: R../LF24-SR
c) LF24-SR rotary actuator packed loose
   – Order code: LF24-SR+WLF
   (WLF mounting kit for ball valve)

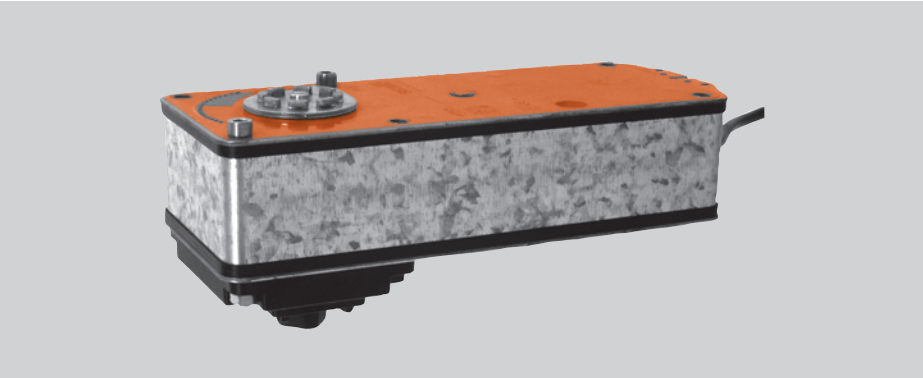
Dimensions [mm]



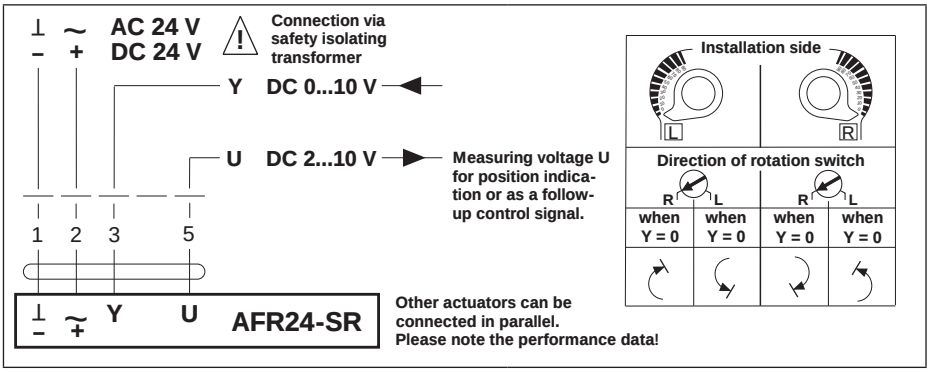
Important

- **Suitable characterized control valves: pages 8 and 9**
- **Use and safety: page 2**
- **Installation instructions: page 36**
- **Installation dimensions: page 36**

ENG-93001-93530-09.04 • Subject to modifications



Wiring diagram



Technical data

Nominal voltage	AC 24 V 50/60 Hz, DC 24 V	
Power supply range	AC 19.2...28.8 V, DC 21.6...28.8 V	
For wire sizing	10 VA (Imax 5.8 A @ 5 ms)	
Power consumption	When charging spring	6 W
	In holding position	2.5 W
Connection	Cable 1 m, 4 x 0.75 mm^2	
Control	DC 0...10 V @ 100 kΩ input impedance	
Operating range	DC 2...10 V for 0...100% ◁	
Position feedback	DC 2...10 V (max. 0.7 mA) for 0...100% ◁	
Direction of rotation	Motor	Reversible with L / R switch
	Spring return	Reversible by mounting L / R
Torque	Motor	min. 15 Nm (at nominal voltage)
	Spring return	min. 15 Nm
Angle of rotation	max. 95° (37...100% adjustable ◁ with integral, mechanical angle of rotation limiting)	
Running time	Motor	150 s
	Spring return	~16 s @ –20...50°C / max. 60 s @ –30°C
Sound power level	Motor	max. 30 dB (A)
	Spring return	~62 dB (A)
Service life	min. 60 000 safety positions	
Position indication	Mechanical	
Protection class	**III** Safety extra-low voltage	
Degree of protection	IP 54	
Ambient temperature range	–30...+50°C	
Temperature of medium	+5...+100°C (ball valve)	
Non-operating temperature	–40...+80°C	
Humidity test	To EN 60730-1	
EMC	**CE** according to 89/336/EEC	
Maintenance	Maintenance-free	
Weight	1.4 kg (without ball valve)	

Rotary actuator for 2 and 3-way characterized control valves DN 15...80 with emergency control function

Modulating actuator (AC/DC 24 V) Control DC 0...10 V

Application

Operation of characterized control valves.

Mode of operation

Modulating control is effected by means of a standard 0…10 V DC control signal.
The AFR.. actuator moves the characterized control valve into the operating position while simultaneously charging the return spring. The characterized control valve is turned back into the safety position by the application of spring energy when the power supply is interrupted.

Product features

Simple direct mounting on the characterized control valve using only one screw. The mounting position in relation to the characterized control valve can be selected in 90° steps.

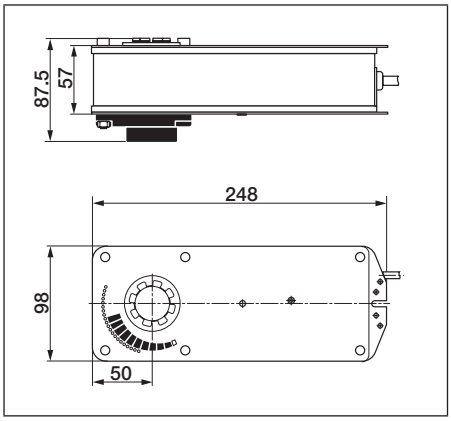
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Signalization: 0...100%, with adjustable auxiliary switch.

Ordering examples:

a) AFR24-SR rotary actuator with R.. characterized control valves fitted
   – Order code: R..+AFR24-SR
b) AFR24-SR rotary actuator and R.. characterized control valves supplied separately
   – Order code: R../AFR24-SR
c) AFR24-SR rotary actuator packed loose
   – Order code: AFR24-SR+WAFR
   (WAFR mounting kit for ball valve)

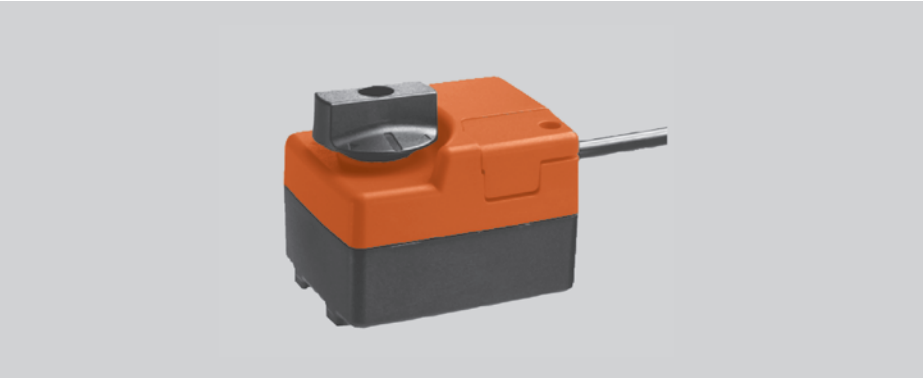
Dimensions [mm]



Important

- **Suitable characterized control valves: pages 8 and 9**
- **Use and safety: page 2**
- **Installation instructions: page 36**
- **Installation dimensions: page 36**

TRD24-3 rotary actuator for characterized control valves and open-close ball valves



Rotary actuator for 2 and 3-way characterized control valves DN 10 and 2 and 3-way open-close ball valves DN 10

3-point actuator (AC 24 V)

3-point or open-close control

Application

Operation of characterized control valves or open-close ball valves.

Mode of operation

3-point control for characterized control valves. Open-close control for open-close ball valves.

Product features

Simple direct mounting on the ball valve using only one screw. The mounting position in relation to the ball valve can be selected in 90° steps.

Functional reliability: The actuator automatically stops when the end stops are reached.

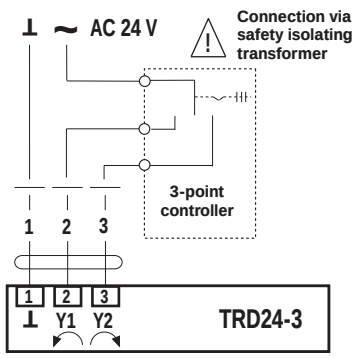
Manual operation possible by lever (the gearing latch remains disengaged as long as the self-resetting lever is pressed).

Ordering examples:

a) TRD24-3 rotary actuator with R.. characterized control valve fitted
   – Order code: R..+TRD24-3
b) TRD24-3 rotary actuator and R.. characterized control valve supplied separately
   – Order code: R../TRD24-3
c) TRD24-3 rotary actuator packed loose
   – Order code: TRD24-3

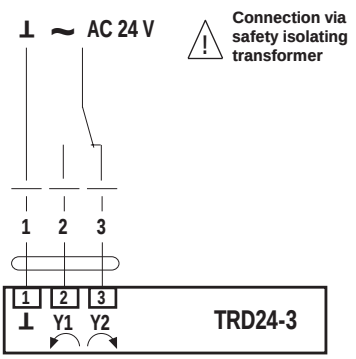
Wiring diagram

3-point control for characterized control valves



	Actuator	Characterized control valve
Y1	1	A-AB = 100%
Y2	0	A-AB = 0%

Open-close control for open-close ball valves

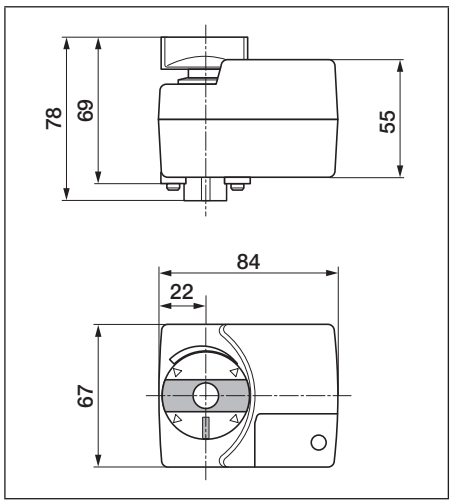


	Actuator	Open-close ball valve
Y1	1	A-AB = 100%
Y2	0	A-AB = 0%

Technical data

Nominal voltage	AC 24 V 50/60 Hz
Power supply range	AC 19.2...28.8 V
For wire sizing	1 VA
Power consumption	1 W
Connection	Cable 1 m, 3 x 0.75 mm^2
Manual operation	Temporary disengagement of gearing latch
Torque	min. 1.6 Nm (at nominal voltage)
Angle of rotation	90°
Running time	105/90 s
Sound power level	max. 35 dB (A)
Protection class	**III** Safety extra-low voltage
Degree of protection	IP 40
Ambient temperature range	-7...+50°C (together with ball valve)
Temperature of medium	+5...+100ºC (ball valve)
Non-operating temperature	–40...+80°C
Humidity test	To EN 60730-1
EMC	**CE** according to 89/336/EEC
LV Directive	**CE** according to 73/23/EEC
Mode of operation	Type 1 EN 60730-1
Maintenance	Maintenance-free
Weight	0.3 kg (without ball valve)

Dimensions [mm]

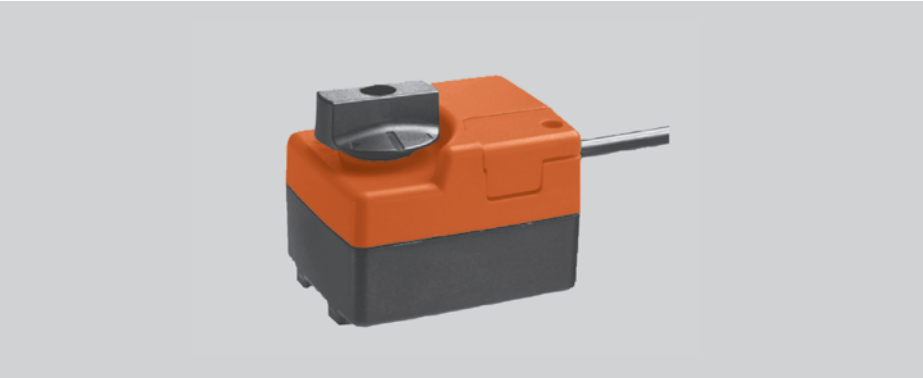


Important

- **Suitable characterized control valves and open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 33**
- **Installation dimensions: page 33**

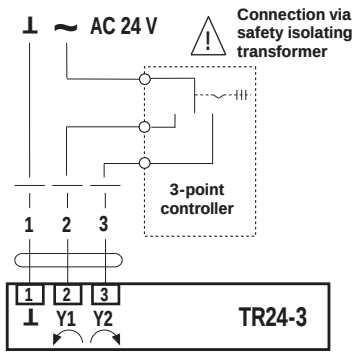
ENG-93001-93530-09.04 • Subject to modifications

TR24-3 rotary actuator for characterized control valves and open-close ball valves



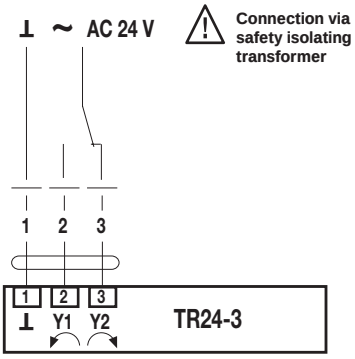
Wiring diagram

3-point control for characterized control valves



	Actuator	Characterized control valve
Y1	1	A-AB = 100%
Y2	0	A-AB = 0%

Open-close control for open-close ball valves



	Actuator	Open-close ball valve
Y1	1	A-AB = 100%
Y2	0	A-AB = 0%

Technical data

Nominal voltage	AC 24 V 50/60 Hz
Power supply range	AC 19.2..28.8 V
For wire sizing	1 VA
Power consumption	1 W
Connection	Cable 1 m, 3 x 0.75 mm^2
Manual operation	Temporary disengagement of gearing latch
Torque	min. 2 Nm (at nominal voltage)
Angle of rotation	90°
Running time	105/90 s
Sound power level	max. 35 dB (A)
Protection class	**III** Safety extra-low voltage
Degree of protection	IP 40
Ambient temperature range	-7...+50°C (together with ball valve)
Temperature of medium	+5...+100ºC (ball valve)
Non-operating temperature	–40...+80°C
Humidity test	To EN 60730-1
EMC	**CE** according to 89/336/EEC
LV Directive	**CE** according to 73/23/EEC
Mode of operation	Type 1 EN 60730-1
Maintenance	Maintenance-free
Weight	0.3 kg (without ball valve)

Rotary actuator for 2 and 3-way characterized control valves DN 15 and 2 and 3-way open-close ball valves DN 15

3-point actuator (AC 24 V)

3-point or open-close control

Application

Operation of characterized control valves or open-close ball valves.

Mode of operation

3-point control for characterized control valves. Open-close control for open-close ball valves.

Product features

Simple direct mounting on the ball valve using only one screw. The mounting position in relation to the ball valve can be selected in 90° steps.

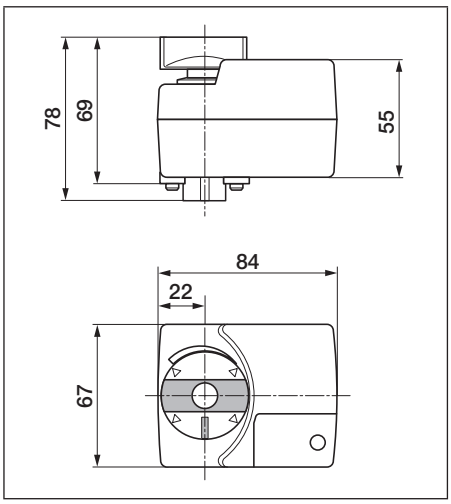
Functional reliability: The actuator automatically stops when the end stops are reached.

Manual operation possible by lever (the gearing latch remains disengaged as long as the self-resetting lever is pressed).

Ordering examples:

a) TR24-3 rotary actuator with R.. characterized control valve fitted
   – Order code: R..+TR24-3
b) TR24-3 rotary actuator and R.. characterized control valve supplied separately
   – Order code: R../TR24-3
c) TR24-3 rotary actuator packed loose
   – Order code: TR24-3

Dimensions [mm]



Important

- **Suitable characterized control valves and open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 33**
- **Installation dimensions: page 33**

NR24-3(-S) rotary actuator for characterized control valves and open-close ball valves

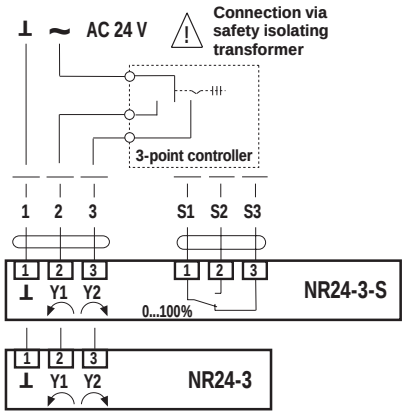
Rotary actuator for 2 and 3-way characterized control valves DN 15...80 and 2 and 3-way open-close ball valves DN 15...80

3-point actuator (AC 24 V)

3-point or open-close control

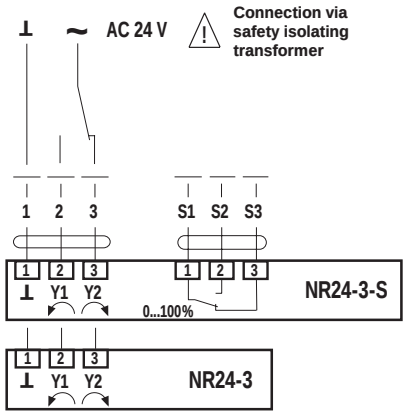
Wiring diagram

3-point control for characterized control valves



	Actuator	Characterized control valve
Y1	1	A-AB = 100%
Y2	0	A-AB = 0%

Open-close control for open-close ball valves



	Actuator	Open-close ball valve
Y1	1	A-AB = 100%
Y2	0	A-AB = 0%

Technical data

Nominal voltage	AC 24 V 50/60 Hz	
Power supply range	AC 19.2...28.8 V	
For wire sizing	1.5 VA	
Power consumption	1.5 W	
Connection	Motor	Cable 1 m, 3 x 0.75 mm²
	Auxiliary switch (NR24-3-S)	Cable 1 m, 3 x 0.75 mm²
Auxiliary switch (NR24-3-S)	1 x EPU 5 (1) A, AC 250 V **II**	
	Adjustable switching point, 0...100%	
Manual operation	Temporary and permanent disengagement of the gearing latch by means of the rotary knob on the housing	
Torque	min. 10 Nm (at nominal voltage)	
Angle of rotation	90°	
Running time	140 s	
Sound power level	max. 35 dB (A)	
Position indication	Scale plate 0...1	
Protection class	**III** Safety extra-low voltage	
Degree of protection	IP 40	
Ambient temperature range	0...+50°C (together with ball valve)	
Temperature of medium	+5...+120ºC (ball valve)	
Non-operating temperature	–30...+80°C	
Humidity test	To EN 60730-1	
EMC	**CE** according to 89/336/EEC	
LV Directive	**CE** according to 73/23/EEC	
Mode of operation	Type 1.B EN 60730-1	
Maintenance	Maintenance-free	
Weight	0.5 kg (without ball valve)	

Application

Operation of characterized control valves or open-close ball valves.

Mode of operation

3-point control for characterized control valves. Open-close control for open-close ball valves.

Product features

Simple direct mounting on the ball valve using only one screw. The mounting position in relation to the ball valve can be selected in 90° steps.

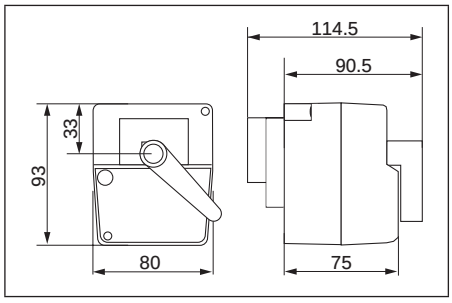
Functional reliability: The actuator automatically stops when the end stops are reached.

Manual operation possible by lever (temporary disengagement of the gearing latch by pressing, permanent disengagement by means of the rotary knob on the housing).

Ordering examples:

a) NR24-3 rotary actuator with R.. characterized control valve fitted
   – Order code: R..+NR24-3
b) NR24-3 rotary actuator and R.. characterized control valve supplied separately
   – Order code: R../NR24-3
c) NR24-3 rotary actuator packed loose
   – Order code: NR24-3

Dimensions [mm]



Important

- **Suitable characterized control valves and open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 34**
- **Installation dimensions: page 34**

ENG-93001-93530-09.04 • Subject to modifications

NR230-3(-S) rotary actuator for characterized control valves and open-close ball valves

Rotary actuator for 2 and 3-way characterized control valves DN 15...80 and 2 and 3-way open-close ball valves DN 15...80

3-point actuator (AC 230 V)

3-point or open-close control

Application

Operation of characterized control valves or open-close ball valves.

Mode of operation

3-point control for characterized control valves. Open-close control for open-close ball valves.

Product features

Simple direct mounting on the ball valve using only one screw. The mounting position in relation to the ball valve can be selected in 90° steps.

Functional reliability: The actuator automatically stops when the end stops are reached.

Manual operation possible by lever (temporary disengagement of the gearing latch by pressing, permanent disengagement by means of the rotary knob on the housing).

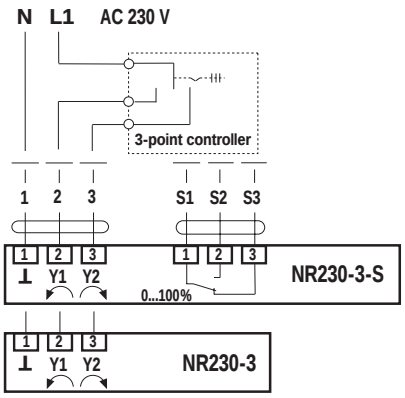
Signalization: 0...100%, with adjustable auxiliary switch (NR230-3-S only).

Ordering examples:

a) NR230-3 rotary actuator with R.. characterized control valve fitted
   – Order code: R..+NR230-3
b) NR230-3 rotary actuator and R.. characterized control valve supplied separately
   – Order code: R../NR230-3
c) NR230-SR rotary actuator packed loose
   – Order code: NR230-3+WNR
   (WNR mounting kit for ball valve)

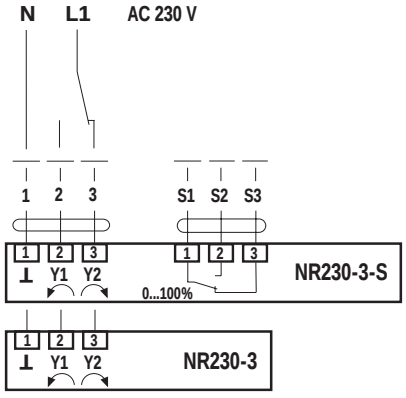
Wiring diagram

3-point control for characterized control valves



Actuator		Characterized control valve
Y1	1	A-AB = 100%
Y2	0	A-AB = 0%

Open-close control for open-close ball valves

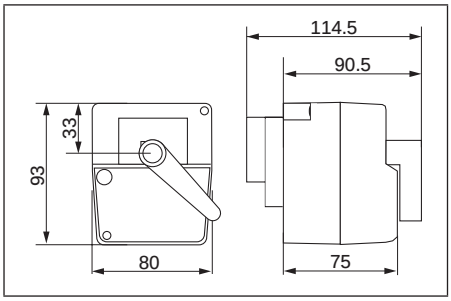


Actuator		Open-close ball valve
Y1	1	A-AB = 100%
Y2	0	A-AB = 0%

Technical data

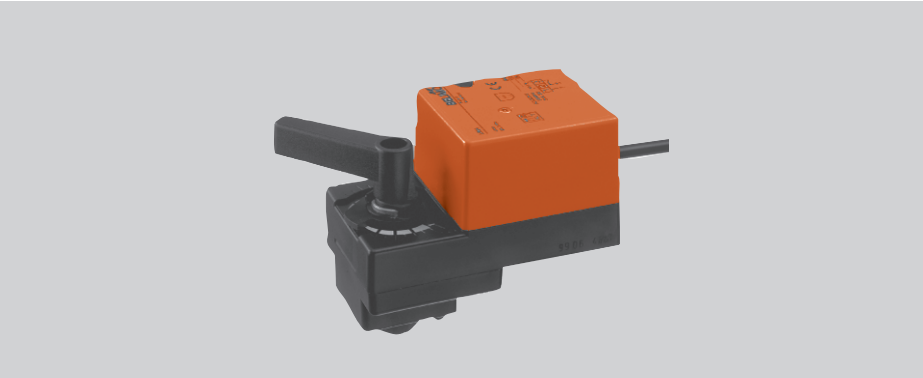
Nominal voltage	AC 230 V 50/60 Hz	
Power supply range	AC 198...264 V	
For wire sizing	3.5 VA	
Power consumption	3.5 W	
Connection	Motor	Cable 1 m, 3 x 0.75 mm²
	Auxiliary switch (NR230-3-S)	Cable 1 m, 3 x 0.75 mm²
Auxiliary switch (NR230-3-S)	1 x EPU 5 (1) A, AC 250 V **II**	
	Adjustable switching point, 0...100%	
Manual operation	Temporary and permanent disengagement of the gearing latch by means of the rotary knob on the housing	
Torque	min. 10 Nm (at nominal voltage)	
Angle of rotation	90°	
Running time	140 s	
Sound power level	max. 35 dB (A)	
Position indication	Scale plate 0...1	
Protection class	**II** Totally insulated	
Degree of protection	IP 40	
Ambient temperature range	0...+50°C (duty cycle 140/35 s)	
Temperature of medium	+5...+120ºC (ball valve)	
Non-operating temperature	–30...+80°C	
Humidity test	To EN 60730-1	
EMC	**CE** according to 89/336/EEC	
LV Directive	**CE** according to 73/23/EEC	
Mode of operation	Type 1.B EN 60730-1	
Maintenance	Maintenance-free	
Weight	0.5 kg (without ball valve)	

Dimensions [mm]

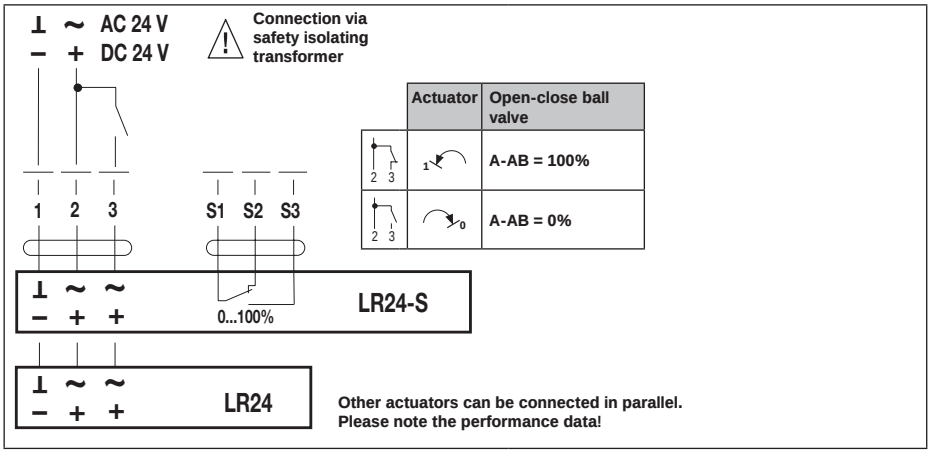


Important

- **Suitable characterized control valves and open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 34**
- **Installation dimensions: page 34**



Wiring diagram



Technical data

Nominal voltage	AC 24 V 50/60 Hz, DC 24 V	
Power supply range	AC/DC 19.2...28.8 V	
For wire sizing	2 VA	
Power consumption	1.5 W	
Connection	Motor	Cable 1 m, 3 x 0.75 mm²
	Auxiliary switch (LR24-S)	Cable 1 m, 3 x 0.75 mm²
Auxiliary switch (LR24-S)	1 x EPU 5 (1.5) A, AC 250 V **II**	
	Adjustable switching point, 0...100%	
Manual operation	Pushbutton, self-resetting	
Torque	min. 4 Nm (at nominal voltage)	
Angle of rotation	max. 95°	
Running time	80...110 s (0...4 Nm)	
Sound power level	max. 35 dB (A)	
Position indication	Scale plate 0...1	
Protection class	**III** Safety extra-low voltage	
Degree of protection	IP 40	
Ambient temperature range	0...+50°C (together with ball valve)	
Temperature of medium	+5...+100ºC (ball valve)	
Non-operating temperature	–40...+80°C	
Humidity test	To EN 60730-1	
EMC	**CE** according to 89/336/EEC	
LV Directive	**CE** according to 73/23/EEC	
Mode of operation	Type 1.B EN 60730-1	
Maintenance	Maintenance-free	
Weight	0.55 kg (without ball valve)	

Rotary actuator for 2 and 3-way open-close ball valves DN 15...32

Open-close actuator (AC/DC 24 V)

Open-close control

Application

Operation of open-close ball valves.

Mode of operation

Open-close control is effected with 1-wire control.

Product features

Simple direct mounting on the open-close ball valve using only one screw. The mounting position in relation to the open-close ball valve can be selected in 90° steps.

Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

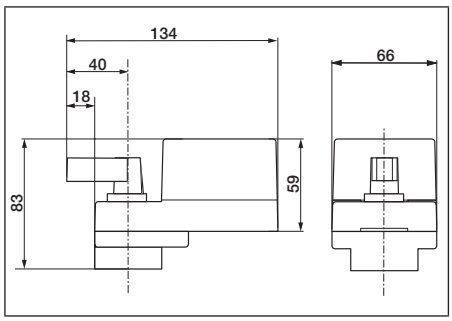
Manual operation possible by lever (the gearing latch remains disengaged as long as the self-resetting pushbutton on the housing is pressed).

Signalization: 0...10%, with adjustable auxiliary switch (LR24-S only).

Ordering examples:

a) LR24 rotary actuator with R.. open-close ball valve fitted
   – Order code: R..+LR24
b) LR24 rotary actuator and R.. open-close ball valve supplied separately
   – Order code: R../LR24
c) LR24 rotary actuator packed loose
   – Order code: LR24

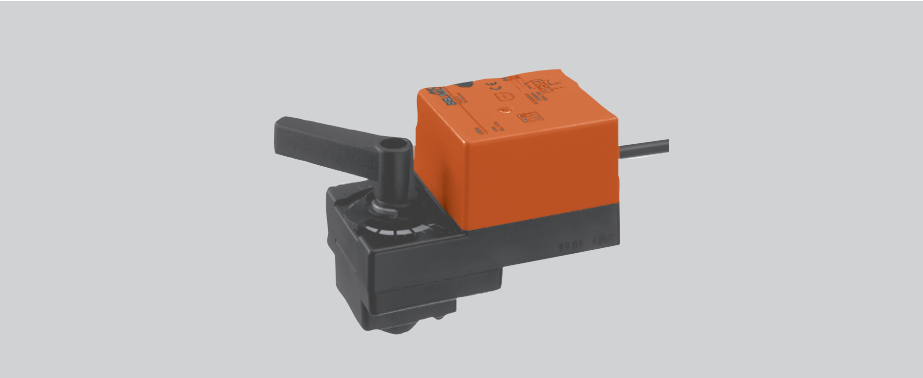
Dimensions [mm]



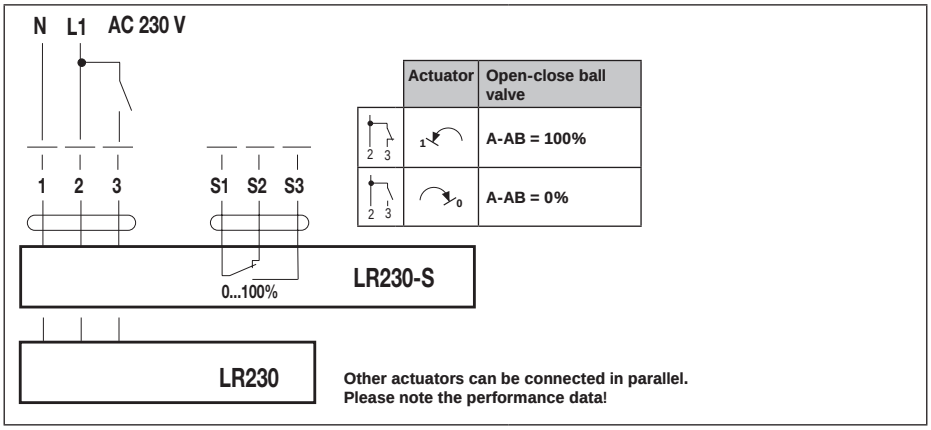
Important

- **Suitable open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 34**
- **Installation dimensions: page 34**

ENG-93001-93530-09.04 • Subject to modifications



Wiring diagram



Technical data

Nominal voltage	AC 230 V 50/60 Hz	
Power supply range	AC 198...264 V	
For wire sizing	12 VA	
Power consumption	1 W	
Connection	Motor	Cable 1 m, 3 x 0.75 mm^2
	Auxiliary switch (LR230-S)	Cable 1 m, 3 x 0.75 mm^2
Auxiliary switch (LR230-S)	1 x EPU 5 (1.5) A, AC 250 V **II**	
	Adjustable switching point, 0...100%	
Manual operation	Pushbutton, self-resetting	
Torque	min. 4 Nm (at nominal voltage)	
Angle of rotation	max. 95°	
Running time	80...110 s (0...4 Nm)	
Sound power level	max. 35 dB (A)	
Position indication	Scale plate 0...1	
Protection class	**II** Totally insulated	
Degree of protection	IP 40	
Ambient temperature range	0...+50°C (together with ball valve)	
Temperature of medium	+5...+100ºC (ball valve)	
Non-operating temperature	–40...+80°C	
Humidity test	To EN 60730-1	
EMC	**CE** according to 89/336/EEC	
LV Directive	**CE** according to 73/23/EEC	
Mode of operation	Type 1.B EN 60730-1	
Maintenance	Maintenance-free	
Weight	0.55 kg (without ball valve)	

Rotary actuator for 2 and 3-way open-close ball valves DN 15...32

Open-close actuator (AC 230 V)

Open-close control

Application

Operation of open-close ball valves.

Mode of operation

Open-close control is effected with 1-wire control.

Product features

Simple direct mounting on the open-close ball valve using only one screw. The mounting position in relation to the open-close ball valve can be selected in 90° steps.

Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

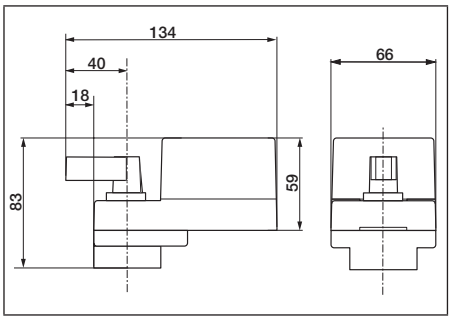
Manual operation possible by lever (the gearing latch remains disengaged as long as the self-resetting pushbutton on the housing is pressed).

Signalization: 0...10%, with adjustable auxiliary switch (LR230-S only).

Ordering examples:

a) LR230 rotary actuator with R.. open-close ball valve fitted
   – Order code: R..+LR230
b) LR230 rotary actuator and R.. open-close ball valve supplied separately
   – Order code: R../LR230
c) LR230 rotary actuator packed loose
   – Order code: LR230

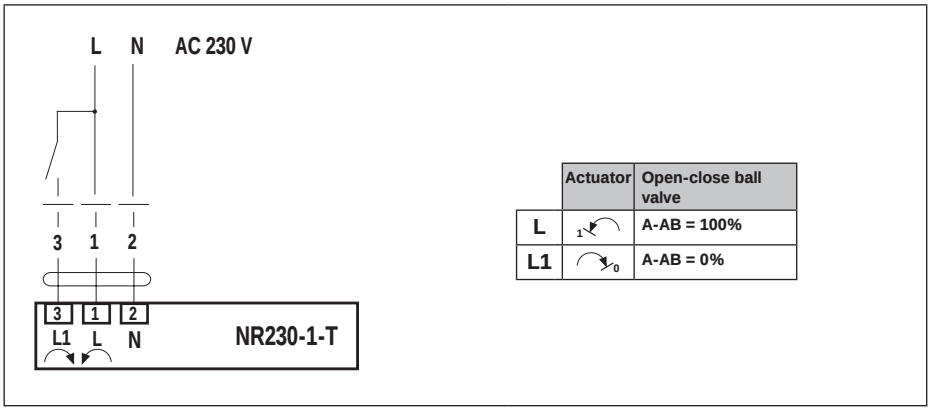
Dimensions [mm]



Important

- **Suitable open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 34**
- **Installation dimensions: page 34**

Wiring diagram



Technical data

Nominal voltage	AC 230 V 50/60 Hz
Power supply range	AC 198...264 V
For wire sizing	3.5 VA
Power consumption	3.5 W
Connection	Screw terminals
Manual operation	Temporary and permanent disengagement of the gearing latch by means of the rotary knob on the housing
Torque	min. 10 Nm (at nominal voltage)
Angle of rotation	90°
Running time	140 s
Sound power level	max. 35 dB (A)
Position indication	Scale plate 0...1
Protection class	**II** Totally insulated
Degree of protection	IP 40
Ambient temperature range	0...+50°C (duty cycle 140/35 s)
Temperature of medium	+5...+120ºC (ball valve)
Non-operating temperature	–30...+80°C
Humidity test	To EN 60730-1
EMC	**CE** according to 89/336/EEC
LV Directive	**CE** according to 73/23/EEC
Mode of operation	Type 1.B EN 60730-1
Maintenance	Maintenance-free
Weight	0.5 kg (without ball valve)

Rotary actuator for 2 and 3-way open-close ball valves DN 15...80

Open-close actuator (AC 230 V)

Open-close control

Application

Operation of open-close ball valves.

Mode of operation

Open-close control is effected with 1-wire control.

Product features

Simple direct mounting on the open-close ball valve using only one screw. The mounting position in relation to the open-close ball valve can be selected in 90° steps.

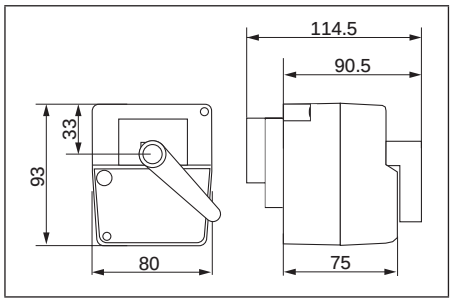
Functional reliability: The actuator automatically stops when the end stops are reached.

Manual operation possible by lever (temporary disengagement of the gearing latch by pressing, permanent disengagement by means of the rotary knob on the housing).

Ordering examples:

a) NR230-1-T rotary actuator with R.. open-close ball valve fitted
   – Order code: R..+NR230-1-T
b) NR230-1-T rotary actuator and R.. open-close ball valve supplied separately
   – Order code: R../NR230-1-T
c) NR230-1-T rotary actuator packed loose
   – Order code: NR230-1-T+WNR
   (WNR mounting kit for ball valve)

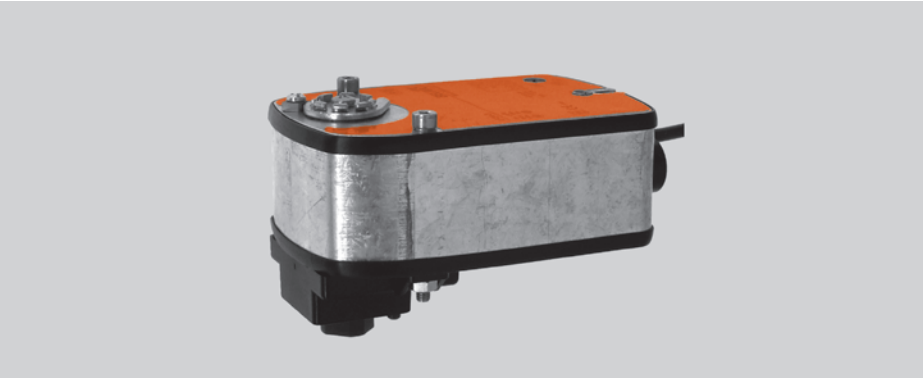
Dimensions [mm]



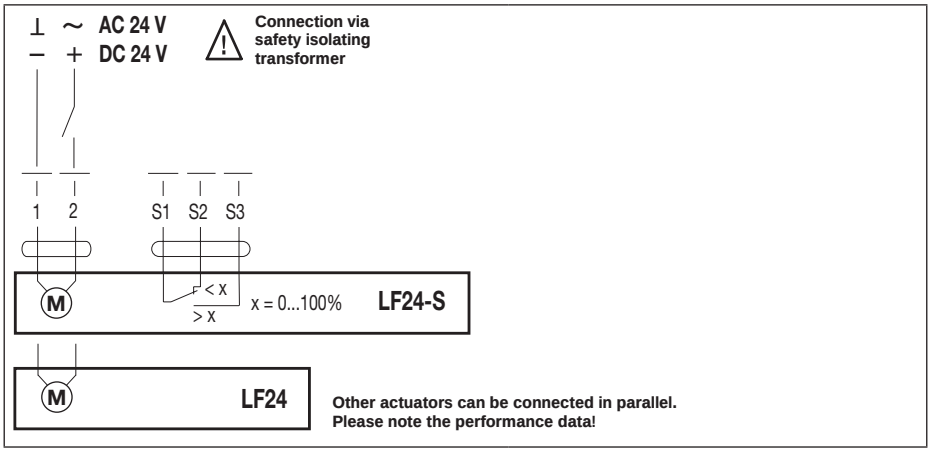
Important

- **Suitable characterized control valves and open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 34**
- **Installation dimensions: page 34**

ENG-93001-93530-09.04 • Subject to modifications



Wiring diagram



Technical data

Nominal voltage	AC 24 V 50/60 Hz, DC 24 V	
Power supply range	AC 19.2...28.8 V, DC 21.6...28.8 V	
For wire sizing	7 VA (Imax 5.8 A @ 5 ms)	
Power consumption	When charging spring	5 W
	In holding position	2.5 W
Connection	Motor	Cable 1 m, 2 x 0.75 mm^2
	Auxiliary switch (LF24-S)	Cable 1 m, 3 x 0.75 mm^2
Auxiliary switch (LF24-S)	1 x EPU 6 (1.5) A, AC 250 V **II**	
	Adjustable switching point, 0...100% ◁	
Direction of rotation	Reversible by mounting L / R	
Torque	Motor	min. 4 Nm (at nominal voltage)
	Spring return	min. 4 Nm
Angle of rotation	max. 95° (37...100% adjustable ◁ with integral, mechanical angle of rotation limiting)	
Running time	Motor	40...75 s (0...4 Nm)
	Spring return	~20 s @ –20...50°C / max. 60 s @ –30°C
Sound power level	Motor	max. 50 dB (A)
	Spring return	~62 dB (A)
Service life	min. 60 000 safety positions	
Position indication	Mechanical	
Protection class	**III** Safety extra-low voltage	
Degree of protection	IP 54	
Ambient temperature range	–30...+50°C	
Temperature of medium	+5...+100ºC (ball valve)	
Non-operating temperature	–40...+80°C	
Humidity test	To EN 60730-1	
EMC	**CE** according to 89/336/EEC	
LV Directive	**CE** according to 73/23/EEC	
Maintenance	Maintenance-free	
Weight	1.4 kg (without ball valve)	

Rotary actuator for 2 and 3-way open-close ball valves DN 15...32 with emergency control function

Open-close actuator (AC/DC 24 V)

Open-close control

Application

Operation of open-close ball valves.

Mode of operation

Open-close control is effected with 1-wire control.
The LF.. actuator moves the open-close ball valve into the operating position while simultaneously charging the return spring. The open-close ball valve is turned back into the safety position by the application of spring energy when the power supply is interrupted.

Product features

Simple direct mounting on the open-close ball valve using only one screw. The mounting position in relation to the open-close ball valve can be selected in 90° steps.

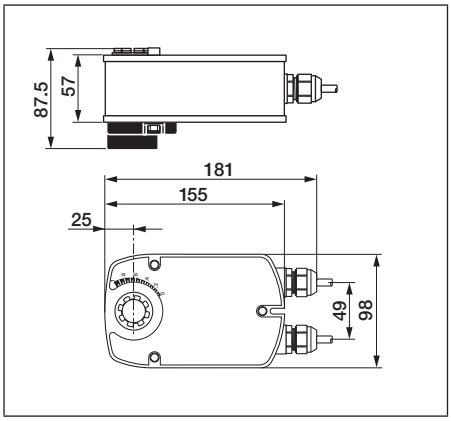
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Signalization: 0...100%, with adjustable auxiliary switch (LF24-S only).

Ordering examples:

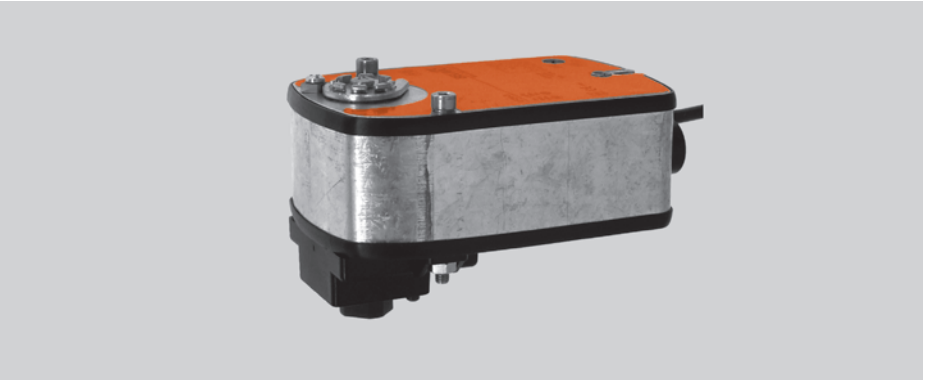
a) LF24 rotary actuator with R.. open-close ball valve fitted
   – Order code: R..+LF24
b) LF24 rotary actuator and R.. open-close ball valve supplied separately
   – Order code: R../LF24
c) LF24 rotary actuator packed loose
   – Order code: LF24+WLF
   (WLF mounting kit for ball valve)

Dimensions [mm]

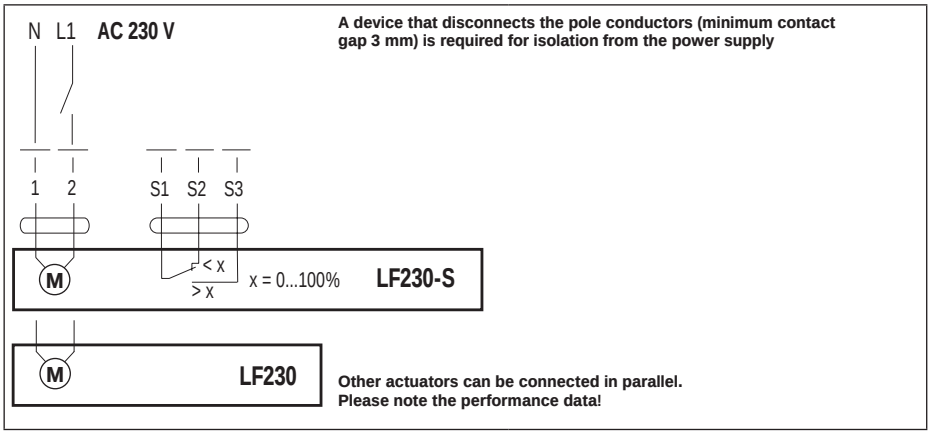


Important

- **Suitable open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 36**
- **Installation dimensions: page 36**



Wiring diagram



Technical data

Nominal voltage	AC 230 V 50/60 Hz	
Power supply range	AC 198...264 V	
For wire sizing	7 VA (Imax 150 mA @ 10 ms)	
Power consumption	When charging spring	5 W
	In holding position	3 W
Connection	Motor	Cable 1 m, 2 x 0.75 mm²
	Auxiliary switch (LF230-S)	Cable 1 m, 3 x 0.75 mm²
Auxiliary switch (LF230-S)	1 x EPU 6 (1.5) A, AC 250 V **II**	
	Adjustable switching point, 0...100% ◁	
Direction of rotation	Reversible by mounting L / R	
Torque	Motor	min. 4 Nm (at nominal voltage)
	Spring return	min. 4 Nm
Angle of rotation	max. 95° (37...100% ◁ adjustable with integral, mechanical angle of rotation limiting)	
Running time	Motor	40...75 s (0...4 Nm)
	Spring return	~20 s @ –20...50°C / max. 60 s @ –30°C
Sound power level	Motor	max. 50 dB (A)
	Spring return	~62 dB (A)
Service life	min. 60 000 safety positions	
Position indication	Mechanical	
Protection class	**II** Totally insulated	
Degree of protection	IP 54	
Ambient temperature range	–30...+50°C	
Temperature of medium	+5...+100ºC (ball valve)	
Non-operating temperature	–40...+80°C	
Humidity test	To EN 60730-1	
EMC	**CE** according to 89/336/EEC	
LV Directive	**CE** according to 73/23/EEC	
Maintenance	Maintenance-free	
Weight	1.55 kg (without ball valve)	

Rotary actuator for 2 and 3-way open-close ball valves DN 15...32 with emergency control function

Open-close actuator (AC 230 V)

Open-close control

Application

Operation of open-close ball valves.

Mode of operation

Open-close control is effected with 1-wire control.
The LF.. actuator moves the open-close ball valve into the operating position while simultaneously charging the return spring. The open-close ball valve is turned back into the safety position by the application of spring energy when the supply voltage is interrupted.

Product features

Simple direct mounting on the open-close ball valve using only one screw. The mounting position in relation to the open-close ball valve can be selected in 90° steps.

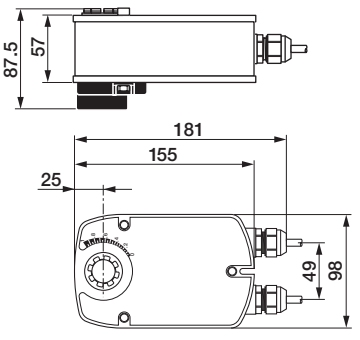
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Signalization: 0...100%, with adjustable auxiliary switch (LF230-S only).

Ordering examples:

a) LF230 rotary actuator with R.. open-close ball valve fitted
   – Order code: R..+LF230
b) LF230 rotary actuator and R.. open-close ball valve supplied separately
   – Order code: R../LF230
c) LF230 rotary actuator packed loose
   – Order code: LF230+WLF
   (WLF mounting kit for ball valve)

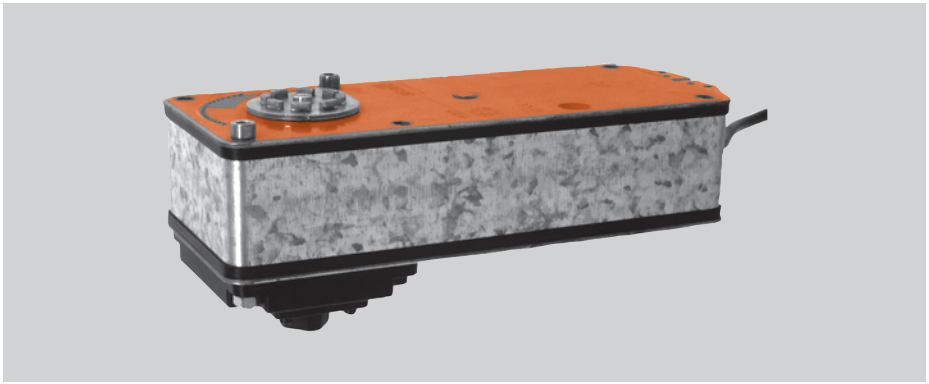
Dimensions [mm]



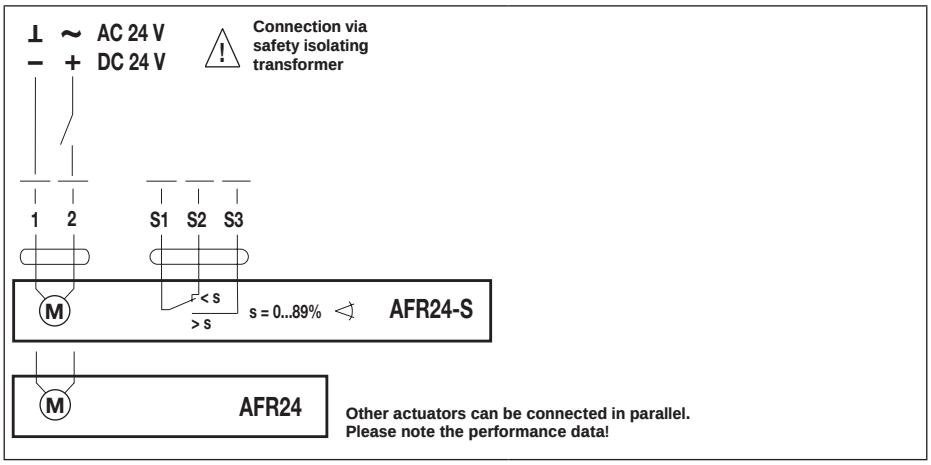
Important

- **Suitable open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 36**
- **Installation dimensions: page 36**

ENG-93001-93530-09.04 • Subject to modifications



Wiring diagram



Technical data

Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
Power supply range	AC 19.2...28.8 V, DC 21.6...28.8 V
For wire sizing	10 VA
Power consumption	When charging spring 5 W In holding position 1.5 W
Connection	Motor Cable 1 m, 2 x 0.75 mm² Auxiliary switch (AFR24-S) Cable 1 m, 3 x 0.75 mm²
Auxiliary switch (AFR24-S)	1 x EPU 6 (3) A, AC 250 V **II** Adjustable switching point, 0...89%
Direction of rotation	Reversible by mounting L / R
Torque	Motor min. 15 Nm (at nominal voltage) Spring return min. 15 Nm
Angle of rotation	max. 95° (adjustable from 33% in 5.5% steps with ZDB-AF angle of rotation limiting)
Running time	Motor ~150 s Spring return ~16 s
Sound power level	Motor max. 45 dB (A) Spring return ~62 dB (A)
Service life	min. 60 000 safety positions
Position indication	Mechanical
Protection class	**III** Safety extra-low voltage
Degree of protection	IP 54
Ambient temperature range	–30...+50°C
Temperature of medium	+5...+100ºC (ball valve)
Non-operating temperature	–40...+80°C
Humidity test	To EN 60730-1
EMC	**CE** according to 89/336/EEC
LV Directive	**CE** according to 73/23/EEC
Maintenance	Maintenance-free
Weight	3 kg (without ball valve)

Rotary actuator for 2 and 3-way open-close ball valves DN 15...80 with emergency control function

Open-close actuator (AC/DC 24 V)

Open-close control

Application

Operation of open-close ball valves.

Mode of operation

Open-close control is effected with 1-wire control.
The AFR.. actuator moves the open-close ball valve into the operating position while simultaneously charging the return spring. The open-close ball valve is turned back into the safety position by the application of spring energy when the power supply is interrupted.

Product features

Simple direct mounting on the open-close ball valve using only one screw. The mounting position in relation to the open-close ball valve can be selected in 90° steps.

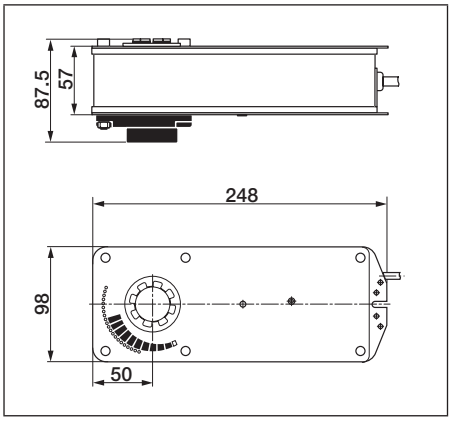
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Signalization: 0...89%, with adjustable auxiliary switch (AFR24-S only).

Ordering examples:

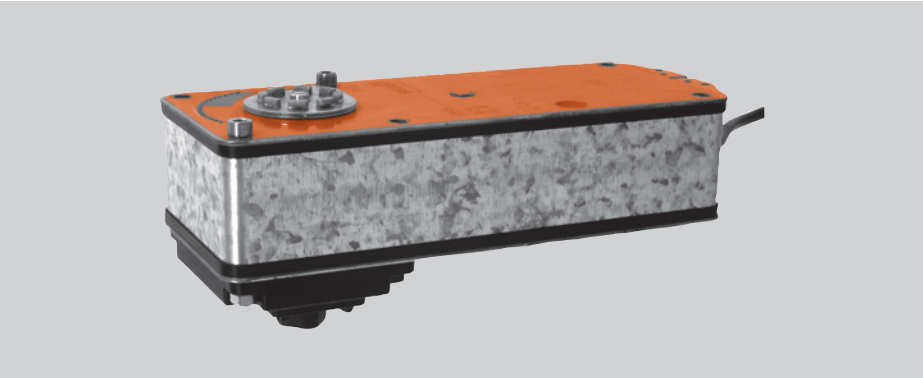
a) AFR24 rotary actuator with R.. open-close ball valve fitted
   – Order code: R..+AFR24
b) AFR24 rotary actuator and R.. open-close ball valve supplied separately
   – Order code: R../AFR24
c) AFR24 rotary actuator packed loose
   – Order code: AFR24+WAFR
   (WAFR mounting kit for ball valve)

Dimensions [mm]

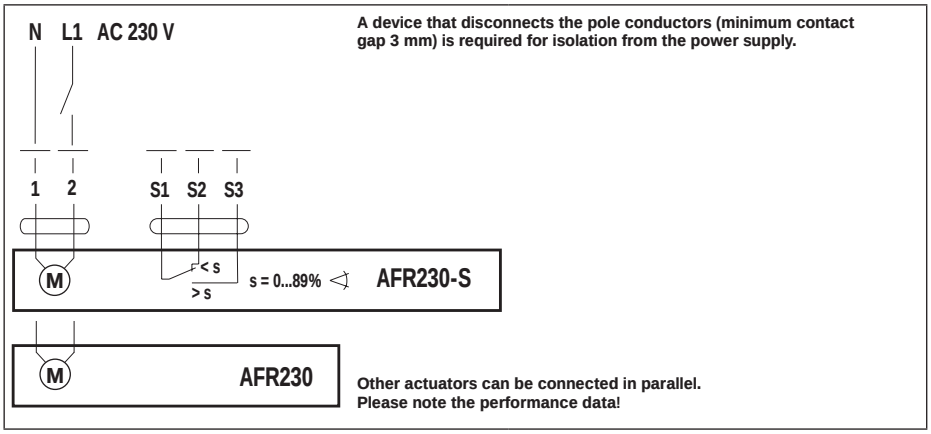


Important

- **Suitable open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 36**
- **Installation dimensions: page 36**



Wiring diagram



Technical data

Nominal voltage	AC 230 V 50/60 Hz	
Power supply range	AC 198...264 V	
For wire sizing	11 VA	
Power consumption	When charging spring	6.5 W
	In holding position	2.5 W
Connection	Motor	Cable 1 m, 2 x 0.75 mm²
	Auxiliary switch (AFR230-S)	Cable 1 m, 3 x 0.75 mm²
Auxiliary switch (AFR230-S)	1 x EPU 6 (3) A, AC 250 V **II**	
	Adjustable switching point, 0...89%	
Direction of rotation	Reversible by mounting L / R	
Torque	Motor	min. 15 Nm (at nominal voltage)
	Spring return	min. 15 Nm
Angle of rotation	max. 95° (adjustable from 33% in 5.5% steps with ZDB-AF angle of rotation limiting)	
Running time	Motor	~150 s
	Spring return	~16 s
Sound power level	Motor	max. 45 dB (A)
	Spring return	~62 dB (A)
Service life	min. 60 000 safety positions	
Position indication	Mechanical	
Protection class	**II** Totally insulated	
Degree of protection	IP 54	
Ambient temperature range	–30...+50°C	
Temperature of medium	+5...+100ºC (ball valve)	
Non-operating temperature	–40...+80°C	
Humidity test	To EN 60730-1	
EMC	**CE** according to 89/336/EEC	
LV Directive	**CE** according to 73/23/EEC	
Maintenance	Maintenance-free	
Weight	3 kg (without ball valve)	

Rotary actuator for 2 and 3-way open-close ball valves DN 15...80 with emergency control function

Open-close actuator (AC 230 V)

Open-close control

Application

Operation of open-close ball valves.

Mode of operation

Open-close control is effected with 1-wire control.
The AFR.. actuator moves the open-close ball valve into the operating position while simultaneously charging the return spring. The open-close ball valve is turned back into the safety position by the application of spring energy when the power supply is interrupted.

Product features

Simple direct mounting on the open-close ball valve using only one screw. The mounting position in relation to the open-close ball valve can be selected in 90° steps.

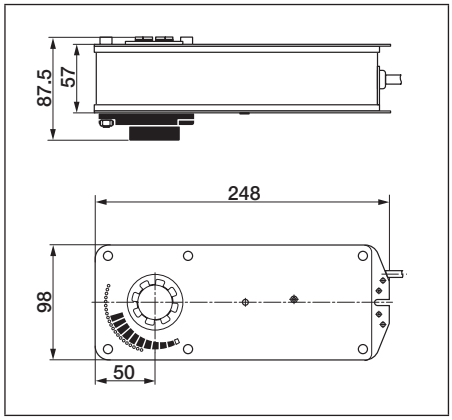
Functional reliability: The actuator is overload-proof and automatically stops when the end stops are reached.

Signalization: 0...89%, with adjustable auxiliary switch (AFR230-S only).

Ordering examples:

a) AFR230 rotary actuator with R.. open-close ball valve fitted
   – Order code: R..+AFR230
b) AFR230 rotary actuator and R.. open-close ball valve supplied separately
   – Order code: R../AFR230
c) AFR230 rotary actuator packed loose
   – Order code: AFR230+WAFR
   (WAFR mounting kit for ball valve)

Dimensions [mm]

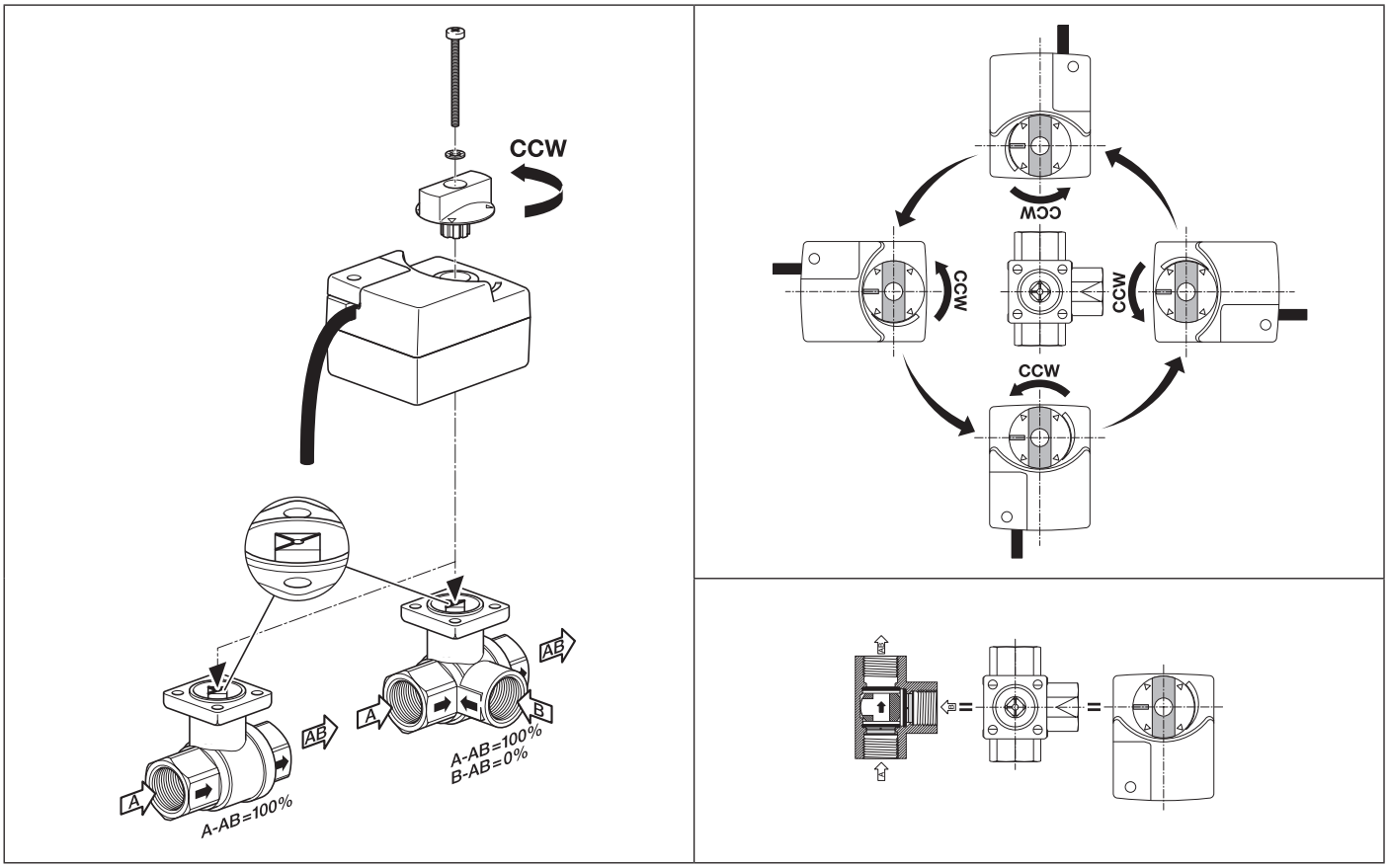


Important

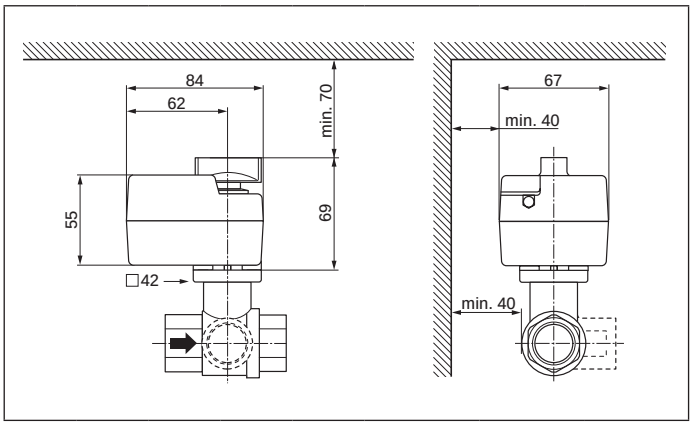
- **Suitable open-close ball valves: pages 8 to 11**
- **Use and safety: page 2**
- **Installation instructions: page 36**
- **Installation dimensions: page 36**

ENG-93001-93530-09.04 • Subject to modifications

Installation of TR.. rotary actuator with R.. ball valve

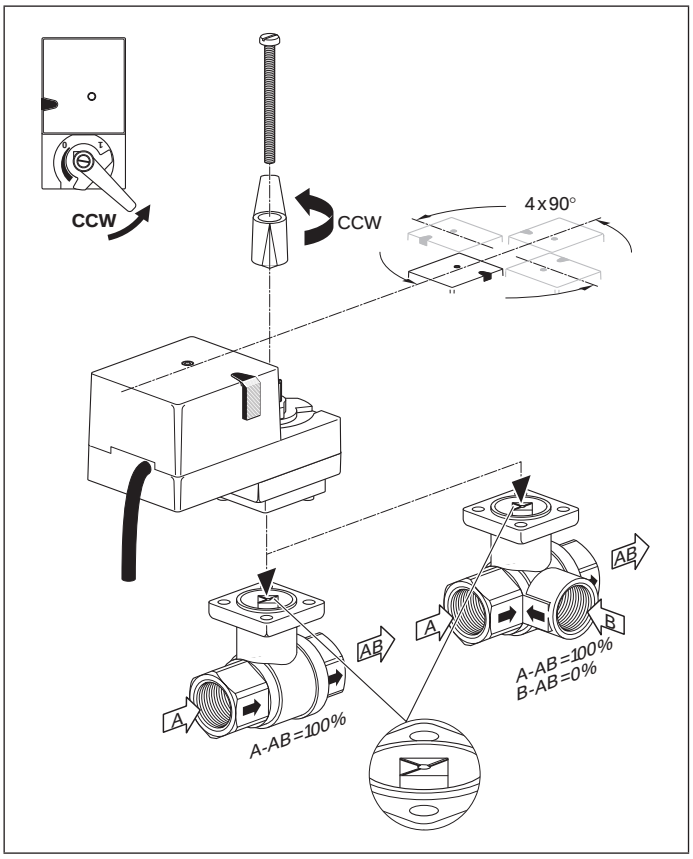


Installation dimensions, TR.. + R..

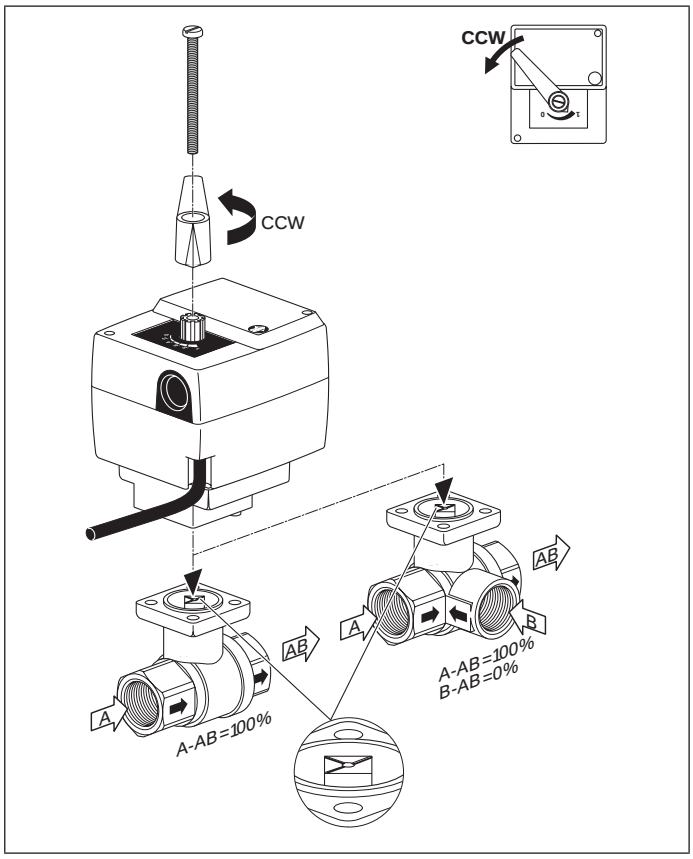


Delivery condition of R..+TR.. :
- Ball valve open
- Lever of the rotary actuator in the counterclockwise end position (ccw)
- Cable connected to port A
- Ball valve dimensions: page 12/13

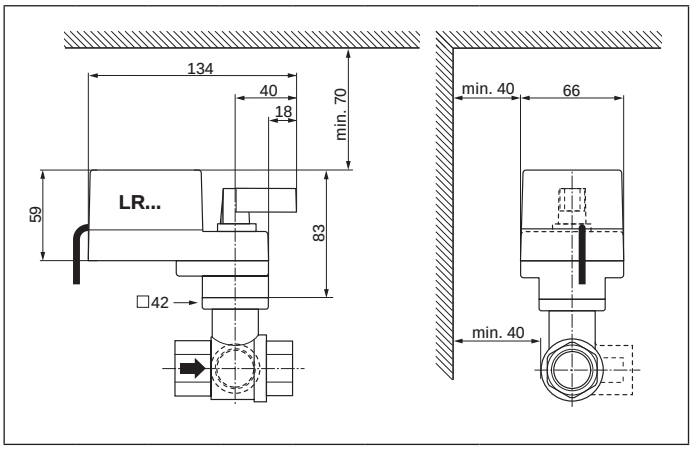
Installation of LR.. rotary actuator with R.. ball valve



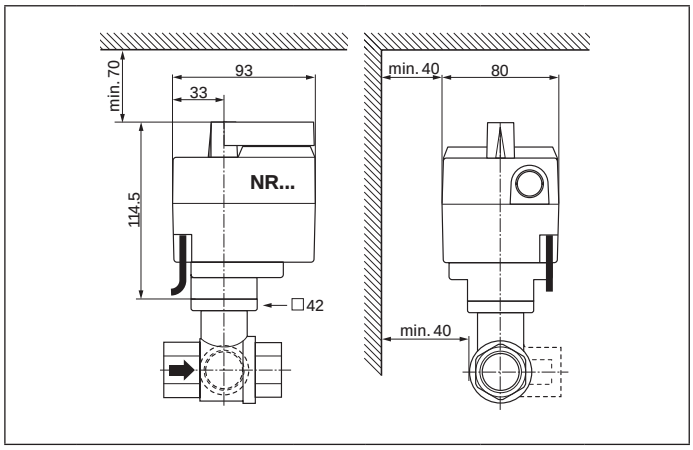
Installation of NR.. rotary actuator with R.. ball valve



Installation dimensions, LR.. + R..



Installation dimensions, NR.. + R..

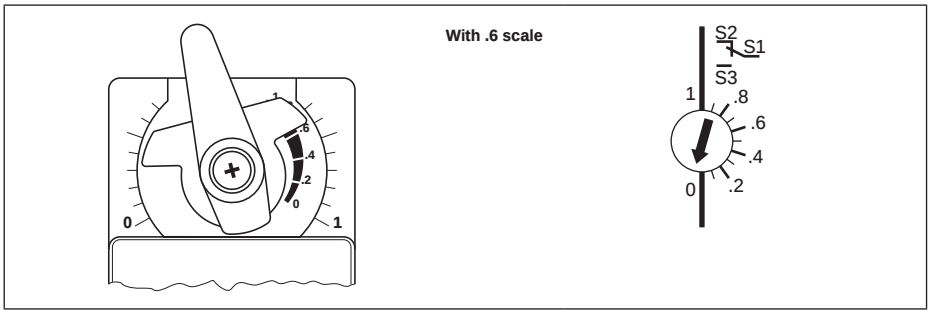


Delivery condition of R..+LR.. :
- Ball valve open
- Lever of the rotary actuator in the counterclockwise end position (ccw)
- Cable connected to port A
- Ball valve dimensions: page 12/13

Delivery condition of R..+NR.. :
- Ball valve open
- Lever of the rotary actuator in the counterclockwise end position (ccw)
- Cable connected to port A
- Ball valve dimensions: page 12/13

ENG-93001-93530-09.04 • Subject to modifications

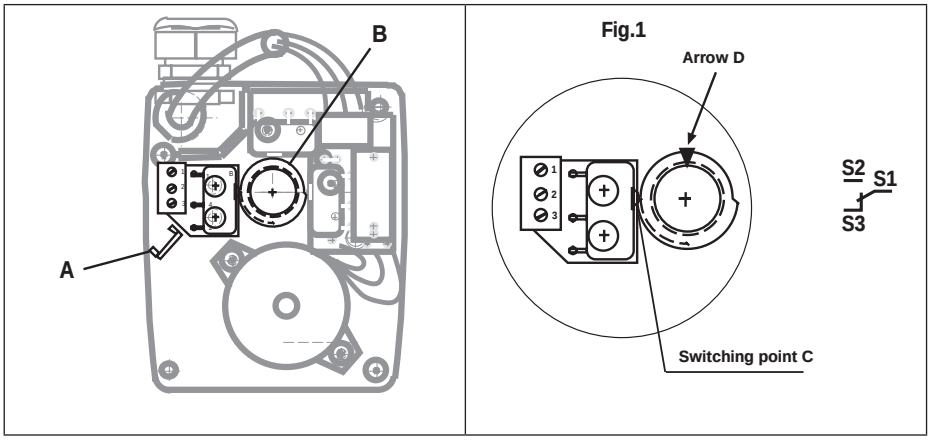
Adjusting LR24-S and LR230-S auxiliary switches



Procedure:

1. Press the manual pushbutton and move the actuator by hand into the position in which it must be switched (e.g. 60% angle of rotation).
2. Turn the scale knob of the auxiliary switch clockwise (cw) and slightly overtravel the 0 on the switch scale with the arrowhead (connection S1–S3 is switched and a 60% angle of rotation is programmed as the switching point).

Adjusting NR24-3-S and NR230-3-S auxiliary switches

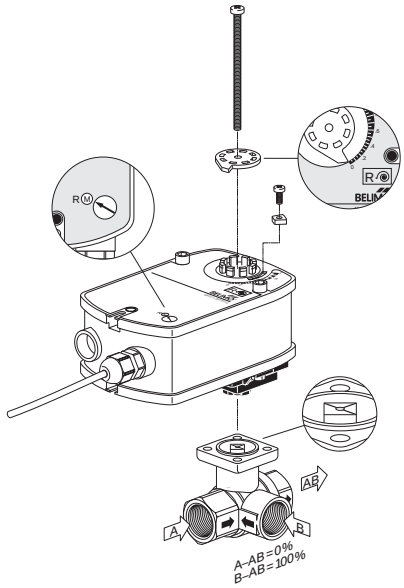


Procedure:

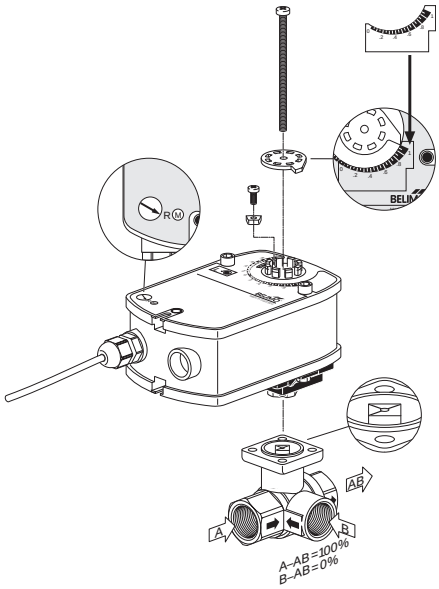
1. Remove the cover of the housing.
2. Press down the manual disengagement A on the actuator and turn the actuator into the required switching position of the auxiliary switch by means of the lever.
3. Insert the cam ring B as shown in Fig. 1, so that the switching point C just about operates the switch. Connection S1–S2 is switched (the arrow D is now at the top).
4. Assemble the cover of the housing.

Installation of LF.. rotary actuator with R.. ball valve

NC

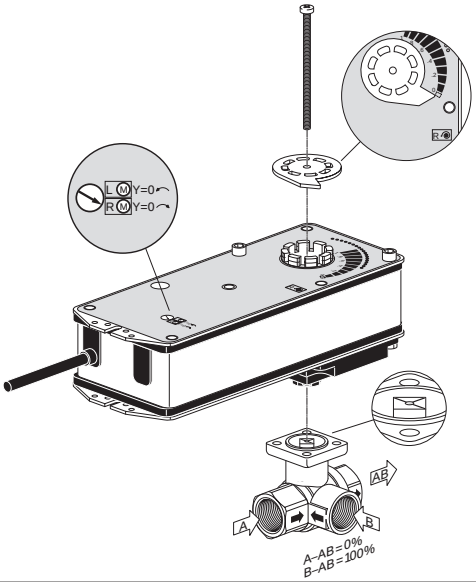


NO

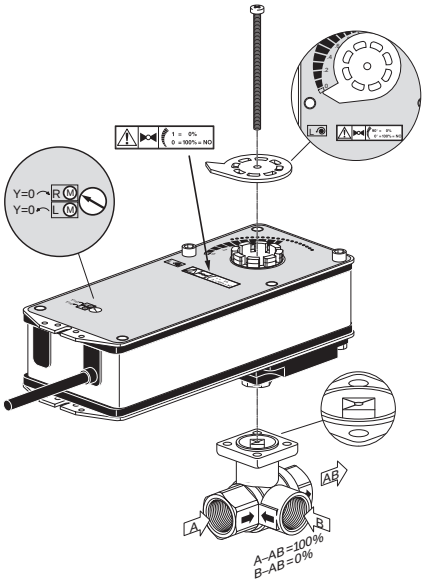


Installation of AFR.. rotary actuator with R.. ball valve

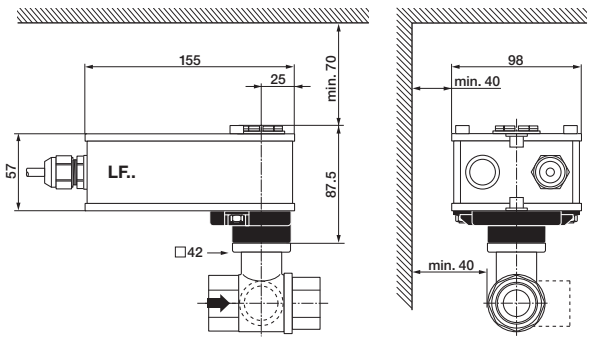
NC



NO

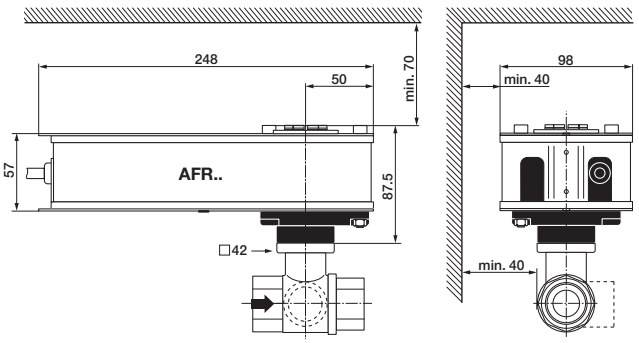


Installation dimensions, LF.. + R..



Delivery condition of R..+LF.. :
- Type of installation for NC: ball valve A–AB closed (safety position)
- Type of installation for NO: ball valve A–AB open (safety position)
- Cable connected to port A
- Ball valve dimensions: page 12/13

Installation dimensions, AFR.. + R..

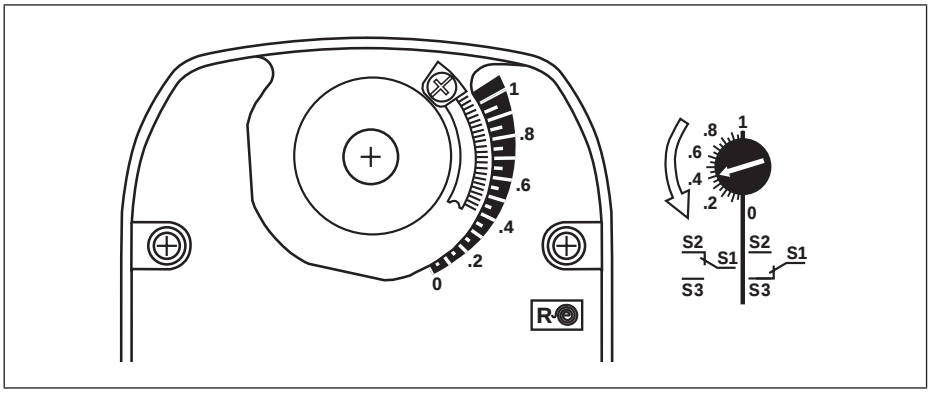


Delivery condition of R..+AFR.. :
- Type of installation for NC: ball valve A–AB closed (safety position)
- Type of installation for NO: ball valve A–AB open (safety position)
- Cable connected to port A
- Ball valve dimensions: page 12/13

ENG-93001-93530-09.04 • Subject to modifications

Adjusting LF24-S and LF230-S auxiliary switches

Installation side R



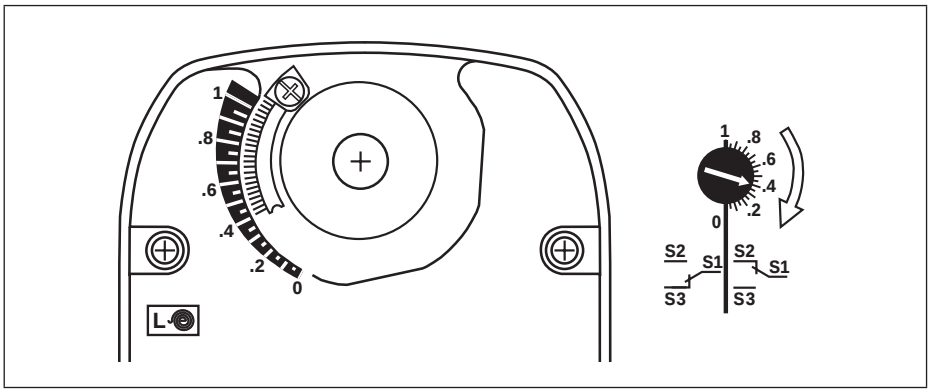
Initial situation:

Actuator in safety position

Procedure:

1. Turn the knob of the auxiliary switch so that the arrow indicates the required switching point (see diagram opposite).
   Example: Switching point setting = .4 corresponds to 40% angle of rotation.
2. If the actuator is now turned into the operating position (ccw ↺), the knob also turns ccw ↺.
   The auxiliary switch is switched as soon as the arrowhead overtravels 0 on the scale (connection S1–S3 is switched).

Installation side L



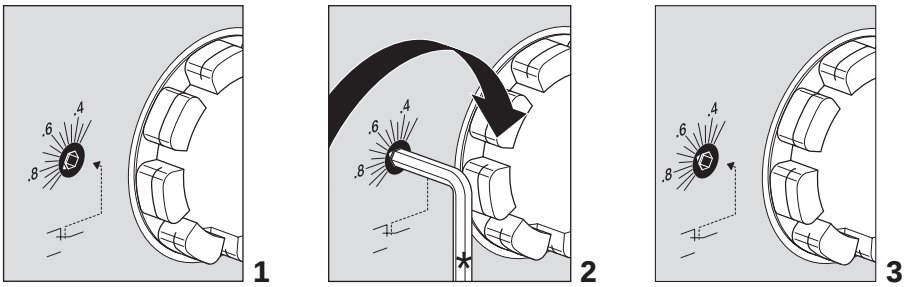
Initial situation:

Actuator in safety position

Procedure:

1. Turn the knob of the auxiliary switch so that the arrow indicates the required switching point (see diagram opposite).
   Example: Switching point setting = .4 corresponds to 40% angle of rotation.
2. If the actuator is now turned into the operating position (cw ↻), the knob also turns cw ↻.
   The auxiliary switch is switched as soon as the arrowhead overtravels 0 on the scale (connection S1–S3 is switched).

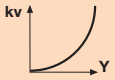
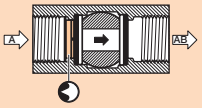
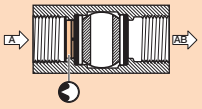
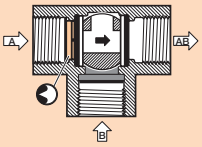
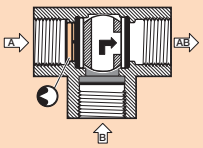
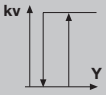
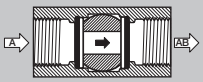
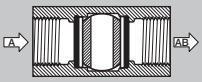
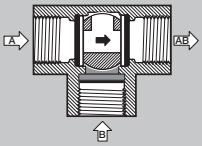
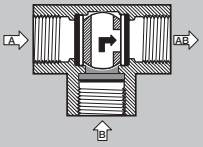
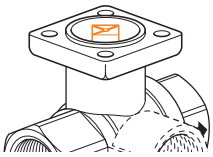
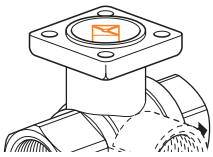
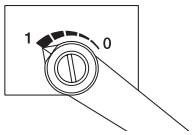
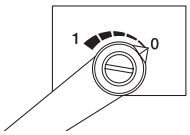
Adjusting AFR24-S and AFR230-S 1 2 3 auxiliary switches



1 2 3

* 3 mm (1/8") hexagonal key not included with the actuator, see Fig. 2

Specified directions of flow

Characterized control valves  		A-AB open		A-AB closed	2-way R2..
		A-AB open		A-AB closed	3-way R3..
Open-close ball valves  		A-AB open		A-AB closed	2-way R2..
		A-AB open		A-AB closed	3-way R3..
Stem position corresponding to ball valve flow direction				A-AB closed	For 2-way and 3-way ball valves
Actuator position corresponding to ball valve flow direction		Actuator 100%		Actuator 0% A-AB closed	

Flow characteristics of characterized control valves

2-way

The flow characteristic is equal-percentage, with a characteristic factor of n(ep) 3.2 or 3.9. This ensures stable control behavior in the elevated part–load range. In the lower part of the opening range between 0 and 30% working range the characteristic is linear. This ensures excellent control behavior in the lower part-load range too. The working range between 0 and 100% corresponds to an angle of rotation between 15 and 85°.

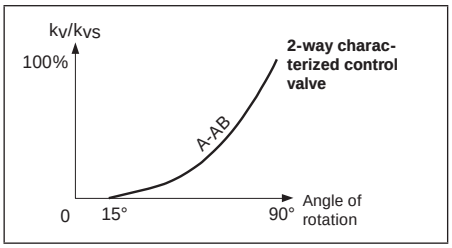
Between 0 and 15° angle of rotation the characterized control valves function as tight-sealing shut-off devices.

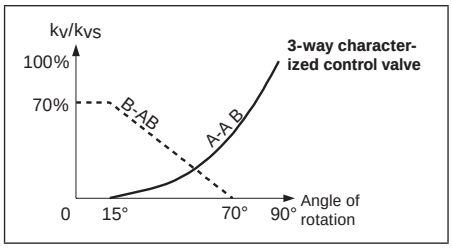
3-way

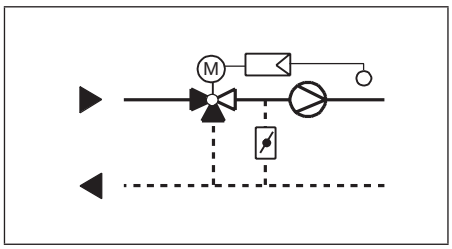
The characteristic of control path A–AB is the same as that for 2-way characterized control valves. **The bypass flow rate (B–AB) is 70% of the k_{vs} value of the control path (A–AB). The bypass has a linear characteristic.**

Note:

Owing to its ball design, the 3-way characterized control valve is only partially suitable for conventional supply temperature control systems. It is therefore advisable to design this kind of temperature control system as a double mixing circuit (see diagram below). There are no restrictions on mixing circuits for air heaters or injection circuits.







ENG-93001-93530-09.04 • Subject to modifications

Mounting positions, installation, commissioning

Separate delivery
If the ball valve is delivered separately from the rotary actuator, they can be assembled directly on site.

No special tools are needed for installation. Full instructions are supplied with the valves and actuators.

Commissioning
Commissioning must not be carried out until the ball valve and the rotary actuator have been properly assembled in accordance with the instructions.

Recommended mounting positions
The ball valves may be mounted either **vertically** (Fig. 1) or **horizontally** (Fig. 2). However, mounting the valves with the stem pointing downwards, i.e. upside down, is not recommended (Fig. 3).

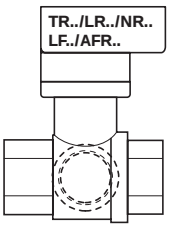


Fig. 1

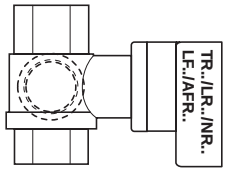


Fig. 2

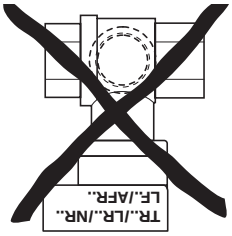


Fig. 3

Maintenance

- The ball valves and rotary actuators are maintenance-free.
- Before any kind of service work is carried out on actuator sets of this type, it is essential to isolate the rotary actuator from the power supply (by unplugging the power lead). Any pumps in the part of the piping system concerned must also be switched off and the appropriate isolating fittings closed (allow everything to cool down first if necessary and reduce the pressure in the system to atmospheric).
- The system must not be returned to service until the ball valve and the rotary actuator have been properly reassembled in accordance with the instructions and the pipework has been refilled in the proper manner.

Subsequent removal
If the application requires the ball valve to be removed subsequently, it is advisable to take appropriate precautions. Example: Provide additional, detachable ZR23.. pipe connectors (page 13).

Disposal
When a complete actuator set (ball valve and rotary actuator) has come to the end of its service life, the two parts must be dismantled, segregated and disposed of in a suitable manner.

Project design

Installation of R2.. characterized control valves, 2-way
R2.. characterized control valves are throttling devices and must therefore be installed in the return line of the system in order to ensure minimum thermal stress on the seals in the fitting. The specified direction of flow must be adhered to.

Installation of R3.. characterized control valves, 3-way
R3.. characterized control valves (3-way) are mixing devices. The specified direction of flow for each application must be adhered to. Whether they are installed in the supply or the return of a system depends on the type of hydraulic circuit that is employed.
In the case of **diverter circuits**, a balancing valve is not required in the bypass line owing to the reduced flow rate in the bypass.

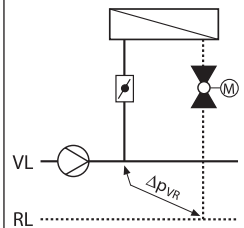
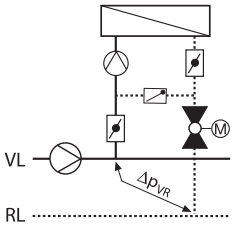
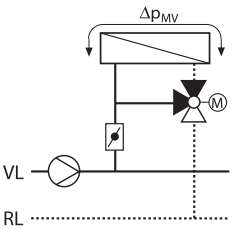
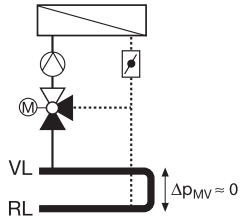
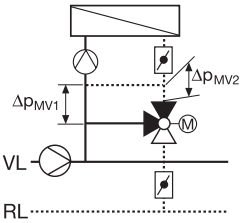
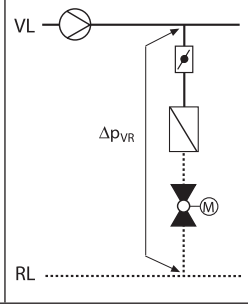
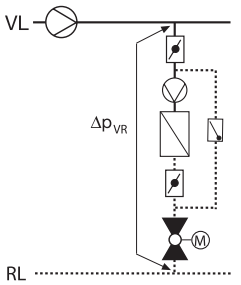
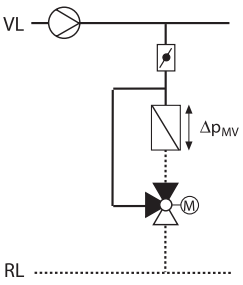
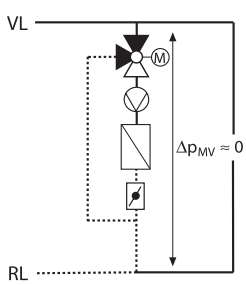
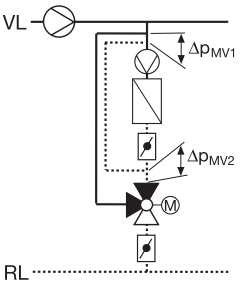
Water quality requirements
The water quality requirements specified in VDI 2035 must be adhered to.

Strainers recommended
Characterized control valves are relatively sensitive control devices. In order to ensure a long service life, it is advisable to fit strainers.

Sufficient shut-off devices
It is essential to ensure that sufficient shut-off devices are provided.

Correct valve selection and sizing
In order to ensure that the actuator set (characterized control valve and rotary actuator) achieves a long service life, it is essential for the valve to be rated for the correct differential pressure Δp_{v100}, i.e. with adequate valve authority (Pv > 0.5). The differential pressure Δp_{v100} depends on the type of hydraulic circuit in which the valve is employed.

Pressure differences Δp_{v100} with characterized control valves fully open

	Δp_{v100} R2.. characterized control valve, 2-way		Δp_{v100} R3.. characterized control valve, 3-way		
	Throttling circuit	**Injection circuit with throttling device**	**Diverter circuit**	**Mixing circuit**	**Injection circuit with 3-way characterized control valve**
	$\Delta p_{v100} > \Delta p_{VR} / 2$ Typical values: 15 kPa < Δp_{v100} < 150 kPa	$\Delta p_{v100} > \Delta p_{VR} / 2$ Typical values: 10 kPa < Δp_{v100} < 100 kPa	$\Delta p_{v100} > \Delta p_{MV}$ Typical values: 5 kPa < Δp_{v100} < 50 kPa	$\Delta p_{v100} > \Delta p_{MV}$ Typical values: Δp_{v100} > 3 kPa (unpressurized manifold). Other mixing circuits: 3 kPa < Δp_{v100} < 30 kPa	$\Delta p_{MV1} + \Delta p_{MV2} \approx 0$ Typical values: Δp_{v100} > 3 kPa
Geographic presentation					
Synoptic presentation					

Legend:

	Characterized control valve, 2-way, with rotary actuator	**VL** ——	Supply	Δp_{VR}	Differential pressure across specified section at rated load
	Characterized control valve, 3-way, with rotary actuator	**RL** ·····	Return	Δp_{MV}	Differential pressure across variable-flow section at rated load (e.g. heat exchanger)
	Pump				
	Non-return valve				
	Balancing valve				

Note: Strainers and shut-off devices are not shown.

ENG-93001-93530-09.04 • Subject to modifications

Characterized control valve with rotary actuator

Throttling or mixing valve with internal or external threads or flanges. Equal-percentage characteristic for controlling low to medium flow rates. Also available for open-close applications. Pipe connectors can be supplied as an option.

Pressure-independent control valve with rotary actuator

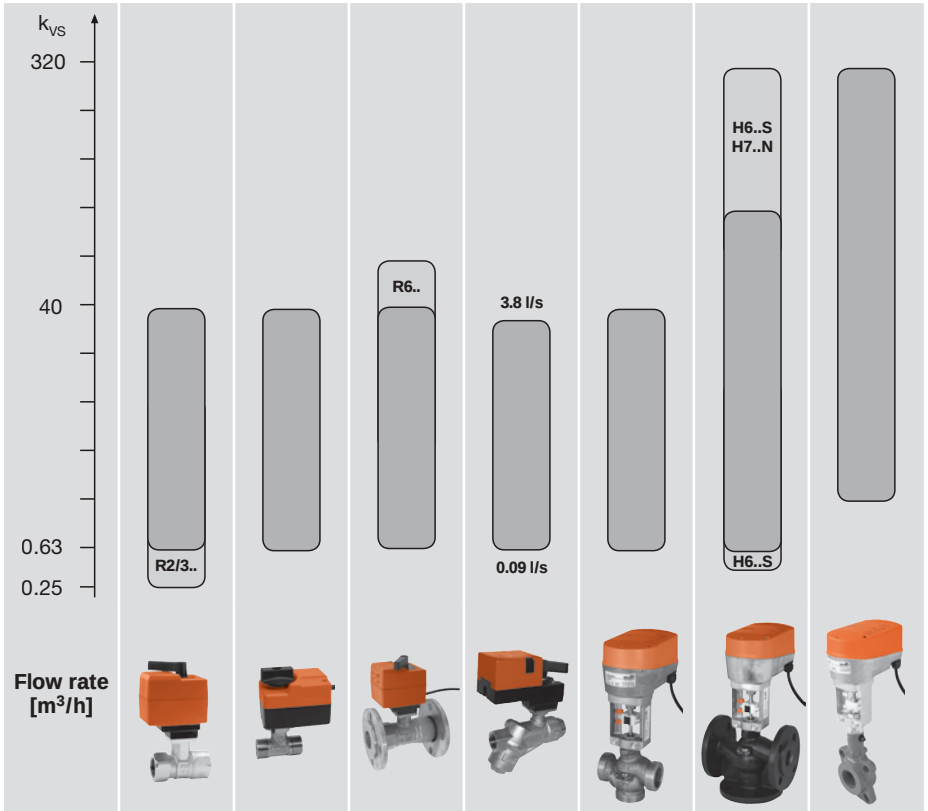
As a result of the consistent further development of the tried-and-tested Belimo characterized control valve, the valve design has been simplified with the new pressure-independent control valve R2..P. The flow rate is constant, even when the valve closes and the differential pressure increases. The valve authority is 1, even with oversized valves.

Globe valve with linear actuator

Classic globe valve with equal-percentage characteristic for controlling low to medium flow rates. Available as a straight-through or mixing valve with flanges or external threads. Also suitable for open-close duty. Actuators with an emergency control function can be supplied.

SuperCompact control valve with linear actuator, flange

With equal-percentage (standard) or linear (optional) characteristic for controlling low to medium flow rates. Designed as a straight-through valve with an intermediate flange. Also available for open-close applications.



	Characterized control valve	Characterized control valve	Characterized control valve	Pressure-independent control valve	Globe valve	Globe valve	SuperCompact control valve
	Internal thread	External thread	Flange	Internal thread	External thread	Flange	Flange
2-way	R2.. R2..K	R4..	R6..R	R2..P	H4..B	H6..N H6..S	S6..
3-way	R3.. R3..K	R5..	R7..R	–	H5..B	H7..N	–
DN	10…50	15…50	15…80	15…50	15…50	15…150 15…100 (H6..N)	20…150
P_s [kPa]	4140 / 2760*	4140 / 2760*	600	4140 / 2760*	1600	1600	1600
PN			6			16	6 / 10 / 16

* DN10…20 / DN40…50

Control valves with bus-capable actuators. For new installations Belimo offers a selected range of control valves in all the usual nominal widths. The actuators that are used with them can satisfy all application requirements.

Converting and retro-fitting globe valves. Belimo offers a wide range of intelligent linear actuators for motorizing and/or converting and retro-fitting all leading makes of valve. This also means, of course, that existing equipment can be upgraded to the latest state of the art at minimum cost. Suitable brackets make mounting the actuators a very simple task requiring no special tools.

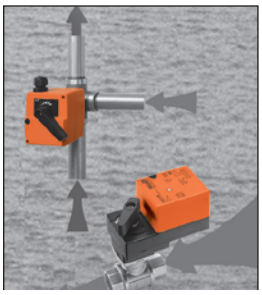
Air applications

Standard actuators and spring-return actuators for air control dampers in HVAC systems

Safety actuators for motorizing fire and smoke extraction dampers

VAV systems for individual room air control

Water applications



Mixing actuators and motorized ball valves for HVAC water circuits

Globe valves and intelligent linear actuators – also for leading makes of valve

Innovation, Quality and Consultancy: A partnership for motorizing HVAC actuators

Contact the following for further information:

Belimo Headquarters

CH BELIMO Holding AG
Brunnenbachstrasse 1
8340 Hinwil, Switzerland
Tel. +41 (0)43 843 61 11
Fax +41 (0)43 843 62 68
info@belimo.ch
www.belimo.ch

Belimo Subsidiaries

AT/ HR/ HU/ SI/ SK BELIMO Automation
Handelsgesellschaft m.b.H.
Geiselbergstrasse 26–32
1110 Wien, Austria
Tel. +43 (0)1 749 03 61-0
Fax +43 (0)1 749 03 61-99
info@belimo.at

AU BELIMO Actuators Pty. Ltd.
Unit 10, 266 Osborne Avenue
Clayton South, VIC 3169
Australia
Tel. +61 (0)3 9551 0201
Fax +61 (0)3 9551 0215
belimo@belimoactuators.com

CA BELIMO Aircontrols (CAN), Inc.
5716 Coopers Ave., Units 14&15
Mississauga, Ontario L4Z 2E8
Canada
Tel. +1 (1)905 712 31 18
Fax +1 (1)905 712 31 24
webmaster@belimo.com

CH BELIMO Automation AG
Sales Switzerland
Brunnenbachstrasse 1
8340 Hinwil, Switzerland
Tel. +41 (0)43 843 62 12
Fax +41 (0)43 843 62 66
info@belimo.ch
www.belimo.ch

DE BELIMO Stellantriebe
Vertriebs GmbH
Welfenstr. 27, Postfach 72 02 30
70599 Stuttgart, Germany
Tel. +49 (0)711 1 67 83-0
Fax +49 (0)711 1 67 83-73
info@belimo.de
www.belimo.de

ES BELIMO Ibérica
de Servomotores, S.A.
C/San Romualdo, 12–14
28037 Madrid, Spain
Tel. +34 91 304 11 11
Fax +34 91 327 25 39
info@belimo.es

FR BELIMO Servomoteurs
Z.A. de Courtry
33, Rue de la Régale
77181 Courtry, France
Tél. +33 (0)1 64 72 83 70
Fax +33 (0)1 64 72 94 09
mail@belimo.fr

GB BELIMO Automation UK Limited
Shepperton Business Park
Govett Avenue, Shepperton
Middlesex TW17 8BA
Great Britain
Tel. +44 (0)1932 260460
Fax +44 (0)1932 269222
belimo@belimo.co.uk

HK BELIMO Actuators Ltd.
Room 208, 2/F
New Commerce Centre
19 On Sum Street, Shatin, N.T.
Hong Kong
Tel. +852 26 87 17 16
Fax +852 26 87 17 95
info@belimo.com.hk

PL BELIMO Silowniki S.A.
ul. Zagadkl 21
02-227 Warszawa, Poland
Tel. +48 (0)22 886 53 05
Fax +48 (0)22 886 53 08
info@belimo.pl

SG BELIMO Actuators Pte Ltd
2, Jurong East Street 21
#04-31F IMM Building
Singapore 609601
Tel. +65 6564 9828
Fax +65 6564 9038
info@belimo.com.sg

US BELIMO Aircontrols (USA), Inc.
43 Old Ridgebury Road
P.O. Box 2928
Danbury, CT 06810 USA
Tel. +1 (1)203 791 99 15
Fax +1 (1)203 792 29 67
webmaster@belimo.com
www.belimo.com

Belimo Representatives and Agencies

AE BELIMO Trading
Middle East Office
P.O. Box 73885
Dubai, U.A.E.
Tel. +971 (0)4 295 9670
Fax +971 (0)4 295 9680
belimome@emirates.net.ae

BG BELIMO Bulgaria Ltd.
j.k. Lagera, 3 Smolyanska Str.
bl. 56, entr. B, ap. 50
1612 Sofia, Bulgaria
Tel. +3592 952 3470/1
Fax +3592 545 995
belimo@mbox.contact.bg

CN BELIMO Actuators Ltd.
Room 1305, Financial Square
No. 333 Jiujiang Road
200001 Shanghai, China
Tel. +86 21 6360 8980
Fax +86 21 6360 8981
shanghai@belimo.ch

CN BELIMO Beijing
Rm 605, Beijing Hai Chang
Edifice, 44, Liang Ma Qiao Road
Chao Yang District
100016 Beijing, China
Tel. +86 10 6462 1382
Fax +86 10 6462 1383
beijing@belimo.ch

CZ BELIMO CZ (Ing. Ivar Mentzl)
Charkovská 16
10100 Praha 10, Czech Republic
Tel. +420 (0)2 717 4 0 311
Fax +420 (0)2 717 43 057
info@belimo.cz

DK BELIMO A/S
Thomas Helstedsvej 7A
8660 Skanderborg, Denmark
Tel. +45 86 52 44 00
Fax +45 86 52 44 88
info@belimo.dk

EE BELIMO Balticum AS
Türi 10 d
11313 Tallinn, Estonia
Tel. +372 6 140 811
Fax +372 6 140 812
info@belimo.ee

FI Oy Suomen BELIMO Ab
Insinöörinkatu 2
00810 Helsinki, Finland
Tel. +358 (0)424 651 1
Fax +358 (0)424 651 250
belimo@belimo.fi

GR/ CY BELIMO Air Controls
29, Tagm. Plessa, Kallithea
GR 17674 Athens, Greece
Tel. +30 2 10 94 00 766
Fax +30 2 10 94 00 767
belimogr@tee.gr

IE Safegard Systems Ltd.
Systems House, Unit 34
Southern Cross Business Park
Bray, Co Wicklow, Ireland
Tel. +353 (0)1 2761600
Fax +353 (0)1 2761611
info@safegard.ie

IL Shemer Representations
P.O. Box 296
56101 Yehud, Israel
Tel. +972 3 536 51 67
Fax +972 3 536 05 81
shemer@shemerep.co.il

IN BELIMO Vitek Air Controls
C-114 Lancelot, First Floor
S.V. Road, Borivali (West)
Mumbai 400 092, India
Tel. +91 22 5695 9439
Fax +91 22 2807 5866
bvac@bom2.vsnl.net.in

IS Hitatækni ehf.
Langholtsvegi 109
104 Reykjavík, Iceland
Tel. +354 5 88 60 70
Fax +354 5 88 60 71
fridmar@hitataekni.is

IT BELIMO Servomotori S.r.l.
Via Stezzano, 5
24050 Zanica BG, Italy
Tel. +39 035 67 26 82
Fax +39 035 67 02 00
info@belimo.it

KR HANMO Corporation
3rd Floor, Yeosam Bldg. 648-23
Gangnam-Ku, Seoul, Korea
Tel. +822 3453 8225
Fax +822 3453 8228

LB Energy Center (EC)
Hamra, Leon Street, Shatilla,
Bldg. 4th Floor,
P.O. Box 113-6955
Beirut, Lebanon
Tel. +961 (0)1 35 38 23
Fax +961 (0)1 35 38 23
belimome@emirates.net.ae

NL/ BE/ LU BELIMO Servomotoren BV
BENELUX
Postbus 300, 8160 AH Epe
Radeweg 25, 8171 MD Vaassen
Netherlands
Tel. +31 5 78 57 68 36
Fax +31 5 78 57 69 15
info@belimo.nl

NO BELIMO Spjeldmotorer A/S
Konowsgate 5
0192 Oslo 1, Norway
Tel. +47 22 70 71 71
Fax +47 22 70 71 70
info@belimo.no

PH BELIMO Actuators Philippines
Rm.# 507 Anita Build., 5th Floor
1300 Quezon Ave.,Cor.South Ave.
1103 Quezon City, Philippines
Tel. +63 (2)373 5440
Fax +63 (2)373 5424
philippines@belimo.com.hk

RO BELIMO Automatizări SRL
Cameliei nr. 5, corp B
10851, sector 1, Bucuresti,
Romania
Tel. +40 21 212 6993
Fax +40 21 212 6995
office@belimo.ro

RU BELIMO Servomotors
Russia Ltd.
Nizhnyaya Pervomaiskaya,
46 Bld.1, Office 303
105203 Moscow, Russia
Tel. +7 095 965 74 64
Fax +7 095 965 74 73
info@belimo.ru

SE BELIMO AB
Hägerstens Allé 88
129 37 Hägersten, Sweden
Tel. +46 (0)8 464 07 00
Fax +46 (0)8 97 85 75
info@belimo.se

SY Philippe A. Jebran
P.O. Box 7791
Damascus, Syria
Tel. +963 11 231 6586
Fax +963 11 231 4052
belimome@emirates.net.ae

TR BELIMO Otomasyon A.S.
Keyap Sitesi No. 20
TR-34775 Y. Dudullu
Istanbul, Turkey
Tel. +90 (0)216 527 98 70
Fax +90 (0)216 527 98 71
info@belimo.com.tr

TW Chianseng Enterprise Co. Ltd.
2F, No. 21, Tong Fong Street
Taipei, Taiwan
Tel. +886 2 27 08 77 80
Fax +886 2 27 02 90 90
taiwan@belimo.com.hk

UA BELIMO Ukraine S.A.R.
34-A, Ul. Yurkovskaya, Appt.No 2
254080 Kiev, Ukraine
Tel./Fax +380 44 463 7586
comaster@belimo.kiev.ua

ZA Belimo Actuators Southern Africa cc
P.O. Box 2483
Alberton 1450, South Africa
Tel. +27 (0)11 868 5681
Fax +27 (0)11 900 2673
belimo@mega.co.za

ENG-93001-93530-09.04 • Subject to modifications