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# REVERSE CONTROL VALVES

## **200 line**

with SIEMENS actuators



# 200 line

**RV / HU 211**  
**RV / HU 221**  
**RV / HU 231**

Two-way single-seated control valve with reverse function

**RV / HU 213**  
**RV / HU 223**  
**RV / HU 233**

Two-way single-seated control valve with reverse function and pressure balanced plug

**RV 215**  
**RV 225**  
**RV 235**

Three-way control valve with reverse function

Control valves **200 line** designed for regulation and shut-off of process liquid flow. The selected materials correspond to recommendations stipulated by ČSN EN 12516-1 (8/2015) - steel and ČSN EN 1503-3 (1/2002) - cast. The maximal permissible operating pressures in behaviour with types of material and temperature are specified in the table on page 24 of this catalogue.

## Control

By their reverse design - valves **RV / HU 200** are especially designed for Siemens actuators

## Application

**RV / HU 2xx** - heating, ventilation, power generation and chemical processing industries

## Process media

**RV / HU 2xx** - liquids, gases and vapours without abrasive particles  
e.g. water, steam, air and other media compatible with material of the valve inner parts

The usage of the valve made of spheroidal cast iron (RV 210) for steam is limited by the following parameters. The steam must be superheated (its dryness at valve outlet  $x_1 \leq 0,98$ ) and inlet pressure  $p_1 \geq 0,4$  MPa when differential pressure is of above-critical value, and  $p_1 \leq 1,6$  MPa when differential pressure is of under critical value. In case these two conditions are not kept, it is necessary to use the valve made of cast steel (RV 220). To ensure a reliable regulation, the producer recommends to pipe a strainer in front of the valve into pipeline or ensure in any other way that process medium does not contain abrasive particles or impurities.

## Installation

The valve can be installed in any position except position when the actuator is under the valve body. The valve is to be piped the way so that the direction of medium flow will coincide with the arrows on the body.

It is necessary to protect the actuator from excessive heat from the pipeline at medium temperatures above 150 °C, e.g. by appropriately insulating the pipeline and valve and tilting the actuator from the vertical axis. When the valve is used as diverting, process medium flows through common valve port AB and split streams leave through valve ports A and B. Detailed informations are given in the instruction for installation and service.

## Packings

### O-Ring EPDM

Packing is designed for non-aggressive media with temperature from 0 to 140 °C. Packing excels with its reliability and long time tightness. It has ability of sealing even if the valve stem is a bit damaged. Low frictional forces enables valve to be actuated with a low linear force actuator. Service life of sealing rings depends on operating conditions and it is more than 400 000 cycles on average.

### DRSpack® (PTFE)

DRSpack® (Direct Radial Sealing Pack) is a packing with high tightness at both low and high operating pressure values. It is the most used type of packing suitable for temperatures ranging from 0 °C to 260 °C. The pH range is from 0 to 14. The packing enables using of actuators with low linear force. The design enables an easy change of the whole packing. The average service life of DRSpack® is more than 500 000 cycles.

### Graphite

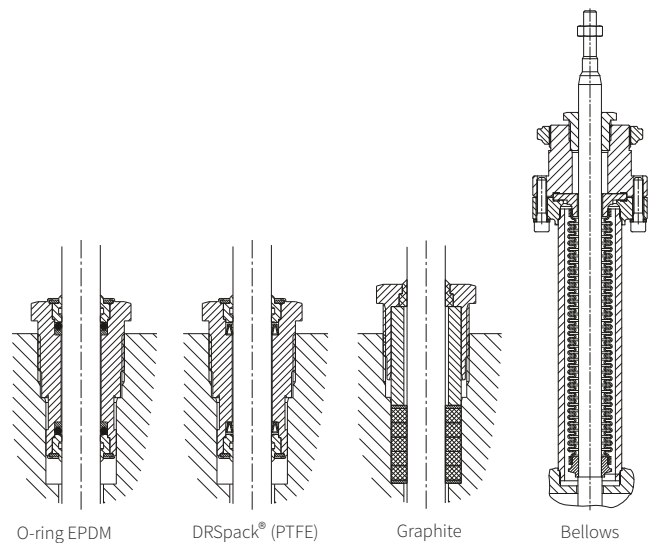
This type of packing can be used for media with temperature up to 550 °C and pH range: 0 to 14. Packing can be "sealed up" either by screwing the packing screw in or adding another sealing ring. In regard of intensive frictional forces, graphite packing is suitable for actuators with a sufficient linear force.

### Bellows

Bellows packing is suitable for low and high temperatures ranging from -50 °C to 550 °C. Bellows ensures absolute tightness to environment. Packing is equipped with safety PTFE packing as standard to prevent medium from leaking in case of damage to bellows. Intensive linear forces are not required.

### Application of bellows packing

Bellows packing is suitable for applications with very aggressive, toxic or other dangerous media that require absolute tightness to environment. In such case, it is necessary to check compatibility of used body material as well as the valve inner parts material with process medium. It is recommended to use bellows with safety packing preventing medium from leaking in case of damage to bellows when there is an extremely dangerous process medium used. Bellows is also a great solution to use of process medium either with temperature below zero when ice accretions cause premature damage to packing or with high temperatures when bellows ensures medium cooling.



### Service life of bellows packing

Bellows material	Temperature				
	200°C	300°C	400°C	500°C	550°C
1.4541	100 000	40 000	28 000	7 000	inappropriate
1.4571	90 000	34 000	22 000	13 000	8 000

Values specified in the table above show minimal guaranteed number of cycles with the valve full stroke when the bellows is fully lengthened and pressed. In regulation, when the valve plug moves only in a portion of the stroke range at the inner centre of the valve, the service life of the bellows is many times longer then depending on concrete operating conditions.

### Principles for plug type selection

V-ported plugs should not be used in above - critical differential pressures with inlet pressure  $p \geq 0,4$  MPa and for regulation of saturated steam. In these cases we recommend to use a perforated plug. The perforated plug should be also used always when cavitation may occur due to a high differential pressure value or valve ports erosion caused by high speed of process medium flow. If the parabolic plug is used (because of small Kvs) for above critical differential pressures, it is necessary to close both plug and seat with a hard metal overlay, i.e. stellite trim.

### Rangeability

Rangeability is the ratio of the biggest value of flow coefficient to the smallest value. In fact it is the ratio (under the same conditions) of highest regulated flow rate value to its lowest value. The lowest or minimal regulated flow rate is always higher than 0.



## RV / HU 2x1

Control valves and  
Fail-safe action  
valves

**DN 15 - 150**  
**PN 16 and 40**

Control valves **RV 211**, **RV 221** and **RV 231** are single-seated valves designed for regulation and shut-off of process medium flow.

Valves with a fail-safe action **HU 211**, **HU 221** and **HU 231** have the same design as RV 2x1 with addition of increased seat sealing. Valves are equipped with fail-safe action actuators (valve closes upon power failure).

Technical data			
Series	RV / HU 211	RV / HU 221	RV / HU 231
Type of valve	Two-way single-seated control valve with reverse function		
Nominal size range	DN 15 to 150		
Nominal pressure	PN 16, PN 40		
Body material	Spheroidal cast iron EN-JS 1025 (EN-GJS-400-10-LT)	Cast steel 1.0619 (GP240GH) 1.7357 (G17CrMo5-5)	Stainless steel 1.4581 (GX5CrNiMoNb19-11-2)
Seat material:	DN 15 - 50	1.4028 / 17 023.6	1.4571 / 17 347.4
DIN W.Nr./ČSN	DN 65 - 150	1.4027 / 42 2906.5	1.4581 / 42 2941.4
Plug material:	DN 15 - 65	1.4021 / 17 027.6	1.4571 / 17 347.4
DIN W.Nr./ČSN	DN 80 - 150	1.4027 / 42 2906.5	1.4581 / 42 2941.4
Operating temp. range	-10 to 300 °C		
Face to face dimensions	Line 1 acc. to ČSN-EN 558+A1 (5/2012)		
Connection flanges	Acc. to ČSN-EN 1092-2 (1/1999)	Acc. to ČSN-EN 1092-1 (4/2002) + A1(7/2013)	
Flange faces	Type B1 (raised-faced) acc. to ČSN-EN 1092-2 (1/1999)	Type B1 (raised-faced) nebo Typ F (female) or Type D (groove) acc. to ČSN-EN 1092-1 (2/2003) + A1(7/2013)	
Type of plug	V-ported, parabolic, perforated		
Flow characteristic	Linear, equal-percentage, LDMspline®, parabolic		
Kvs value	0.4 to 360 m <sup>3</sup> /h		
Leakage rate	Class III. acc. to ČSN-EN 1349 (5/2001) (<0.1% Kvs) for control valves with metal-metal seat sealing Class IV. acc. to ČSN-EN 1349 (5/2001) (<0.01% Kvs) for control valves with metal-PTFE seat sealing		
Rangeability r	50 : 1		
Packing	O - ring EPDM t <sub>max</sub> = 140°C, DRSpack®(PTFE) t <sub>max</sub> = 260°C, Exp. graphite, bellows t <sub>max</sub> = 500°C		

## Kvs values and differential pressures

**$\Delta p_{max}$  value is the valve max. differential pressure when open-close function is always guaranteed. In regard of service life of seat and plug, it is recommended so that permanent differential pressure would not exceed 1.6 MPa. Otherwise it is suitable to use perforated plug or sealing surfaces of seat and plug with a hard metal overlay.**

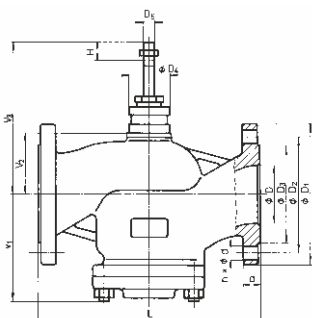
For further information on actuating, see catalogue sheets		Actuating (actuator)								SAX ...	SKD ...	SKB ...	SKC ...					
		Marking in vlve spec. No.								ELE	HLA, HLB HLC	HLD, HLE HLF	HLG, HLH HLI					
		Linear force								800 N	1000 N	2800 N	2800 N					
DN	H	Kvs [m <sup>3</sup> /h]								$\Delta p_{max}$ [Mpa]	$\Delta p_{max}$ [Mpa]	$\Delta p_{max}$ [Mpa]	$\Delta p_{max}$ [Mpa]					
		1	2	3	4	5	6	7		met PTFE	met PTFE	met PTFE	met PTFE					
15	20	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	1.0 <sup>1)</sup>	0.6 <sup>1)</sup>	0.4 <sup>1)</sup>	0.25 <sup>1)</sup>		4.00	---	4.00	---	4.00	---	---	---	
15		4.0 <sup>1)</sup>	---	---	---	---	---	---		3.40	---	4.00	---	4.00	---	---	---	
20		---	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	1.0 <sup>1)</sup>	0.6 <sup>1)</sup>	---		4.00	---	4.00	---	4.00	---	---	---	
20		---	4.0 <sup>1)</sup>	---	---	---	---	---		3.40	---	4.00	---	4.00	---	---	---	
20		6.3 <sup>1)</sup>	---	---	---	---	---	---		1.56	---	2.15	---	4.00	---	---	---	
25		---	---	---	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	---	---		4.00	---	4.00	---	4.00	---	---	---	---
25		10.0	6.3 <sup>2)</sup>	4.0 <sup>2)</sup>	---	---	---	---		0.88	1.29	1.24	1.65	4.00	4.00	---	---	---
32		---	---	---	4.0 <sup>1)</sup>	---	---	---		3.40	---	4.00	---	4.00	---	---	---	---
32		16.0	10.0	6.3 <sup>2)</sup>	---	---	---	---		0.45	0.77	0.67	0.99	2.66	2.98	---	---	---
40		25.0	16.0	10.0	---	---	---	---		0.23	0.49	0.38	0.63	1.66	1.91	---	---	---
50	40.0	25.0	16.0	---	---	---	---		0.10	0.29	0.18	0.37	0.95	1.14	---	---	---	
65	63.0	40.0	25.0	---	---	---	---		0.02	0.17	0.07	0.22	0.54	0.69	---	---	---	
80	40	100.0	63.0	40.0	---	---	---	---		---	---	---	---	---	---	0.34	0.47	
100		160.0	100.0	63.0	---	---	---	---		---	---	---	---	---	---	0.20	0.30	
125		250.0	160.0	100.0	---	---	---	---		---	---	---	---	---	---	0.11	0.19	
150		360.0	250.0	160.0	---	---	---	---	---	---	---	---	---	---	---	---	0.06	0.14

- 1) parabolic plug
  - 2) V-ported plug with linear characteristic, parabolic plug with equal-percentage, LDMspline® and parabolic characteristic
- Perforated plug available only with Kvs values in shadowed frames with the following restrictions:
- Kvs values 2.5 to 1.6 m<sup>3</sup>/hour available with linear characteristic only
  - Perforated plug with Kvs value acc. to column No. 2 available with linear or parabolic characteristic only.

Max. differential pressure  $\Delta p$  for valves PN 16 must be 1.6 MPa metal - version with metal - metal seat sealing  
 PTFE - version with metal - PTFE seat sealing (is not applicable to contoured plugs)  
 Max. differential pressures specified in table apply to PTFE and O-ring packing.  
 $\Delta p$  for bellows must be consulted with the producer. max Values  $\Delta p_{max}$  are set for the most unfavourable pressure ratios on the valve PN 40, but in concrete cases the real  $\Delta p$  value can be higher than values specified in the table above.

## Dimensions and weight for the type RV / HU 2x1

DN	PN 16					PN 40					PN 16, PN 40												
	D <sub>1</sub> mm	D <sub>2</sub> mm	D <sub>3</sub> mm	d mm	n	D <sub>1</sub> mm	D <sub>2</sub> mm	D <sub>3</sub> mm	d mm	n	D mm	D <sub>4</sub> mm	D <sub>5</sub> mm	L mm	V <sub>1</sub> mm	V <sub>2</sub> mm	*V <sub>2</sub> mm	*V <sub>3</sub> mm	a mm	m <sub>1</sub> kg	m <sub>2</sub> kg	*m <sub>v</sub> kg	
15	95	65	45			95	65	45			15			130	68	47	---	143	---	16	4.5	5.5	---
20	105	75	58	14		105	75	58	14		20			150	68	47	---	143	---	18	5.5	6.5	---
25	115	85	68			115	85	68			25			160	85	52	250	148	346	18	6.5	8	3.5
32	140	100	78		4	140	100	78		4	32		10	180	85	52	250	148	346	20	8	9.5	3.5
40	150	110	88			150	110	88			40			200	85	52	250	148	346	20	9	11	3.5
50	165	125	102			165	125	102	18		50	44		230	117	72	270	168	366	20	14	21	3.5
65	185	145	122	18	4 <sup>1)</sup>	185	145	122			65			290	117	72	270	168	366	22	18	27	3.5
80	200	160	138			200	160	138			80		14	310	152	106	452	222	568	24	26	40	4.5
100	220	180	158		8	235	190	162	22	8	100			350	152	106	452	222	568	24	38	49	4.5
125	250	210	188			270	220	188			125			400	175	134	480	250	596	26	58	82	5
150	285	240	212	22		300	250	218			150			480	200	134	480	250	596	28	78	100	5



- <sup>1)</sup> with regard of the standard previously in force, there is an option
  - <sup>#)</sup> to have the number of connection bolts as stipulated in ČSN-EN 1092-1
- m<sub>v</sub> - weight to be added to weight of valve equipped bellows packing  
 m<sub>1</sub> - valves RV / HU 211  
 m<sub>2</sub> - valves RV / HU 221 a RV / HU 231



## RV / HU 2x3

Control valves and  
Fail-safe action  
valves

**DN 25 - 150**  
**PN 16 and 40**

Control valves **RV 213**, **RV 223** and **RV 233** are single-seated valves with pressure-balanced plug designed for regulation and shut-off of process medium flow. Valves with a fail-safe action series **HU 213**, **HU 223** and **HU 233** have the same design as RV 2x3 with addition of increased seat sealing. Valves are equipped with fail-safe action actuators (valve closes upon power failure).

### Technical data

Series	RV / HU 213	RV / HU 223	RV / HU 233
<b>Type of valve</b>	<b>Two-way single-seated control valve with pressure balanced plug and with reverse function</b>		
<b>Nominal size range</b>	DN 25 to 150		
<b>Nominal pressure</b>	PN 16, PN 40		
<b>Body material</b>	Spheroidal cast iron EN-JS 1025 (EN-GJS-400-10-LT)	Cast steel 1.0619 (GP240GH) 1.7357 (G17CrMo5-5)	Stainless steel 1.4581 (GX5CrNiMoNb19-11-2)
<b>Seat material:</b> DN 25 - 50	1.4028 / 17 023.6	1.4028 / 17 023.6	1.4571 / 17 347.4
<b>DIN W.Nr./ČSN</b> DN 65 - 150	1.4027 / 42 2906.5	1.4027 / 42 2906.5	1.4581 / 42 2941.4
<b>Plug material:</b> DN 25 - 65	1.4021 / 17 027.6	1.4021 / 17 027.6	1.4571 / 17 347.4
<b>DIN W.Nr./ČSN</b> DN 80 - 150	1.4027 / 42 2906.5	1.4027 / 42 2906.5	1.4581 / 42 2941.4
<b>Operating temp. range</b>	-10 to 260 °C	-10 to 260 °C	-10 to 260 °C
<b>Face to face dimensions</b>	Line 1 acc. to ČSN-EN 558+A1 (5/2012)		
<b>Connection flanges</b>	Acc. to ČSN-EN 1092-2 (1/1999)	Acc. to ČSN-EN 1092-1+A1 (7/2013)	
<b>Flange faces</b>	Type B1 (raised-faced) acc. to ČSN-EN 1092-2 (1/1999)	Type B1 (raised-faced) or Type F (female) nebo Type D (groove) acc. to ČSN-EN 1092-1+A1 (7/2013)	
<b>Type of plug</b>	V-ported, perforated		
<b>Flow characteristic</b>	Linear, equal-percentage, LDMspline®, parabolic		
<b>Kvs value</b>	4 to 360 m <sup>3</sup> /h		
<b>Leakage rate</b>	Class III. acc. to ČSN-EN 1349 (5/2001) (<0.1% Kvs) for control valves with metal-metal seat sealing Class IV. acc. to ČSN-EN 1349 (5/2001) (<0.01% Kvs) for control valves with metal-PTFE seat sealing		
<b>Rangeability r</b>	50 : 1		
<b>Packing</b>	O - ring EPDM t <sub>max</sub> = 140 °C, DRSpack®(PTFE) t <sub>max</sub> = 260 °C, bellows t <sub>max</sub> = 260 °C		

## Kvs values and differential pressures

$\Delta p_{max}$  value is the valve max. differential pressure when open-close function is always guaranteed. In regard of service life of seat and plug, it is recommended so that permanent differential pressure would not exceed 1.6 MPa. Otherwise it is suitable to use perforated plug or sealing surfaces of seat and plug with a hard metal overlay.

For further information on actuating, see catalogue sheets		Actuating (actuator) Mark. in valve spec. No. Linear force			SKD ... HLA, HLB, HLC		SKB ... HLD, HLE, HLF		SKC ... HLG, HLH, HLI	
		Kvs [m <sup>3</sup> /h]			1000 N $\Delta p_{max}$		2800 N $\Delta p_{max}$		2800 N $\Delta p_{max}$	
DN	H	1	2	3	metal	PTFE	metal	PTFE	metal	PTFE
25	20	10	6.3 <sup>1)</sup>	4.0 <sup>1)</sup>	1.60 (1.60)	1.60 (1.60)	4.00 (4.00)	4.00 (4.00)	---	---
32		16.0	10.0	6.3 <sup>1)</sup>	1.60 (1.60)	1.60 (1.60)	4.00 (4.00)	4.00 (4.00)	---	---
40		25.0	16.0	10.0	1.60 (1.60)	1.60 (1.60)	4.00 (4.00)	4.00 (4.00)	---	---
50		40.0	25.0	16.0	1.60 (1.60)	1.60 (1.60)	4.00 (4.00)	4.00 (4.00)	---	---
65		63.0	40.0	25.0	1.60 (0.89)	1.60 (1.60)	4.00 (4.00)	4.00 (4.00)	---	---
80	40	100.0	63.0	40.0	---	---	---	---	4.00 (4.00)	4.00 (4.00)
100		160.0	100.0	63.0	---	---	---	---	4.00 (3.50)	4.00 (4.00)
125		250.0	160.0	100.0	---	---	---	---	4.00 (2.40)	4.00 (4.00)
150		360.0	250.0	160.0	---	---	---	---	4.00 (1.60)	4.00 (3.50)

<sup>1)</sup> linear characteristic only

metal - version with metal - metal seat sealing

PTFE - version with metal - PTFE seat sealing

(xx) -  $\Delta p_{max}$  values specified in parentheses apply to perforated plug

Max. differential pressure  $\Delta p$  for valves PN 16 must be 1.6 MPa.

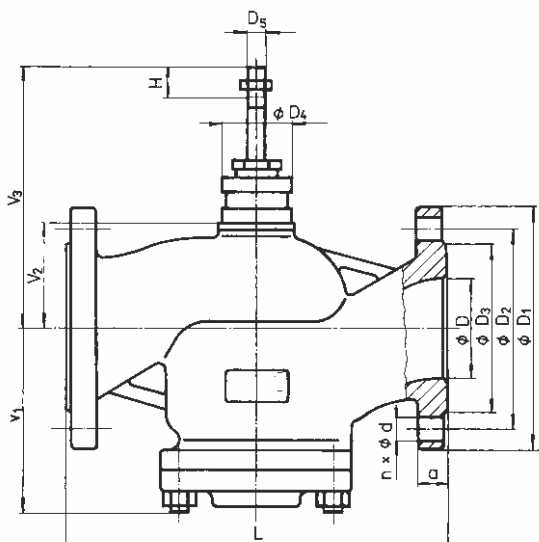
Max. differential pressures specified in table apply to PTFE and O-ring packing.  $\Delta p_{max}$  for bellows must be consulted with the producer.

Perforated plug available only with Kvs values in shadowed frames with the following restrictions:

- perforated plug with Kvs value acc. to column No. 2 available with linear or parabolic characteristic only

## Dimensions and weights for the type RV / HU 2x3

DN	PN 16					PN 40					PN 16, PN 40												
	D <sub>1</sub> mm	D <sub>2</sub> mm	D <sub>3</sub> mm	d mm	n	D <sub>1</sub> mm	D <sub>2</sub> mm	D <sub>3</sub> mm	d mm	n	D mm	D <sub>1</sub> mm	D <sub>3</sub> mm	L mm	V <sub>1</sub> mm	V <sub>2</sub> mm	<sup>#</sup> V <sub>2</sub> mm	V <sub>3</sub> mm	<sup>#</sup> V <sub>3</sub> mm	a mm	m <sub>1</sub> kg	m <sub>2</sub> kg	<sup>#</sup> m <sub>1</sub> kg
25	115	85	68	14	4	115	85	68	14	4	25	10	10	160	85	52	250	148	346	18	6.5	8	3.5
32	140	100	78	140		100	78	14	32		180			85	52	250	148	346	20	8	9.5	3.5	
40	150	110	88	150		110	88	18	40		200			85	52	250	148	346	20	9	11	3.5	
50	165	125	102	165		125	102	18	50		230			117	72	270	168	366	20	14	21	3.5	
65	185	145	122	18	4 <sup>1)</sup>	185	145	122	22	8	65	44	14	290	117	72	270	168	366	22	18	27	3.5
80	200	160	138	200	160	138	22	80			310			152	106	452	222	568	24	26	40	4.5	
100	220	180	158	220	180	158	26	100			350			152	106	452	222	568	24	38	49	4.5	
125	250	210	188	250	210	188	26	125			400			175	134	480	250	596	26	58	82	5	
150	285	240	212	22	300	250	218	26	150	480	200	134	480	250	596	28	78	100	5				



<sup>1)</sup> with regard of the standard previously in force, there is an option

<sup>#)</sup> to have the number of connection bolts as stipulated in ČSN-EN 1092-1 - for valve with bellows packing

m<sub>v</sub> - weight to be added to weight of valve equipped with bellows packing

m<sub>1</sub> - valves RV / HU 213

m<sub>2</sub> - valves RV / HU 223 and RV / HU 233





# RV 2x5

Control valves

**DN 15 - 150**  
**PN 16 a 40**

Control valves **RV 215**, **RV 225** and **RV 235** are three-way valves with mixing or flow-diverting function.

Technical data				
Series		RV 215	RV 225	RV 235
Type of valve	Three-way control valve with reverse function			
Nominal size range	DN 15 to 150			
Nominal pressure	PN 16, PN 40			
Body material		Spheroidal cast iron EN-JS 1025 (EN-GJS-400-10-LT)	Cast steel 1.0619 (GP240GH) 1.7357 (G17CrMo5-5)	Stainless steel 1.4581 (GX5CrNiMoNb19-11-2)
Seat material:	DN 25 - 50	1.4028 / 17 023.6	1.4028 / 17 023.6	1.4571 / 17 347.4
DIN W.Nr./ČSN	DN 65 - 150	1.4027 / 42 2906.5	1.4027 / 42 2906.5	1.4581 / 42 2941.4
Plug material:	DN 25 - 65	1.4021 / 17 027.6	1.4021 / 17 027.6	1.4571 / 17 347.4
DIN W.Nr./ČSN	DN 80 - 150	1.4027 / 42 2906.5	1.4027 / 42 2906.5	1.4581 / 42 2941.4
Operating temp. range	-10 to 300 °C			
Face to face dimensions	Line 1 acc. to ČSN-EN 558+A1 (5/2012)			
Connection flanges	Acc. to ČSN-EN 1092-2 (1/1999)		Acc. to ČSN-EN 1092-1+A1 (7/2013)	
Flange face	Type B1 (raised-face) acc. to ČSN-EN 1092-2 (1/1999)		Typ B1 (raised-face) nebo Typ F (female) nebo Typ D (groove) acc. to ČSN-EN 1092-1+A1 (7/2013)	
Type of plug	V-ported, perforated			
Flow characteristic	Linear, equal-percentage, LDMspline®, parabolic			
Kvs value	1.6 to 360 m <sup>3</sup> /h			
Leakage rate in A-AB way	Class III. acc. to ČSN-EN 1349 (5/2001) (<0.1% Kvs) for control valves with metal-metal seat sealing Class IV. acc. to ČSN-EN 1349 (5/2001) (<0.01% Kvs) for control valves with metal-PTFE seat sealing			
Leakage rate in B-AB way	Not guaranteed, to 2% Kvs			
Rangeability r	50 : 1			
Packing	O - ring EPDM t <sub>max</sub> = 140 °C, DRSpack® (PTFE) t <sub>max</sub> = 260 °C, bellows t <sub>max</sub> = 260 °C			



## Kvs values and differential pressures

**$\Delta p_{max}$  value is the valve max. differential pressure when open-close function is always guaranteed. In regard of service life of seat and plug, it is recommended so that permanent differential pressure would not exceed 1.6 MPa. Otherwise it is suitable to use perforated plug or sealing surfaces of seat and plug with a hard metal overlay.**

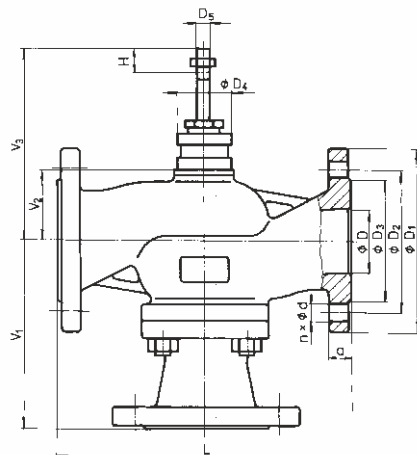
For further information on actuating, see catalogue sheets		Actuating (actuator)			SAX ...		SKD ...		SKB ...		SKC ...	
		Marking in valve specification No.			ELE		HLA, HLB, HLC		HLD, HLE, HLF		HLG, HLH, HLI	
		Linear force			800 N		1000 N		2800 N		2800 N	
		Kvs [m <sup>3</sup> /h]			$\Delta p_{max}$		$\Delta p_{max}$		$\Delta p_{max}$		$\Delta p_{max}$	
DN	H	1	2	3	metal	PTFE	metal	PTFE	metal	PTFE	metal	PTFE
15	20	4.0 <sup>1)</sup>	2.5 <sup>1)</sup>	1.6 <sup>1)</sup>	3.40	---	4.00	---	4.00	---	---	---
20		6.3 <sup>1)</sup>	4.0 <sup>1)</sup>	2.5 <sup>1)</sup>	1.56	---	2.15	---	4.00	---	---	---
25		10.0	6.3 <sup>2)</sup>	4.0 <sup>2)</sup>	0.88	1.29	1.24	1.65	4.00	4.00	---	---
32		16.0	10.0	6.3 <sup>2)</sup>	0.45	0.77	0.67	0.99	2.66	2.89	---	---
40		25.0	16.0	10.0	0.23	0.49	0.38	0.63	1.66	1.91	---	---
50	40	40.0	25.0	16.0	0.10	0.29	0.18	0.37	0.95	1.14	---	---
65		63.0	40.0	25.0	0.02	0.17	0.07	0.22	0.54	0.69	---	---
80		100.0	63.0	40.0	---	---	---	---	---	---	0.34	0.47
100		160.0	100.0	63.0	---	---	---	---	---	---	0.20	0.30
125		250.0	160.0	100.0	---	---	---	---	---	---	0.11	0.19
150		360.0	250.0	160.0	---	---	---	---	---	0.06	0.14	

- <sup>1)</sup> parabolic plug in straight way, V-ported plug in angle way
- <sup>2)</sup> V-ported plug in angle way, in straight way for linear characteristic V-ported plug and for equal-percentage characteristic parabolic plug
- metal - version with metal - metal seat sealing
- PTFE - version with metal - PTFE seat sealing (does not apply to contoured plugs)

Max. differential pressures specified in table apply to PTFE and O-ring packing.  $\Delta p_{max}$  for bellows must be consulted with the producer.  
Bellows packing can be used with V-ported plug only.  
Max. differential pressure  $\Delta p$  for valves PN 16 must be 1.6 MPa.

## Dimensions and weight of valves RV 2x5

DN	PN 16					PN 40					PN 16, PN 40												
	D <sub>1</sub> mm	D <sub>2</sub> mm	D <sub>3</sub> mm	d mm	n	D <sub>1</sub> mm	D <sub>2</sub> mm	D <sub>3</sub> mm	d mm	n	D mm	D <sub>4</sub> mm	D <sub>5</sub> mm	L mm	V <sub>1</sub> mm	V <sub>2</sub> mm	<sup>#</sup> V <sub>2</sub> mm	V <sub>3</sub> mm	<sup>#</sup> V <sub>3</sub> mm	a mm	m <sub>1</sub> kg	m <sub>2</sub> kg	<sup>#</sup> m <sub>v</sub> kg
15	95	65	45			95	65	45			15			130	110	47	---	143	---	16	5.5	6	---
20	105	75	58	14		105	75	58	14		20			150	115	47	---	143	---	18	6.5	7	---
25	115	85	68		4	115	85	68		4	25		10	160	130	52	250	148	346	18	8.3	9.5	3.5
32	140	100	78			140	100	78			32			180	135	52	250	148	346	20	10.5	12	3.5
40	150	110	88			150	110	88			40	44		200	140	52	250	148	346	20	12	13.5	3.5
50	165	125	102			165	125	102	18		50			230	175	72	270	168	366	20	17	24	3.5
65	185	145	122	18	4 <sup>1)</sup>	185	145	122		8	65		14	290	180	72	270	168	366	22	22	31	3.5
80	200	160	138			200	160	138			80	310		220	106	452	222	568	24	31	43	4.5	
100	220	180	158		8	235	190	162	22	8	100		14	350	230	106	452	222	568	24	44	55	4.5
125	250	210	188			270	220	188			125	400		260	134	480	250	596	26	65	90	5	
150	285	240	212	22		300	250	218	26		150	480		290	134	480	250	596	28	94	120	5	



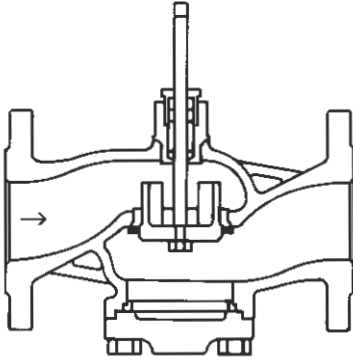
- <sup>1)</sup> with regard of the standard previously in force, there is an option
- <sup>#)</sup> to have the number of onnection bolts as stipulated in ČSN-EN 1092-1
- for valve with bellows packing
- m<sub>v</sub> - weight to be added to weight of valve equipped with bellows packing
- m<sub>1</sub> - valves RV 215
- m<sub>2</sub> - valves RV 225 and RV 235

Valve complete specification No. for ordering RV / HU 2x1, RV / HU 2x3, RV 2x5									
		XX	XXX	XXX	XXXX	XX	- XX	/ XXX	- XXX
<b>1. Valve</b>	Control valve	RV							
	Fail-safe action valve	HU							
<b>2. Series</b>	Valves made of sph. cast iron EN-JS 1025		2 1						
	Valves made of cast steel 1.0619, 1.7357		2 2						
	Valves made of stainless steel 1.4581		2 3						
	Reverse valve		1						
	Pressure-balanced, reverse valve		3						
	Mixing (diverting), reverse valve		5						
<b>3. Actuating</b> <sup>1)</sup> Fail-safe action actuators	Electric actuator			E					
	Electrohydraulic actuator			H					
	SAX 31, SAX 61, SAX 81			E L E					
	SKD 32.50, SKD 82.50, SKD 82.8, SKD 62.9			H L A					
	SKD 32.51, SKD 32.21, SKD 82.51 <sup>1)</sup>			H L B					
	SKD 62, SKD 62U <sup>1)</sup>			H L C					
	SKB 32.50, SKB 82.50, SKB 62.9			H L D					
	SKB 32.51, SKB 82.51 <sup>1)</sup>			H L E					
	SKB 62, SKB 62U <sup>1)</sup>			H L F					
	SKC 32.60, SKC 82.60, SKC 62.9			H L G					
	SKC 32.61, SKC 82.61 <sup>1)</sup>			H L H					
	SKC 62, SKC 62U <sup>1)</sup>			H L I					
<b>4. Connection</b>	Raised flange					1			
	Female flange					2			
	Groove flange					3			
<b>5. Body material</b> <small>(Operating temperature ranges are specified in parentheses)</small>	Cast steel 1.0619 (-10 to 400 °C)					1			
	Spherooidal cast iron EN-JS 1025 (-10 to 300 °C)					4			
	CrMo steel 1.7357 (-10 to 500 °C)					7			
	Stainless steel 1.4581 (-10 to 500 °C)					8			
	Other material on request					9			
<b>6. Seat sealing</b> <sup>2)</sup> from DN 25; t <sub>max</sub> = 260 °C	Metal - Metal					1			
	Soft sealing (metal - PTFE) in straight way <sup>2)</sup>					2			
	Hard metal overlay on sealing surfaces					3			
<b>7. Packing</b>	O - ring EPDM					1			
	DRSpack® (PTFE)					3			
	Bellows					7			
	Bellows with safety PTFE packing					8			
<b>8. Flow characteristic</b> <sup>3)</sup> Not applicable to RV 2x5	Linear						L		
	Equal-percentage in straight way						R		
	LDMspline® <sup>3)</sup>						S		
	Parabolic <sup>3)</sup>						P		
	Linear - perforated plug <sup>3)</sup>						D		
	Equal-percentage - perforated plug <sup>3)</sup>						Q		
Parabolic - perforated plug <sup>3)</sup>						Z			
<b>9. Kvs</b>	Column No. acc. to Kvs values table						X		
<b>10. Jmenovitý tlak PN</b>	PN 16							16	
	PN 40							40	
<b>11. Max. operating temperature °C</b> <sup>4)</sup> Not applicable for RV / HU 2x3	O - ring EPDM								140
	DRSpack® (PTFE), bellows								220
	DRSpack® (PTFE), bellows								260
	Bellows <sup>4)</sup>								300
<b>12. Nominal size DN</b>	DN								XXX

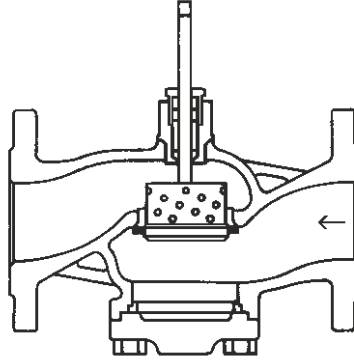
**Ordering example:** Two-way control valve DN 65, PN 40, with Siemens actuator SKB 32.50, body material: spheroidal cast iron, flange with raised face, metal-metal seat sealing, PTFE packing, linear characteristic, Kvs = 63 m<sup>3</sup>/h is specified as follows: **RV 211 HLD 1413 L1 40/220-65**

### Valves RV / HU 2x1

Section of valve with V-ported plug

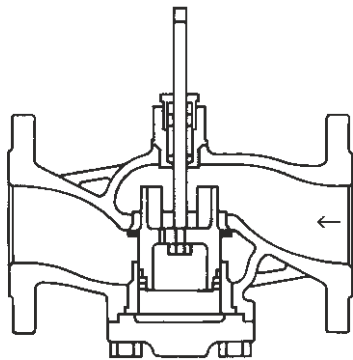


Section of valve with perforated plug

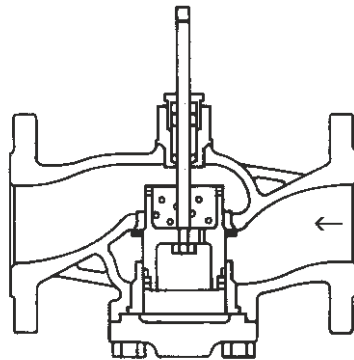


### Valves RV / HU 2x3

Section of pressure-balanced valve with V-ported plug

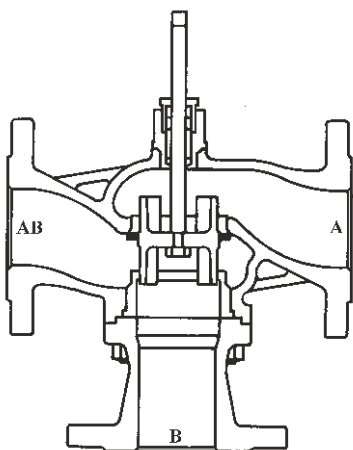


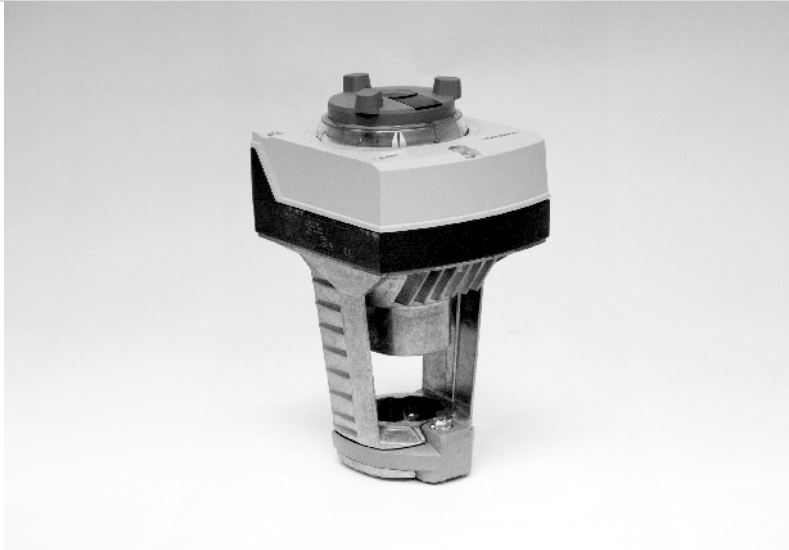
Section of pressure-balanced valve with perforated plug



### Valves RV 2x5

Section of three-way valve with V-ported plug





## Electric actuators

**Siemens**  
**SAX**

**ELE**

Technical data					
Type	SAX 31.00	SAX 31.03	SAX 61.03	SAX 81.00	SAX 81.03
Mark in valve spec. No.	ELE				
Voltage	230 V AC			24 V AC/DC	
Frequency	50 Hz				
Power consumption	3,5 VA	8 VA	8 VA	3,5 VA	8 VA
Control	3 - position		0 - 10 V, 4 - 20 mA, 0 - 1000 Ω	3 - position	
	120 s	30 s	30 s	120 s	30 s
Nominal force	800 N				
Travel	20 mm				
Enclosure	IP 54				
Process medium max. temp.	130°C (160°C when using a bellows or cooler)				
Ambient and actuator surface temp. range	-15 to 55°C				
Ambient humidity limit	< 95 % of relative humidity				
Handle	yes				
Weight	1,85 kg				

**Note:** See original producer's catalogue sheets for further information about actuators

### Accessories for actuators SAX31..., SAX81... (optional)

Auxiliary switch ASC10.51  
2x auxiliary switch ASC10.51 (only wo ASZ7.5)  
Potentiometer 135 W ASZ7.5/135  
Potentiometer 200 W ASZ7.5/200  
Potentiometer 1000 W ASZ7.5/1000  
Weather shield ASK39.1  
Stem heating element (130°C...160°C)

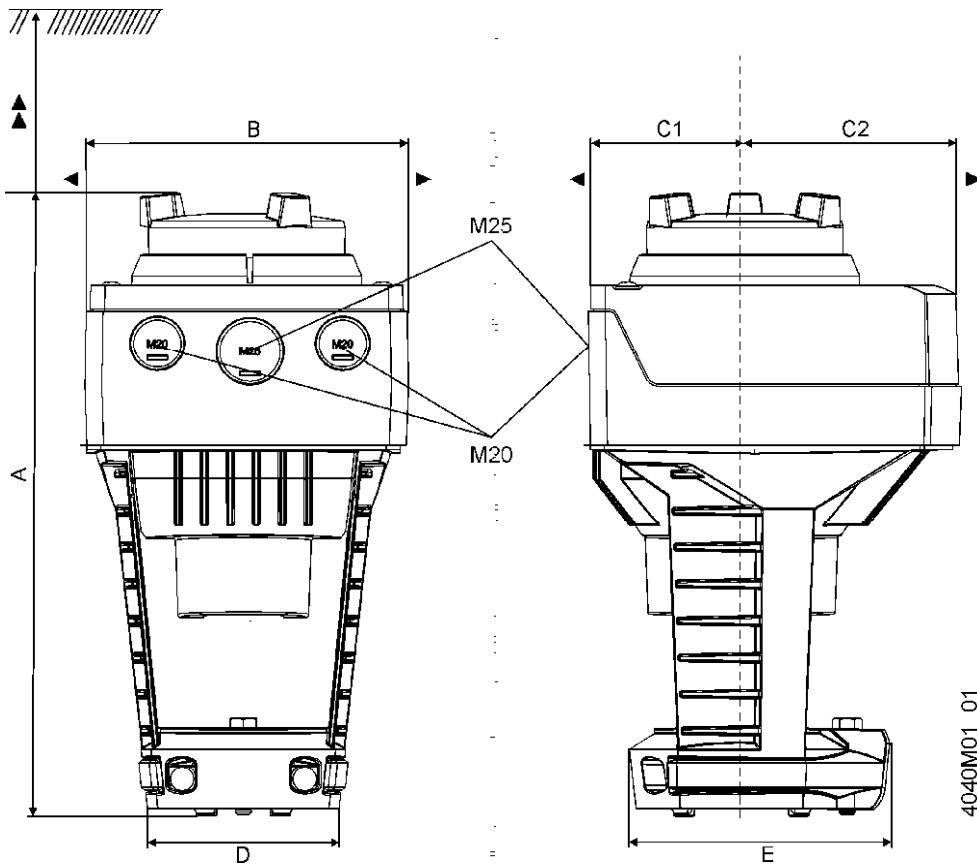
### Accessories for actuators SAX61... (optional)

Auxiliary switch ASC10.51  
2x auxiliary switch ASC10.51 (only wo AZX61.1)  
Function module AZX61.1  
Weather shield ASK39.1  
Stem heating element (130°C...160°C)

### Function module AZX61.1

The functional module allows sequential drive, adaptation of control signal and reversing signal

## Dimensions of actuator

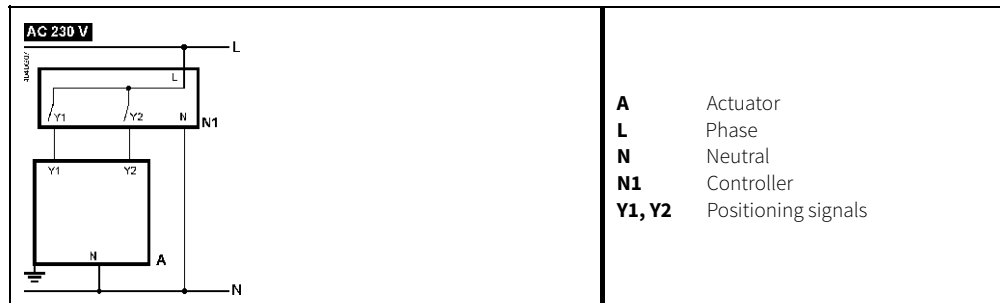


Product type	A	B	C	C1	C2	D	E	>	>>
SAX...	242	124	150	68	82	80	100	100	200
Included cover ASK39.1	+25	154	300	200	100	-	-	-	-

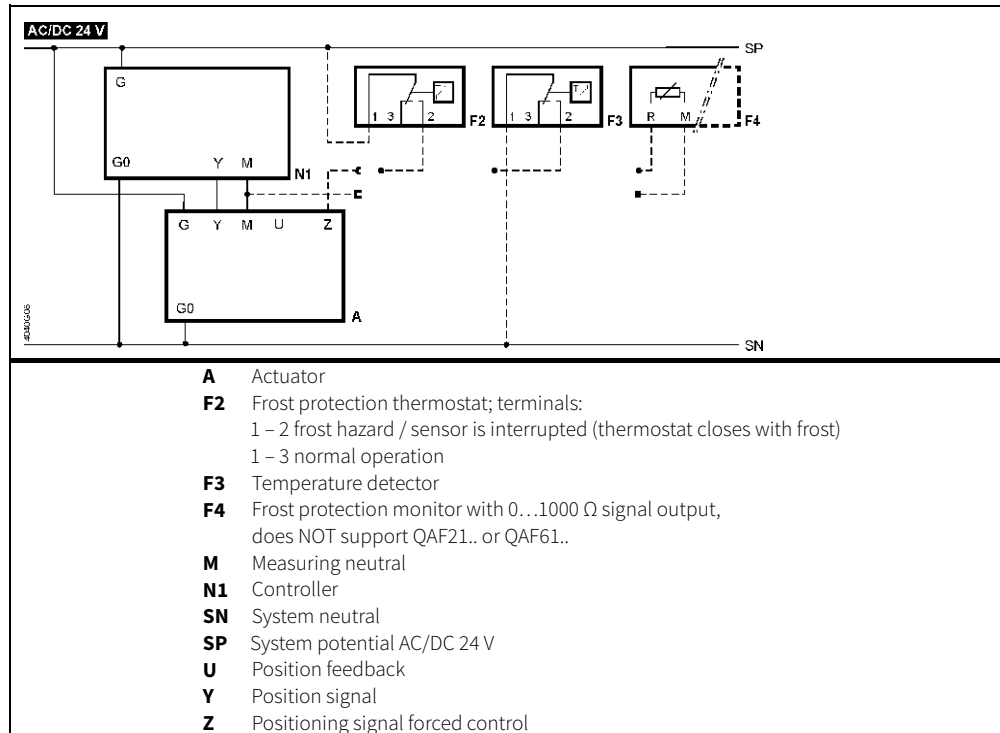
Dimensions in mm

## Wiring diagram

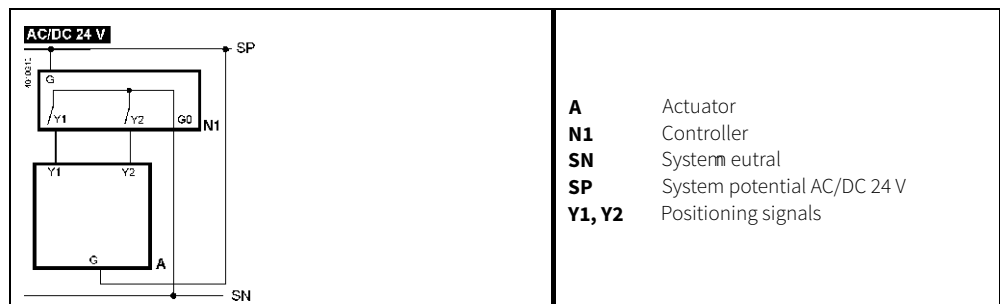
### SAX31..



### SAX61..



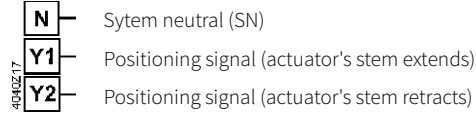
### SAX81..



## Connection terminals

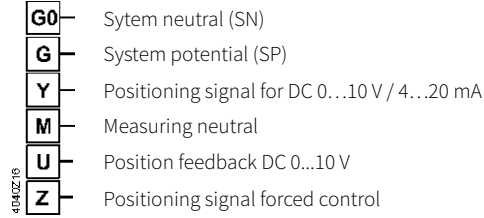
### SAX31..

AC 230 V, 3-position



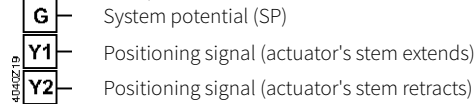
### SAX61..

AC/DC 24 V, DC 0...10 V / 4...20 mA / 0...1000 Ω



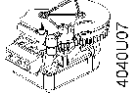
### SAX81..

AC/DC 24 V, 3-position

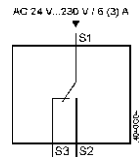
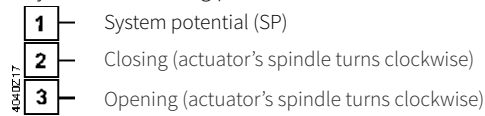


### Auxiliary switch

#### ASC10.51



Adjustable switching points, AC 24...230 V

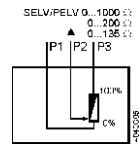
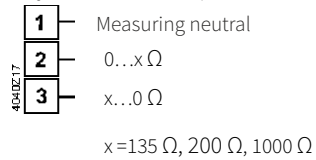


### Potentiometer

#### ASZ7.5/..



Adjustment of zero point, DC 10 V







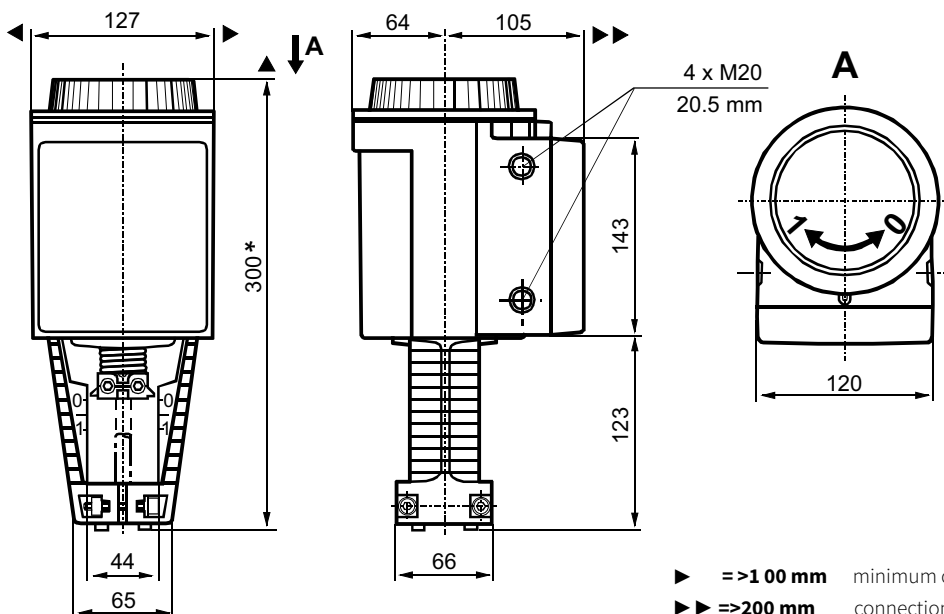
## Electrohydraulic actuators

# Siemens SKD 32 SKD 82

HLA, HLB

Technical data					
Type	SKD 32.50	SKD 82.50	SKD 32.51	SKD 32.21	SKD 82.51
Mark in valve spec. No.	HLA		HLB		
Voltage	230 V AC	24 V AC	230 V AC		24 V AC
Frequency	50...60 Hz				
Power consumption	10 VA		15 VA		
Control	3 - position		3 - position		
Running time	open	120 s	120 s	30 s	120 s
	closed	120 s	120 s	10 s	120 s
Fail-safe action time	---		8 s		
Nominal force	1000 N				
Travel	20 mm				
Enclosure	IP 54				
Process medium max. t.	150 °C (180°C when using a bellows or cooler)				
Ambient and actuator's surface temp. limit	-15 to 50 °C				
Ambient humidity limit	5 - 95 % of relative humidity				
Weight	3,6 kg				

### Dimensions of actuator



### Accessorie (optional)

- Pair of auxiliary switches ASC9.3
- Potentiometer 1000 Ω ASZ7.3 \*)
- Potentiometer 135 Ω ASZ7.31 \*)
- Potentiometer 200 Ω ASZ7.32 \*)

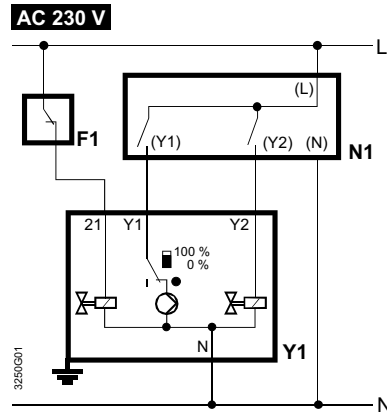
\*) 1 potentiometer can be used for 1 actuator only

## Wiring diagrams

### SKD32...

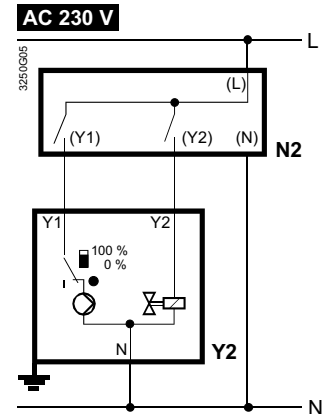
AC 230 V  
3-position

#### SKD32.21, SKD32.51



**F1** Safety thermostat  
**N1, N2** Controllers  
**Y1, Y2** Actuators  
**L** Phase  
**N** Neutral conductor

#### SKD32.50

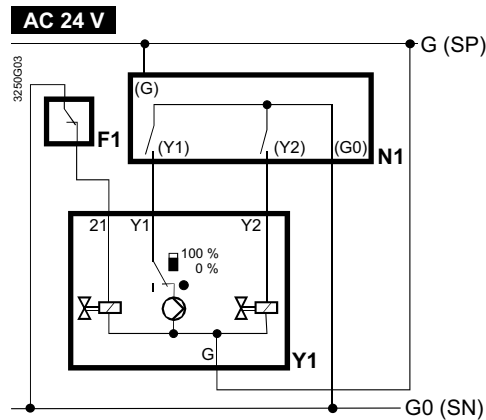


**Y1** Control signal «Open»  
**Y2** Control signal «Close»  
**21** Spring-return function

### SKD82...

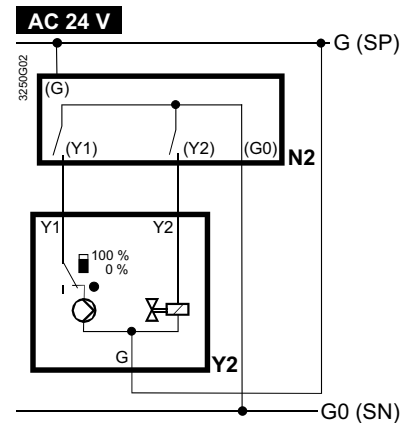
AC 24 V  
3-position

#### SKD82.51, SKD82.51U



**F1** Safety thermostat  
**N1, N2** Controllers  
**Y1, Y2** Actuators  
**SP** System potential AC 24 V  
**SN** System neutral

#### SKD82.50, SKD82.50U



**(Y1) (Y2)** Controller contacts  
**Y1** Control signal «Open»  
**Y2** Control signal «Close»  
**21** Spring-return function



## Electrohydraulic actuators

# Siemens SKD 60 SKD 62

HLA, HLC

Technical data			
Type	SKD 60	SKD 62	SKD 62UA *)
Mark in valve spec. No.	HLA	HLC	
Voltage	24 V AC		
Frequency	50...60 Hz		
Power consumption	17 VA / 12 VA		
Control	0 - 10 V, 4 - 20 mA, 0 - 1000 Ω		
Running time	open	30 s	
	closed	15 s	
Fail-safe action time	---	15 s	
Nominal force	1000 N		
Travel	20 mm		
Enclosure	IP 54		
Process medium max. t.	150°C		
Ambient and actuator's surface temp. limit	-15 to 50 °C		
Ambient humidity limit	5 - 95 % of relative humidity		
Weight	3,6 kg	3,85 kg	3,6 kg

\*) UA ... version with improved electronics

### Accessories (optional)

Auxiliary switch 24 V ASC1.6

### Description

Each actuator with continuous control signal is equipped with ACT control technology enabling the following features as standard:

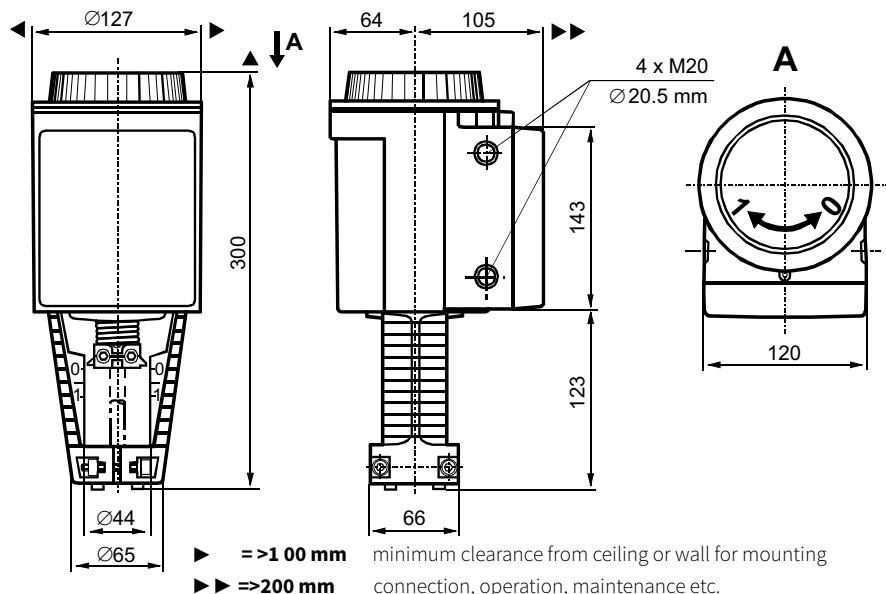
- stroke range calibration
- state indication via LED
- flow characteristic selection (log / lin)
- selection of control signal at Y terminal
- feedback signal at U terminal corresponding to current stroke position
- forced control at Z terminal

Version with improved electronics (UA) further enables:

- inversion of control signal
- sequence control
- stroke limiting

### Dimensions

All dimensions in v mm





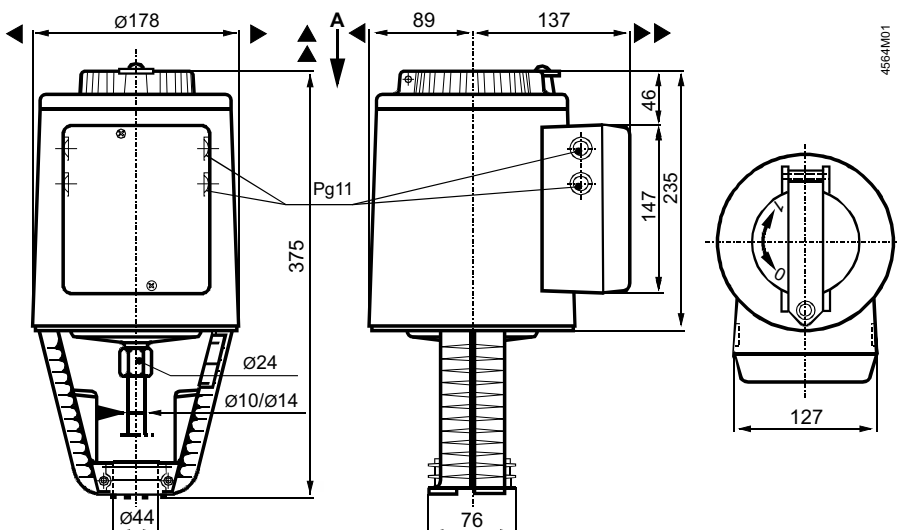
## Elektrohydraulic actuators

# Siemens SKB 32, 82 SKC 32, 82

**HLD, HLE, HLG, HLH**

Technical data								
Type	SKB 32.50	SKB 82.50	SKB 32.51	SKB 82.51	SKC 32.60	SKC 82.60	SKC 32.61	SKC 82.61
Mark in valve spec. No.	HLD		HLE		HLG		HLH	
Voltage	230 V AC	24 V AC	230 V AC	24 V AC	230 V AC	24 V AC	230 V AC	24 V AC
Frequency	50...60 Hz							
Power consumption	10 VA		15 VA		19 VA		24 VA	
Control	3 - position							
Running time	open	120 s	120 s	120 s	120 s	120 s	120 s	120 s
	closed	120 s	120 s	120 s	120 s	120 s	120 s	120 s
Fail-safe action time	---		10 s		---		18 s	
Nominal force	2800 N							
Travel	20 mm				40 mm			
Enclosure	IP 54							
Process medium max. t.	220 °C (higher temperatures only when using a bellows or cooler)							
Ambient and actuator's surface temp. limit	-15 to 55 °C							
Ambient humidity limit	0 - 95 % of relative humidity							
Weight	8,4 kg		8,9 kg		10 kg		10,5 kg	

### Dimension of actuator



### Accessories (optional)

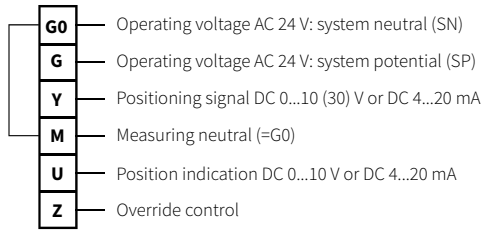
- Pair of auxiliary switches ASC9.3
- Potentiometer 1000 Ω ASZ7.3 \*)
- Potentiometer 135 Ω ASZ7.31 \*)
- Potentiometer 200 Ω ASZ7.32 \*)

\*) 1 potentiometer can be used for 1 actuator only

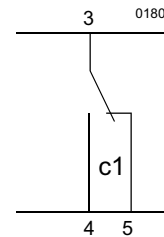
- ▶ =>100 mm minimum clearance from ceiling or wall for mounting
- ▶▶ =>200 mm connection, operation, maintenance etc.

## Connection terminals

### SKD6...



### Auxiliary switch ASC1.6

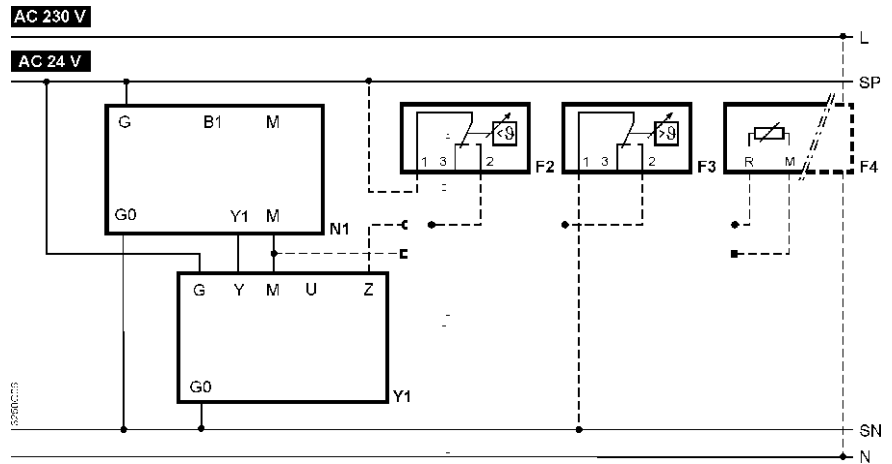


## Wiring diagrams

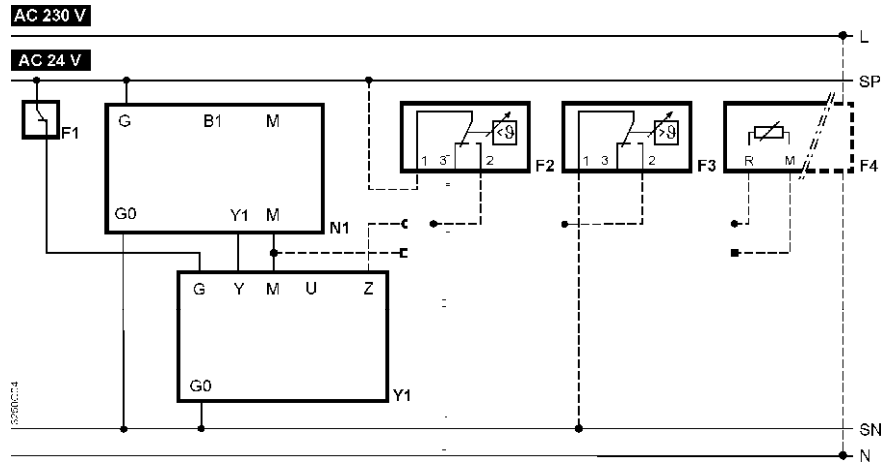
### SKD6..

AC 24 V  
DC 0...10 V, 4...20 mA,  
0...1000 Ω

### SKD60



### SKD62 SKD62UA



- Y1** Actuator
- N1** Controller
- F1** Temperature limiter
- F2** Frost protection thermostat  
terminals: 1-3 frost hazard / sensor is interrupted  
(thermostat closes with frost)  
1-2 normal operation
- F3** Frost protection monitor
- F4** Frost protection monitor QAF21.. or QAF61.. (for SKD62UA only) \*
- G (SP)** System potential AC 24 V
- G0 (SN)** Systemo neutral

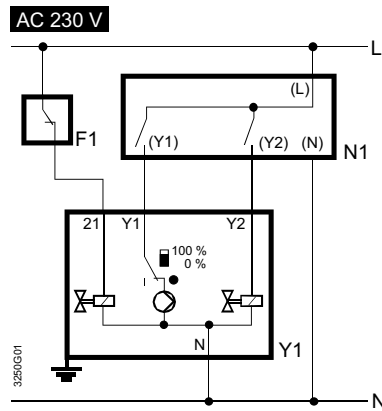
\* Only with sequence control and the appropriate selector switch settings

## Wiring diagram

### SKB32..., SKC 32..

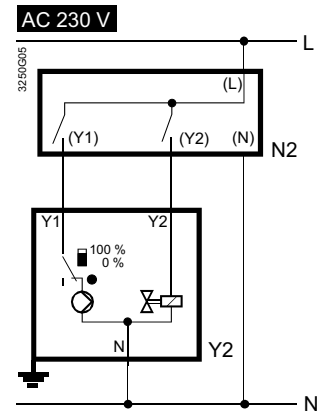
AC 230 V  
3-position

#### SKB32.51, SKC 32.51



**F1** Temperature limiter  
**N1, N2** Controller  
**Y1, Y2** Actuators  
**L** Phase  
**N** Neutral

#### SKB32.50, SKC 32.50

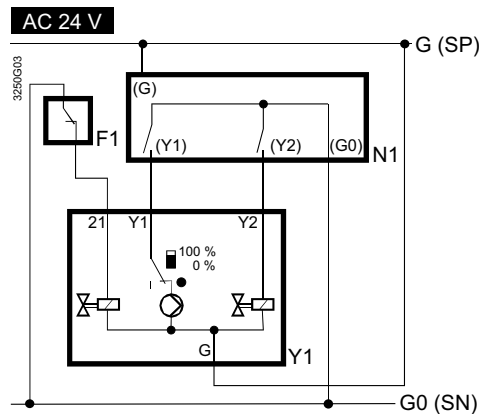


**Y1** Positioning signal «open»  
**Y2** Positioning signal «close»  
**21** Spring-return function

### SKB82...; SKC82..

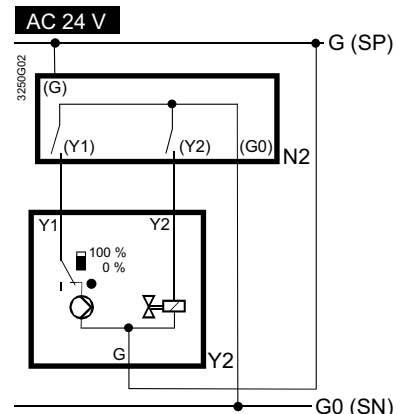
AC 24 V  
3-position

#### SKB82.51, SKC82.51



**F1** Temperature limiter  
**N1, N2** Controller  
**Y1, Y2** Actuators  
**SP** System potential AC 24 V  
**SN** System neutral

#### SKB82.50, SKC82.50



**Y1** Positioning signal «open»  
**Y2** Positioning signal «close»  
**21** Spring-return function



## Elektrohydraulic actuators

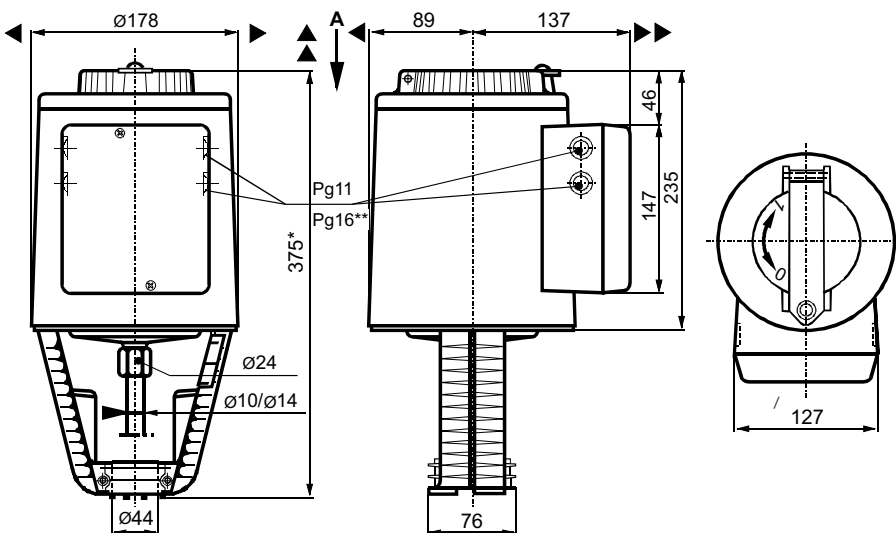
# Siemens SKB 60, 62 SKC 60, 62

HLD, HLF, HLG, HLI

Technical data						
Type	SKB 60	SKB 62	SKB 62UA *)	SKC 60	SKC 62	SKC 62UA *)
Mark in valve spec. No.	HLD	HLF		HLG	HLI	
Voltage	24 V					
Frequency	50...60 Hz					
Power consumption	13 VA	17 VA		24 VA	28 VA	
Control	0 - 10 V, 4 - 20 mA, 0 - 1000 Ω					
Running time	open	120 s		120 s		
	closed	15 s		20 s		
Fail-safe action time	---	15 s		---	20 s	
Nominal force	2800 N					
Travel	20 mm			40 mm		
Enclosure	IP 54					
Process medium max. t.	220 °C (higher temperatures only when using a bellows or cooler)					
Ambient and actuator's surface temp. limit	-15 to 55 °C					
Ambient humidity limit	0 - 95 % of relative humidity					
Weight	8,6 kg			10 kg		

\*) UA ... verze se zdokonalenou elektronikou

## Dimensions of actuator



- ▶ =>100 mm minimum clearance from ceiling or wall for mounting
- ▶▶ =>200 mm connection, operation, maintenance etc.

## Accessories (optional)

Auxiliary switch 24 V ASC1.6

## Description

Each actuator with continuous control signal is equipped with ACT control technology enabling the following features as standard:

- stroke range calibration
- state indication via LED
- flow characteristic selection (log / lin)
- selection of control signal at Y terminal
- feedback signal at U terminal corresponding to current stroke position
- forced control at Z terminal

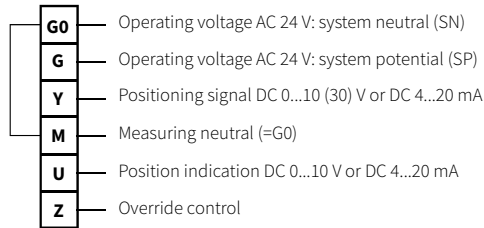
Version with improved electronics (UA) further enables:

- inversion of control signal
- sequence control
- stroke limiting

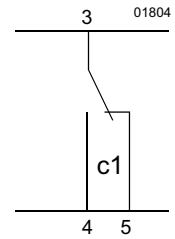


## Connection terminals

### SKB6.., SKC6..



### Auxiliary switch ASC1.6

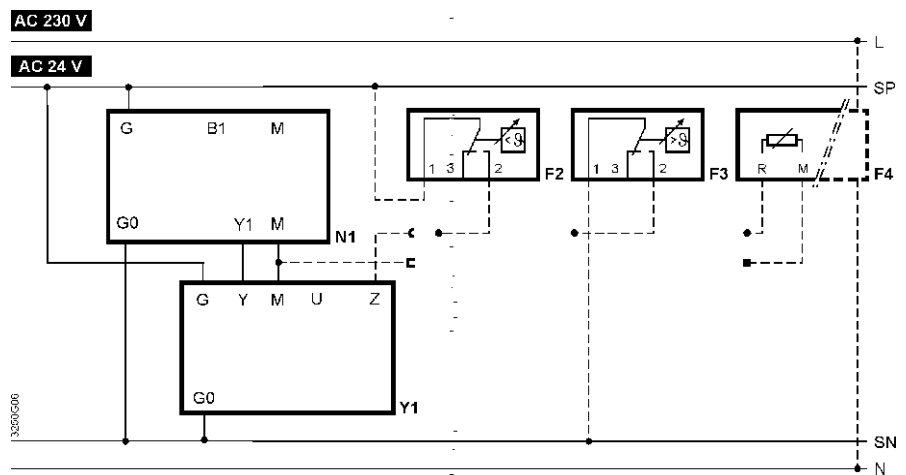


## Wiring diagrams

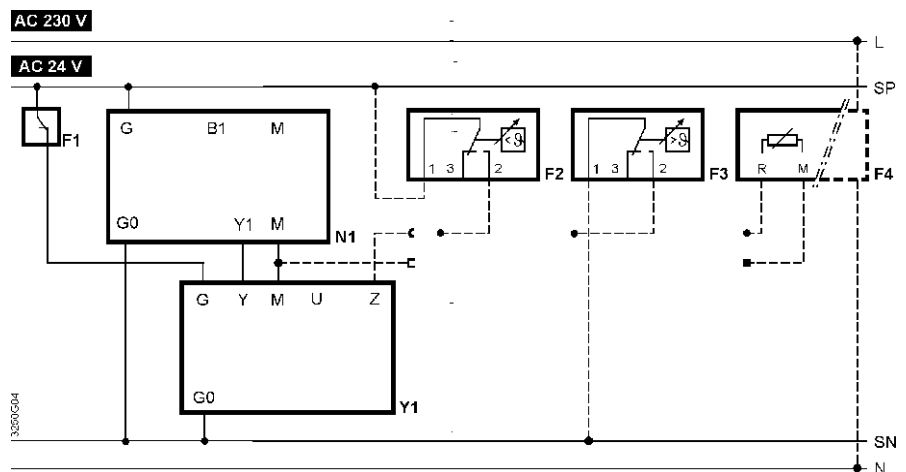
### SKB6.., SKC6..

AC 24 V  
DC 0...10 V, 4...20 mA,  
0...1000 Ω

#### SKB60 SKC60



#### SKB62 SKB62UA SKC62 SKC62UA



- Y1** Actuator
- N1** Controller
- F1** Temperature limiter
- F2** Frost protection thermostat  
terminals: 1 – 3 frost hazard / sensor is interrupted  
(thermostat closes with frost)  
1 – 2 normal operation
- F3** Frost protection monitor
- F4** Frost protection monitor QAF21.. or QAF61.. (for SKD62UA only) \*
- G (SP)** System potential AC 24 V
- G0 (SN)** Systemo neutral

\* Only with sequence control and the appropriate selector switch settings

Maximal permissible operating pressures [MPa] acc. to ČSN EN 12516-1, ČSN EN 1092-2															
Material	PN	Temperature [ °C ]													
		RT <sup>1)</sup>	100	120	150	200	250	300	350	375	400	425	450	475	500
<b>Spher. cast iron</b> <b>EN-JS 1025</b> (EN-GJS-400-18-LT)	<b>16</b>	1,60	1,60	1,60	1,55	1,47	1,39	1,28	1,12	---	---	---	---	---	---
	<b>25</b>	2,50	2,50	2,50	2,43	2,30	2,18	2,00	1,75	---	---	---	---	---	---
	<b>40</b>	4,00	4,00	4,00	3,88	3,68	3,48	3,20	2,80	---	---	---	---	---	---
<b>Cast steel</b> 1.0619 (GP240GH)	<b>16</b>	1,56	1,36	1,32	1,27	1,14	1,04	0,94	0,88	0,86	0,84	---	---	---	---
	<b>25</b>	2,44	2,13	2,07	1,98	1,78	1,62	1,47	1,37	1,35	1,32	---	---	---	---
	<b>40</b>	3,90	3,41	3,31	3,17	2,84	2,60	2,35	2,19	2,16	2,11	---	---	---	---
<b>Chrommolybden steel</b> <b>1.7357</b> (G17CrMo5-5)	<b>16</b>	1,63	1,63	1,61	1,58	1,49	1,43	1,33	1,23	1,20	1,15	1,11	1,07	1,00	0,89
	<b>25</b>	2,55	2,54	2,51	2,48	2,33	2,23	2,08	1,93	1,88	1,80	1,73	1,67	1,56	1,39
	<b>40</b>	4,08	4,07	4,02	3,96	3,74	3,57	3,33	3,09	3,00	2,89	2,77	2,67	2,50	2,23
<b>Stainless steel</b> <b>1.4581</b> (GX5CrNiMoNb19-11-2)	<b>16</b>	1,59	1,44	1,39	1,33	1,25	1,17	1,10	1,06	1,05	1,02	1,02	1,01	1,00	0,89
	<b>25</b>	2,49	2,25	2,18	2,08	1,95	1,84	1,72	1,66	1,63	1,60	1,59	1,58	1,56	1,39
	<b>40</b>	3,98	3,60	3,49	3,33	3,13	2,94	2,75	2,65	2,61	2,56	2,54	2,52	2,50	2,23
<b>Stainless steel</b> <b>1.4308</b> (GX5CrNi19-10)	<b>16</b>	1,52	1,17	1,12	1,06	0,96	0,89	0,83	0,79	0,77	0,74	0,74	0,72	0,71	0,70
	<b>25</b>	2,37	1,84	1,76	1,66	1,50	1,40	1,30	1,23	1,20	1,16	1,15	1,13	1,11	1,09
	<b>40</b>	3,79	2,94	2,82	2,65	2,41	2,24	2,08	1,97	1,91	1,86	1,84	1,80	1,78	1,74

<sup>1)</sup> -10°C to 50°C



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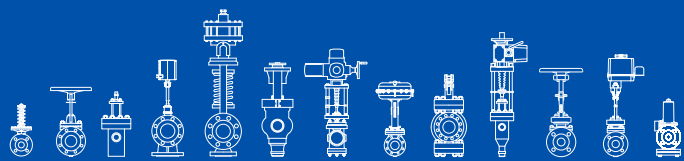
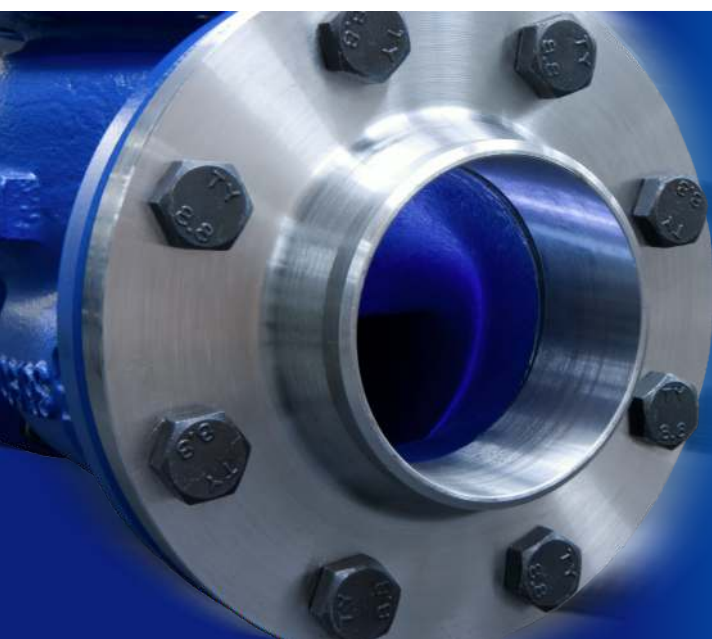
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