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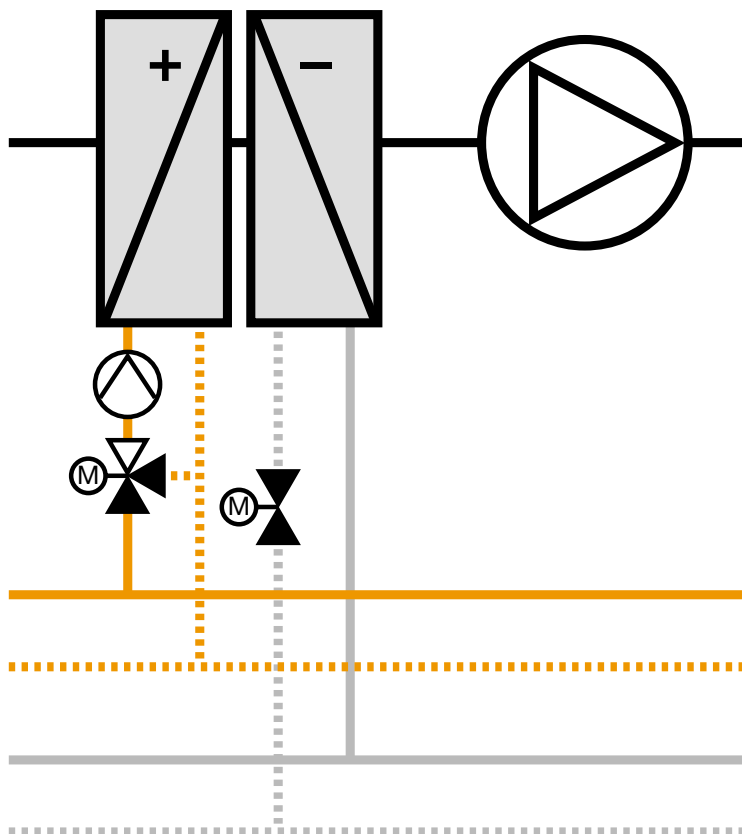
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**KARTY KATALOGOWE****W****j. polskim****przesyłamy na życzenie****fax-em!!!****6. H-3****Product Information****Globe valves with Linear Actuators**

## 6. H4../H5.. globe valves (external thread) with linear actuators



**Globe valves DN 15...50**

- NV linear actuator
- equal-percentage characteristic
- modulating or 3-point control
- emergency control function

## 6. H6../H7.. globe valves (flange PN16) with linear actuators



**Globe valves DN 15...80**

- NV linear actuator
- equal-percentage characteristic
- modulating or 3-point control
- emergency control function


**Globe valves DN 65...150**

- AV linear actuator
- equal-percentage characteristic
- modulating or 3-point control

For details of characterised control ball valves and Open/Close ball valves see Product Information 5. R..

For details of rotary actuators for slipper (rotary) valves see Product Information 5. NR..

### Important

#### Use of Belimo control devices

*The control devices described in this publication are intended for use in the closed water circuits of heating, ventilating and air-conditioning systems. Use of the control devices in conjunction with other liquid or gaseous fluids is not allowed.*

#### Flow rates

*The recognized rules should be applied when determining the flow characteristic of control devices.*

## Globe valves and linear actuators for modulating control

**Key features of globe valves for the modulating control of cold and hot water**

Characteristic: equal-percentage    Max. pressure: 1600 kPa (PN16)

Other technical data see Product Data Sheets pp. 6–9

<b>k<sub>vs</sub></b> [m³/h]	0.63	1	1.6	2.5	4	6.3	10	16	25	40	58	90	63	100	145	220	320
<b>DN</b> [mm]	15	15	15	15	15	20	25	32	40	50	65	80	65	80	100	125	150

Connection external thread ISO 228

2-way 	H411	H412	H413	H414	H415	H420	H425	H432	H440	H450	-	-
	H511	H512	H513	H514	H515	H520	H525	H532	H540	H550	-	-

Connection Flange ISO 7005-2

Flange ISO 7005-2

2-way 	H611	-	H613	-	H615	H620	H625	H632	H640	H650	H664	H679	H665	H680	H6100	H6125	H6150
	H711	-	H713	-	H715	H720	H725	H732	H740	H750	H764	H779	H765	H780	H7100	H7125	H7150

Linear actuator 3-point	<b>NV24-3</b> AC/DC 24 V (Product Data Sheet p. 10)	<b>NV230-3</b> AC 230 V (Product Data Sheet p. 10)	<b>AV24-3</b> AC 24 V (Prod. Data Sheet p.18)	<b>AV230-3</b> AC 230 V (Prod. Data Sheet p.18)
Linear actuator modulating DC 0..10 V	<b>NV24-MFT</b> AC/DC 24 V (Product Data Sheet p. 12)		<b>AV24-MFT</b> AC/DC 24 V (Product Data Sheet p. 20)	
Linear actuator modulating DC 0..10 V emergency control function	<b>NVF24-MFT</b> AC/DC 24 V emergency control function pulling <sup>1)</sup> (Product Data Sheet p. 15)	<b>NVF24-MFT-E</b> AC/DC 24 V emergency control function pushing <sup>2)</sup> (Product Data Sheet p. 15)		

<sup>1)</sup> Valve closed when de-energised

<sup>2)</sup> Valve open when de-energised

### Accessories: Union for valves with external thread

Valve type	2-way / 3-way	
	H4.. / H5..	
DN 15	ZH2315	
DN 20	ZH2320	
DN 25	ZH2325	
DN 32	ZH2332	
DN 40	ZH2340	
DN 50	ZH2350	

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AV24-3, AV230-3	18..19
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AV24-MFT	20..22
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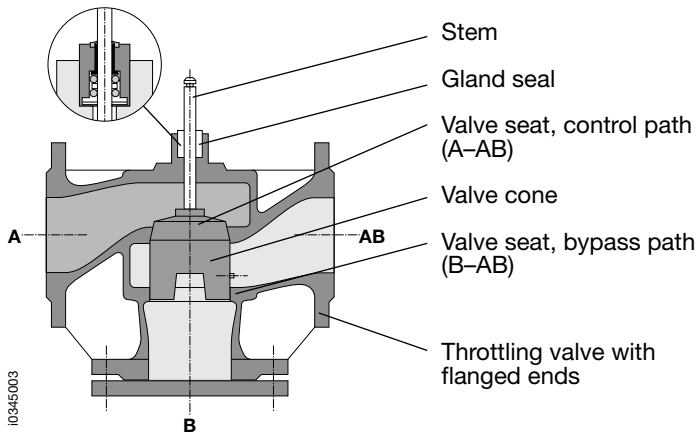
## Globe valves and linear actuators

Belimo globe valves have been designed for long service life in closed-loop circuits carrying cold or hot water.

The wide range of capacity from 1 kW to 3 MW is covered with very few different types of valve.

There are throttling and mixing versions of the valves available with either external thread or flanged ends.

The component parts of a globe valve (2-way flanged version) are as follows:

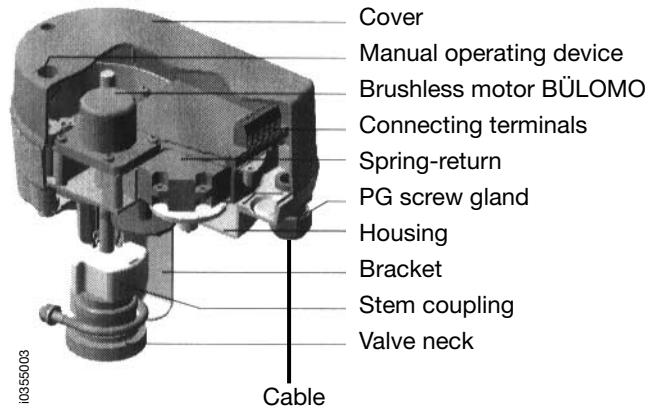


The design of Belimo globe valves has been greatly improved in several important aspects. In addition, various other features have been incorporated with the aim of increasing their service life and reducing maintenance costs.

The valves are always supplied as a «total functional solution», i.e. together with a suitable linear actuator. There are various alternative types of actuator available offering different actuating force ratings and additional features such as an emergency control function.

Belimo linear actuators are also available with the unique MFT® Multi-Function Technology which allows them to be adapted for use with different types of valve and other control devices as well as most non-Belimo products currently on the market. Thus, globe valves and actuators can be incorporated very efficiently and effectively into any total system as well as being linked up to field bus systems.

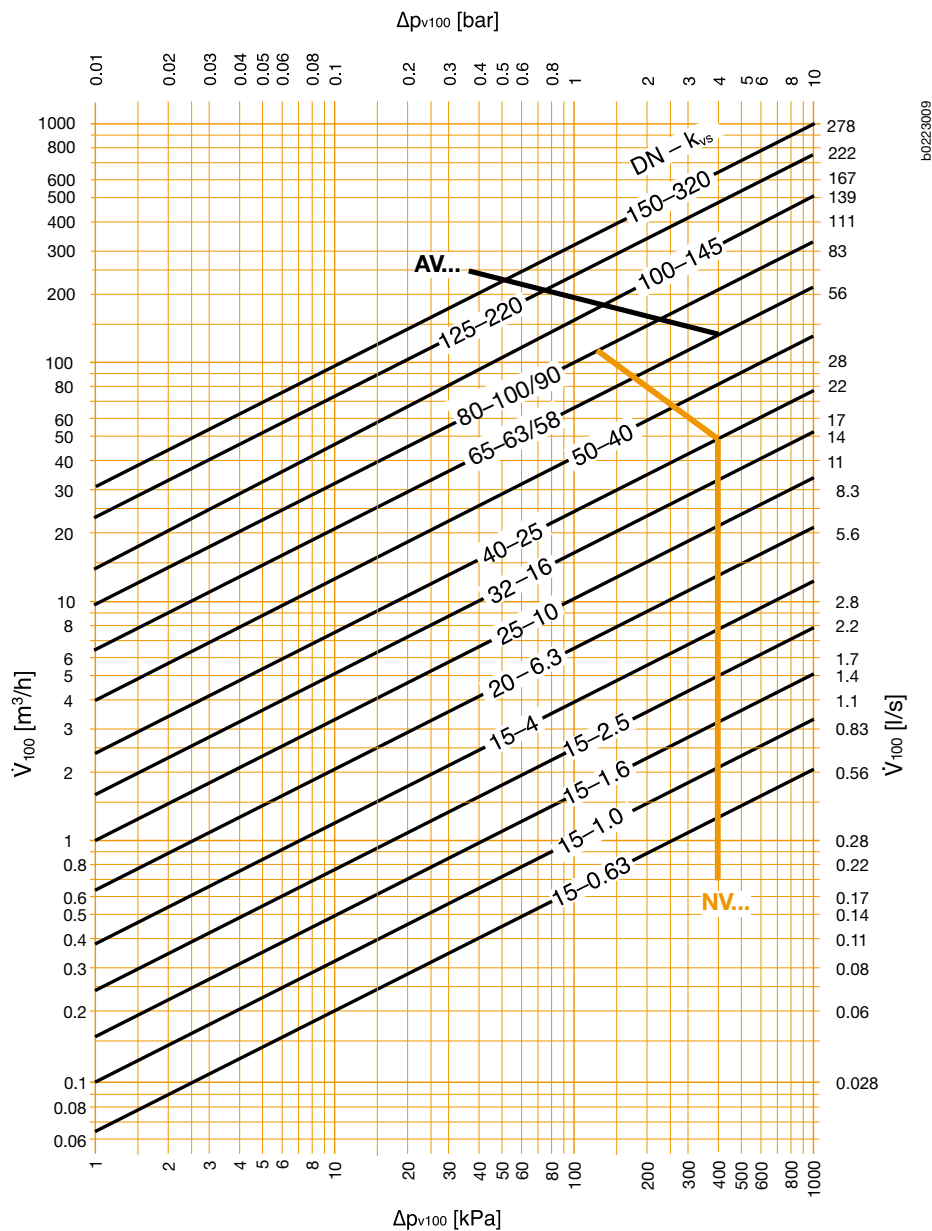
The component parts of a linear actuator with MFT Technology (e.g. NVF24-MFT) are as follows:



## The cost-effective total solution

Customers who choose Belimo motorised valves will be able to enjoy products that offer the same technically-advanced standard and are as easy to use as those in the field of air control dampers for which Belimo has been famous for many years.

**Sizing diagram for globe valves**



**Legend**

**$\Delta p_{max}$**   
Maximum permitted pressure difference for long service life across control path A-AB referred to the whole range of opening.

**$\Delta p_{v100}$**   
Differential pressure with globe valve full open.

**$\dot{V}_{100}$**  Nominal flow rate at  $\Delta p_{v100}$

**Formula for  $k_{vs}$**

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

$k_{vs}$  [ $m^3/h$ ]  
 $\dot{V}_{100}$  [ $m^3/h$ ]  
 $\Delta p_{v100}$  [kPa]

**Definition  $\Delta p_s$  (p. 6-9)**

Close off pressure at which the linear actuator can still seal the valve tightly allowing for the appropriate leakage rate.

AV... actuators with 2000 N force  
 NV... actuators with 800 N force

**Selecting globe valves**

$k_{vs}$ [ $m^3/h$ ]	0.63	1	1.6	2.5	4	6.3	10	16	25	40	58	90	63	100	145	220	320
DN [mm]	15	15	15	15	15	20	25	32	40	50	65	80	65	80	100	125	150
Connection	external thread ISO 228																
2-way	H411	H412	H413	H414	H415	H420	H425	H432	H440	H450	-	-					
3-way	H511	H512	H513	H514	H515	H520	H525	H532	H540	H550	-	-					
Connection	Flange ISO 7005-2												Flange ISO 7005-2				
2-way	H611	-	H613	-	H615	H620	H625	H632	H640	H650	H664	H679	H665	H680	H6100	H6125	H6150
3-way	H711	-	H713	-	H715	H720	H725	H732	H740	H750	H764	H779	H765	H780	H7100	H7125	H7150

## Selection: H4..

$k_{vs}$ [m <sup>3</sup> /h]	DN [mm]	2-way	Suitable linear actuator 3-point	Suitable linear actuator modulating DC 0..10 V	Suitable linear actuator modulating DC 0..10 V with emergency control function
0.63	15	H411	NV24-3 AC/DC 24 V (Product Data Sheet p. 10)	NV24-MFT AC/DC 24 V (Product Data Sheet p. 12)	NVF24-MFT AC/DC 24 V emergency control function, pulling <sup>1)</sup> (Product Data Sheet p. 15)
1	15	H412			
1.6	15	H413			
2.5	15	H414			
4	15	H415			
6.3	20	H420			
10	25	H425			
16	32	H432			
25	40	H440			
40	50	H450	NV230-3 AC 230 V (Product Data Sheet p. 10)	NVF24-MFT-E AC/DC 24 V emergency control function, pushing <sup>2)</sup> (Product Data Sheet p. 15)	

<sup>1)</sup> Valve closed when de-energised

<sup>2)</sup> Valve open when de-energised

### Important:

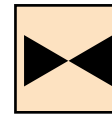
- Sizing diagram for globe valves, page 5
- It is essential to pay attention to the notes on pp. 23–27 referring to application, installation, project design, commissioning and maintenance.
- Pipe connectors as accessories, page 24

Technical data	H4..
Flow media	Cold and hot water, water with glycol up to 50% by volume
Temperature of medium	+ 5 °C...+ 120 °C (lower temperatures to order)
Rated pressure	1600 kPa (PN16)
Flow characteristic	Control path A–AB equal-percentage (to VDI/VDE 2173) n(ep) = 3, optimised in opening range
Rangeability	DN 15 Sv > 50 DN 20...50 Sv > 100
Leakage rate	Control path A–AB max. 0.05% of $k_{vs}$ value
Pipe connections	External thread G to ISO 228
Differential pressure	DN 15..40 $\Delta p_{max} = 400$ kPa DN 50 $\Delta p_{max} = 300$ kPa
Closing pressure	see Dimensions table
Stroke	see Dimensions table
Mounting position	Vertical to horizontal
Maintenance	Maintenance-free
Materials	
Body	Cast iron GG25
Valve cone	Brass
Valve seat	Cast iron GG25
Valve stem	Stainless steel
Stem gland seal	EPDM O-ring

## Dimensions: H4..

DN	Stroke	$\Delta ps$	Dimensions [mm]			External thread	Weight
			L	B	H		
[mm]	[mm]	[kPa]				G	[kg]
15	10	1600	80	46	27	G1"	0.85
20	15	1600	80	66	26	G1 1/4"	1.1
25	15	1300	95	67	26	G1 1/2"	1.5
32	15	800	112	74	32	G2"	2.2
40	20	490	132	84	36	G2 1/4"	3.1
50	20	300	160	94	42	G2 3/4"	4.4

A 2-way valve can be converted to a 3-way valve by removing the blind plug in Port B.



## 2-way globe valves with external thread DN 15...50

For the modulating control of cold and hot water.

### Applications

- Water-side control of air handling units
- Water-side control in heating systems

### Mode of operation

The globe valve is operated by a NV-Series linear actuator. The actuators are controlled by a standard modulating or 3-point control system and move the cone of the valve – the throttling element – to the opening position dictated by the control signal.

### Product features

#### Equal-percentage characteristic

Produced by the profiling of the valve cone.

#### Manual operation with NV actuator

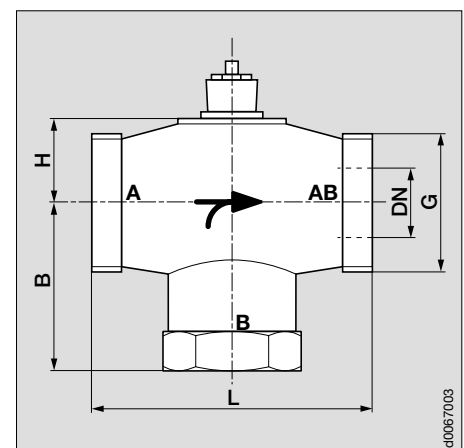
Using a hexagonal key to turn the actuator.

Ordering a globe valve with a suitable NV.. linear actuator

### Examples for ordering:

- Globe valve H415 with NV24-MFT – actuator pre-assembled  
– Order Code: H415+NV24-MFT
- Globe valve H415 and NV24-MFT – actuator enclosed  
– Order Code: H415/NV24-MFT

Installation instructions page 23/Fig. 1



## Selection: H5..

$k_{vs}$ [m³/h]	DN [mm]	3-way	Suitable linear actuator 3-point	Suitable linear actuator modulating DC 0..10 V	Suitable linear actuator modulating DC 0..10 V with emergency control function
0.63	15	H511	NV24-3 AC/DC 24 V (Product Data Sheet p. 10)	NV24-MFT AC/DC 24 V (Product Data Sheet p. 12)	NVF24-MFT AC/DC 24 V emergency control function, pulling <sup>1)</sup> (Product Data Sheet p. 15)
1	15	H512			
1.6	15	H513			
2.5	15	H514			
4	15	H515			
6.3	20	H520			
10	25	H525			
16	32	H532			
25	40	H540			
40	50	H550			
			NV230-3 AC 230 V (Product Data Sheet p. 10)		NVF24-MFT-E AC/DC 24 V emergency control function, pushing <sup>2)</sup> (Product Data Sheet p. 15)

<sup>1)</sup> Valve closed when de-energised

<sup>2)</sup> Valve open when de-energised

### Important:

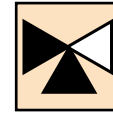
- Sizing diagram for globe valves, page 5
- It is essential to pay attention to the notes on pp. 23–27 referring to application, installation, project design, commissioning and maintenance.
- Pipe connectors as accessories, page 24

Technical data	H5..
Flow media	Cold and hot water, water with glycol up to 50% by volume
Temperature of medium	+ 5 °C...+ 120 °C (lower temperatures to order)
Rated pressure	1600 kPa (PN16)
Flow characteristic	Control path A–AB equal-percentage (to VDI/VDE 2173) $n(ep) = 3$ , optimised in opening range Bypass B–AB linear (to VDI/VDE 2173)
Rangeability	DN 15 Sv > 50 DN 20...50 Sv > 100
Leakage rate	Control path A–AB max. 0.05% of $k_{vs}$ value Bypass B–AB max. 1% of $k_{vs}$ value
Pipe connections	External thread G to ISO 228
Differential pressure	DN 15..40 $\Delta p_{max} = 400$ kPa DN 50 $\Delta p_{max} = 300$ kPa
Closing pressure	see Dimensions table
Stroke	see Dimensions table
Mounting position	Vertical to horizontal
Maintenance	Maintenance-free
Materials	
Body	Cast iron GG25
Valve cone	Brass
Valve seat	Cast iron GG25
Valve stem	Stainless steel
Stem gland seal	EPDM O-ring

## Dimensions: H5..

DN	Stroke	$\Delta ps$	Dimensions [mm]			External thread	Weight
			L	B	H		
[mm]	[mm]	[kPa]				G	[kg]
15	10	1600	80	40	27	G1"	0.75
20	15	1600	80	55	26	G1 1/4"	0.95
25	15	1300	95	60	26	G1 1/2"	1.3
32	15	800	112	66	32	G2"	1.9
40	20	490	132	75	36	G2 1/4"	2.7
50	20	300	160	85	42	G2 3/4"	3.9

A 3-way valve can be converted to a 2-way valve by sealing Port B with a blind plug.



## 3-way globe valves with external thread DN 15...50

For the modulating control of cold and hot water.

### Applications

- Water-side control of air handling units
- Water-side control in heating systems

### Mode of operation

The globe valve is operated by a NV-Series linear actuator. The actuators are controlled by a standard modulating or 3-point control system and move the cone of the valve – the throttling element – to the opening position dictated by the control signal.

### Product features

**Equal-percentage characteristic**  
Produced by the profiling of the valve cone. The bypass has a linear characteristic.

### Manual operation with NV actuator

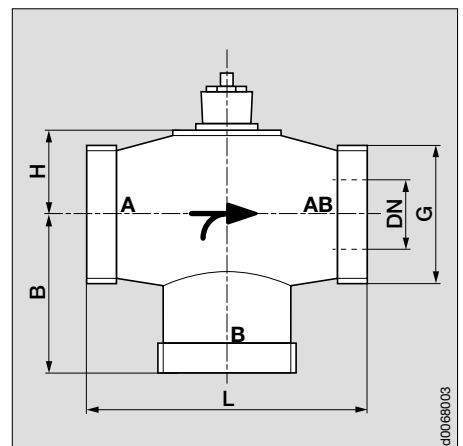
Using a hexagonal key to turn the actuator.

Ordering a globe valve with a suitable NV.. linear actuator

### Examples for ordering:

- Globe valve H515 with NV24-3 – actuator pre-assembled – Order Code: H515+NV24-3**
- Globe valve H515 and NV24-3 – actuator enclosed – Order Code: H515/NV24-3**

Installation instructions page 23/Fig. 1





## Selection: H6..

$k_{vs}$ [m³/h]	DN [mm]	2-way	Suitable linear actuator 3-point	Suitable linear actuator modulating DC 0..10 V	Suitable linear actuator modulating DC 0..10 V with emergency control function
0.63	15	H611	NV24-3 AC/DC 24 V (Product Data Sheet p.10)	NV24-MFT AC/DC 24 V (Product Data Sheet p.12)	NVF24-MFT, AC/DC 24 V emergency control function, pulling <sup>1)</sup> (Product Data Sheet p.15)
1.6	15	H613			
4	15	H615			
6.3	20	H620			
10	25	H625			
16	32	H632			
25	40	H640			
40	50	H650			
58	65	H664			
90	80	H679			
63	65	H665	AV24-3 AC 24 V (Product Data Sheet p.18)	AV24-MFT AC/DC 24 V (Product Data Sheet p. 20)	NVF24-MFT-E, AC/DC 24 V emergency control function, pushing <sup>2)</sup> (Product Data Sheet p.15)
100	80	H680			
145	100	H6100			
220	125	H6125	AV230-3 AC 230 V (Product Data Sheet p.18)		
320	150	H6150			

### Important:

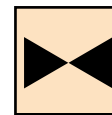
- Sizing diagram for globe valves, page 5
- It is essential to pay attention to the notes on pp. 23–27 referring to application, installation, project design, commissioning and maintenance.

Technical data	H6..
Flow media	Cold and hot water, water with glycol up to 50% by volume
Temperature of medium	+ 5 °C...+ 120 °C (lower temperatures to order)
Rated pressure	1600 kPa (PN16)
Flow characteristic	Control path A–AB equal-percentage (to VDI/VDE 2173) $n(ep) = 3$ , optimised in opening range
Rangeability	DN15 $S_v > 50$ DN20...150 $S_v > 100$
Leakage rate	Control path A–AB max. 0.05% of $k_{vs}$ value
Pipe connections	Flanges to ISO 7005-2 (PN16)
Differential pressure	
Closing pressure	see Dimensions table
Stroke	
Mounting position	Vertical to horizontal
Maintenance	Maintenance-free
Materials	
Body	DN 15...100 cast iron GG25 DN 125...150 cast iron GGG40.3
Valve cone	brass
Valve seat	cast iron GG25
Valve stem	stainless steel
Stem gland seal	EPDM O-ring

## Dimensions: H6..

DN [mm]	Stroke [mm]	Actuator Type	$\Delta p_{max}$ [kPa]	$\Delta p_s$ [kPa]	Dimensions [mm]			Flanges [mm]				Weight [kg]
					L	B	H	D	K	d	C	
15	10	NV..	400	1600	130	72	41	95	65	4x14	16	3.4
20	15		400	1600	150	77	41	105	75	4x14	18	3.3
25	15		400	1300	160	82	41	115	85	4x14	18	5.6
32	15		400	800	180	88	41	140	100	4x19	20	7.8
40	20		400	490	200	100	52	150	110	4x19	20	11.9
50	20		300	300	230	110	52	165	125	4x19	22	15.5
65	20		200	200	290	130	52	185	145	4x19	20	19.4
80	20		135	135	310	186	77	200	160	8x19	22	32.8
65	20		400	400	290	130	52	185	145	4x19	20	19.5
80	30		270	270	310	186	77	200	160	8x19	22	32.9
100	30	AV..	160	160	350	206	77	220	180	8x19	24	37.0
125	40		90	90	400	–	222	250	210	8x19	26	55.0
150	40		50	50	480	–	241	285	240	8x23	26	75.0

A 2-way valve can be converted to a 3-way valve by removing the blind plug (flange from DN 65) in Port B. Except DN 125 and DN 150!



## 2-way globe valves with flanged ends DN 15...150

For the modulating control of cold and hot water.

### Applications

- Water-side control of air handling units
- Water-side control in heating systems

### Mode of operation

The globe valve is operated by a NV- or AV-Series linear actuator. The actuators are controlled by a standard modulating or 3-point control system and move the cone of the valve – the throttling element – to the opening position dictated by the control signal.

### Product features

#### Equal-percentage characteristic

Produced by the profiling of the valve cone.

#### Manual operation with NV / AV actuator

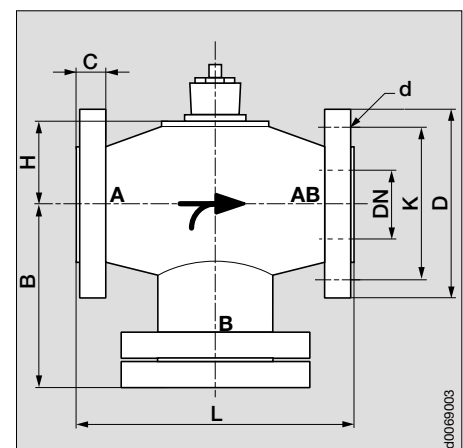
Using a hexagonal key to turn the actuator.

Ordering a globe valve with a suitable NV../ AV.. linear actuator

#### Examples for ordering:

- Globe valve H640 with NV24-MFT – actuator pre-assembled  
– Order Code: H640+NV24-MFT
- Globe valve H640 and NV24-MFT – actuator enclosed  
– Order Code: H640/NV24-MFT

Installation instructions page 23 + 25/Fig. 1





## Selection: H7..

$k_{vs}$ [m³/h]	DN [mm]	3-way	Suitable linear actuator 3-point	Suitable linear actuator modulating DC 0..10 V	Suitable linear actuator modulating DC 0..10 V with emergency control function
0.63	15	H711	NV24-3 AC/DC 24 V (Product Data Sheet p.10)	NV24-MFT AC/DC 24 V (Product Data Sheet p.12)	NVF24-MFT, AC/DC 24 V emergency control function, pulling <sup>1)</sup> (Product Data Sheet p.15)
1.6	15	H713			
4	15	H715			
6.3	20	H720			
10	25	H725			
16	32	H732			
25	40	H740			
40	50	H750			
58	65	H764			
90	80	H779			
63	65	H765	AV24-3 AC 24 V (Product Data Sheet p.18)	AV24-MFT AC/DC 24 V (Product Data Sheet p. 20)	NVF24-MFT-E, AC/DC 24 V emergency control function, pushing <sup>2)</sup> (Product Data Sheet p.15)
100	80	H780			
145	100	H7100			
220	125	H7125			
320	150	H7150			
			AV230-3 AC 230 V (Product Data Sheet p.18)		

### Important:

- Sizing diagram for globe valves, page 5
- It is essential to pay attention to the notes on pp. 23–27 referring to application, installation, project design, commissioning and maintenance.

Technical data	H7..
Flow media	Cold and hot water, water with glycol up to 50% by volume
Temperature of medium	+ 5 °C...+ 120 °C (lower temperatures to order)
Rated pressure	1600 kPa (PN16)
Flow characteristic	Control path A–AB equal-percentage (to VDI/VDE 2173) n(ep) = 3, optimised in opening range Bypass B–AB linear (to VDI/VDE 2173)
Rangeability	DN15 Sv > 50 DN20...150 Sv > 100
Leakage rate	Control path A–AB max. 0.05% of $k_{vs}$ value Bypass B–AB max. 1% of $k_{vs}$ value
Pipe connections	Flanges to ISO 7005-2 (PN16)
Differential pressure	
Closing pressure	see Dimensions table
Stroke	
Mounting position	Vertical to horizontal
Maintenance	Maintenance-free
Materials	
Body	DN 15...100 cast iron GG25 DN 125...150 cast iron GGG40.3
Valve cone	brass
Valve seat	cast iron GG25
Valve stem	stainless steel
Stem gland seal	EPDM O-ring

## Dimensions: H7..

DN	Stroke	Actuator	$\Delta p_{max}$	$\Delta ps$	Dimensions [mm]			Flanges [mm]				Weight	
[mm]	[mm]	Type	[kPa]	[kPa]	L	B	H	D	K	d	C	[kg]	
15	10	NV..	400	1600	130	65	41	95	65	4x14	16	4.3	
20	15		400	1600	150	70	41	105	75	4x14	18	4.2	
25	15		400	1300	160	75	41	115	85	4x14	18	5.3	
32	15		400	800	180	80	41	140	100	4x19	20	7.3	
40	20		400	490	200	90	52	150	110	4x19	20	11.0	
50	20		300	300	230	100	52	165	125	4x19	22	14.5	
65	20		200	200	290	120	52	185	145	4x19	20	16.9	
80	20		135	135	310	155	77	200	160	8x19	22	28.5	
65	20		AV..	400	400	290	120	52	185	145	4x19	20	17.0
80	30			270	270	310	155	77	200	160	8x19	22	28.6
100	30	160		160	350	175	77	220	180	8x19	24	31.7	
125	40	90		90	400	250	222	250	210	8x19	26	58.0	
150	40	50		50	480	300	241	285	240	8x23	26	81.6	

A 3-way valve can be converted to a 2-way valve by sealing Port B with a blind flange.



## 3-way globe valves with flanged ends DN 15...150

For the modulating control of cold and hot water.

### Applications

- Water-side control of air handling units
- Water-side control in heating systems

### Mode of operation

The globe valve is operated by a NV- or AV-Series linear actuator. The actuators are controlled by a standard modulating or 3-point control system and move the cone of the valve – the throttling element – to the opening position dictated by the control signal.

### Product features

#### Equal-percentage characteristic

Produced by the profiling of the valve cone. The bypass has a linear characteristic.

#### Manual operation with NV / AV actuator

Using a hexagonal key to turn the actuator.

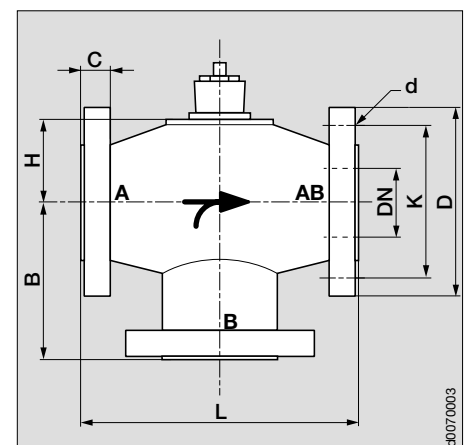
Ordering a globe valve with a suitable NV../AV.. linear actuator

#### Examples for ordering:

- Globe valve H750 with NV230-3 – actuator pre-assembled  
– Order Code: H750+NV230-3
- Globe valve H765 and AV24-MFT – actuator enclosed  
– Order Code: H765/AV24-MFT

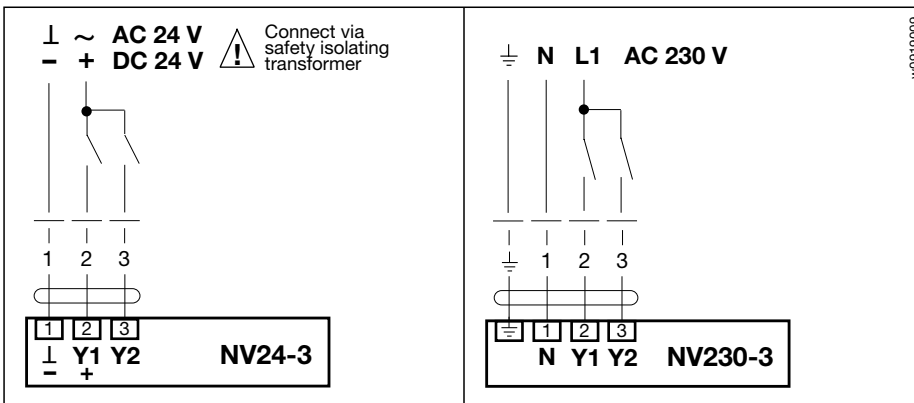
AV-Series actuators can only be supplied separately.

Installation instructions page 23+25/Fig. 1





## Wiring diagrams



## NV...-3, suitable for the following globe valves

Valve	Design	Type	DN [mm]	$k_{vs}$ [m <sup>3</sup> /h]	Actuator type
	2-way	H4..	15...50	0.63...40	NV24-3 (AC/DC 24 V)    NV230-3 (AC 230 V)
		H6..	15...80	0.63...90	
	3-way	H5..	15...50	0.63...40	NV24-3 (AC/DC 24 V)    NV230-3 (AC 230 V)
		H7..	15...80	0.63...90	

Technical data	NV24-3	NV230-3
Nominal voltage	AC 24 V 50/60 Hz, DC 24 V	AC 230 V 50/60 Hz
Nominal voltage range	AC 19.2...28.8 V DC 21.6...28.8 V	AC 198...264 V
For wire sizing	5 VA	7 VA
Power consumption	3 W	6 W
Connecting cable	1 m long, 3 x 0.75 mm <sup>2</sup>	1 m long, 4 x 0.75 mm <sup>2</sup>
Nominal stroke	20 mm	
Actuating force	800 N	
Manual operation	hexagonal key, self-resetting	
Actuating time	7.5 s/mm	
Sound power level	max. 35 dB (A)	
Position indication	mechanical 10...20 mm stroke	
Protection class	⊡ (protection low voltage)	I (with PE conductor)
Degree of protection	IP54	
Ambient temp. range	0°... + 50 °C	
Non-operating temp.	-40°... + 80 °C	
Temperature of medium	+ 5°... + 120 °C	
Humidity test	to EN 60730-1	
EMC	CE according to 89/336/EEC, 92/31/EEC, 93/68/EEC	
LV Directive	CE according to 73/23/EEC	
Mode of operation	Type 1 to EN60730-1	
Maintenance	maintenance-free	
Weight	1.5 kg (without valve)	

## Linear actuators for 2-way and 3-way globe valves DN 15...80

### 3-point actuators

**NV24-3**      AC 24 V / DC 24 V  
**NV230-3**      AC 230 V

### Application

Operation of globe valves.

### Mode of operation

Control is effected by means of a 3-point control signal.

## Product features

Simple attachment to the neck of the valve by means of a clamping strap. Semi-automatic coupling of the valve stem to the actuator spindle. The actuator can be rotated through 360° on the neck of the valve.

### Functional reliability

The actuator is short-circuit-proof and protected against polarity reversal.

### Manual operation

Inserting a 5 mm hexagonal key and turning it clockwise causes the actuator spindle to extend from the actuator housing. Together with the action of the valve this causes the flow of water to increase. The lifting spindle retains its position until the power supply is energized. (The controller takes first priority.)

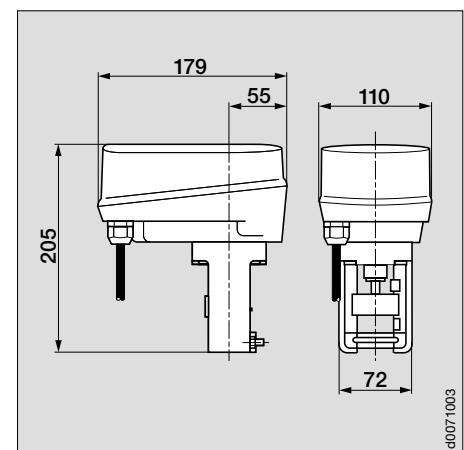
### Position indication

The stroke of the valve is indicated mechanically on the mounting bracket; the indicator adjusts itself automatically.

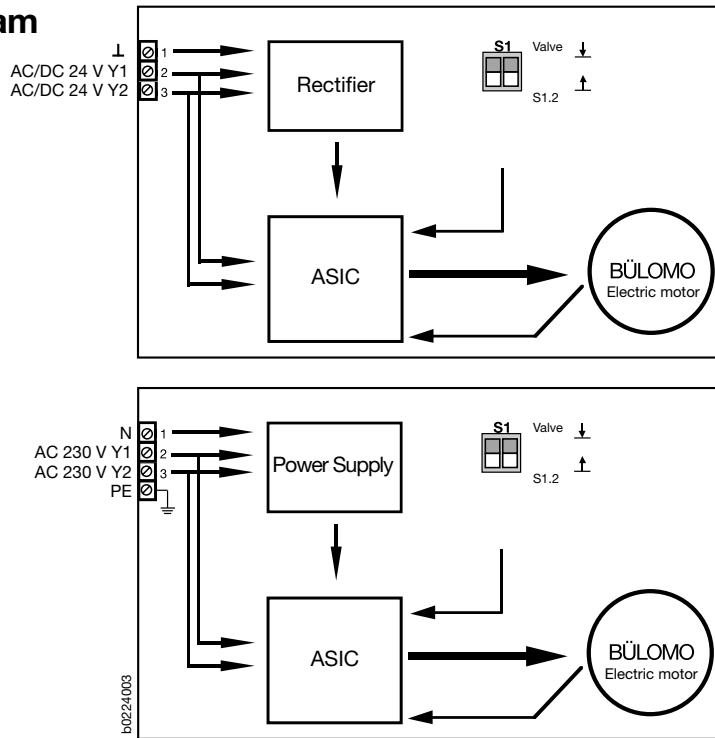
### Danger

The linear actuator contains no components which the user can replace or repair.

## Dimensions



**Block diagram**



The terminals for connecting the lead and the S1 control device will be found under the cover of the actuator.

The 3-point signal is processed in the ASIC unit and controls the brushless electric motor (BÜLOMO).

In the AC 24 V version the actuator electronics receive their power supply from the rectifier.

In the AC 230 V version the actuator electronics receive their power supply from the power supply unit.

When a actuator is opening a valve and it reaches the OPEN or CLOSED seat the power supply to the actuator is reduced. Thanks to the use of a brushless motor the control signals Y1 and Y2 do not have to be interrupted externally (so protection against overload is assured).

**Functional description**

S1	Setting of running times and choice of closing point	
S1.1	Running time	
	<b>Off position</b>	<b>Actuating time 7.5 s/mm*</b>
	On position	inactive
S1.2	Choice of closing point	
	<b>Off position</b>	<b>Closed with actuator spindle retracted*</b>
	On position	Closed with actuator spindle extended

\***Bold type** in the table means standard factory setting.

Dip switch S1.2 can be used for reversing the direction of lift. This causes the closing point to be defined for either retraction or extension of the actuator spindle. The direction of travel of the spindle can also be reversed by interchanging conductors Y1 and Y2.

Only properly authorised and trained persons may change the settings of dip switch S1.

**Wiring diagrams**

**NV24-3**

Linear actuator	Relay contact	Relay contact		Valve**
		a	b	
Actuator spindle	S1.2	a	b	H...
<b>stops</b>	<b>Off</b>	<b>Open</b>	<b>Open</b>	<b>stopped</b>
<b>extending</b>	<b>Off</b>	<b>Closed</b>	<b>Open</b>	<b>opening</b>
<b>retracting</b>	<b>Off</b>	<b>Open</b>	<b>Closed</b>	<b>closing</b>
<b>retracting</b>	<b>Off</b>	<b>Closed</b>	<b>Closed</b>	<b>closing</b>
stops	On	Open	Open	stopped
retracting	On	Closed	Open	closing
extending	On	Open	Closed	opening
extending	On	Closed	Closed	opening

\*\* referred to control path A-AB

**NV230-3**

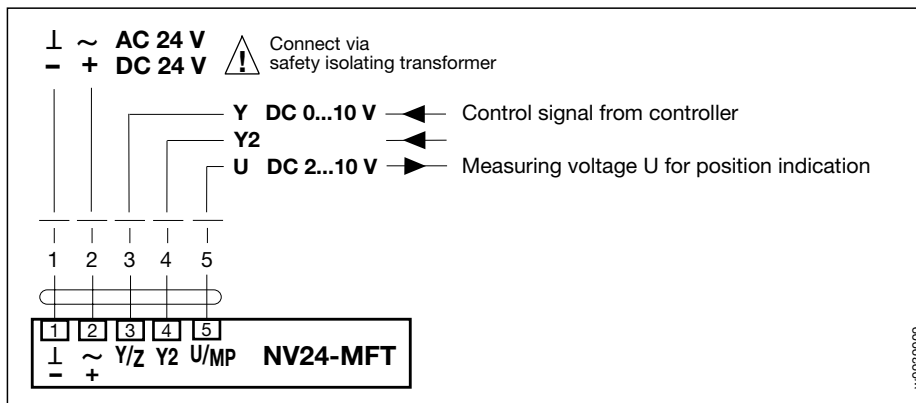
Linear actuator	Relay contact	Relay contact		Valve**
		a	b	
Actuator spindle	S1.2	a	b	H...
<b>stops</b>	<b>Off</b>	<b>Open</b>	<b>Open</b>	<b>stopped</b>
<b>extending</b>	<b>Off</b>	<b>Closed</b>	<b>Open</b>	<b>opening</b>
<b>retracting</b>	<b>Off</b>	<b>Open</b>	<b>Closed</b>	<b>closing</b>
<b>retracting</b>	<b>Off</b>	<b>Closed</b>	<b>Closed</b>	<b>closing</b>
stops	On	Open	Open	stopped
retracting	On	Closed	Open	closing
extending	On	Open	Closed	opening
extending	On	Closed	Closed	opening

\*\* referred to control path A-AB

**Bold type** in the table means standard factory setting.



## Wiring diagram



## NV24-MFT, suitable for the following globe valves

Valve	Design	Type	DN [mm]	$k_{vs}$ [m <sup>3</sup> /h]	Actuator type
	2-way	H4.. H6..	15...50 15...80	0.63...40 0.63...90	NV24-MFT (modulating)
	3-way	H5.. H7..	15...50 15...80	0.63...40 0.63...90	

Technical data	NV24-MFT
Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
Nominal voltage range	AC 19.2...28.8 V, DC 21.6...28.8 V
For wire sizing	5 VA
Power consumption	3 W
Connecting cable	1 m long, 5 x 0.75 mm <sup>2</sup>
Control signal	DC 0...10 V @ 100 kΩ
Operating range	DC 2...10 V for 0...100% stroke
Measuring voltage U	DC 2...10 V @ 0.5 mA
Uni-rotation	± 5%
Nominal stroke	20 mm
Actuating force	800 N
Manual operation	hexagonal key, self-resetting
Running time	150 s
Sound power level	max. 35 dB (A)
Position indication	mechanical 10...20 mm stroke
Protection class	⊠ (protection low voltage)
Degree of protection	IP54
Ambient temp. range	0°... + 50 °C
Non-operating temp	-40°... + 80 °C
Temperature of medium	+5°... +120 °C
Humidity test	to EN 60730-1
EMC	CE according to 89/336/EEC, 92/31/EEC, 93/68/EEC
Software class A	to EN 60730-1 / Mode of operation Type 1 to EN 60730-1
Maintenance	maintenance-free
Weight	1.5 kg (without valve)

## Linear actuator for 2-way and 3-way globe valves DN 15...80

### Modulating actuator (AC/DC 24 V)

### Control DC 0...10 V

#### Application

Operation of globe valves.

#### Mode of operation

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

## Product features

Simple attachment to the neck of the valve by means of a clamping strap. Semi-automatic coupling of the valve stem to the actuator spindle. The actuator can be rotated through 360° on the neck of the valve.

#### Functional reliability

The actuator is short-circuit-proof and protected against polarity reversal. The stroke is adapted automatically and is also overload-proof.

#### Manual operation

Inserting a 5 mm hexagonal key and turning it clockwise causes the actuator spindle to extend from the actuator housing.

Together with the action of the valve this causes the flow of water to increase. The lifting spindle retains its position until the power supply is energized. (The controller takes first priority.)

#### Position indication

The stroke of the valve is indicated mechanically on the mounting bracket and the maximum lift adjusts itself automatically. There is a twin-colour LED status indicator under the cover of the housing.

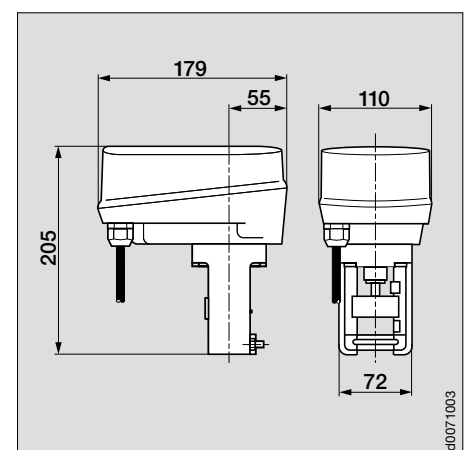
#### MFT® Multi-Function Technology

The integral microprocessor allows a wide variety of parameters to be reconfigured either at the factory or on-site.

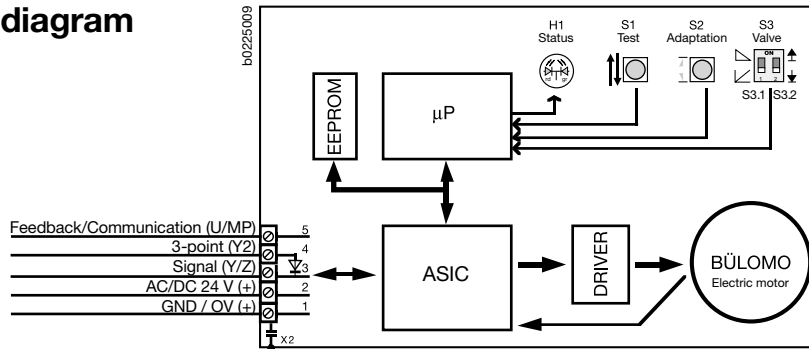
#### Danger

The linear actuator contains no components which the user can replace or repair.

## Dimensions



**Block diagram**



Under the cover of the actuator are the terminals for connecting the lead, the control devices S1, S2 and S3 and the LED indicator H1. The control signal is processed in the microprocessor and fed to the brushless electric motor (BÜLOMO) via the driver. By setting the dip switch S3 appropriately or by pressing pushbuttons S1 and S2 it is possible to configure the actuator very simply on-site to suit actual requirements when changes from the factory settings are needed.

**LED indicator H1**

Green steady light	Actuator working properly
Green flashing light	Test run or adaptation with synchronisation in progress
Red steady light	Fault; repeat adaptation
Red flashing light	After power interruption (> 2 sec.). By the next closing movement the valve will be automatically synchronised in the chosen closing point. The LED indicator will change from a red flashing into a green steady light.
Alternate red/green flashing light	Addressing via control system and operation of adaptation pushbutton S2 in progress

The actuator is maintenance-free. The twin-colour LED indicator is under the cover of the actuator; the indicator shows actual actuator status. It also allows simple commissioning if the factory settings need to be changed.

**Functional description S**

S1	Test switch	The valve performs full stroke at maximum running time and check the adapted lift
S2	Adaptation	The stroke effected (between the two mechanical end-stops of the valve) is acquired as 100% stroke and stored in the microprocessor. The control signal and running time are then matched to this 100% stroke.
S3.1	Direction of stroke	The direction of stroke is reversed to the control signal
		<b>Off position*</b> <b>Control signal 0% corresponds to 0% stroke = 0% U5</b>
	On position	Control signal 100% corresponds to 0% stroke = 0% U5
S3.2	Choice of closing point	Closing point with actuator spindle extended or retracted. The feedback signal U5 will be set to 0% by the chosen closing point.
		<b>Off position*</b> <b>Closing point with actuator spindle retracted</b>
	On position	Closing point with actuator spindle extended

Only properly authorised and trained persons may change the settings of dip switch S3 and pushbutton S2.

Switches S1 and S2 and dip switch S3 are located under the cover of the actuator. The test switch allows a simple check of the actuating system to be performed. Adaptation of the stroke is performed automatically at first power-up. Another adaptation independent of the first can be performed whenever necessary. The direction of stroke can be matched to the pattern of signal. The factory setting is for the stroke to increase with the control signal. Depending on the type of valve (NO/NC) the closing point (zero stroke) can be set for spindle extended or retracted.

\* **Bold type** in the table means standard factory setting.

**MFT**

Parameter	Basic value	Variable
Control signal	<b>DC 0...10 V</b>	3-point, Open/Close
Operating range	<b>DC 2...10 V</b>	Start point DC 0.5...30 V Finish point DC 2.5...32 V
Feedback U5	<b>DC 2...10 V</b>	Start point 0.5...8 V Finish point 1.5...10 V Changeover to fault alarm
Stroke	<b>20 mm</b>	2...20 mm
Running time	<b>150 s</b>	150...400 s
Actuating force	<b>100 %</b>	50...100 % (from 800 N)

**Bold type** in the table means basic value factory setting.

**Multi-Function Technology** allows optimum matching of parameters to the different needs of an installation. The parameters are either entered as standard values at the factory or altered subsequently using an MFT-H adjuster. Special versions with different values pre-set can be ordered as explained on the Configuration Data Sheet page 28. Data is exchanged over the MP (Multi-Point) communication system.

**Remote control / MP communication system**

Remote control	The Multi-Point communication system allows the actuator to be operated by remote control.
Fault alarm	When the SW flag has been set, a feedback signal U5 is also available in addition to the LED status indicator.
MP communication	The actuator is ready for room bus operation. Up to 8 actuators can be wired in parallel.

Instead of an analogue measuring voltage, digital data can be read and overwritten from the U5 connecting terminal using a suitable interface.



## Wiring diagrams

### Override control "Open"

Linear actuator		Relay contact		Valve**
Actuator spindle	Dip switch position S3.1   S3.2	a	b	H..
<b>extending</b>	<b>Off</b>	<b>Off</b>	<b>Closed</b>	<b>Open</b>
retracting	Off	On	Closed	Open
retracting	On	Off	Closed	Open
extending	On	On	Closed	Open

\*\* referred to control path A-AB

A typical use for "Open" override control is in a frost protection circuit. Whether or not the frost thermostat has to interrupt the signal conductor to controller b depends on the make of controller being used (not necessary if the signal output at the controller is short-circuit-proof and protected against polarity reversal).

### 3-point control

Linear actuator		Relay contact		Valve**
Actuator spindle		a	b	H..
stops		Open	Open	stopped
extending		Closed	Open	opening
retracting		Open	Closed	closing
retracting		Closed	Closed	closing

\*\* referred to control path A-AB

3-point control is easy to implement with a 4-wire connection.

However, the linear actuator must be parameterized for 3-point control.

### Feedback U5 with with configured modulating linear actuator

Control signal	Dip switch position S3.1   S3.2		Actuator spindle	Measuring voltage
10 V	<b>Off</b>	<b>Off</b>	<b>extending</b>	<b>10 V</b>
	Off	On	retracting	10 V
	On	Off	retracting	2 V
	On	On	extending	2 V
2 V	<b>Off</b>	<b>Off</b>	<b>retracting</b>	<b>2 V</b>
	Off	On	extending	2 V
	***	On	extending	10 V
	***	On	retracting	10 V

\*\*\* With control signals < 150 mV the direction of lift indicated is inverted.

Feedback U5 is measured as the voltage between terminals 1 and 5. The effective lift is assigned during adaptation of the chosen measuring voltage (standard factory setting DC 2...10 V).

**Bold type** in the table means standard factory setting.

W0949105





**Linear actuators for 2-way and 3-way globe valves DN 15...80**

**Modulating actuator (AC/DC 24 V) with emergency control function**

**Control DC 0...10 V**

**Application**

Operation of globe valves.

**Mode of operation**

Modulating control is effected by means of a standard DC 0...10 V control signal. When the actuator is de-energized the actuator spindle of the NVF.. type retracts and that of the NVF..E type extends.

**Product features**

Simple attachment to the neck of the valve by means of a clamping strap. Semi-automatic coupling of the valve stem to the actuator spindle. The actuator can be rotated through 360° on the neck of the valve.

**Functional reliability**

The actuator is short-circuit-proof and protected against polarity reversal. The lift is adapted automatically and is also overload-proof.

**Manual operation**

Inserting a standard tool (a 5 mm hexagonal key) and turning it clockwise causes the spindle to extend from the actuator housing. Together with the action of the valve this causes the flow of water to increase. The actuator spindle retains its position until the power supply is energized. (The controller takes first priority.)

**Position indication**

The stroke of the valve is indicated mechanically on the mounting bracket; the maximum stroke adjusts itself automatically. There is a twin-colour LED status indicator under the cover of the actuator.

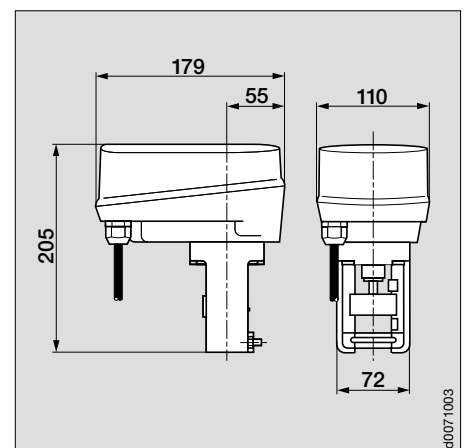
**MFT® Multi-Function Technology**

The integral microprocessor allows a wide variety of parameters to be reconfigured either at the factory or on-site.

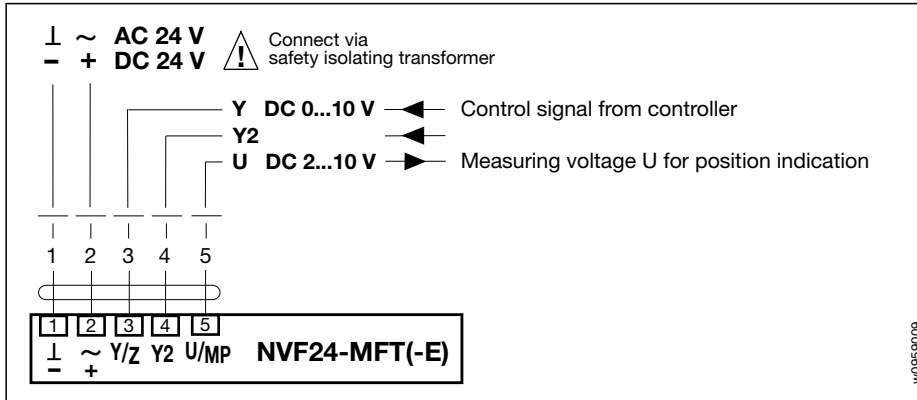
**Danger**

The linear actuator contains no components which the user can replace or repair.

**Dimensions**



**Wiring diagram**



**NVF24-MFT.., suitable for the following globe valves**

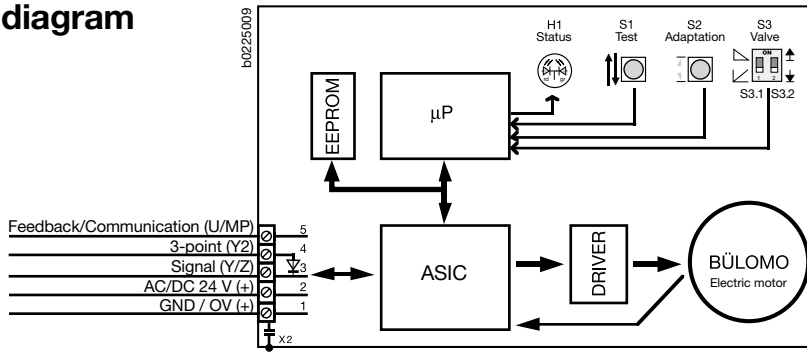
Valve	Design	Type	DN [mm]	k <sub>vs</sub> [m³/h]	Actuator type
	2-way	H4..	15...50	0.63...40	NVF24-MFT (pulling <sup>1)</sup> NVF24-MFT-E (pushing <sup>2)</sup> )
		H6..	15...80	0.63...90	
	3-way	H5..	15...50	0.63...40	
		H7..	15...80	0.63...90	

<sup>1</sup> Valve closed when de-energised

<sup>2</sup> Valve open when de-energised

Technical data	NVF24-MFT	NVF24-MFT-E
Emergency control funct.	pulling	pushing
Nominal voltage	AC 24 V 50/60 Hz, DC 24 V	
Nominal voltage range	AC 19.2...28.8 V, DC 21.6...28.8 V	
For wire sizing	10 VA	
Power consumption	5.5 W	
Connecting cable	1 m long, 5 x 0.75 mm <sup>2</sup>	
Control signal	DC 0...10 V @ 100 kΩ	
Operating range	DC 2...10 V for 0...100% stroke	
Measuring voltage U	DC 2...10 V @ 0.5 mA	
Uni-rotation	+/- 5%	
Nominal stroke	20 mm	
Actuating force	800 N	
Manual operation	hexagonal key, self-resetting	
Running time	150 s	
Emergency control time	< 1.5 s/mm	
Sound power level	max. 35 dB (A)	
Position indication	mechanical 10...20 mm stroke	
Protection class	⊕ (protection low voltage)	
Degree of protection	IP54	
Ambient temp. range	0°... +50°C	Temp. of medium +5°... +120°C
Non-operating temp.	-40°... +80°C	Humidity test to EN 60730-1
EMC	CE according to 89/336/EEC, 92/31/EEC, 93/68/EEC	
Software class A	to EN 60730-1/ Mode of operation	Type 1 to EN 60730-1
Maintenance	maintenance-free	
Weight	1.8 kg (without valve)	

## Block diagram



Under the cover of the actuator are the terminals for connecting the lead, the control devices S1, S2 and S3 and the LED indicator H1. The control signal is processed in the microprocessor and fed to the brushless electric motor (BÜLOMO) via the driver. By setting the dip switch S3 appropriately or by pressing pushbuttons S1 and S2 it is possible to configure the actuator very simply on-site to suit actual requirements when changes from the factory settings are needed.

### LED indicator H1

Green steady light	Actuator working properly
Green flashing light	Test run or adaptation with synchronisation in progress
Red steady light	Fault; repeat adaptation
Red flashing light	After power interruption (> 2 sec.). By the next closing movement the valve will be automatically synchronised in the chosen closing point. The LED indicator will change from a red flashing into a green steady light.
Alternate red/green flashing light	Addressing via control system and operation of adaptation pushbutton S2 in progress

The actuator is maintenance-free. The twin-colour LED indicator is under the cover of the actuator; the indicator shows actual actuator status. It also allows simple commissioning if the factory settings need to be changed.

### Functional description S

S1	Test switch	The valve performs full stroke at maximum running time and check the adapted lift
S2	Adaptation	The stroke effected (between the two mechanical end-stops of the valve) is acquired as 100% stroke and stored in the microprocessor. The control signal and running time are then matched to this 100% stroke.
S3.1	Direction of stroke	The direction of stroke is reversed to the control signal
	<b>Off position*</b>	<b>Control signal 0% corresponds to 0% stroke = 0% U5</b>
	On position	Control signal 100% corresponds to 0% stroke = 0% U5
S3.2	Choice of closing point	Closing point with actuator spindle extended or retracted. The feedback signal U5 will be set to 0% by the chosen closing point.
	<b>Off position*</b>	<b>Closing point with actuator spindle retracted</b>
	On position	Closing point with actuator spindle extended
Only properly authorised and trained persons may change the settings of dip switch S3 and pushbutton S2.		

\* **Bold type** in the table means standard factory setting.

Switches S1 and S2 and dip switch S3 are located under the cover of the actuator. The test switch allows a simple check of the actuating system to be performed. Adaptation of the stroke is performed automatically at first power-up. Another adaptation independent of the first can be performed whenever necessary.

The direction of stroke can be matched to the pattern of signal. The factory setting is for the stroke to increase with the control signal. Depending on the type of valve (NO/NC) the closing point (zero stroke) can be set for spindle extended or retracted.

### MFT

Parameter	Basic value	Variable
Control signal	<b>DC 0...10 V</b>	3-point, Open/Close
Operating range	<b>DC 2...10 V</b>	Start point DC 0.5...30 V Finish point DC 2.5...32 V
Feedback U5	<b>DC 2...10 V</b>	Start point 0.5...8 V Finish point 1.5...10 V Changeover to fault alarm
Stroke	<b>20 mm</b>	2...20 mm
Running time	<b>150 s</b>	150...400 s

**Bold type** in the table means basic value factory setting.

**Multi-Function Technology** allows optimum matching of parameters to the different needs of an installation. The parameters are either entered as standard values at the factory or altered subsequently using an MFT-H adjuster.

Special versions with different values preset can be ordered as explained on the Configuration Data Sheet page 28. Data is exchanged over the MP (Multi-Point) communication system.

### Remote control / MP communication system

Remote control	The Multi-Point communication system allows the actuator to be operated by remote control.
Fault alarm	When the SW flag has been set, a feedback signal U5 is also available in addition to the LED status indicator.
MP communication	The actuator is ready for room bus operation. Up to 8 actuators can be wired in parallel.

Instead of an analogue measuring voltage, digital data can be read and overwritten from the U5 connecting terminal using a suitable interface.

**Wiring diagrams**

Emergency control function, modulating

NVF24-MFT retracting <sup>1)</sup>		Relay contact	Valve**
Actuator spindle	retracting	a	H..
		Open	0%

NVF24-MFT-E extending <sup>2)</sup>		Relay contact	Valve**
Actuator spindle	extending	a	H..
		Open	100%

<sup>1)</sup> Valve closed when de-energized  
<sup>2)</sup> Valve open when de-energized  
 \*\* referred to control path A-AB

The actuator spindle runs to the end-stop when the power supply is interrupted. In the case of NVF24-MFT actuators the actuator spindle retracts into the actuator housing and the valve closes.

In the case of NVF24-MFT-E actuators the actuator spindle extends from the actuator housing and the valve opens.

Emergency control function with 3-point control, Type NVF24-MFT

Linear actuator	Relay contact			Valve**
	a	b	c	
Actuator spindle	a	b	c	H..
stops	Closed	Open	Open	stopped
extending	Closed	Closed	Open	opening
retracting	Closed	Open	Closed	closing
retracting	Closed	Closed	Closed	closing
retracting	Open	Open	Open	closing
		Closed	Open	
		Open	Closed	
		Closed	Closed	

\*\* referred to control path A-AB

3-point control can be implemented very easily with a 4-wire connection, although the actuator must have been parameterized for 3-point control. The actuator spindle retracts if the power supply is interrupted.

Emergency control function with 3-point control, Type NVF24-MFT-E

Linear actuator	Relay contact			Valve**
	a	b	c	
Actuator spindle	a	b	c	H..
stops	Closed	Open	Open	stopped
extending	Closed	Closed	Open	opening
retracting	Closed	Open	Closed	closing
retracting	Closed	Closed	Closed	closing
extending	Open	Open	Open	opening
		Closed	Open	
		Open	Closed	
		Closed	Closed	

\*\* referred to control path A-AB

3-point control can be implemented very easily with a 4-wire connection, although the actuator must have been parameterized for 3-point control. The actuator spindle extends if the power supply is interrupted.

Feedback U5 with with configured modulating linear actuator

Control signal	Dip switch position		Actuator spindle	Measuring voltage
	S3.1	S3.2		
10 V	Off	Off	<b>extending</b>	<b>10 V</b>
	Off	On	retracting	10 V
	On	Off	retracting	2 V
2 V	On	On	extending	2 V
	Off	On	extending	2 V
	On	Off	extending	10 V
***	On	On	retracting	10 V

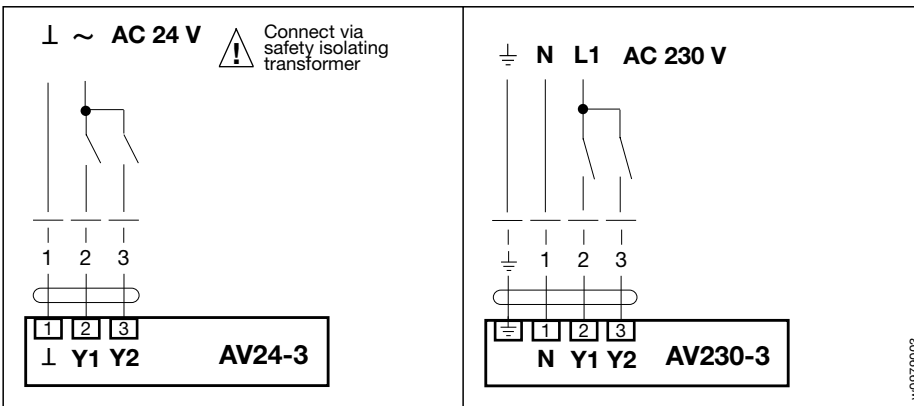
\*\*\* With control signals < 150 mV the direction of lift indicated is inverted.

Feedback U5 is measured as the voltage between terminals 1 and 5. The effective lift is assigned during adaptation of the chosen measuring voltage (standard factory setting DC 2...10 V).

**Bold type** in the table means standard factory setting.



## Wiring diagrams



## AV...-3, suitable for the following globe valves

Valve	Design	Type	DN [mm]	$k_{vs}$ [m <sup>3</sup> /h]	Actuator type
	2-way	H6..	65...150	63...320	AV24-3 AV230-3
	3-way	H7..	65...150	63...320	(AC 24 V) (AC 230 V)

Technical data	AV24-3	AV230-3
Nominal voltage	AC 24 V 50/60 Hz	AC 230 V 50/60 Hz
Nominal voltage range	AC 19.2...28.8 V	AC 198...264 V
For wire sizing	5 VA	
Power consumption	4 W	10 W
Connecting cable	1 m long, 3 x 0.75 mm <sup>2</sup>	1 m long, 4 x 0.75 mm <sup>2</sup>
Nominal stroke	40 mm	
Actuating force	2000 N	
Manual operation	hexagonal key, self-resetting	
Actuating time	8 s/mm	
Sound power level	max. 35 dB (A)	
Position indication	mechanical 20...40 mm stroke	
Protection class	(protection low voltage)	I (with PE conductor)
Degree of protection	IP54	
Ambient temp. range	0°... + 50 °C	
Non-operating temp.	-40°... + 80 °C	
Temperature of medium	+ 5°... + 120 °C	
Humidity test	to EN 60730-1	
EMC LV Directive	CE according to 89/336/EEC, 92/31/EEC, 93/68/EEC CE according to 73/23/EEC	
Mode of operation	Type 1 to EN60730-1	
Maintenance	maintenance-free	
Weight	2.9 kg (without valve)	

## Linear actuators for 2-way and 3-way globe valves DN 65...150

### 3-point actuators

**AV24-3** AC 24 V  
**AV230-3** AC 230 V

### Application

Operation of globe valves.

### Mode of operation

Control is effected by means of a 3-point control signal.

### Product features

Simple attachment to the neck of the valve by means of a clamping flange. Form-fit coupling of the valve stem to the actuator spindle. The actuator can be rotated through 360° on the neck of the valve.

### Functional reliability

The actuator is protected against polarity reversal.

### Manual operation

Inserting a 4 mm hexagonal key and turning it clockwise causes the actuator spindle to extend from the actuator housing. Together with the action of the valve this causes the flow of water to increase. The lifting spindle retains its position until the power supply is energised. (The controller takes first priority.)

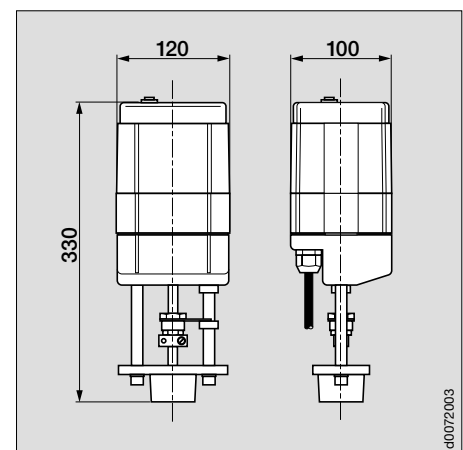
### Position indication

The stroke of the valve is indicated mechanically on the mounting column; the indicator adjusts itself automatically.

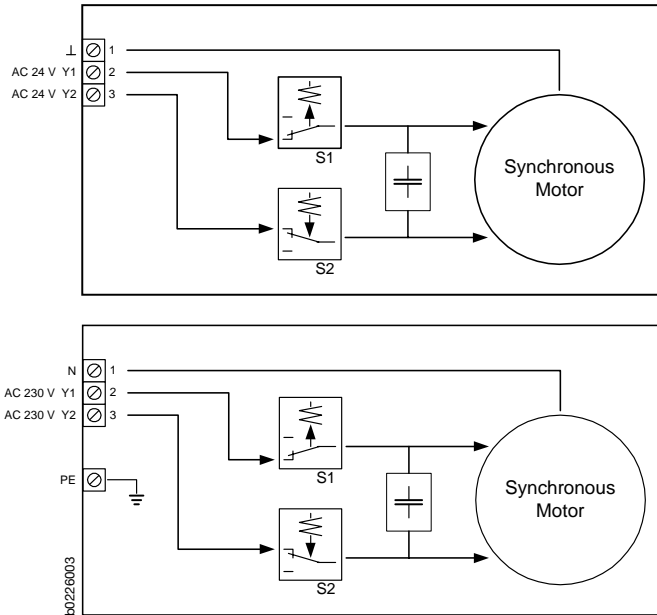
### Danger

The linear actuator contains no components which the user can replace or repair.

## Dimensions



**Block diagram**



The terminals for connecting the lead will be found under the cover of the actuator.

AV..-3 actuators are powered by a synchronous electric motor. When an actuator is opening a valve and it reaches the OPEN or CLOSED seat the Y1 or Y2 control signal is interrupted inside the actuator by means of limit switch S1 or S2.

The limit switches are force-sensitive in operation, which means that when the actuator runs on to a stop, e.g. a valve seat, an additional force is produced in the gearing. If this force exceeds 2000 N the limit switch is activated and protects the gearing against premature wear and failure.

**Wiring diagrams**

**3-point control with AC 24 V nominal voltage**

Linear actuator	Relay contact		Valve**
Actuator spindle	a	b	H..
stops	Open	Open	stopped
extending	Closed	Open	opening
retracting	Open	Closed	closing

\*\* referred to control path A-AB

In the case of AV..-3 actuators the control signals Y1 and Y2 must never be applied simultaneously to the terminals or to connecting lead cores 2 and 3 otherwise the service life of the motor will be seriously reduced.

If the Y1 and Y2 signals are only applied briefly (for 1 to 2 s) the actuator is protected and the spindle oscillates randomly back and forth.

**3-point control with AC 230 V nominal voltage**

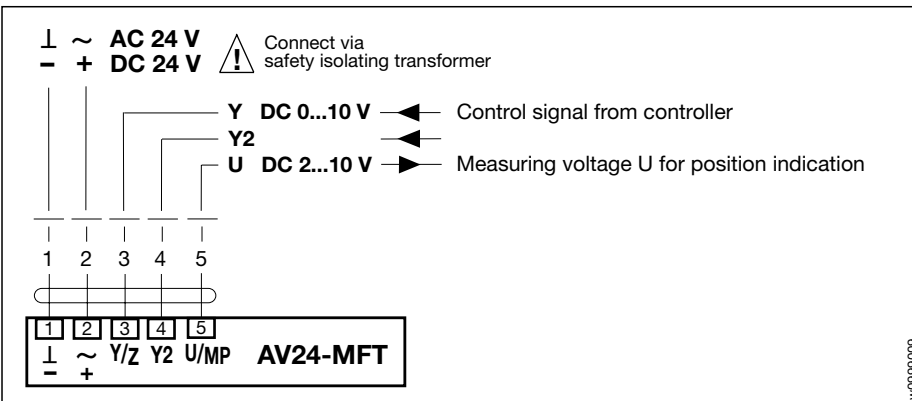
Linear actuator	Relay contact		Valve**
Actuator spindle	a	b	H..
stops	Open	Open	stopped
extending	Closed	Open	opening
retracting	Open	Closed	closing

\*\* referred to control path A-AB





## Wiring diagram



## AV24-MFT, suitable for the following globe valves

Valve	Design	Type	DN [mm]	$k_{vs}$ [m <sup>3</sup> /h]	Actuator type
	2-way	H6..	65...150	63...320	AV24-MFT (modulating)
	3-way	H7..	65...150	63...320	

Technical data	AV24-MFT
Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
Nominal voltage range	AC 19.2...28.8 V, DC 21.6...28.8 V
For wire sizing	7 VA
Power consumption	5 W
Connecting cable	1 m long, 5 x 0.75 mm <sup>2</sup>
Control signal	DC 0...10 V @ 100 kΩ
Operating range	DC 2...10 V for 0...100% stroke
Measuring voltage U	DC 2...10 V @ 0.5 mA
Uni-rotation	+/- 5%
Nominal stroke	40 mm
Actuating force	2000 N
Manual operation	hexagonal key, self-resetting
Running time	320 s
Sound power level	max. 35 dB (A)
Position indication	mechanical 20...40 mm stroke
Protection class	⊠ (protection low voltage)
Degree of protection	IP54
Ambient temp. range	0°... + 50°C
Non-operating temp.	-40°... + 80°C
Temperature of medium	+ 5°... + 120°C
Humidity test	to EN 60730-1
EMC	CE according to 89/336/EEC, 92/31/EEC, 93/68/EEC
Software class A	to EN 60730-1/ Mode of operation Type 1 to EN 60730-1
Maintenance	maintenance-free
Weight	2.9 kg (without valve)

**Linear actuator for 2-way and 3-way globe valves DN 65...150**  
**Modulating actuator (AC/DC 24 V)**  
**Control DC 0...10 V**

**Application**  
 Operation of globe valves.

**Mode of operation**  
 Modulating control is effected by means of a standard DC 0...10 V control signal.

**Product features**  
 Simple attachment to the neck of the valve by means of a clamping flange. Form-fit coupling of the valve stem to the actuator spindle. The actuator can be rotated through 360° on the neck of the valve.

**Functional reliability**  
 The actuator is short-circuit-proof and protected against polarity reversal. The stroke is adapted automatically and is also overload-proof.

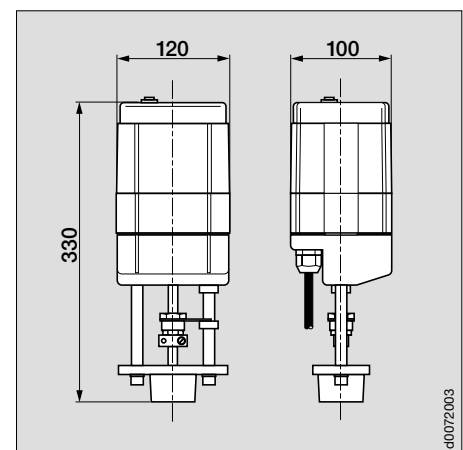
**Manual operation**  
 Inserting a 4 mm hexagonal key and turning it clockwise causes the actuator spindle to extend from the actuator housing. Together with the action of the valve this causes the flow of water to increase. The actuator spindle retains its position until the power supply is energised. (The controller takes first priority.)

**Position indication**  
 The stroke of the valve is indicated mechanically on the mounting column and the maximum stroke adjusts itself automatically. There is a twin-colour LED status indicator under the cover of the housing.

**MFT® Multi-Function Technology**  
 The integral microprocessor allows a wide variety of parameters to be reconfigured either at the factory or on-site.

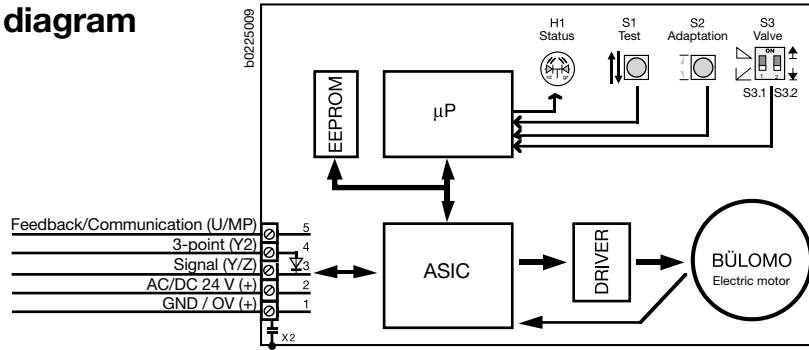
**Danger**  
 The linear actuator contains no components which the user can replace or repair.

## Dimensions





**Block diagram**



Under the cover of the actuator are the terminals for connecting the lead, the control devices S1, S2 and S3 and the LED indicator H1. The control signal is processed in the microprocessor and fed to the brushless electric motor (BÜLOMO) via the driver. By setting the dip switch S3 appropriately or by pressing pushbuttons S1 and S2 it is possible to configure the actuator very simply on-site to suit actual requirements when changes from the factory settings are needed.

**LED indicator H1**

Green steady light	Actuator working properly
Green flashing light	Test run or adaptation with synchronisation in progress
Red steady light	Fault; repeat adaptation
Red flashing light	After power interruption (> 2 sec.). By the next closing movement the valve will be automatically synchronised in the chosen closing point. The LED indicator will change from a red flashing into a green steady light.
Alternate red/green flashing light	Addressing via control system and operation of adaptation pushbutton S2 in progress

The actuator is maintenance-free. The twin-colour LED indicator is under the cover of the actuator; the indicator shows actual actuator status. It also allows simple commissioning if the factory settings need to be changed.

**Functional description S**

S1	Test switch	The valve performs full stroke at maximum running time and check the adapted lift
S2	Adaptation	The stroke effected (between the two mechanical end-stops of the valve) is acquired as 100% stroke and stored in the microprocessor. The control signal and running time are then matched to this 100% stroke.
S3.1	Direction of stroke	The direction of stroke is reversed to the control signal
		<b>Off position*</b> <b>Control signal 0% corresponds to 0% stroke = 0% U5</b>
	On position	Control signal 100% corresponds to 0% stroke = 0% U5
S3.2	Choice of closing point	Closing point with actuator spindle extended or retracted. The feedback signal U5 will be set to 0% by the chosen closing point.
		<b>Off position*</b> <b>Closing point with actuator spindle retracted</b>
	On position	Closing point with actuator spindle extended

Only properly authorised and trained persons may change the settings of dip switch S3 and pushbutton S2.

Switches S1 and S2 and dip switch S3 are located under the cover of the actuator. The test switch allows a simple check of the actuating system to be performed. Adaptation of the stroke is performed automatically at first power-up. Another adaptation independent of the first can be performed whenever necessary. The direction of stroke can be matched to the pattern of signal. The factory setting is for the stroke to increase with the control signal. Depending on the type of valve (NO/NC) the closing point (zero stroke) can be set for spindle extended or retracted.

\* **Bold type** in the table means standard factory setting.

**MFT**

Parameter	Basic value	Variable
Control signal	<b>DC 0...10 V</b>	3-point, Open/Close
Operating range	<b>DC 2...10 V</b>	Start point DC 0.5...30 V Finish point DC 2.5...32 V
Feedback U5	<b>DC 2...10 V</b>	Start point 0.5...8 V Finish point 1.5...10 V Changeover to fault alarm
Stroke	<b>40 mm</b>	4...40 mm
Running time	<b>320 s</b>	320...900 s
Actuating force	<b>100 %</b>	50...100 % (from 2000 N)

**Multi-Function Technology** allows optimum matching of parameters to the different needs of an installation. The parameters are either entered as standard values at the factory or altered subsequently using an MFT-H adjuster. Special versions with different values pre-set can be ordered as explained on the Configuration Data Sheet page 28. Data is exchanged over the MP (Multi-Point) communication system.

**Bold type** in the table means basic value factory setting.

**Remote control / MP communication system**

Remote control	The Multi-Point communication system allows the actuator to be operated by remote control.
Fault alarm	When the SW flag has been set, a feedback signal U5 is also available in addition to the LED status indicator.
MP communication	The actuator is ready for room bus operation. Up to 8 actuators can be wired in parallel.

Instead of an analogue measuring voltage, digital data can be read and overwritten from the U5 connecting terminal using a suitable interface.

## Wiring diagrams

### Override control "Open"

Linear actuator		Relay contact		Valve**	
Actuator spindle	Dip switch position		a	b	H..
	S3.1	S3.2			
<b>extending</b>	<b>Off</b>	<b>Off</b>	<b>Closed</b>	<b>Open</b>	<b>100%</b>
retracting	Off	On	Closed	Open	0%
retracting	On	Off	Closed	Open	0%
extending	On	On	Closed	Open	100%

\*\* referred to control path A-AB

A typical use for "Open" override control is in a frost protection circuit. Whether or not the frost thermostat has to interrupt the signal conductor to controller b depends on the make of controller being used (not necessary if the signal output at the controller is short-circuit-proof and protected against polarity reversal).

### Override control "Close"

Linear actuator		Relay contact		Valve**	
Actuator spindle	Dip switch position		a	b	H..
	S3.1	S3.2			
<b>retracting</b>	<b>Off</b>	<b>Off</b>	<b>Closed</b>	<b>Open</b>	<b>0%</b>
extending	Off	On	Closed	Open	100%
extending	On	Off	Closed	Open	100%
retracting	On	On	Closed	Open	0%

\*\* referred to control path A-AB

A typical use for "Close" override control is in a plant shutdown circuit with the controller unit remaining operational. Whether or not the plant shutdown switch has to interrupt the signal conductor to controller b depends on the make of controller being used (not necessary if the signal output at the controller is short-circuit-proof and protected against polarity reversal).

### 3-point control

Linear actuator		Relay contact		Valve**
Actuator spindle	a	b	H..	
stops	Open	Open	stopped	
extending	Closed	Open	opening	
retracting	Open	Closed	closing	
retracting	Closed	Closed	closing	

\*\* referred to control path A-AB

3-point control is easy to implement with a 4-wire connection.

However, the linear actuator must be parameterised for 3-point control.

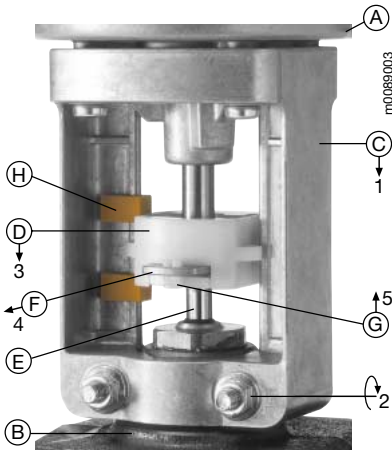
### Feedback U5 with configured modulating linear actuator

Control signal	Dip switch position		Actuator spindle	Measuring voltage
	S3.1	S3.2		
10 V	<b>Off</b>	<b>Off</b>	<b>extending</b>	<b>10 V</b>
	Off	On	retracting	10 V
	On	Off	extending	2 V
	On	On	retracting	2 V
0 V	<b>Off</b>	<b>Off</b>	<b>retracting</b>	<b>2 V</b>
	Off	On	extending	2 V
	On	Off	retracting	10 V
	On	On	extending	10 V

Feedback U5 is measured as the voltage between terminals 1 and 5. The effective lift is assigned during adaptation of the chosen measuring voltage (standard factory setting DC 2...10 V).

**Bold type** in the table means standard factory setting.

**Mounting: NV.. linear actuator on H.. globe valve**



The neck of the valve (B) must be cleaned before the linear actuator (A) is fitted to it.

Care must be taken to ensure that the bracket (C) is pushed down (1) until it is in firm contact with the neck of the valve. The bracket must then be secured firmly to the neck of the valve by tightening (with min. 9 Nm) the two fixing nuts (2) with a 10 mm open-jaw or ring spanner. Next, use the manual operating device to move the position indicator (D) to the position (3) of the valve stem (E). Engage the angle-piece (F) with the position indicator so that the angle-piece latches into the valve stem. Providing the connection between the valve stem and the actuator spindle has

been made correctly, the angle-piece will run automatically out of the position indicator (4).

Insert the locking device (G) into the position indicator (5) to secure it so that the angle-piece cannot unlatch accidentally.

The followers (H) are moved automatically to the maximum amount of stroke shown by the position indicator.

When dismantling, first remove the locking device from the angle-piece. The angle-piece must then be pressed into the position indicator so that the valve stem unlatches. The linear actuator can be detached from the neck of the valve after first releasing the fixing nuts.

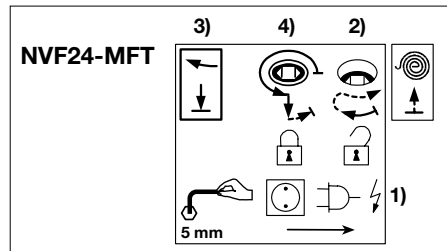
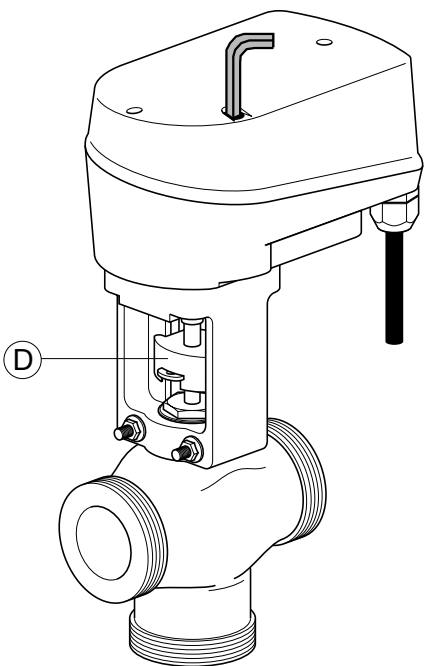
**Manual operation of NV.. linear actuator**

When a linear actuator is supplied separately but together with a valve, the actuator spindle is extended to the ca. 3/4 position. The spindle can be operated with a hexagonal key (the 5 mm [or 3/16"]

hexagonal key is not included with the actuator).

The manual operating mechanism is overload-proof. The actuator spindle will remain at the manual setting until the power

supply to the actuator is energised or, the next time the power supply is interrupted, it moves to whichever end lift position has been selected.



**1) Isolate the actuator from the power supply**

**2) Disengaging manual operation of the NVF24-MFT**

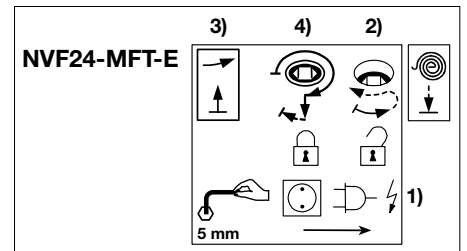
Turn the hexagonal key clockwise through ca. 45° until resistance is encountered. Then lift the key (ca. 7 mm) until the black socket for the key is level with the top of the housing cover. The spring mechanism will now rotate the key counter-clockwise and the actuator spindle will retract.

**3) Manual operation of the NVF24-MFT**

Turning the hexagonal key clockwise causes the actuator spindle to extend; it must be stopped at the required position of lift.

**4) Locking manual operation of the NVF24-MFT**

Turn the hexagonal key back 3/4 turn counter-clockwise and then press it down into the cover of the housing (the black socket will move inwards ca. 7 mm). Slight counter-clockwise rotation of the key will then lock the manual operating mechanism in position.



**1) Isolate the actuator from the power supply**

**2) Disengaging manual operation of the NVF24-MFT-E**

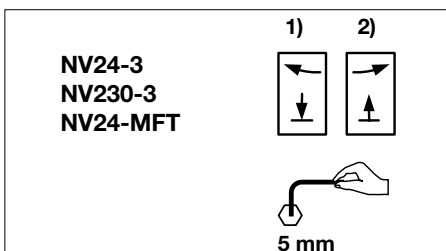
Turn the hexagonal key counter-clockwise through ca. 45° until resistance is encountered. Then lift the key (ca. 7 mm) until the black socket for the key is level with the top of the housing cover. The spring mechanism will now rotate the key clockwise, the actuator spindle will extend fully, the position indicator (D) will move down and the valve can be coupled up.

**3) Manual operation of the NVF24-MFT-E**

Turning the hexagonal key counter-clockwise causes the actuator spindle to retract; it must be stopped at the required position of lift.

**4) Locking manual operation of the NVF24-MFT-E**

Turn the hexagonal key back 3/4 turn clockwise and then press it down into the cover of the housing (the black socket will move inwards ca. 7 mm). Slight clockwise rotation of the key will then lock the manual operating mechanism in position.



Turning the hexagonal key clockwise 1) causes the actuator spindle to extend; turning it counter-clockwise 2) causes it to retract.

## Dimensions:

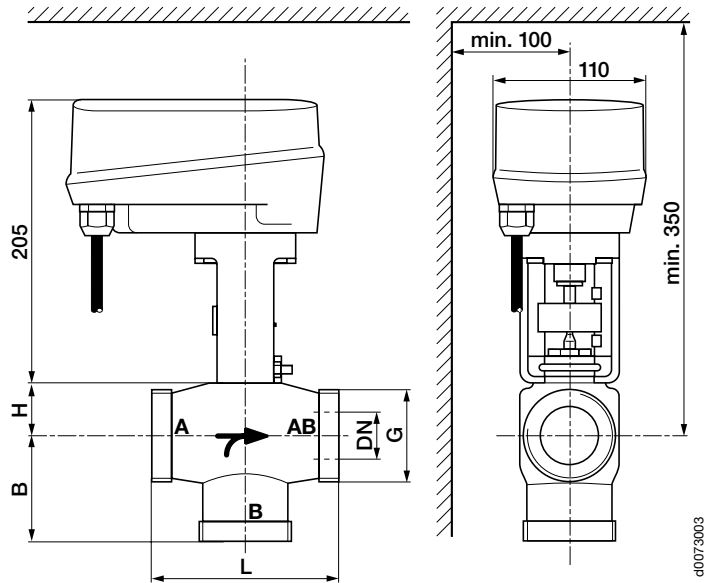
### Assembled unit, NV.. linear actuator with H4.. or H5.. globe valve, DN 15 to 50

Globe valve with male screw ends

DN	External thread	Dimensions [mm]				2-way			3-way		
		L	H	B	Weight	B	Weight	B	Weight		
[mm]	G			[mm]	[kg]	*[kg]	[mm]	[kg]	*[kg]		
15	G1"	80	27	46	2.35	2.65	40	2.25	2.55		
20	G1 1/4"	80	26	62	2.6	2.9	55	2.45	2.75		
25	G1 1/2"	95	26	67	3	3.3	60	2.8	3.1		
32	G2"	112	32	74	3.7	4.0	66	3.4	3.7		
40	G2 1/4"	132	36	84	4.6	4.9	75	4.2	4.5		
50	G2 3/4"	160	42	94	5.9	6.2	85	5.4	5.7		

Weight includes NV.. linear actuator

\* Weight includes NVF.. linear actuator



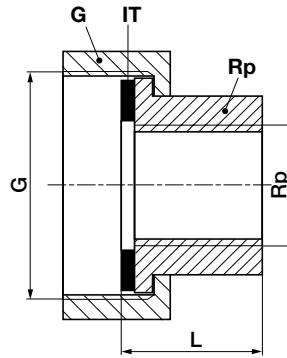
## Accessories:

Union for H4.. and H5.. valves with external thread

Type	ZH2315	ZH2320	ZH2325	ZH2332	ZH2340	ZH2350
DN [mm]	15	20	25	32	40	50
G	1"	1 1/4"	1 1/2"	2"	2 1/4"	2 3/4"
Rp	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Weight [kg]	0.19	0.32	0.43	0.76	0.89	1.35
Dimension L [mm]	24	24	28	33	35	38

ZH23.. union includes: \* Union nut (G-thread), \* female part (Rp-thread), flat gasket (IT)

\* Material: Black malleable cast-iron



## Dimensions:

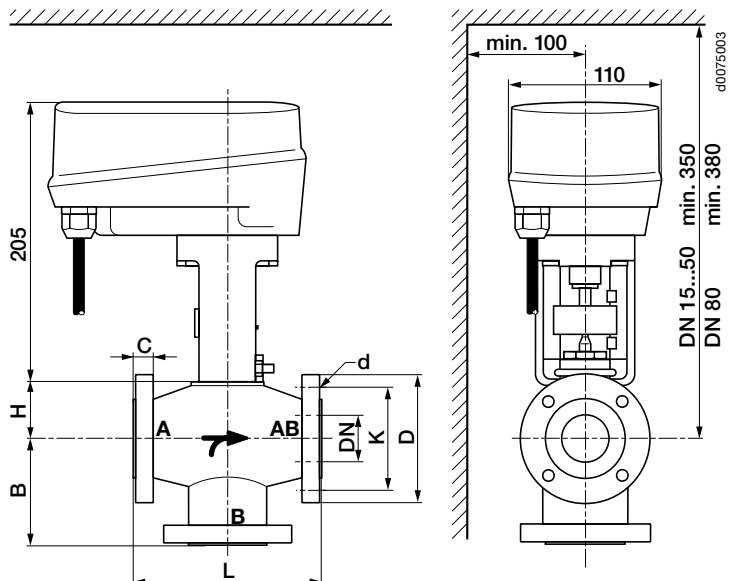
### Assembled unit, NV.. linear actuator with H6.. or H7.. globe valve, DN 15 to 80

Globe valve with flanged ends

DN	Dimensions [mm]						2-way			3-way		
	L	H	D	K	d	C	B	Weight	B	Weight		
[mm]							[mm]	[kg]	*[kg]	[mm]	[kg]	*[kg]
15	130	41	95	65	4x14	16	72	4.9	5.2	65	5.8	6.1
20	150	41	105	75	4x14	18	77	4.8	5.1	70	5.7	6.0
25	160	41	115	85	4x14	18	82	7.1	7.4	75	6.8	7.1
32	180	41	140	100	4x19	20	88	9.3	9.6	80	8.8	9.1
40	200	52	150	110	4x19	20	100	13.3	13.6	90	12.5	12.8
50	230	52	165	125	4x19	22	110	17.0	17.3	100	16.0	16.3
65	290	52	185	145	4x19	20	130	20.9	21.2	120	18.4	18.7
80	310	77	200	160	8x19	22	186	34.3	34.6	155	30.0	30.3

Weight includes NV.. linear actuator

\* Weight includes NVF.. linear actuator



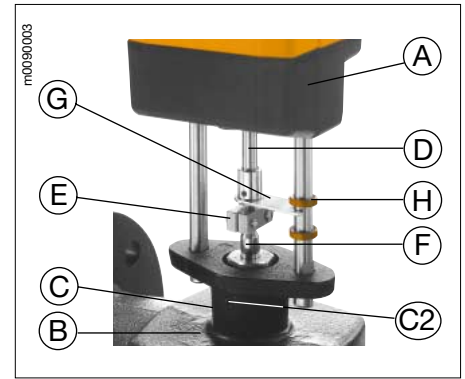
**Mounting: AV.. linear actuator on H.. globe valve**

The neck of the valve (B) must be cleaned before the linear actuator (A) is fitted to it. Care must be taken to ensure that the mounting flange (C) is pushed down until it is in firm contact with the neck of the valve. The mounting flange must then be secured firmly to the neck of the valve by tightening the three fixing bolts (C2) with a 3 mm hexagonal key. Next, use the manual operating device to move the actuator spindle (D) to the position of the valve

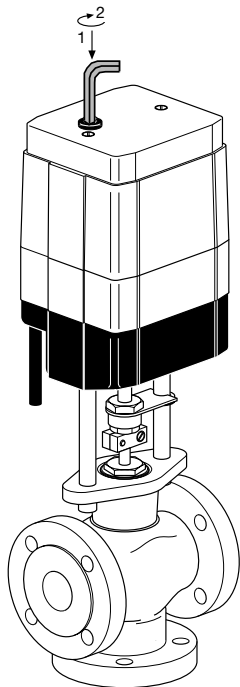
stem (F). The stem coupling (E) is securely attached to the valve stem by means of two fixing bolts.

The position indicator (G) moves the followers (H) automatically to the maximum amount of lift travelled.

When dismantling, release the stem coupling first so that the linear actuator can be detached from the neck of the valve after first releasing the fixing bolts (C2).



**Manual operation of AV..**



m0086003

The actuator spindle can be moved together with the position indicator by inserting a 4 mm hexagonal key (1) through the housing cover and engaging it. (The key is not included in the scope of supply).

Rotating the key clockwise (2) will cause the actuator spindle to extend and rotating it anticlockwise will cause it to retract. The manual operating device is overload-proof. The actuator spindle will remain in the manual operation position until the actuator has been connected to the power supply. When energised, the actuator will move the actuator spindle in response to the control signal.

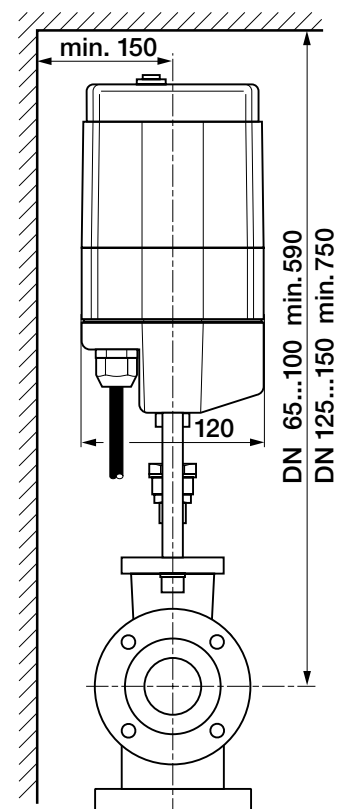
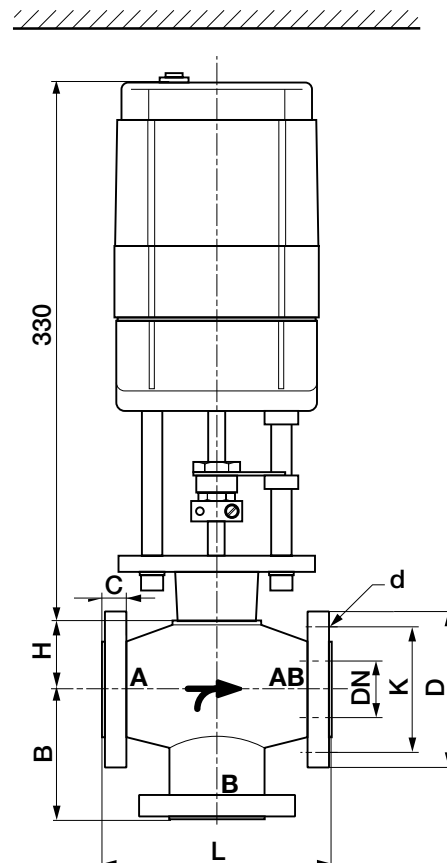
**Dimensions:**

**Assembled unit, AV.. linear actuator with H6.. or H7.. globe valve, DN 65 to 150**

Globe valve with flanged ends

DN	Dimensions [mm]						2-way		3-way	
	L	H	D	K	d	C	B	Weight	B	Weight
[mm]							[mm]	[kg]	[mm]	[kg]
65	290	52	185	145	4x19	20	130	22.4	120	19.9
80	310	77	200	160	8x19	22	186	35.8	155	31.5
100	350	77	220	180	8x19	24	206	39.9	175	34.6
125	400	222	250	210	8x19	26	-	57.9	250	60.9
150	480	241	285	240	8x23	26	-	77.9	300	84.5

Weight includes AV.. linear actuator



d0076003

## Installation, mounting position and commissioning

### Separate supply

When a linear actuator is enclosed with a supplied globe valve they can be assembled on-site.

### Recommended mounting position

The globe valves may be mounted either vertical (Fig. 1) or horizontal (Fig. 2). However, mounting the valves with the spindle pointing downwards, i.e. upside down, is not recommended (Fig. 3).

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 globe valve and linear actuator have been assembled in accordance with the instructions.

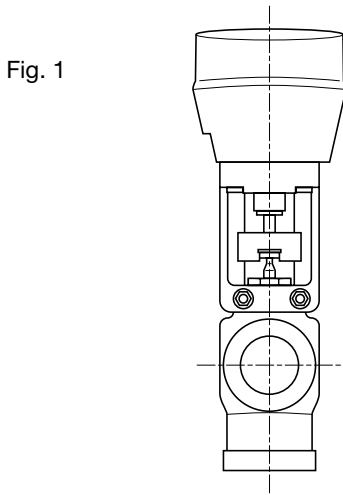


Fig. 1

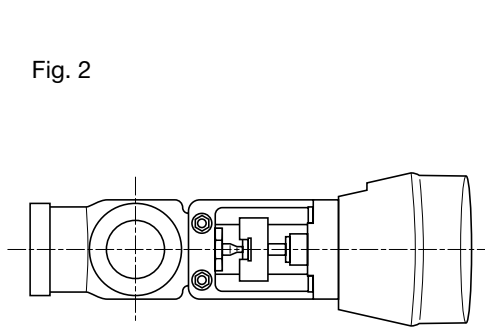


Fig. 2

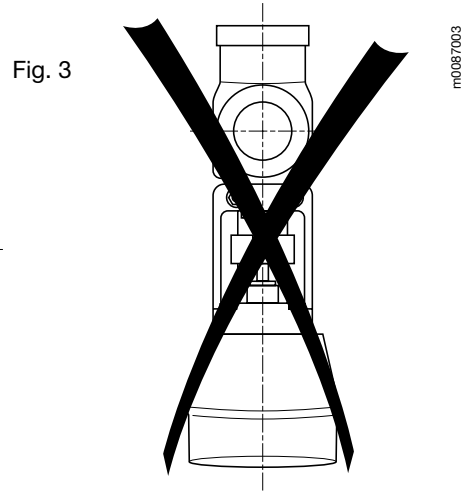
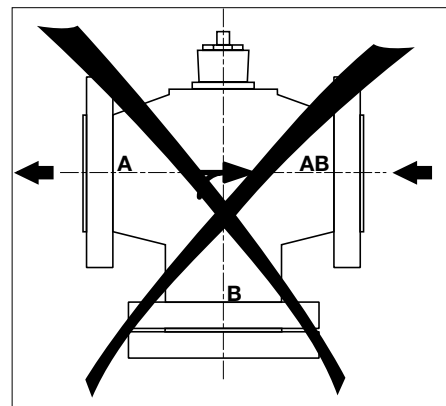


Fig. 3

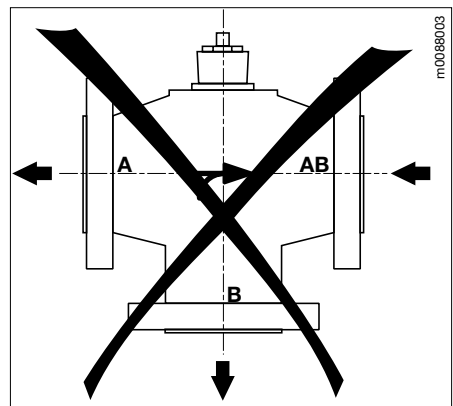
m0087003

### Direction of flow

The prescribed directions of flow for specific applications must be adhered to.



This direction of flow not allowed, 2-way



This direction of flow not allowed, 3-way

m0086003

## Flow characteristics of globe valves

### 2-way

The flow characteristic is equal-percentage, with a characteristic factor of  $n(ep) = 3$ . This ensures stable control behaviour in the elevated part-load range. In the lower part of the opening range between 0 and 30% stroke the characteristic is linear. This ensures excellent control characteristics, in the lower part of the load range too (Fig. 1).

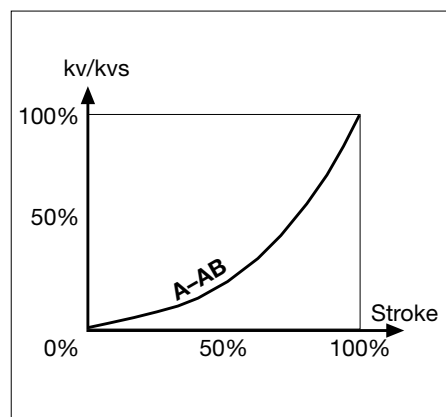


Fig. 1

### 3-way

The characteristic of the control path A-AB is the same as that for 2-way globe valves. The bypass B-AB has the same  $k_{vs}$  value as the control path. The bypass has a linear characteristic (Fig. 2).

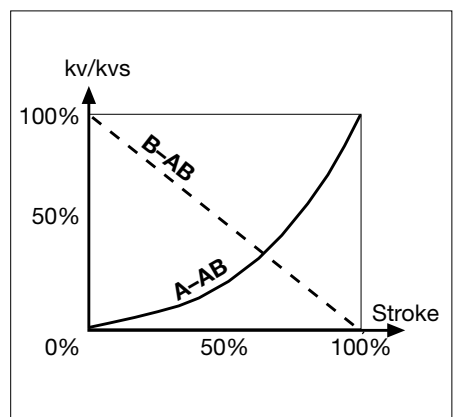


Fig. 2

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**Maintenance**

- Globe valves and linear actuators are maintenance-free.
- Before any kind of service work is carried out on control devices of this type it is essential to isolate the actuator from the power supply (by unplugging the power lead). Any pumps in the particular part of the piping system concerned must also be switched off and the appropriate isolating fittings closed (also allow everything to cool down first if necessary and reduce the pressure in the system to atmospheric).
- The systems must not be returned to service until the globe valve and the linear actuator have been properly reinstalled and connected and the pipe-work has been refilled in the proper manner.

**Disposal**

When a control device (globe valve and linear actuator) has come to the end of its

service life, the two parts must be dismantled and sorted into different materials before being disposed of.

**Project design**

**Installing H4.. and H6.. globe valves, 2-way**

The valves are throttling devices so must be installed in the return line of systems in order to ensure less thermal stress on the seals of the device. The direction of flow specified must be adhered to.

**Installing H5.. and H7.. globe valves, 3-way**

The valves are mixing devices. Whatever type of installation is employed it is essential to adhere to the directions of flow specified. Whether a valve is installed in the supply or the return of a system depends on the type of hydraulic circuit being employed. In the case of a diverter circuit a balancing throttle can be installed in the bypass line.

**Water quality requirements**

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

**Strainer**

Globe valves are relatively sensitive control devices and in order to ensure that they give long service life the fitting of a strainer is recommended.

**Sufficient isolating valves**

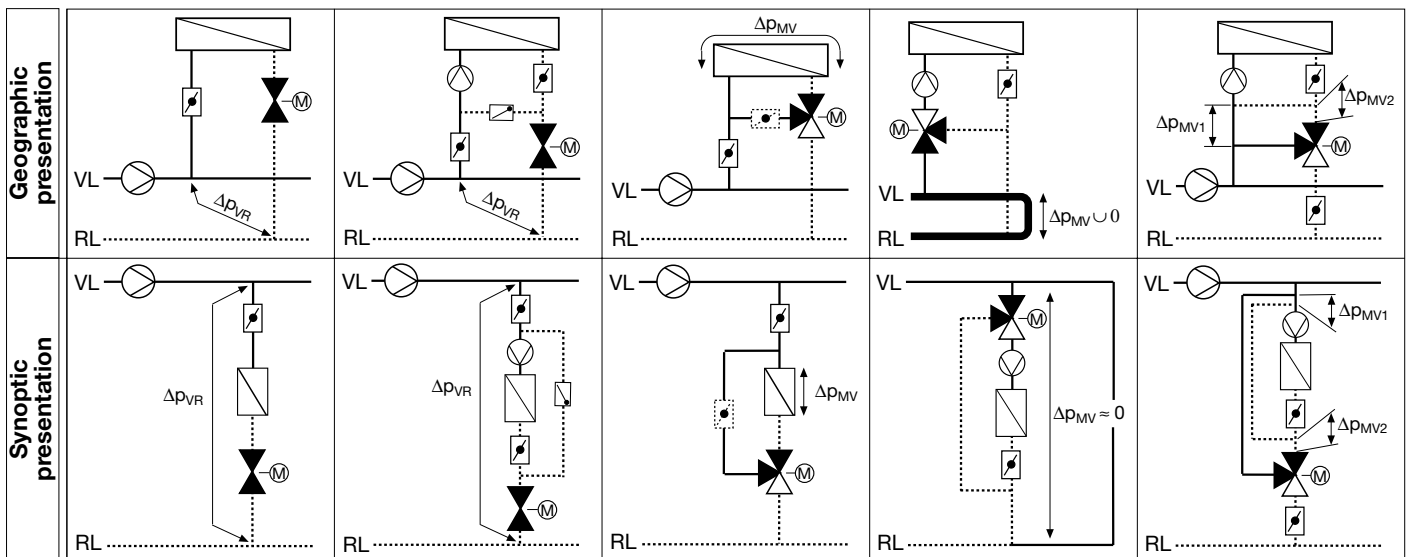
It is essential to ensure that sufficient isolating valves are provided.

**Correct valve selection and sizing**

In order to ensure that the control device (globe valve and linear actuator) achieves a long service life, it is essential for the valve to be rated for the correct differential pressure  $\Delta p_{v100}$  across the valve, i.e. with adequate valve authority ( $P_v > 0.5$ ). The differential pressure  $\Delta p_{v100}$  depends on the type of hydraulic circuit in which the valve is being used.

**Differential pressures  $\Delta p_{v100}$  with globe valves full open**

H4../H6.. globe valve, 2-way		H5../H7.. globe valve, 3-way		
Throttling circuit	Injection circuit with throttling device	Diverter circuit (with a mixing valve in the return pipe)	Mixing circuit	Injection circuit with 3-way valve
$\Delta p_{v100} > \Delta p_{VR}/2$	$\Delta p_{v100} > \Delta p_{VR}/2$	$\Delta p_{v100} > \Delta p_{MV}$	$\Delta p_{v100} > \Delta p_{MV}$	$\Delta p_{v100} > \Delta p_{MV1} + \Delta p_{MV2}$ $\approx 0 \text{ bar}$
Typical values: 15 kPa < $\Delta p_{v100}$ < 200 kPa	Typical values: 10 kPa < $\Delta p_{v100}$ < 150 kPa	Typical values: 5 kPa < $\Delta p_{v100}$ < 50 kPa	Typical values: $\Delta p_{v100} > 3 \text{ kPa}$ (unpressurized manifold) For other mixing circuits: 3 kPa < $\Delta p_{v100}$ < 30 kPa	Typical values: $\Delta p_{v100} > 3 \text{ kPa}$



**Legend**

Globe valve, 2-way with linear actuator	Globe valve, 3-way with linear actuator	Pump	Non-return valve	Balancing valve	VL— Supply RL···· Return
---	---	------	------------------	-----------------	-----------------------------

$\Delta p_{VR}$ Differential pressure across specified section at rated load	$\Delta p_{MV}$ Differential pressure across variable-flow section at rated load (e.g. heat exchanger)	<b>Note:</b> Strainers and isolating fittings are not shown.
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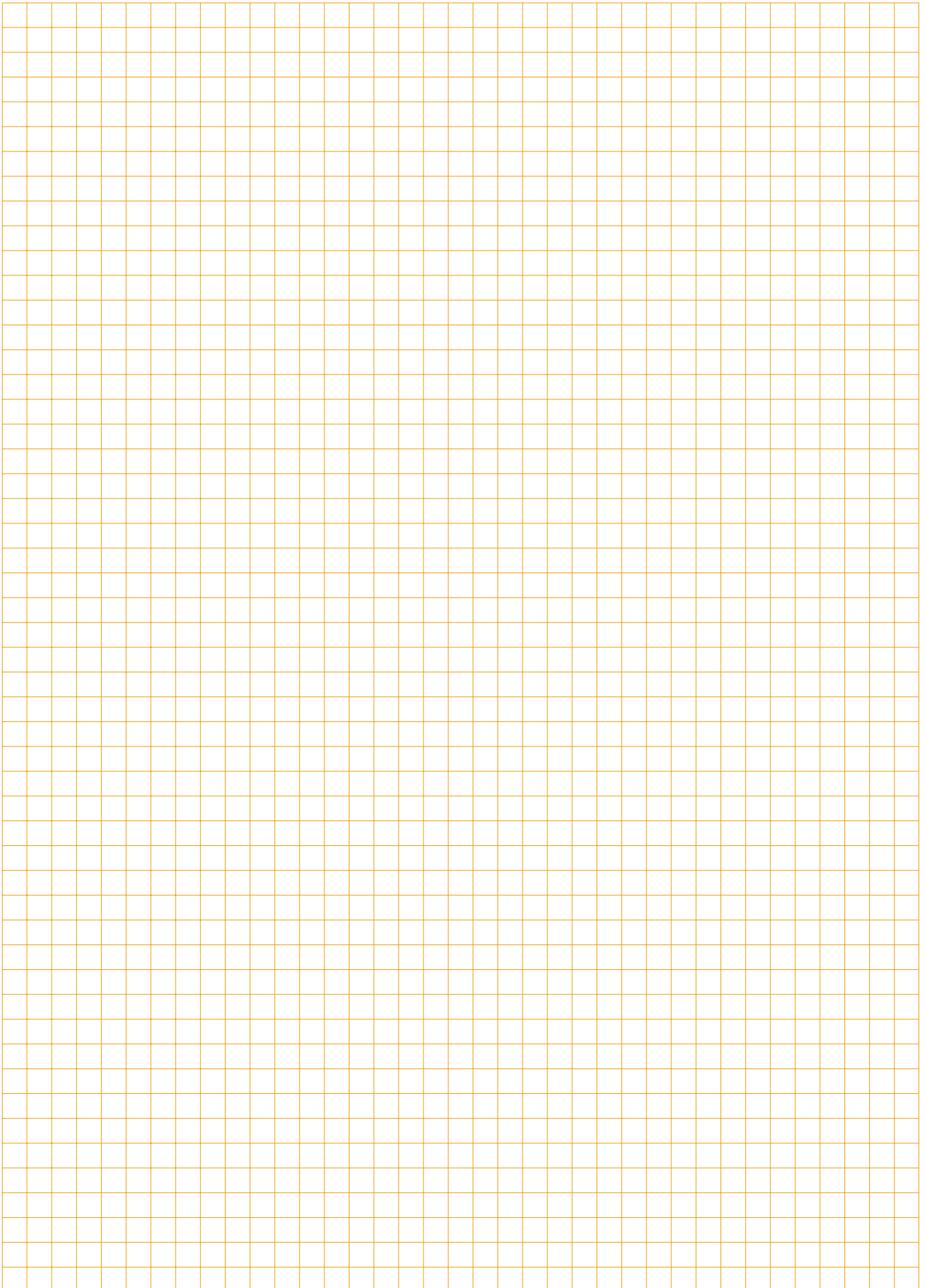
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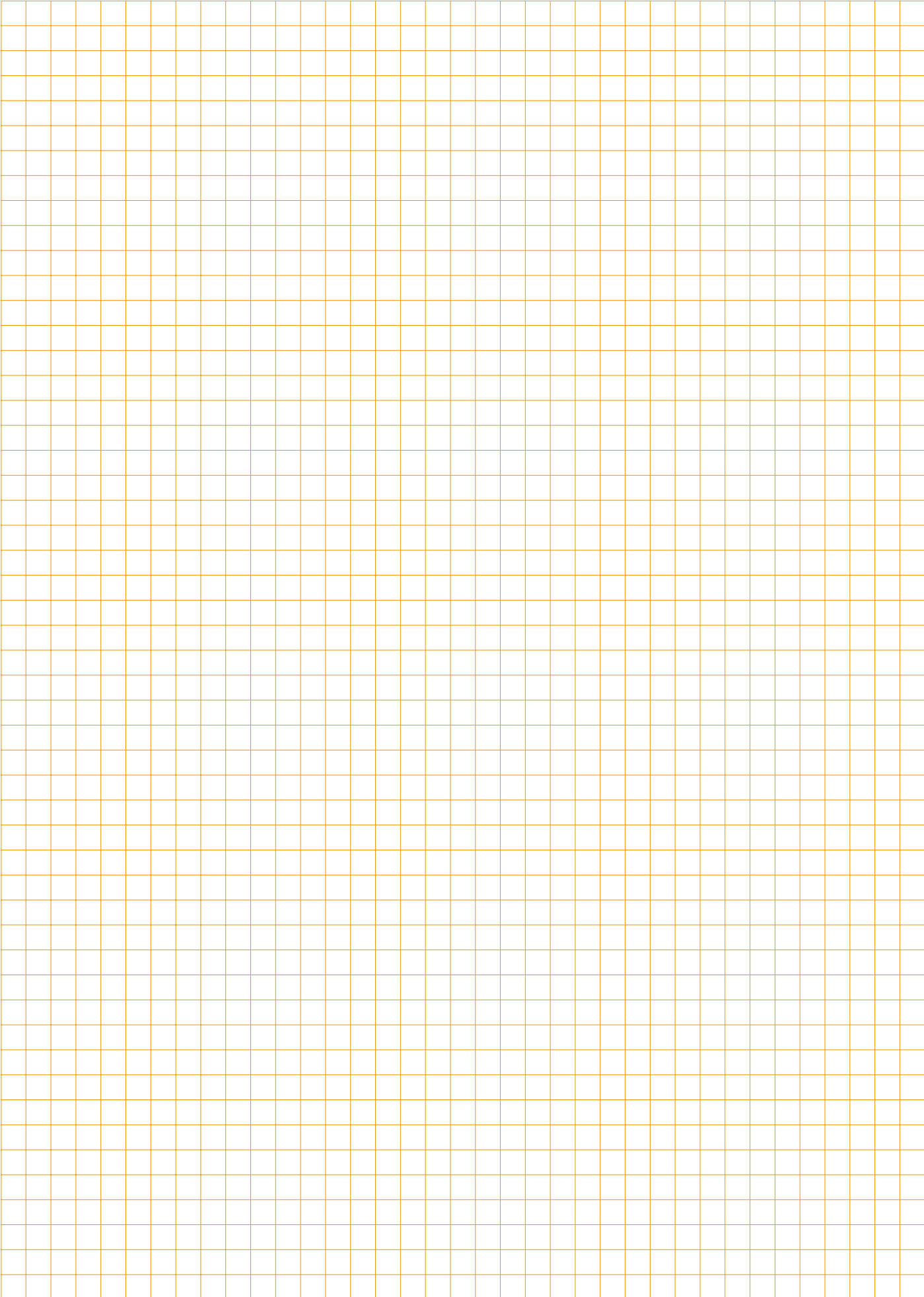
ENG-93001-93620-05.2001-3M • Printed in Switzerland • ZSD • Subject to technical changes

## Special parameters for NV..-MFT and AV24-MFT

Customer: _____ _____ _____	This Configuration Data Sheet is intended to accompany orders as well as providing documentation for linear actuators with MFT employing special parameters.		
Quantity: _____	Globe valve type	H□□□□+	Linear actuator mounted
Required delivery: _____		H□□□□/	Linear actuator separate
	Linear actuator	NV24-□□□□ AV24-□□□□	Leave blank; code will be generated by Belimo

<b>Control signal</b>	<input type="checkbox"/> <b>Modulating (basic value)</b> <input type="checkbox"/> 3-point		
<b>Operating range with modulating control signal</b>	<input type="checkbox"/> <b>DC 2...10 V (basic value)</b> Start point = DC 2 V Finish point = DC 10 V <input type="checkbox"/> DC 0...10 V Start point = DC 0 V Finish point = DC 10 V <input type="checkbox"/> Start point DC □□.□ V (0.5...30 V) Finish point must be at least 2 Volt above start point. <input type="checkbox"/> Finish point DC □□.□ V (2.5...32 V)		
<b>Feedback U5</b>	<input type="checkbox"/> <b>Measuring voltage DC 2...10 V (basic value)</b> <input type="checkbox"/> Measuring voltage DC 0...10 V <input type="checkbox"/> Start point DC □.□ V (0.5...8 V) Finish point must be at least 1 Volt above start point. <input type="checkbox"/> Finish point DC □□.□ V (1.5...10 V) <input type="checkbox"/> Fault alarm When a fault occurs, a constant voltage of DC 8.5 V is produced at output U5 and overrides the measuring voltage. It is advisable to set the end point of the modulating measuring voltage to a maximum of DC 8.0 V otherwise the higher level system will not be able to interpret the DC 8.5 V fault signal.		
<b>Nominal stroke</b>	<input type="checkbox"/> <b>Adaption (basic setting)</b> Automatic adaption on first power-up or when adaption pushbutton S2 is pressed. Only possible between two end-stops inside the valve. <input type="checkbox"/> Nominal stroke □□ mm (2...max.) max. 20 mm for NV.. max. 40 mm for AV.. adaption pushbutton S2 inactive.		
<b>Stroke limiting</b>	<input type="checkbox"/> <b>Nominal stroke 100% (basic setting)</b> A reduced value of lift can be set with 2-way valves. The working range and the running time are adapted to the reduced lift which is entered as a percentage of the nominal lift. The U5 feedback signal is referred to the nominal lift. <input type="checkbox"/> Stroke limiting □□ % (20...99%)		
<b>Running time</b>	<input type="checkbox"/> <b>Basic value</b> 150 s for NV.. 320 s for AV.. <input type="checkbox"/> Running time □□□ s (150...400s) for NV.. <input type="checkbox"/> □□□ s (320...900s) for AV..		
<b>Actuating force</b>	<input type="checkbox"/> <b>Basic value 100%</b> for NV24-MFT, 800 N for AV24-MFT, 2000 N <input type="checkbox"/> Actuating force reduced □□□ % (50...100%)		







# The worldwide leading actuator technology for all controlled devices in heating, ventilation and air-conditioning plants

## Air applications



Damper actuators and spring-return actuators for air control dampers are invaluable elements of good HVAC systems.

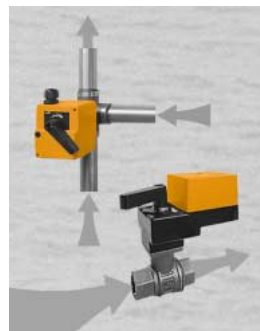


Extra-strong safety actuators for motorizing fire and smoke extraction dampers help raise safety standards in buildings.



Air volume boxes – equipped with VAV-Control – ensure higher standards of comfort for the occupants of air-conditioned single rooms as well as saving energy.

## Water applications



Rotary actuators for heating system mixing valves and motorized ball valves ensure reliable control of HVAC water systems.



Globe valves with MFT2 actuators allow easy adaptation to the needs of HVAC systems.

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