

**01 - 02.5**

08.12.GB

**Control valves**  
**Control valves with flow limitation**  
**BEE line**



## Kv coefficient calculation

Calculation itself is carried out with respect to conditions of regulating circuit and operating medium according to equations mentioned below. Control valve must be designed to be able to regulate maximal flow quantity at given operating conditions. At the same time it is necessary to check whether minimal flow rate can be even regulated or not.

Condition is the following ratio  $r > Kvs / K_{v_{min}}$

Because of possible minus tolerance 10% of  $K_{v_{100}}$  against  $Kvs$  and requirement for possible regulation within range of maximal flow (decrement and increase of flow), producer recommends to select  $Kvs$  value higher than maximal operating  $Kv$  value:

$$Kvs = 1.1 \div 1.3 Kv$$

It is necessary to take into account to which extent  $Q_{max}$  involve "precautionary additions" that could result in valve oversizing.

## Relations of Kv calculation

		Pressure drop $p_2 > p_1/2$ $\Delta p < p_1/2$	Pressure drop $\Delta p \geq p_1/2$ $p_2 \leq p_1/2$
Kv =	Liquid	$\frac{Q}{100} \sqrt{\frac{\rho_1}{\Delta p}}$	$\frac{Q}{100} \sqrt{\frac{\rho_1}{\Delta p}}$
	Gas	$\frac{Q_n}{5141} \sqrt{\frac{\rho_n \cdot T_1}{\Delta p \cdot p_2}}$	$\frac{2 \cdot Q_n}{5141 \cdot p_1} \sqrt{\rho_n \cdot T_1}$

## Flow characteristic selection in regard of valve stroke

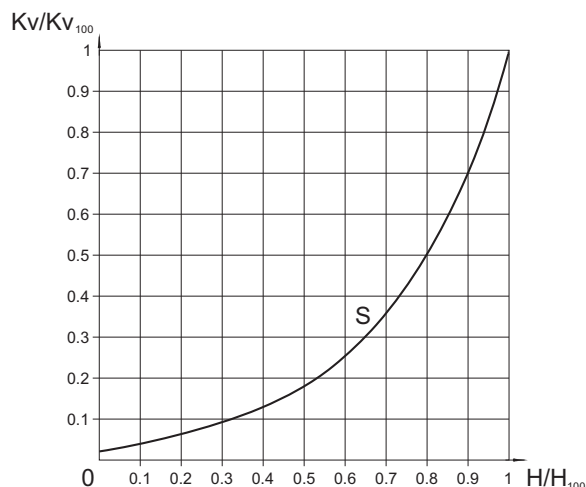
To make right selection of valve flow characteristic, it is suitable to carry out checking of what stroke values will be reached in different operation states. We recommend to carry out such checking at least for minimal, nominal and maximal flow rates. The principle for flow characteristic selection is to avoid, if possible, 5÷10% of the beginning and end of the valve stroke range.

To calculate valve stroke at different operating conditions with different types of flow characteristics is possible with the advantage of using LDM's calculation programme VALVES. The programme serves for complete design of valve from  $Kv$  calculation to specification of a concrete valve with its actuator.

## Dimensions and units

Marking	Unit	Name of dimension
Kv	$m^3 \cdot h^{-1}$	Flow coefficient under conditions of units of flow
$K_{v_{100}}$	$m^3 \cdot h^{-1}$	Flow coefficient at nominal stroke
$K_{v_{min}}$	$m^3 \cdot h^{-1}$	Flow coefficient at minimal flow rate
Kvs	$m^3 \cdot h^{-1}$	Valve nominal flow coefficient
Q	$m^3 \cdot h^{-1}$	Flow rate in operating conditions ( $T_1, p_1$ )
$Q_n$	$Nm^3 \cdot h^{-1}$	Flow rate in normal conditions (0°C, 0.101 Mpa)
$p_1$	MPa	Upstream absolute pressure
$p_2$	MPa	Downstream absolute pressure
$p_s$	MPa	Absolute pressure of saturated steam at given temperature ( $T_1$ )
$\Delta p$	MPa	Valve differential pressure ( $\Delta p = p_1 - p_2$ )
$\rho_1$	$kg \cdot m^{-3}$	Process medium density in operating conditions ( $T_1, p_1$ )
$\rho_n$	$kg \cdot Nm^{-3}$	Gas density in normal conditions (0°C, 0.101 Mpa)
$T_1$	K	Absolute temperature at valve inlet ( $T_1 = 273 + t_1$ )
r	1	Rangeability

## Valve flow characteristics

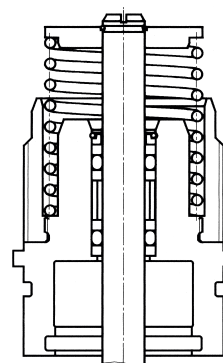


S - LDMspline® characteristic

$$Kv/K_{v_{100}} = 0.0183 + 0.269 \cdot (H/H_{100}) - 0.380 \cdot (H/H_{100})^2 + 1.096 \cdot (H/H_{100})^3 - 0.194 \cdot (H/H_{100})^4 - 0.265 \cdot (H/H_{100})^5 + 0.443 \cdot (H/H_{100})^6$$

## Packing - O-ring EPDM

Well proven type of packing with sealing elements made of high quality EPDM is suitable for operating with temperature of, +2 to +150 °C. The packing excels with its reliability and long time tightness. Its properties ensure safe usage in no-maintenance applications. Main preferences of the packing is low frictional forces, sealing capability in both ports (even when there is underpressure in the valve) and service life exceeding 1 000 000 cycles.



## Simplified procedure for designing of two-way control valve

Given: medium water, 115°C, static pressure at piping spot 600 kPa (6 bar),  $\Delta p_{AVAIL} = 40$  kPa (0,4 bar),  $\Delta p_{PIPELINE} = 7$  kPa (0,07 bar),  $\Delta p_{APPLIANCE} = 15$  kPa (0,15 bar), nominal flow rate  $Q_{NOM} = 3,5$  m<sup>3</sup>.h<sup>-1</sup>, minimal flow rate  $Q_{MIN} = 0,4$  m<sup>3</sup>.h<sup>-1</sup>.

$$\Delta p_{AVAIL} = \Delta p_{VALVE} + \Delta p_{APPLIANCE} + \Delta p_{PIPELINE}$$

$$\Delta p_{VALVE} = \Delta p_{AVAIL} - \Delta p_{APPLIANCE} - \Delta p_{PIPELINE} = 40 - 15 - 7 = 18 \text{ kPa (0,18 bar)}$$

$$Kv = \frac{Q_{NOM}}{\sqrt{\Delta p_{VALVE}}} = \frac{3,5}{\sqrt{0,18}} = 8,25 \text{ m}^3 \cdot \text{h}^{-1}$$

Precautionary additions for process tolerances (provided that flow rate Q was not oversized):

$$Kvs = (1,1 \text{ to } 1,3) \cdot Kv = (1,1 \text{ to } 1,3) \cdot 8,25 = 9,1 \text{ to } 10,7 \text{ m}^3 \cdot \text{h}^{-1}$$

Now we choose the nearest Kvs value from those available in our catalogue, i.e.  $Kvs = 10$  m<sup>3</sup>.h<sup>-1</sup>. This value corresponds to nominal size of DN 25. Then if we choose threaded valve PN 16 made of spheroidal cast iron, we will get the following specification No.:

**RV 122 2431 25/150-25/T**

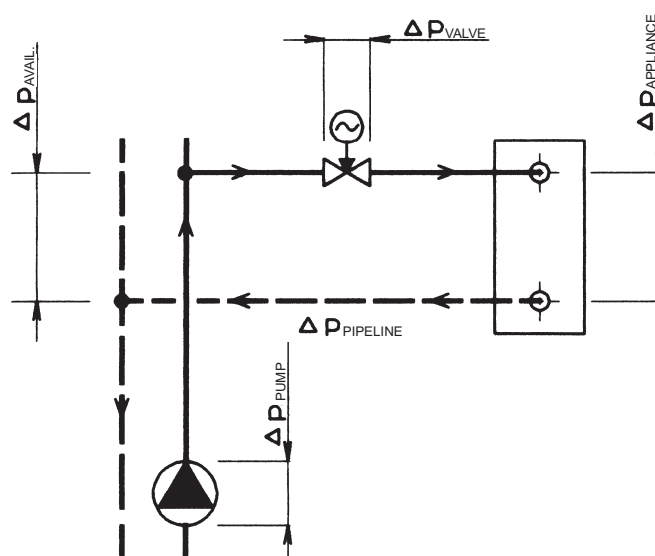
Then we select an appropriate actuator according to the regulation demands.

## Determination of real pressure drop value of a chosen valve at fully open with given flow rate

$$\Delta p_{VALVE H100} = \left( \frac{Q_{NOM}}{Kvs} \right)^2 = \left( \frac{3,5}{10} \right)^2 = 0,123 \text{ bar (12,3 kPa)}$$

The control valve's real pressure drop calculated this way shall be taken into account in a hydraulic calculation of regulating circuit.

Scheme of typical regulation loop with the application of two-way control valve



Remark: More detailed information on calculation and design of LDM control valves is mentioned in calculation instructions No. 01-12.0. Equations mentioned above apply in a simplified way to water. To reach optimum results, we recommend to use original calculation programme VALVES which is available on request free of charge.

## Determination of valve's real authority

$$a = \frac{\Delta p_{VALVE H100}}{\Delta p_{VALVE H0}} = \frac{12,3}{40} = 0,31$$

Value a should be at least equal to 0,3. A chosen valve checking is then satisfactory.

**Caution:** the valve's authority calculation should be related to a valve pressure difference in its closed position i.e. disposition pressure value in a branch  $\Delta p_{AVAIL}$  when flow rate is zero, not to a pressure value of a pump  $\Delta p_{PUMP}$ , because, due to pipeline circuit pressure drops up to the spot where the regulating branch is connected, the following equation applies:  $\Delta p_{AVAIL} < \Delta p_{PUMP}$ . In such cases we consider for simplicity the following:  $\Delta p_{AVAIL H100} = \Delta p_{AVAIL H0} = \Delta p_{DISP}$ .

## Checking of rangeability

We carry out the same checking for minimal flow rate  $Q_{MIN} = 0,4$  m<sup>3</sup>.h<sup>-1</sup>. Because the pressure losses of the stable shorts reduce to the second power of the flow rate, the following differential pressure values correspond to the min. flow rate:  $\Delta p_{PIPELINE QMIN} = 0,23$  kPa,  $\Delta p_{APPLIANCE QMIN} = 0,49$  kPa.  $\Delta p_{VALVE QMIN} = 40 - 0,23 - 0,49 = 39,28 = 39$  kPa.

$$Kv_{MIN} = \frac{Q_{MIN}}{\sqrt{\Delta p_{VALVE QMIN}}} = \frac{0,4}{\sqrt{0,39}} = 0,64 \text{ m}^3 \cdot \text{h}^{-1}$$

Necessary rangeability value

$$r = \frac{Kvs}{Kv_{MIN}} = \frac{10}{0,64} = 15,6$$

shall be lower than mentioned rangeability value of  $r = 50$ . Checking is then satisfactory.

## BEE line

### RV 122

**Control valves  
DN 15 - 50, PN 25**



## Description

Valves series RV 122 BEE are control valves of a compact construction with pressure-balanced plug and externally threaded coupling. The valves' execution enables their application with low-linear force actuators for high differential pressures. They excel with minimum dimensions and weight, quality control features and a high tightness in closed position. Thanks to a unique LDMspline® flow characteristic which has been optimized for thermodynamic processes control, the valves are ideal for applications in heating and air-conditioning. In regard of a sophisticated design of internal parts and long service life of the packing, the valves fulfill every demand for a long-time service without necessary maintenance. The valve is, owing to its compact execution, a basic element of a unit-type valve series BEE line.

Within the scope of delivery of the valves, we deliver connection couplings enabling the valve to be connected to pipeline either with threads, flanges or weld unions, providing so quick and trouble-free piping.

Assembled with LDM actuators, the valves can be controlled with either 3-position or continuous signal.

## Application

Used materials for throttling trim which consist of plug made of high-quality stainless steel and soft sealing elements, ensure a hermetic tightness in both ports and enable the valves to be used not only in common warm-water and hot-water regulation

circuits in heating but also in applications with special characteristic features of process medium such as in refrigerating industry and air-conditioning. Maximal permissible operating pressures in behaviour with process medium temperature are mentioned in table on page 10 of this catalogue.

## Process media

The valve series RV 122 are suitable for applications where process medium is water or air. Further they can be used for refrigerating media and other non-aggressive liquids or gases with temperature ranging +2°C to +150°C. Sealing surfaces of control trim are resistant to common sludge or water impurities. Yet it is recommended to pipe a strainer in front of valve to ensure a reliable function and tightness in case there are abrasive particles present.

## Installation

The valves can be installed in any position except position when the actuator is under the valve body. The flow direction is indicated by the arrows positioned in the horizontal line of the valve body.

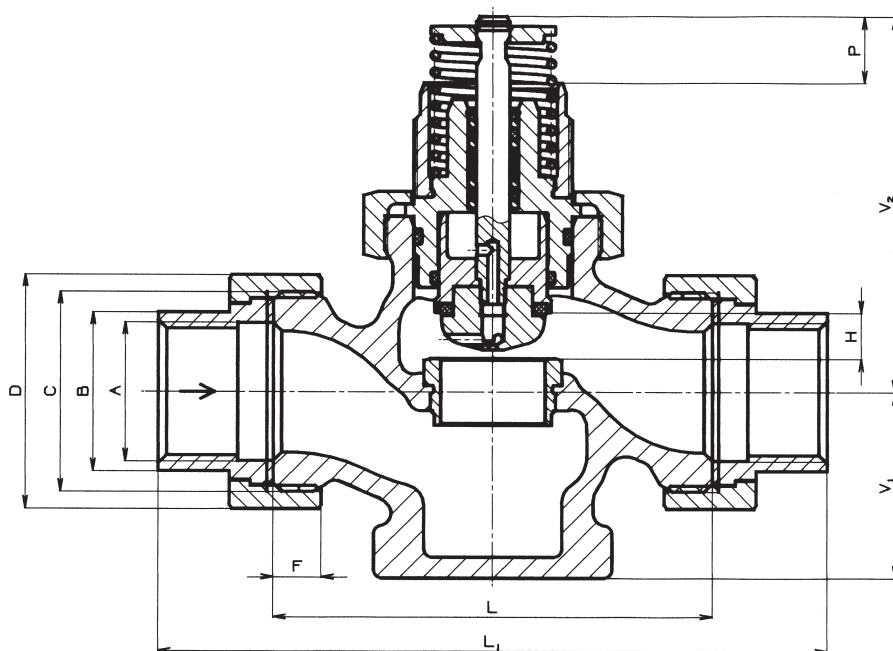
## Technical data

Series	RV 122
Execution	Two-way, pressure-balanced, straight-through control valve
Nominal diameter range	DN 15 to 50
Nominal pressure	PN 25
Body material	Spheroidal cast iron EN-JS1030
Plug material	Stainless steel 1.4006 / 17 027.6
Seat material	Stainless steel 1.4021 / 17 022.6
Stem material	Stainless steel 1.4305
Seat sealing	EPDM
Packing	EPDM
Operating temperature range	+2 to +150°C
Connection	Externally threaded coupling + screw joints Flanges with raised faces Externally threaded coupling + weld unions
Material of weld unions	DN 15 to 32 ... 1.0036 / 11 373.0 DN 40 and 50 ... 1.0308 / 11 353.0
Plug type	Contoured with soft seat sealing
Flow characteristic	LDMspline®
Kvs value	0.16 to 40 m <sup>3</sup> /hour
Leakage rate	Class IV. - S1 acc. to ČSN-EN 1349 (5/2001) (<0.0005 % Kvs)
Rangeability r	min 50 : 1

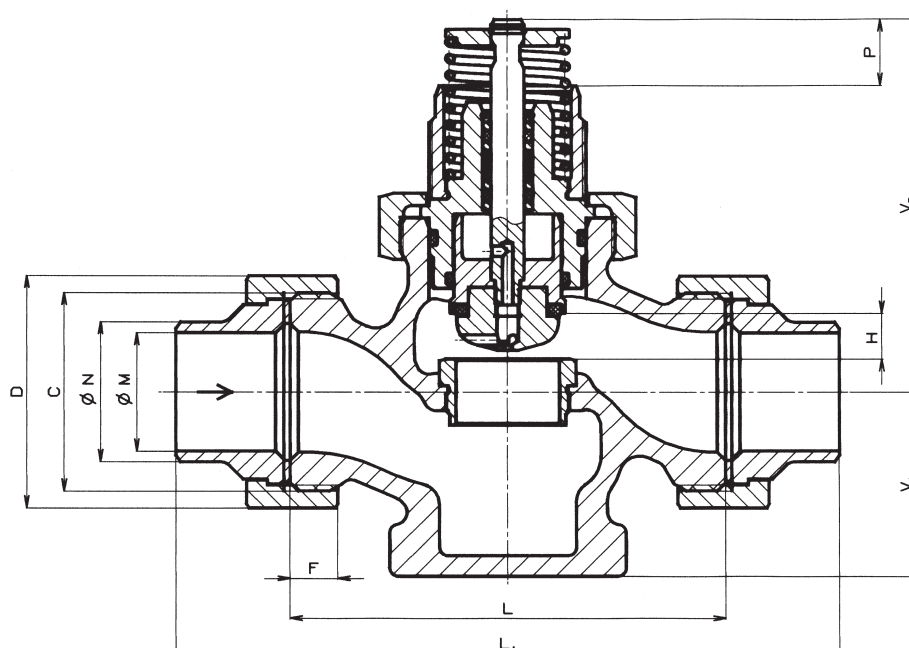
## Dimensions and weights of RV 122/T with threaded connection and RV 122/W with welded unions

DN	L	L <sub>1</sub>	V <sub>1</sub>	V <sub>2</sub>	A	B	C	D	ØM	ØN	F	H	P	m 122/T	m 122/W
	mm	mm	mm	mm		mm		mm	mm	mm	mm	mm	mm	kg	kg
15	100	146	44.5	90	Rp 1/2	25	G 1	41	16.1	21.3	9	11	16	1.7	1.7
20	100	149			Rp 3/4	32	G 1 1/4	51	21.7	26.9	10			2.0	1.9
25	105	160			Rp 1	38	G 1 1/2	56	29.5	33.7	11			2.3	2.3
32	130	193	63	110.4	Rp 1 1/4	47	G 2	71	37.2	42.4	12			3.7	3.6
40	140	207			Rp 1 1/2	53	G 2 1/4	76	43.1	48.3	14			4.6	4.5
50	160	233			Rp 2	66	G 2 3/4	91	54.5	60.3	16			6.7	6.5

Valves RV 122/T with threaded connection



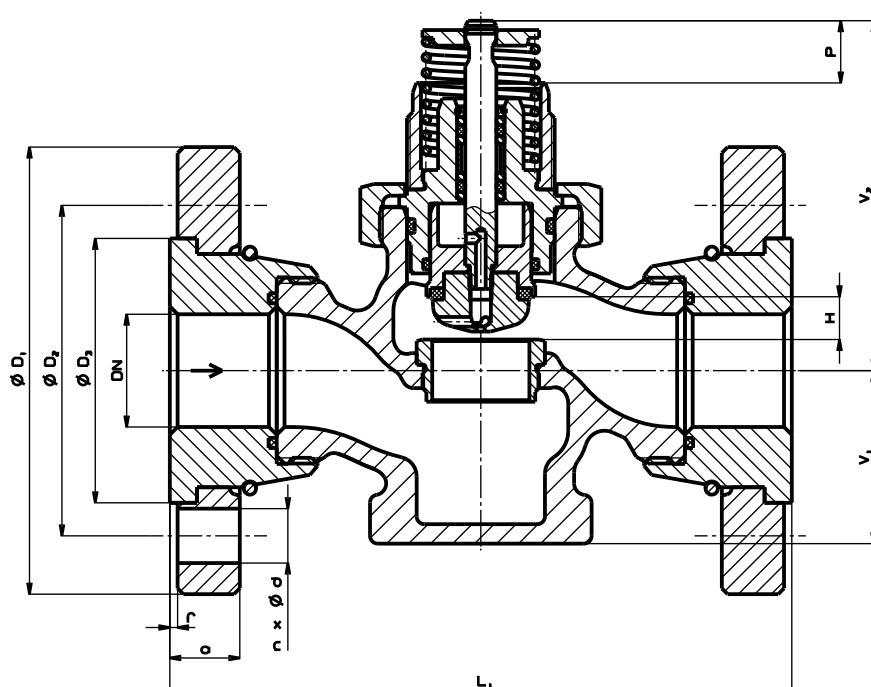
Valves RV 122/W with weld unions



## Dimensions and weights of RV 122/F with flanges

DN	$L_1$	$V_1$	$V_2$	$\varnothing D_1$	$\varnothing D_2$	$\varnothing D_3$	a	f	n	$\varnothing d$	H	P	m 122/F
	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm	mm	kg
15	130	44.5	90	95	65	45	16	2	4	14	11	16	2.8
20	150			105	75	58	16	2	4	14			3.5
25	160			115	85	68	18	2	4	14			4.4
32	180	63	110.4	140	100	78	18	2	4	18			6.5
40	200			150	110	88	19	3	4	18			8.0
50	230			165	125	102	19	3	4	18			10.9

Valves RV 122/F with raised-faced flanges





## BEE line

## RV 122 P

### Control valves with flow limitation DN 15 - 50, PN 25

## Description

Valves series RV 122 P BEE are control valves of a compact construction with pressure-balanced plug and externally threaded coupling and flow limitation mechanism. The valves' execution enables their application with low-linear force actuators for high differential pressures. They excel with minimum dimensions and weight, quality control features and a high tightness in closed position. Thanks to a unique LDMspline® flow characteristic which has been optimized for thermodynamic processes control, the valves are ideal for applications in heating and air-conditioning. In regard of a sophisticated design of internal parts and long service life of the packing, the valves fulfill every demand for a long-time service without necessary maintenance. The valve is, owing to its compact execution, a basic element of a unit-type valve series BEE line.

Within the scope of delivery of the valves, we deliver connection couplings enabling the valve to be connected to pipeline either with threads, flanges or weld unions, providing so quick and trouble-free piping.

Assembled with LDM actuators, the valves can be controlled with either 3-position or continuous signal.

## Application

Used materials for throttling trim which consist of plug made of high-quality stainless steel and soft sealing elements, ensure a hermetic tightness in both ports and enable the valves to be

used not only in common warm-water and hot-water regulation circuits in heating but also in applications with special characteristic features of process medium such as in refrigerating industry and air-conditioning and where there is necessity for precise setting of flow. The flow limitation enables precise setting of flow independently on Kvs value. Maximal permissible operating pressures in behaviour with process medium temperature are mentioned in table on page 10 of this catalogue.

## Process media

The valve series RV 122 P are suitable for applications where process medium is water or air. Further they can be used for refrigerating media and other non-aggressive liquids or gases with temperature ranging +2°C to +150°C. Sealing surfaces of control trim are resistant to common sludge or water impurities. Yet it is recommended to pipe a strainer in front of valve to ensure a reliable function and tightness in case there are abrasive particles present.

## Installation

The valves can be installed in any position except position when the actuator is under the valve body. The flow direction is indicated by the arrows positioned in the horizontal line of the valve body.

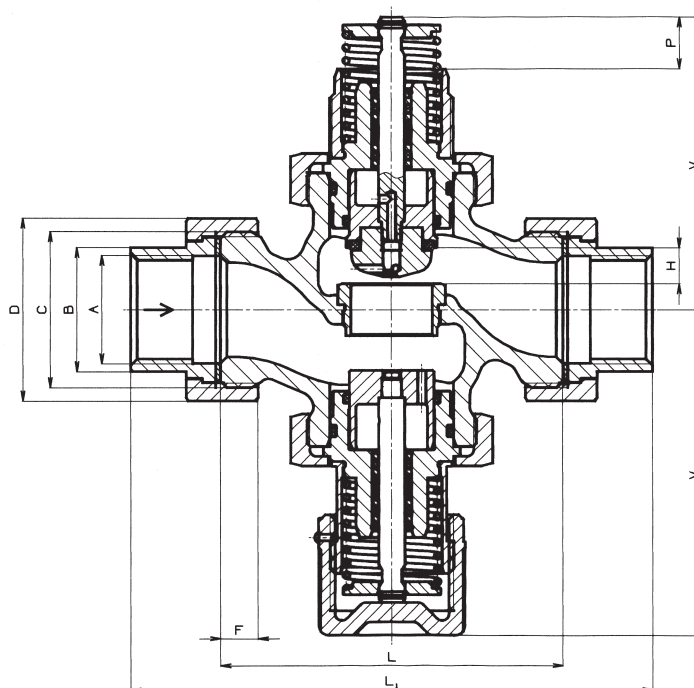
## Technical data

Series	RV 122 P
Execution	Two-way, pressure-balanced, straight-through control valve with flow limitation
Nominal diameter range	DN 15 to 50
Nominal pressure	PN 25
Body material	Spheroidal cast iron EN-JS1030
Plug material	Stainless steel 1.4006 / 17 027.6
Seat material	Stainless steel 1.4021 / 17 022.6
Stem material	Stainless steel 1.4305
Seat sealing	EPDM
Packing	EPDM
Operating temperature range	+2 to +150°C
Connection	Externally threaded coupling + screw joints Flanges with raised faces Externally threaded coupling + weld unions
Material of weld unions	DN 15 to 32 ... 1.0036 / 11 373.0 DN 40 and 50 ... 1.0308 / 11 353.0
Plug type	Contoured with soft seat sealing
Flow characteristic	LDMspline®
Kvs value	0.16 to 35 m <sup>3</sup> /hour
Leakage rate	Class IV. - S1 acc. to ČSN-EN 1349 (5/2001) (<0.0005 % Kvs)
Rangeability r	min 50 : 1

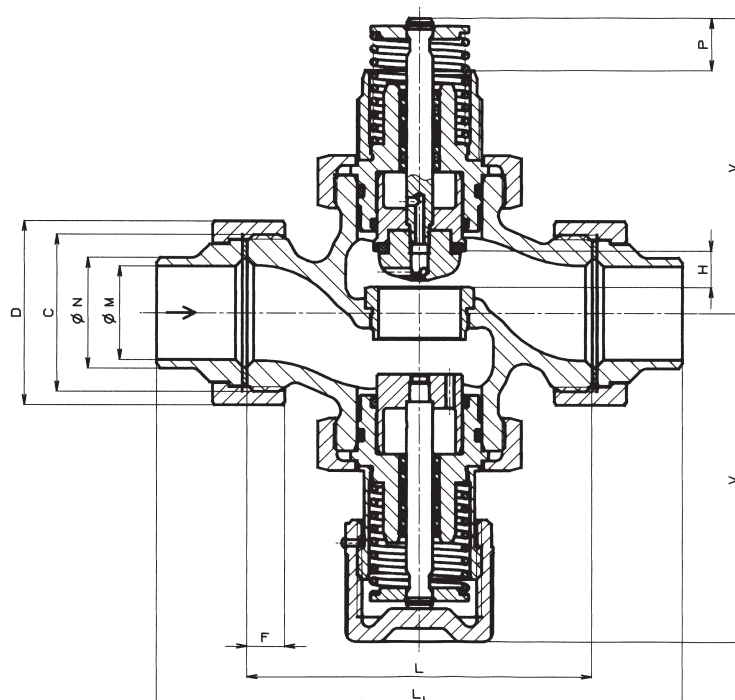
## Dimensions and weights of RV 122 P../T with threaded connection and RV 122 P../W with weld unions

DN	L	L <sub>1</sub>	V <sub>1</sub>	V <sub>2</sub>	A	B	C	D	ØM	ØN	F	H	P	m	
														122 P../T	122 P../W
	mm	mm	mm	mm		mm		mm	mm	mm	mm	mm	mm	kg	kg
15	100	146	100	90	Rp 1/2	25	G 1	41	16.1	21.3	9	11	16	2.1	2.1
20	100	149			Rp 3/4	32	G 1 1/4	51	21.7	26.9	10			2.4	2.3
25	105	160			Rp 1	38	G 1 1/2	56	29.5	33.7	11			2.7	2.7
32	130	193	119	110.4	Rp 1 1/4	47	G 2	71	37.2	42.4	12			4.5	4.4
40	140	207			Rp 1 1/2	53	G 2 1/4	76	43.1	48.3	14			5.5	5.4
50	160	233			Rp 2	66	G 2 3/4	91	54.5	60.3	16			8.0	7.8

Valves RV 122 P../T with threaded connection



Valves RV 122 P../W with weld unions

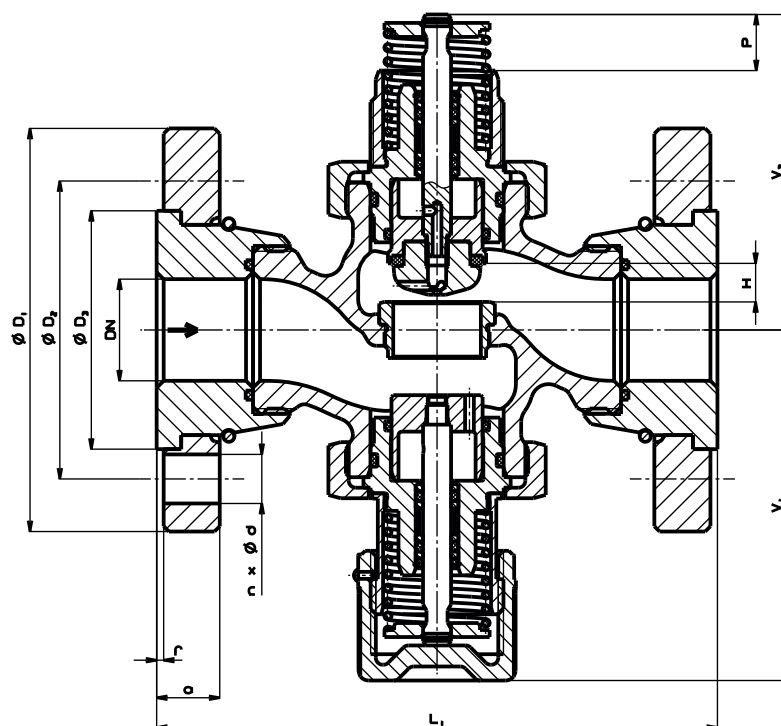




## Dimensions and weights of RV 122 P../F with flanges

DN	$L_1$	$V_1$	$V_2$	$\varnothing D_1$	$\varnothing D_2$	$\varnothing D_3$	a	f	n	$\varnothing d$	H	P	m 122 P../F
	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm	mm	kg
15	130	100	90	95	65	45	16	2	4	14	11	16	3.2
20	150			105	75	58	16	2	4	14			3.9
25	160			115	85	68	18	2	4	14			4.8
32	180	119	110.4	140	100	78	18	2	4	18			7.3
40	200			150	110	88	19	3	4	18			8.9
50	230			165	125	102	19	3	4	18			12.2

Valves RV 122 P../F with raised-faced flanges



## Valve complete specification No. for ordering RV 122 (BEE)

		XX	XXX	X	XX	XX	XX	/	XXX	-	XX	/	X
1. Type of valve	Control valve	RV											
2. Series	Pressure-balanced valve with external thread		122										
3. Function	Control valve			R									
	Control valve with flow limitation			P									
4. Execution	Two-way				2								
5. Body material	Spheroidal cast iron EN-JS1030				4								
6. Flow characteristic	LDMspline®					3							
7. Kvs	No. of the column acc. to the table of Kvs values						X						
8. Nominal pressure	PN 25							25					
9. Max. temperature °C	150 °C								150				
10. Nominal size	DN 15 to 50									XX			
11. Connection	Threaded												T
	Flange PN 25 with raised face												F
	Weld unions												W

Remark: Connection dimensions of flanges for PN 25, PN 16 and PN 10 are for DN 15 to 50 the same.

### Ordering example: RV 122 R 2431 25/150-25/T

Due to an uniqueness of each version, the valves can be ordered with a simplified code as follows:

Example:	<b>BEE DN 25/T</b>	two-way valve DN 25 with threaded connection
	<b>BEE DN 32/F</b>	two-way valve DN 32 with flanges
	<b>BEE DN 32P/F</b>	two-way valve with flow limitation DN 32 with flanges
	<b>BEE DN 15-1.6/W</b>	two-way valve DN 15 with weld unions

## Kvs and differential pressure values

DN	Kvs [m <sup>3</sup> /hour]								$\Delta p_{max}$
	1	2	3	4	5	6	7	8	MPa
15	4.0	2.5	1.6	1.0	0.63	0.4	0.25	0.16	2.5
20	6.3	---	---	---	---	---	---	---	2.5
25	10.0	---	---	---	---	---	---	---	2.5
32	16.0	---	---	---	---	---	---	---	2.5
40	25.0 (22.0)*	---	---	---	---	---	---	---	2.5
50	40.0 (35.0)*	---	---	---	---	---	---	---	2.5

\* The values in the parentheses apply to the version with flow limitation.

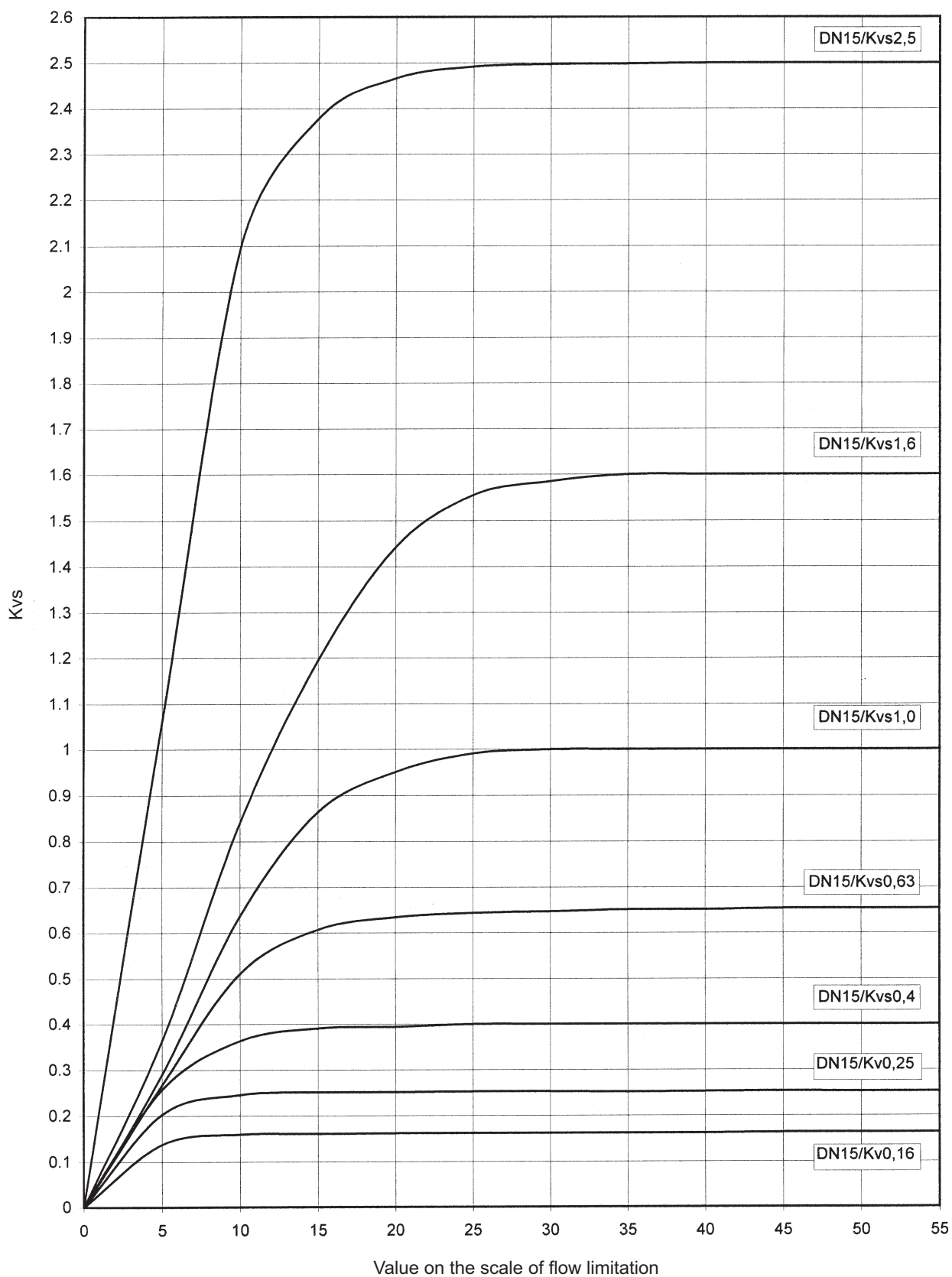
## Available actuators

LDM	Electric actuator ANT3-11.xx	AC 230 or AC/DC 24 V, 3-position control or 0(2) - 10 V, (0)4 - 20 mA
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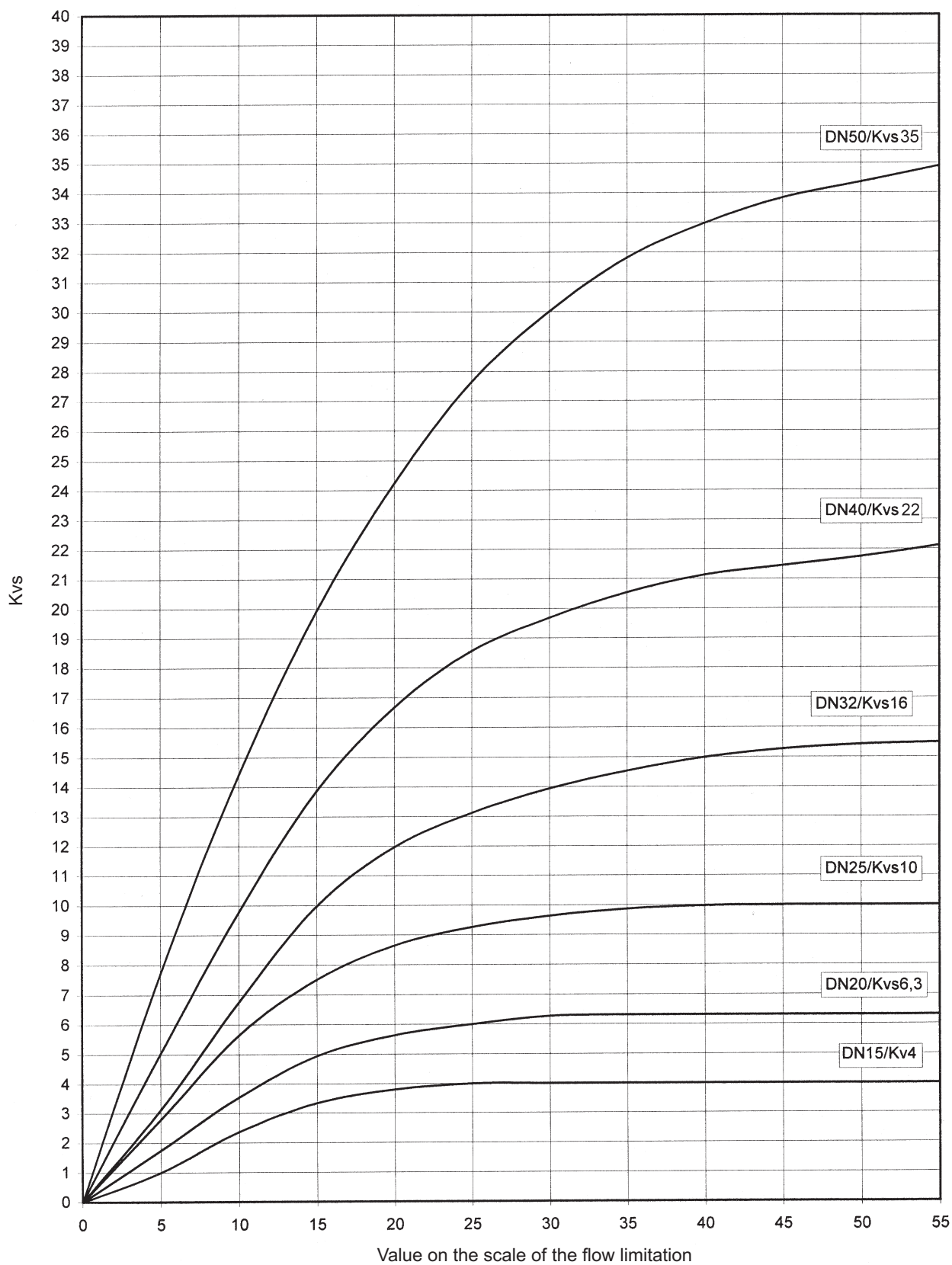
## Maximal permissible operating pressures [MPa]

Material	PN	Temperature [°C]										
		120	150	200	250	300	350	400	450	500	525	550
Spheroidal cast iron EN-JS1030	25	2.5	2.43	---	---	---	---	---	---	---	---	---
		---	---	---	---	---	---	---	---	---	---	---

### RV 122 P - behaviour of Kvs with setting of flow limitation



## RV 122 P - behaviour of Kvs with setting of flow limitation



# ANT3-11.1x(SC)



## LDM electric actuators

### Description

Electromechanical actuators ANT3-11 are designed to control the regulating valves LDM series RV 122 BEE line and actuators ANT3-5 to control regulating valves RV 111 COMAR line. Its connection to the valve ensures a zero clearance between stem of the actuator and the valve so the precise regulating ability is ensured even for minimal position changes. The actuators are self-adaptive. The end positions are limited by the valve stroke. To communicate with a control system, the actuators are equipped with either standard 3-position control or proportional control (options: 0..10 V, 2..10 V, 0..20 mA or 4..20 mA). The version marked "SC" contains electronically controlled fail-safe function activated by power supply failure, by valves with proportional control by failure of voltage at NF terminal as well. In setting mode for the actuators with proportional control it is possible to define a final position in percentage of the stroke value. The actuator automatically runs into that position when the fail-safe function is induced. Standard setting is position "closed". As a source of energy for the fail-safe function, there are block of capacitors which are continuously charged when the actuator is in operation. Service life of capacitors is 10 years what corresponds with service life of the actuator under standard conditions. All the types of ANT actuator are equipped with hand wheel for manual operating.

### Application

The actuators in combination with LDM valves are designed especially for applications in heating, air-conditioning and refrigerating. There they can take advantage of combination of control flow characteristic LDMspline® optimized for heat transfer processes and precision and reliability provided by simple mechanic design. In some applications, it is possible to make use of its fail-safe function which is induced by voltage failure at given terminal and puts the valve to previously defined position.

### Technical data of actuators ANT3-11

Type ANT3-...	11.10	11.11	11.10SC	11.11SC	11.12SC
Voltage (± 10%)	24 V AC	24 V AC/DC	24 V AC/DC		
Frequency	50 Hz				
Control	3-position	0..10 V, 4..20 mA	3-position	0..10 V, 4..20 mA	3-position
Power consumption	1,5 VA	14 VA	14 VA	14 VA	14 VA
Nominal force	300 N + 30%				
Nominal stroke	ANT3-11.xx ... 11 mm; ANT3-5.xx ... 5,5 mm				
Open-close run time 50 Hz	66 s	10 s	66 s	10 s	25 s
Fail-safe function	---	---	15 s	15 s	15 s
Feedback	100 Ω, 1 kΩ <sup>1)</sup>	0(2)-10V; 0(4)-20mA <sup>2)</sup>			
Adjustable position switch	PS1 <sup>1)</sup>	---	---	---	---
Impedance of input control signal	---	≥ 10 kΩ (V) 250 Ω (mA)	---	≥ 10 kΩ (V) 250 Ω (mA)	---
Enclosure	IP 54 (IEC 60529)				
Medium max. temp.	150°C				
Ambient temp. range	-5 to +55°C				
Ambient humidity range	5 .. 95 % relative humidity				
Storage conditions	-15 to +55 C°, 5 .. 95 % relative humidity				
Weight	0,7 kg		0,8 kg		

<sup>1)</sup> Optional accessories. It shall be clearly specified in the order. Only one accessory is usable.

<sup>2)</sup> Standard equipment. It shall be clearly specified in the order (type and range of feedback signal, basic execution 0-10V)

## Optional accessories

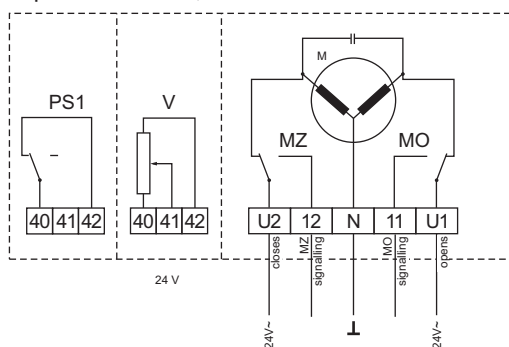
Resistance position transmitter	0..100 Ω or 0..1000 Ω	(for 3-position control actuators only without safety function)
Adjustable position switch PS1		(for 3-position control actuators only without safety function)

## Wiring diagrams of actuators

Note: ANT3-11 ... closes the valve by extending its stem: 

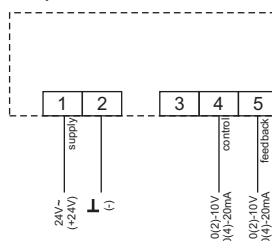
### ANT3-11.10

3-position control, 24 V AC



### ANT3-11.11;

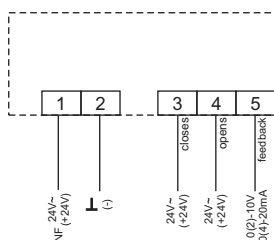
Proportional control, 24 V AC/DC



### ANT3-11.10SC

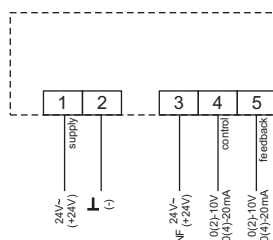
### ANT3-11.12SC

3-position control, 24 V AC/DC, fail-safe function



### ANT3-11.11SC

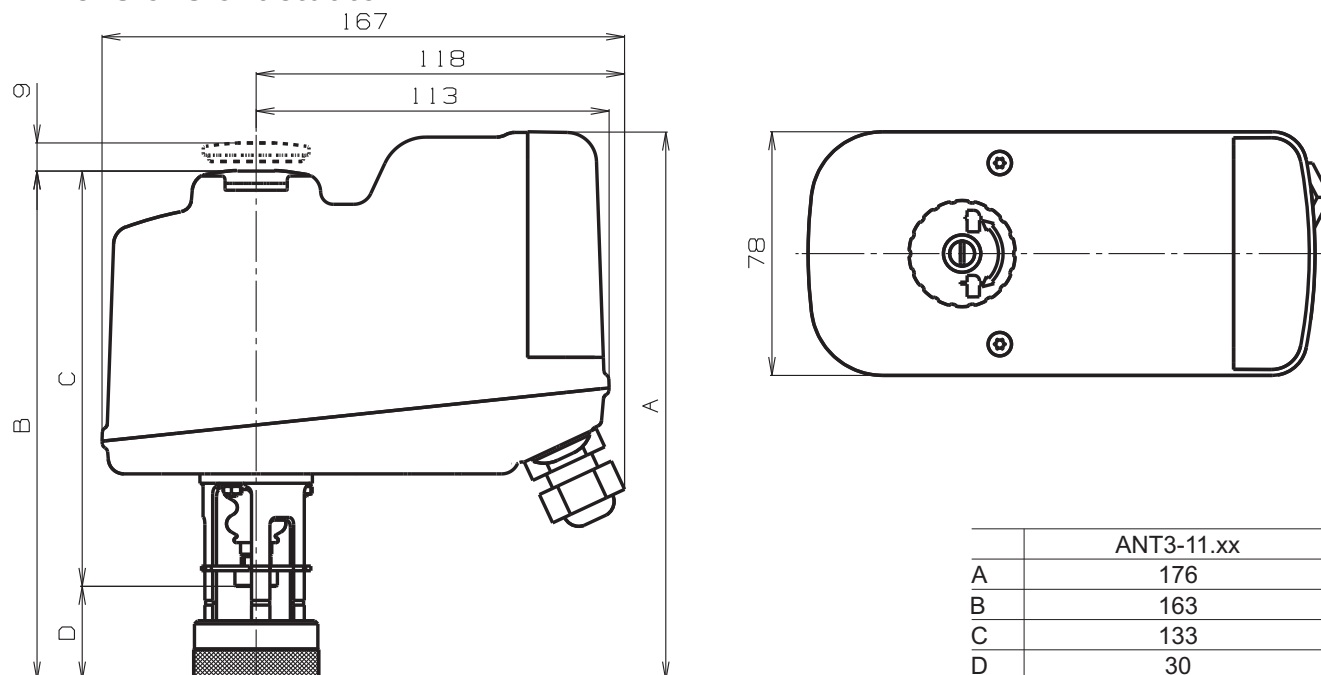
Proportional control, 24 V AC/DC, fail-safe function



- MO power switch for "Open" position
- MZ power switch for "Closed" position
- M motorek
- V feedback 100Ω or 1000Ω
- Ps1 adjustable position switch (max. 0,5 A)
- NF terminal fail-safe function
- 11, 12 terminals signalling of end positions (max. 0,5 A)

Type of control and feedback signal (voltage or current) are adjusted from production and it is not possible to change it. Range is adjustable using PC and software ANT3 .

## Dimensions of actuator



# ANT3-11.2x(SC)



## LDM electric actuators

### Description

Electromechanical actuators ANT3-11 are designed to control the regulating valves LDM series RV 122 BEE line and actuators ANT3-5 to control regulating valves RV 111 COMAR line. Its connection to the valve ensures a zero clearance between stem of the actuator and the valve so the precise regulating ability is ensured even for minimal position changes. The actuators are self-adaptive. The end positions are limited by the valve stroke. To communicate with a control system, the actuators are equipped with either standard 3-position control or proportional control (options: 0..10 V, 2..10 V, 0..20 mA or 4..20 mA). The version marked "SC" contains electronically controlled fail-safe function activated by power supply failure, by valves with proportional control by failure of voltage at NF terminal as well. In setting mode for the actuators with proportional control it is possible to define a final position in percentage of the stroke value. The actuator automatically runs into that position when the fail-safe function is induced. Standard setting is position "closed". As a source of energy for the fail-safe function, there are block of capacitors which are continuously charged when the actuator is in operation. Service life of capacitors is 10 years what corresponds with service life of the actuator under standard conditions. All the types of ANT actuator are equipped

### Application

The actuators in combination with LDM valves are designed especially for applications in heating, air-conditioning and refrigerating. There they can take advantage of combination of control flow characteristic LDMspline® optimized for heat transfer processes and precision and reliability provided by simple mechanic design. In some applications, it is possible to make use of its fail-safe function which is induced by voltage failure at NF terminal and puts the valve to

### Properties

- Easy assembly to the valve without the necessity of any adjusting. No tools required.
- Self-adaptive function precisely sets the stroke range according to the limit positions of the valve stroke.
- Hand wheel for operating in case of emergency
- Stroke indicator for information on actual open position of the valve.
- Option of equipping with resistance feedback or adjustable position switch (for actuators with 3-position control without safety function)
- Intelligent microprocessor control (for actuators with a fail-safe function and proportional control)
- Automatic recognition of presence of impurities between the seat and plug of the valve including an algorithm for self-cleaning function (for actuators with proportional control)
- Option of control signal 0..10 V, 2..10 V, 0..20 mA, 4..20 mA (for actuators with proportional control)
- Option of adjusting a final position for actuators with fail-safe function in range of 0..100% of the stroke.
- Possibility to read history and detection of failures (for actuators with microprocessor)
- Long service life and reliability with a sophisticated and patented design due to a selection of high quality materials
- Feedback 0(2)-10V or 0(4)-20mA for actuators with microprocessor control
- Possibility of digital control (protocol MODBUS)
- Adjustable sensitivity (dead band)

### Technical data of actuators ANT3-11 and ANT3-5

Type ANT3-...	11.20	11.21	11.20SC	11.21SC
Voltage ( $\pm 15\%$ )	230 V AC			
Frequency	50 Hz			
Control	3-position	0..10 V, 4..20 mA	3-position	0..10 V, 4..20 mA
Power consumption	3 VA	10 VA	10 VA	10 VA
Nominal force	300 N + 30%			
Nominal stroke	ANT3-11.xx ... 11 mm; ANT3-5.xx ... 5,5 mm			
Open-close run time 50 Hz	66 s	10 s	66 s	10 s
Fail-safe function	---	---	15 s	15 s
Feedback	100 $\Omega$ , 1 k $\Omega$ <sup>1)</sup>	0(2)-10V; 0(4)-20mA <sup>2)</sup>		
Adjustable position switch	PS1 <sup>1)</sup>	---	---	---
Impedance of input control signal	---	$\geq 10$ k $\Omega$ (V) 250 $\Omega$ (mA)	---	$\geq 10$ k $\Omega$ (V) 250 $\Omega$ (mA)
Enclosure	IP 54 (IEC 60529)			
Medium max. temp.	150°C			
Ambient temp. range	-5 to +55°C			
Ambient humidity range	5 .. 95 % relative humidity			
Storage conditions	-15 to +55 C°, 5 .. 95 % relative humidity			
Weight	0,7 kg		0,8 kg	


<sup>1)</sup> Optional accessories. It shall be clearly specified in the order. Only one accessory is usable.

<sup>2)</sup> Standard equipment. It shall be clearly specified in the order (type and range of feedback signal, basic execution 0-10V)

## Optional accessories

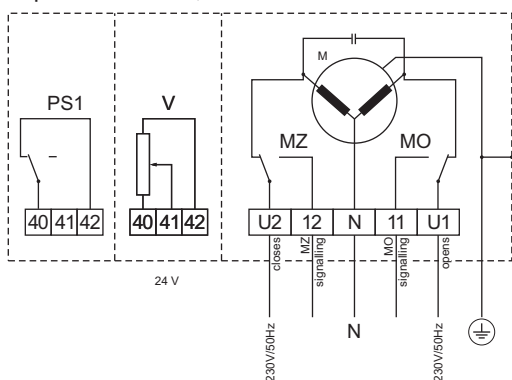
Resistance position transmitter	0..100 Ω or 0..1000 Ω	(for 3-position control actuators only without safety function)
Adjustable position switch PS1		(for 3-position control actuators only without safety function)

## Wiring diagrams of actuators

Note: ANT3-11 ... closes the valve by extending its stem: 

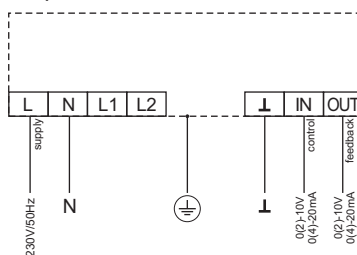
### ANT3-11.20; ANT3-5.20

3-position control, 230 V AC



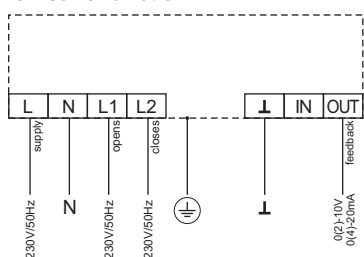
### ANT3-11.21;

Proportional control, 230 V AC



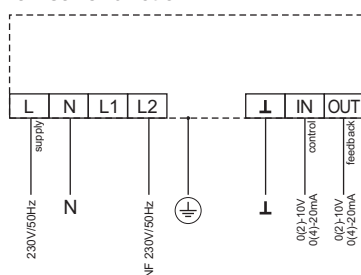
### ANT3-11.20SC

3-position control, 230 V AC, fail-safe function



### ANT3-11.21SC

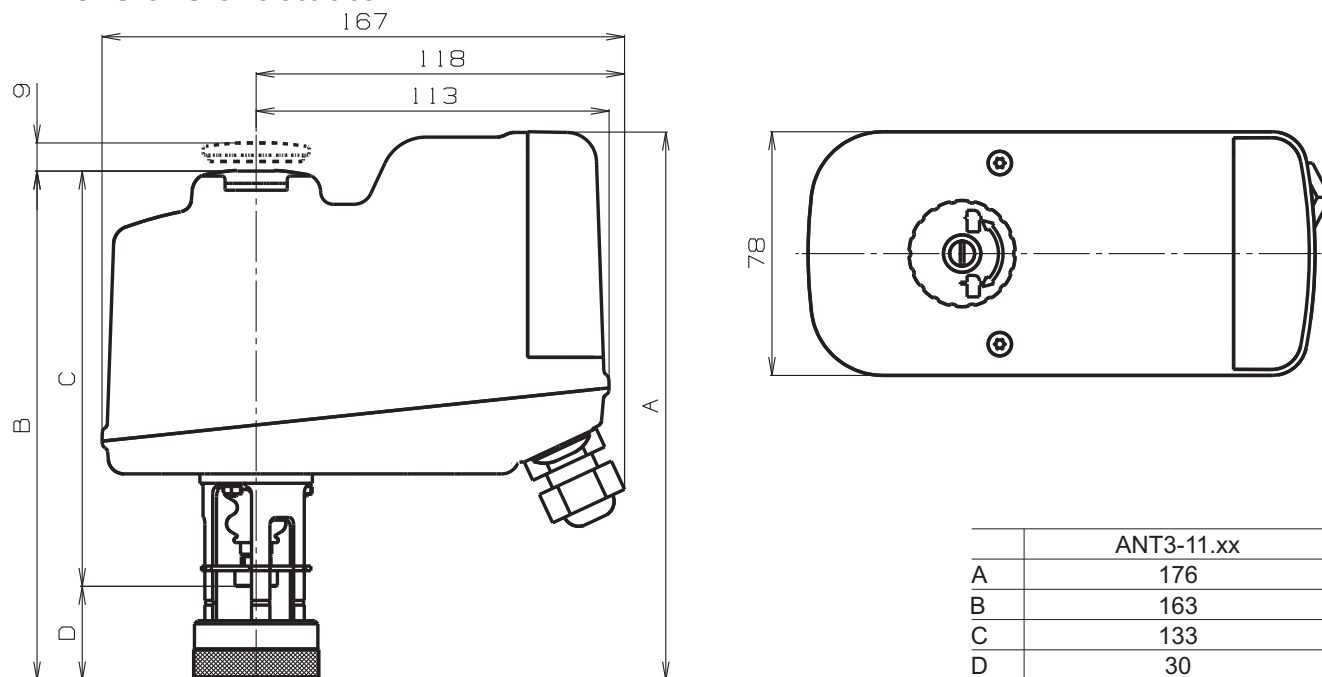
Proportional control, 230 V AC, fail-safe function



- MO power switch for "Open" position
- MZ power switch for "Closed" position
- M motor
- V feedback 100Ω or 1000Ω
- Ps1 adjustable position switch (max. 0,5 A)
- NF terminal fail-safe function
- 11, 12 terminals signalling of end positions (max. 0,5 A)

Type of control and feedback signal (voltage or current) are adjusted from production and it is not possible to change it. Range is adjustable using PC and software ANT3.

## Dimensions of actuator







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