



**CYLINDERS AND
VALVES
SERIES KNORR**



3

Moving more than air



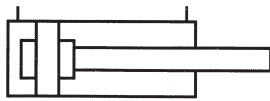
	page
3.1 Cylinders	
3.1.1 SDJ / SEJ	Clamping cylinder 3
3.1.2	Accessories for clamping cylinders 5
3.1.3 DU_J	Standard cylinder 6
3.1.4	Accessories for standard cylinders 9
3.2 Directional control valves	
3.2.1 Manually and mechanically actuated valves	
3.2.1.1 W_J-01 / W_J-03	2/2 and 3/2-way valves G 1/8" 19
3.2.1.2 WBJ / WHJ / WTJ / WRJ / WRLJ	3/2 and 5-way valves G 1/4" 23
3.2.2 Pneumatically actuated valves	
3.2.2.1 WKJ	3/2 and 5-way valves G 1/4" 29
3.2.2.2 SKVG / SIVG	5-way valves for base-mounting 31
3.2.3 Solenoid valves	
3.2.3.1 WMJ	3/2 and 5-way valves G 1/4" 33
3.2.3.2 SMVG / SMIVG	5-way valves for base-mounting 35
3.3 Flow control valves, logic elements	
3.3.1 SEJ	Quick exhaust valves 38
3.3.2 DRJ	Shuttle valve 39
3.3.3 ED / EDR	Uni-/bi-directional flow regulators 40
3.4 K-rings and pistons	41

Spare-part kits can be found on the page displaying the relevant product.

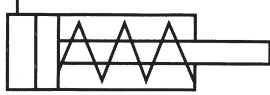


The JOYNER company policy is one of a continuous improvement process. We therefore reserve the right to amend, enhance and change specifications of the products presented in this document without notice.

Clamping cylinder SDJ double acting / SEJ single acting



SDJ



SEJ



Technical characteristics

General characteristics	
Design	compact
Piston-Ø	20 ... 40 mm
Stroke	10 ... 150 mm
Port size	G 1/8"
Fixing	Thread and through fixing holes
Mounting position	any
Temperature range	-20 °C ... +80 °C
Materials used	Body and head: aluminum anodized, Piston rod: stainless steel, Seals: NBR
Pneumatic characteristics	
Medium	compressed air, filtered max. 50 µm
Operating pressure	0.2 ... 10 bar

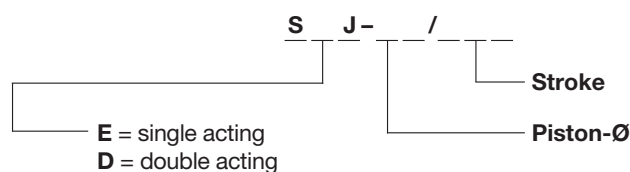
Standard strokes	
SEJ 20-40	10, 20, 30, 50
SDJ 20	10, 20, 30, 50, 75, 100
SDJ 30 and 40	10, 20, 30, 50, 75, 100, 125, 150

Retraction force for SEJ-cylinders

Piston-Ø	extended*	retracted at stroke*			
		10 mm	20 mm	30 mm	50 mm
20 mm	29	25	21	17	9
30 mm	63	54	45	37	19
40 mm	62	54	46	39	24

* Retraction force [N]

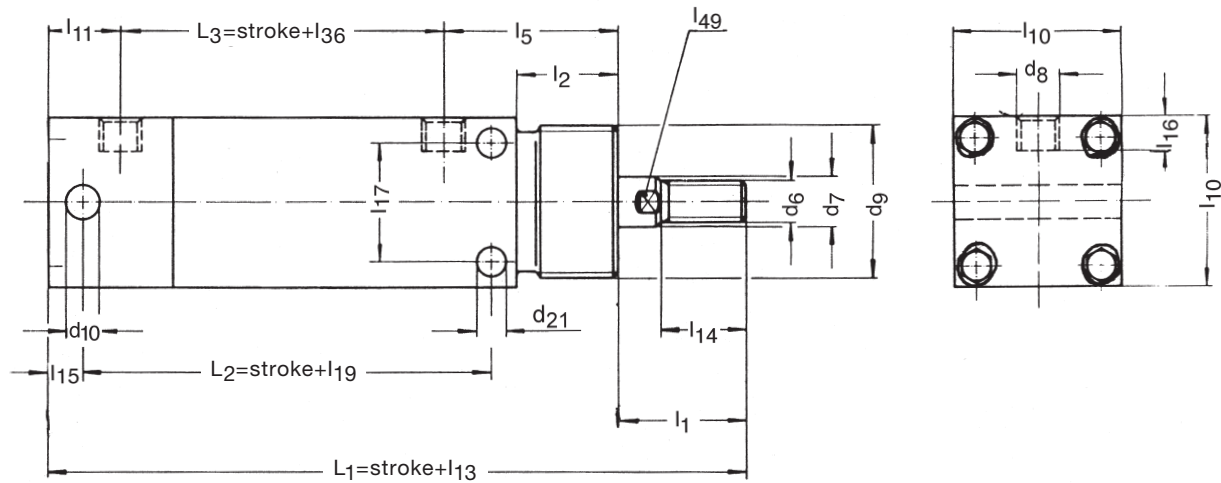
Types



Clamping cylinder SDJ / SEJ

Dimensions

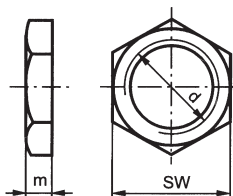
SDJ / SEJ with piston-Ø 20 mm to 40 mm



Piston-Ø	l_1	l_2	l_5	l_{10}	l_{11}	l_{13}	l_{14}	l_{15}	l_{16}	l_{17}
20 mm	20	20	29	30	15	90	14	6	8	-
30 mm	30	24	41	40	17	115	20	8	8	28
40 mm	31.5	30	48	50	20.5	130	20	10	10	38

Piston-Ø	l_{19}	l_{36}	l_{49}	d_6	d_7	d_8	d_9	d_{10}	d_{21}
20 mm	-	26	9	M8	10	G 1/8"	M26 x 1.5	6	-
30 mm	47	27	10	M10	12	G 1/8"	M36 x 2	8	7
40 mm	52	30	10	M10	12	G 1/8"	M36 x 2	10	7

Accessory fixing nut – GT



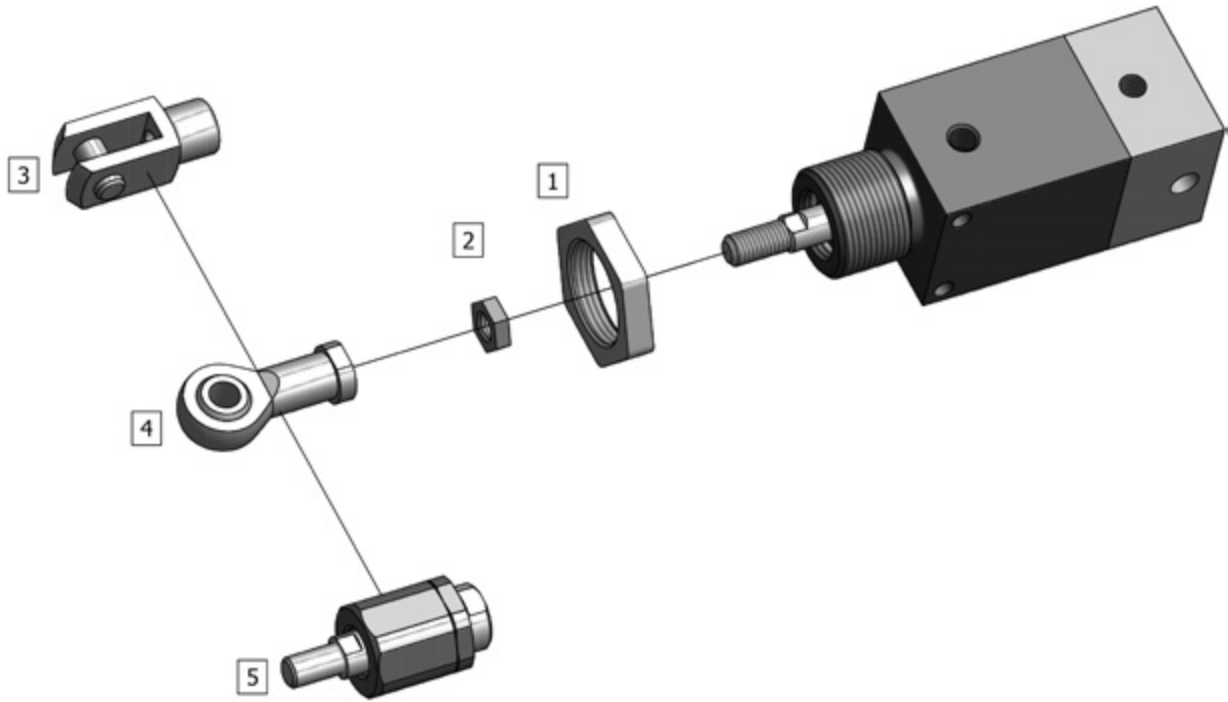
Piston-Ø	d	m	SW	Order number
20 mm	M26 x 1.5	8	36	E 140010000
30 mm	M36 x 2	9	46	E 140010001
40 mm	M36 x 2	9	46	E 140010001

Spare-part kits

Order information

Type	Order number for piston-Ø		
	20 mm	30 mm	40 mm
SDJ	J 060200003	J 060300003	J 060400003

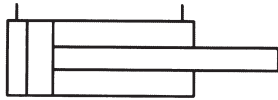




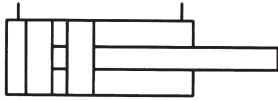
Pos.	Fixing element	Type	
1	Fixing nut body	GT	refer to page 4
2	Fixing nut piston rod	DS	refer to catalogue 1 – 1.4.1
3	Rod clevis	GF	refer to catalogue 1 – 1.4.1
4	Universal rod eye for piston rod	GS	refer to catalogue 1 – 1.4.1
5	Flexible joint	FK	refer to catalogue 1 – 1.4.1



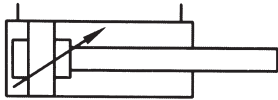
Standard cylinder double acting, with or without cushioning



DUJ



DUMJ



DUDJ

DUJ

DUDJ with cushioning

DUHJ high temperature

DUMJ magnetic piston

DUVJ enforced piston rod

Technical characteristics

General characteristics	
Design	Flange
Piston-Ø	30 ... 200 mm
Stroke	50 ... 500 mm *
Port size	G 1/4", G 1/2" starting piston-Ø 100 mm
Fixing	by accessories
Mounting position	any
Temperature range	-20 °C ... +80 °C (DUHJ up to +120 °C)
Materials used	Head and cap: aluminum Tube: hard anodized aluminum Piston rod: stainless steel Seals: NBR
Pneumatic characteristics	
Medium	Compressed air, filtered max. 50 µm
Operating pressure	0,2 ... 10 bar

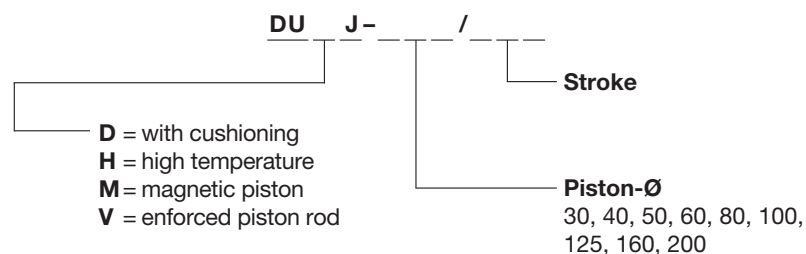
* larger strokes up to 1000 mm with enforced piston rod on request.



Standard strokes

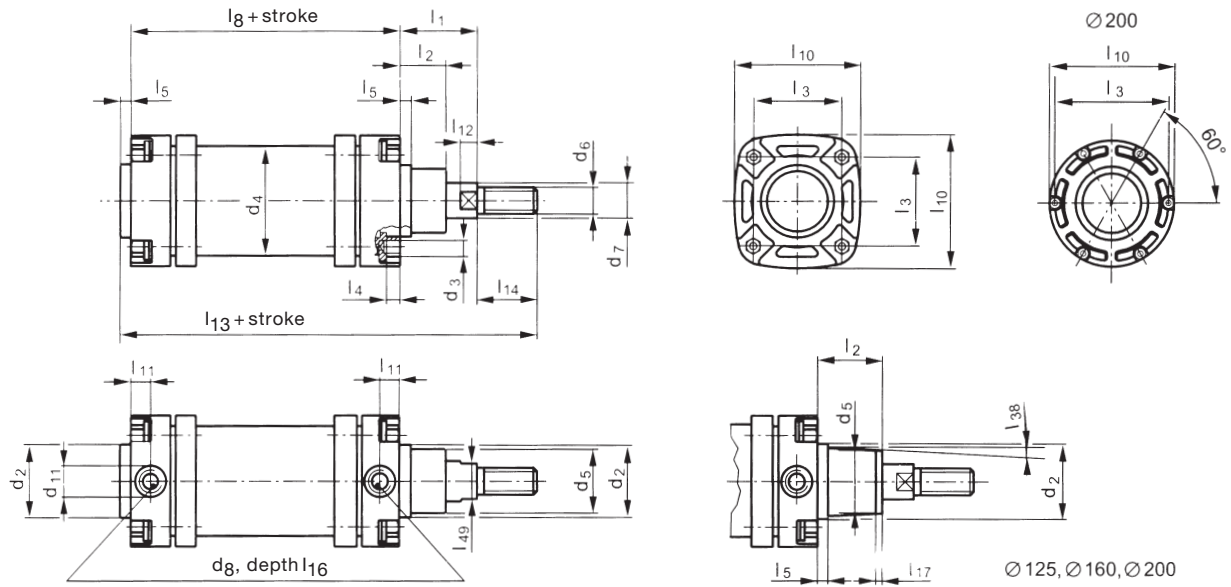
50, 75, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800

Types



Dimensions

DUJ
DUMJ
DUDJ
DUHJ



Piston-Ø	l_1	l_2	l_3	l_4	l_5	l_8	l_8^*	l_{10}	l_{11}	l_{12}	l_{13}	l_{13}^*	l_{14}
30 mm	40.5	29	36	13	7	72	82	50	13	6	139.5	149.5	20
40 mm	40.5	29	44	10	7	72	82	65	13	6	139.5	149.5	20
50 mm	43.0	29	47	10	7	72	72	70	13	8	147.0	147.0	25
60 mm	43.0	29	56	10	7	72	72	80	13	8	147.0	147.0	25
80 mm	43.0	26	72	10	9	78	88	100	13	10	160.0	170.0	30
100 mm	41.0	25	88	12	10	102	108	124	19	10	183.0	189.0	30
125 mm	72.0	52	108	12	11	102	102	152	19	13	225.0	225.0	40
160 mm	104.0	82	140	12	12	106	111	196	19	14	272.0	277.0	50
200 mm	130.0	107	Ø230	12	14	111	111	Ø260	19	15	310.0	310.0	55

Piston-Ø	l_{16}	l_{17}	l_{38}	l_{49}	$d_{2, d10}$	d_3	d_4	d_5	d_6	d_7	d_8	d_{11}
30 mm	12	-	-	10	34	M6	35	-	M10	12	G1/4	22
40 mm	15	-	-	10	42	M6	45	40	M10	12	G1/4	22
50 mm	15	-	-	14	47	M6	55	40	M12	16	G1/4	22
60 mm	15	-	-	14	47	M6	67	40	M12	16	G1/4	22
80 mm	15	-	-	17	55	M8	87	45	M16	20	G1/4	22
100 mm	20	-	-	22	70	M10	107	50	M20	25	G1/2	30
125 mm	20	15	6°	27	85	M10	137	58	M24	30	G1/2	30
160 mm	20	15	5°	32	110	M12	172	65	M30	35	G1/2	30
200 mm	20	40	25°	36	145	M12	215	75	M36	40	G1/2	30

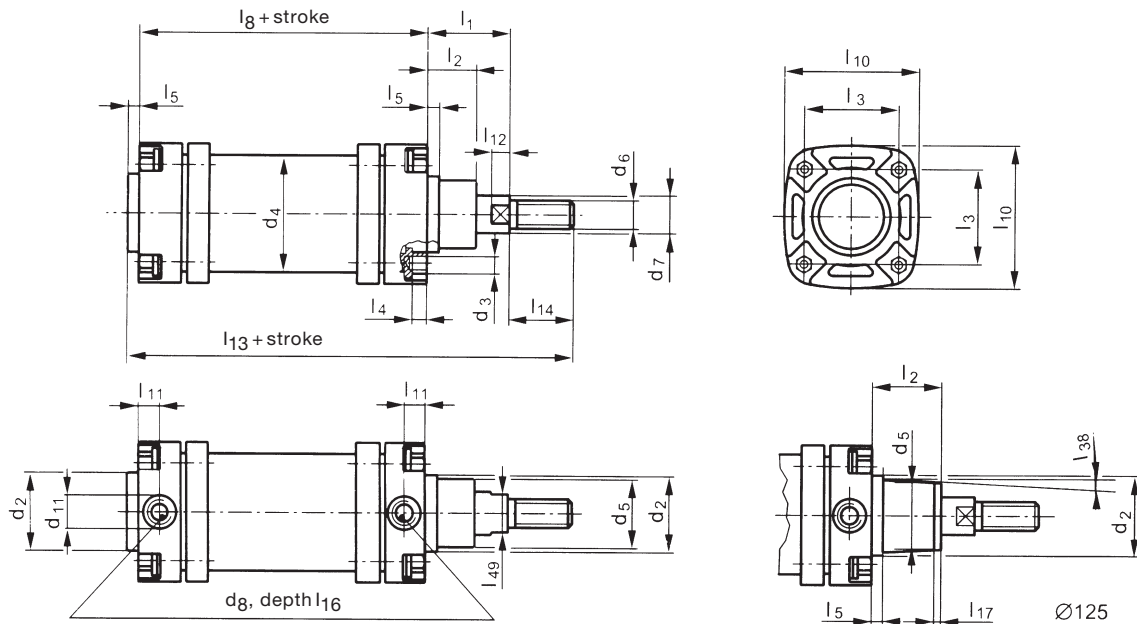
* For DUMJ



Standard cylinder DU_J

Dimensions

DUVJ

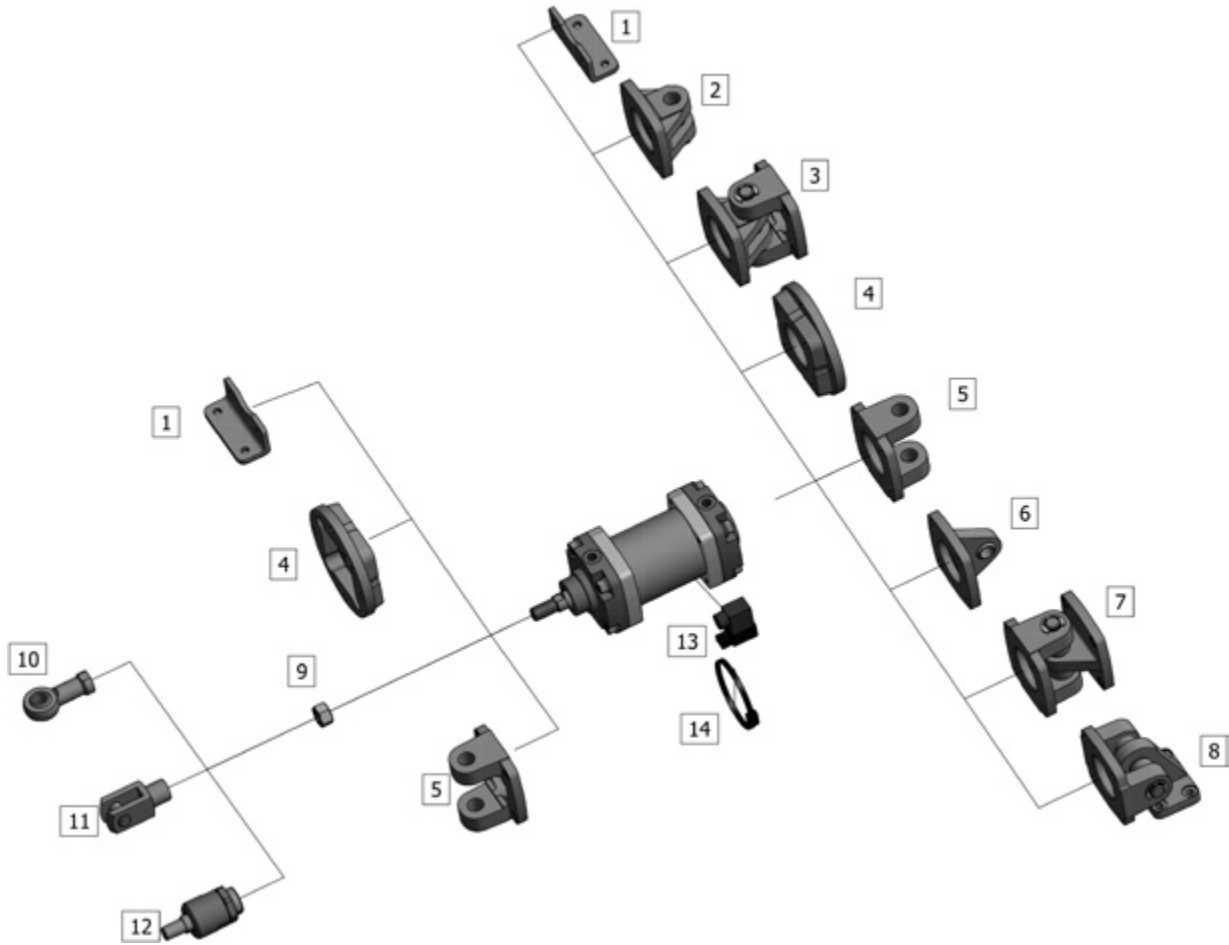


Piston-Ø	l_1	l_2	l_3	l_4	l_5	l_8	l_{10}	l_{11}	l_{12}	l_{13}	l_{14}	l_{16}
40 mm	43	29	44	10	7	72	65	13	8	147	25	15
50 mm	53	36	47	10	7	72	70	13	10	162	30	15
60 mm	53	36	56	10	7	72	80	13	10	162	30	15
80 mm	53	37	72	10	9	78	100	13	10	170	30	15
100 mm	72	52	88	12	10	102	124	19	13	224	40	20
125 mm	104	77	108	12	11	102	152	19	14	267	50	20

Piston-Ø	l_{17}	l_{38}	l_{49}	$d_{2, d_{10}}$	d_3	d_4	d_5	d_6	d_7	d_8	d_{11}
40 mm	–	–	14	42	M6	45	40	M12	16	G1/4	22
50 mm	–	–	17	47	M6	55	45	M16	20	G1/4	22
60 mm	–	–	17	47	M6	67	45	M16	20	G1/4	22
80 mm	–	–	22	55	M8	87	50	M20	25	G1/4	22
100 mm	8	5°	27	70	M10	107	58	M24	30	G1/2	30
125 mm	15	5°	32	85	M10	137	65	M30	35	G1/2	30



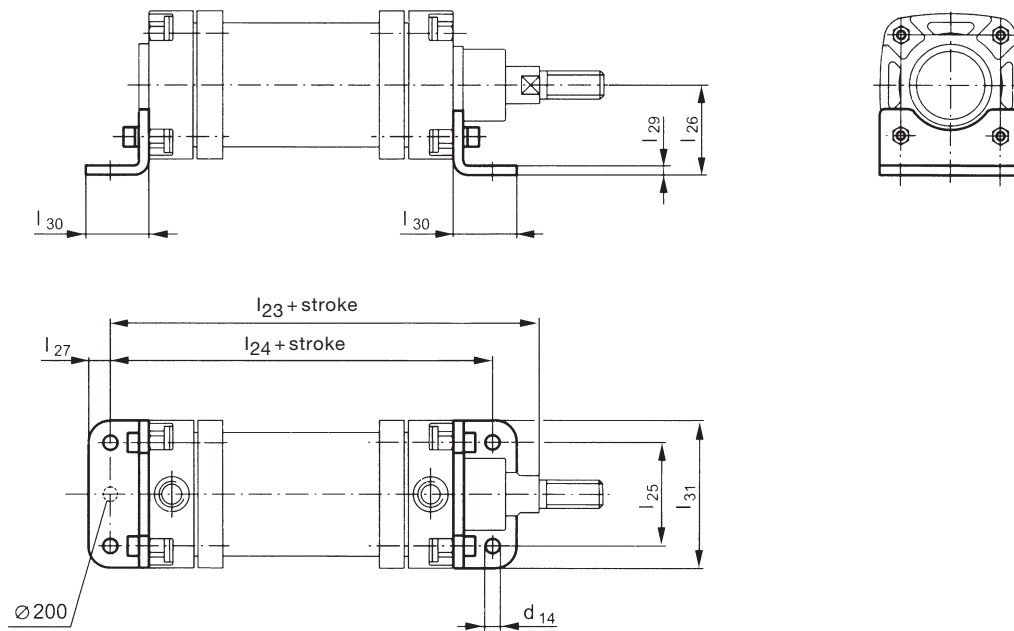
Accessories for standard cylinder DU_J



Pos.	Fixing element	Type	
1	Foot (one pair)	Accessory 11	refer to page 10
2	Female hinge slim	Accessory 21	refer to page 11
3	Female hinge slim with back support	Accessory 23	refer to page 12
4	Flange	Accessory 30/40	refer to page 13
5	Female hinge wide	Accessory 51/61	refer to page 14
6	Clevis flange with spherical bearing	Accessory 81	refer to page 15
7	Female hinge wide with back support	Accessory 83	refer to page 16
8	Female hinge wide with back support 90°	Accessory 85	refer to page 17
9	Fixing nut	DS	refer to catalogue 1 – 1.4.1
10	Universal rod eye for piston rod	GS	refer to catalogue 1 – 1.4.1
11	Rod clevis	GF	refer to catalogue 1 – 1.4.1
12	Flexible joint	FK	refer to catalogue 1 – 1.4.1
13	Proximity switch	ZS-4	refer to page 18
14	Fastener for proximity switch	SP	refer to page 18



Accessory foot – 11



Piston-Ø	l_{23}	l_{23}^*	l_{23}^{**}	l_{24}	l_{24}^{**}	l_{25}	l_{26}	l_{27}	l_{29}	l_{30}	l_{31}	d_{14}	Order number
30 mm	134.0	–	144.0	115	125	36	35.0	8.5	5	30	50	7.0	J 010300011
40 mm	134.0	136.5	144.0	115	125	44	42.5	10.5	6	32	65	7.0	J 010400011
50 mm	136.5	146.5	136.5	115	115	47	45.0	11.5	6	33	70	7.0	J 010500011
60 mm	136.5	146.5	136.5	115	115	56	50.0	12.5	6	34	80	7.0	J 010600011
80 mm	147.0	157.0	157.0	130	130	72	60.0	14.0	6	40	100	9.5	J 010800011
100 mm	177.0	208.0	183.0	170	170	88	75.0	18.0	8	52	124	11.5	J 011000011
125 mm	210.5	237.5	210.5	175	175	108	90.0	21.5	10	58	152	11.5	J 011250011
160 mm	252.0	–	252.0	190	190	140	110.0	23.0	11	65	196	14.0	J 011600011
200 mm	283.0	–	283.0	195	195	200	145.0	23.0	12	65	260	18.0	J 012000011

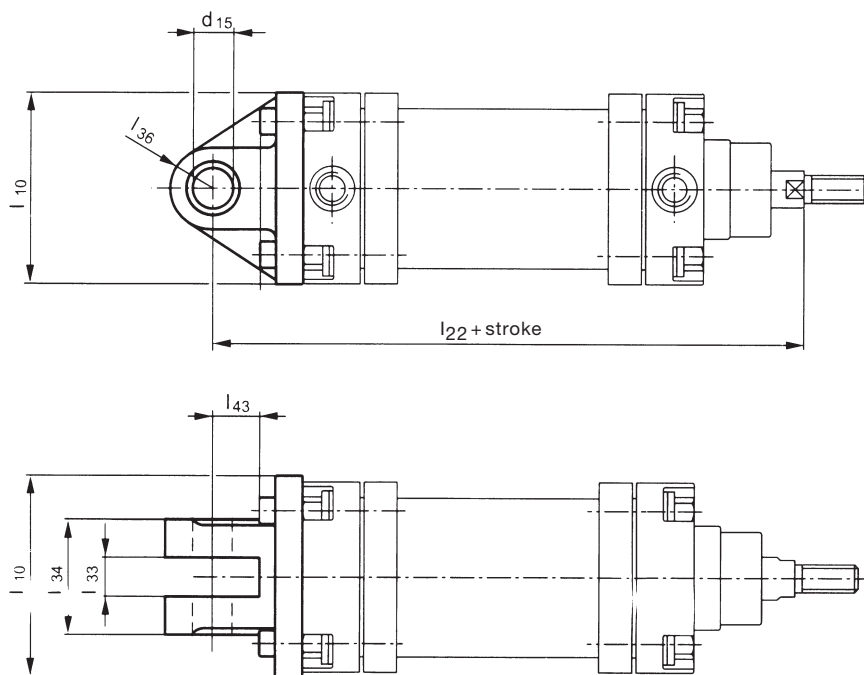
* For DUVJ

** For DUMJ

Delivery: 1 pair



Accessory female hinge slim – 21

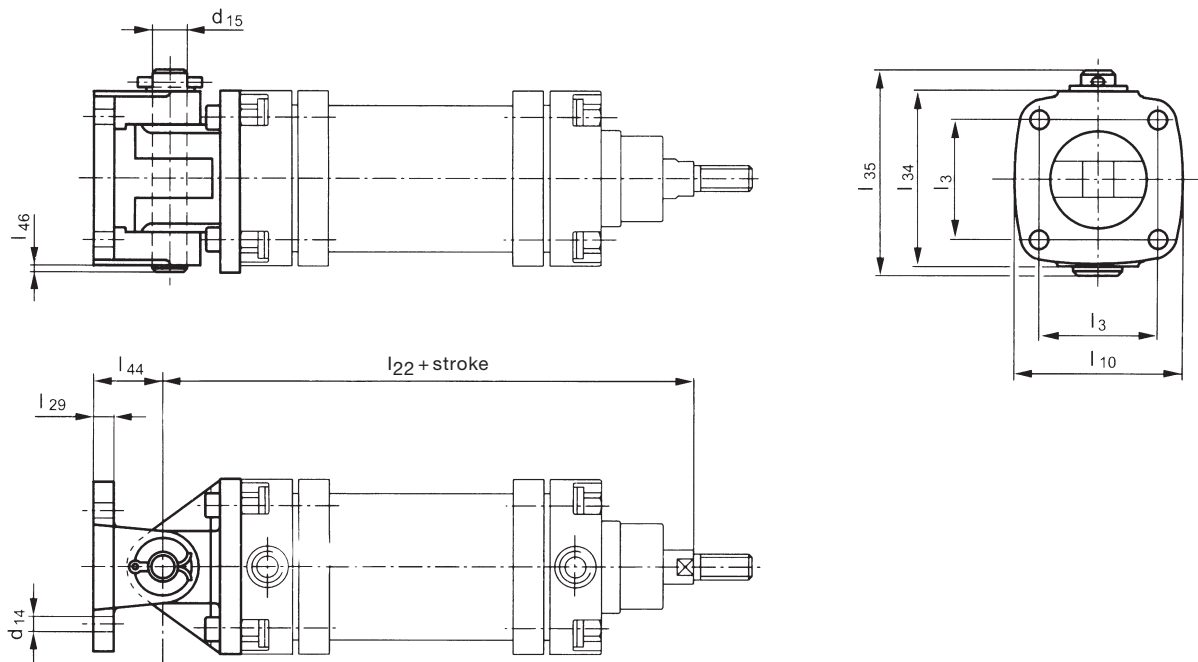


Piston-Ø	l_{10}	l_{22}	l_{22}^*	l_{22}^{**}	l_{33}^{H11}	$l_{34} d_{10}$	l_{36}	l_{43}	d_{15}^{H8}	Order number
30 mm	50	142.5	–	152.5	12	36	15	16	10	J 010300021
40 mm	65	147.5	150	157.5	16	44	16	20	12	J 010400021
50 mm	70	153.0	163	153.0	18	48	18	22	14	J 010500021
60 mm	80	153.0	163	153.0	18	48	18	22	16	J 010600021
80 mm	100	165.0	175	175.0	20	60	20	25	18	J 010800021
100 mm	124	193.0	224	199.0	25	75	25	30	22	J 011000021
125 mm	152	232.0	259	232.0	32	92	30	35	25	J 011250021
160 mm	196	278.0	–	278.0	40	120	38	43	30	J 011600021
200 mm	Ø260	316.0	–	316.0	50	155	45	50	35	J 012000021

* For DUVJ
** For DUMJ



Accessory female hinge slim with back support – 23



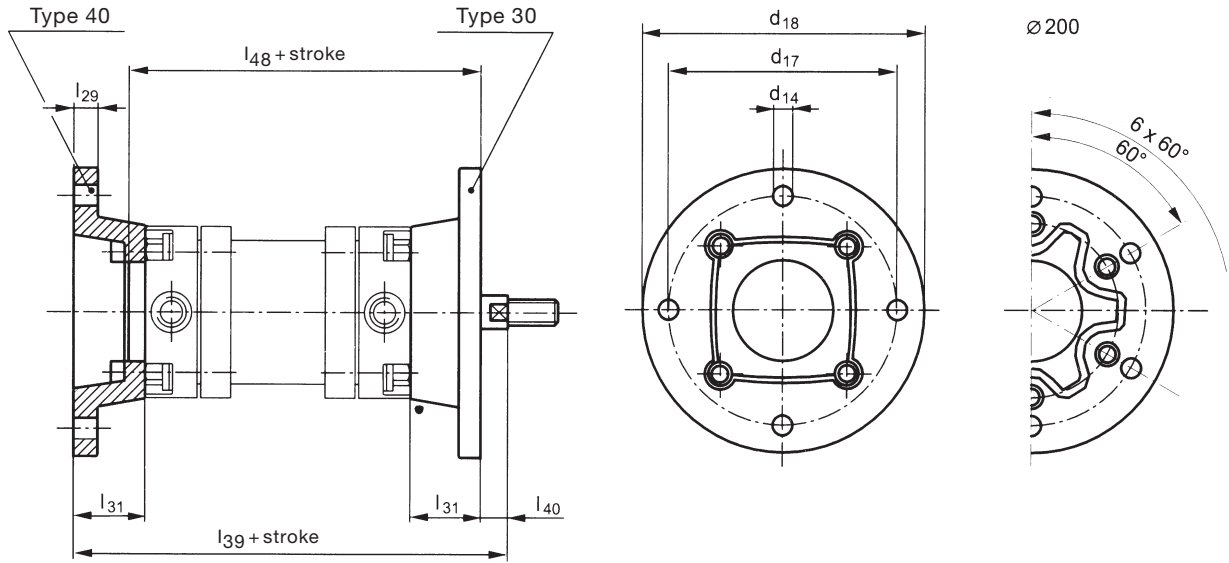
Piston-Ø	l_3	l_{10}	l_{22}	l_{22}^*	l_{22}^{**}	l_{29}	l_{34}	l_{35}	l_{44}	l_{46}	d_{14}	d_{15}	Order number
30 mm	36	50	142.5	–	152.5	10	56	67	30	2	7.0	10	J 010300023
40 mm	44	65	147.5	150	157.5	10	70	83	35	3	7.0	12	J 010400023
50 mm	47	70	153.0	163	153.0	10	74	88	38	3	7.0	14	J 010500023
60 mm	56	80	153.0	163	153.0	10	84	98	38	3	7.0	16	J 010600023
80 mm	72	100	165.0	175	175.0	12	104	118	44	3	9.0	18	J 010800023
100 mm	88	124	193.0	224	199.0	17	128	144	50	4	11.5	22	J 011000023
125 mm	108	152	232.0	259	232.0	20	156	175	58	5	11.5	25	J 011250023
160 mm	140	196	278.0	–	278.0	22	200	225	68	5	14.0	30	J 011600023
200 mm	Ø230	Ø260	316.0	–	316.0	22	260 _{-0.4}	286	75	6	14.0	35	J 012000023

* For DUVJ
** For DUMJ



Accessories for standard cylinder DU_J

Accessory flange – 30/40



Head side assemblage = 30
Cap side assemblage = 40

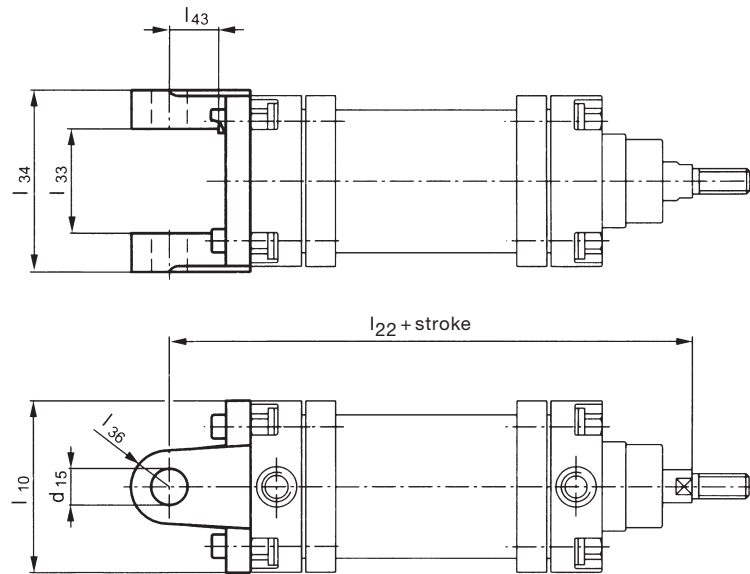
Piston-Ø	l_{29}	l_{31}	l_{39}	l_{39}^*	l_{39}^{**}	l_{40}	l_{40}^*	l_{48}	l_{48}^{**}	d_{14}	d_{17}	d_{18}	Order number
30 mm	10	16	128.5	–	138.5	24.5	–	95	105	7.0	70	86	J 010300030
40 mm	10	32	144.5	147	154.5	8.5	11	111	121	9.0	90	115	J 010400030
50 mm	10	32	147.0	157	147.0	11.0	21	111	111	9.0	95	120	J 010500030
60 mm	10	32	147.0	157	147.0	11.0	21	111	111	9.0	105	130	J 010600030
80 mm	12	29	150.0	160	160.0	14.0	24	116	126	9.0	120	140	J 010800030
100 mm	12	32	175.0	206	181.0	9.0	40	144	150	11.5	150	175	J 011000030
125 mm	14	55	229.0	256	229.0	17.0	44	168	168	14.0	190	220	J 011250030
160 mm	20	85	295.0	–	295.0	19.0	–	203	203	18.0	235	275	J 011600030
200 mm	22	36	277.0	–	277.0	94.0	–	161	161	18.0	300	340	J 012000030

* For DUVJ
** For DUMJ

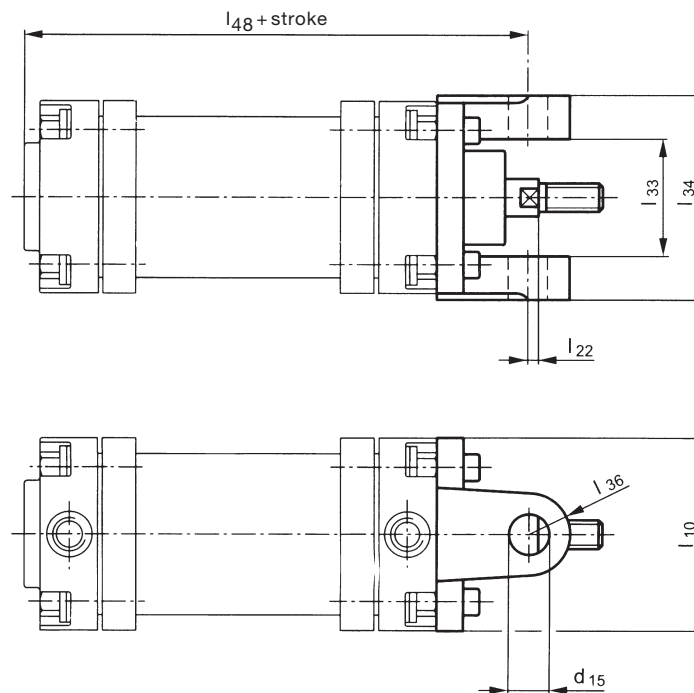


Accessory female hinge wide – 51/61

Cap side assemblage = 51



Head side assemblage = 61

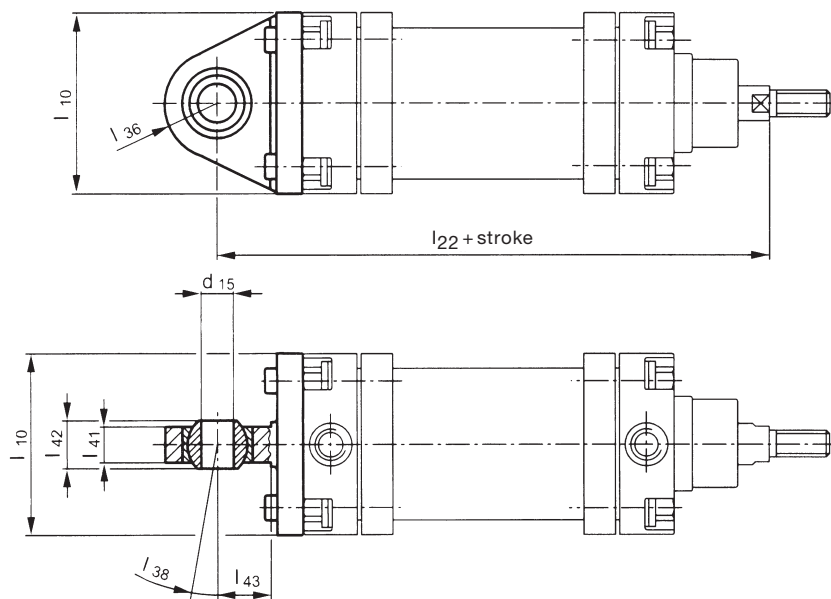


Piston-Ø	l_{10}	l_{22}	l_{22}^*	l_{22}^{**}	l_{33}^{H11}	$l_{34} d_{10}$	l_{36}	l_{43}	d_{15}^{H8}	Order number
30 mm	50	142.5	–	152.5	36	56	15	16	10	J 010300051
40 mm	65	147.5	150	157.5	44	70	16	20	12	J 010400051
50 mm	70	153.0	163	153.0	48	74	18	22	14	J 010500051
60 mm	80	153.0	163	153.0	48	84	18	22	16	J 010600051
80 mm	100	165.0	175	175.0	60	104	20	25	18	J 010800051
100 mm	124	193.0	224	199.0	75	128	25	30	22	J 011000051
125 mm	152	232.0	259	232.0	92	156	30	35	25	J 011250051
160 mm	196	278.0	–	278.0	120	200	38	43	30	J 011600051
200 mm	Ø260	316.0	–	316.0	155	260 _{-0.4}	45	50	35	J 012000051

* For DUVJ
** For DUMJ



Accessory clevis flange with spherical bearing – 81



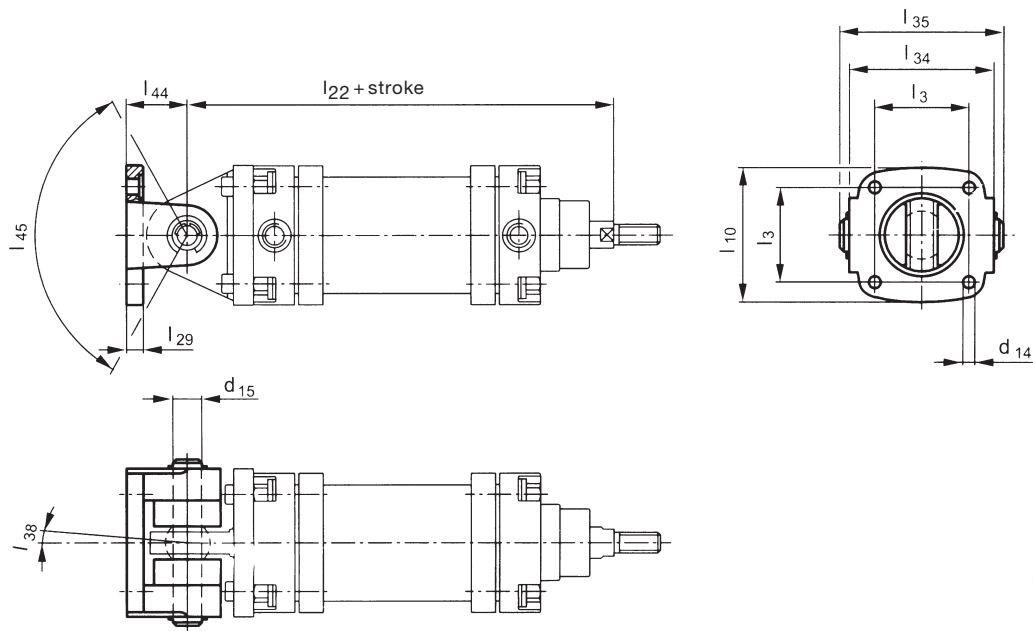
Piston-Ø	l_{10}	l_{22}	l_{22}^*	l_{22}^{**}	l_{36}	l_{36}	l_{41}	$l_{42\pm 0.1}$	l_{43}	d_{15}^{H7}	Order number
30 mm	50	142.5	–	152.5	18	13°	10.5	14	17	10	J 010300081
40 mm	65	147.5	150	157.5	21	13°	12.0	16	20	12	J 010400081
50 mm	70	153.0	163	153.0	23	15°	13.5	19	23	14	J 010500081
60 mm	80	153.0	163	153.0	25	15°	15.0	21	23	16	J 010600081
80 mm	100	165.0	175	175.0	28	15°	16.5	23	26	18	J 010800081
100 mm	124	193.0	224	199.0	31	15°	20.0	28	29	22	J 011000081
125 mm	152	232.0	259	232.0	35	15°	22.0	31	39	25	J 011250081

* For DUWJ

** For DUMJ



Accessory female hinge wide with back support – 83



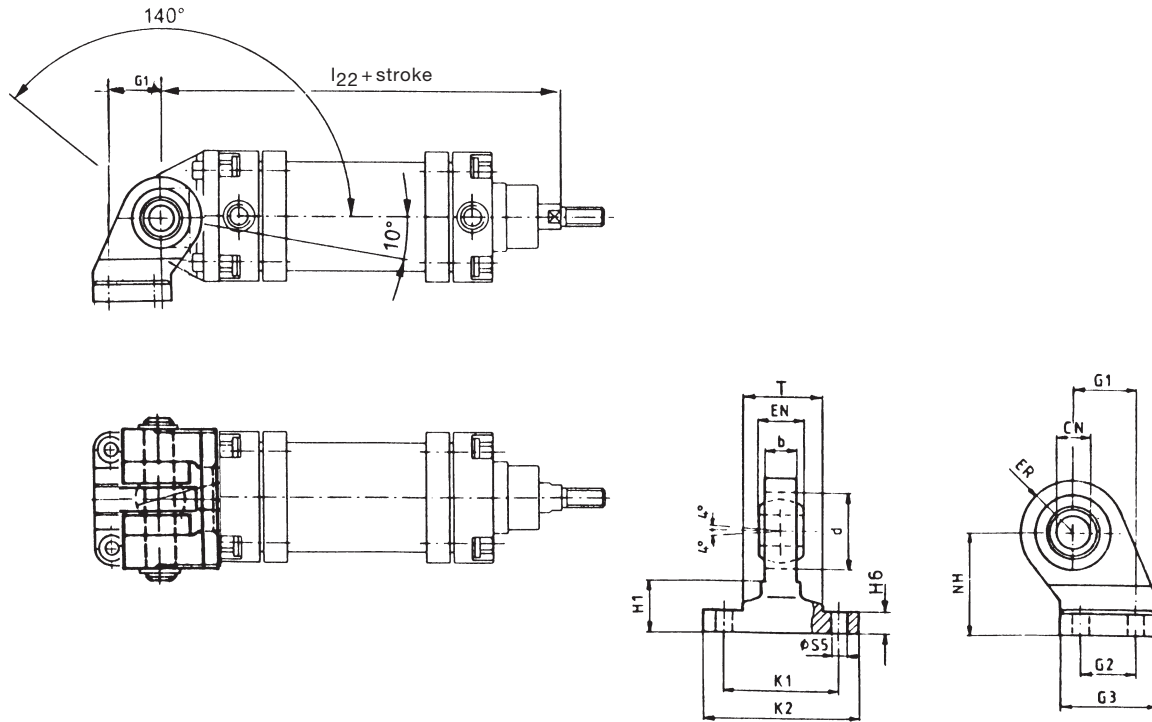
Piston-Ø	l_3	l_{10}	l_{22}	l_{22}^*	l_{22}^{**}	l_{29}	l_{34}	l_{35}	l_{38}	l_{44}	l_{45}	d_{14}	d_{15}^{H7}	Order number
30 mm	36	50	142.5	0	152.5	10	56	64	7°	30	110°	7.0	10	J 010300083
40 mm	44	65	147.5	150	157.5	10	70	78	7°	35	130°	7.0	12	J 010400083
50 mm	47	70	153.0	163	153.0	10	74	84	8°	38	130°	7.0	14	J 010500083
60 mm	56	80	153.0	163	153.0	10	84	94	9°	38	120°	7.0	16	J 010600083
80 mm	72	100	165.0	175	175.0	12	104	114	9°	44	110°	9.0	18	J 010800083
100 mm	88	124	193.0	224	199.0	17	128	140	9°	50	90°	11.5	22	J 011000083

* For DUVJ

** For DUMJ



Accessory female hinge wide with back support 90° – 85



Piston-Ø	l_{22}	l_{22}^*	l_{22}^{**}	EN	b	CN ^{H7}	d	G1 ^{Js14}	G2 ^{Js14}	G3 _{max.}	NH ^{Js15}	H6	K1 ^{Js14}	K2 _{max.}	ER _{max.}	S5 ^{H13}	T	Order number
30 mm	142.5	-	152.5	14	10.5	10	22	21	18	31	32	10	38	51	16	5.5	24	J 010300085
40 mm	147.5	150	157.5	16	12.0	12	26	24	22	35	36	10	41	54	18	5.5	27	J 010400085
50 mm	153.0	163	153.0	21	15.0	16	32	33	30	45	45	12	50	65	21	6.6	31	J 010500085
60 mm	153.0	163	153.0	21	15.0	16	32	37	35	50	50	12	52	67	23	6.6	33	J 010600085
80 mm	165.0	175	175.0	25	18.0	20	40	47	40	60	63	14	66	86	28	9.0	42	J 010800085
100 mm	193.0	224	199.0	25	18.0	20	40	55	50	70	71	15	76	96	30	9.0	52	J 011000085

* For DUVJ

** For DUMJ

Spare-part kits

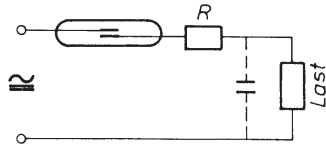
Order information / numbers

Piston-Ø	30 mm	40 mm	50 mm	60 mm	80 mm	100 mm	125 mm	160 mm	200 mm
Type									
DUJ, DUMJ	J 060300010	J 060400010	J 060500001	J 060600001	J 060800001	J 061000001	J 061250001	J 061600000	J 062000000
DUVJ	-	J 060400015	J 060500006	J 060600006	J 060800006	J 061000006	J 061250006	-	-
DUDJ	J 060300012	J 060400012	J 060500003	J 060600003	J 060800003	J 061000003	J 061250003	J 061600002	J 062000002

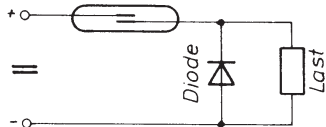


Accessory proximity switch for DUMJ-__

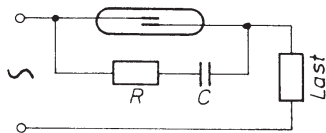
ZS-4 for DUMJ



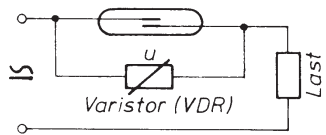
Capacitive load



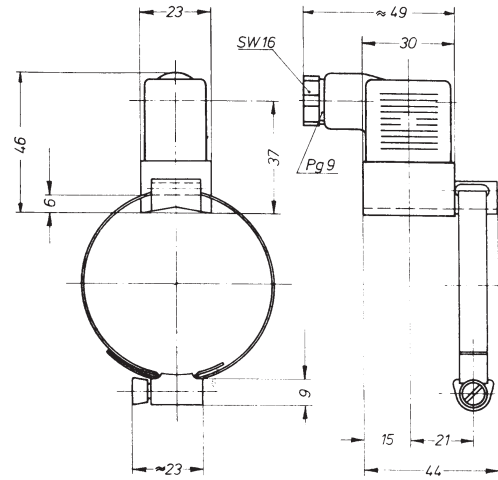
Inductive load
(DC)



Inductive load



Protection for
proximity switch



Fastener type SP__ (please add 2 digits for piston-Ø), to be ordered separately.

Example: For DUMJ-30 order an SP 030

Technical characteristics

Type	ZS-4
Switch on/off	1 ms / 1 ms
Temperature range	-20 °C ... +60 °C
Mounting position	any
Voltage	max. 220V
Power	max. 30 W / 25 VA
Current	max. 1 Amp.
Protection	IP 65



2/2-, 3/2-way valves G 1/8" W_J-01/-03

Manually and mechanically actuated valves

Technical characteristics

General characteristics	
Design	spool valve
Port size	G 1/8"
Fixing	through fixing holes
Mounting position	any
Temperature range	-20 °C ... +80 °C
Weight	0.086 ... 0.230 kg
Pneumatic characteristics	
Medium	Compressed air, filtered max. 50 µm
Operating pressure	0 ... 10 bar
Flow Q _n *, **)	P to A 6,8 l/s A to R 6,9 l/s



*) For details refer to page 3-20

**) Pressure-supply: 6 bar, differential pressure: 1 bar.

Types

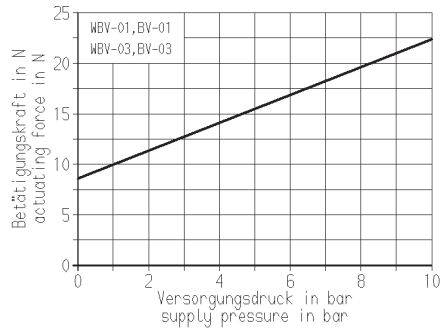
Symbol	Type	Symbol	Type	Weight
	WBJ-01		WBJ-03	0.086 kg
	WAJ-01		WAJ-03	0.094 kg
	WEJ-01		WEJ-03	0.124 kg
	WTJ-01		WTJ-03	0.122 kg
	WHEJ-01		WHEJ-03	0.230 kg
	WRJ-01		WRJ-03	0.114 kg



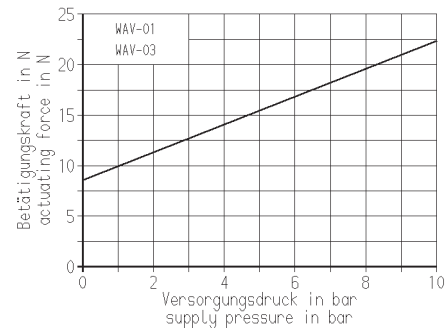
2/2-, 3/2-way valves G 1/8" W_J-01/-03

Relationship of operating pressure and actuating force

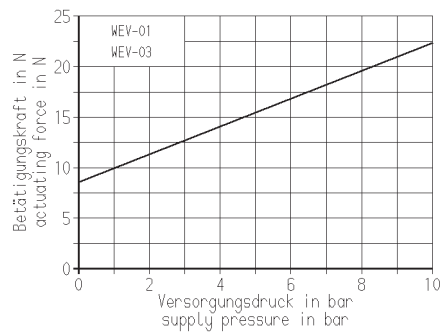
WBJ-01 / WBJ-03



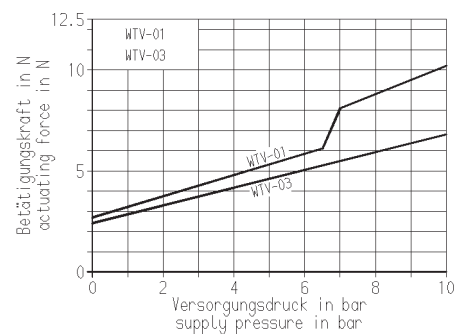
WAJ-01 / WAJ-03



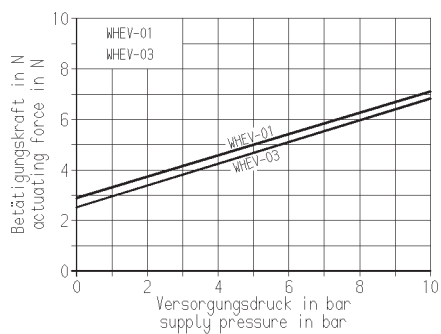
WEJ-01 / WEJ-03



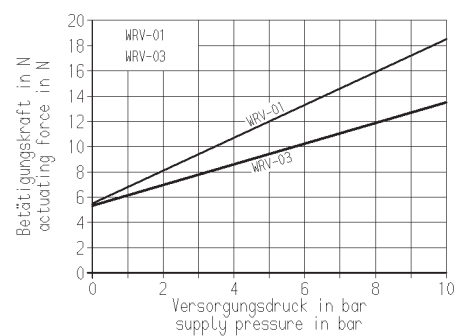
WTJ-01 / WTJ-03



WHEJ-01 / WHEJ-03

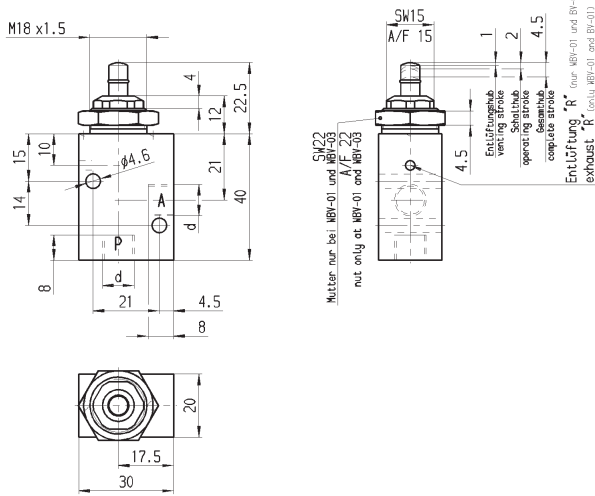


WRJ-01 / WRJ-03

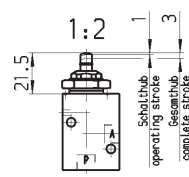


2/2-, 3/2-way valves G 1/8" W_J-01/-03

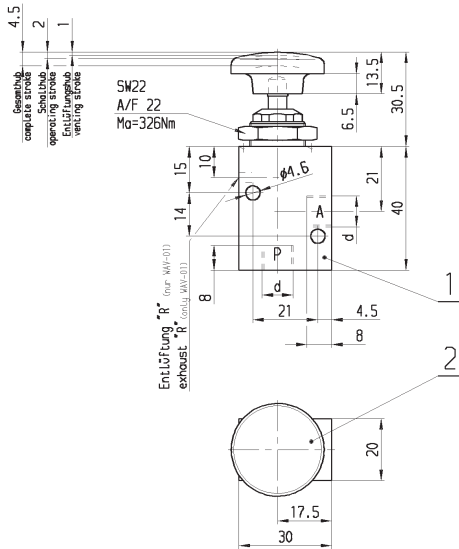
WBJ-01



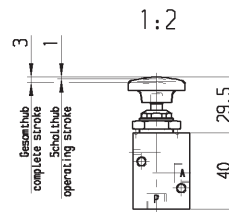
WBJ-03



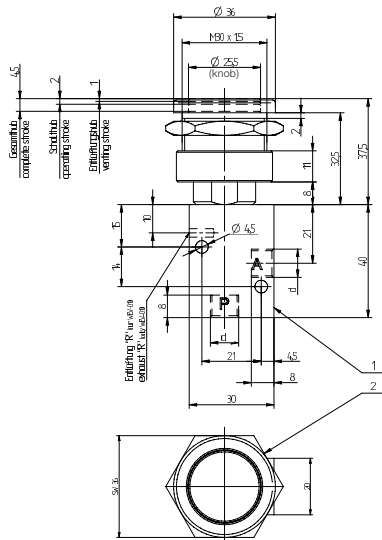
WAJ-01



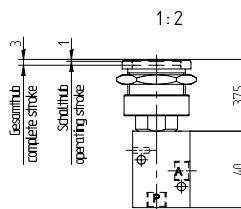
WAJ-03



WEJ-01

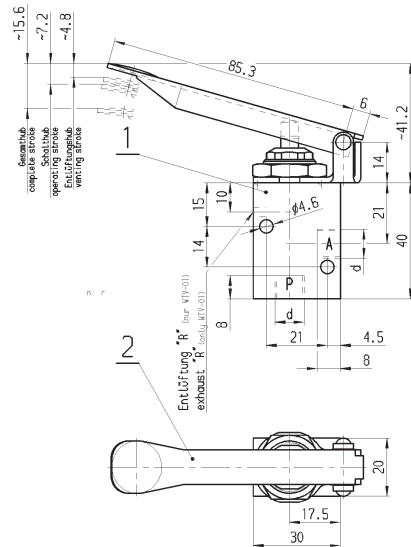


WEJ-03

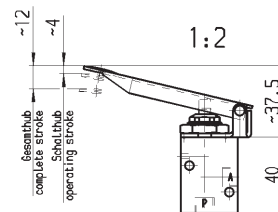


2/2-, 3/2-way valves G 1/8" W_J-01/-03

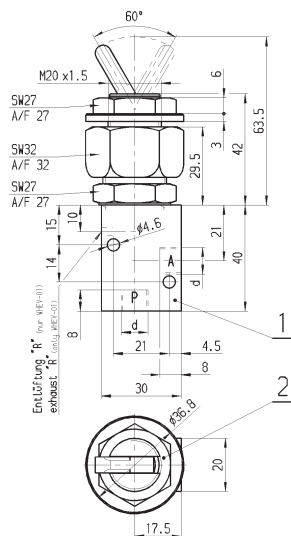
WTJ-01



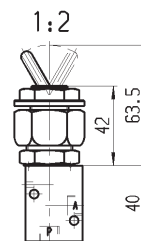
WTJ-03



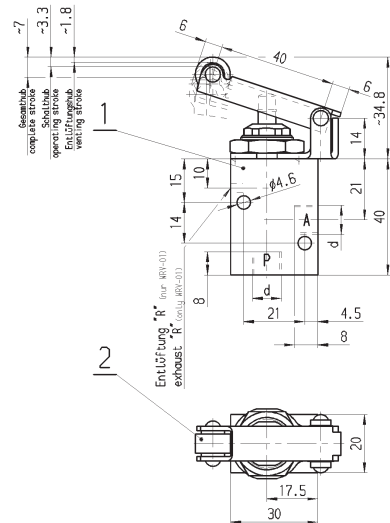
WHEJ-01



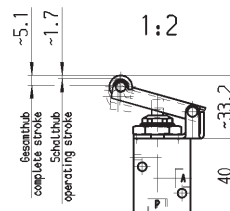
WHEJ-03



WRJ-01



WRJ-03



3/2-, 5/2, 5/3-way valves G 1/4"

WBJ/WHJ/WTJ/WRJ/WRLJ

Manually and mechanically actuated valves

Technical characteristics

General characteristics	
Design	popped valve, non-overlapping
Port size	G 1/4"
Fixing	through fixing holes
Mounting position	any
Temperature range	-25 °C ... +80 °C
Weight	0.280 ... 2.800 kg
Pneumatic characteristics	
Medium	Compressed air filtered max. 50 µm
Operating pressure	0 ... 10 bar
K _v value *, **)	6 ... 11.5 l/min. water
Flow Q _n *, **)	6.5 ... 12.4 l/sec.

*) For details refer to page 3-24

**) Pressure-supply: 6 bar, differential pressure: 1 bar.



Order information please refer to next pages.

Accessories

To convert a 3/2-way into a 2/2-way valve take-out the silencer from port R and replace it by a plug with seal-ring.

Accessories

Type	Order number
Seal 17 x 2.5 mm	E160000035
Plug	E210300002

Spare parts

Type	For	Order number
Spare-part kit	WBJ-1	J 061040000
Spare-part kit	WBJ-2	J 061040000
Spare-part kit	WBJ-5	J 061040001
Spare-part kit	WBJ-6	J 061040001
Dust protection cap		E210090000



3/2-, 5/2, 5/3-way valves G 1/4"

WBJ/WHJ/WTJ/WRJ/WRLJ

Types / Technical specifications

Symbol	Type	K_v [l/min.] water		Q_n [l/sec.]		Wight
	WBJ-1 WBJ-1s*) WBJ-1v**)	P to A P to R	8.2 8	P to A A to R	8.8 8.6	0.28 kg
	WBJ-2 WBJ-2s*) WBJ-2v**)	P to A A to R	8.1 11.5	P to A A to R	8.7 12.4	0.28 kg
	WHJ-1	P to A A to R	8.2 8	P to A A to R	8.8 8.6	0.44 kg
	WBJ-6 WBJ-6s*)	P to A P to B A to R B to S	8.2 8.2 8 8	P to A P to B A to R B to S	8.8 8.8 8.6 8.6	0.55 kg
	WHJ-6	P to A P to B A to R B to S	8.2 8.2 8 8	P to A P to B A to R B to S	8.8 8.8 8.6 8.6	0.85 kg
	WTJ-1 WTJ-1s*)	P to A A to R	8.2 8	P to A P to B	8.8 8.6	0.43 kg
	WTJ-2 WTJ-2s*)	P to A A to R	8.2 8	P to A A to R	8.8 8.6	0.43 kg
	WRJ-1 WRJ-1s*)	P to A A to R	8.2 8	P to A A to R	8.8 8.6	0.37 kg
	WRJ-2 WRJ-2s*)	P to A A to R	8.2 8	P to A A to R	8.7 12.4	0.37 kg
	WRLJ-1 WRLJ-1s*)	P to A A to R	8.2 8	P to A A to R	8.8 8.6	0.39 kg
	WRLJ-2 WRLJ-2s*)	P to A P to A	8.1 11.5	P to A P to A	8.7 12.4	0.39 kg
	WBJ-5 WBJ-5s*)	P to A P to B A to R B to S	6 8.1 9 8.1	P to A P to B A to R B to S	6.5 8.7 9.7 8.7	0.55 kg
	WHJ-5	P to A P to B A to R	6 8.1 9	P to A P to B A to R	6.5 8.7 9.7	0.85 kg

*) Dust protected

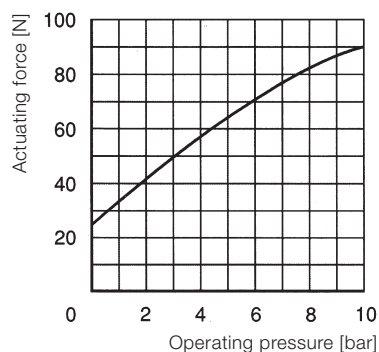
**) For vacuum



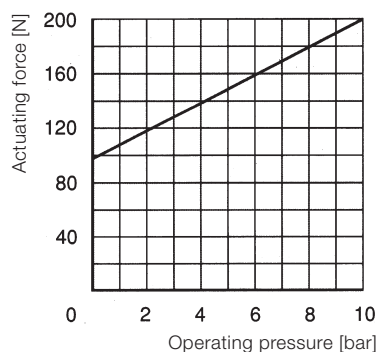
3/2-, 5/2, 5/3-way valves G 1/4" WBJ/WHJ/WTJ/WRJ/WRLJ

Relationship of operating pressure and actuating force

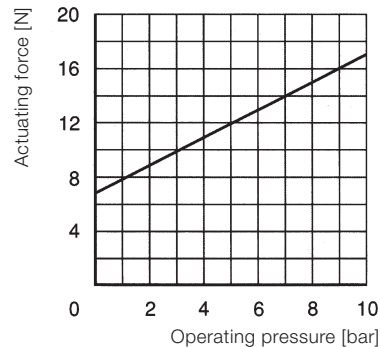
WBJ-1



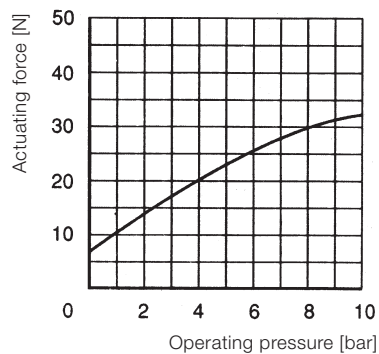
WBJ-2



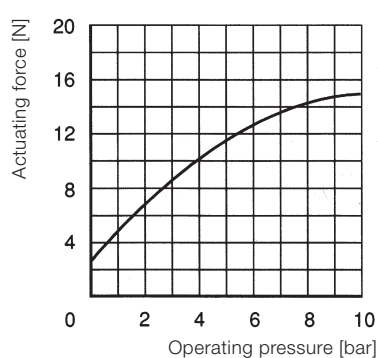
WHJ-1



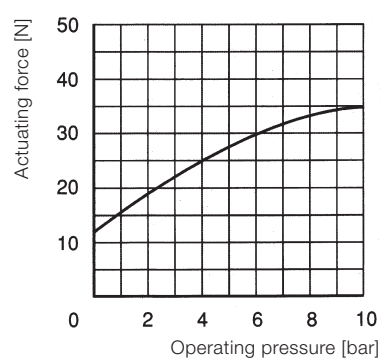
WRJ-1 / WRLJ-1



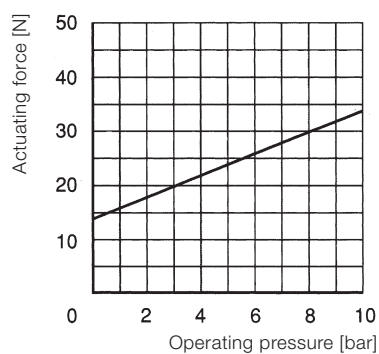
WTJ-1



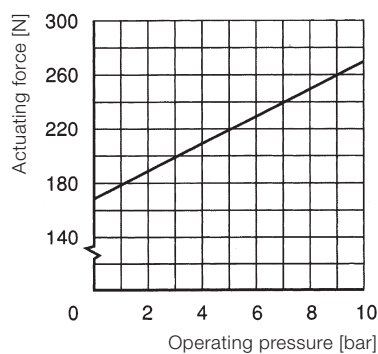
WTJ-2



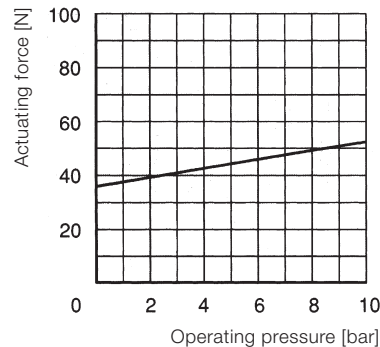
WHJ-6



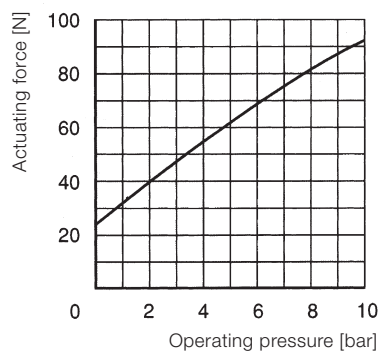
WBJ-5



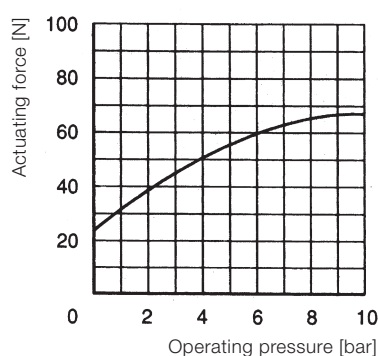
WHJ-5



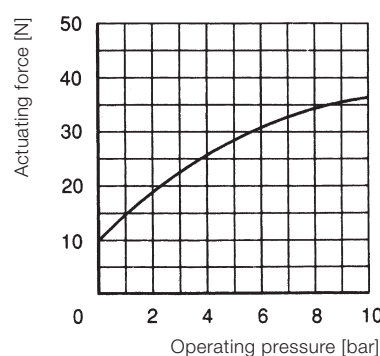
WBJ-6



WRJ-2 / WRLJ-2



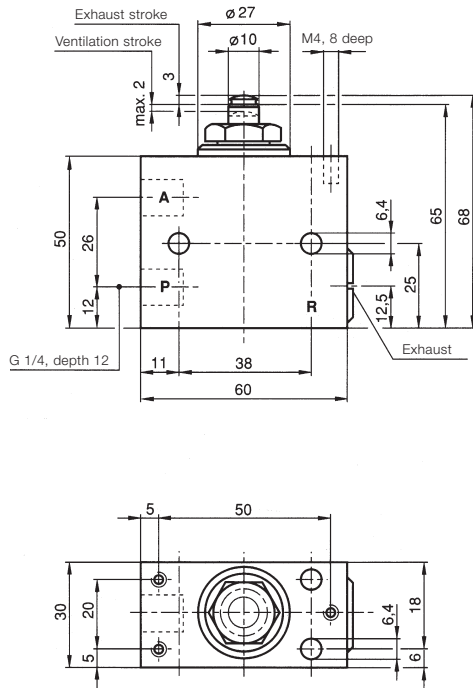
WGJ-6



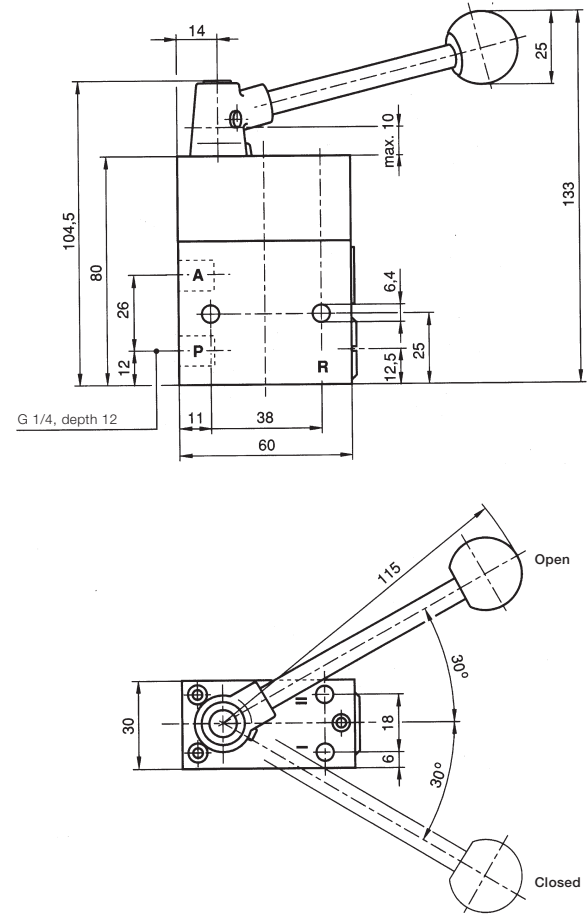
3/2-, 5/2, 5/3-way valves G 1/4" WBJ/WHJ/WTJ/WRJ/WRLJ

Dimensions [mm]

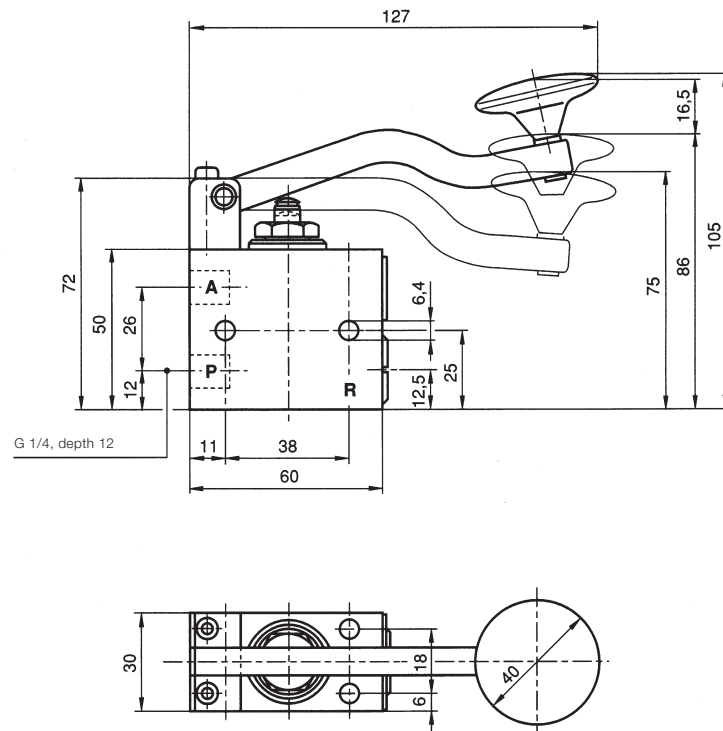
WBJ-1 WBJ-2



WHJ-1



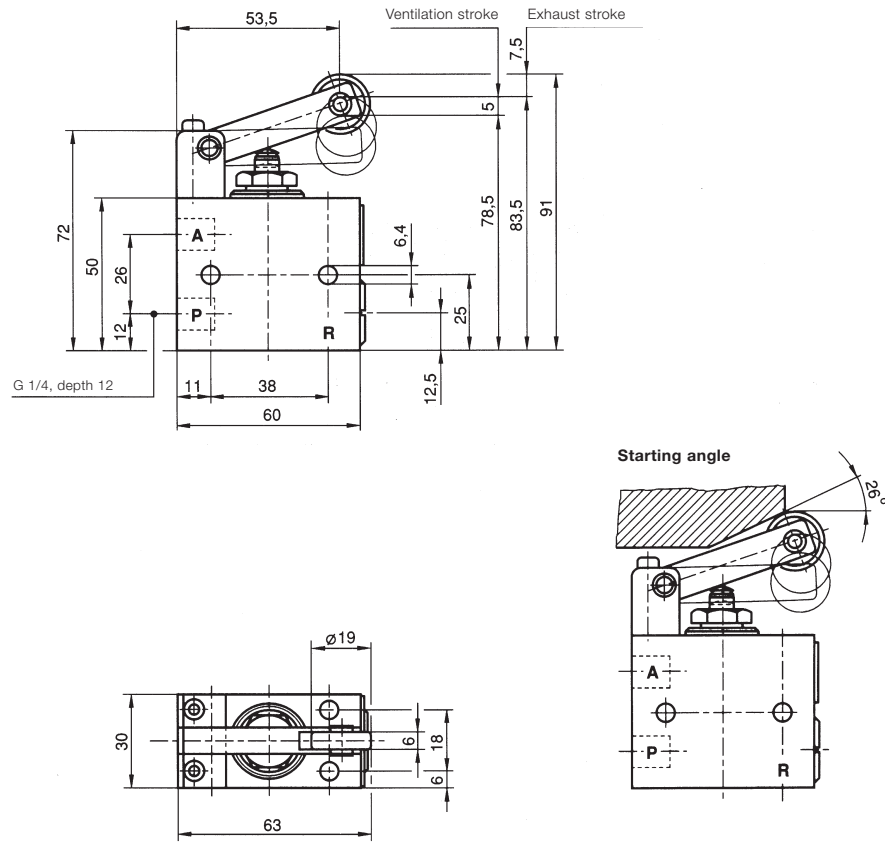
WTJ-1 WTJ-2



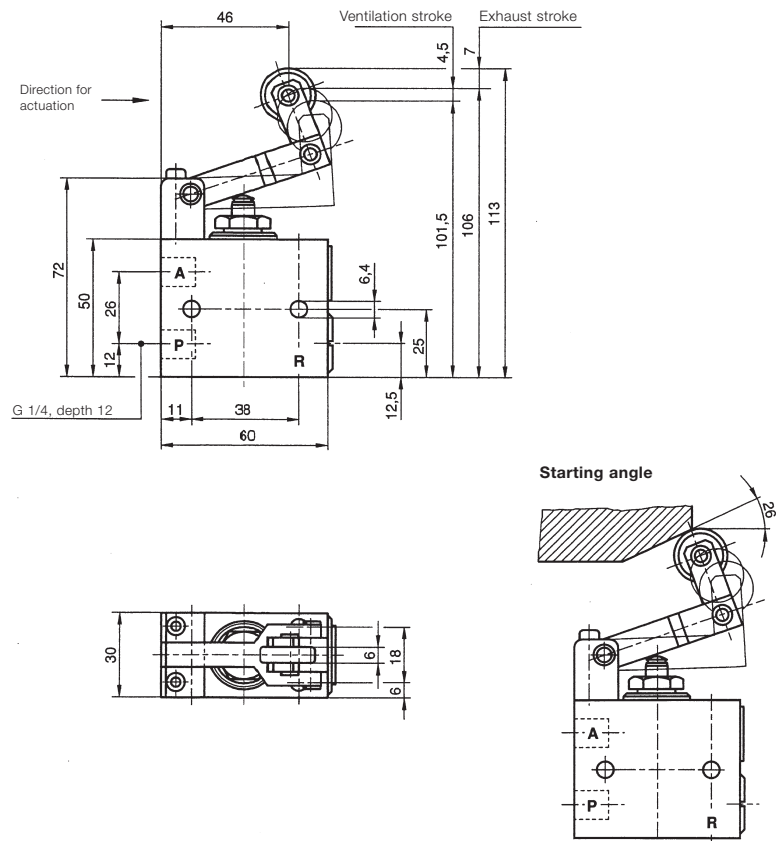
3/2-, 5/2, 5/3-way valves G 1/4" WBJ/WHJ/WTJ/WRJ/WRLJ

Dimensions [mm]

WRJ-1 WRJ-2



WRLJ-1 WRLJ-2

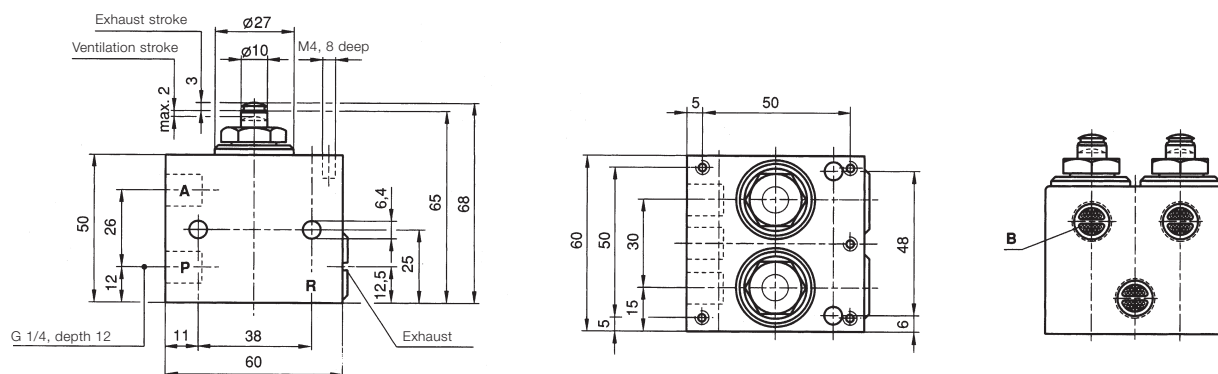


3/2-, 5/2, 5/3-way valves G 1/4"

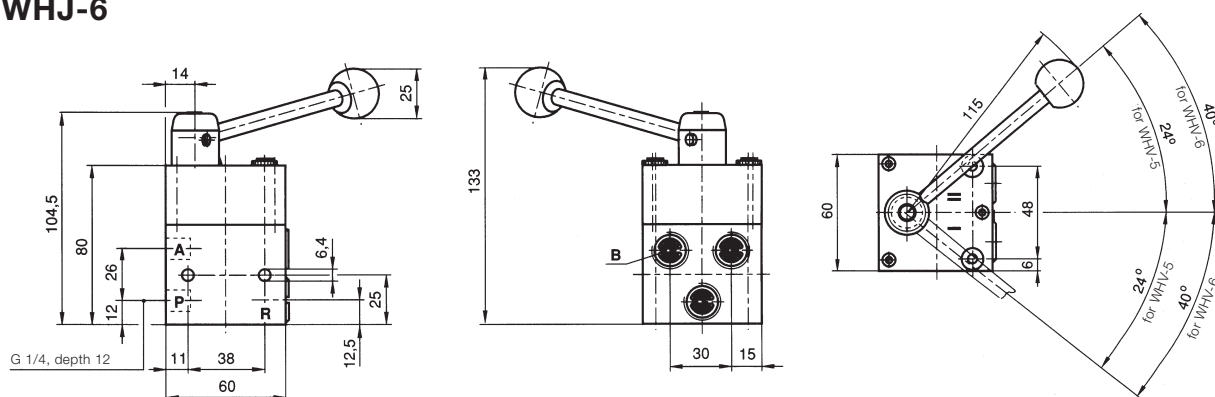
WBJ/WHJ/WTJ/WRJ/WRLJ

Dimensions [mm]

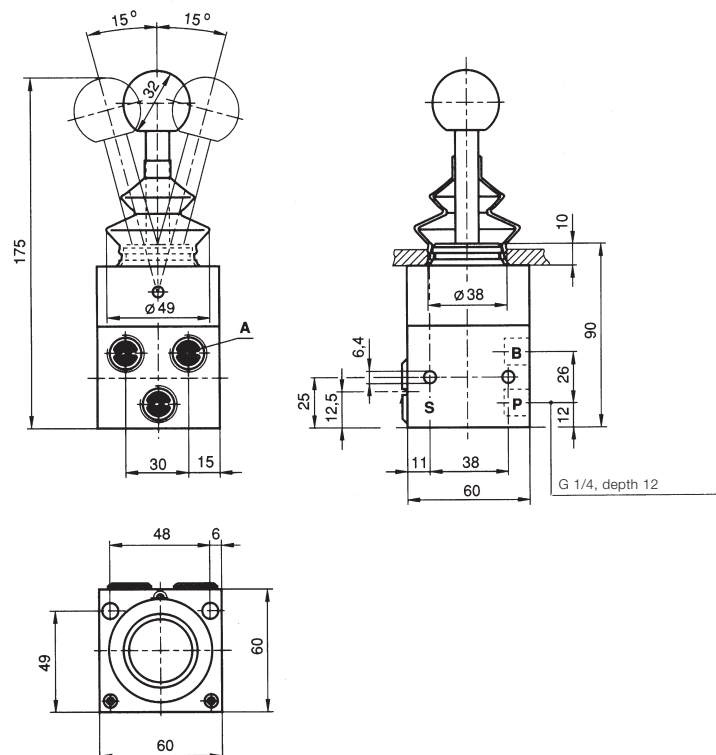
WBJ-5 WBJ-6



WHJ-5 WHJ-6



WGJ-6



3/2-, 5/2-way valves G 1/4" WKJ

Pneumatically actuated

Technical characteristics

General characteristics	
Design	popped valve, non-overlapping
Port size	G 1/4", pilot port G 1/8"
Fixing	through fixing holes
Mounting position	any
Temperature range	-20 °C ... +80 °C
Weight	0.4 kg
Switching time	On: 0.03 s Off: 0.07 s
Materials	Body: aluminum anodized Seals: NBR
Pneumatic characteristics	
Medium	Compressed air, filtered max. 50 µm
Pilot pressure	1.6 ... 10 bar
Operating pressure	0 ... 10 bar
K _v value *)	8.1 ... 11.5 l/min. water
Flow Q _n *)	8.6 ... 12.4 l/sec.

*) Pressure-supply: 6 bar, differential pressure: 1 bar.

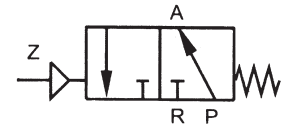
WKJ-1
WKJ-2
WKJ-5/1



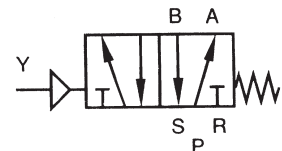
WKJ-1



WKJ-2



WKJ-5/1



Accessories

To convert a 3/2-way into a 2/2-way valve take-out the silencer from port R and replace it by a plug with seal-ring.

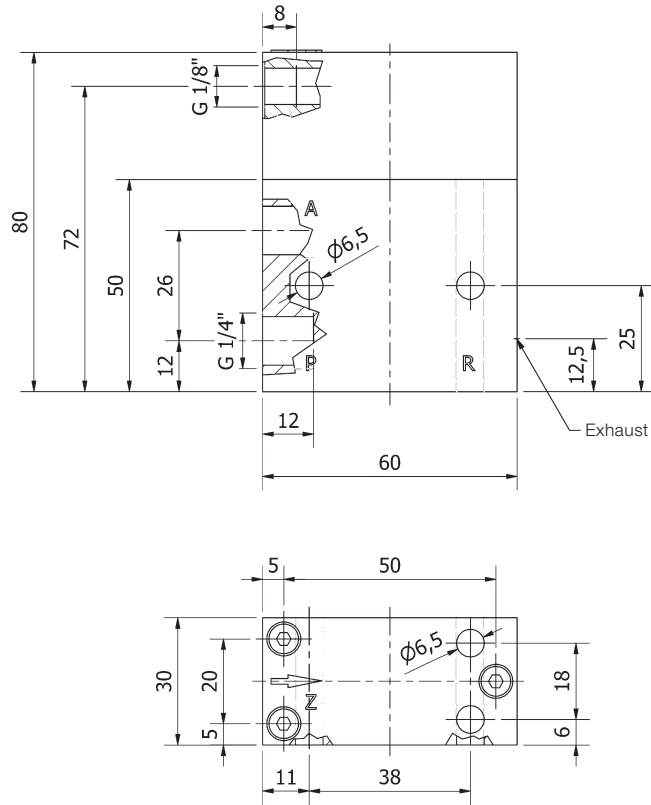
Accessories

Type	Order number
Seal 17 x 2.5 mm	E160000035
Plug	E210300002

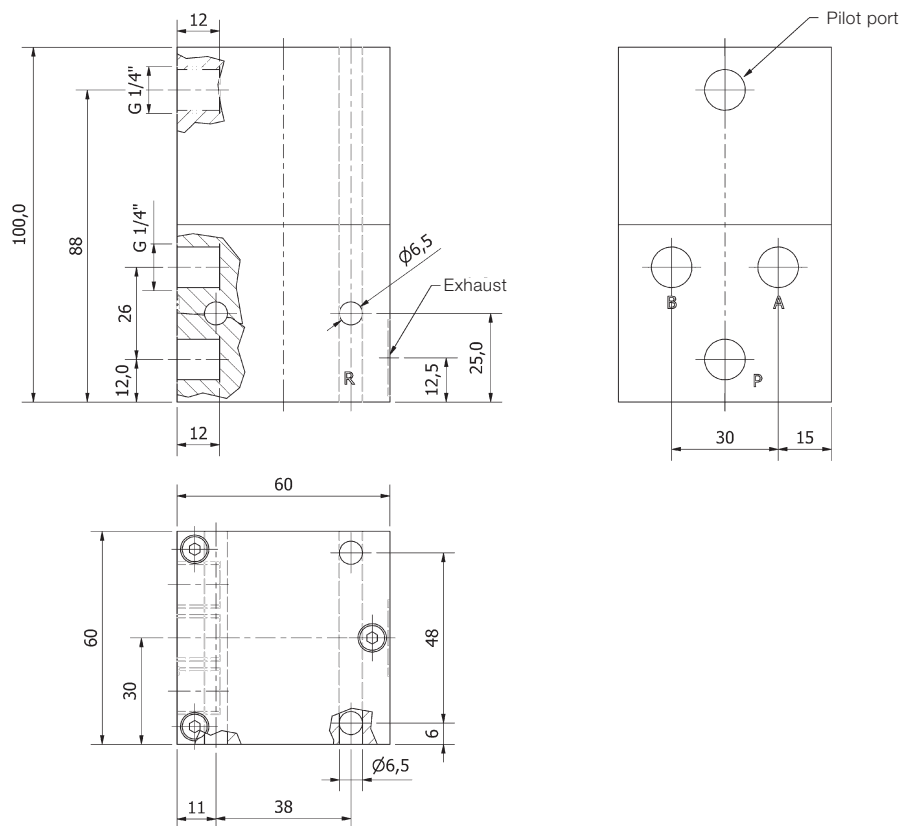


3/2-, 5/2-way valves G 1/4" WKJ

WKJ-1
WKJ-2



WKJ-5/1

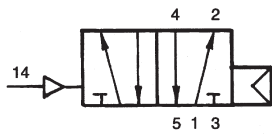


Any mounting position possible.

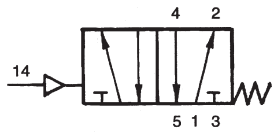


5/2-, 5/3-way valves SKVG/SIVG

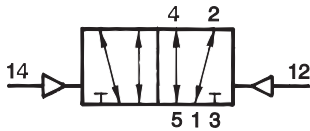
Pneumatically actuated



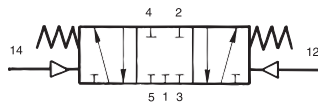
SKVG-510
5/2-way air spring



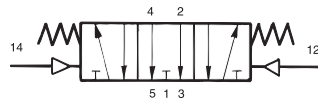
SKVG-511
5/2-way mech. spring



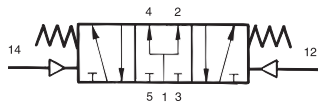
SIVG-520
5/2-way double pilot



SIVG-531
5/3-way, centre closed



SIVG-532
5/3-way,
centre exhausted



SIVG-533
5/3-way,
centre pressurized



Design
Spool valve.

Technical characteristics

Type	SKVG-510	SKVG-511	SIVG-520	SIVG-53*
Medium	Filtered compressed air, lubricated or unlubricated			
Port size	Ø 7 mm – G 1/4" in mounting plate			
Orifice size	7 mm			
Air-flow	1250 l/min.			
Operating pressure	2 ... 10 bar			
Actuating pressure	= Operating pressure	3 ... 10 bar	2.5 ... 10 bar	3 ... 10 bar
Temperature range	-10 °C ... +60 °C			
Materials	Body: Al anodized, Inner parts: brass and POM, Spool: stainless steel, Seals NBR			
Weight	0.310 kg		0.340 kg	0.350 kg



5/2-, 5/3-way valves SKVG/SIVG

Function of SKVG 510/511 SIVG 520

SKVG-510

5/2-way spool-valve with air-spring return.

SKVG-511

5/2-way spool-valve with mechanical spring.

SIVG-520

5/2-way double pilot valve. Ports are interchangeable.
Valve can also be used to control 2 pressures.

Function of SIVG-531/532/533

Valve is actuated by signals to ports 12 and 14.

SIVG-531

Centre closed. Double acting cylinder stays at current position.

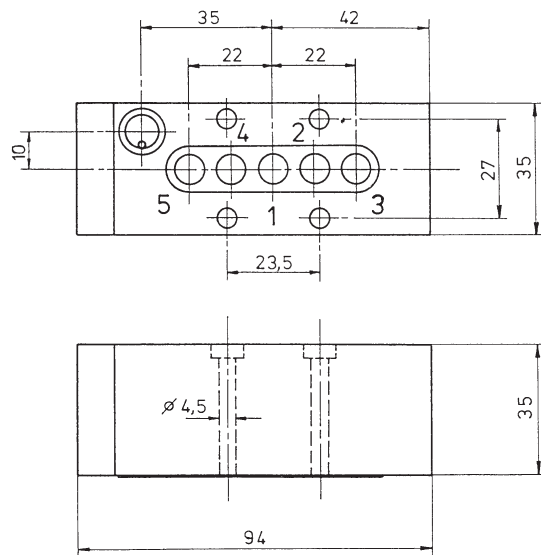
SIVG-532

Centre exhausted. Cylinder is free to move independently.

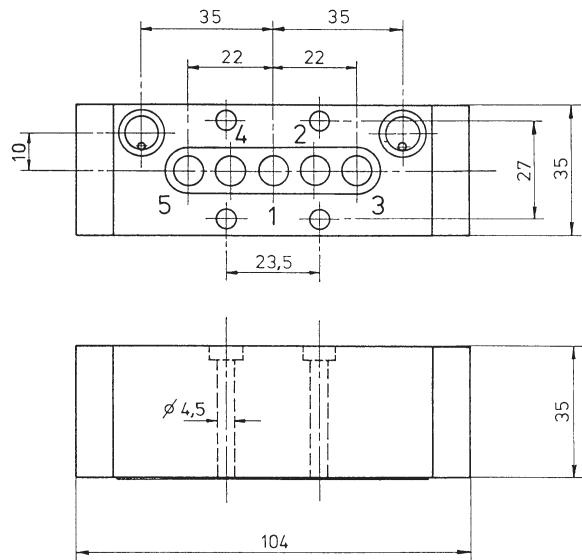
SIVG-533

Centre pressurized. Piston is blocked by compressed air.
Use with rodless cylinders.

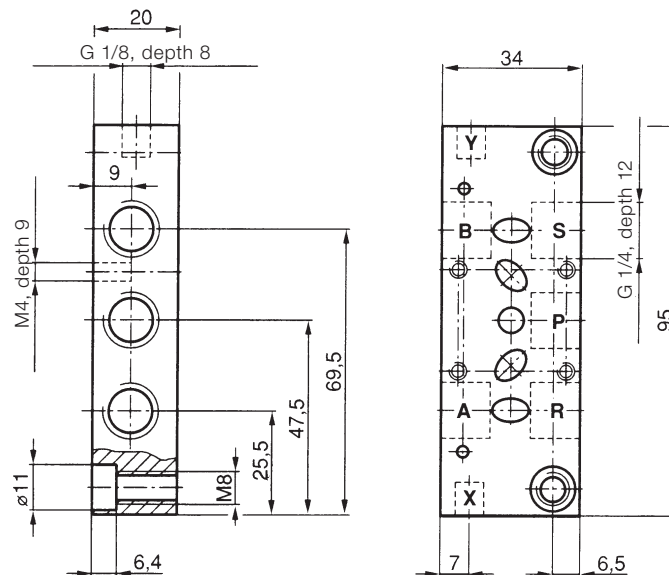
SKVG 510 SKVG 511



SIVG 520 SIVG 53*



R01/7



3/2-, 5/2-way valves G 1/4" WMJ

Solenoid valves

Technical characteristics

General characteristics	
Design	popped valve, non-overlapping
Port size	G 1/4" or M14 x 1.5
Fixing	through fixing holes
Mounting position	any
Temperature range	
AC	-10 °C ... +50 °C
DC	-10 °C ... +60 °C
Weight	0.7 kg, 1.4 kg
Materials	Body: aluminum anodized Seals: NBR
Electric characteristics	
Voltage	24 V~, 110 V~, 230 V~, others on request
Voltage tolerance	±10 %
Power consumption	DC: 10 W, AC: 26 VA inrush 16 VA holding
ED	100 %
Protection	IP 65 with appropriate connectors (not part of the delivery)

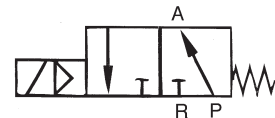
WMJ-1
WMJ-2
WMJ-5
WMJ-1N with manual override
WMJ-2N with manual override
WMJ-5N with manual override



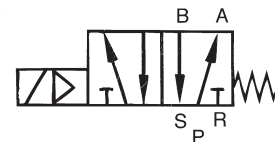
WMJ-1
WMJ-1N



WMJ-2
WMJ-2N



WMJ-5
WMJ-5N

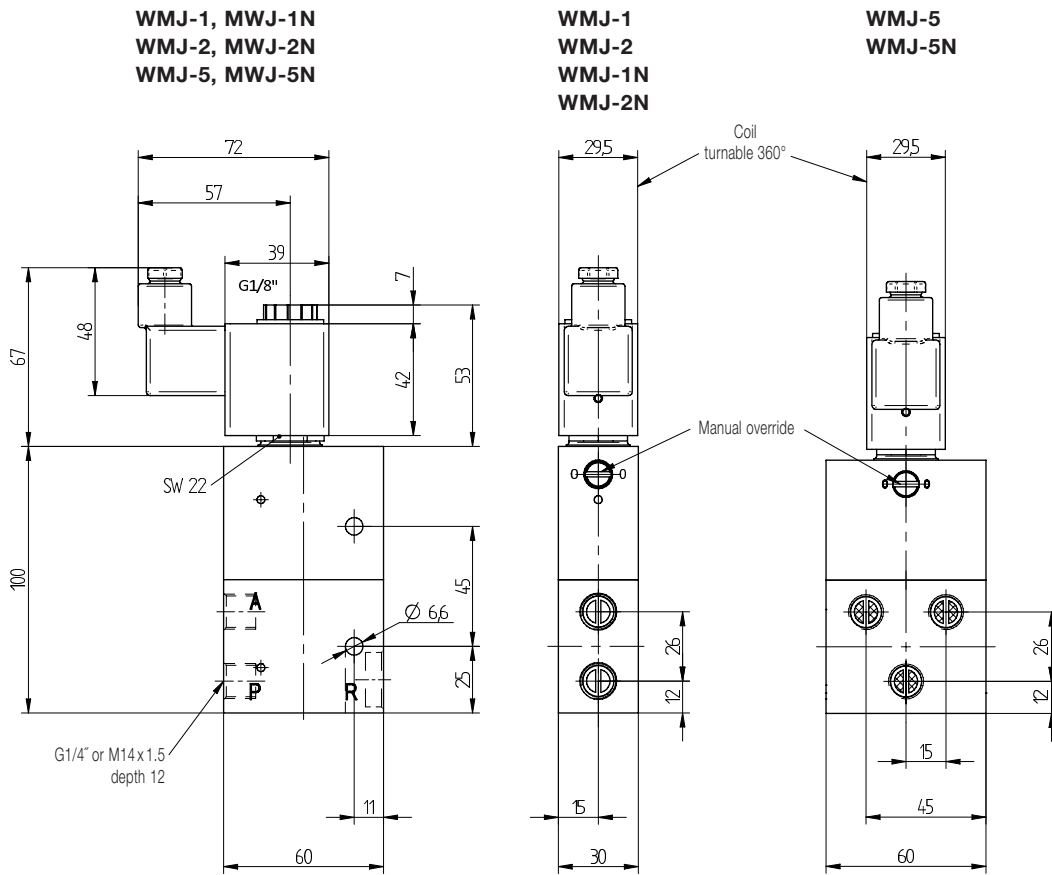


Types

Type		WMJ-1	WMJ-2	WMJ-5
Type		WMJ-1N	WMJ-2N	WMJ-5N
Weight		0.75 kg		1.4 kg
Operating pressure		1.6 ... 10 bar	4 ... 10 bar	2.2 ... 10 bar
K _v value in l/min. water	P to A (B)	8.2 l/min.	8 l/min.	8 l/min.
	A (B) to R	8 l/min.	11.5 l/min.	8.5 l/min.
Q _n in l/s	P to A (B)	8.8 l/sec.	8.6 l/sec.	8.6 l/sec.
	A (B) to R	8.6 l/sec.	12.4 l/sec.	9.5 l/sec.



3/2-, 5/2-way valves G 1/4" WMJ

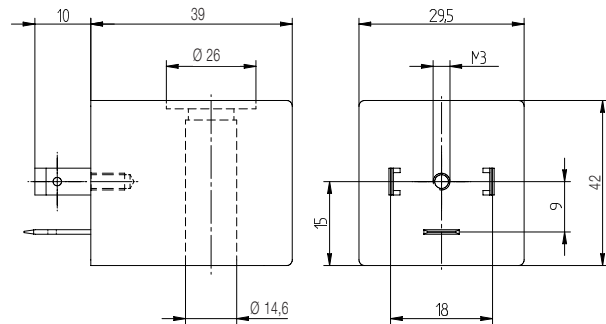


Standard coil: MAJ-5

Housing material PA 30% fibre reinforced. Isolation class F. Wire class H. Connection A in accordance to EN 175301-803. For connectors please refer to catalogue 4 – 4.9.4 Type G 182. In combination with this connector IP 65 can be reached.

Appropriate connector type 182, please refer to chapter 4.9. Connector is not part of delivery.

AC coils can be used with 50 or 60 Hz.



MAJ-5

Accessories

To convert a 3/2-way into a 2/2-way valve take-out the silencer from port R and replace it by a plug with seal-ring.

Accessories

Type	Order number
Seal 17 x 2.5 mm	E160000035
Plug	E210300002

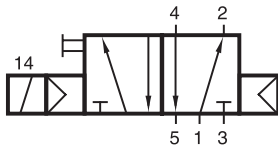
Spare parts

For valves type	Order number
WMJ1, WMJ-2	J061040002
WMJ-5	J061040003

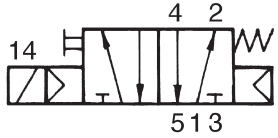


5/2-, 5/3-way valves G 1/4" SMVG/SIMVG

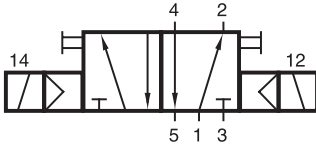
Single or double solenoid valves



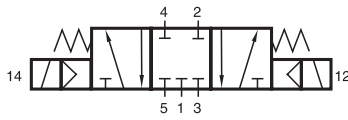
SMVG-510
5/2-way NC
air spring



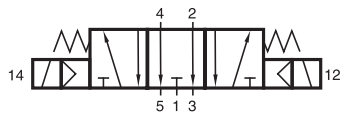
SMVG-511
5/2-way NC
mech. spring



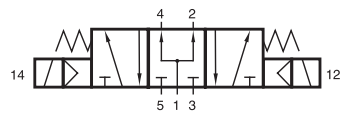
SIMVG-520
5/2-way
double solenoid



SIMVG-531
5/3-way
centre closed



SIMVG-532
5/3-way
centre exhausted



SIMVG-533
5/3-way
centre pressurized



Design and function

Spool valve.

Exhaust can be throttled.

Valves can also be delivered without manual override.

Technical characteristics

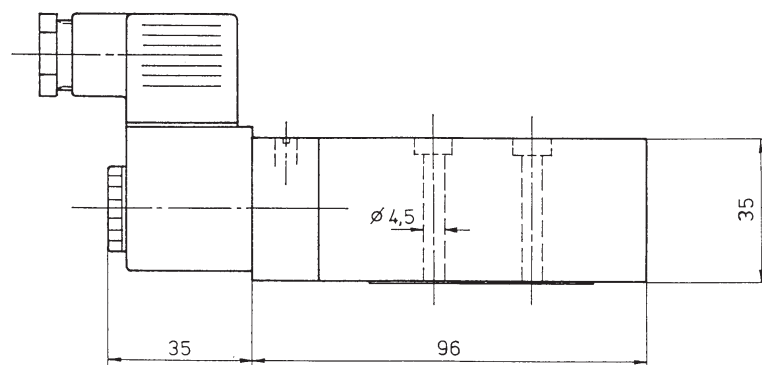
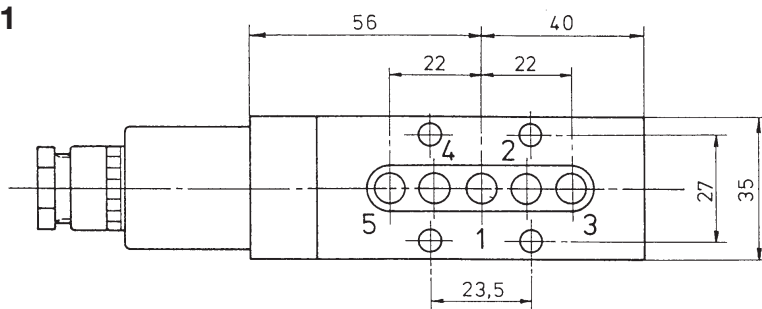
Type	SMVG-510	SMVG-511	SIMVG-520	SIMVG 53*
Medium	Filtered compressed air, lubricated or unlubricated			
Port size	Ø 7 mm – G 1/4" in mounting plate			
Orifice size	7 mm			
Air-flow	1200 l/min.			
Operating pressure	1 ... 10 bar	3 ... 10 bar	1 ... 10 bar	3 ... 10 bar
Switching-time at 6 bar on/off	13/16 ms			
Temperature range	DC: -10 °C ... +60 °C / AC: -10 °C ... +50 °C			
Materials	Body: Al anodized, Inner parts: brass and POM, Spool: stainless steel, Seals NBR			
Standard current	24 V DC / 110 V AC / 230 V AC, others on request			
Protection	IP 65 with appropriate connector according to DIN 40050			
Weight	0.55 kg		0.68 kg	

Connectors are not part of delivery.

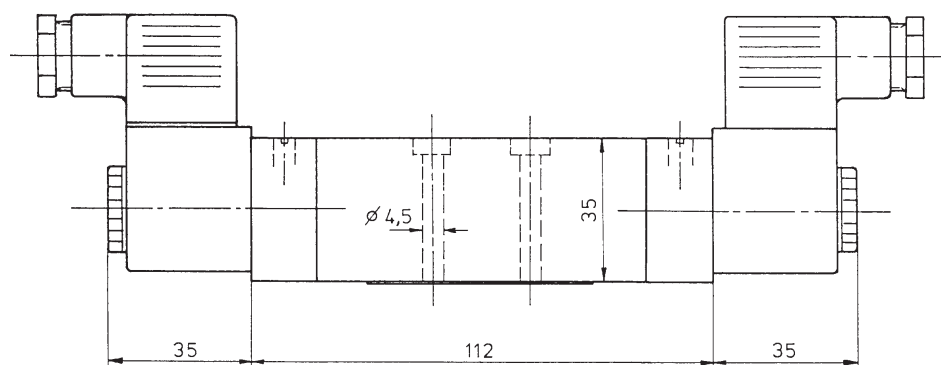
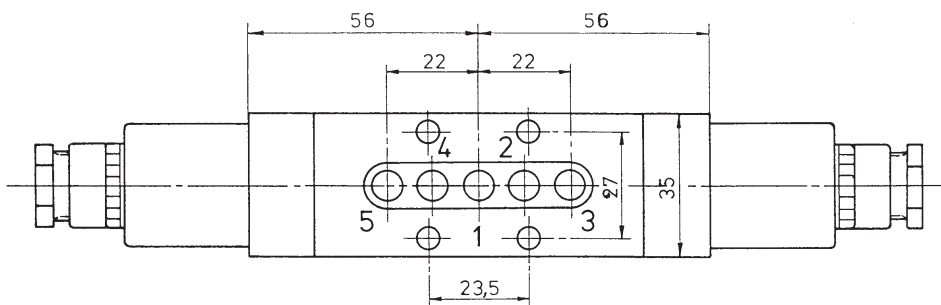


5/2-, 5/3-way valves G 1/4" SMVG/SIMVG

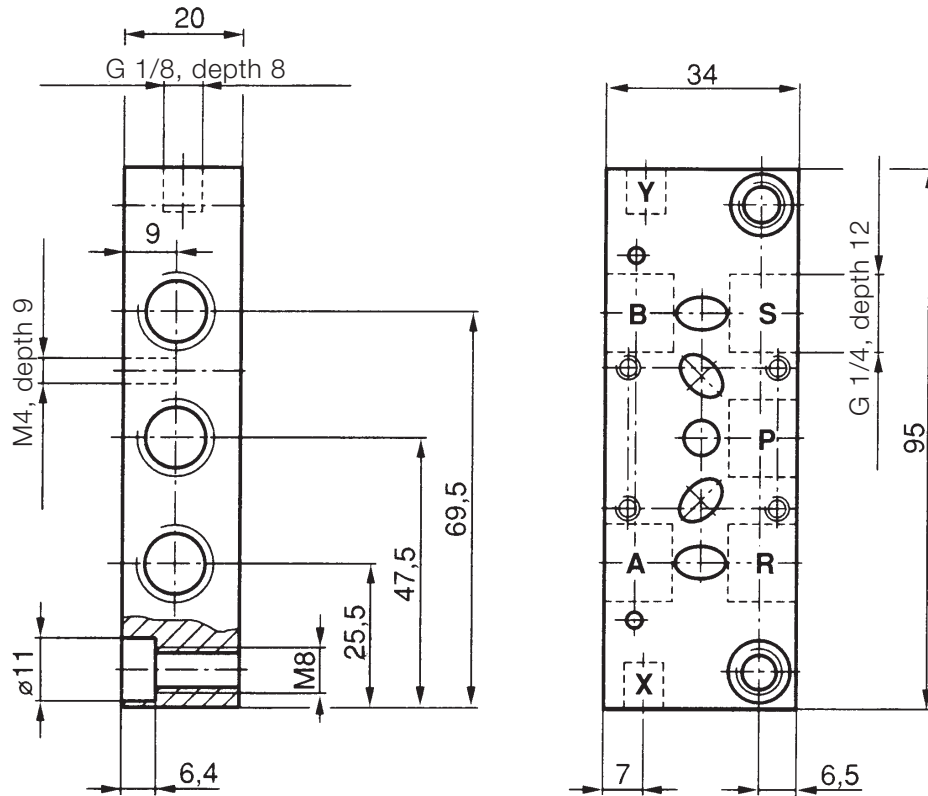
SMVG-510 SMVG-511



SIMVG-520 SIMVG-53*



R 01/7



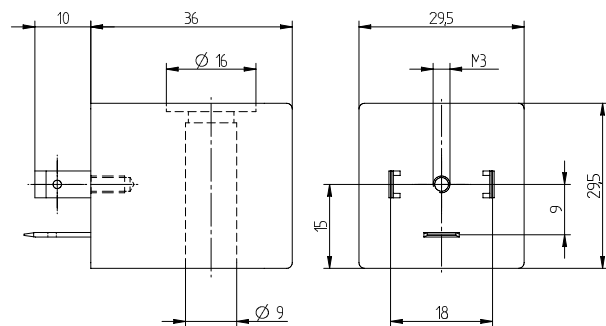
Standard coil: **MA 30**



Housing material PA 30% fibre reinforced. Isolation class F. Wire class H. Connection A in accordance to EN 175301-803. For connectors please refer to catalogue 4 – 4.9.4 Type G 182. In combination with this connector IP 65 can be reached.

Appropriate connector type 182, please refer to chapter 4.9. Connector is not part of delivery.

AC coils can be used with 50 or 60 Hz.

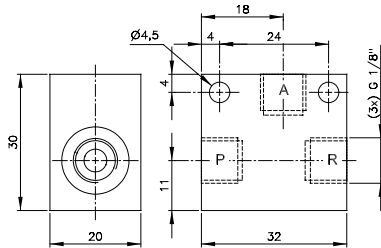
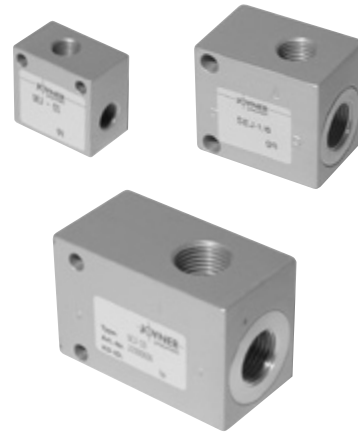
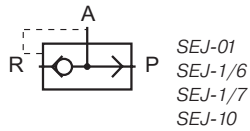


MA 30

Type	Current	Tolerance	I	Power consumption	LED	Connection
MA 30 24DC	24 V =	± 10 %	83 mA	2 W	–	Form A – EN 175301-803
MA 30 110AC	110 V ~	± 10 %	27 mA	3 VA	–	Form A – EN 175301-803
MA 30 230AC	230 V ~	± 10 %	13 mA	3 VA	–	Form A – EN 175301-803



SEJ-01 / SEJ-1/6 / SEJ-1/7 / SEJ-10



SEJ-01

Quick exhaust valves are used to increase the speed of the piston in a single- or double acting cylinder.

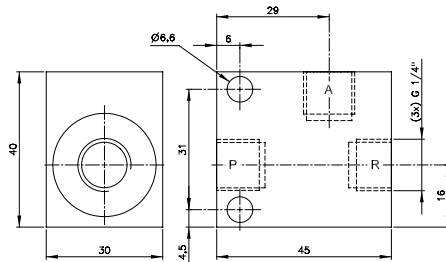
Temperature range: -20°C ... +80°C

Valve can also be used as a non-return valve. For this application close port R.

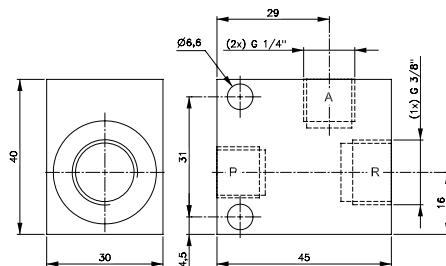
Valve can also be used as an OR-gate. Please use P and R as in-ports. A is exhaust.

Available on request:

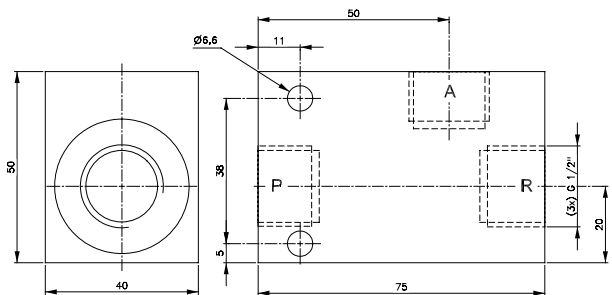
- Low temperature valves
- Valves made from stainless steel 1.4571



SEJ-1/7



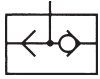
SEJ-1/6



SEJ-10

Type	Ports		Air flow	Operation pressure	Differential pressure to connect P with A and R	Weight
	A + P	R				
SEJ-01	G 1/8"	G 1/8"	560 l/min	0.3 - 10 bar	1.3 bar	0.06 kg
SEJ-1/7	G 1/4"	G 1/4"	1200 l/min	0.2 - 10 bar	1.5 bar	0.18 kg
SEJ-1/6	G 1/4"	G 3/8"	1200 l/min	0.2 - 10 bar	1.5 bar	0.18 kg
SEJ 10	G 1/2"	G 1/2"	3600 l/min	0.5 - 10 bar	1.2 bar	0.26 kg





DRJ-1/1

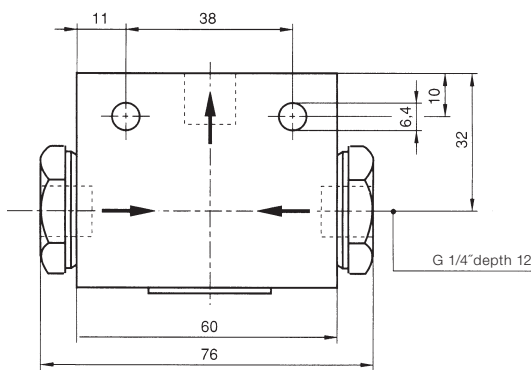


Shuttle valve OR-gate

The OR-gate has two inputs and one output.

The shuttle valve is used when only one of two possible signals is required to pass on a signal. Function: If one of two signal inputs are activated, an output signal on port 2 is present and the other input is blocked. In case of pressurising both inputs at different pressure levels, the higher pressure is fed to port 2.

Temperature range: - 20 °C ... + 80 °C

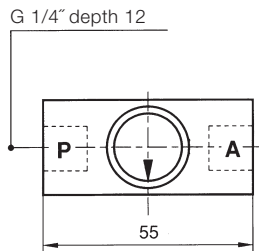
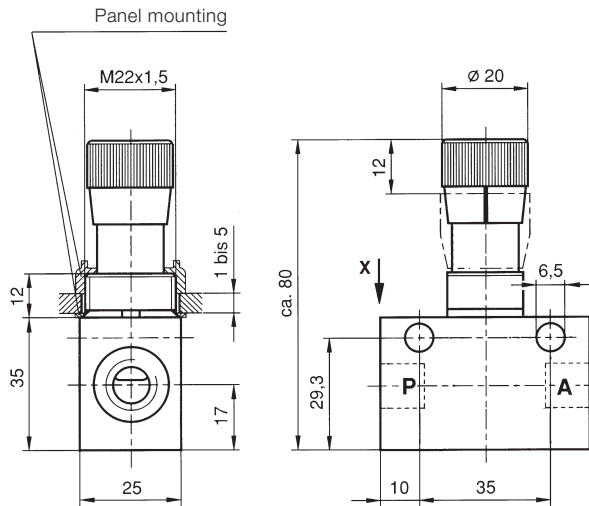
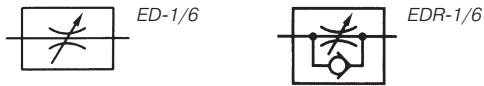


DRJ-1/1

Type	Ports	Air flow	Operating pressure	Weight
DRJ-1/1	G 1/4"	1050 l/min	0,5 - 10 bar	0.31 kg



ED-1/6 / EDR-1/6



ED-1/6 / EDR-1/6



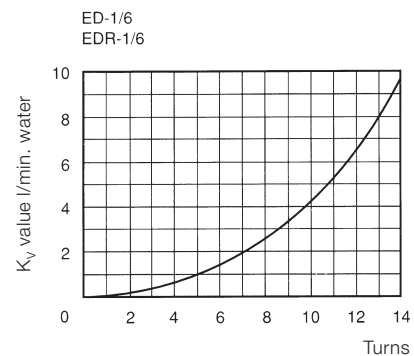
High precision block form flow regulator.

Regulating element: spindle with cut-outs therefore precise regulation along the entire range.

Wall- and panel-mounting possible.

Type EDR-1/6 uni-directional block form flow regulator. Air streaming in the direction of the throttle can be regulated by turning the spindle. In the opposite direction air streams unthrottled.

Type ED-1/6 bi-directional flow regulator. Air is regulated in both directions.



Type	Function	Ports	Air flow max.	Operating pressure	Weight
ED-1/6	uni directional	G 1/4"	660 l/min	0.3 - 10 bar	0.12 kg
EDR-1/6	bi directional	G 1/4"	660 l/min	0.35 - 10 bar	0.12 kg



K-Rings and pistons

Proven reliability for decades

In pneumatic applications such as cylinders and valves the K-Ring is approved for decades. Use it without risk.

Wide tolerance field

Piston as well as bearing surface can be at tolerance c11/H11, sometimes even larger tolerances are possible. Generally available tubes and bars with a peak-to-valley height of up to 2 µm can be used. Runout is compensated by the K-Ring.

No sealing problems

The K-Ring guarantees a close to 100 % sealing effect given a pressure difference. Changing the pressure direction does not lead to leakage.

Low friction

On average you will lose only 2 % of the force of the piston due to friction. In regulators K-Rings can replace diaphragms.

Lubrication without problems

The special sealing rim makes sure that a lubrication film stays for a long time on the bearing surface. In most cases no re-lubrication is required. In case of questions concerning oils or grease do not hesitate to contact us.

Long life

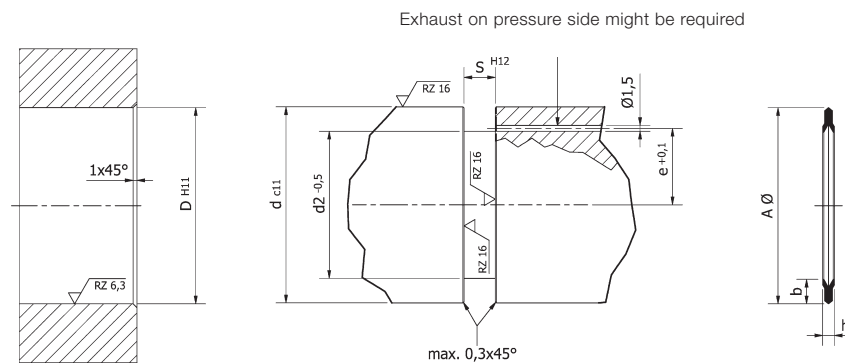
Several million switches are possible, wear is related to stroke.

Wide temperature range

In a range of -20 °C to +100 °C the use of the NBR-quality is possible, low- as well as high-temperature versions are available.

Standard pressure range

Up to 10 bar, for use with higher pressure please check back.



K-Rings – external seal – part of the range

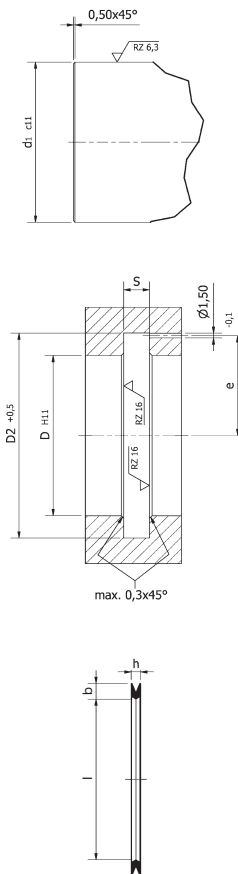
Type	Order-Nr.	Groove				K-Ring			Type	Order-Nr.	Groove				K-Ring		
		D/d ₁	d ₂	s	[e]	A	b	h			D/d ₁	d ₂	s	[e]	A	b	h
KA12	N 893/12	12	5.5	1.7	3.5	12.5	2.4	1.5	KA63	N 896/63	63	47.0	3.5	24.3	64.0	7.0	3.0
KA15	N 890/15	15	5.5	2.3	3.5	15.6	3.8	2.0	KA65	N 896/65	65	49.0	3.5	25.3	66.0	7.0	3.0
KA16	N 890/16	16	6.5	2.3	4.0	16.5	3.8	2.0	KA70	N 890/70	70	55.5	3.5	28.5	71.1	6.0	3.0
KA18	N 890/18	18	8.5	2.3	5.0	18.6	3.8	2.0	KA75	N 896/75	75	59.0	3.5	30.3	76.1	7.0	3.0
KA20	N 890/20	20	10.0	2.3	5.8	20.6	3.8	2.0	KA80	N 896/80	80	61.0	4.1	31.3	81.2	8.3	3.5
KA22	N 890/22	22	12.0	2.3	6.8	22.6	3.8	2.0	KA85	N 890/85	85	68.0	4.1	34.8	86.2	7.1	3.5
KA25	N 890/25	25	15.0	2.3	8.3	25.7	3.8	2.0	KA90	N 896/90	90	71.0	4.1	36.3	91.3	8.3	3.5
KA26	N 890/26	26	16.0	2.3	8.8	26.7	3.8	2.0	KA100	N 890/100	100	79.0	4.6	40.3	101.4	8.1	4.0
KA28	N 896/28	28	17.0	2.3	9.3	28.7	4.5	2.0	KA105	N 890/105	105	86.0	4.6	43.8	106.4	8.1	4.0
KA30	N 890/30	30	20.0	2.3	10.8	30.7	3.8	2.0	KA110	N 890/110	110	91.0	4.6	46.3	111.4	8.1	4.0
KA32	N 890/32	32	22.0	2.3	11.8	32.7	3.8	2.0	KA115	N 890/115	115	92.5	5.1	47.0	116.5	9.5	4.5
KA35	N 890/35	35	22.5	3.0	12.0	35.8	5.0	2.5	KA125	N 896/125	125	101.0	5.1	51.3	126.6	10.7	4.5
KA36	N 890/36	36	23.5	3.0	12.5	36.8	5.0	2.5	KA140	N 896/140	140	113.5	5.6	57.5	141.7	11.8	5.0
KA40	N 890/40	40	27.5	3.0	14.5	40.8	5.0	2.5	KA150	N 890/150	150	125.0	6.2	63.3	151.8	11.8	5.5
KA42	N 890/42	42	29.5	3.0	15.5	42.8	5.0	2.5	KA160	N 890/160	160	131.5	6.2	66.5	161.8	11.0	5.5
KA45	N 890/45	45	32.5	3.0	17.0	45.8	5.0	2.5	KA190	N 890/190	190	158.5	7.8	80.0	192.2	14.0	7.0
KA50	N 890/50	50	37.5	3.0	19.5	50.9	5.0	2.5	KA200	N 890/200	200	163.0	8.8	82.3	202.6	16.2	8.0
KA55	N 896/55	55	41.0	3.0	21.3	55.9	6.0	2.5	KA225	N 890/225	225	189.5	8.8	95.5	227.5	16.0	8.0
KA60	N 896/60	60	44.0	3.5	22.8	61.0	7.0	3.0	KA250	N 890/250	250	214.5	8.8	108.0	252.7	16.0	8.0
									KA300	N 890/300	300	258.0	10.8	129.8	303.2	19.0	10.0
									KA355	N 890/355	355	313.0	10.8	157.3	358.7	19.0	10.0
									KA406	N 890/406	406	361.0	10.8	181.3	412.0	20.0	10.0

All dimensions in mm.
Other dimensions available on request.



K-Rings – internal seal – part of the range

Type	Order-Nr.	Groove				K-Ring		
		D/d ₁	d ₂	s	[e]	l	b	h
Ki 6	N 891/06	6	15.5	2.3	7.0	5.4	3.8	2
Ki 9	N 891/09	9	18.5	2.3	8.5	8.4	3.8	2
Ki 10	N 891/10	10	19.5	2.3	9.0	9.4	3.8	2
Ki 12	N 891/12	12	21.5	2.3	10.0	11.4	3.8	2
Ki 14	N 891/14	14	23.5	2.3	11.0	13.3	3.8	2
Ki 16	N 897/16	16	27.0	2.3	12.7	15.4	4.5	2
Ki 18	N 897/18	18	29.0	2.3	13.7	17.4	4.5	2
Ki 20	N 891/20	20	29.5	2.3	14.0	19.2	3.8	2
Ki 22	N 891/22	22	33.5	2.3	15.0	21.1	3.8	2
Ki 25	N 891/25	25	34.5	2.3	16.5	24.4	3.8	2
Ki 28	N 897/28	28	39.0	2.3	18.7	27.3	4.5	2
Ki 30	N 897/30	30	41.0	2.3	19.7	29.3	4.5	2
Ki 32	N 897/32	32	43.0	2.3	20.7	31.3	4.5	2
Ki 36	N 891/36	36	48.0	3.0	23.2	35.2	5	2.5
Ki 38	N 891/38	38	50.0	3.0	24.2	37.2	5	2.5
Ki 40	N 891/40	40	52.0	3.0	25.2	39.2	5	2.5
Ki 45	N 897/45	45	59.0	3.0	28.7	44.2	6	2.5
Ki 50	N 897/50	50	64.0	3.0	31.2	49.1	6	2.5
Ki 52	N 897/52	52	66.0	3.0	32.2	51.5	6	2.5
Ki 60	N 897/60	60	76.0	3.5	37.2	59.0	7	3.0



All dimensions in mm. Other dimensions available on request.

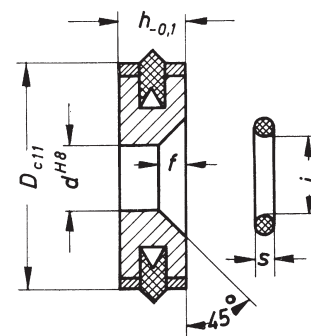
Function of a K-Ring

I The K-Ring is assembled with radial pre-stress. The lips are at the groove wall. Therefore the ring seals also at small pressure difference.

II When inflated pressure can pass the lip. The lip on the opposite side is pressed against the groove wall. Also the sealing rim is pressed against the bearing surface. Increasing pressure increases the sealing effect. This enhances security.

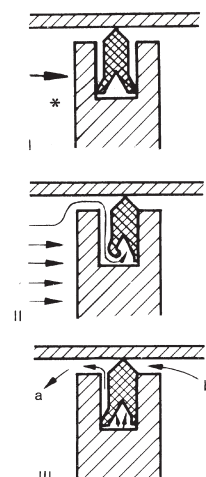
III When pressure is reduced or direction of pressure changes, the pressure inside the sealing system stays high and assures absolute tightness.

* In case low friction at low pressure (< 1 bar) is top priority we recommend to exhaust the sealing system. This can only be recommended if sealing is required in one direction only.



Piston with K-Ring – part of the range

Type	Order.-Nr.	Pistons					Rod Z
		D	d	h	f	i x s	
KK 20	1/55601/020	20	6	9	2	6x1.5	10
KK 25	1/55601/025	25	6	10	2	6x1.5	10
KK 30	1/55601/030	30	10	10	2.8	10x2.2	12
KK 35	1/55601/035	35	10	10	2.8	10x2.2	12
KK 40	1/55601/040	40	10	10	2.8	10x2.2	12
KK 50	1/55601/050	50	12	10	2.7	12x2	16
KK 60	1/55601/060	60	12	10	2.7	12x2	16
KK 80	1/55601/080	80	16	16	2.7	16x2	20
KK 100	1/55601/100	100	20	16	2.7	20x2	25
KK 125	1/55601/125	125	24	16	2.7	24x2	30
KK 160	1/55601/160	160	30	20	4.1	30x3	35
KK 200	1/55601/200	200	30	25	4.1	30x3	40



All dimensions in mm.







JOYNER pneumatic GmbH

Im Netzbrunnen 6 · D-70825 Korntal-Münchingen
 Phone +49 (0) 7150 91312-0 · Fax +49 (0) 7150 91312-10
 Internet: www.joyner.de · Mail: info@joyner.de

JOYNER pneumatic GmbH

Schimmelbuschstraße 9 · D-40699 Erkrath
 Phone +49 (0) 2104 3035-40 · Fax +49 (0) 2104 3035-55
 Internet: www.joyner.de · Mail: erkrath@joyner.de

THE JOYNER-RANGE:



Round cylinders



Cylinders ISO 15552



Compact cylinders
ISO 21287



Standard and clamping
cylinders



Rodless cylinders



Valve terminals and
manifold systems



Spool valves



Valves with
NAMUR interface



Manually and mechanically
actuated valves



K-Rings and pistons

Moving more than air

OFFICIAL DISTRIBUTORS:

NORDBADEN, SAAR, PFALZ

Hekomatic

Drucklufttechnische Anlagen GmbH
 Marconistraße 17-21
 D-68309 Mannheim
 Phone +49 (0) 621 722963
 Fax +49 (0) 621 722964
 Mail: hekomatic@t-online.de

NORDDEUTSCHLAND

Wille GmbH

Ingenieurbüro für Drucklufttechnik
 Norderoog 4
 D-28259 Bremen
 Phone +49 (0) 421 57636-0
 Fax +49 (0) 421 57636-30
 Mail: info@wille-gmbh.de

