

RODLESS CYLINDER WITH BALL RECIRCULATING GUIDE SERIES V-Lock



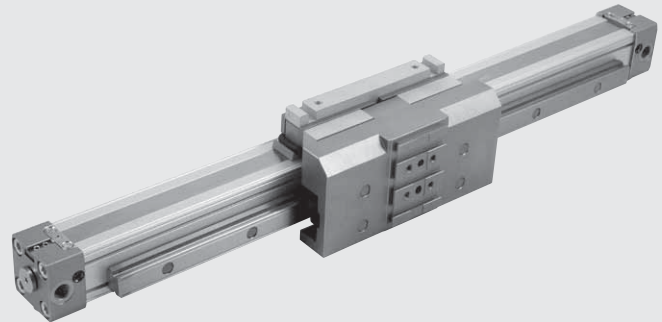
V-Lock rodless cylinders come with bores Ø 16, Ø 25 and Ø 32. Their main feature is that the carriage support has a dovetail with V-Lock grooves for mounting other components in the V-Lock family. The provision of threaded holes and centring pins allows non-V-Lock components to be fixed onto the carriage.

The fixing foots also use the V-Lock system, so the cylinder can be fixed onto something else using K or QS elements.

The carriage support is mounted on ball-recirculation pads that run on tempered guides and can withstand very high loads and moments.

Main features of V-Lock rodless cylinders:

- extruded anodized aluminium alloy cylinder liner;
- sensor grooves in the liner;
- longitudinal pneumatic seal system using stainless steel non-deformable strips;
- very high load capacities acting in any direction, without affecting the cylinder carriage in any way;
- tempered steel guide anchored firmly to the cylinder liner;
- ball-bearing pads made using special technology to allow very silent operation and long maintenance intervals;
- built-in adjustable pneumatic cushioning;
- provision for the application of adjustable stops and shock absorbers;
- with diameter 32 cylinders, the valves can be fixed onto the liner using the retracting sensor grooves, without the need for intermediate brackets.



TECHNICAL DATA

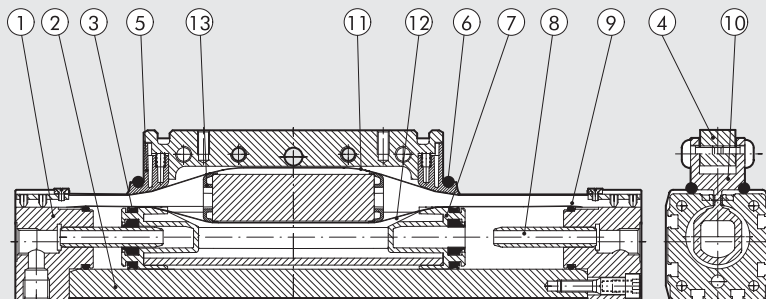
Operating pressure	bar	1 to 8
	MPa	0.1 to 0.8
	psi	14.5 to 116
Temperature range	°C	-10 to +80
	°F	14 to 176
Fluid	If unlubricated 50 µm unfiltered air is used, lubrication must be deactivated	
Bore	mm	Ø 16; 25; 32
Design	Double-acting rodless cylinder with direct transmission system	
Strokes	mm	Ø 16: from 100 to 1350 with intervals of 1
		Ø 25: from 100 to 2300 with intervals of 1
		Ø 32: from 100 to 2300 with intervals of 1
Threaded ports		M5, 1/8", 1/4"
Fixing position		Free
Max. speed with or without shock absorbers	m/s	≤1
Notes	For speeds lower than 0.2 m/s, to prevent bounce, use the No stick-slip version with unlubricated. When operating conditions exceed the values shown in the "Diagram of speed and maximum cushionable load", it is advisable to use the version with external shock absorbers	
Lubrication	Every 2000 km or once a year (grease code 9910506)	

WEIGHTS

Ø	Version 275		Version 276	
	Weight [g] Stroke = 0	Weight [g] every mm	Weight [g] Stroke = 0	Weight [g] every mm
16	500	1.79	758	1.79
25	1676	2.99	2208	2.99
32	3168	5.04	4381	5.04

COMPONENTS

- ① CYLINDER HEAD: aluminium alloy
- ② LINER: shaped anodized aluminium alloy
- ③ PISTON GASKET: NBR o FKM/FPM
- ④ CENTRAL ELEMENT: aluminium alloy
- ⑤ WIPER RING: Hostaform®
- ⑥ OR-SEAL: FKM/FPM
- ⑦ PISTON: Hostaform®
- ⑧ CUSHIONING CONE: aluminium alloy
- ⑨ STATIC OR-SEAL: NBR or FKM/FPM
- ⑩ CARRIAGE: aluminium alloy
- ⑪ BOUTER STRIP: stainless steel
- ⑫ INNER STRIP: stainless steel
- ⑬ BAND SUPPORT: Hostaform®



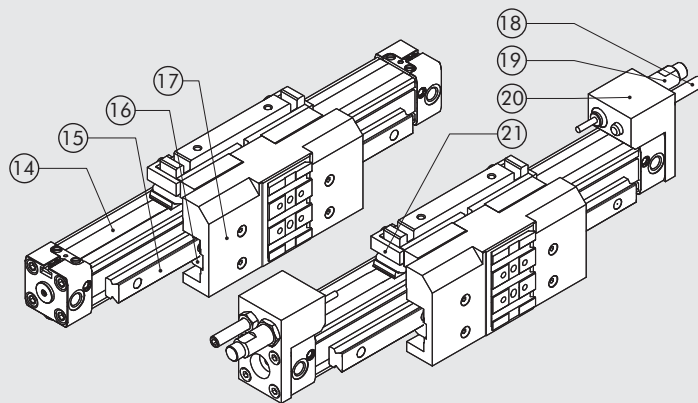
For version 275 _____ CNK

- ⑭ CYLINDER: see above
- ⑮ GUIDE: hardened steel
- ⑯ PAD: steel with hardened ball recirculation
- ⑰ CARRIAGE SUPPORT: anodized aluminium

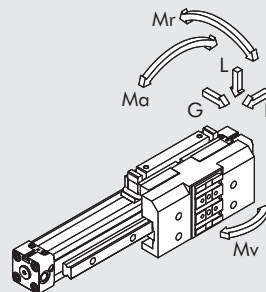
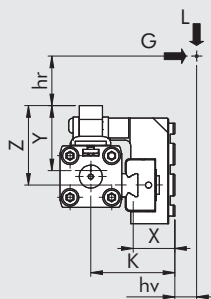
For version 276 _____ CNK

In addition to the above details:

- ⑱ END-OF-STROKE STUD PIN: galvanized steel, complete with 2 galvanised steel nuts
- ⑲ DECELERATOR: burnished steel, complete with 2 galvanised or burnished steel nuts
- ⑳ DECELERATOR SUPPORT: anodized aluminium
- ㉑ BRACKET: hardened-andtempered galvanized steel



DIMENSIONING - MOMENTS AND FORCES



Ø	Actual force F at 6 bar [N]	Cushioning stroke [mm]	K [mm]	X [mm]	Y [mm]	Z [mm]	Max. load L [N]	Max. load G [N]	Ma max [Nm]	Mr max [Nm]	Mv max [Nm]
16	110	15	35	16	29	33	500	500	16	15	16
25	250	21	50.5	21	44	51.5	1500	1500	100	50	100
32	420	26	59	22.5	53.5	70	3000	3000	200	100	200

N.B.: When the cylinder is subjected simultaneously to torque and force, keep to the following equations, where the lengths have to be given in metres.

$$Ma = F \cdot (hr + Y) \quad Mr = G \cdot (hr + z) + L \cdot (hv + X) \quad Mv = F \cdot (K + hv)$$

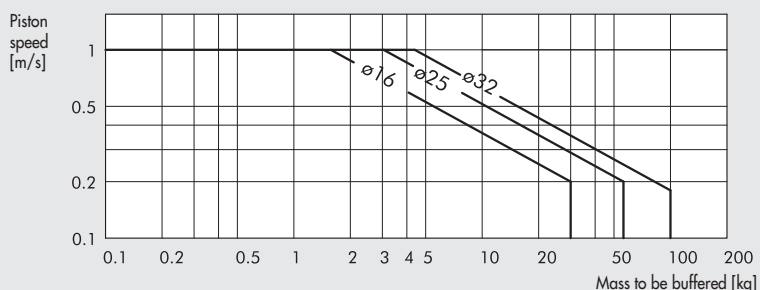
$$\frac{Ma}{Ma_{max}} + \frac{Mr}{Mr_{max}} + \frac{Mv}{Mv_{max}} + \frac{L}{L_{max}} + \frac{G}{G_{max}} \leq 1$$

DIAGRAM OF SPEED AND MAXIMUM CUSHIONABLE LOAD

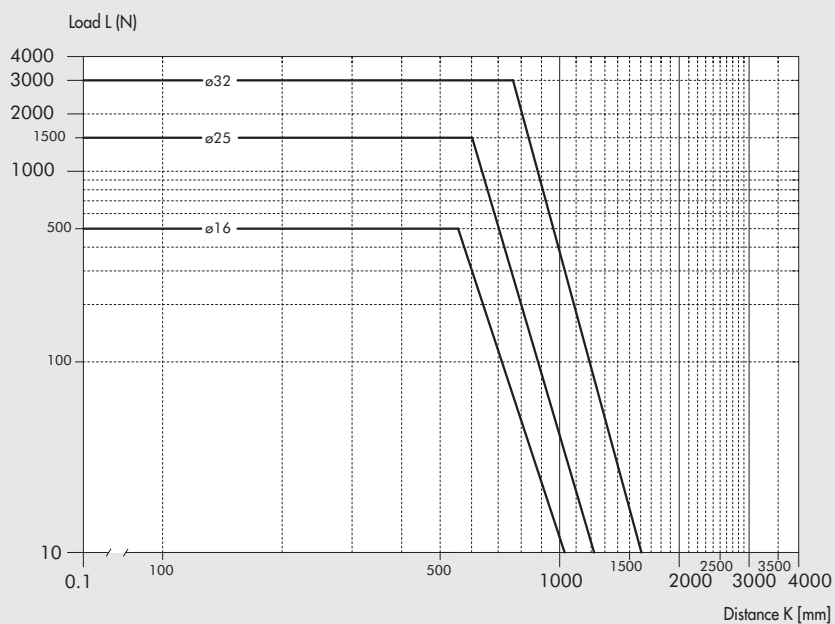
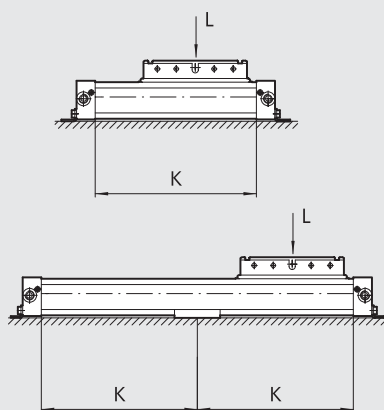
For the cylinder to reach the end-of-stroke position without intense or repeated impact, which would damage it, it is necessary to annul the kinetic energy of the moving mass and the energy generated.

The maximum cushionable load depends on the traversing speed and the absorption of the air buffer supplied standard with the various cylinders.

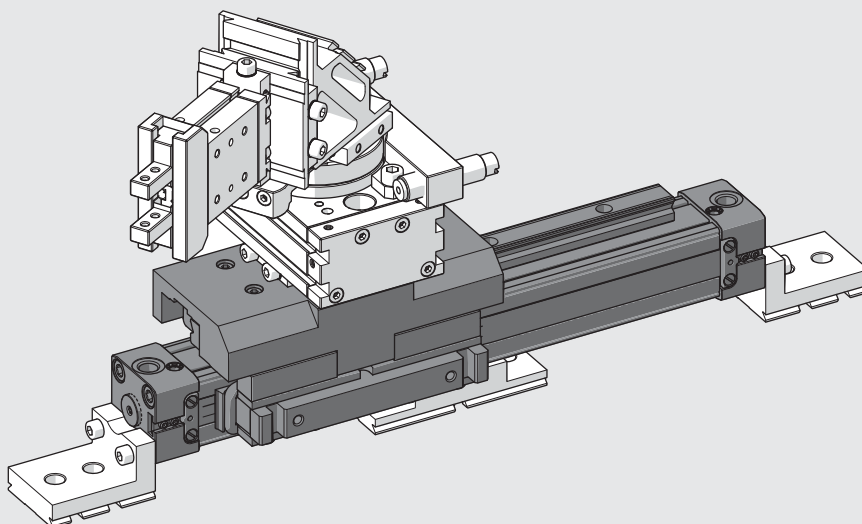
The diagram shows the speeds and cushionable masses for the various diameters at a pressure of 6 bar.



MAXIMUM LOAD BASED ON DISTANCE BETWEEN SUPPORTS

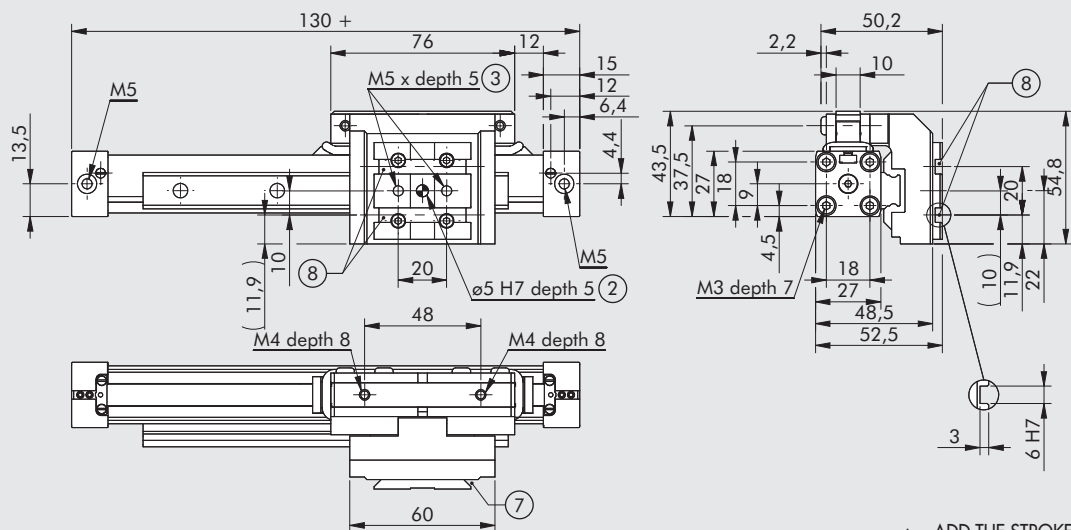


EXAMPLES OF APPLICATION



DIMENSIONS

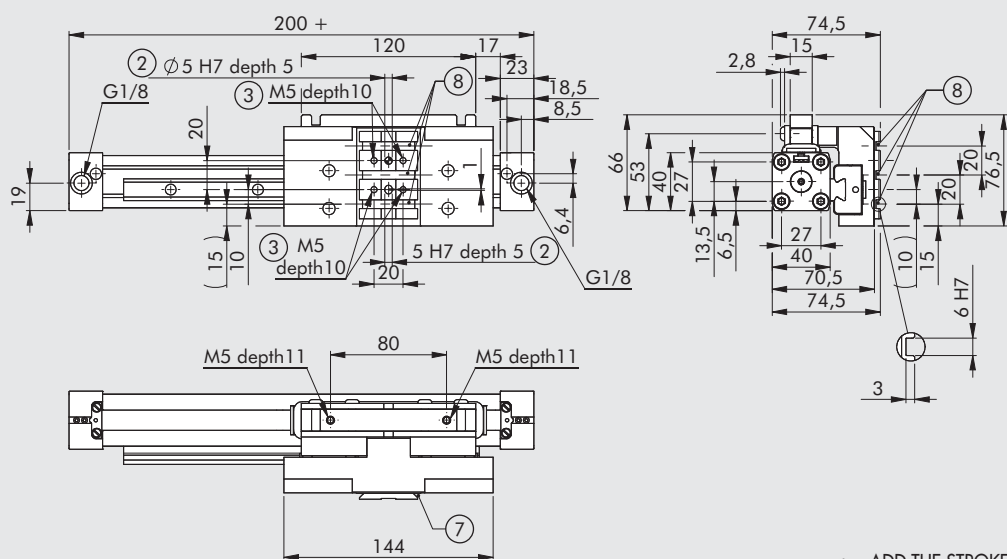
Ø 16



+ = ADD THE STROKE

- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-LOCK" fixing.
For standard dimensions, see
chapter V-LOCK adaptors
- ⑧ Slot for "V-LOCK" precision key

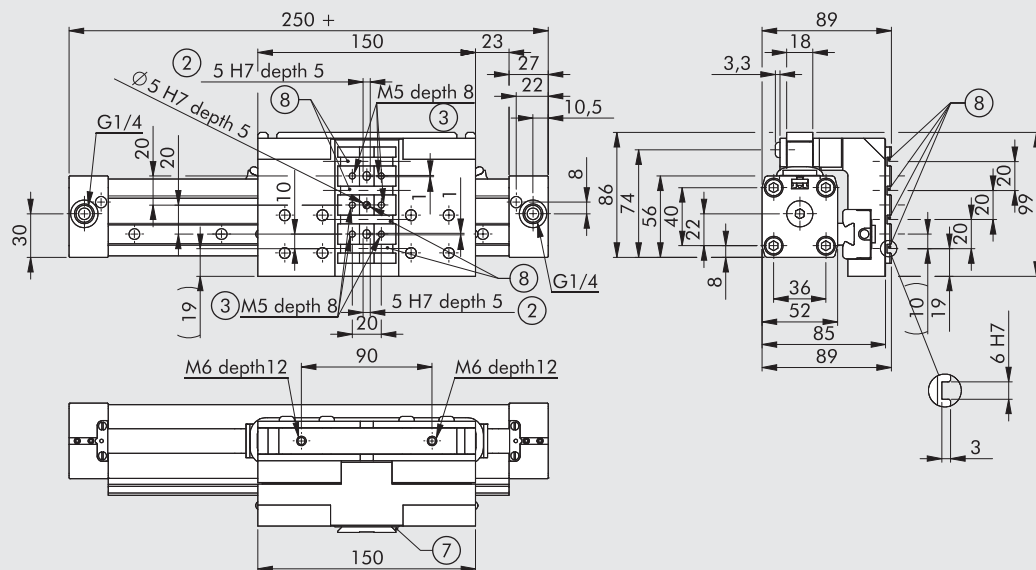
Ø 25



+ = ADD THE STROKE

- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-LOCK" fixing.
For standard dimensions, see
chapter V-LOCK adaptors
- ⑧ Slot for "V-LOCK" precision key

Ø 32



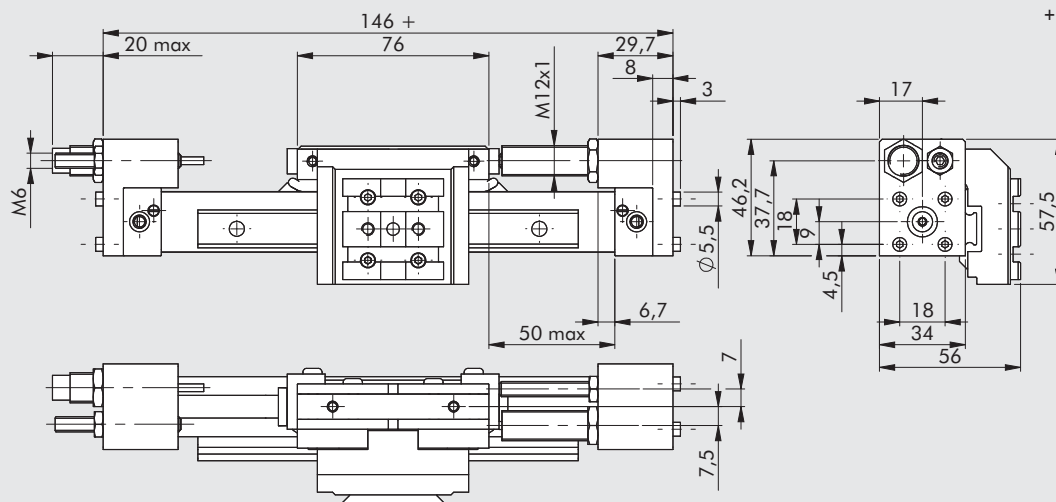
+ = ADD THE STROKE

- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-LOCK" fixing.
For standard dimensions, see
chapter V-LOCK adaptors
- ⑧ Slot for "V-LOCK" precision key

DIMENSIONS OF VERSION WITH DECELERATORS

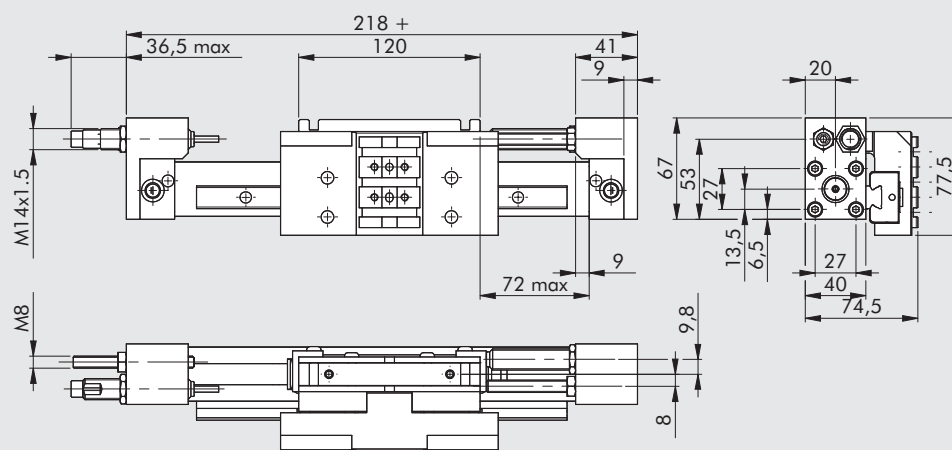
Ø 16

+ = ADD THE STROKE



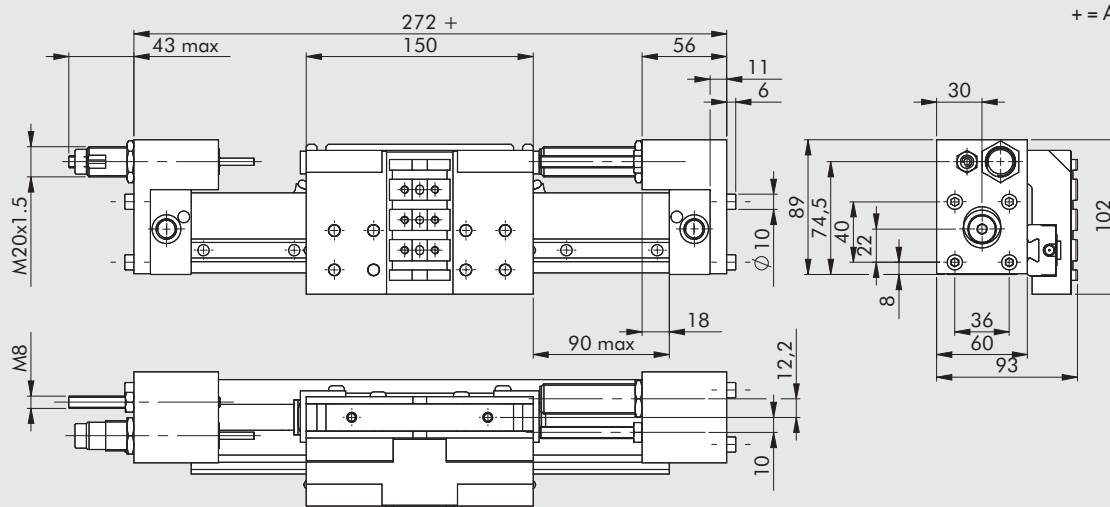
Ø 25

+ = ADD THE STROKE



Ø 32

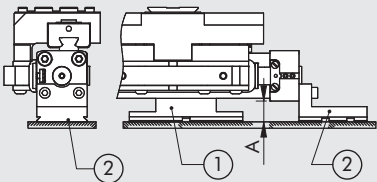
+ = ADD THE STROKE



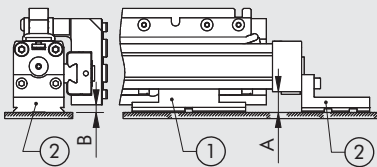
Ø	Stroke	Max. cushioning		Max. impact force [N]	Max. thrust force [N]
		For stroke [J]	For hour [J]		
16	10	4.5	14125	1000	220
25	16	18	34000	2800	530
32	22	40	53700	3750	890

ASSEMBLY DIAGRAMS

275 (horizontal)

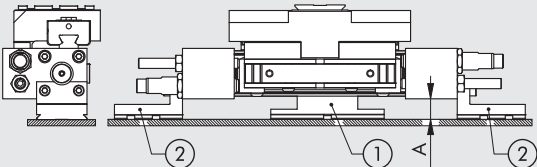


275/276 (vertical)

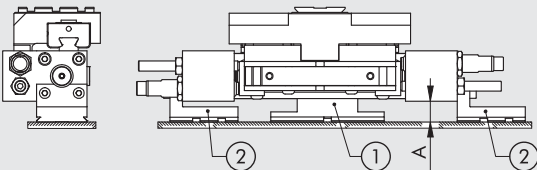


276 (horizontal)

Ø 16 - 25



Ø 32



Ø	A	Horizontal		A	B	Vertical	
		Intermediate support code (1)	Foot code (2)			Intermediate support code (1)	Foot code (2)
16	17	W0950164004K	W0950167001K	17	5.7	W0950164004K	W0950167001K
25	16.5	W0950254004K	W0950257001K	16.5	6	W0950254004K	W0950257001K
32	17.5	W0950324004K	W0950327001K	17.5	4.5	W0950324004K	W0950327001K

KEY TO CODES

CYL	2 7	5	0	3 2	0 1 0 0	C	N	K
	TYPE			BORE	STROKE		GASKETS	FAMILY
	27 Rodless cylinder	5 Dual-acting, cushioned, magnetic, with ball recirculation guides ▲ 6 Dual-acting, cushioned, with ball recirculation guides + adjustable stops and decelerators	0 Magnetic S Non-magnetic ■ G No stick-slip	16 25 32	Ø 16: 100 to 1350 mm Ø 25 and 32: 100 to 2300 mm		N NBR gaskets	K V-Lock

■ Use at speeds lower than 0.2 m/s to prevent bounce. Use unlubricated air only.
▲ For use in conditions exceeding those shown in the "Diagram of speed and maximum cushionable load" on page A3.39.

NOTES

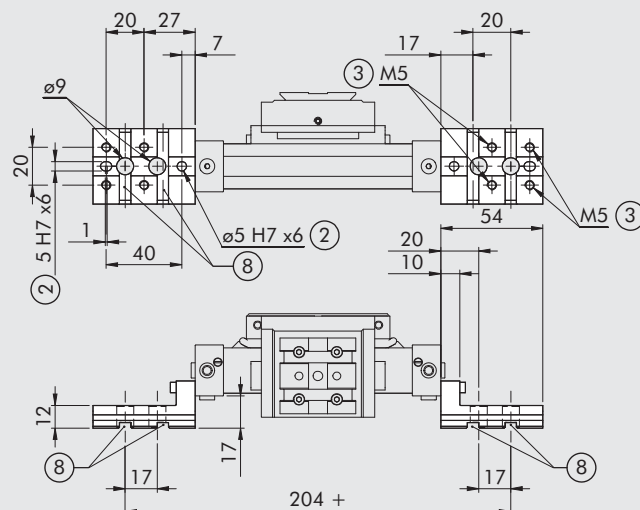
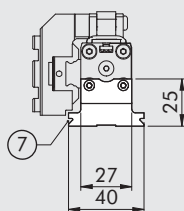
ACTUATORS

RODLESS CYLINDER WITH BALL RECIRCULATING GUIDE SERIES V-Lock

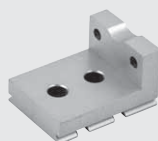


- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key

Note: One element per pack, complete with 2 short screws for fixing to the head and 2 long screws for use when a decelerator support is present.

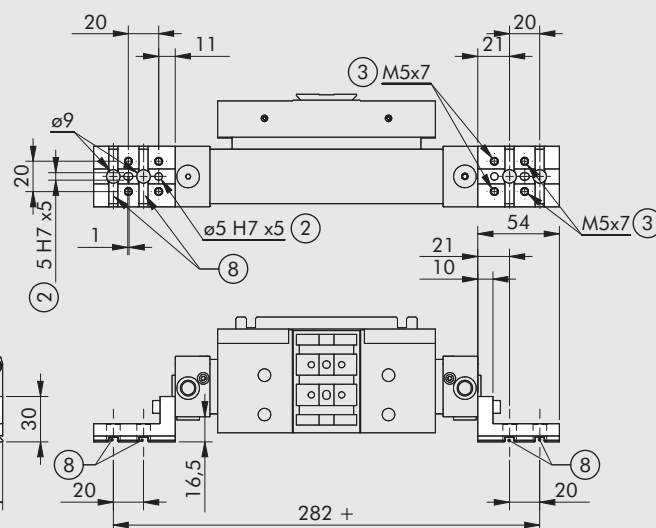
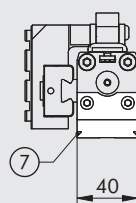


RODLESS CYLINDER WITH BALL RECIRCULATING GUIDE SERIES V-Lock

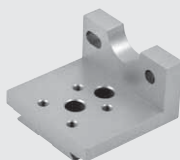


- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key

Note: One element per pack, complete with 2 short screws for fixing to the head and 2 long screws for use when a decelerator support is present.

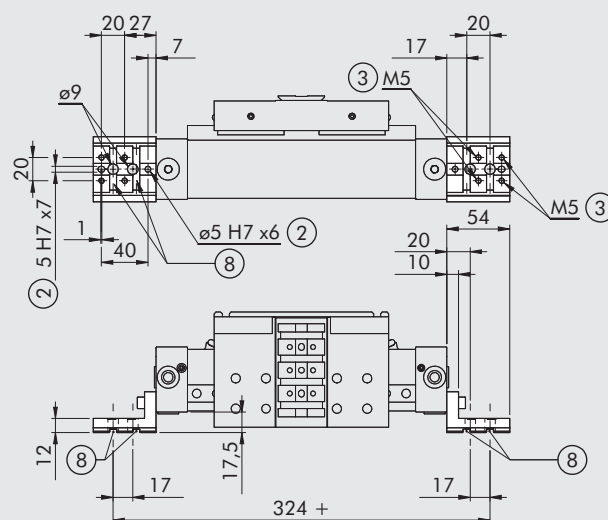
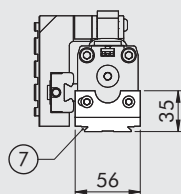


RODLESS CYLINDER WITH BALL RECIRCULATING GUIDE SERIES V-Lock



- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see
chapter V-Lock adaptors
- ⑧ Slot for "V-Lock" precision key

Note: One element per pack, complete with 2 short screws for fixing to the head and 2 long screws for use when a decelerator support is present

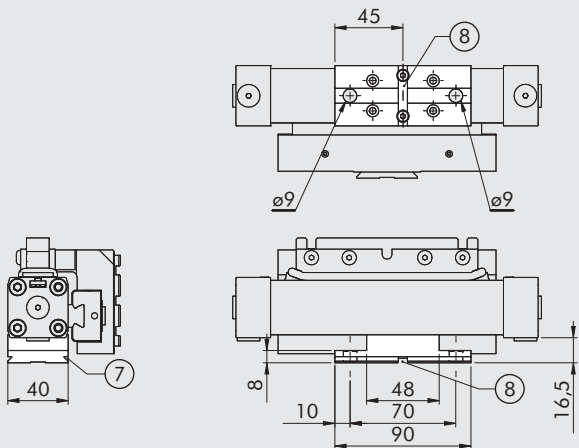


INTERMEDIATE SUPPORT Ø 25, CODE W0950254004K



- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key

Weight: 127 g
Note: Plate supplied with 2 screws

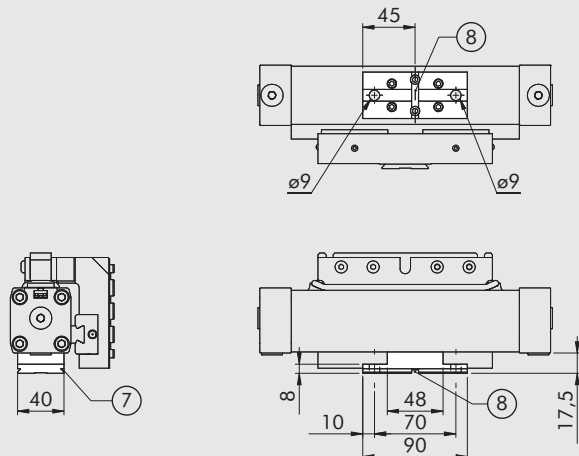


INTERMEDIATE SUPPORT Ø 32, CODE W0950324004K



- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key

Weight: 136 g
Note: 1 support + 4 screws and 4 fixing plates

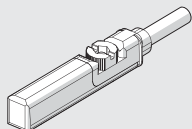


ACCESSORIES: MAGNETIC SENSORS

RETRACTING SENSOR

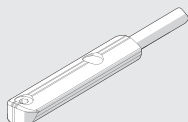
SENSOR, SQUARE TYPE

Latest generation,
secure fixing



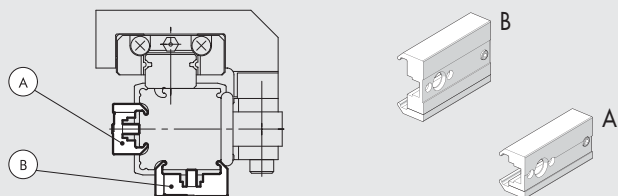
SENSOR, OVAL TYPE

Traditional



For codes and technical data, see **chapter A6**.

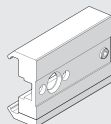
Ø 16 SENSOR SUPPORT



Code	Description	Type	Mounting on the carriage opposite side	Mounting on the guide opposite side
0950164003	Sensor support short	A	•	
0950164001	Sensor support std	B		•

Note: Supplied complete with 2 screw, 1 pin

Ø 25 SENSOR SUPPORT

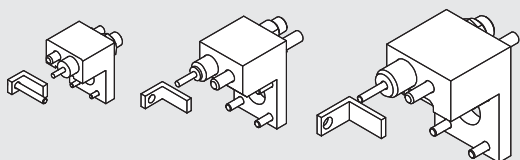


Code	Description
0950164001	Sensor support STD

Note: Supplied with 1 stud pin, 2 screws

ACCESSORIES: DECELERATORS

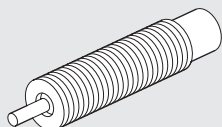
ADJUSTABLE LIMIT SWITCH AND SHOCK ABSORBERS KIT



Code	Description	Weight [g]
0950164002K	Rodless cylinder limit switch and shock absorbers Ø 16 V-Lock	133
0950254002K	Rodless cylinder limit switch and shock absorbers Ø 25 V-Lock	267
0950324002K	Rodless cylinder limit switch and shock absorbers Ø 32 V-Lock	610

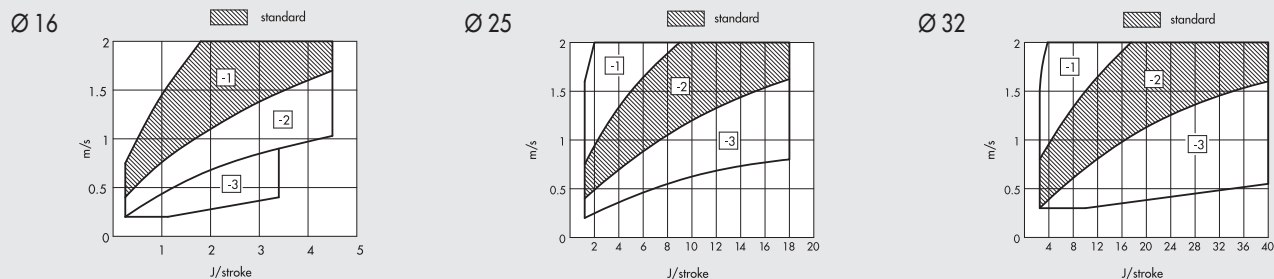
Note: Kit contents: 1 decelerator support, 1 decelerator, 1 decelerator nut, 1 stop grub screw, 1 grub screw nut, 1 bracket, 1 bracket screw (for Ø 16 only), 4 support locking screws.

SHOCK ABSORBERS



Code	Description	Ø
0950004003	Shock absorbers ECO15 MF1 + nut M12x1	16
0950004004	Shock absorbers ECO25 MC2 + nut M14x1.5	25
0950004005	Shock absorbers ECO50 MC2 + nut M20x1.5	32

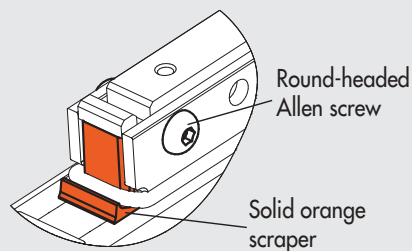
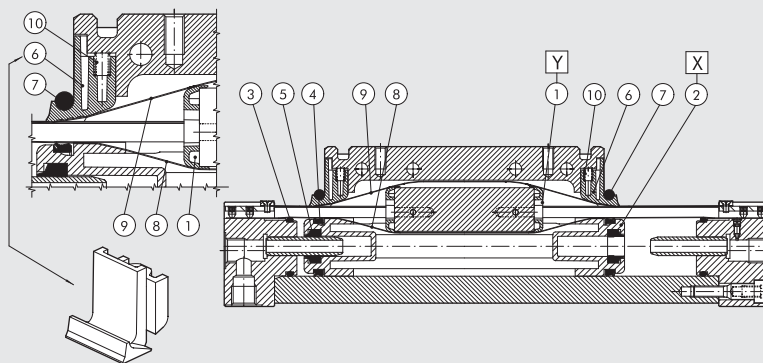
GRAPHS TO HELP CHOOSE THE RIGHT SHOCK ABSORBERS



The dotted areas indicate that the SHOCK ABSORBERS is supplied standard. Other options can be selected depending on the speed [m/sec] and the maximum work force [J/stroke] to dissipate at each stroke. Refer to the diagrams above to select the correct option.

SPARES

- ① Band support kit
- ② Piston kit
- ③ ④ ⑤ ⑥ ⑦ ⑩ NBR gaskets Kit (FKM/FPM for ⑦)
- ⑧ ⑨ Bands Kit (inner/outer)



Spare parts label on one cylinder side

X		Y	
PISTON	☐ Type A	BANDS SUPPORT	☐ White
	☐ Type 0		☐ Black
	☐ Type 1		☐ Orange
	☐ Type 2		☐ Light Gray
	☐ Type 3		☐ Dark Gray
			☐ Yellow

BANDS SUPPORT KIT POS 1 (Y)

Ø	Code White	Code Black	Code Orange	Code Light grey	Code Dark grey	Code Yellow
16	0090165080	0090165081	0090165082	0090165083	0090165084	0090165085
25	0090255080	0090255081	0090255082	0090255083	0090255084	0090255085
32	0090325080	0090325081	0090325082	0090325083	0090325084	0090325085

PISTON KIT POS 2 (X)

Ø	Code Type 0 (0 rings)	Code Type 1 (1 rings)	Code Type 2 (2 rings)	Code Type 3 (3 rings)	Code Type A (4 rings)	Code Yellow
16	0090165015	0090165016	0090165017	0090165018	—	0090165085
25	0090255015	0090255016	0090255017	0090255018	0090255019	0090255085
32	0090325015	0090325016	0090325017	0090325018	0090325019	0090325085

BANDS KIT (INNER AND OUTER) POS. 8-9

Ø	Code
16	0090166_ _ _ _
25	0090256_ _ _ _
32	0090326_ _ _ _

Complete the code with the 4 figure cylinder stroke.

NBR GASKET KIT POS. 3-4-5-6-7-10

Ø	Code
16	0090165022
25	0090255022
32	0090325022

COMPACT PRECISION SLIDE SERIES S14K

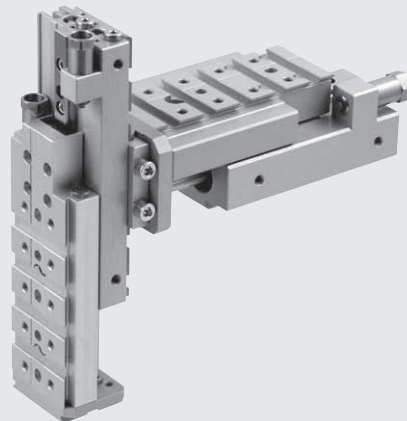


Flat, compact precision slides with two cylinders.

The fixed and moving parts are moved by a sturdy ball recirculation carriage running on hardened guides. Elastic mechanical stop or shock absorbers are used to achieve adjustable stop at the end of the stroke.

A three-position version is available allowing an intermediate stop.

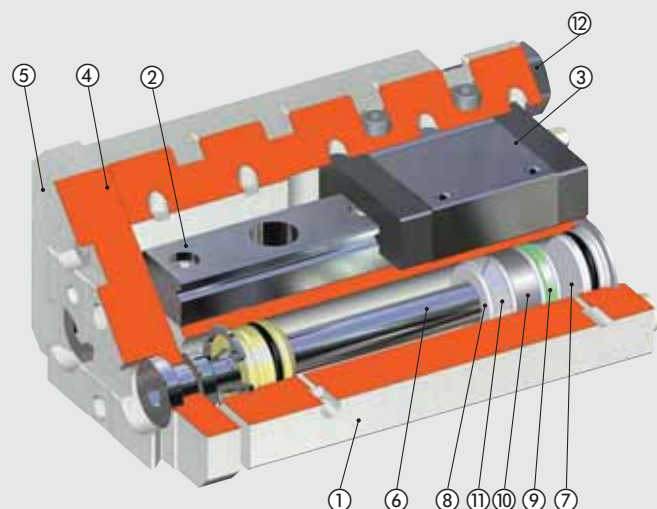
Slots are provided in the body for end-of-stroke sensors.



TECHNICAL DATA		S14K-8	S14K-16	S14K-25
Operating pressure	bar	2 to 8		
	psi	29 to 116		
Temperature range	°C	-10 to +80		
Fluid		Dry or lubricated 10 µm filtered compressed air. Lubrication, if used, must be continuous		
Maximum speed	m/s	0.8 (we always suggest to use micro regulator)	0.8	0.8
Versions		With shock absorbers – With elastic mechanical stop		
Bore		2 x Ø 8	2 x Ø 16	2 x Ø 25
Piston rod diameter	mm	4	8	12
Strokes	mm	10, 20, 30, 40, 50, 80, 100	10, 20, 30, 40, 50, 80, 100, 125, 150	10, 20, 30, 40, 50, 80, 100, 125, 150, 200
Stroke reduction by adjusting the decelerators retraction	mm	16 extension / 16 retraction	12 extension / 12 retraction	30 extension / 30 retraction
Stroke reduction by adjusting the buffers retraction	mm	8 extension / 8 retraction	10 extension / 10 retraction	15 extension / 15 retraction
Maximum impact energy with hydraulic decelerators	J	2	5	20
Maximum impact energy with buffers	J	0.15	0.25	0.5
Sensors		Sensors Magnetic Hall or Reed		
Theoretical thrust force at 6 bar	N	60	240	589
Theoretical pull force at 6 bar	N	46	180	453
Repeatability in stop positions	mm	0.02 (with shock absorbers); 0.02 (with buffers and 5 bar minimum pressure)		
Monitoring position		Any		
Notes		Lubrication recommended: every 2 million cycles for strokes below 100 mm and 1 million for longer strokes (grease code 9910506)		

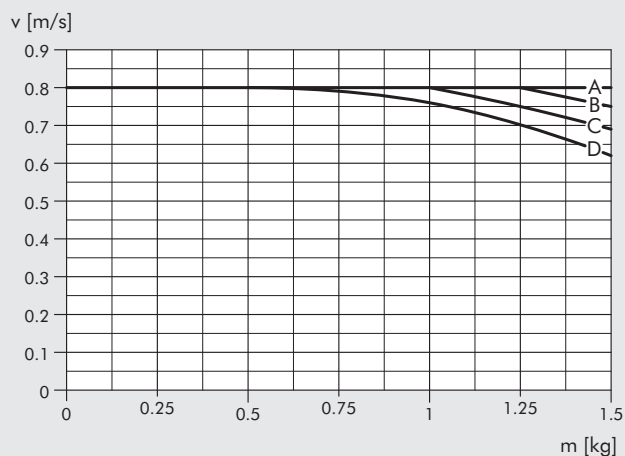
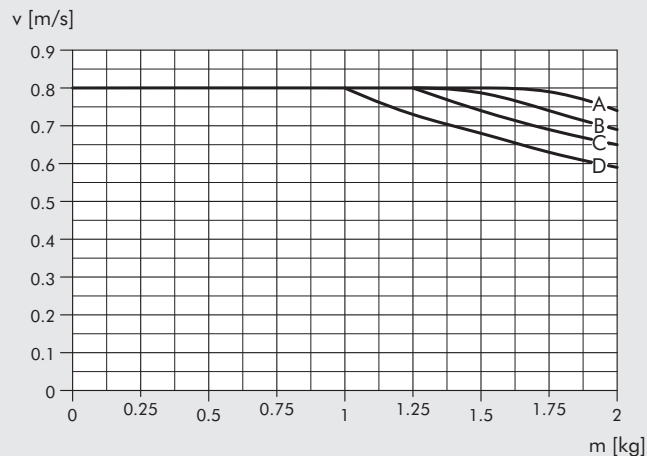
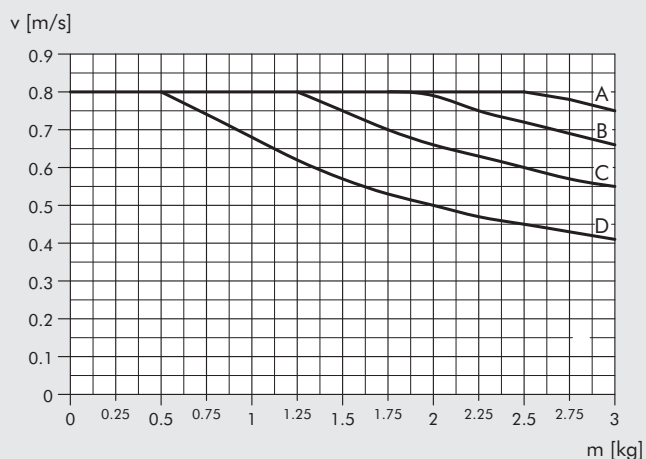
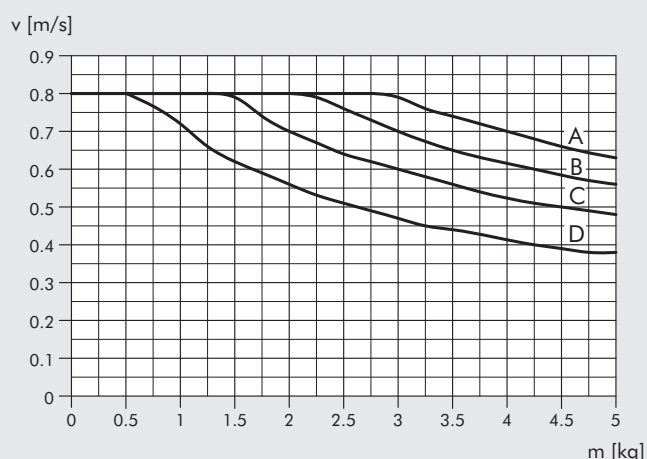
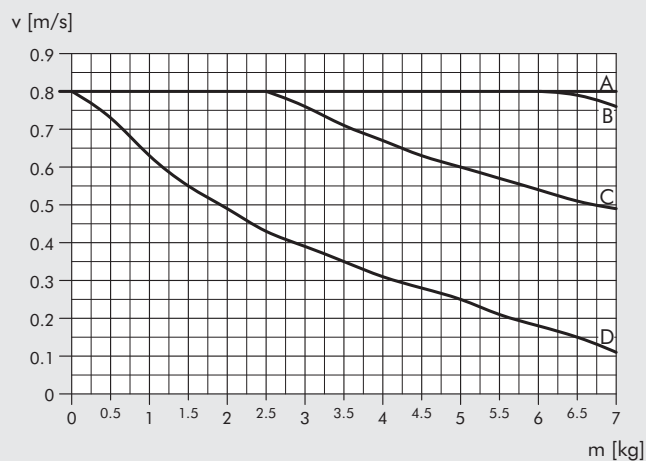
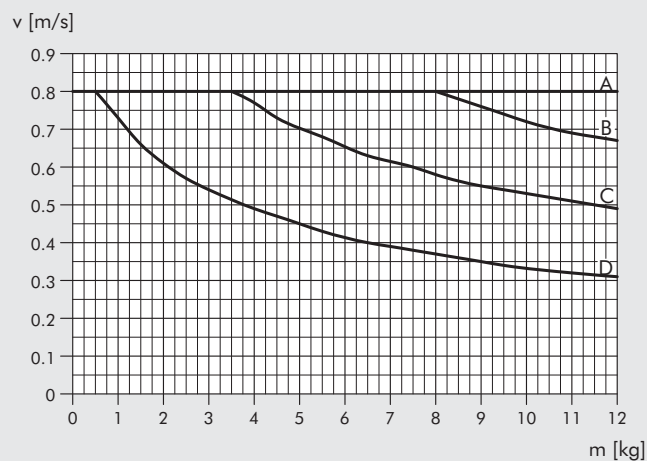
COMPONENTS

- ① SLIDE BODY: anodised aluminium
- ② GUIDE: hardened steel
- ③ CARRIAGE: recirculating ball bearings
- ④ MOVING PART: anodised aluminium
- ⑤ FRONT PLATE: anodised aluminium
- ⑥ PISTON ROD: stainless steel
- ⑦ END CAP: brass
- ⑧ PISTON: aluminium
- ⑨ GASKETS: polyurethane/NBR
- ⑩ MAGNET: plastoferrite/plastoneodymium
- ⑪ GUIDE STRIP: special technopolymer
- ⑫ STOP: stainless steel



Stroke [mm]	Total slide weight [kg]	Masses in movement [kg]
10	2.582	1.137
20	2.570	1.137
30	2.561	1.137
40	2.548	1.137
50	2.705	1.198
80	3.143	1.367
100	3.434	1.469
125	3.788	1.608
150	4.180	1.748
200	4.914	2.026

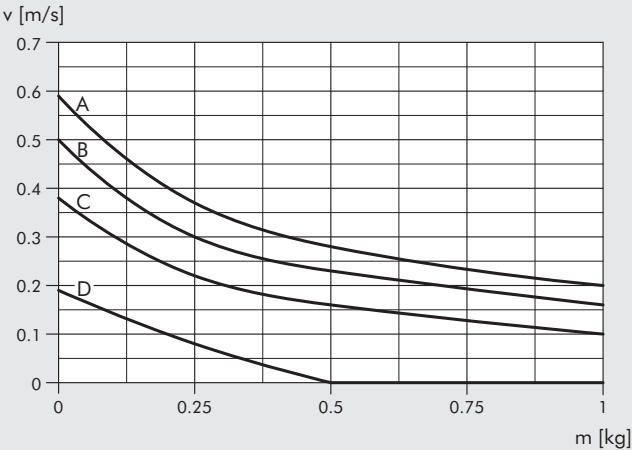
A3.48

MAXIMUM LOADS: VERSIONS WITH SHOCK ABSORBERS
S14K Ø 8 - Vertical orientation

S14K Ø 8 - Horizontal orientation

S14K Ø 16 - Vertical orientation

S14K Ø 16 - Horizontal orientation

S14K Ø 25 - Vertical orientation

S14K Ø 25 - Horizontal orientation


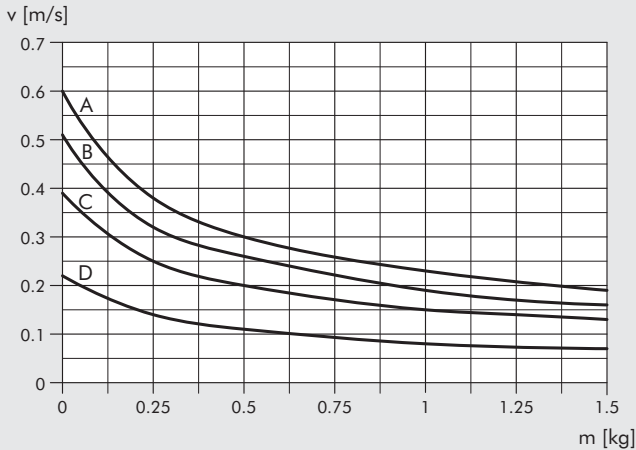
A = 2 bar B = 4 bar C = 6 bar D = 8 bar

MAXIMUM LOADS: VERSIONS WITH ELASTIC MECHANICAL STOP

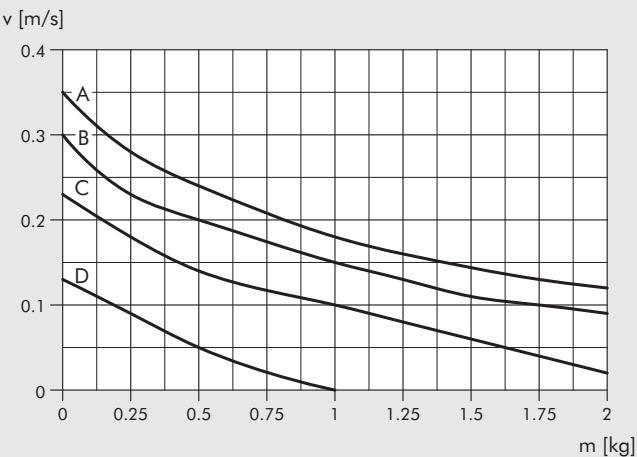
S14K Ø 8 - Vertical orientation



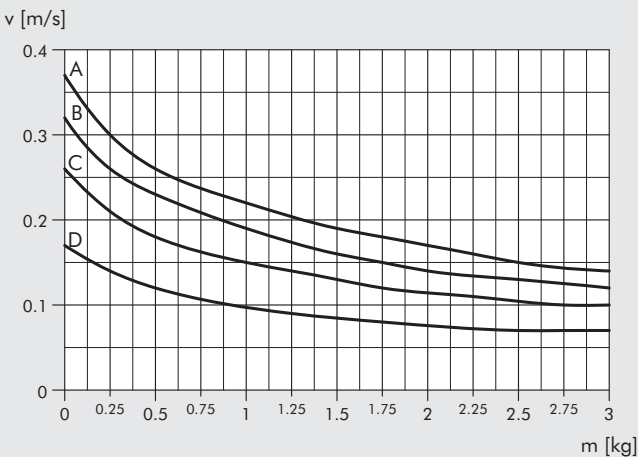
S14K Ø 8 - Horizontal orientation



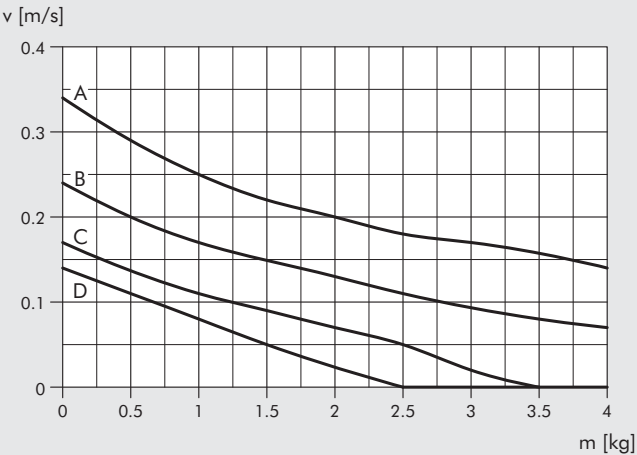
S14K Ø 16 - Vertical orientation



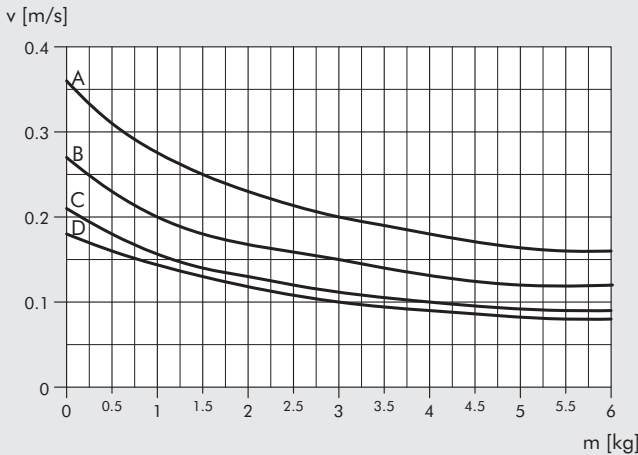
S14K Ø 16 - Horizontal orientation



S14K Ø 25 - Vertical orientation



S14K Ø 25 - Horizontal orientation

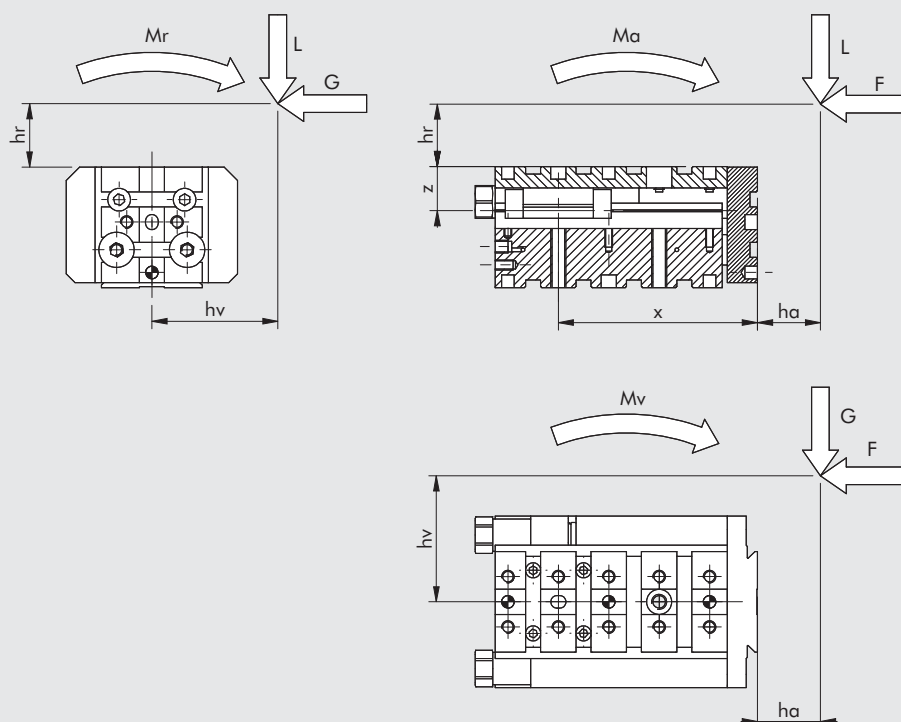


A = 2 bar B = 4 bar C = 6 bar D = 8 bar

STATIC FORCES AND MOMENTS

To prevent the recirculating ball guide from getting damaged, the maximum static loads and moments applied must meet the following equations, where the lengths have to be given in metres.

$$\frac{M_a}{M_{a \max}} + \frac{M_r}{M_{r \max}} + \frac{M_v}{M_{v \max}} + \frac{L}{L_{\max}} + \frac{G}{G_{\max}} \leq 1$$



Sum of the moments, with the signs shown in the example:

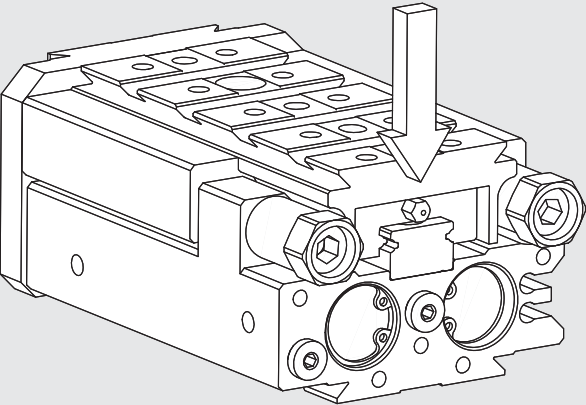
$$M_r = L \cdot hv - G \cdot (hr+z)$$

$$M_a = -F \cdot (hr+z) + L \cdot (ha+x)$$

$$M_v = -F \cdot hv + G \cdot (ha+x)$$

Ø	Stroke [mm]	X [mm]	Z [mm]	G max [N]	L max [N]	Mr max [Nm]	Ma max [Nm]	Mv max [Nm]
8	10	61	14	309.1	368.0	1.8	1.3	1.1
	20	61	14	309.1	368.0	1.8	1.3	1.1
	30	61	14	309.1	368.0	1.8	1.3	1.1
	40	71	14	309.1	368.0	1.8	1.3	1.1
	50	83.5	14	398.2	474.1	2.7	2.7	2.2
	80	113.5	14	398.2	474.1	2.7	2.7	2.2
	100	133.5	14	398.2	474.1	2.7	2.7	2.2
16	10	67	17.5	962.6	1145.9	10.7	9.1	7.7
	20	67	17.5	962.6	1145.9	10.7	9.1	7.7
	30	67	17.5	962.6	1145.9	10.7	9.1	7.7
	40	79	17.5	962.6	1145.9	10.7	9.1	7.7
	50	79	17.5	962.6	1145.9	10.7	9.1	7.7
	80	119	17.5	962.6	1145.9	10.7	9.1	7.7
	100	146.5	17.5	962.6	1145.9	10.7	9.1	7.7
	125	171.5	17.5	962.6	1145.9	10.7	9.1	7.7
25	150	196.5	17.5	962.6	1145.9	10.7	9.1	7.7
	10	98	22	1423.1	1694.1	43.6	18	15.1
	20	98	22	1423.1	1694.1	43.6	18	15.1
	30	98	22	1423.1	1694.1	43.6	18	15.1
	40	98	22	1423.1	1694.1	43.6	18	15.1
	50	108	22	1423.1	1694.1	43.6	18	15.1
	80	138	22	1423.1	1694.1	43.6	18	15.1
	100	158	22	1423.1	1694.1	43.6	18	15.1
	125	183	22	1423.1	1694.1	43.6	18	15.1
	150	208	22	1423.1	1694.1	43.6	18	15.1
	200	258	22	1423.1	1694.1	43.6	18	15.1

LUBRICATION INSTRUCTIONS

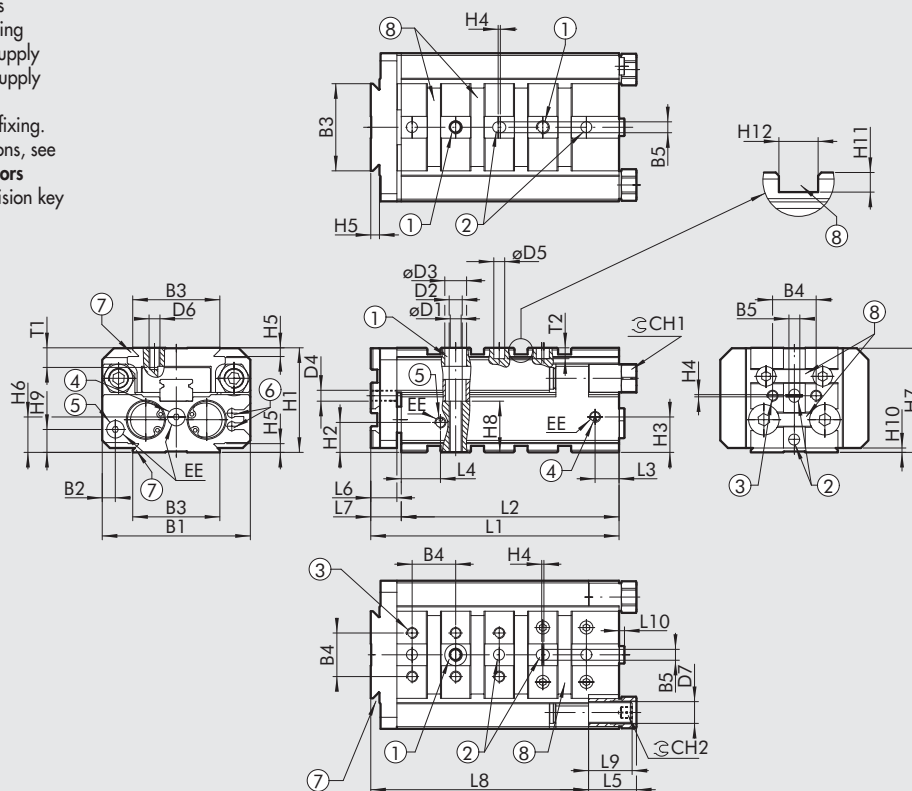


Ball recirculation carriages are supplied pre-lubricated.
They can be re-greased when necessary using the hole (Ø 8) or greasing Nipple (Ø 16 and Ø 25) provided.
The lubrication frequency depends on the environmental and operating conditions.
To ensure smooth movement and long life, we recommend an average lubrication interval of 2 million cycles for strokes less than 100 mm and 1 million for longer strokes.
A suitable bearing lubrication grease must be used (code 9910506).

NOTES

DIMENSIONS

- ① Through holes for fixing actuators
- ② Holes for centring pins
- ③ Threaded holes for fixing
- ④ Piston rod extension supply
- ⑤ Piston rod retraction supply
- ⑥ Sensor fixing slots
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see
chapter V-Lock adaptors
- ⑧ Slot for "V-Lock" precision key



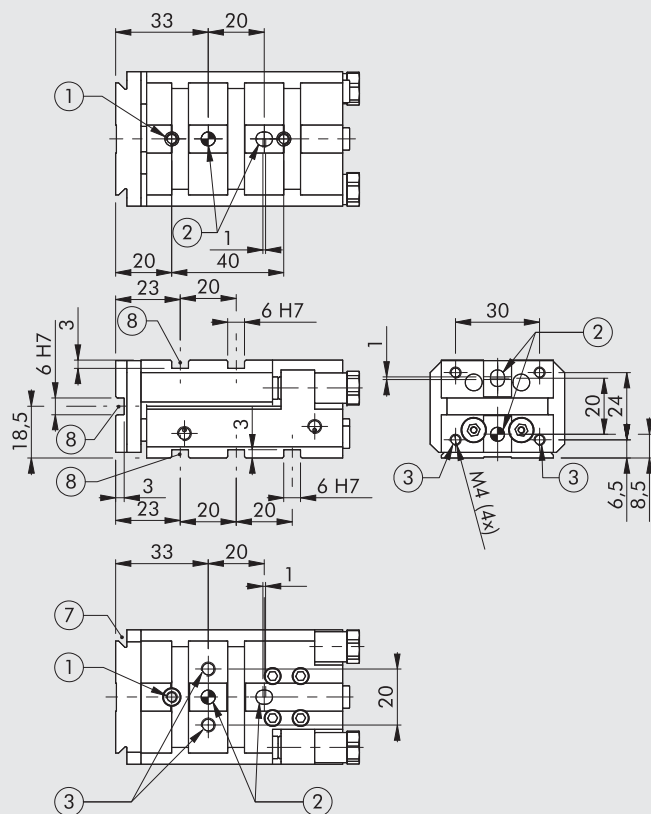
Ø	B1	B2	B3	B4	B5 ^{H7}	ØD1	D2	ØD3	D4	ØD5 ^{H7}	D6	D7	EE	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12 ^{H7}	T1	T2	CH1	CH2
8	48	7	40	-	5	3.3	M4	6	-	5	M5	M8x1	M5	35	8.8	11.3	1	4	10	34.8	17	7.5	2	3	6	6	5	11	4
16	68	6	40	20	5	5	M6	9.5	M5	5	M5	M10x1	M5	48	13.8	16.3	1	4	16.3	47.8	23.5	10.5	2	3	6	9	5	13	5
25	106	7.5	40	20	5	6.8	M8	11	M5	5	M5	M14x1.5	1/8"	64	17.3	23	1	4	17	63.8	35	12	2	3	6	10	5	18	6

ACCORDING TO THE STROKE

Ø	Stroke	L1	L2	L3	L4	L5	L6	L7	L8	L9		L10
										buffer decel.	shock absorbers	
8	10	81	70	10	13.5	16	9	11	71	15	27.9	2.5
	20	81	70	10	13.5	16	9	11	71	15	27.9	2.5
	30	81	70	10	13.5	16	9	11	71	15	27.9	2.5
	40	91	80	10	13.5	16	9	11	81	15	27.9	2.5
	50	106	95	10	13.5	16	9	11	96	15	27.9	2.5
	80	136	125	10	13.5	16	9	11	126	15	27.9	2.5
16	100	156	145	10	13.5	16	9	11	146	15	27.9	2.5
	10	109	95	11	18	22	12	14	95	20	30.7	2.5
	20	109	95	11	18	22	12	14	95	20	30.7	2.5
	30	109	95	11	18	22	12	14	95	20	30.7	2.5
	40	119	105	11	18	22	12	14	105	20	30.7	2.5
	50	129	115	11	18	22	12	14	115	20	30.7	2.5
25	80	159	145	11	18	22	12	14	145	20	30.7	2.5
	100	179	165	11	18	22	12	14	165	20	30.7	2.5
	125	204	190	11	18	22	12	14	190	20	30.7	2.5
	150	229	215	11	18	22	12	14	215	20	30.7	2.5
	10	138	120	16.5	25	30	16	18	118	28	65.7	2.5
	20	138	120	16.5	25	30	16	18	118	28	65.7	2.5
25	30	138	120	16.5	25	30	16	18	118	28	65.7	2.5
	40	138	120	16.5	25	30	16	18	118	28	65.7	2.5
	50	148	130	16.5	25	30	16	18	128	28	65.7	2.5
	80	178	160	16.5	25	30	16	18	158	28	65.7	2.5
	100	198	180	16.5	25	30	16	18	178	28	65.7	2.5
	125	223	205	16.5	25	30	16	18	203	28	65.7	2.5
25	150	248	230	16.5	25	30	16	18	228	28	65.7	2.5
	200	298	280	16.5	25	30	16	18	278	28	65.7	2.5

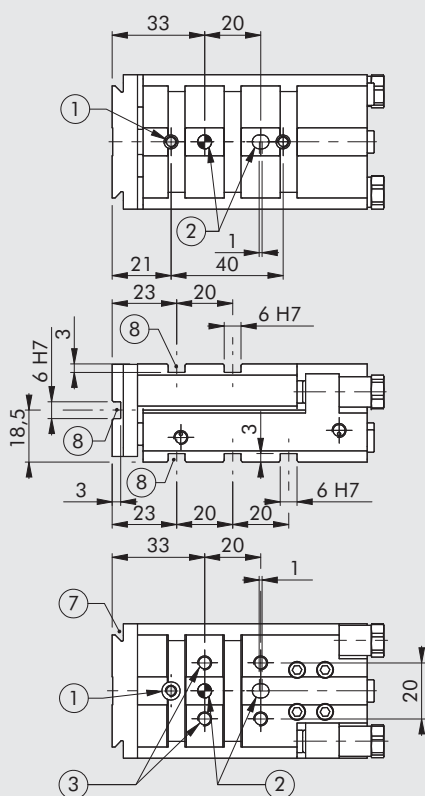
DIMENSIONS OF SLIDE S14K Ø 8

Ø 8 stroke 10; 20; 30 mm

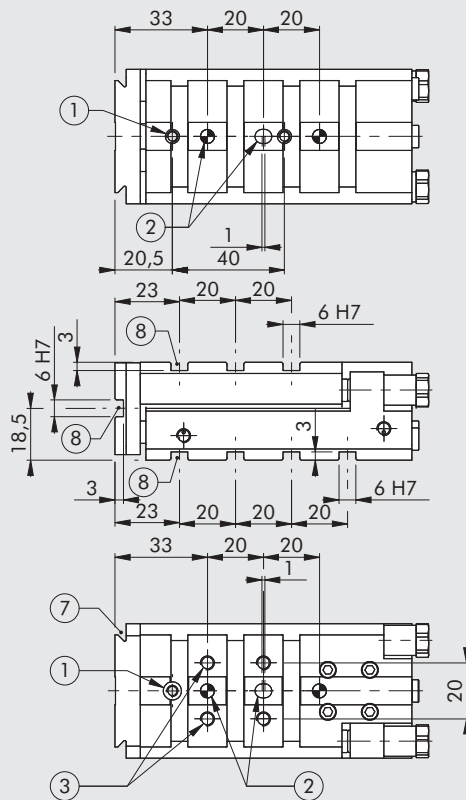


- ① Through holes for fixing actuators
- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see
chapter V-Lock adaptors
- ⑧ Slot for "V-Lock" precision key

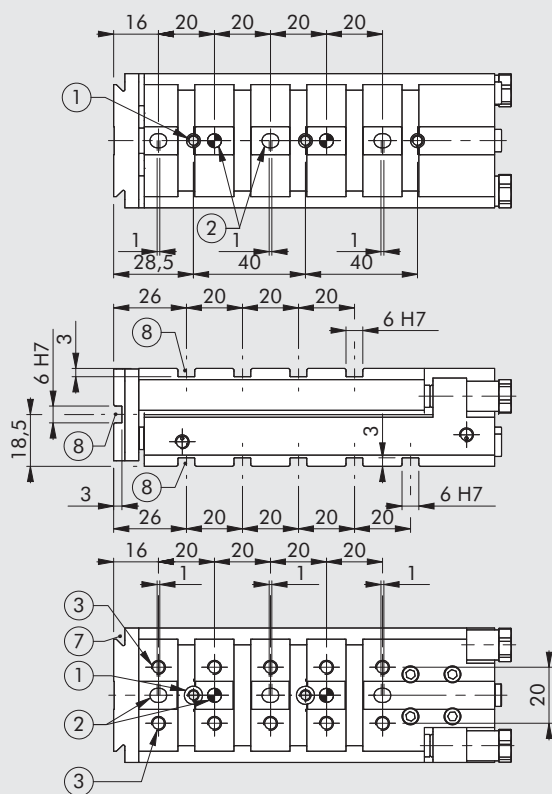
Ø 8 stroke 40 mm



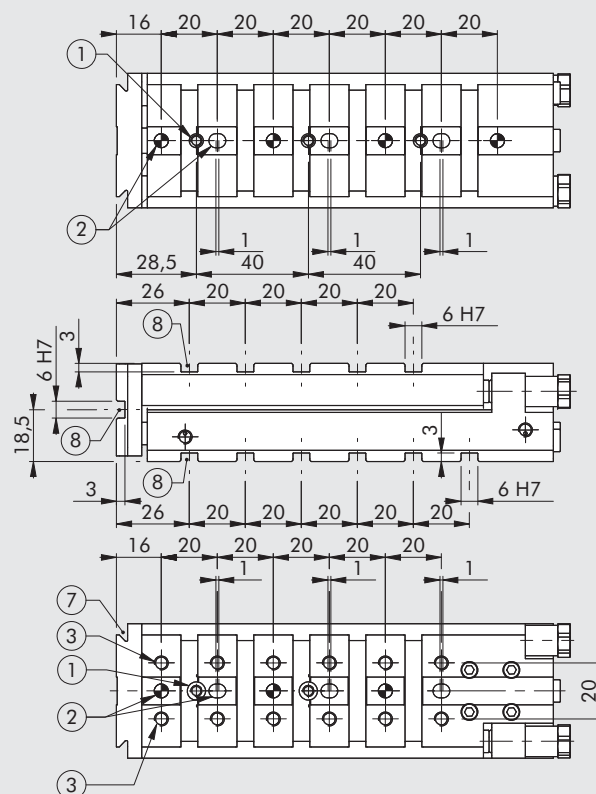
Ø 8 stroke 50 mm



Ø 8 stroke 80 mm



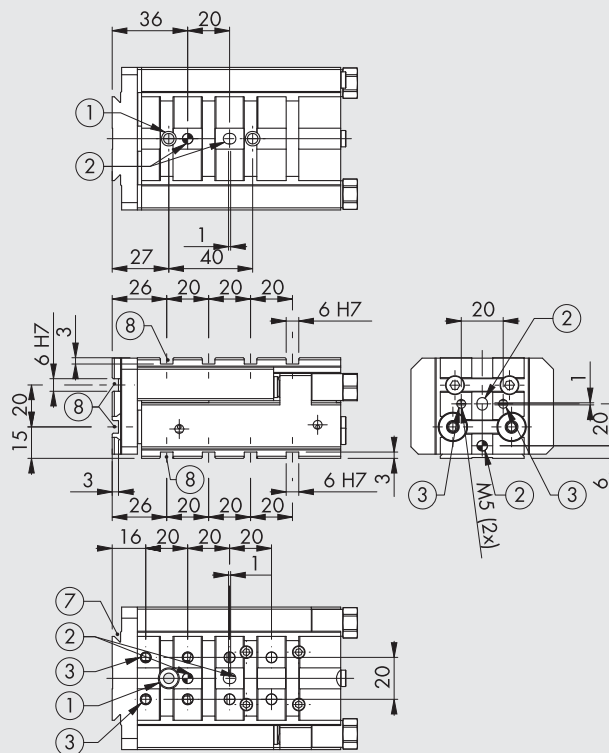
Ø 8 stroke 100 mm



NOTES

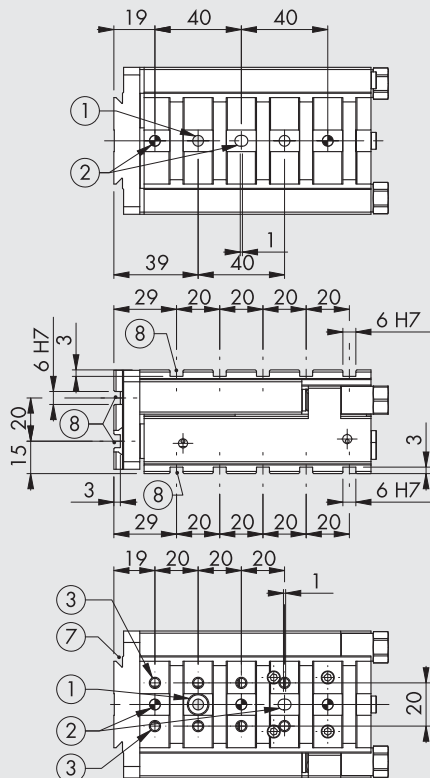
DIMENSIONS OF SLIDE S14K Ø 16

Ø 16 stroke 10; 20; 30 mm

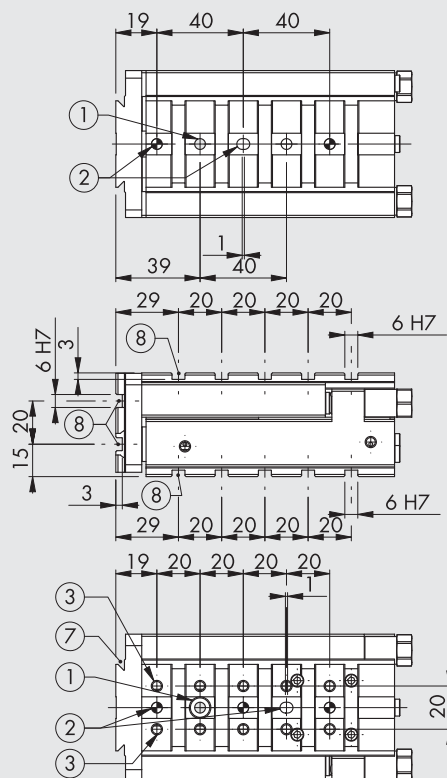


- ① Through holes for fixing actuators
- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see
chapter V-Lock adaptors
- ⑧ Slot for "V-Lock" precision key

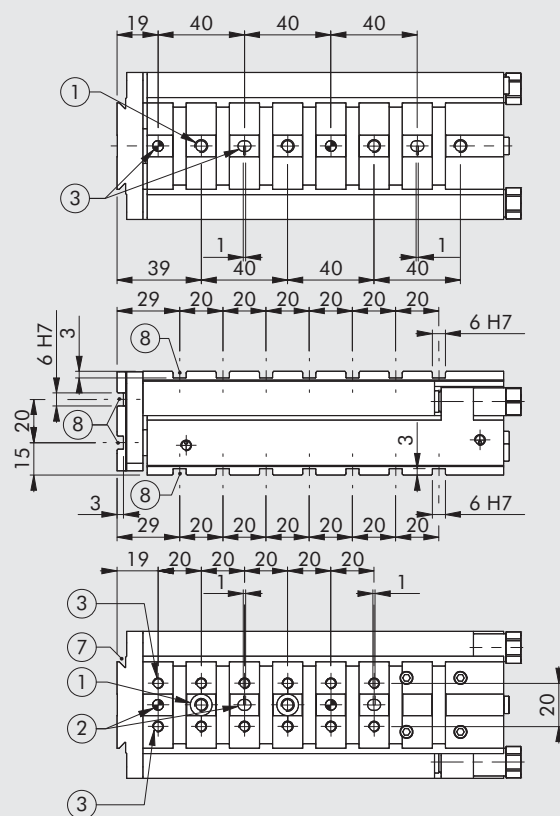
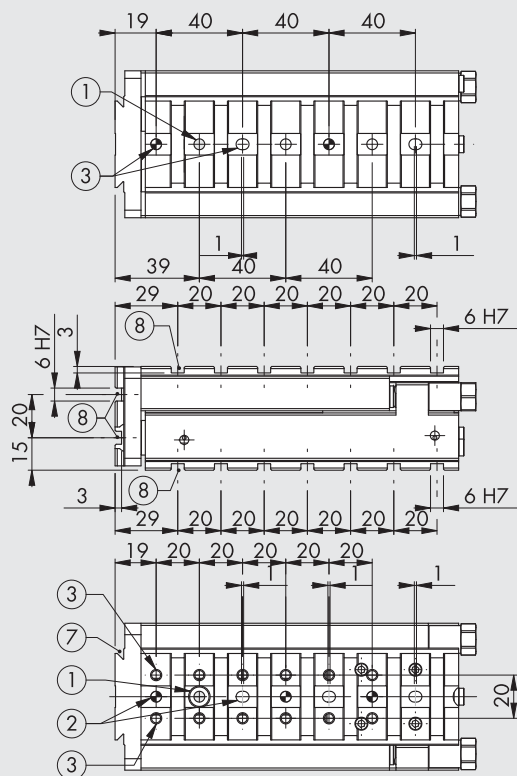
Ø 16 stroke 40 mm



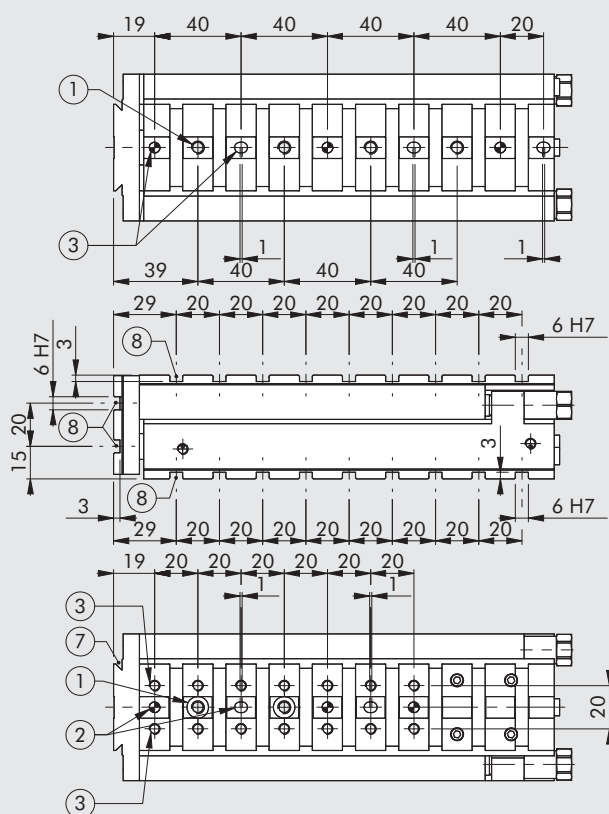
Ø 16 stroke 50 mm



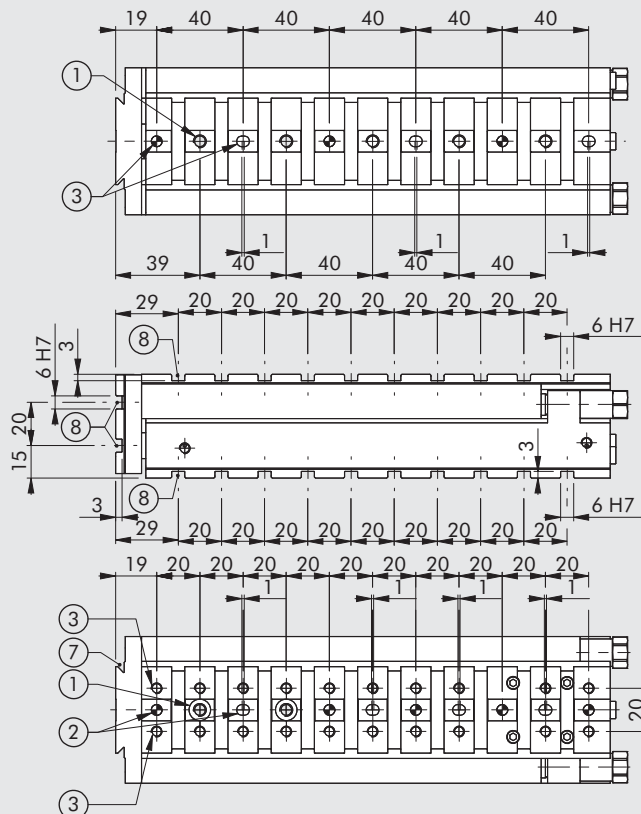
Ø 16 stroke 100 mm



Ø 16 stroke 125 mm

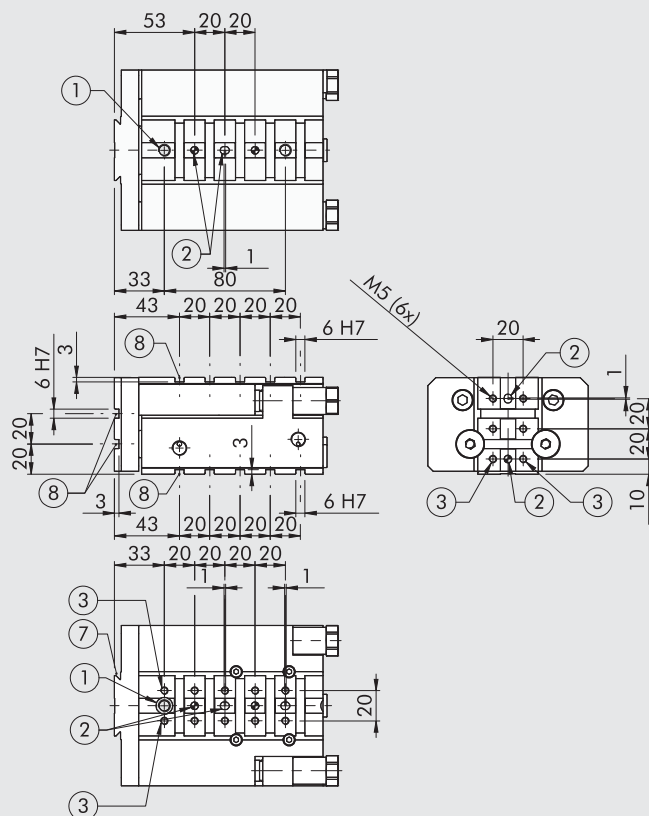


Ø 16 stroke 150 mm



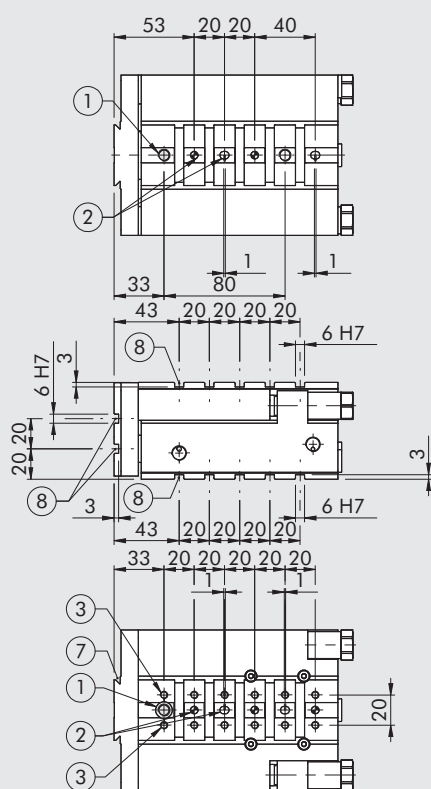
DIMENSIONS OF SLIDE S14K Ø 25

Ø 25 stroke 10; 20; 30; 40 mm

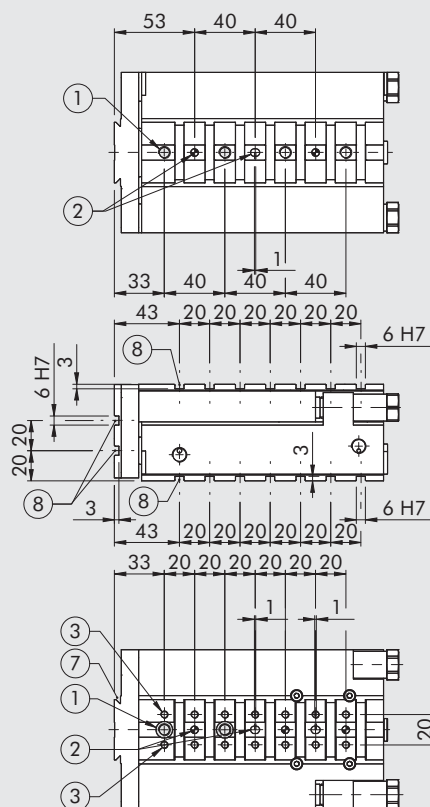


- ① Through holes for fixing actuators
- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see
chapter V-Lock adaptors
- ⑧ Slot for "V-Lock" precision key

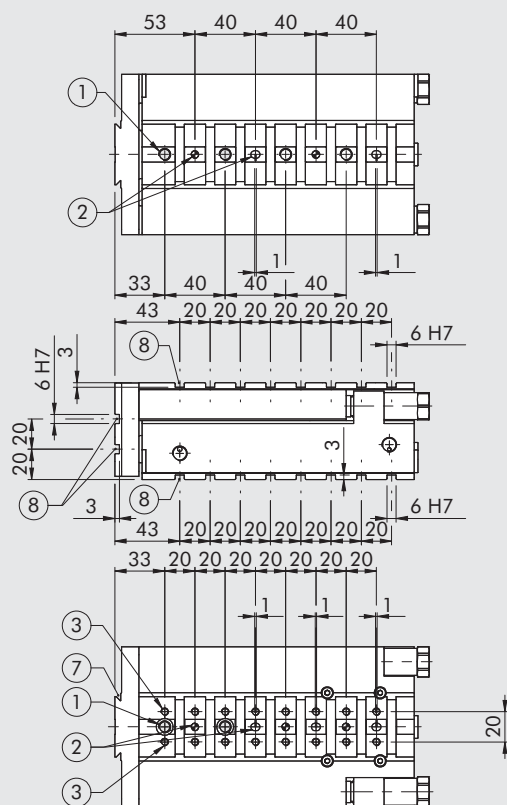
Ø 25 stroke 50 mm



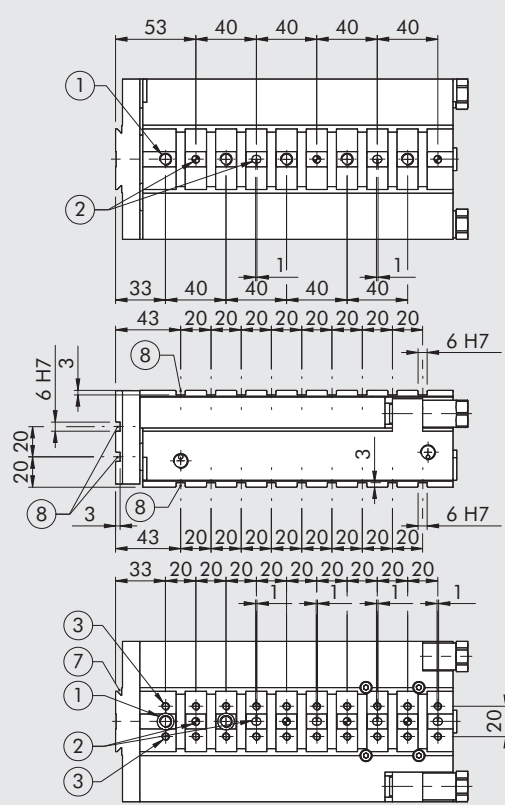
Ø 25 stroke 80 mm



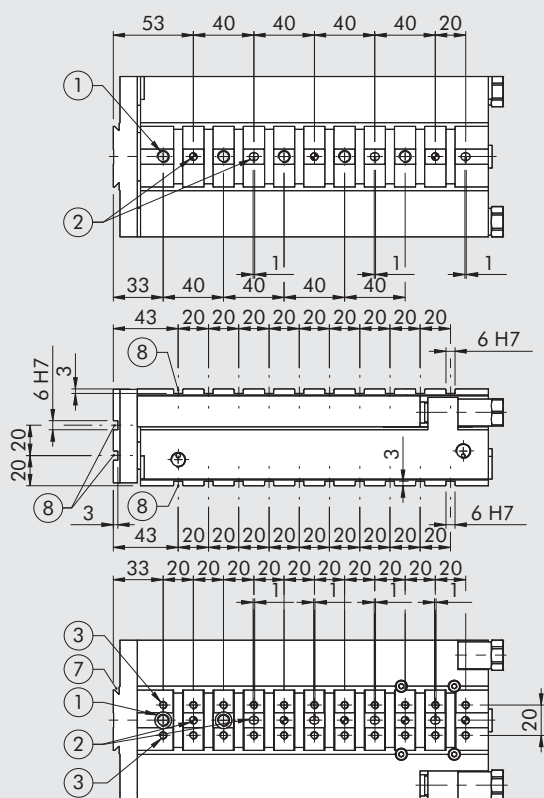
Ø 25 stroke 100 mm



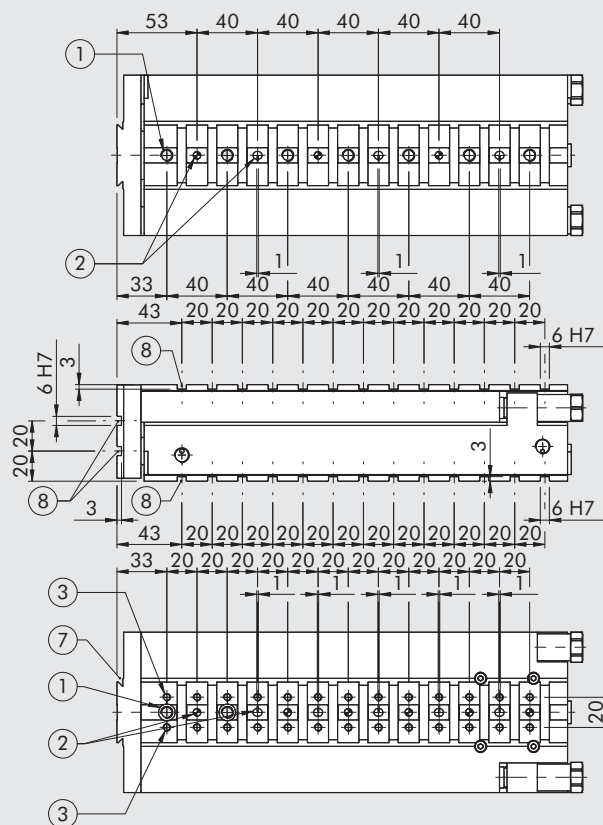
Ø 25 stroke 125 mm



Ø 25 stroke 150 mm



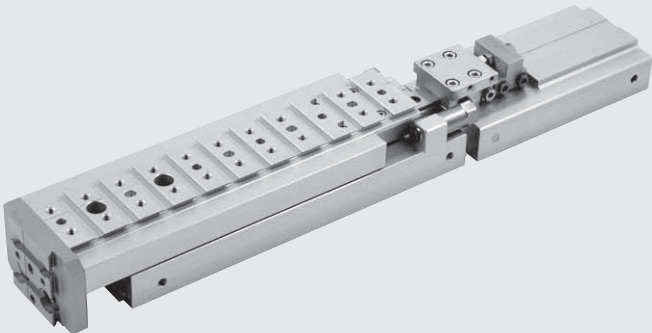
Ø 25 stroke 200 mm



THIRD-POSITION STOP DEVICE

Slide S14 can be supplied in a version with a third-position stop device for application where the slide needs to stop in an intermediate position (e.g. for depositing a workpiece). A stop device is mounted in series with the slide and partialises the total stroke when supplied with compressed air. The third-position stop device comes with a magnet on the piston and slots for sensors to monitor the position of the piston rod.

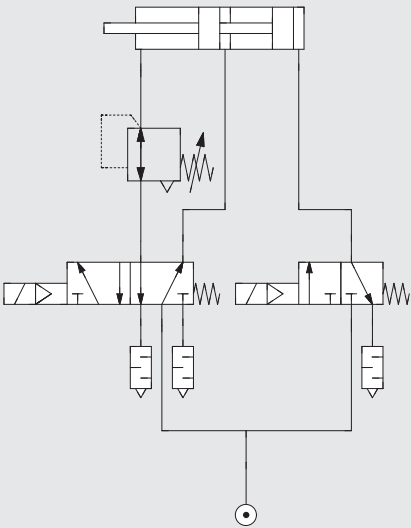
This device can be ordered with a free nominal stroke, up to the total length of the slide on which it is mounted, with 1 mm interval. The stop position can be adjusted mechanically within ± 1.5 mm of the nominal stroke. For example, a stop device with a 30 mm stroke can limit the stroke of the slide by an adjustable length ranging from 28.5 to 31.5 mm.



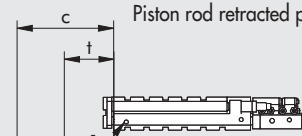
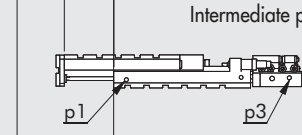
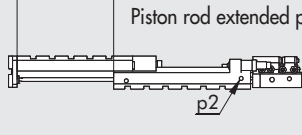
	S14K-8	S14K-16	S14K-25
Maximum impact energy in intermediate position [J]	0.05	0.15	0.25

PNEUMATIC SYSTEM DIAGRAM

The third-position stop device can be operated by a 3/2 valve, as shown in the diagram. The optional pressure regulator can be used to regulate the backpressure, and hence the useful force, in the first section of the stroke.



PNEUMATIC THRUST CHART

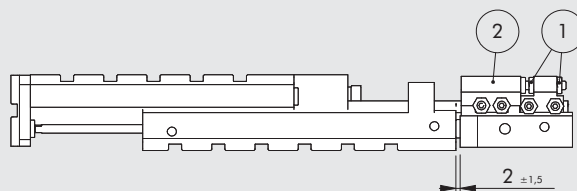
Supply diagram	Useful theoretical thrust [N] depending on pressure [bar]		
	S14K-8	S14K-16	S14K-25
 Piston rod retracted position	$p1 \times 7.5$	$p1 \times 30$	$p1 \times 75.5$
 Intermediate position	$p3 \times 10 - p1 \times 7.5$	$p3 \times 40 - p1 \times 30$	$p3 \times 98 - p1 \times 75.5$
 Piston rod extended position	$p2 \times 10$	$p2 \times 40$	$p2 \times 98$

c = Slide S14K stroke
t = Third-position stop device stroke

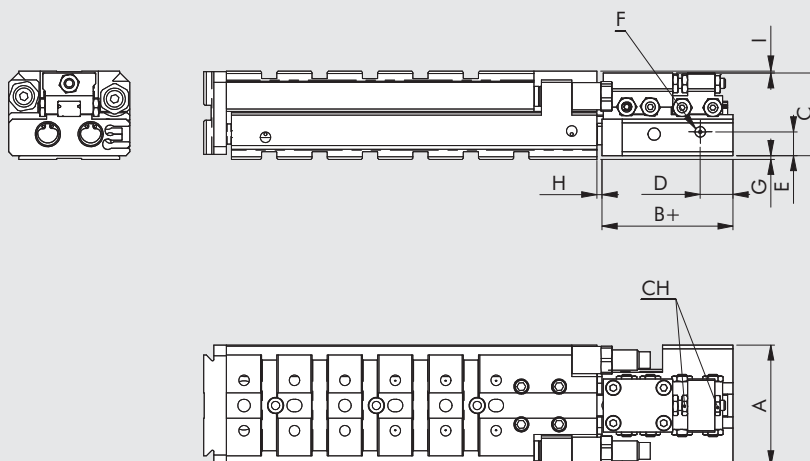
FINE ADJUSTMENT

How to adjust the third position:

- Unscrew the lock nuts on the adjusting grub screw ①
- Regulate the position of the stop by adjusting the moving unit ②
- Tighten the lock nuts on the adjusting grub screw ①



DIMENSIONS OF THE THIRD-POSITION DEVICE FOR SLIDE S14K Ø 8 - Ø 16 - Ø 25



+ = Add the stroke of the third position
H = Adjusting the third position

Ø	A	B	C	D	E	F	G	H max	I	CH
8	48	52	33.3	13	9	M5	1	4	0.7	7
16	68	60	42	13	12	M5	3	4	3	8
25	106	85	59.5	16	16	1/8"	4	4	0.5	13

KEY TO CODES - STANDARD VERSION

W147	2	08	3	050	K
TYPE	MODEL	BORE	STOP	STROKE	FAMILY
Precision slide	2 S14K	08 16 25	3 With mechanical stop 5 With shock absorbers	See general technical data	K V-Lock

KEY TO CODES - VERSION WITH THIRD-POSITION STOP DEVICE

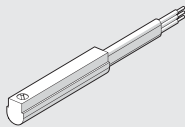
W147	2	08	3	050	020	K
TYPE	MODEL	BORE	STOP	STROKE	THIRD POSITION STROKE	FAMILY
Precision slide	2 S14K	08 16 25	3 With mechanical stop 5 With shock absorbers	See general technical data		K V-Lock

S14K SLIDE ACCESSORIES

V-Lock ACCESSORIES

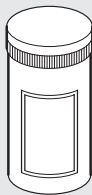
See page A3.36

SENSOR Ø 4



For codes and technical data, see **chapter A6**.

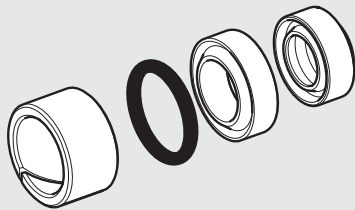
GREASE



Code	Description	Weight [g]
9910506	Tube of RHEOLUBE 363 AX1 grease	400

S14K SLIDE SPARE PARTS

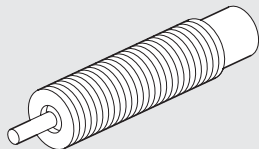
GASKET SPARE PARTS KIT



Code	Description
W1472089001K	S14K gasket kit Ø 8
W1472169001K	S14K gasket kit Ø 16
W1472259001K	S14K gasket kit Ø 25

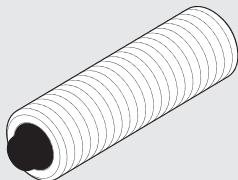
NOTE: kit contents: 1 guide strip, 1 piston rod gasket, 1 piston gasket, 1 end cap O-ring

SHOCK ABSORBERS



Code	Ø	Description
W0950005300	8	Shock absorbers - 2 M8 x 1
W0950005301	16	Shock absorbers - 2 M10 x 1
W0950005303	25	Shock absorbers - 2 M14 x 1.5

ELASTIC MECHANICAL STOP



Code	Ø	Description
W0950005400K	8	Elastic mechanical stop M8 x 1
W0950005401K	16	Elastic mechanical stop M10 x 1
W0950005402K	25	Elastic mechanical stop M14 x 1.5

COMPACT GUIDED CYLINDER SERIES CMPGK



The CMPGK is a functional, sturdy guided compact cylinder with a built-in guide unit.

The piston rod guide bushings are mounted directly in the anodised aluminium alloy cylinder liner.

Two different types of guides can be mounted as required: sintered bronze bushings coupled with chromed and ground carbon steel piston rods, or ball recirculation bushings with chromed and ground hardened steel piston rods.

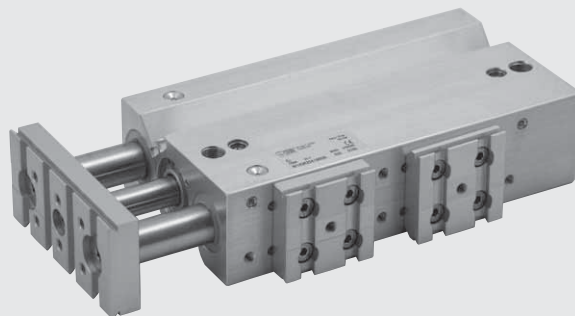
Grooves are provided on one side of the body to accommodate retractable sensors.

Currently available is either a non-cushioned version with the end-of-stroke stop cushioned by NBR front gaskets, or a cushioned one with pins that can be adjusted to regulate progressive braking.

The front plate features the typical V-lock dovetail with grooves and holes.

V-Lock fixing elements can be fitted to the main body on any of the three surfaces identified as UP, SIDE and DOWN. The chosen surface has a grid of threaded holes and pinholes with one or two V-Lock plates, depending on the stroke.

The plates are mounted in a preset position, but they can be moved on the grid as required.



TECHNICAL DATA		CUSHIONED	NON-CUSHIONED
Operating pressure	bar MPa	1 to 10 0.1 to 1	
	psi	14.5 to 145	
Temperature range	°C °F	-10 to +80 14 to 176	
Fluid		Filtered air without lubrication; lubrication, if used, must be continuous	
Bore	mm	16, 20, 25, 32, 40	
Standard stroke	mm	Ø 16: 20, 30, 40, 50 Ø 20: 20, 30, 40, 50, 75, 100, 150, 200 Ø 25: 20, 30, 40, 50, 75, 100, 150 Ø 32: 25, 50, 75, 100, 150, 175 Ø 40: 25*, 50, 75, 100, 150, 175	Ø 16: 30*, 40, 50, 75, 100, 150, 200 Ø 20: 25, 30, 40, 50, 75, 100, 150, 200 Ø 25: 25, 30, 40, 50, 75, 100, 150, 200 Ø 32: 25, 50, 75, 100, 150, 200 Ø 40: 50, 75, 100, 150, 200
Version		With bronze bushings - With ball bearings	
Sensor magnet		Standard	
Maximum impact energy	J	See diagram on next page	Ø 16: 0.06 Ø 20: 0.14 Ø 25: 0.2 Ø 32: 0.4 Ø 40: 0.6
Notes		* Side and Down versions only	

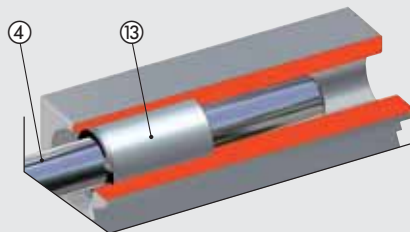
WEIGHTS

Ø	Non-cushioned		Cushioned	
	Weight [g] Stroke = 0	Weight [g] each mm	Weight [g] Stroke = 0	Weight [g] each mm
16	395	5.77	514	5.77
20	586	7.38	643	7.38
25	650	11.01	835	11.01
32	1042	17.51	1454	17.51
40	1128	19.04	1579	19.04

COMPONENTS

- ① BARREL: anodized aluminium alloy
- ② PISTON ROD: grinded chrome steel
- ③ GUIDE ROD: grinded chrome steel
- ④ GUIDE ROD: hardened and tempered chrome steel, grinded
- ⑤ REAR BASE: anodized aluminium alloy
- ⑥ FRONT BASE: anodized aluminium alloy
- ⑦ PISTON ROD GASKET: polyurethane
- ⑧ CUSHIONING GASKET: NBR
- ⑨ PISTON: aluminium alloy
- ⑩ MAGNET: plastroferrite
- ⑪ PISTON GASKET: NBR
- ⑫ SLIDE BUSHING: sintered bronze
- ⑬ BALL BEARINGS
- ⑭ DUST SCRAPER RING: NBR or FKM/FPM
- ⑮ GREASE NIPPLES: zinc-plated or stainless steel
- ⑯ FLANGE: anodized aluminium alloy
- ⑰ CUSHIONING NEEDLE: OT58 brass

Ball Bearings versions



Bronze bushings version

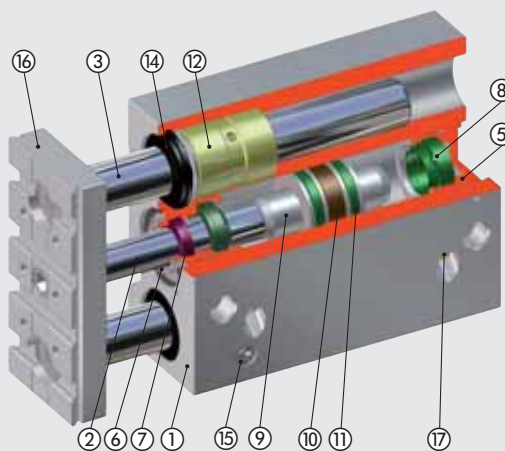
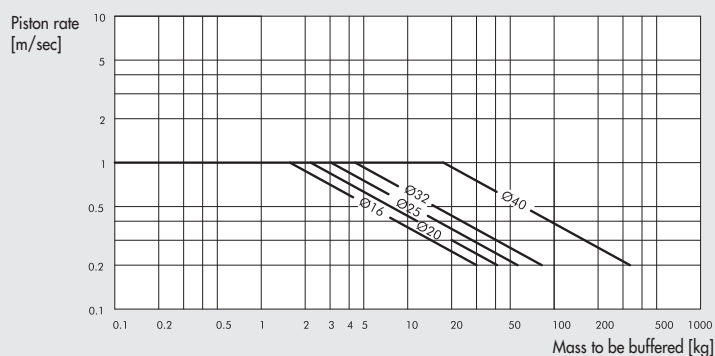
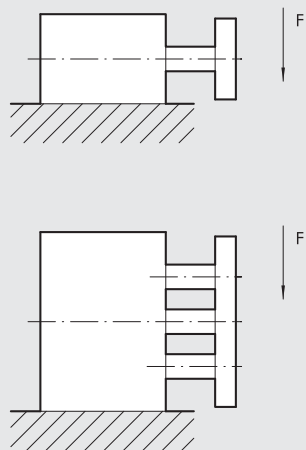


DIAGRAM OF SPEED AND MAXIMUM CUSHIONABLE LOAD

For the cylinder to reach the end-of-stroke position without intense or repeated impact which would damage it, it is necessary to annul the kinetic energy of the moving mass and the work generated. The maximum cushionable load depends on the traversing speed and the absorption of the air buffer supplied standard with the various cylinders. The diagram shows the speeds and cushionable mass for the various diameters at a pressure of 6 bar.



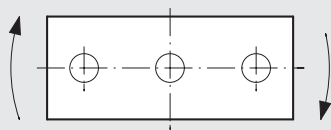
MAXIMUM SIDE LOAD



Ø mm	Guide unit	Stroke (mm)									
		20	25	30	40	50	75	100	150	175	200
16	Bushes	29	–	26	23	20	16	14	10	–	8
	Balls	31	–	27	38	34	29	24	12	–	8
20	Bushes	52	50	45	39	35	58	49	38	–	31
	Balls	56	–	48	79	70	54	50	27	–	32
25	Bushes	71	67	61	54	48	78	66	50	–	41
	Balls	72	68	62	78	73	60	52	37	–	30
32	Bushes	–	197	–	–	168	138	109	78	70	65
	Balls	–	89	–	–	60	276	217	138	122	110
40	Bushes	–	197	–	–	168	138	109	78	70	65
	Balls	–	89	–	–	60	276	217	138	122	110

N.B.: Forces are expressed in N

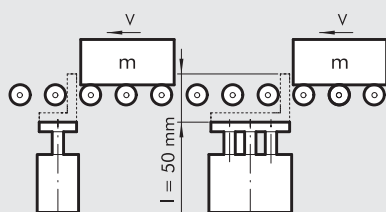
MAXIMUM TORQUE ON PLATE



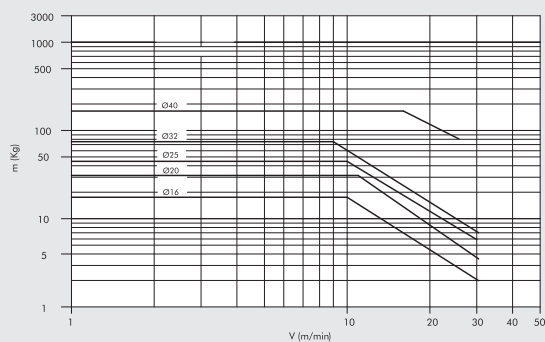
Ø mm	Guide unit	Stroke (mm)									
		20	25	30	40	50	75	100	150	175	200
16	Bushes	0.45	–	0.36	0.32	0.28	0.24	0.20	0.46	–	0.12
	Balls	0.60	–	0.50	0.72	0.65	0.54	0.45	0.35	–	0.25
20	Bushes	0.92	0.85	0.79	0.72	0.64	1.05	0.90	0.69	–	0.56
	Balls	1.28	–	1.08	1.78	1.59	1.24	1	0.61	–	0.49
25	Bushes	1.55	1.42	1.32	1.18	1.04	1.70	1.44	1.10	–	0.90
	Balls	1.98	1.78	1.70	2.16	2.20	1.66	1.4	1.02	–	0.82
32	Bushes	–	3.94	–	–	2.95	2.46	1.97	1.55	1.38	1.24
	Balls	–	1.97	–	–	1	2.96	2.44	2.40	2.43	2.18
40	Bushes	–	4.40	–	–	3.45	2.96	2.46	1.70	1.55	1.40
	Balls	–	2.46	–	–	1.45	6.38	5.4	3	2.73	2.40

N.B.: Forces are expressed in Nm

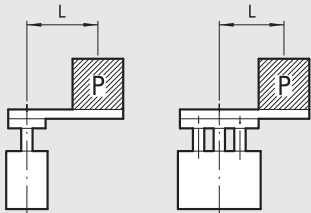
STOPPER FUNCTIONS



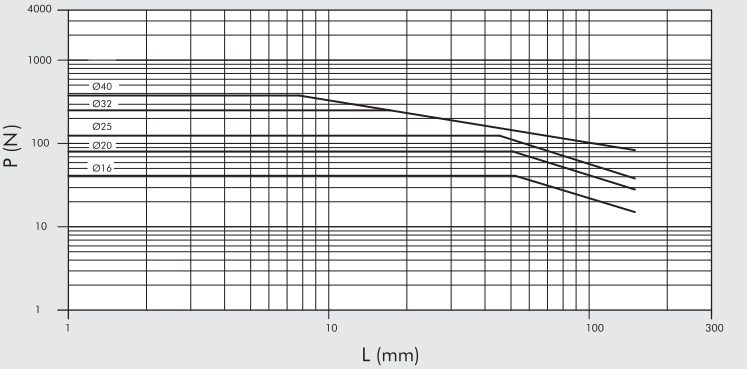
The graph refers to a 50 mm-stroke cylinder.



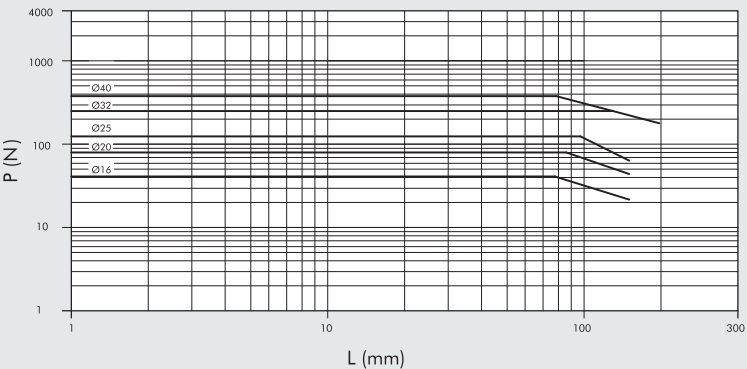
LIFTING FUNCTIONS



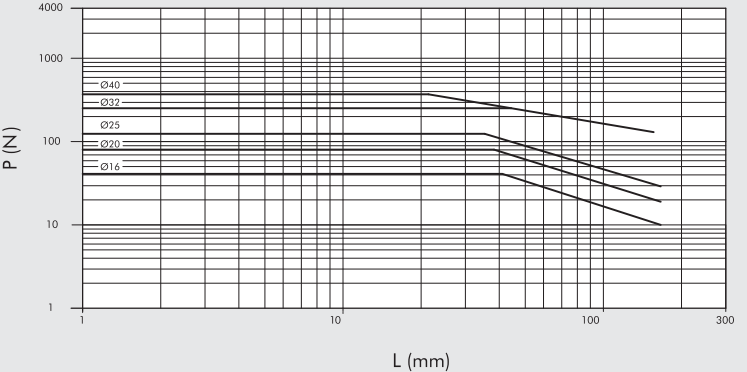
The graph refers from 25 to 50 mm-stroke cylinders with ball re-circulation guide unit



The graph refers from 75 to 100 mm-stroke cylinders with ball re-circulation guide unit

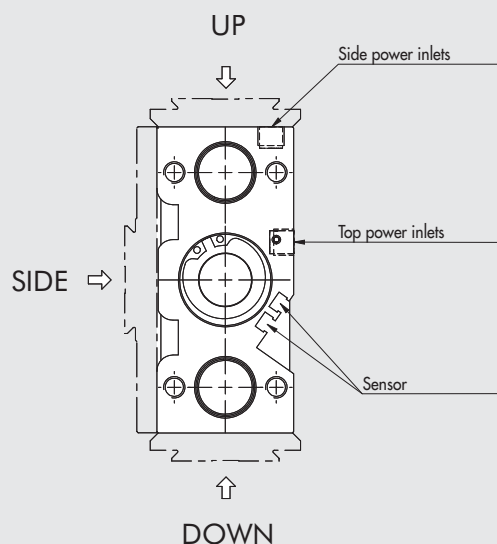


The graph refers to 50 mm-stroke cylinders with bushing guide unit



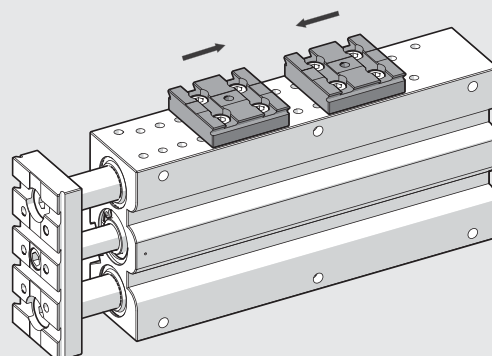
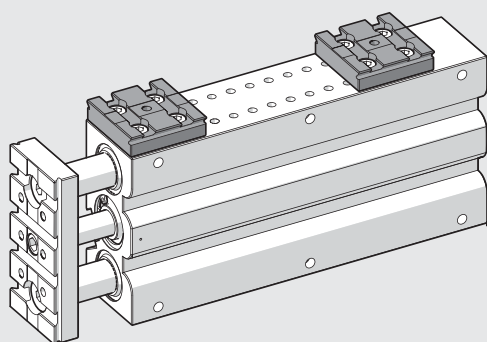
MOUNTING OPTIONS

The surface of the body on which to mount the V-Lock plates must be specified at the coding stage. The surface is identified by a letter **U** (Up), **S** (Side) or **D** (Down).

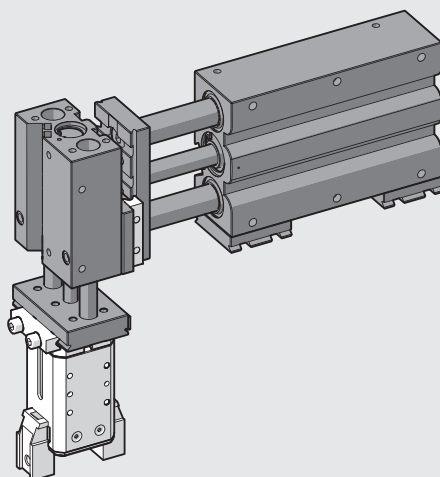


The chosen side of the CMPGK cylinder has a series of threaded holes and pinholes, and one or more V-Lock plates, depending on the stroke. The cylinder is delivered with a plate mounted in the foremost position and another, if provided, in the rearmost position.

The V-Lock plates can be moved as required and fixed to any of the threaded holes.

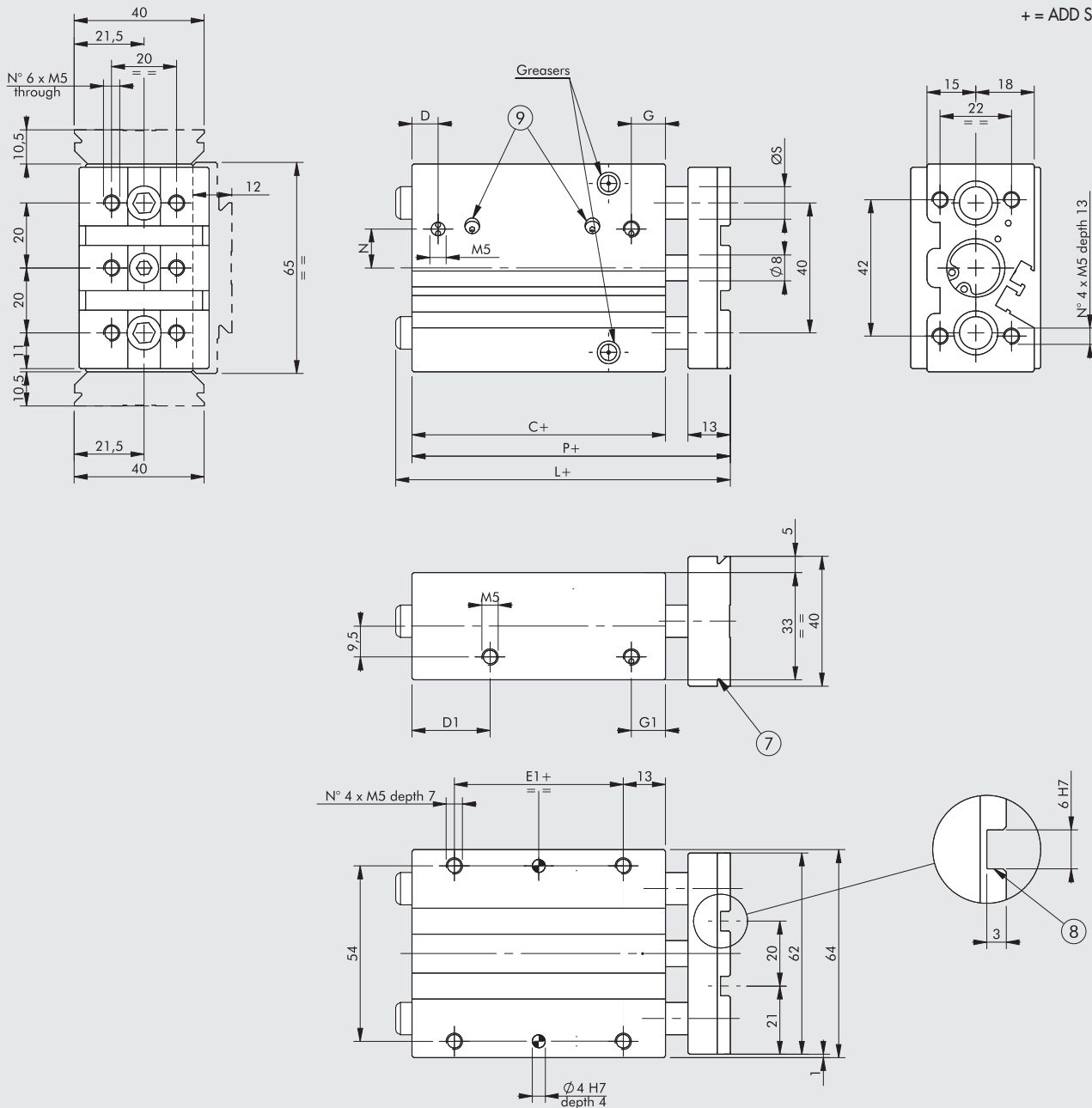


EXAMPLES OF APPLICATION



DIMENSIONS OF Ø 16, BA AND BB NON-CUSHIONED VERSION
DIMENSIONS OF Ø 16, BA AND BB CUSHIONED VERSION

+ = ADD STROKE



- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key
- ⑨ Cushioning pins (in the cushioned version only)

Stroke	L
0 to 50	49
75 to 200	77.5

Stroke	L
0 to 50	76
75 to 200	104.5

NON-CUSHIONED

C	D	D1	E1	G	G1	L		N	P	Ø S	
						BA*	BB**			BA*	BB**
33	8.5	20	7	11.5	11.5	see above		6.5	49	10	10

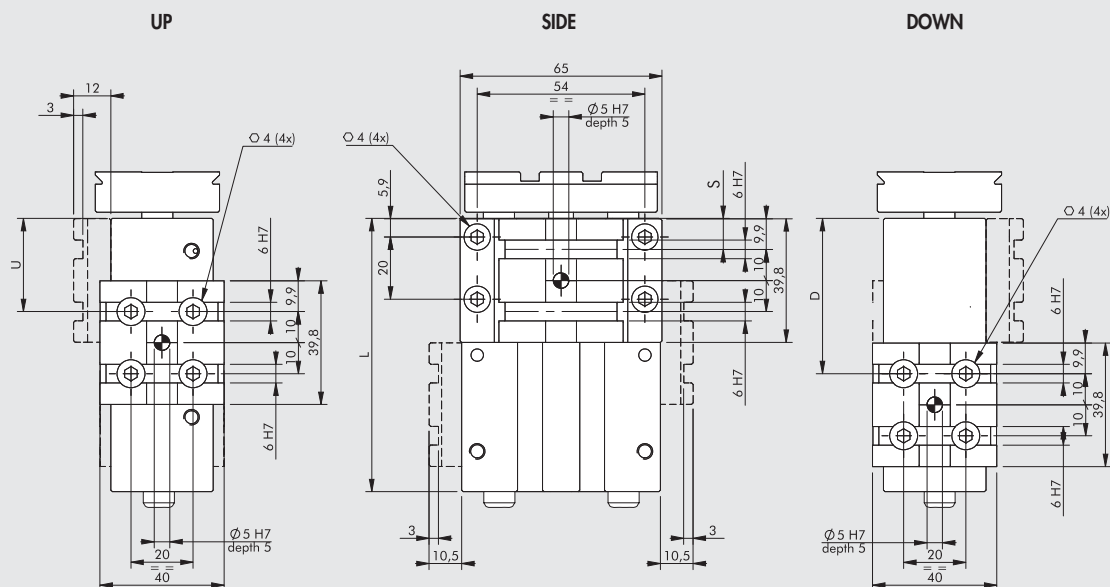
CUSHIONED

C	D	D1	E1	G	G1	L		N	P	Ø S	
						BA*	BB**			BA*	BB**
58	8	24	32	10.5	10.5	see above		12	74	10	10

* Version BA (Bronze Bushings)

** Version BB (Ball Bearings)

POSITION OF Ø 16 PLATES, BA AND BB NON-CUSHIONED VERSION
POSITION OF Ø 16 PLATES, BA AND BB CUSHIONED VERSION



NON-CUSHIONED

Stroke [mm]	30			40			50			75			100			150			200			
Position	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	
Possible positions (see page A3.67)	-	10	10	-	10	10	-	10	10	-	10	10	-	10	10	-	10	10	-	10	10	
	-	-	30	* 30	30	30	* 30	-	30	30	30	30	30	30	30	30	30	30	30	30	30	
									50	50	50	50	-	50	50	50	50	50	50	50	50	
									* 70	70	70	70		70	70	70	70	70	70	70	70	
													* 90	90	90	90	90	90	90	90	90	
																110	110	110	110	110	110	
																* 130	130	130	130	130	130	
																-	-	150	150	150	150	
																			170	170	170	
																			* 190	190	190	
No. of V-Lock plates supplied	1			1			1			2			2			2			2			
L	63			73			83			108			133			183			233			

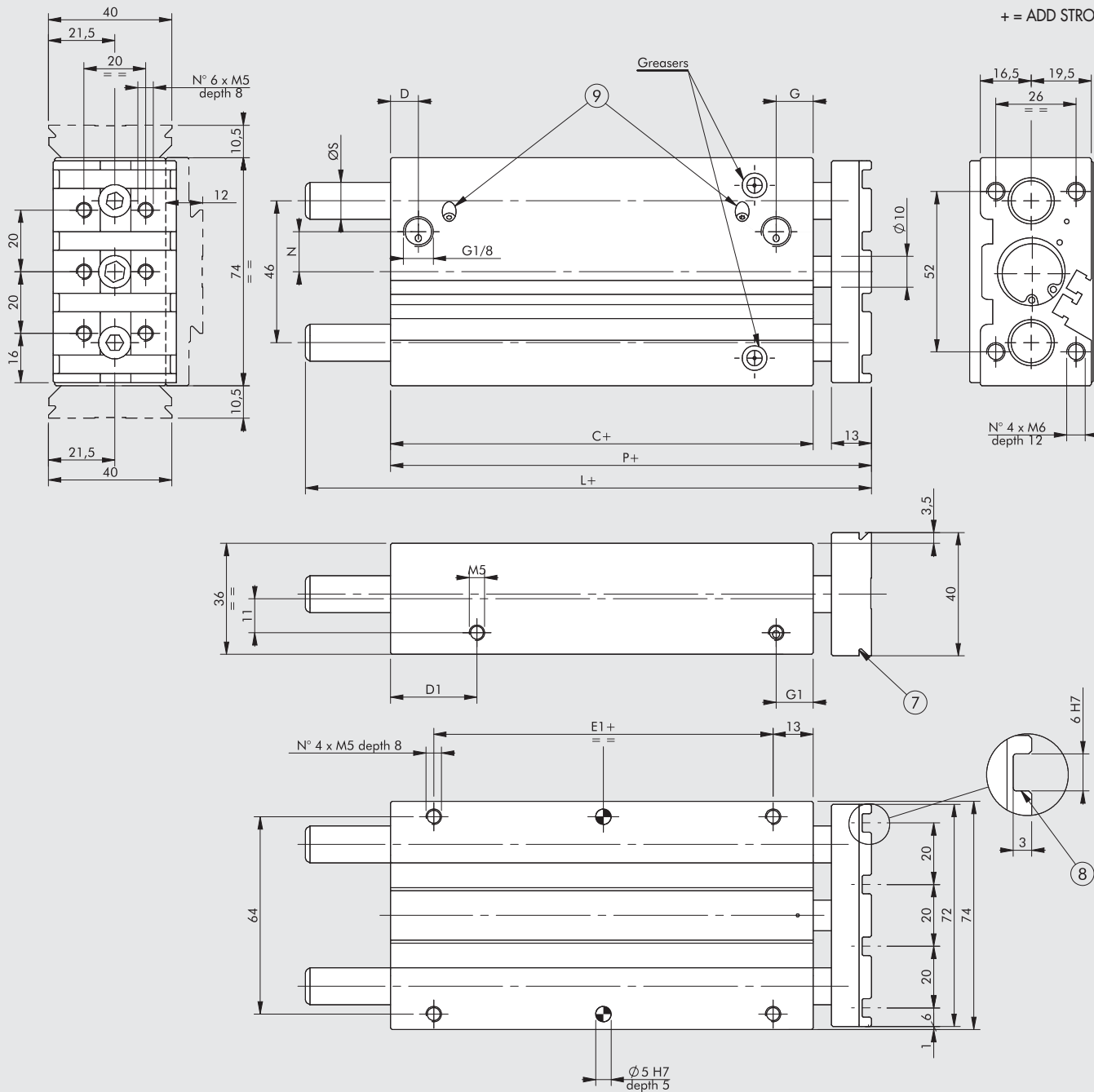
CUSHIONED

Stroke [mm]	20			30			40			50												
Position	U	S	D	U	S	D	U	S	D	U	S	D										
Possible positions (see page A3.67)	-	10	-	-	10	-	-	10	-	-	10	-										
	* 30	30	30	* 30	-	30	30	-	30	30	30	30										
	-	-	50	-	-	50	* 50	-	50	* 50	50	50										
							-	-	70	-	70	70										
No. of V-Lock plates supplied	1			1			1			2												
L	78			88			98			108												

* Outlet side power supply not available

DIMENSIONS OF Ø 20, BA AND BB NON-CUSHIONED VERSION
DIMENSIONS OF Ø 20, BA AND BB CUSHIONED VERSION

+ = ADD STROKE



- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key
- ⑨ Cushioning pins (in the cushioned version only)

Stroke	L
0 to 50	52
75 to 200	82

Stroke	L
0 to 50	81
75 to 200	108.5

NON-CUSHIONED

C	D	D1	E1	G	G1	L		N	P	Ø S	
						BA*	BB**			BA*	BB**
37	9	20	10	11	11	see above		8.5	52	12	10

CUSHIONED

C	D	D1	E1	G	G1	L		N	P	Ø S	
						BA*	BB**			BA*	BB**
62	9	28	35	12	12	see above		13	81	12	10

* Version BA (Bronze Bushings)
 ** Version BB (Ball Bearings)

ACTUATORS

COMPACT GUIDED CYLINDER SERIES CMPGK

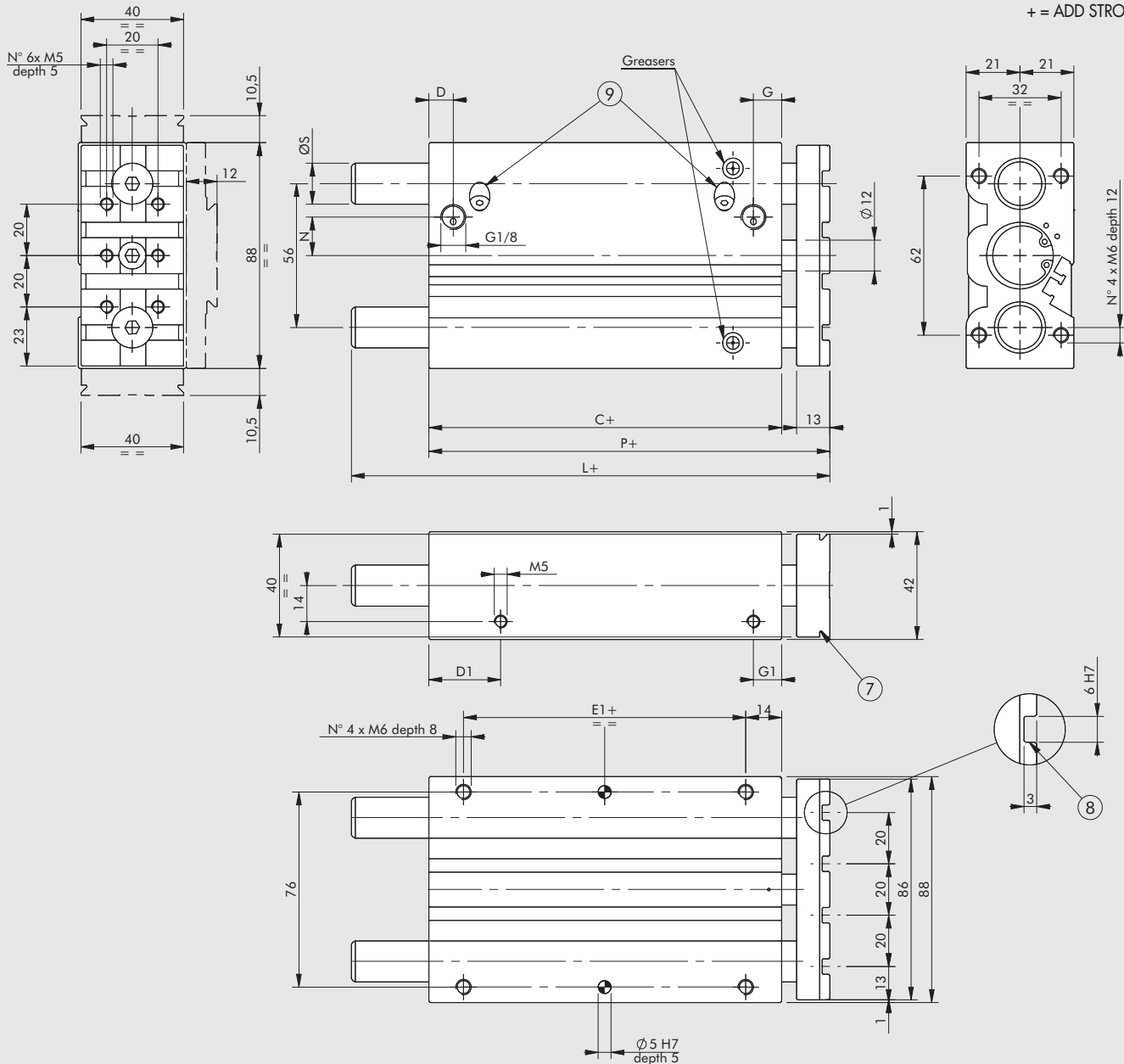


CUSHIONED

* Outlet side power supply not available ● Return side power supply not available ■ Side power supply not available

DIMENSIONS OF Ø 25, BA AND BB NON-CUSHIONED VERSION
DIMENSIONS OF Ø 25, BA AND BB CUSHIONED VERSION

+ = ADD STROKE



- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key
- ⑨ Cushioning pins (in the cushioned version only)

Stroke	L
0 to 50	52.5
75 to 200	82.5

NON-CUSHIONED

C	D	D1	E1	G	G1	L		N	P	Ø S	
						BA*	BB**			BA*	BB**
37.5	9	23	10	11	11	see above		8	52.5	16	16

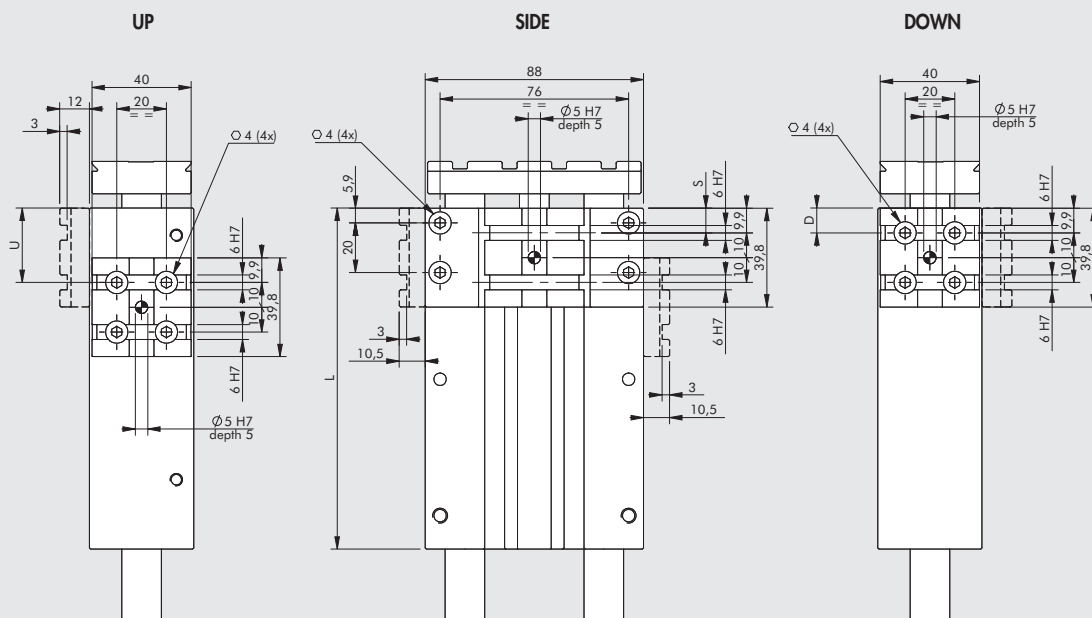
* Version BA (Bronze Bushings)
 ** Version BB (Ball Bearings)

Stroke	L
0 to 50	81.5
75 to 200	111.5

CUSHIONED

C	D	D1	E1	G	G1	L		N	P	Ø S	
						BA*	BB**			BA*	BB**
62.5	9.5	28	35	11	11	see above		15	81.5	16	16

POSITION OF Ø 25 PLATES, BA AND BB NON-CUSHIONED VERSION
POSITION OF Ø 25 PLATES, BA AND BB CUSHIONED VERSION



NON-CUSHIONED

Stroke [mm]	25			30			40			50			75			100			150			200		
Position	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D
Possible positions (see page A3.67)	■ 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10
	-	-	30	-	-	30	* 30	30	30	* 30	-	30	30	30	30	30	30	30	30	30	30	30	30	30
							* 50	-	50	-	-	50	50	50	50	50	-	50	50	50	50	50	50	50
													* 70	70	70	70	-	70	70	70	70	70	70	70
																* 90	90	90	90	90	90	90	90	90
																-	-	110	110	110	110	110	110	110
																			* 130	130	130	130	130	130
																			-	150	150	150	150	150
																						170	170	170
																						* 190	190	190
																						-	-	210
No. of V-Lock plates supplied	1			1			1			1			2			2			2			2		
L	62.5			67.5			77.5			87.5			112.5			137.5			187.5			237.5		

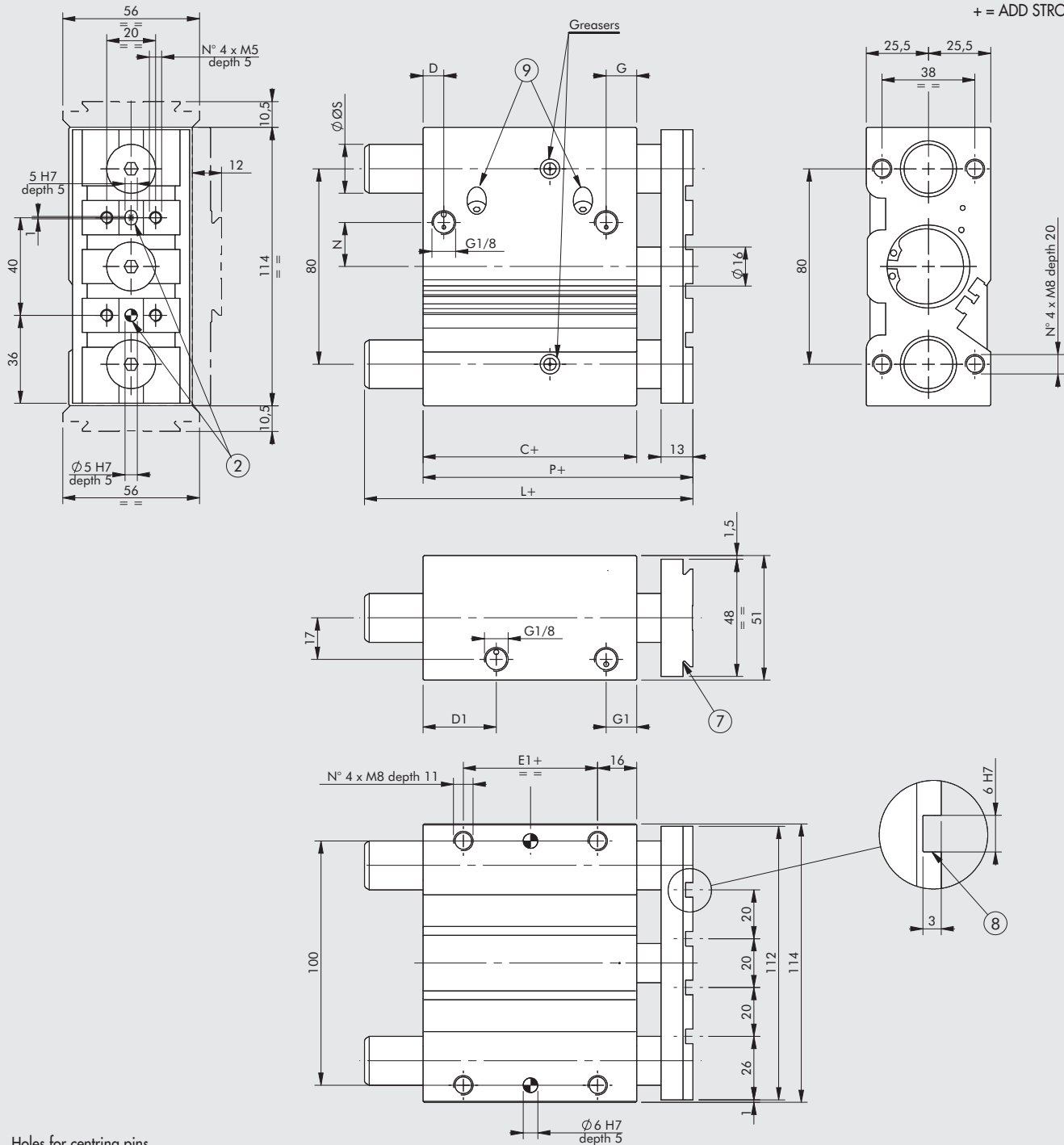
CUSHIONED

Stroke [mm]	20			30			40			50			75			100			150					
Position	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D
Possible positions (see page A3.67)	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10			
	* 30	-	30	* 30	-	30	* 30	30	30	* 30	30	30	30	30	30	30	30	30	30	30	30			
	-	-	50	-	-	50	* 50	50	50	* 50	50	50	50	-	50	50	50	50	50	50	50			
							-	-	70	-	70	70	70	-	70	70	-	70	70	70	70			
													* 90	90	90	90	-	90	90	-	90			
													* 110	-	110	* 110	110	110	110	-	110			
																-	-	130	130	130	130			
																			* 150	150	150			
																			-	170	170			
No. of V-Lock plates supplied	1			1			1			1			2			2			2					
L	82.5			92.5			102.5			112.5			137.5			162.5			212.5					

* Outlet side power supply not available ● Return side power supply not available ■ Side power supply not available

DIMENSIONS OF Ø 32, BA AND BB NON-CUSHIONED VERSION
DIMENSIONS OF Ø 32, BA AND BB CUSHIONED VERSION

+ = ADD STROKE



- ② Holes for centring pins
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key
- ⑨ Cushioning pins (in the cushioned version only)

NON-CUSHIONED

C	D	D1	E1	G	G1	L		N	P	Ø S	
						BA*	BB**			BA*	BB**
37.5	9	26.5	5	12.5	12.5	76.5	76.5	14	52.5	20	20

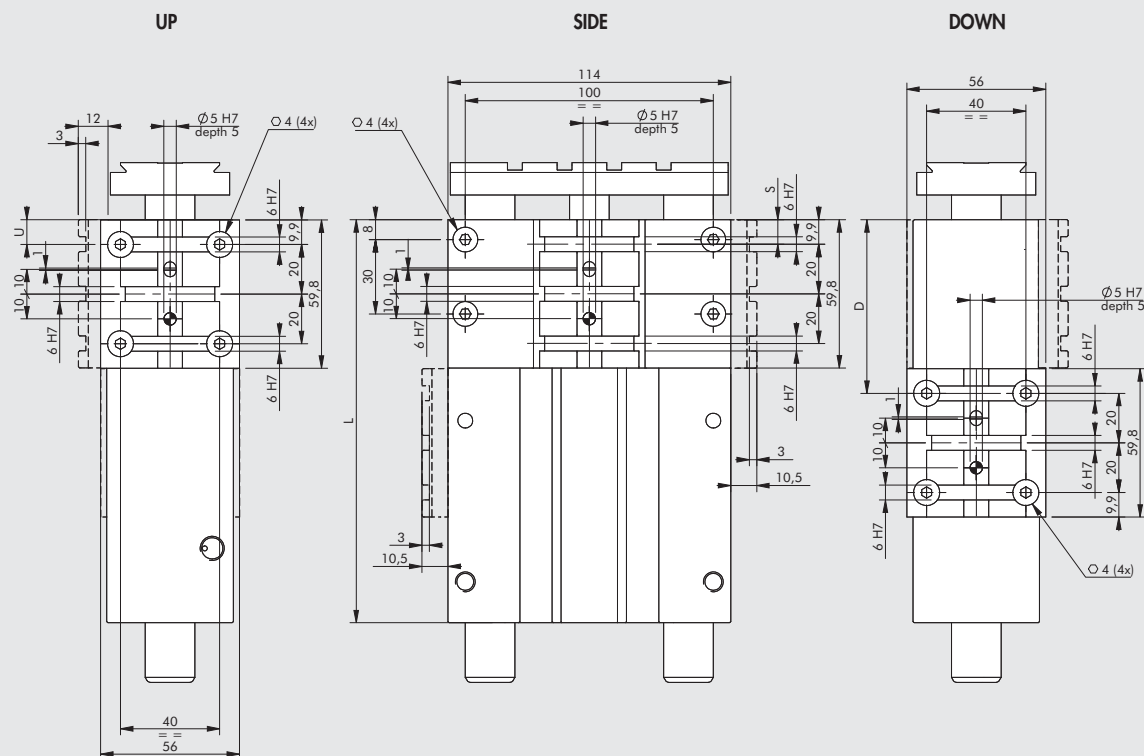
CUSHIONED

C	D	D1	E1	G	G1	L		N	P	Ø S	
						BA*	BB**			BA*	BB**
62.5	8.5	25	30	12.5	12.5	109.5	109.5	18	85.5	20	20

* Version BA (Bronze Bushings)

** Version BB (Ball Bearings)

POSITION OF Ø 32 PLATES, BA AND BB NON-CUSHIONED VERSION
POSITION OF Ø 32 PLATES, BA AND BB CUSHIONED VERSION



NON-CUSHIONED

Stroke [mm]	25			50			75			100			150			200		
Position	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D
Possible positions (see page A3.67)	■ 10	10	10	■ 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10
							-	40	-	-	-	-	-	40	-	-	40	-
										* 70	-	70	70	-	70	70	70	70
										-	100	-	-	-	-	-	100	-
													-	130	130	130	130	130
																-	160	-
																-	-	190
No. of V-Lock plates supplied	1			1			1			2			2			2		
L	62.5			87.5			112.5			137.5			187.5			237.5		

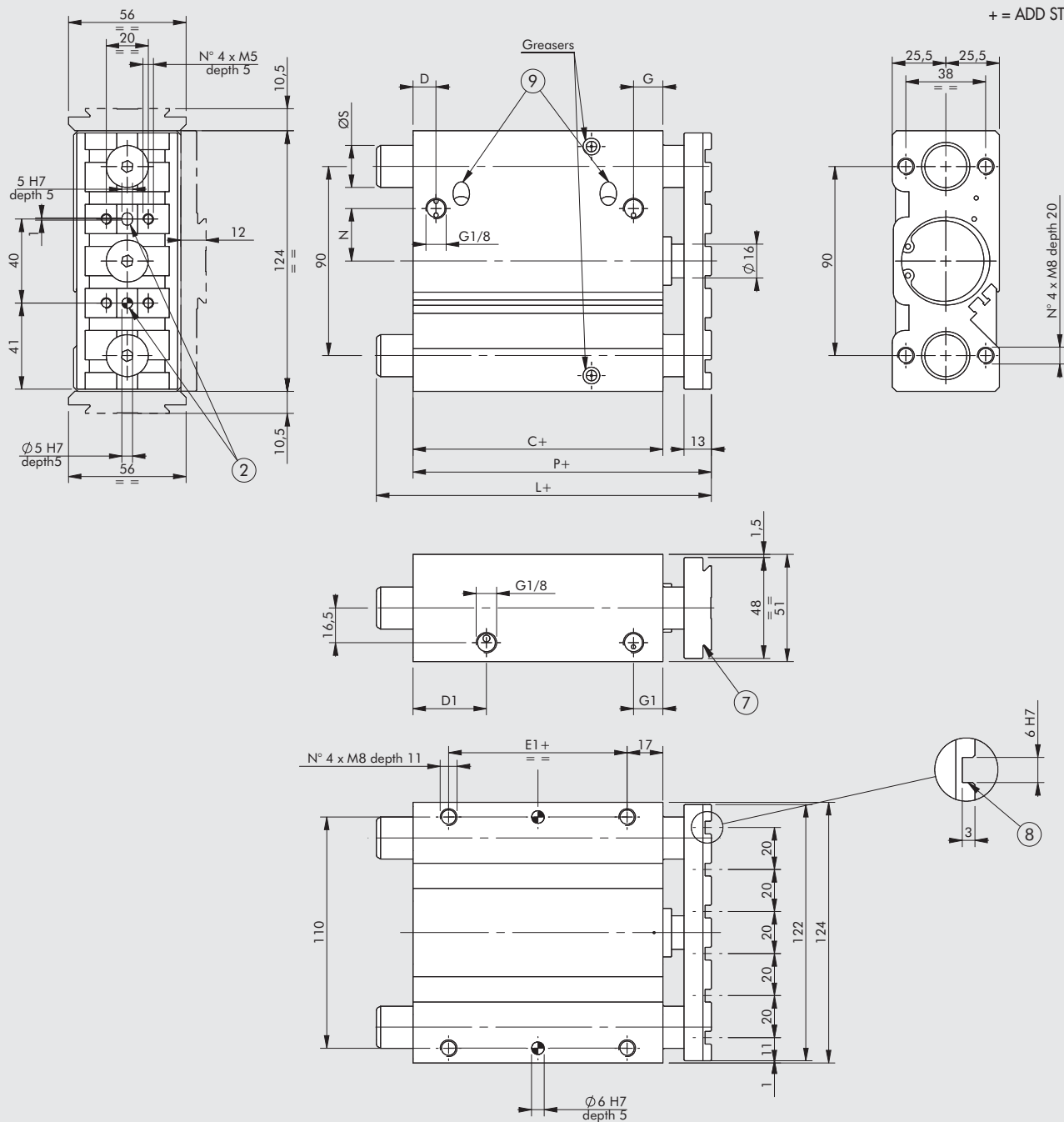
CUSHIONED

Stroke [mm]	25			50			75			100			150			175		
Position	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D
Possible positions (see page A3.67)	■ 10	-	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10
							-	-	-	-	-	-	-	40	-	-	40	-
							-	-	70	70	70	70	70	70	70	70	70	70
							-	100	-	-	100	-	-	100	-	-	100	-
													* 130	130	130	130	130	130
													-	160	-	-	160	-
																-	-	190
No. of V-Lock plates supplied	1			1			1			2			2			2		
L	87.5			112.5			137.5			162.5			212.5			237.5		

* Outlet side power supply not available ● Return side power supply not available ■ Side power supply not available

DIMENSIONS OF Ø 40, BA AND BB NON-CUSHIONED VERSION
DIMENSIONS OF Ø 40, BA AND BB CUSHIONED VERSION

+ = ADD STROKE



- ② Holes for centring pins
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key
- ⑨ Cushioning pins (in the cushioned version only)

NON-CUSHIONED

C	D	D1	E1	G	G1	L		N	P	Ø S	
						BA*	BB**			BA*	BB**
44	10	35	10	14	14	76.5	76.5	21	59	20	20

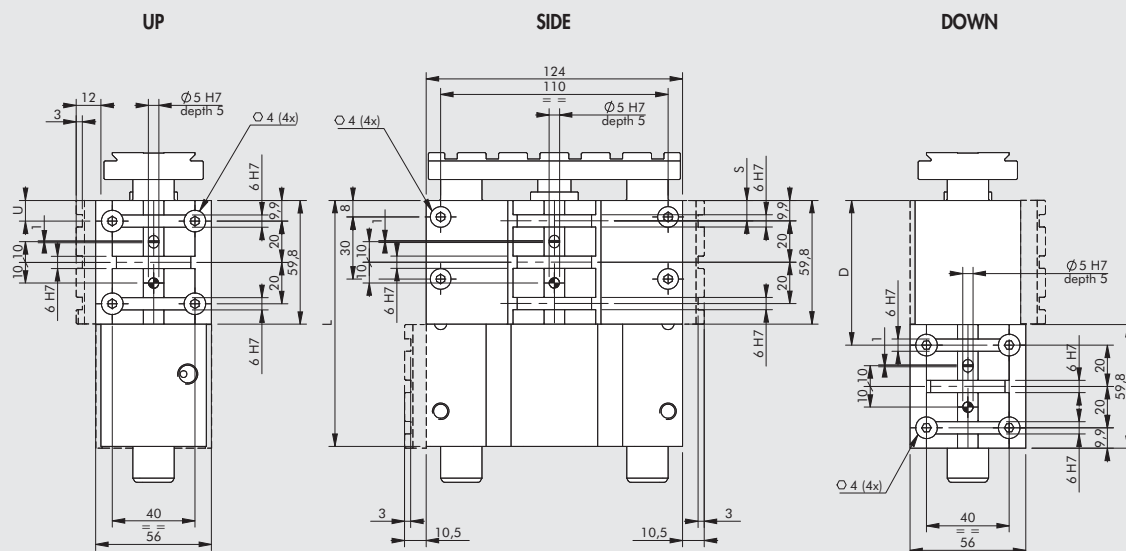
* Version BA (Bronze Bushings)

** Version BB (Ball Bearings)

CUSHIONED

C	D	D1	E1	G	G1	L		N	P	Ø S	
						BA*	BB**			BA*	BB**
69	11	35	35	14	14	109.5	109.5	25	92	20	20

POSITION OF Ø 40 PLATES, BA AND BB NON-CUSHIONED VERSION
POSITION OF Ø 40 PLATES, BA AND BB CUSHIONED VERSION



NON-CUSHIONED

Stroke [mm]	50			75			100			150			200			
Position	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	
Possible positions (see page A3.67)	■ 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	
	-	40	-	-	40	-	-	-	-	-	40	-	30	40	-	
	-	-	-	* 70	-	70	* 70	-	70	70	-	70	70	70	70	
										-	-	-	-	100	-	
										* 130	130	130	130	130	130	
													-	160	-	
													-	190	190	
No. of V-Lock plates supplied	1			1			1			2			2			
L	94			119			144			194			244			

CUSHIONED

Stroke [mm]	25			50			75			100			150			175			
Position	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	U	S	D	
Possible positions (see page A3.67)	-	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	● 10	10	10	
	-	40	-	-	40	-	-	-	-	-	40	-	-	40	-	-	40	-	
				-	-	70	* 70	-	70	70	70	70	70	70	70	70	70	70	
										-	100	-	-	100	-	-	100	-	
													* 130	130	130	130	130	130	
													-	160	-	-	160	-	
																-	190	190	
No. of V-Lock plates supplied	1			1			1			2			2			2			
L	94			119			144			169			219			244			

* Outlet side power supply not available ● Return side power supply not available ■ Side power supply not available

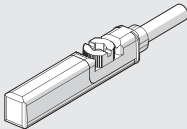
KEY TO CODES

CYL	W143	032	2	050	U	K
	TYPE	DIAMETER	VERSION	STROKE	FIXING SIDE	FAMILY
	Compact guided cylinder	016 Ø 16 020 Ø 20 025 Ø 25 032 Ø 32 040 Ø 40	2 Non-cushioned with bronze bushings 3 Non-cushioned with ball bearings 4 Cushioned with bronze bushings 5 Cushioned with ball bearings	CUSHIONED VERSION Ø 16: 20, 30, 40, 50 Ø 20: 20, 30, 40, 50, 75, 100, 150, 200 Ø 25: 20, 30, 40, 50, 75, 100, 150 Ø 32: 25, 50, 75, 100, 150, 175 Ø 40: 25*, 50, 75, 100, 150, 175 NOT CUSHIONED VERSION ♦ Ø 16: 30*, 40, 50, 75, 100, 150, 200 Ø 20: 25, 30, 40, 50, 75, 100, 150, 200 Ø 25: 25, 30, 40, 50, 75, 100, 150, 200 Ø 32: 25, 50, 75, 100, 150, 200 Ø 40: 50, 75, 100, 150, 200 * Side and Down versions only ♦ Other strokes on request but with the same cylinder dimensions as the standard stroke immediately above.	U Up S Side D Down	K V-Lock

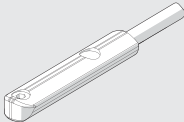
ACCESSORIES

RETRACTABLE SENSOR

SENSOR, SQUARE TYPE
Latest generation,
secure fixing



SENSOR, OVAL TYPE
Traditional



For codes and technical data, see **chapter A6**.

NOTES

GUIDE UNITS SERIES GDHK AND GDMK



Guide units GDHK and GDMK guarantee excellent alignment and anti-rotation of the pneumatic cylinder connected to them. They can be used either singly or in combination to obtain complete handling units. The typical dovetail profile with V-Lock slots allows assembly with other elements in the V-Lock series.

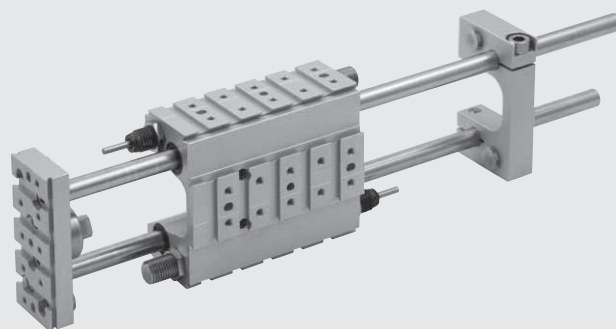
Guide units can be coupled with:

- ISO 6432 cylinders Ø 12, 16, 20 and Ø 25. **You can not use sensor circlip mod. DSW;**
- ISO 15552 series 3 cylinders Ø 32 and 40;
- ISO 15552 STD and type A cylinders Ø 32 and 40. **You can not apply position sensors.**
- Electric cylinder series Elektro ISO 15552 Ø32. It is a version with shorter columns; the cylinder must be an anti-rotation type because the guide coupling is rotary and cannot prevent piston rod rotation.

Series GDHK has bronze bushes and is more suitable for high loads. Series GDMK has recirculating ball bushes and is more suitable for high speeds.

Guide units are available with 5 types of stop mechanism:

- without stops (stop is provided by the cylinder);
- with buffers for piston rod retraction;
- with a hydraulic shock absorber for piston rod retraction;
- with buffers for piston rod extension and retraction;
- with hydraulic shock absorbers for piston rod extension and retraction.

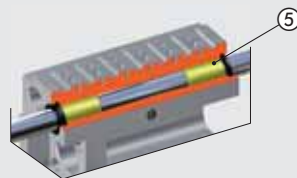


TECHNICAL DATA		Ø 12	Ø 16	Ø 20	Ø 25	Ø 32	Ø 40
Strokes	mm	From 1 to 600					
		The total stroke can be shortened using adjusting stops and/or the rear plate					
Stroke reduction via stop adjustment	mm	-14 per side		-22 per side		-40 per side	-35 per side
Temperature range	°C	-10 to +80					
Recommended maximum speed	m/s	1					
Rear plate torques	Nm	7 ±1		22 ±2			35 ±2
Guide column diameter	mm	10		12		16	20
Maximum impact energy							
with shock absorbers	Ec [J]	5		20		25	70
with buffers	Ec [J]	0.5		1		2	2
without stops		refer to the diagram on page A3.82					
Repeatability (at 6 bar)							
Versions with buffers	mm	±0.02 (with minimum pressure 5 bar)					
Versions with shock absorbers	mm	±0.02					
Lubrication		The guides are supplied lubricated. There are two greasers on the guide bodies (one per column) for periodic lubrication using a pump with a nozzle.					
		The following greases are recommended:					
		- version GDHK: code 9910502 (RHEOLUBE 362 HB)					
		- version GDMK: code 9910506 (RHEOLUBE 363AX1)					
		The lubrication interval depends on numerous factors such as load, temperature, speed, stroke, lubricant, environmental conditions and assembly position.					
		As a general rule, lubrication is recommended every 500.000 – 1.000.000 cycles.					

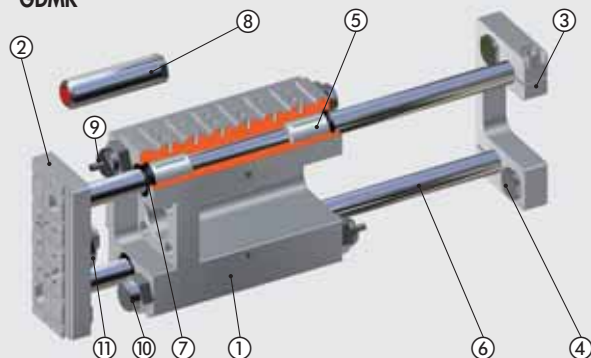
COMPONENTS

- ① BODY: anodised aluminium
- ② FRONT PLATE: anodised aluminium
- ③ REAR PLATE: anodised aluminium
- ④ STOP: tempered steel
- ⑤ COLUMN GUIDES:
 - sintered bronze (for GDH version)
 - recirculation ball bushes (for GDM version)
- ⑥ GUIDE COLUMNS:
 - C45 grinded chrome steel (for GDH version)
 - tempered steel (for GDM version)
- ⑦ DUST SCRAPER RING: polyurethane or NBR
- ⑧ BUFFER
- ⑨ DECELERATOR
- ⑩ ADJUSTABLE STOP: tempered steel
(for versions with shock absorbers)
- ⑪ COUPLING: C45 steel

GDHK

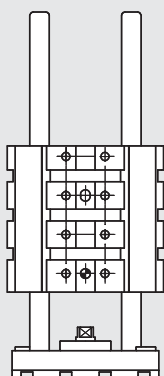


GDMK



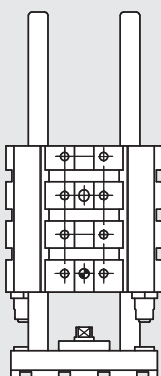
EXECUTIONS

00



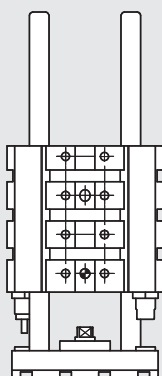
without stop

01



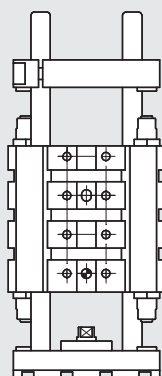
with
front stop
and buffers

02



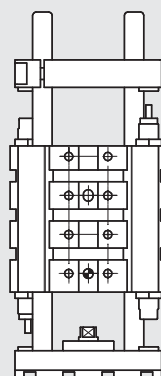
with
front stop
and shock absorber

03



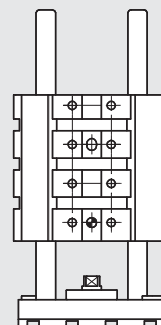
with
front and rear stop
and buffers

04



with
front and rear stop
and shock absorbers

05



with
short columns
for Elektro cylinder

WEIGHTS AND MOVING MASSES

TOTAL WEIGHTS

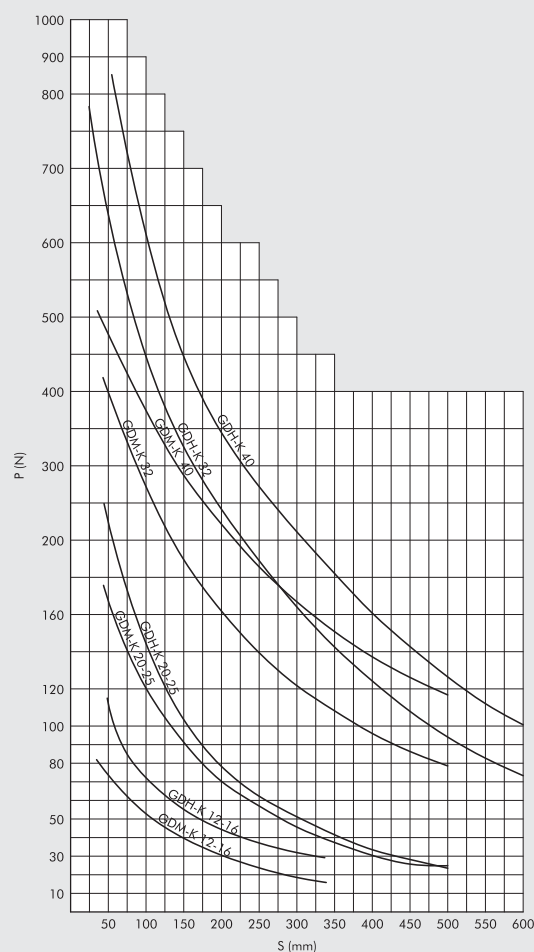
Ø mm	Weight [g] for Stroke = 0 mm						Weight [g] every mm
	Execution						
	00	01	02	03	04	05	
12-16	779	817	823	953	965	-	1.2
20-25	1412	1520	1534	1809	1837	-	1.8
32	2262	2582	2558	3161	3113	2137	3.1
40	4316	4836	4873	5864	5938	-	4.9

TOTAL MOVING MASSES

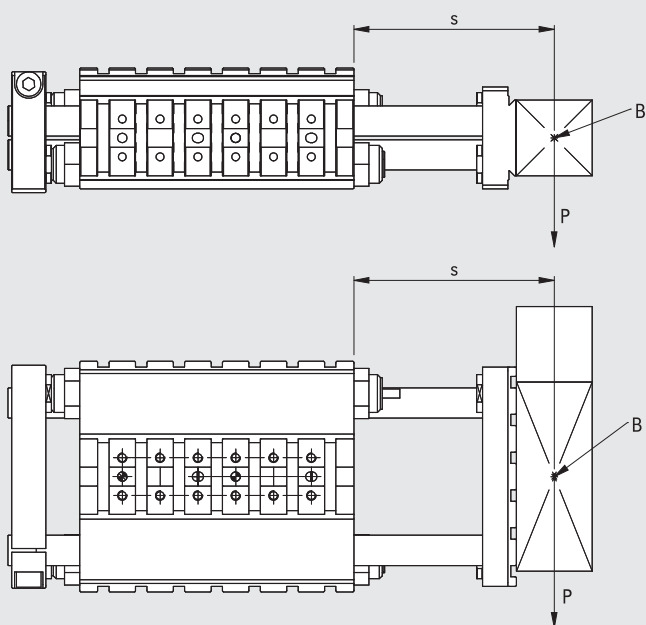
Ø mm	Weight [g] for Stroke = 0 mm						Weight [g] every mm
	Execution						
	00	01	02	03	04	05	
12-16	293	293	293	391	391	-	1.2
20-25	518	518	518	699	699	-	1.8
32	667	667	667	926	926	542	3.1
40	1670	1670	1670	2178	2178	-	4.9

LOAD DIAGRAM

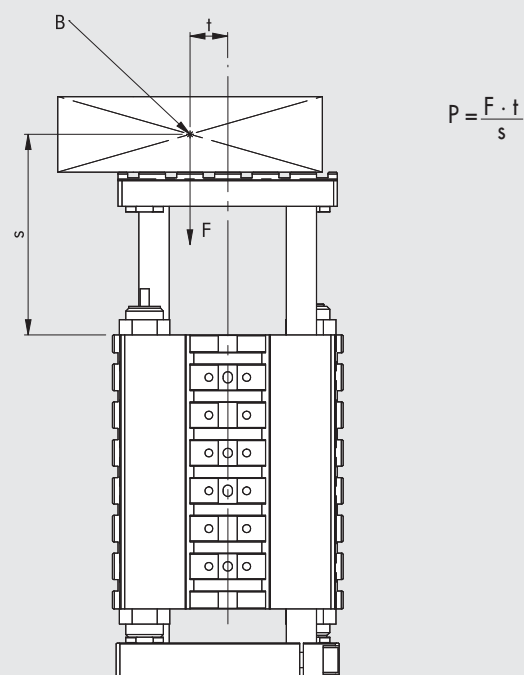
The graph on the right shows the maximum static load that can be applied to the guides as a function of the distance between the body of the guide and the barycenter of the load (with the piston rod extended).



HORIZONTAL APPLICATIONS



VERTICAL APPLICATIONS

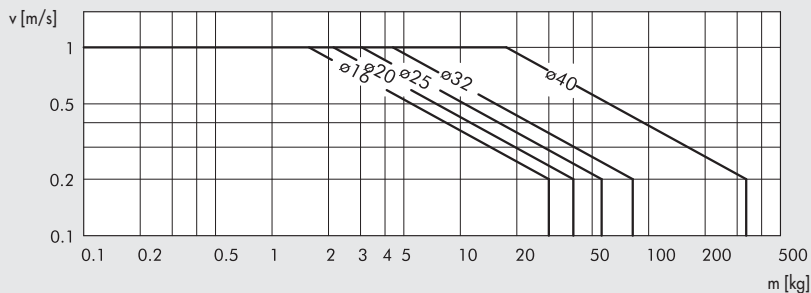


B = Barycentre; S = Projection; P = Useful load

MAXIMUM LOADS AND SPEEDS

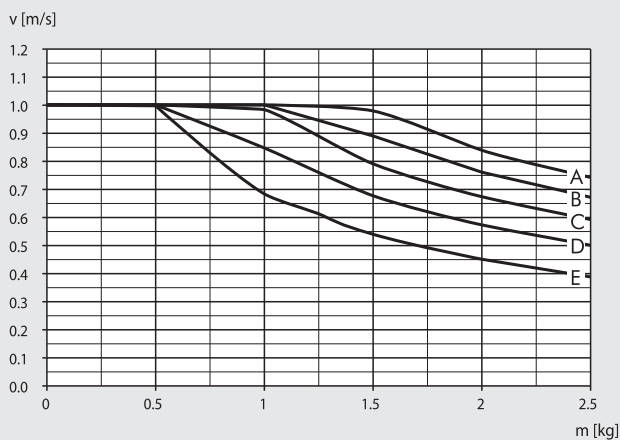
The graphs below show the maximum recommended movable loads "m" (masses) [kg] as a function of the average traverse speed "v" [m/s], defined as stroke/time, slide position (horizontal/vertical) and supply pressure.

MAXIMUM LOADS: VERSIONS WITHOUT STOPS

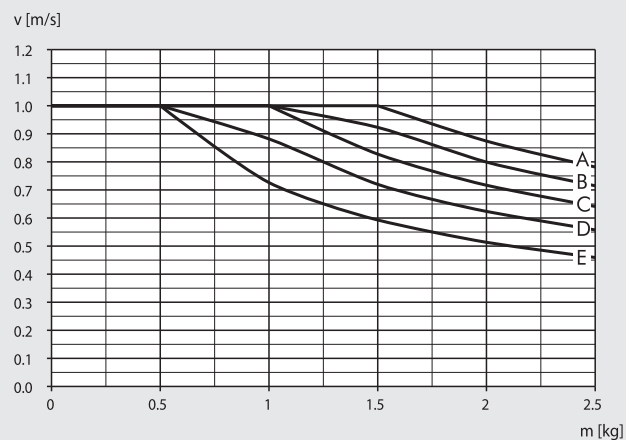


MAXIMUM LOADS: VERSIONS WITH SHOCK ABSORBERS

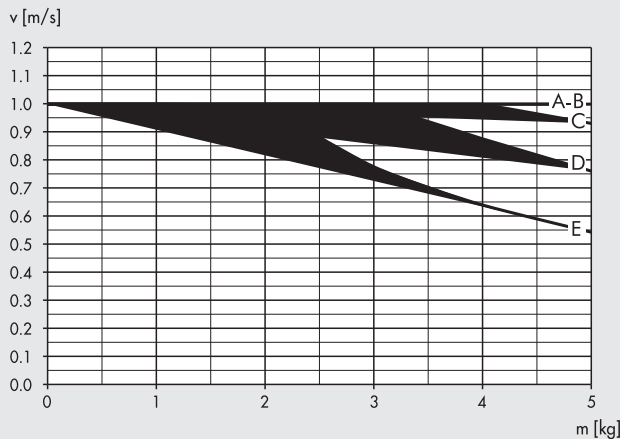
Ø 12-16 - Vertical orientation



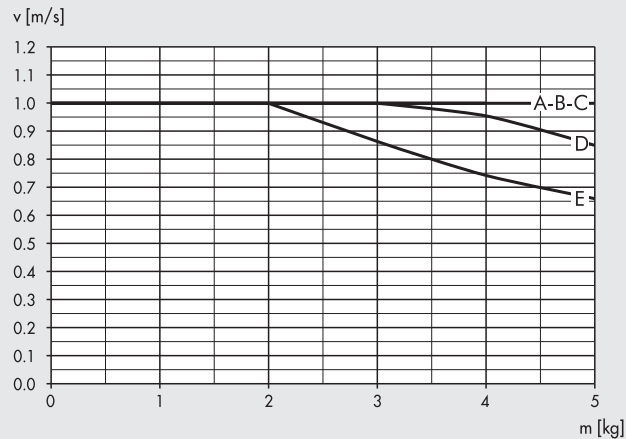
Ø 12-16 - Horizontal orientation



Ø 20-25 - Vertical orientation

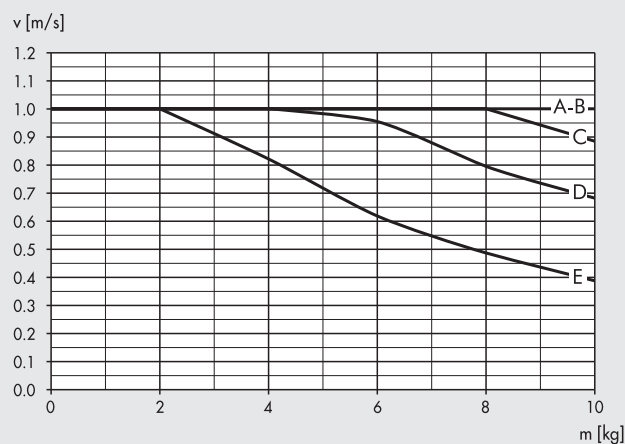


Ø 20-25 - Horizontal orientation

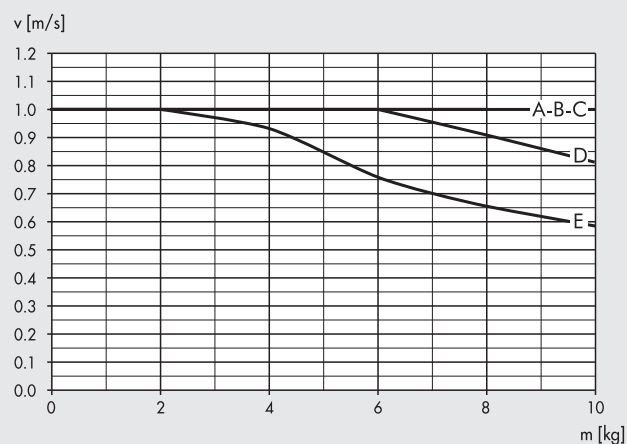


A = 2 bar B = 4 bar C = 6 bar D = 8 bar E = 10 bar

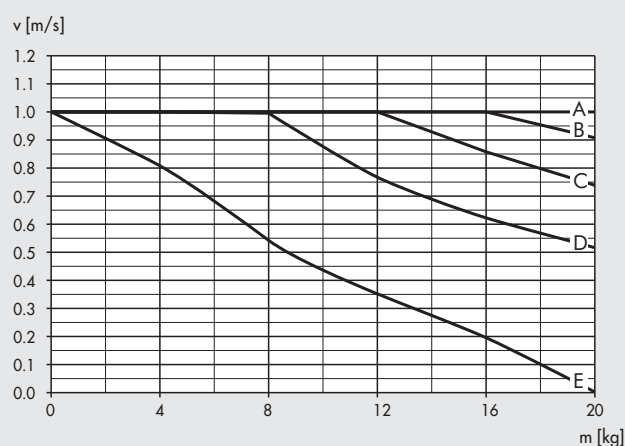
Ø 32 - Vertical orientation



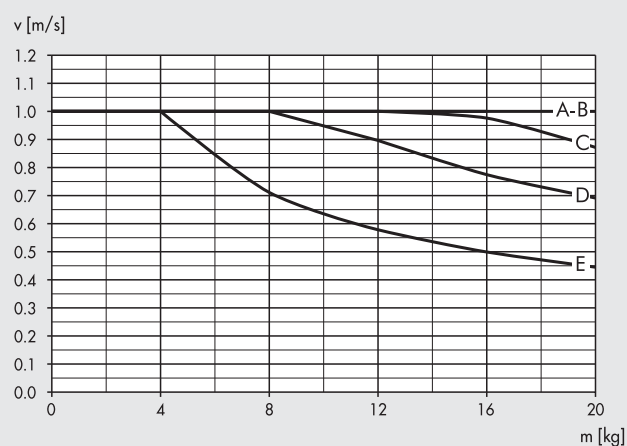
Ø 32 - Horizontal orientation



Ø 40 - Vertical orientation



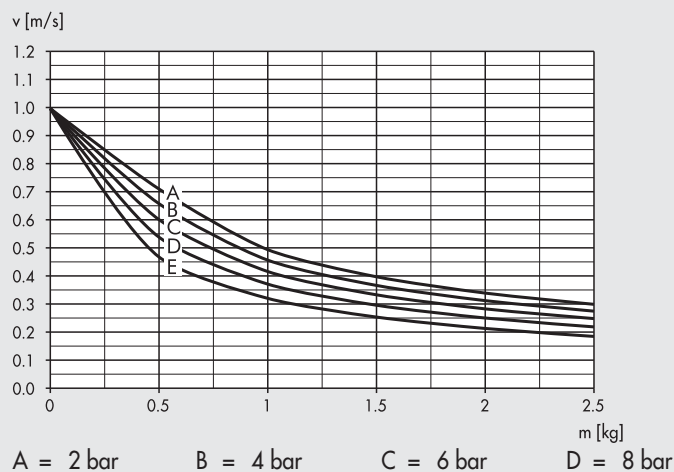
Ø 40 - Horizontal orientation



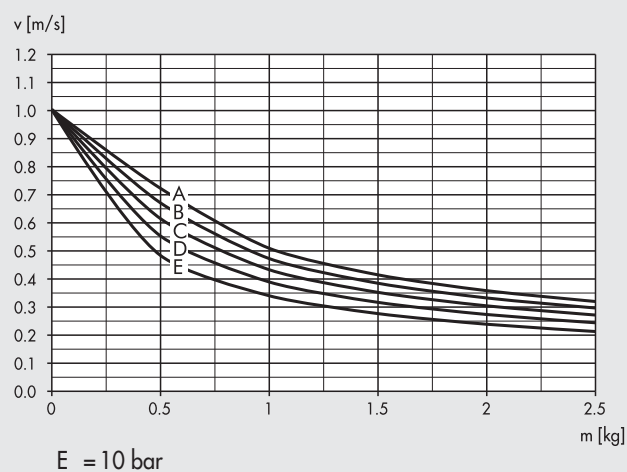
A = 2 bar B = 4 bar C = 6 bar D = 8 bar E = 10 bar

MAXIMUM LOADS: VERSIONS WITH BUFFERS

Ø 12-16 - Vertical orientation

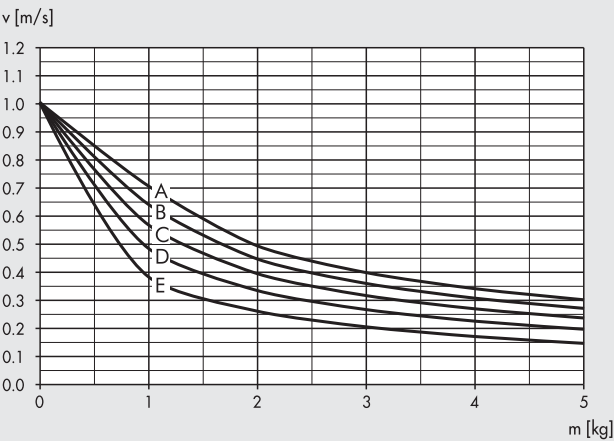


Ø 12-16 - Horizontal orientation

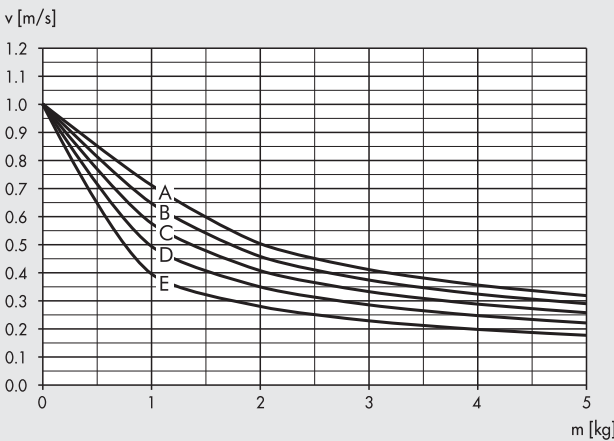


A = 2 bar B = 4 bar C = 6 bar D = 8 bar E = 10 bar

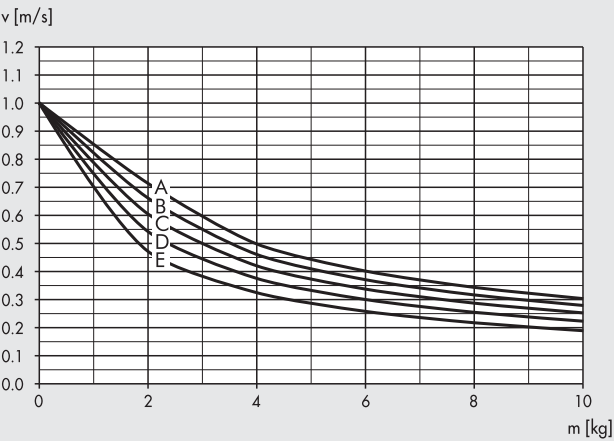
Ø 20-25 - Vertical orientation



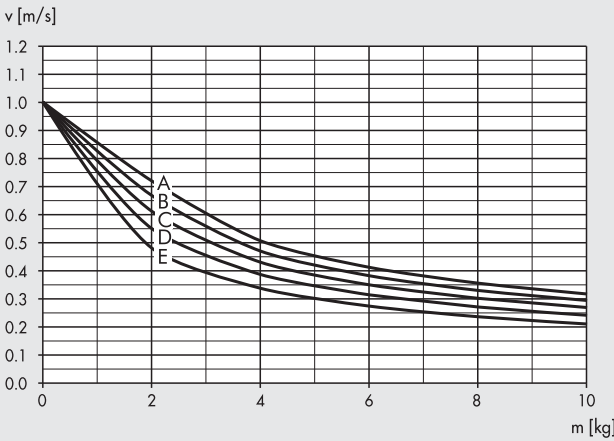
Ø 20-25 - Horizontal orientation



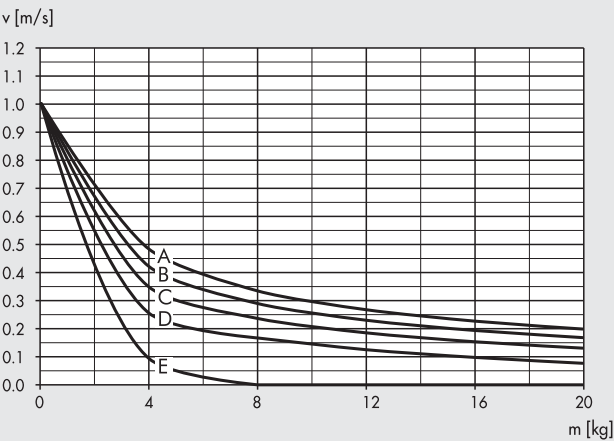
Ø 32 - Vertical orientation



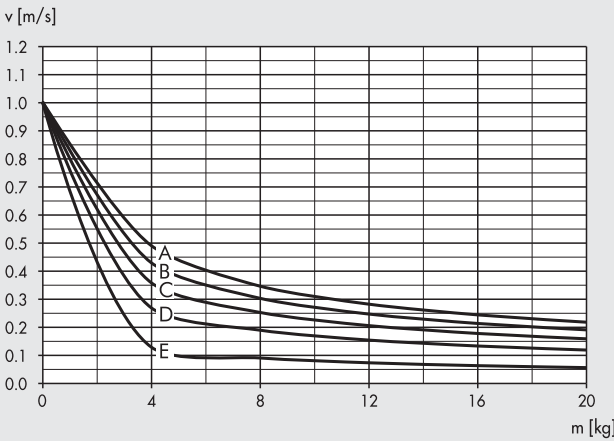
Ø 32 - Horizontal orientation



Ø 40 - Vertical orientation



Ø 40 - Horizontal orientation



A = 2 bar B = 4 bar C = 6 bar D = 8 bar E = 10 bar

+ = ADD THE STROKE

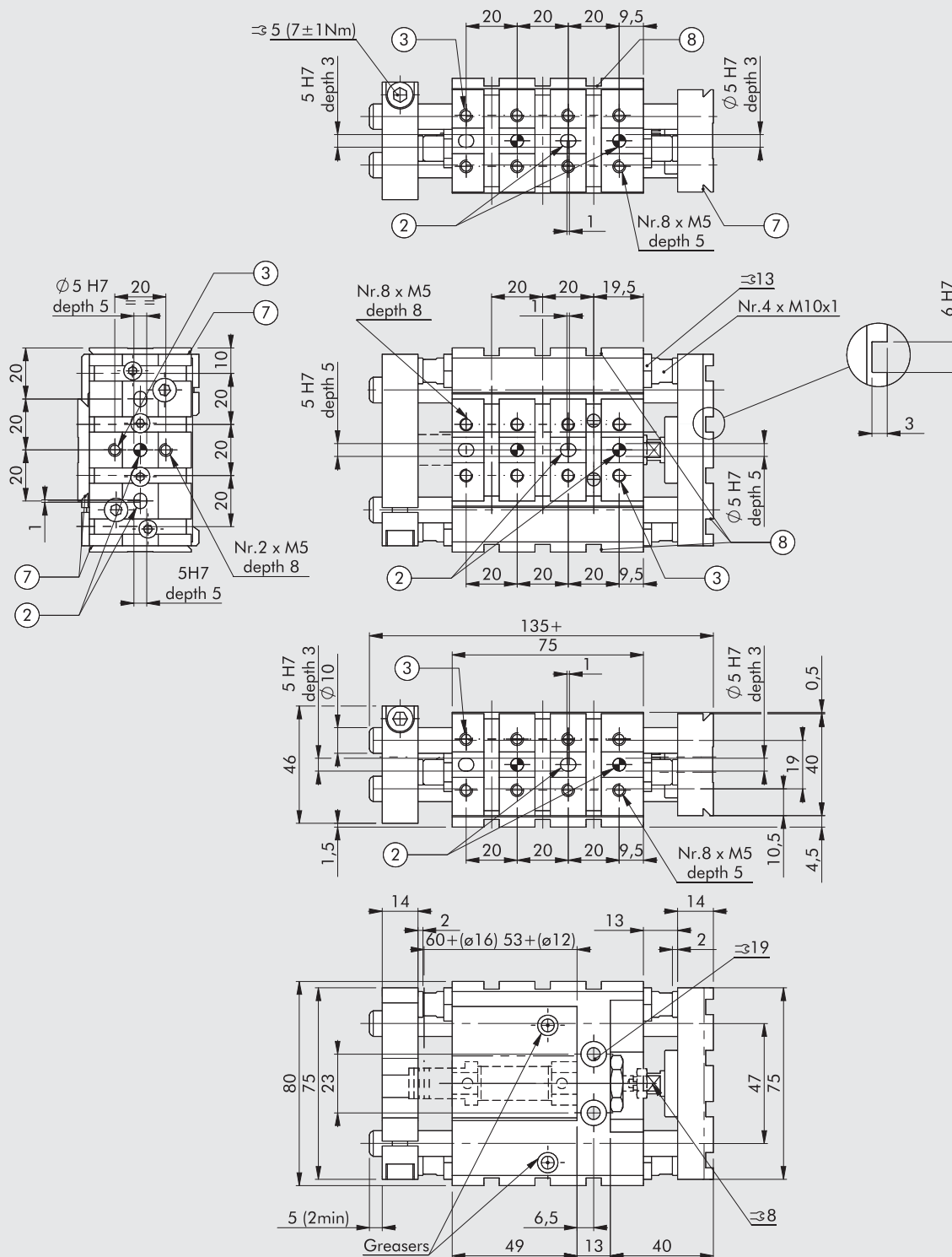


- ### A3.85

DIMENSIONS Ø 12-16

Versions 03-04

+ = ADD THE STROKE

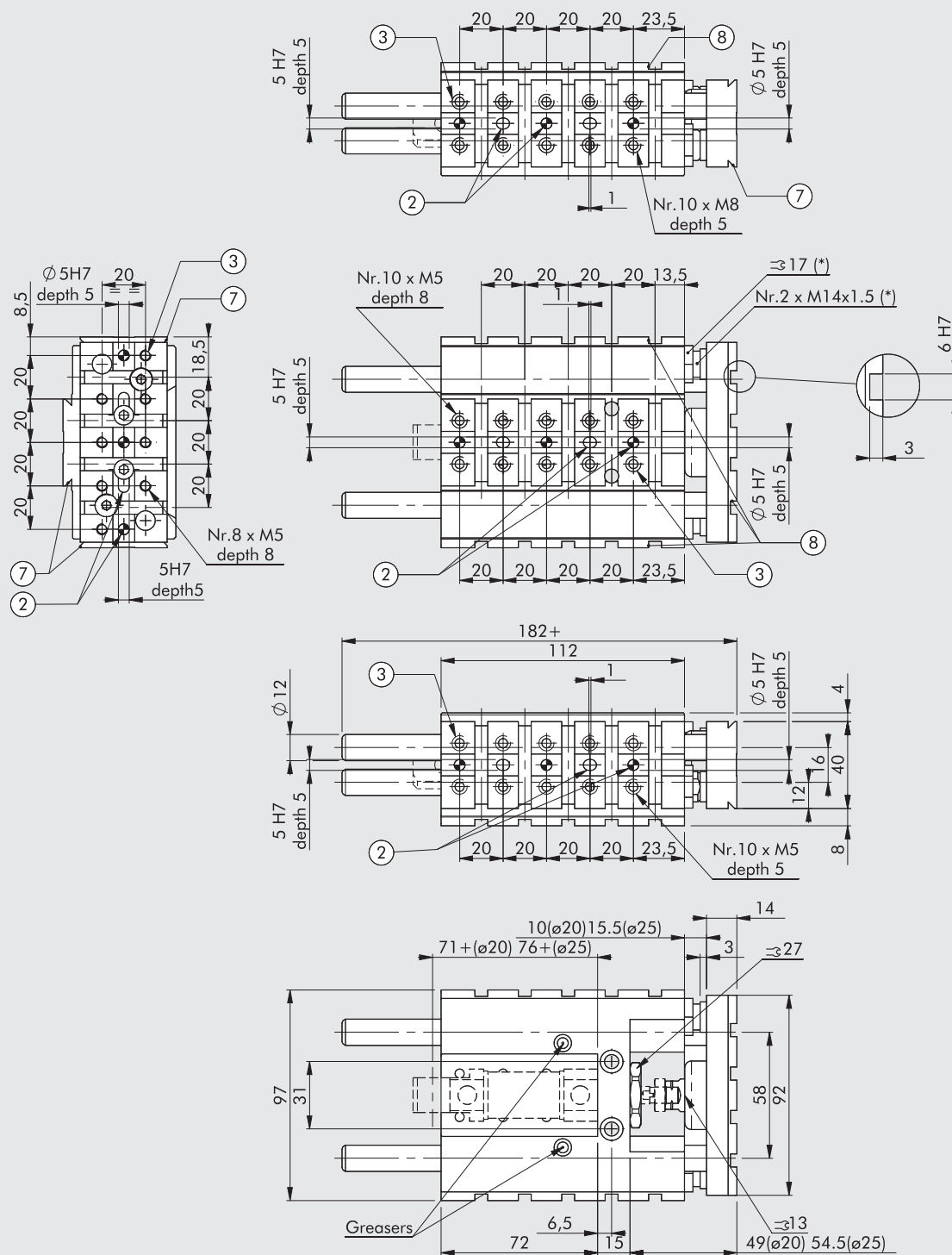


- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key

DIMENSIONS Ø 20-25

Versions 00-01-02

+ = ADD THE STROKE



* Not present in version 00

② Holes for centring pins

③ Threaded holes for fixing

⑦ Dovetail for "V-Lock" fixing.

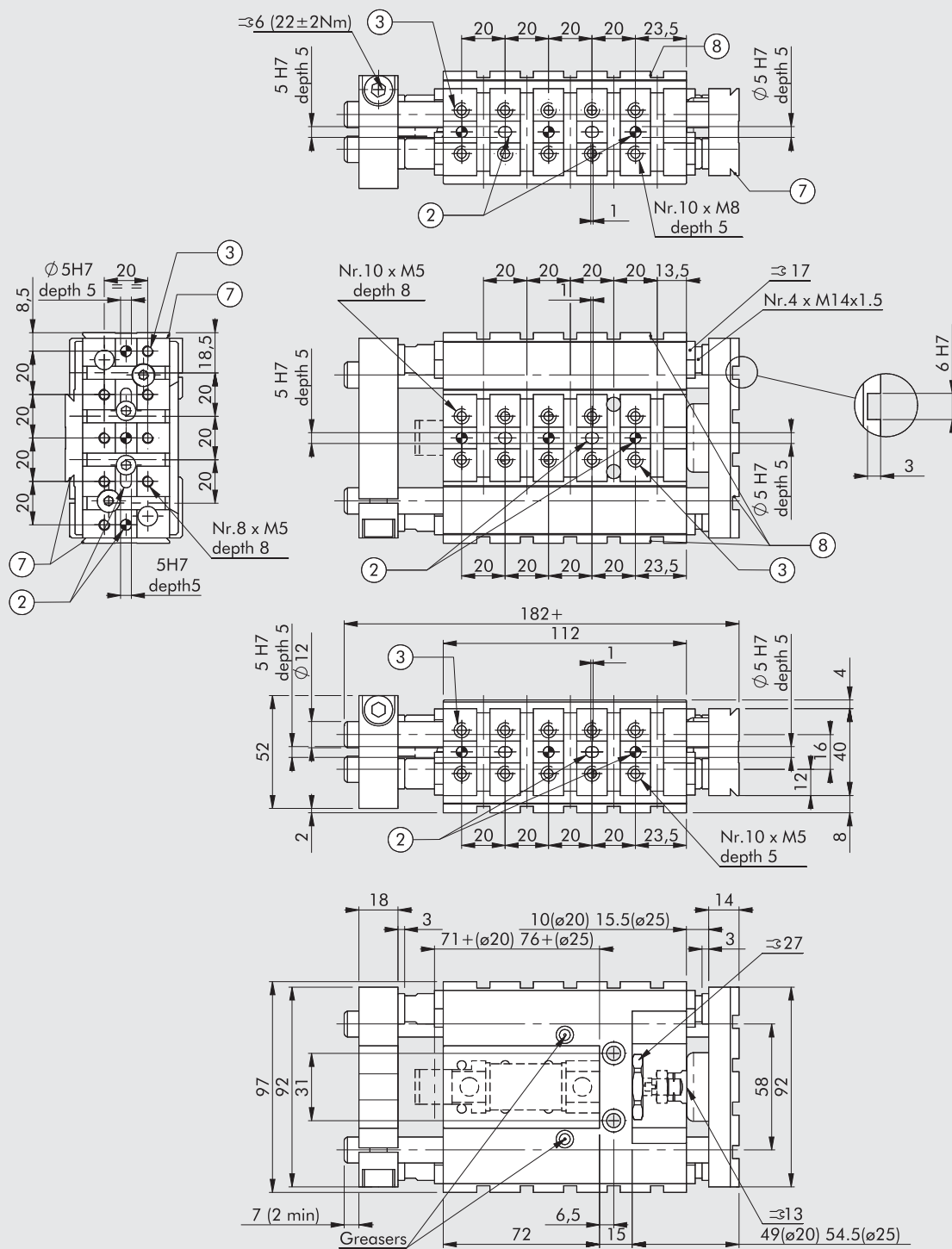
For standard dimensions, see **chapter V-Lock adaptors**

⑧ Slot for "V-Lock" precision key

DIMENSIONS Ø 20-25

Versions 03-04

+ = ADD THE STROKE

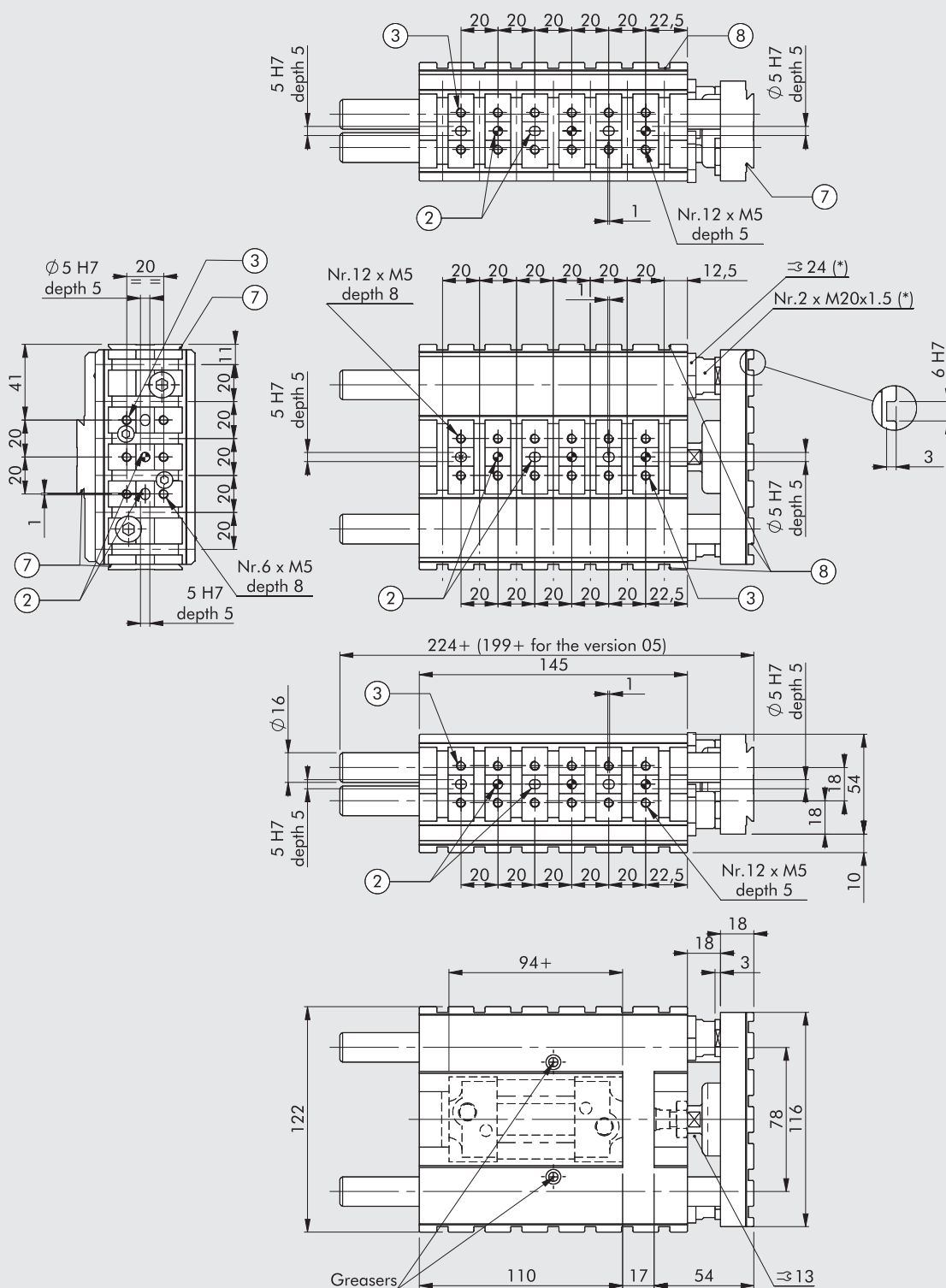


- ② Holes for centring pins
- ③ Threaded holes for fixing
- ⑦ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key

DIMENSIONS Ø 32

Versions 00-01-02-05

+ = ADD THE STROKE



* Not present in version 00 and 05

② Holes for centring pins

③ Threaded holes for fixing

⑦ Dovetail for "V-Lock" fixing.

For standard dimensions, see **chapter V-Lock adaptors**

⑧ Slot for "V-Lock" precision key

Versions 00-01-02

+ = ADD THE STROKE



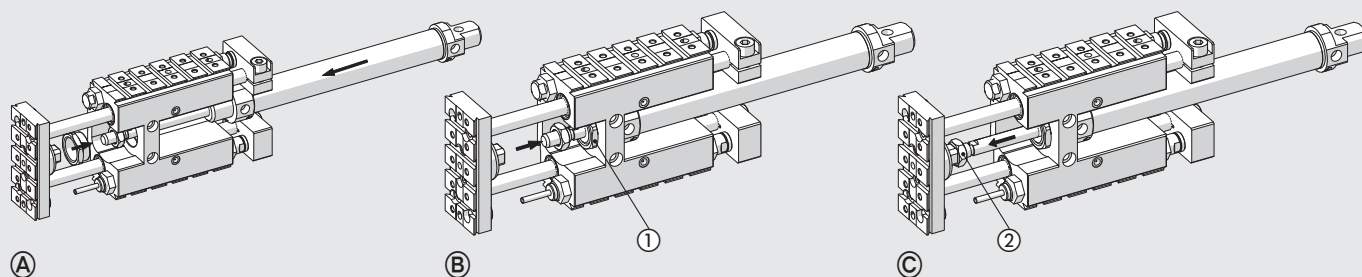
GUIDE UNITS SERIES GDHK AND GDMK

- * Not present in version 00
 - ② Holes for centring pins
 - ③ Threaded holes for fixing
 - ⑦ Dovetail for "V-Lock" fixing.
- For standard dimensions, see **chapter V-Lock adaptors**
- ⑧ Slot for "V-Lock" precision key

MOUNTING ON ISO 6432 CYLINDERS

For mounting on the body of ISO 6432 cylinders:

- Ⓐ Insert the cylinder in the guide.
- Ⓑ Retract the piston rod and tighten the nut ① from the front using a wrench, holding the front end of the cylinder firmly.
- Ⓒ Screw the piston rod onto the coupling and tighten the nut ②.

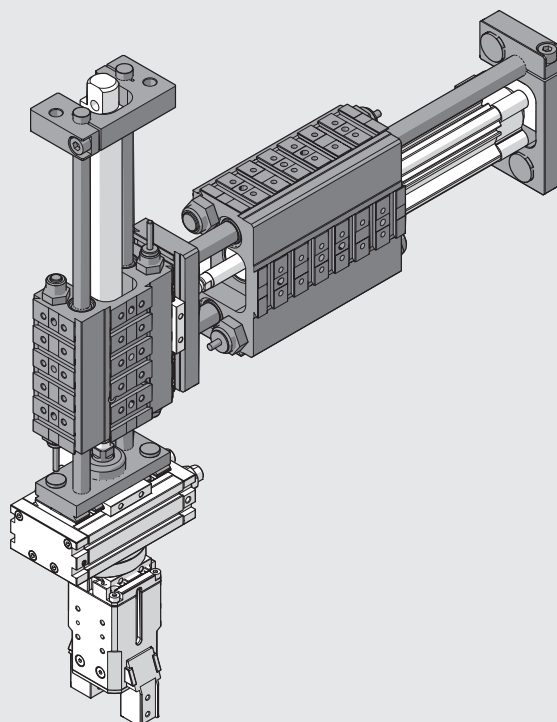


KEY TO CODES

W070	012	2	050	00	K
TYPE	BORE	VERSION	STROKE	EXECUTION	FAMILY
Guide unit	012 12	2 Version H	See general technical data	00 Without stop	K V-Lock
	012 16	3 Version M		01 With front stop and buffers	
	020 20			02 With front stop and shock absorber	
	025 25			03 With front and rear stops and buffers	
	032 32			04 With front and rear stops and shock absorbers	
	040 40			■ 05 With short columns for Elektro cylinder	

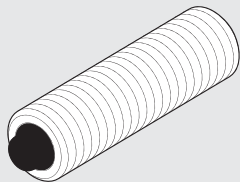
■ For Ø 32 only

EXAMPLES OF APPLICATION



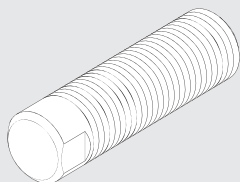
ACCESSORIES AND SPARE PARTS FOR GUIDE UNITS SERIES GDHK AND GDMK

ELASTIC MECHANICAL STOP



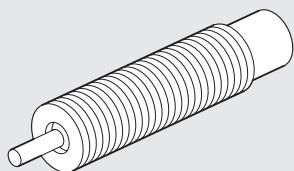
Code	Ø	Description
W0950005401K	12-16	Elastic mechanical stop M10x1 + nut
W0950005402K	20-25	Elastic mechanical stop M14x1.5 + nut
W0950005403K	32	Elastic mechanical stop M20x1.5 + nut
W0950005404K	40	Elastic mechanical stop M25x1.5 + nut

MECHANICAL STOPS



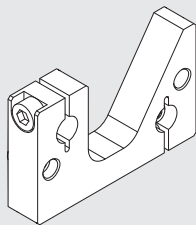
Code	Ø	Description
W0950005501K	12-16	Mechanical stop M10x1 + nut
W0950005502K	20-25	Mechanical stop M14x1.5 + nut
W0950005503K	32	Mechanical stop M20x1.5 + nut
W0950005504K	40	Mechanical stop M25x1.5 + nut

SHOCK ABSORBERS



Code	Ø	Description
W0950005301	12-16	Shock absorbers 2 M10x1 + nut
0950004004	20-25	Shock absorbers ECO25 MC2 + nut M14x1.5
0950004005	32	Shock absorbers ECO50 MC2 + nut M20x1.5
0950004006	40	Shock absorbers ECO100 MF2 + nut M25x1.5

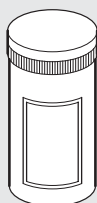
REAR PLATE KITS



Code	Ø	Description
W0950005600K	12-16	Rear plate kit GD_K
W0950005601K	20-25	Rear plate kit GD_K
W0950005602K	32	Rear plate kit GD_K
W0950005603K	40	Rear plate kit GD_K

Note: individually packed with 2 screws

GREASE



Code	Description	Weight [g]
9910502	Tube of RHEOLUBE 362 grease (for GDHK version)	1000
9910506	Tube of RHEOLUBE 363 AX1 grease (for GDMK version)	400

LINEAR UNITS SERIES LEPK



The LEPK linear units are designed for horizontal or vertical mounting. They are driven by an ISO 6432 pneumatic cylinder that can be easily removed when it needs to be replaced.

The precision round bars, which are hardened and incorporated in the rectangular profile enclosed by the body, provide a reliable guide system without any backlash, jointly with the adjustable casters.

The stroke is limited by mechanical stops that are provided with a fine adjustment device and hydraulic shock-absorbers.

A LED visible through the openings provided in the body indicates the switching status. The final positions are controlled by inductive sensors (included in the supply). The front plate comes with V-Lock connections. Dovetail guides are provided on both sides of the body for the connection of the V-Lock or QS system.

The area of the body where to make the transversal grooves for connection with type K fixing elements can be specified at the time of the order. The encapsulated construction ensures the elimination of any points of hazard and increased silent operation.

The linear units are available in two versions:

- version A comes with a retracted position and an adjustable extended position;
- version B is designed to achieve a second supplementary adjustable extended position.

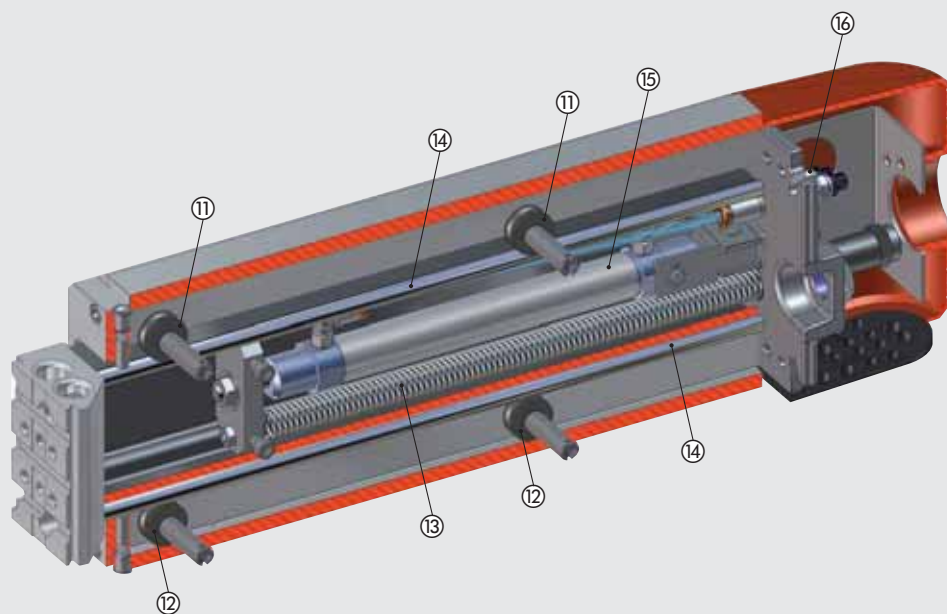
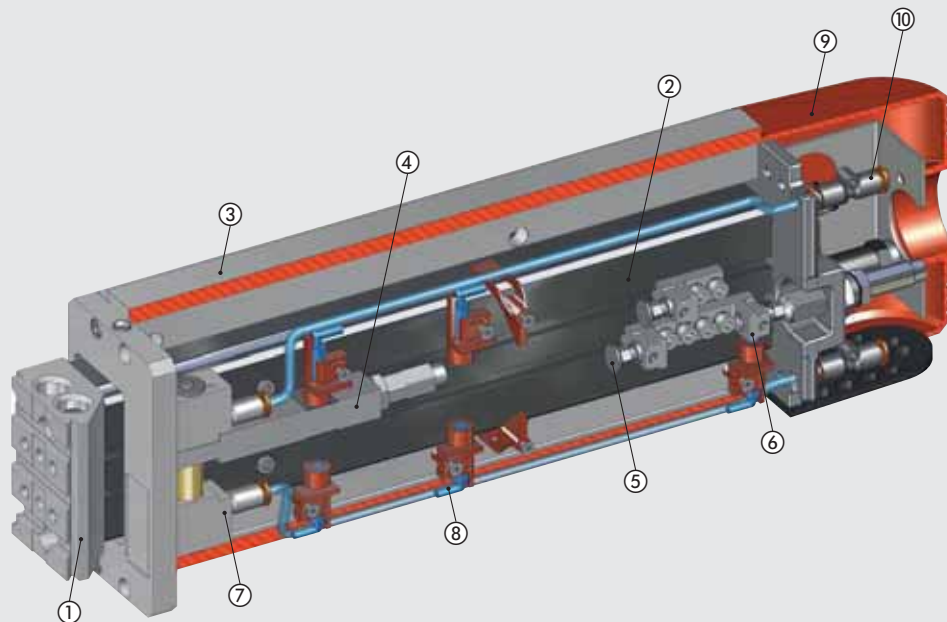
The LEPK units for vertical mounting can be equipped with a return spring to balance the weights. In the event of an emergency or a drop in pressure, the vertical slide is automatically pulled into the upper end-of-stroke position (slide fully retracted). For the orderly arrangement of cables and pipes, a hose pipe can be ordered. The linear unit for horizontal mounting can be supplied complete with an electrical terminal board.



TECHNICAL DATA		LEPK-1-90-H		LEPK-1-160-H		LEPK-1-225-H		LEPK-2-320-H		LEPK-2-450-H		LEPK-1-60-V		LEPK-1-90-V		LEPK-1-160-V				
		Type A	Type B	Type A	Type B	Type A	Type B	Type A	Type B	Type A	Type B	Type A	Type B	Type A	Type B	Type A	Type B			
Number of positions		2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3			
Orientation		Horizontal										Vertical								
Operating pressure		bar	3 to 7																	
		MPa	0.3 to 0.7																	
		psi	43.5 to 101																	
Temperature range		°C	-10 to 50																	
		°F	14 to 122																	
Fluid			Lubricated or unlubricated 20 µm filtered air. If lubricated air is used, lubrication must be continuous																	
End position stop shock-absorption		mm	Hydraulic shock-absorbers																	
End-position control			Inductive sensors with a LED visible from the outside																	
Repeatability (on 100 strokes at constant conditions)		mm	< 0.005																	
Piston diameter / Piston rod diameter		mm	16 / 6																	
Stroke (min / max)		mm	15 to 90		15 to 160		15 to 225		50 to 320		50 to 450		15 to 60		15 to 90		15 to 160			
Intermediate useful stroke		mm	- 0 to 80		- 0 to 100		- 0 to 100		- 0 to 150		- 0 to 150		- 0 to 50		- 0 to 80		- 0 to 100			
Theoretic force at 6 bar:																				
in thrust		N	106		106		106		165		260		Max. 90 (see page A3.101/102)							
in traction		N	90		90		90		137		218		Max. 150 (see page A3.101/102)							
Weight		kg	2.5	3.1	3.2	3.8	4.5	4.6	8	9.6	10.5	11	2.15	2.5	2.35	3	3.1	3.7		
Weight of the moving mass		kg	0.68		0.83		1.25		2.29		3.12		0.61		0.68		0.83			
Maximum kinetic energy		J/stroke	5.88																	
		J/h	25000																	
Electrical protection class with PG29 pipe mounted (only for versions with a terminal board)			IP 42										-		-		-			
Relative air humidity (only for versions with a terminal board)			< 95 %										-		-		-			
Power connection cable (only for versions with a terminal board)			Max. 17 wires 0.14 - 0.5 mm² for max. 15 proximity switches +0 V +24 V																	
Pneumatic connection																				
Speed control			Pipe Ø 4 Flow regulators Ø 4 - M5						Pipe Ø 6 Flow regulators Ø 6 - 1/8"						Pipe Ø 4 Flow regulators Ø 4 - M5					

IMPORTANT: for maximum forces and moments, see page A3.97

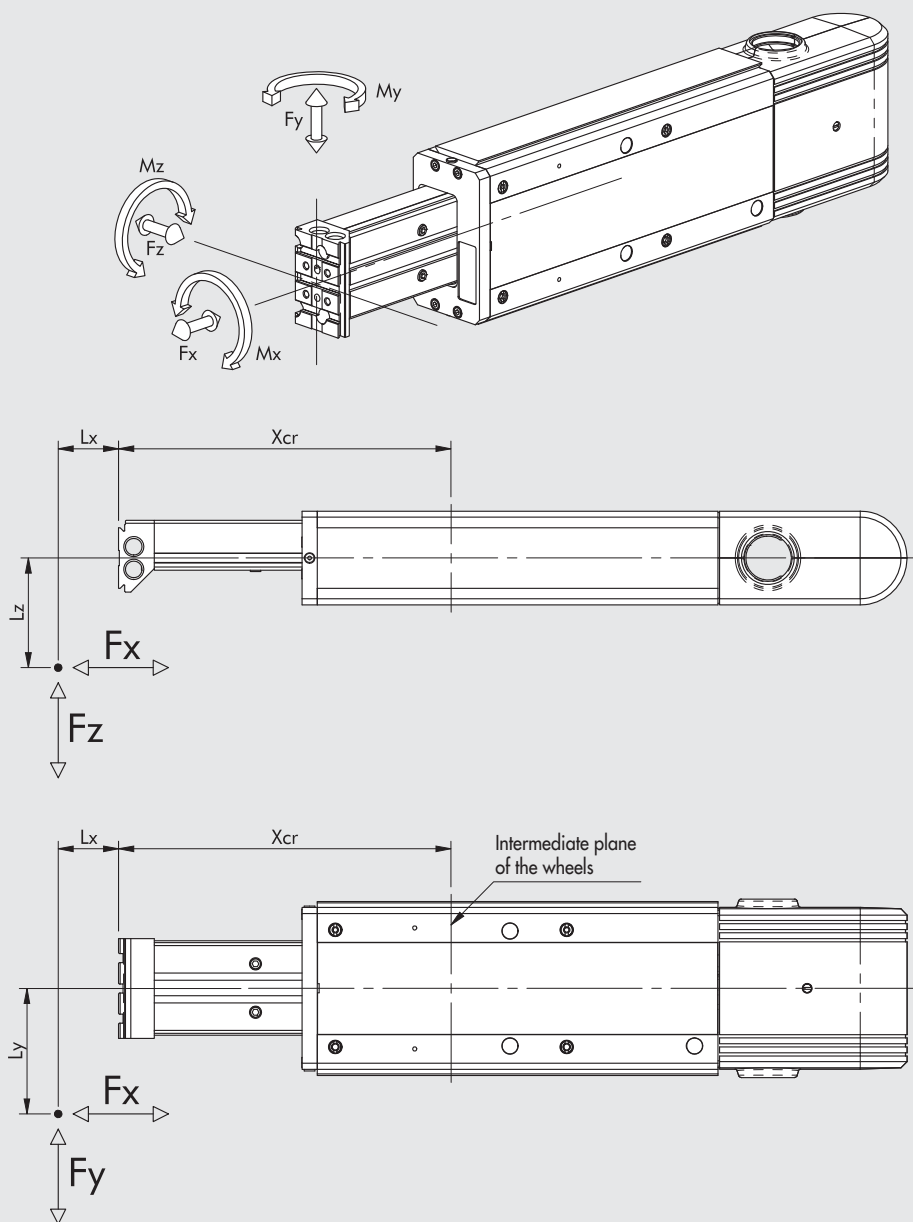
COMPONENTS



- ① FRONTAL INTERFACE: anodized aluminium
- ② SLIDING GUIDE: burnished aluminium
- ③ BODY: anodized aluminium
- ④ 3rd POSITION STOP: aluminium
- ⑤ ADJUSTABLE STOP: galvanized steel
- ⑥ FIXED STOP: galvanized steel
- ⑦ CONTROL CYLINDER, 3rd POSITION
- ⑧ INDUCTIVE SENSOR
- ⑨ GUARD: technopolymer

- ⑩ CYLINDER AIR SUPPLY FITTING, 3rd POSITION
- ⑪ ECCENTRIC ROLLER
- ⑫ CENTRIC ROLLER
- ⑬ RETURN SPRING: steel (optional for vertical versions only)
- ⑭ HARDENED GUIDE: hardened ground chromed steel
- ⑮ PNEUMATIC CYLINDER FOR HANDLING
- ⑯ FLOW REGULATOR FOR PNEUMATIC CYLINDER

DIAGRAM OF FORCES AND MOMENTS



Type	Xcr [mm]
LEPK-1-90-H-A	100
LEPK-1-90-H-B	128.5
LEPK-1-160-H-A	100
LEPK-1-160-H-B	134
LEPK-1-225-H-A	165
LEPK-1-225-H-B	165
LEPK-1-60-V-A	100
LEPK-1-60-V-B	115.5
LEPK-1-90-V-A	100
LEPK-1-90-V-B	128.5
LEPK-1-160-V-A	100
LEPK-1-160-V-B	134
LEPK-2-320-H-A	132
LEPK-2-320-H-B	179.5
LEPK-2-450-H-A	179.5
LEPK-2-450-H-B	179.5

ACTUATORS

LINEAR UNITS SERIES LEPK

Size	Fy [N]	Fz [N]	Mx [Nm]	My [Nm]	Mz [Nm]
LEPK-1	550	270	11	20	40
LEPK-2	1000	600	50	60	100

N.B.: The values are calculated on the basis of theoretical useful life of 10.000 km.

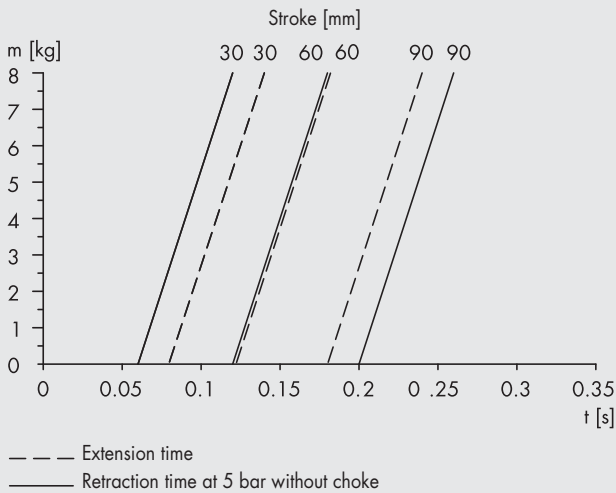
N.B.: When the cylinder is subjected simultaneously to torque and force, keep to the following equations, where the lengths have to be given in metres.

$$M_x = F_z \cdot L_y + F_y \cdot L_z \quad M_y = F_z \cdot (L_x + X_{cr}) + F_x \cdot L_z \quad M_z = F_y \cdot (L_x + X_{cr}) + F_x \cdot L_y$$

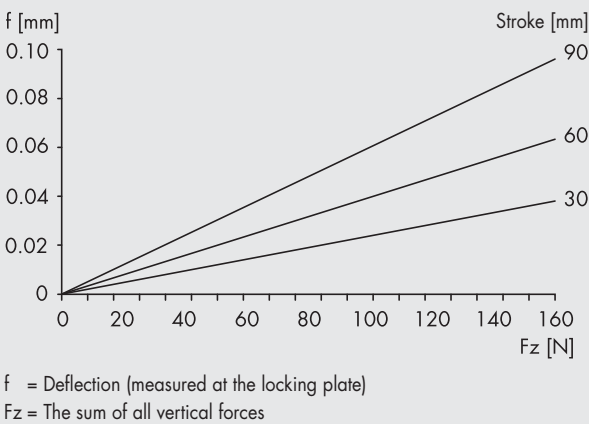
$$\frac{[M_x]}{M_{x \max}} + \frac{[M_y]}{M_{y \max}} + \frac{[M_z]}{M_{z \max}} + \frac{[F_y]}{F_{y \max}} + \frac{[F_z]}{F_{z \max}} \leq 1$$

HORIZONTAL LAYOUT

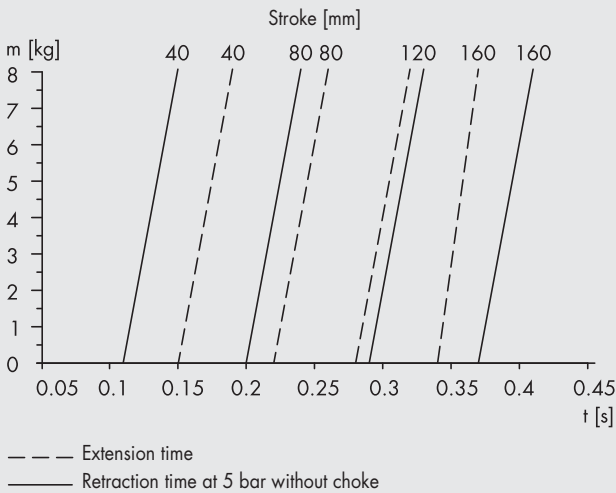
LEPK-1-90-H-A/B - Diagram of traverse times



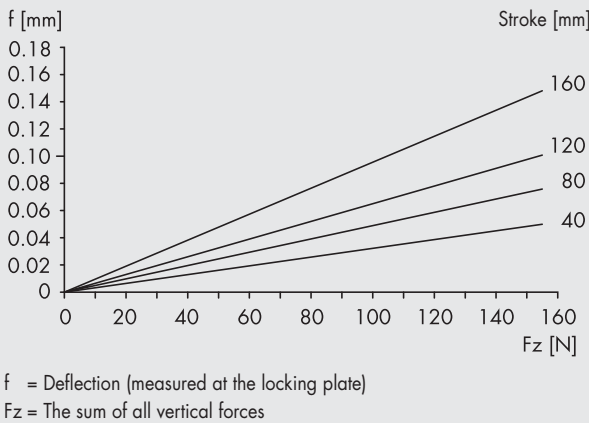
LEPK-1-90-H-A/B - Stress-deformation diagram



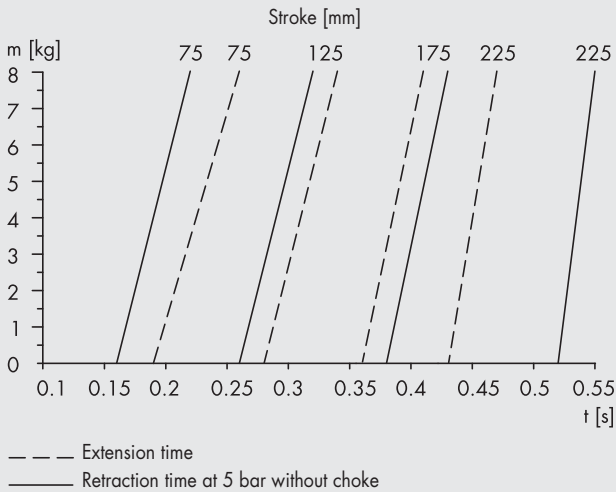
LEPK-1-160-H-A/B - Diagram of traverse times



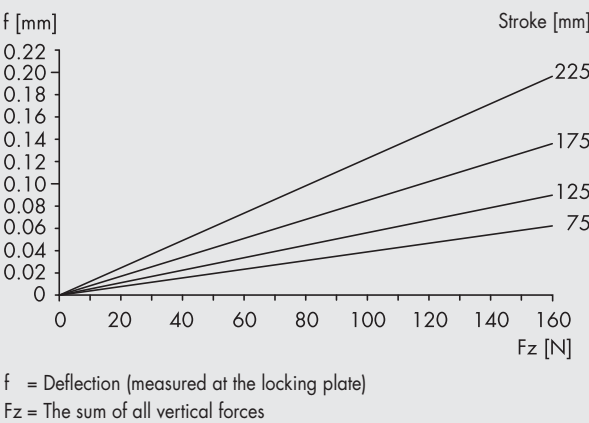
LEPK-1-160-H-A/B - Stress-deformation diagram



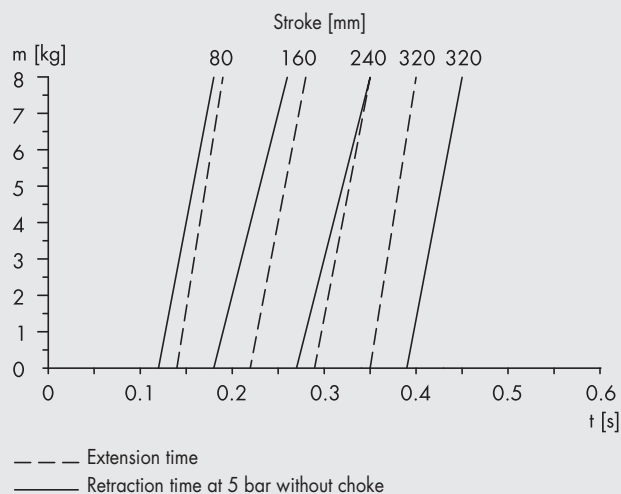
LEPK-1-225-H-A/B - Diagram of traverse times



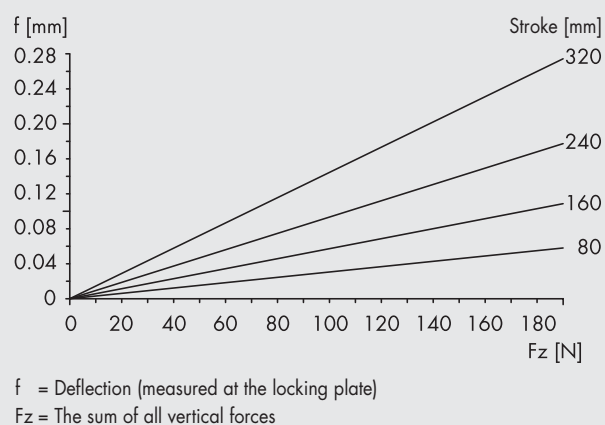
LEPK-1-225-H-A/B - Stress-deformation diagram



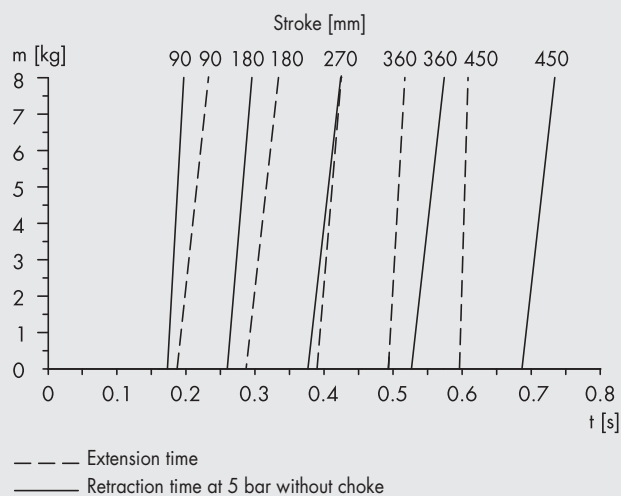
LEPK-2-320-H-A/B - Diagram of traverse times



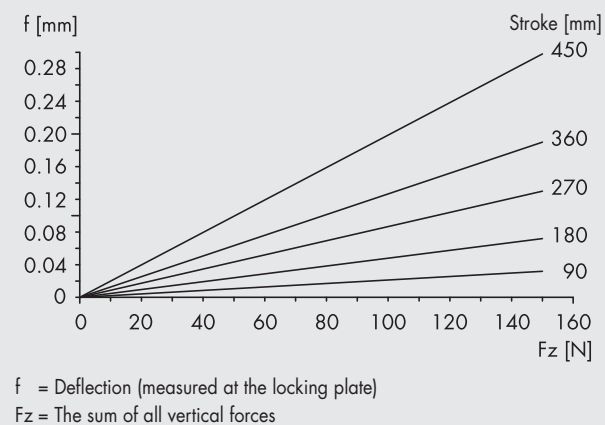
LEPK-2-320-H-A/B - Stress-deformation diagram



LEPK-2-450-H-A/B - Diagram of traverse times



LEPK-2-450-H-A/B - Stress-deformation diagram



VERTICAL LAYOUT

EXAMPLE

LEPK-1-60-V-A/B - Traverse times

Extension time

$m = 3 \text{ kg}$

Stroke = 40 mm

Result: $t = 0.11 \text{ s}$

Retraction time

$m = 3 \text{ kg}$

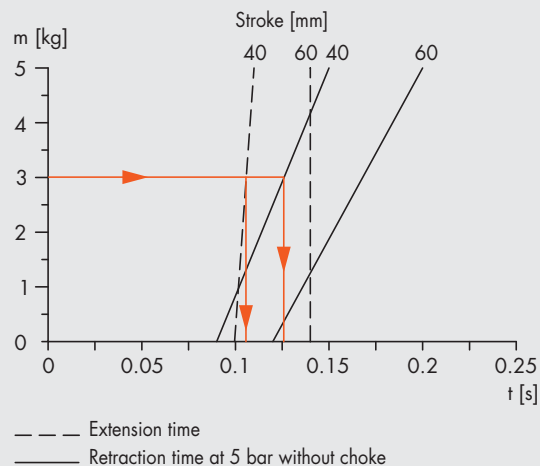
Stroke = 40 mm

Result: $t = 0.13 \text{ s}$

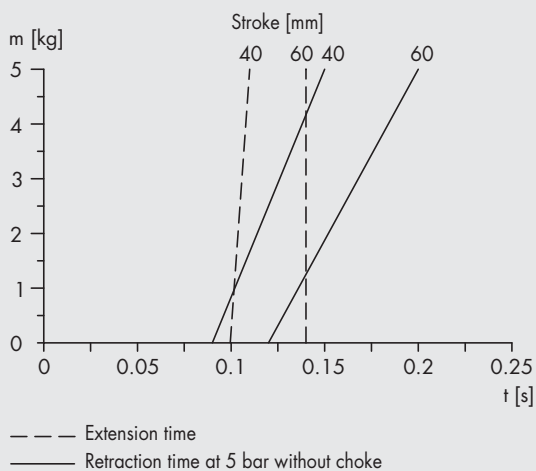
m = Mass applied [kg]

t = Traverse times [s]

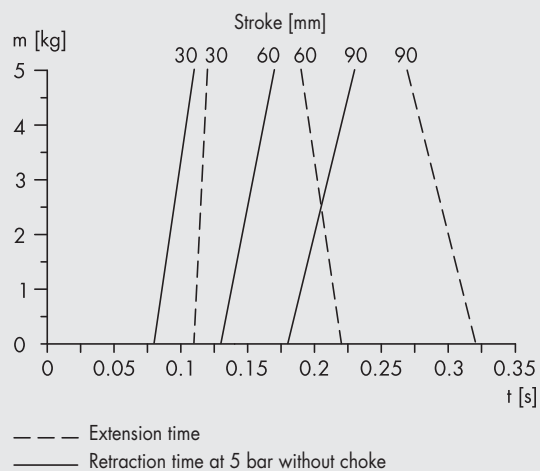
Stroke = Traverse stroke [mm]



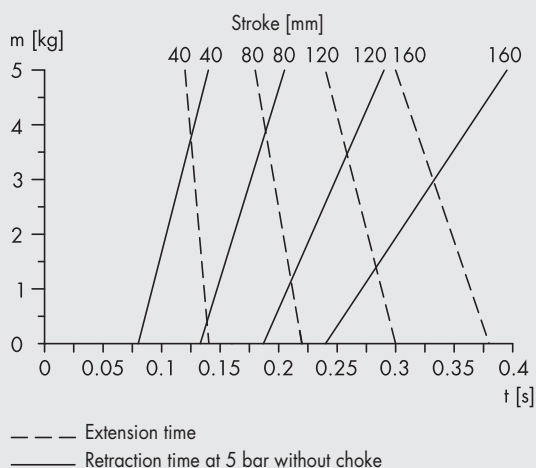
LEPK-1-60-V-A/B - Diagram of traverse times



LEPK-1-90-V-A/B - Diagram of traverse times



LEPK-1-160-V-A/B - Diagram of traverse times



FORCES RELATING TO LEPK VERTICAL UNITS WITH SPRING

EXAMPLE

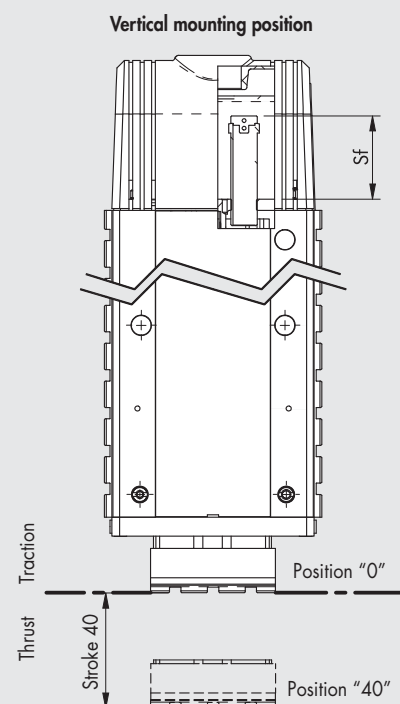
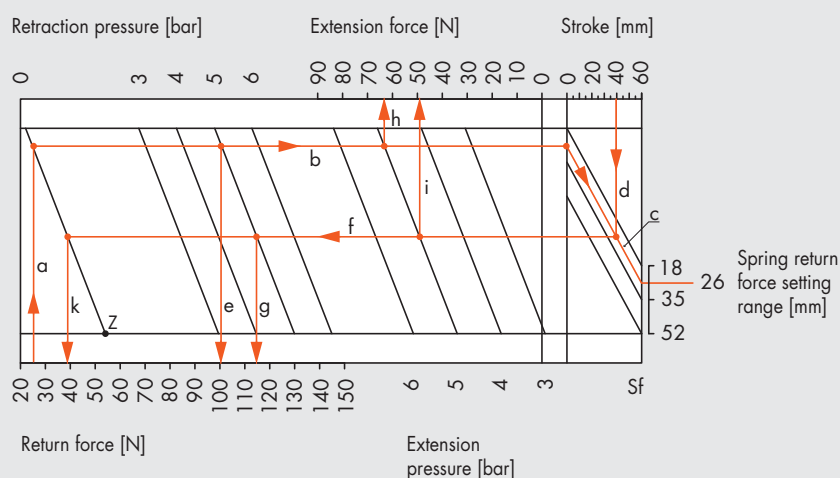
LEPK-1-60-V-A/B – Diagram of forces – Interpretation of the diagram of LEPK vertical unit forces

Stroke = 40 mm

Operating pressure = 5 bar

Mass applied = 2.5 kg (about 25 N)

Requirement = in no-pressure conditions (0 bar), the mass applied (2.5 kg) must move to the upper end-of-stroke position ("0")



- Maintenance of the LEPK in position "0" with no pressure (stroke = 0 mm, pressure = 0 bar): starting from the weight force of the mass to be lifted (25 N), and following the lines **a - b - c**, you can set the $S_f = 26$ mm and the following force values:

- line e**: tractive force in position "0" and with a pressure of 5 bar in the cylinder on the front side (stroke = 0 mm, pressure = 5 bar): in the case in point, it is around 100 N.
The mass applied must now be subtracted:
 $F = 100 \text{ N} - 25 \text{ N} = 75 \text{ N}$

- line h**: thrust force in position "0" and with a pressure of 5 bar in the cylinder on the back side (stroke = 0 mm, pressure = 5 bar): in the case in point, it is about 65 N.
The mass applied must now be added up, which gives:
 $F = 65 \text{ N} + 25 \text{ N} = 90 \text{ N}$

N.B.: As can be seen in the graph, for the LEPK-1-60-V, the maximum weight sustainable by the spring alone without pressure is about 55 N (with $S_f = 52$ mm). See point "Z" in the graph.

- Verification of the forces with stroke setting to 40 mm: starting from the 40 mm stroke and following the line **d - f** the following values of force are obtained:

- line g**: traction force in position "40" and with a pressure of 5 bar in the cylinder on the front side (stroke = 0 mm, pressure = 5 bar): in the case in point, it is around 115 N.
The mass applied must now be subtracted, which gives:
 $F = 115 \text{ N} - 25 \text{ N} = 90 \text{ N}$

Traction position "0" $p = 5$ bar



Thrust position "0" $p = 5$ bar

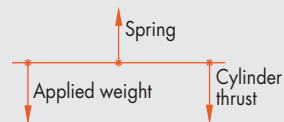


Traction position "40" $p = 5$ bar



- **line i:** thrust force in position "40" and with a pressure of 5 bar in the cylinder on the back side (stroke = 40 mm, pressure = 5 bar): in the case in point, it is about 50 N.
The mass applied must now be added up, which gives:
 $F = 50 \text{ N} + 25 \text{ N} = 75 \text{ N}$
- **line k:** tractive force of the spring in position "40" and without pressure (stroke = 40 mm, pressure = 0 bar): in the case in point it is about 39 N.
The mass applied must now be subtracted, which gives:
 $F = 39 \text{ N} - 25 \text{ N} = 14 \text{ N}$

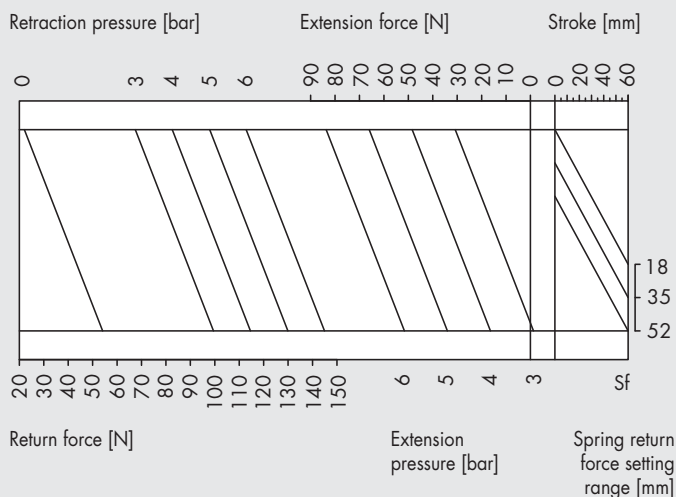
Thrust position "40" p = 5 bar



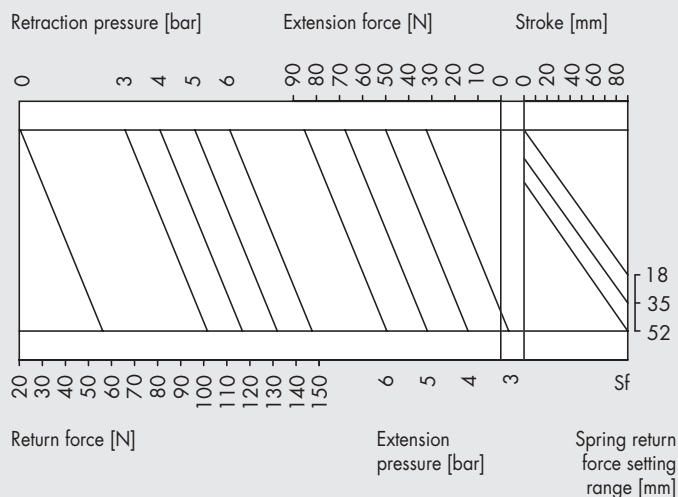
Traction position "40" p = 0 bar



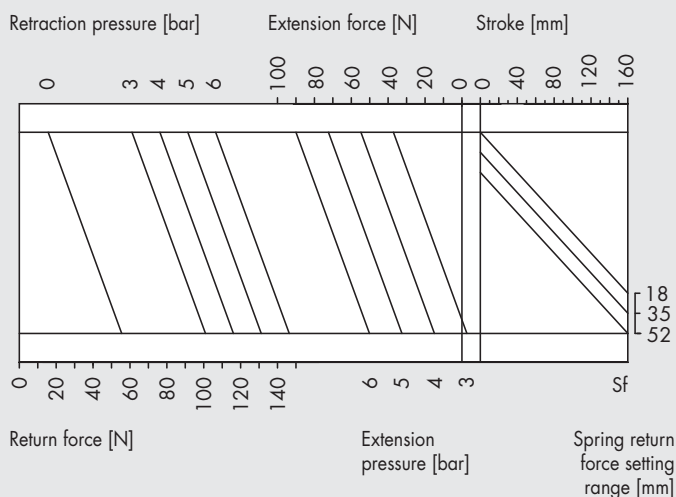
LEPK-1-60-V-A/B - Diagram of forces



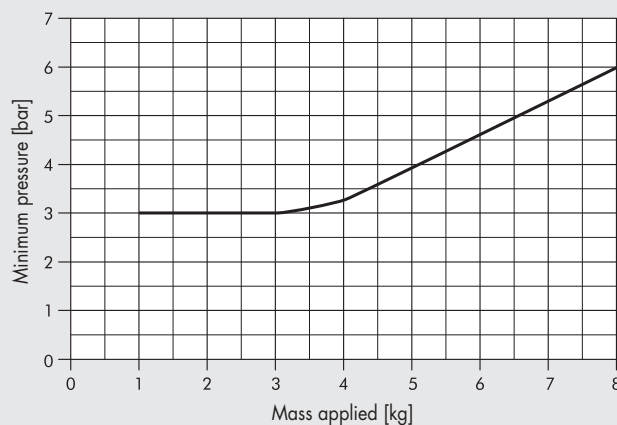
LEPK-1-90-V-A/B - Diagram of forces



LEPK-1-160-V-A/B - Diagram of forces

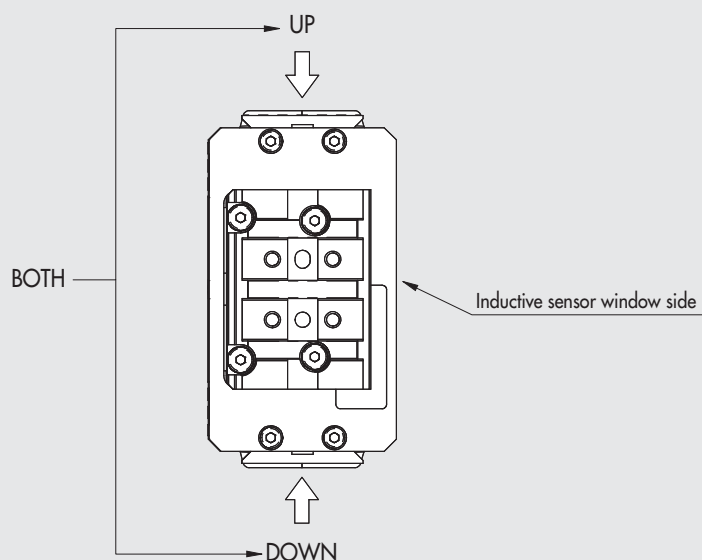


Minimum vertical retraction actuation pressure without spring



MOUNTING OPTIONS

At the encoding stage, you need to determine whether to make the V-Lock grooves and on what side. Number "0" (Zero) identifies the no machining condition, while the letters "U" (Up), "D" (Down) and "B" (Both) identify the side where V-Lock connections must be provided. The letters identify the position of machining in accordance with the diagram shown in the drawing below.



After determining the side of machining, you need to establish the point at which to perform the first V-Lock machining (the reference is the front plane).

The position of the first machining shall be in accordance with the following rules:

- minimum distance from the front reference plane: 25 mm;
- subsequent distances: starting from 25 mm, the distance is increased by 20 mm steps at a time (i.e. 25, 45, 65, 85, etc.).

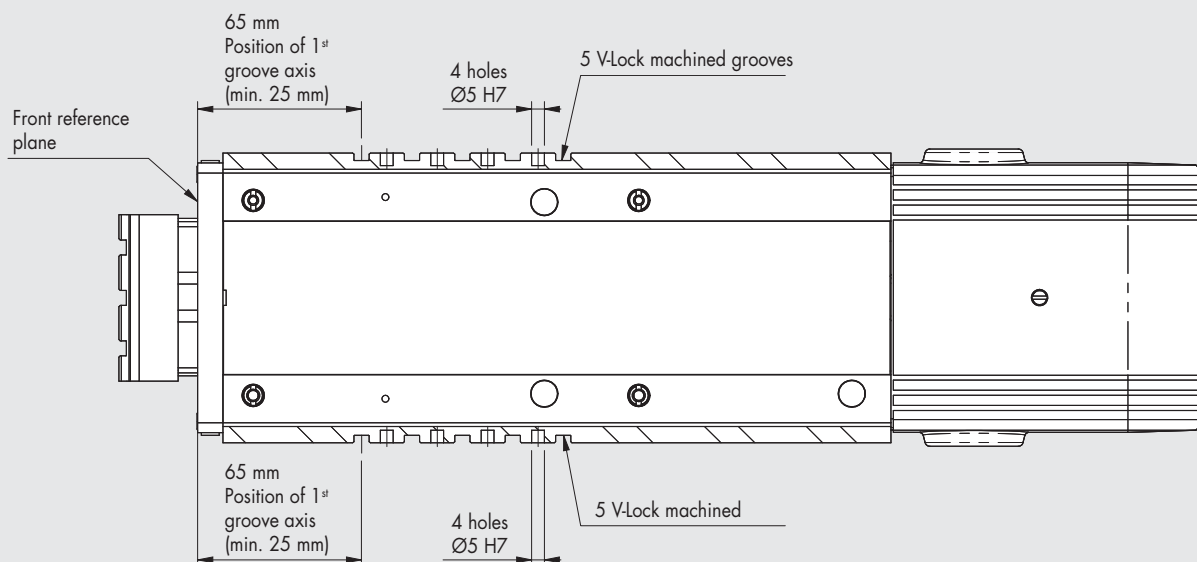
The number of the V-Lock grooves to be machined is then indicated (the number of $\varnothing 5$ H7 pinholes coincides with the number of grooves less 1).

IMPORTANT!

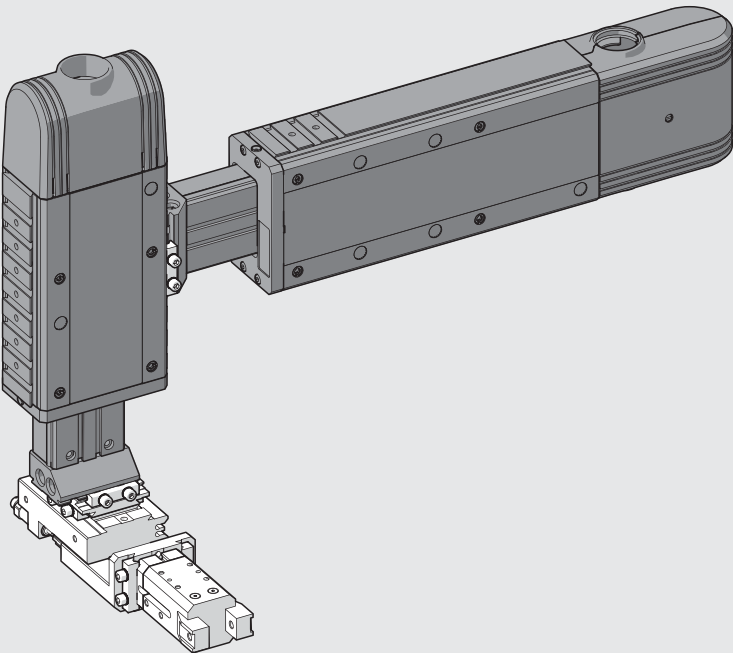
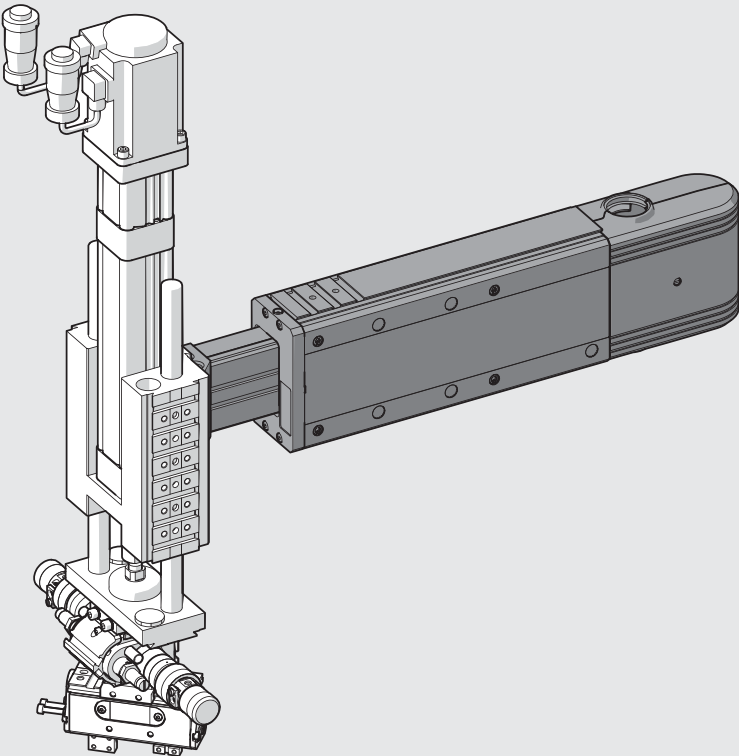
If you decide for version "B", i.e. the one with the grooves machined on both sides of the body, the distance values and the number of grooves shall apply to both sides.

EXAMPLE

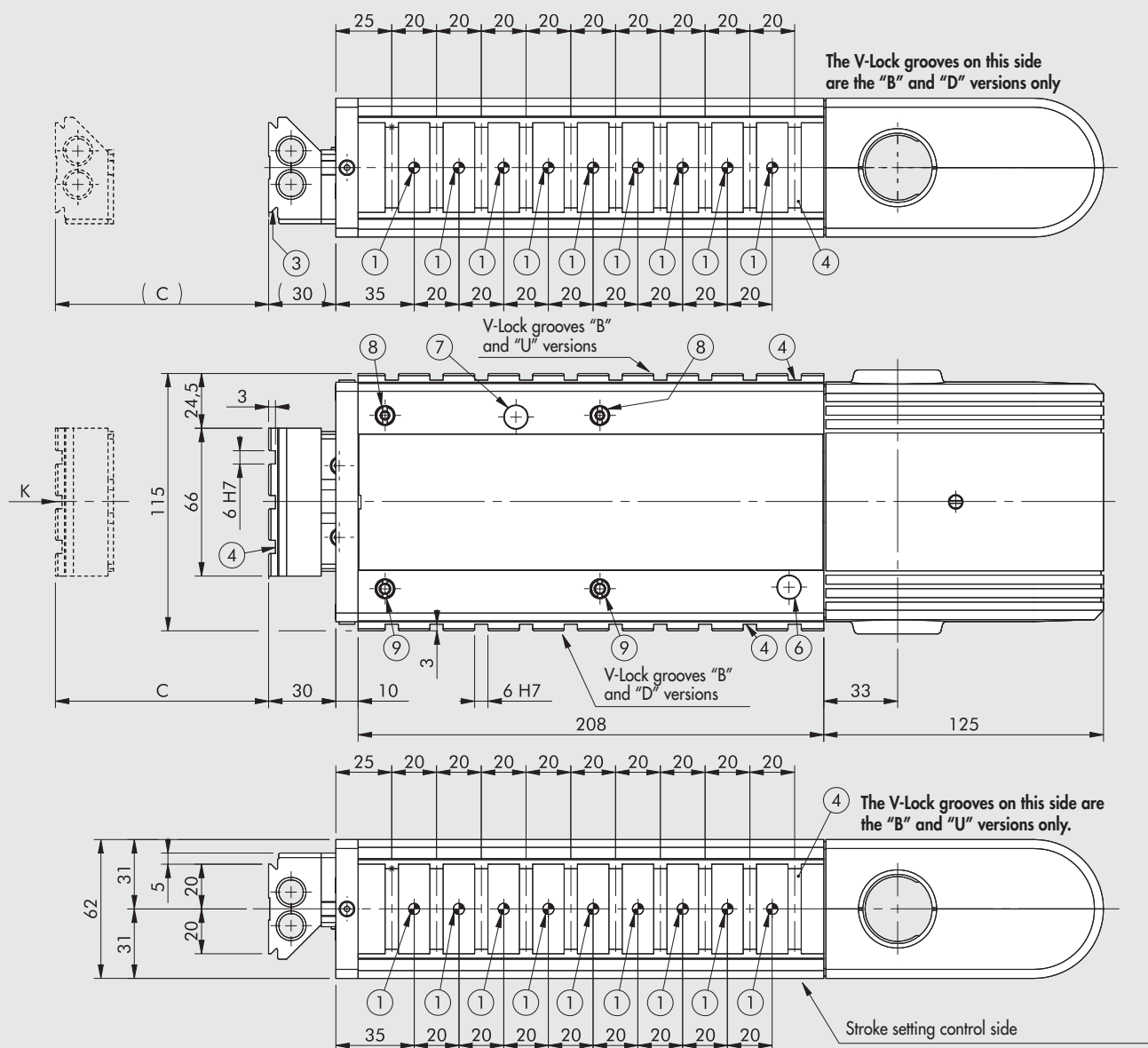
If you order an LEPK unit encoded **K1012H00090B06505K** the part ordered will be as follows:



EXAMPLES OF APPLICATION



DIMENSIONS OF THE LEPK-1-90-H-A LINEAR UNIT (horizontal, 2 positions)



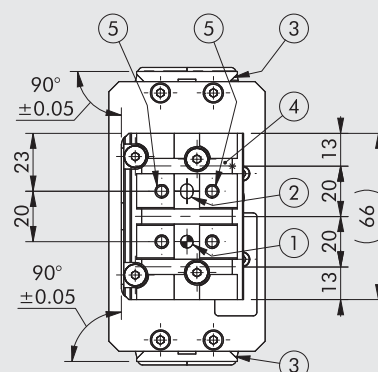
- ① Holes for centring pins
- ② Centring slot
- ③ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ④ Slot for "V-Lock" precision key
- ⑤ Threaded holes for fixing
- ⑥ Sensor LED inspection hole for the retracted position ("0")
- ⑦ Sensor LED inspection hole for the extended position
- ⑧ Eccentric rod for backlash take-up
- ⑨ Centric rod

IMPORTANT!

The drawing shows the code K101AH00090B02510K with the maximum number of V-Lock grooves (version BOTH)

Code	Description	C
K101AH00090000000K	LEPK-1-90-H-A	15 to 90
K101AH00090B-----K		
K101AH00090D-----K		
K101AH00090U-----K		
K101AH200900000000K	LEPK-1-90-H-A without terminal board	
K101AH20090B-----K		
K101AH20090D-----K		
K101AH20090U-----K		

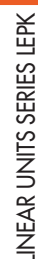
VIEWED FROM "K"



IMPORTANT. The LEPK-1-90-H-A can hold maximum 10 V-Lock grooves and hence a maximum of 9 Ø5 H7 pinholes.

ACTUATORS

LINEAR UNITS SERIES LEPK



- IMPORTANT!**
The drawing shows the code K101AH00160B02513K with the maximum number of V-Lock grooves (version BOTH)

VIEWED FROM "K"

90°
±0.05

23

20

90°
±0.05

66

13

20

13

20

13

1

2

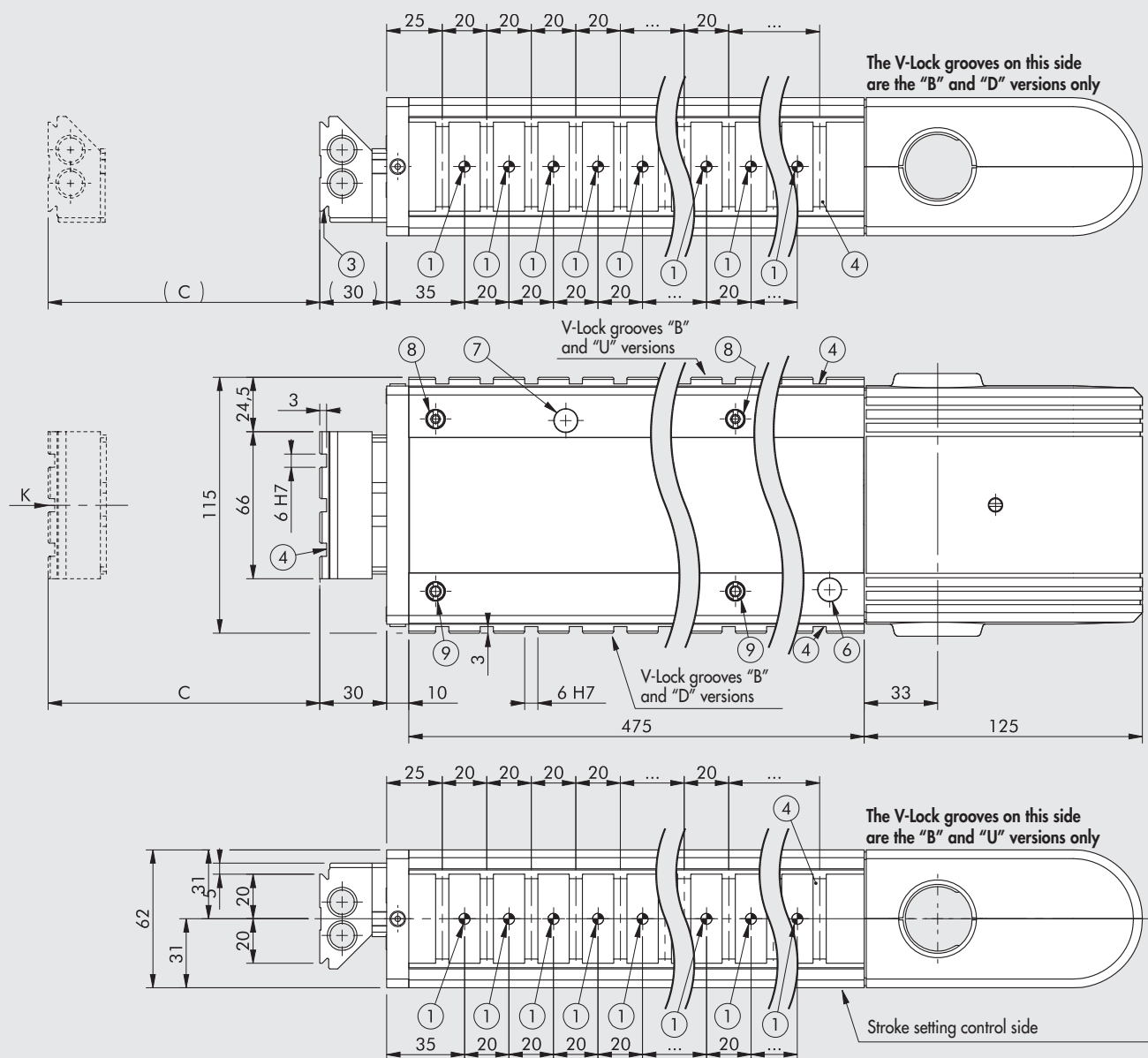
3

4

5

A3.107

DIMENSIONS OF THE LEPK-1-225-H-A LINEAR UNIT (horizontal, 2 positions)



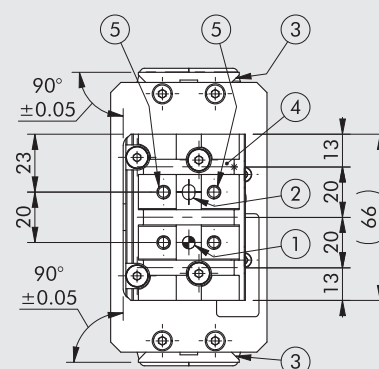
- ① Holes for centring pins
- ② Centring slot
- ③ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ④ Slot for "V-Lock" precision key
- ⑤ Threaded holes for fixing
- ⑥ Sensor LED inspection hole for the retracted position ("0")
- ⑦ Sensor LED inspection hole for the extended position
- ⑧ Eccentric rod for backlash take-up
- ⑨ Centric rod

IMPORTANT!

The drawing shows the code K101AH00225B02523K with the maximum number of V-Lock grooves (version BOTH)

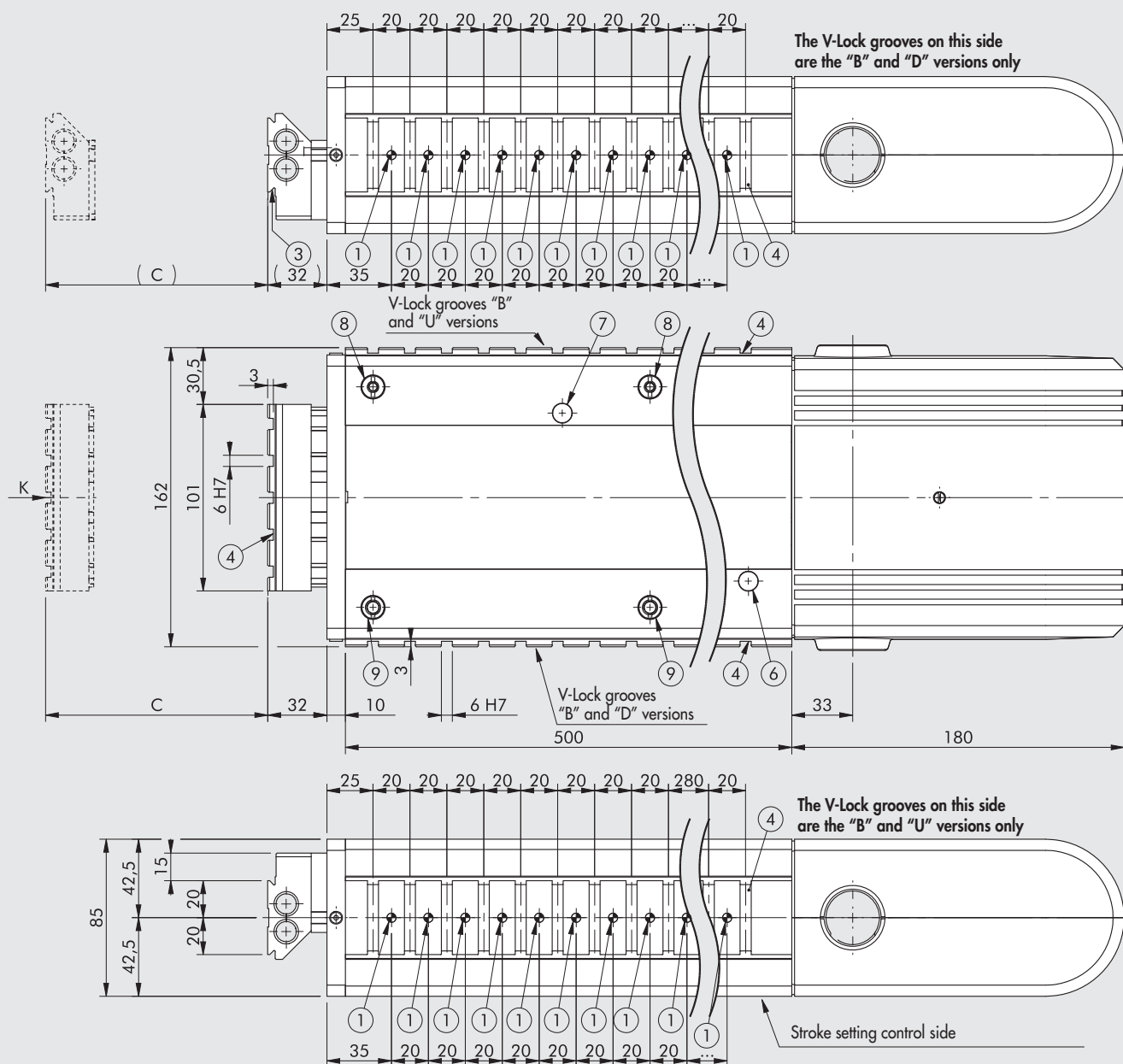
Code	Description	C
K101AH00225000000K		
K101AH00225B ----- K	LEPK-1-225-H-A	15 to 225
K101AH00225D ----- K		
K101AH00225U ----- K		
K101AH202250000000K		
K101AH20225B ----- K	LEPK-1-225-H-A without terminal board	
K101AH20225D ----- K		
K101AH20225U ----- K		

VIEWED FROM "K"



IMPORTANT. The LEPK-1-225-H-A can hold maximum 23 grooves and hence a maximum of 22 Ø5 H7 pinholes.

DIMENSIONS OF THE LEPK-2-320-H-A LINEAR UNIT (horizontal, 2 positions)



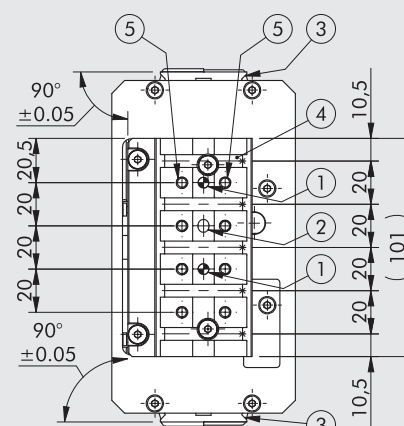
- ① Holes for centring pins
- ② Centring slot
- ③ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ④ Slot for "V-Lock" precision key
- ⑤ Threaded holes for fixing
- ⑥ Sensor LED inspection hole for the retracted position ("0")
- ⑦ Sensor LED inspection hole for the extended position
- ⑧ Eccentric rod for backlash take-up
- ⑨ Centric rod

IMPORTANT!

The drawing shows the code K102AH00320B02524K with the maximum number of V-Lock grooves (version BOTH)

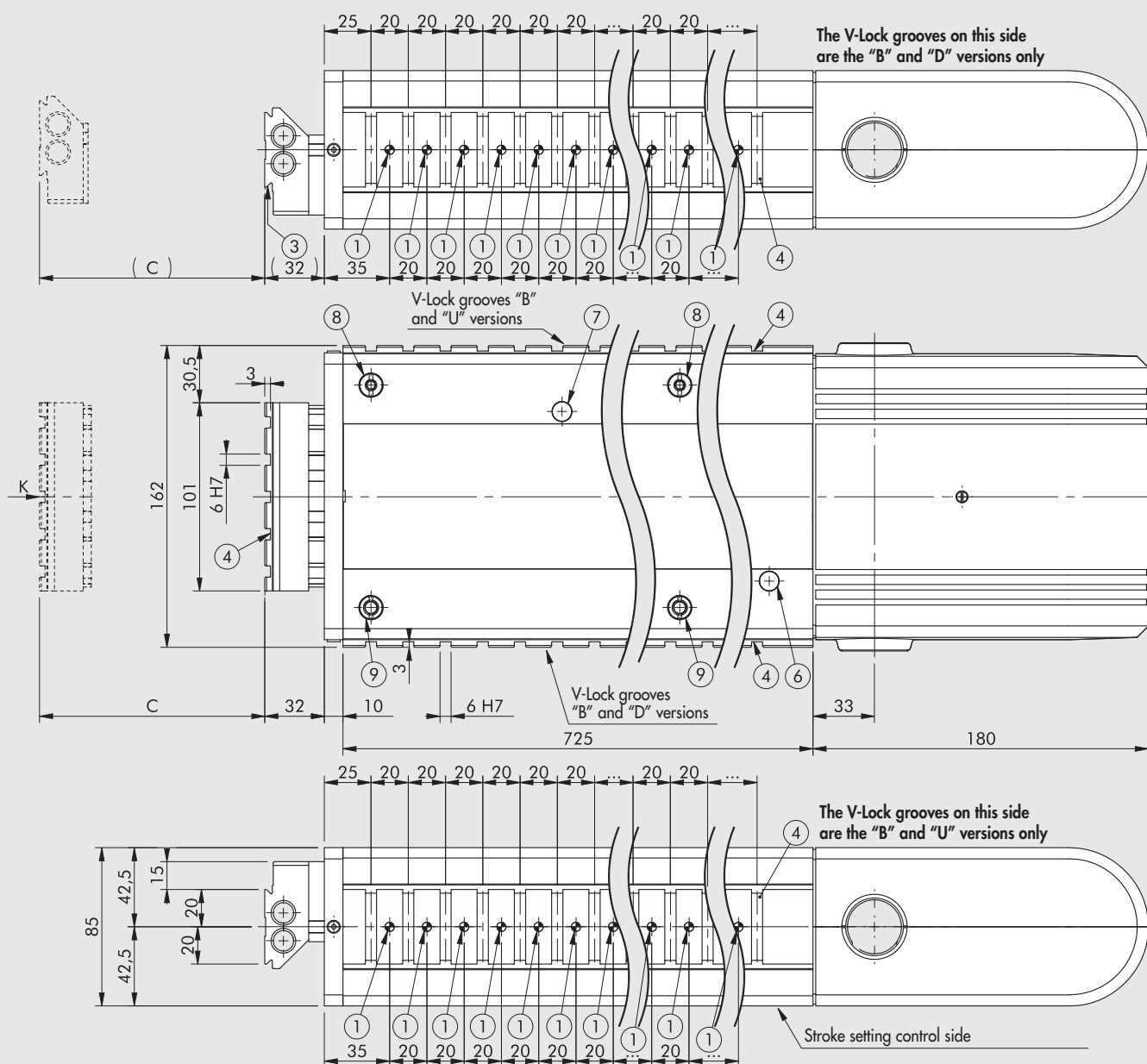
Code	Description	C
K102AH00320000000K	LEPK-2-320-H-A	50 to 320
K102AH00320B ---- K		
K102AH00320D ---- K		
K102AH00320U ---- K		
K102AH20320000000K	LEPK-2-320-H-A without terminal board	
K102AH20320B ---- K		
K102AH20320D ---- K		
K102AH20320U ---- K		

VIEWED FROM "K"



IMPORTANT. The LEPK-2-320-H-A can hold maximum 24 V-Lock grooves and hence a maximum of 23 Ø5 H7 pinholes.

DIMENSIONS OF THE LEPK-2-450-H-A LINEAR UNIT (horizontal, 2 positions)



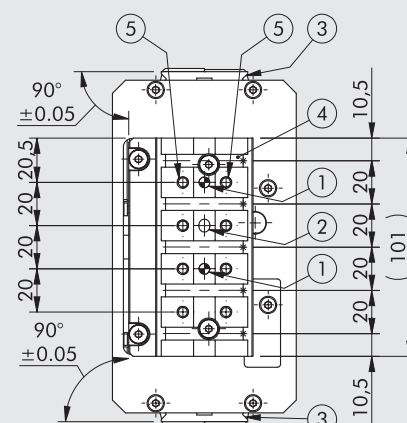
- ① Holes for centring pins
- ② Centring slot
- ③ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ④ Slot for "V-Lock" precision key
- ⑤ Threaded holes for fixing
- ⑥ Sensor LED inspection hole for the retracted position ("0")
- ⑦ Sensor LED inspection hole for the extended position
- ⑧ Eccentric rod for backlash take-up
- ⑨ Centric rod

IMPORTANT!

The drawing shows the code K102AH00450B02535K with the maximum number of V-Lock grooves (version BOTH)

Code	Description	C
K102AH00450000000K	LEPK-2-450-H-A	50 to 450
K102AH00450B-----K		
K102AH00450D-----K		
K102AH00450U-----K		
K102AH204500000000K	LEPK-2-450-H-A without terminal board	
K102AH20450B-----K		
K102AH20450D-----K		
K102AH20450U-----K		

VIEWED FROM "K"

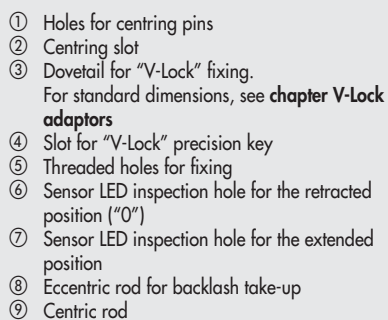


IMPORTANT. The LEPK-2-450-H-A can hold maximum 35 V-Lock grooves and hence a maximum of 34 Ø5 H7 pinholes.

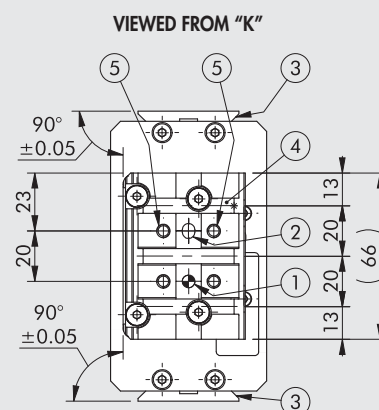
ACTUATORS

LINEAR UNITS SERIES LEPK

The V-Lock grooves on this side are the "B" and "U" versions only

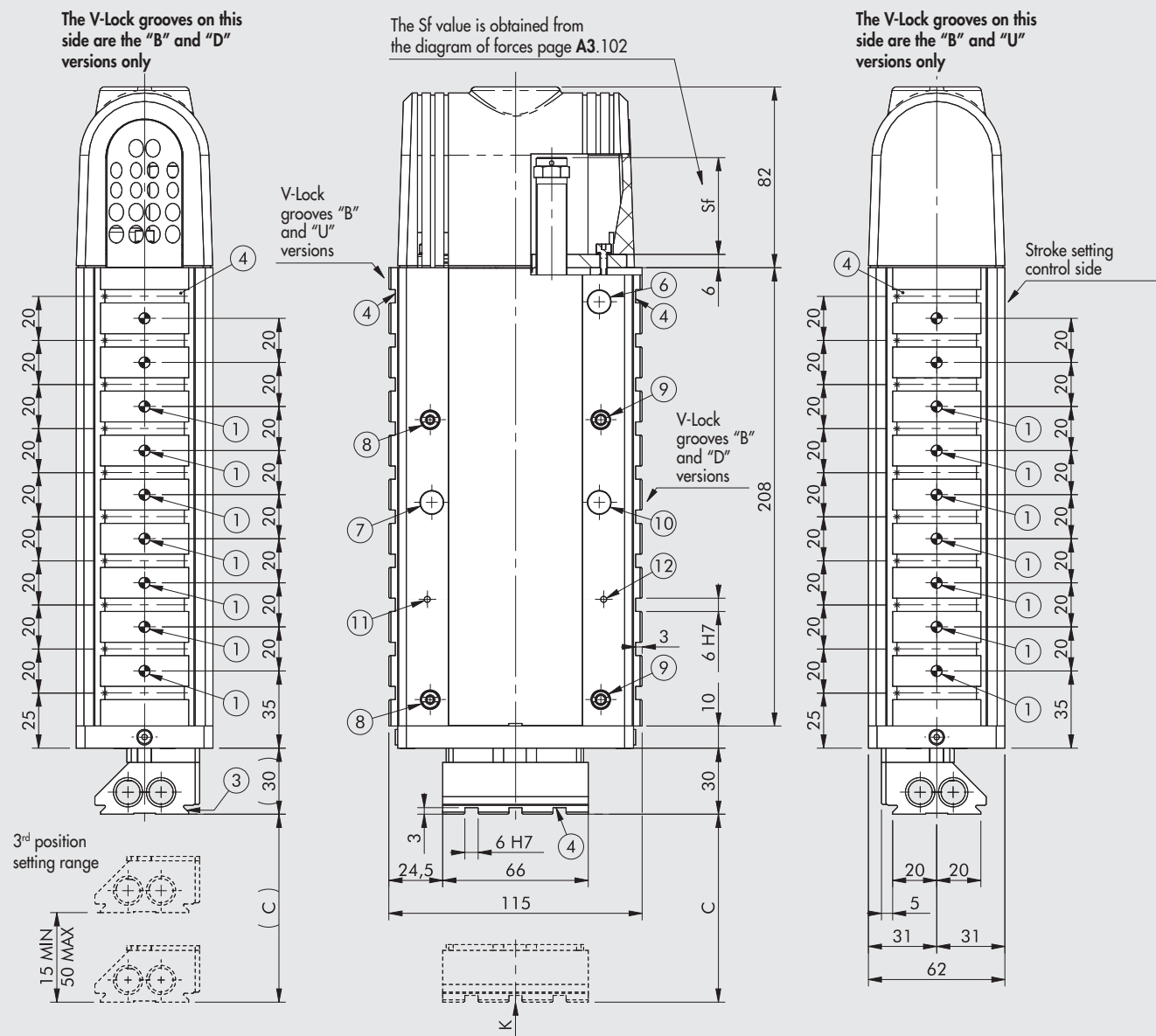


Code	Description	C
K101AV00060000000K	LEPK-1-60-V-A	15 to 60
K101AV00060B _ _ _ _ _ K		
K101AV00060D _ _ _ _ _ K		
K101AV00060U _ _ _ _ _ K		
K101AS200600000000K	LEPK-1-60-V-A without spring	
K101AS20060B _ _ _ _ _ K		
K101AS20060D _ _ _ _ _ K		
K101AS20060U _ _ _ _ _ K		



A3.115

DIMENSIONS OF THE LEPK-1-60-V-B LINEAR UNIT (Vertical, 3 positions)



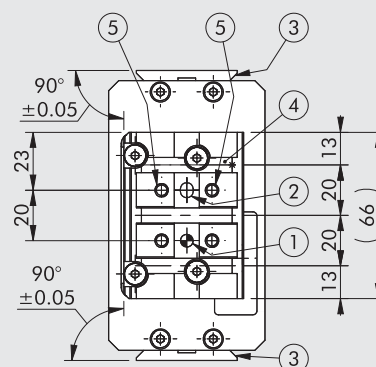
- ① Holes for centring pins
- ② Centring slot
- ③ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ④ Slot for "V-Lock" precision key
- ⑤ Threaded holes for fixing
- ⑥ Sensor LED inspection hole for the retracted position ("0")
- ⑦ Sensor LED inspection hole for the extended position
- ⑧ Eccentric rod for backlash take-up
- ⑨ Centric rod
- ⑩ Sensor LED inspection hole for 3rd position DISABLED
- ⑪ Sensor LED inspection hole for 3rd position ENABLED
- ⑫ Sensor LED inspection hole for 3rd position ENABLED

IMPORTANT!

The drawing shows the code K101BV00060B02510K with the maximum number of V-Lock grooves (version BOTH)

Code	Description	C
K101BV00060000000K	LEPK-1-60-V-B	15 to 60
K101BV00060B-----K		
K101BV00060D-----K		
K101BV00060U-----K		
K101BS200600000000K	LEPK-1-60-V-B without spring	
K101BS20060B-----K		
K101BS20060D-----K		
K101BS20060U-----K		

VIEWED FROM "K"



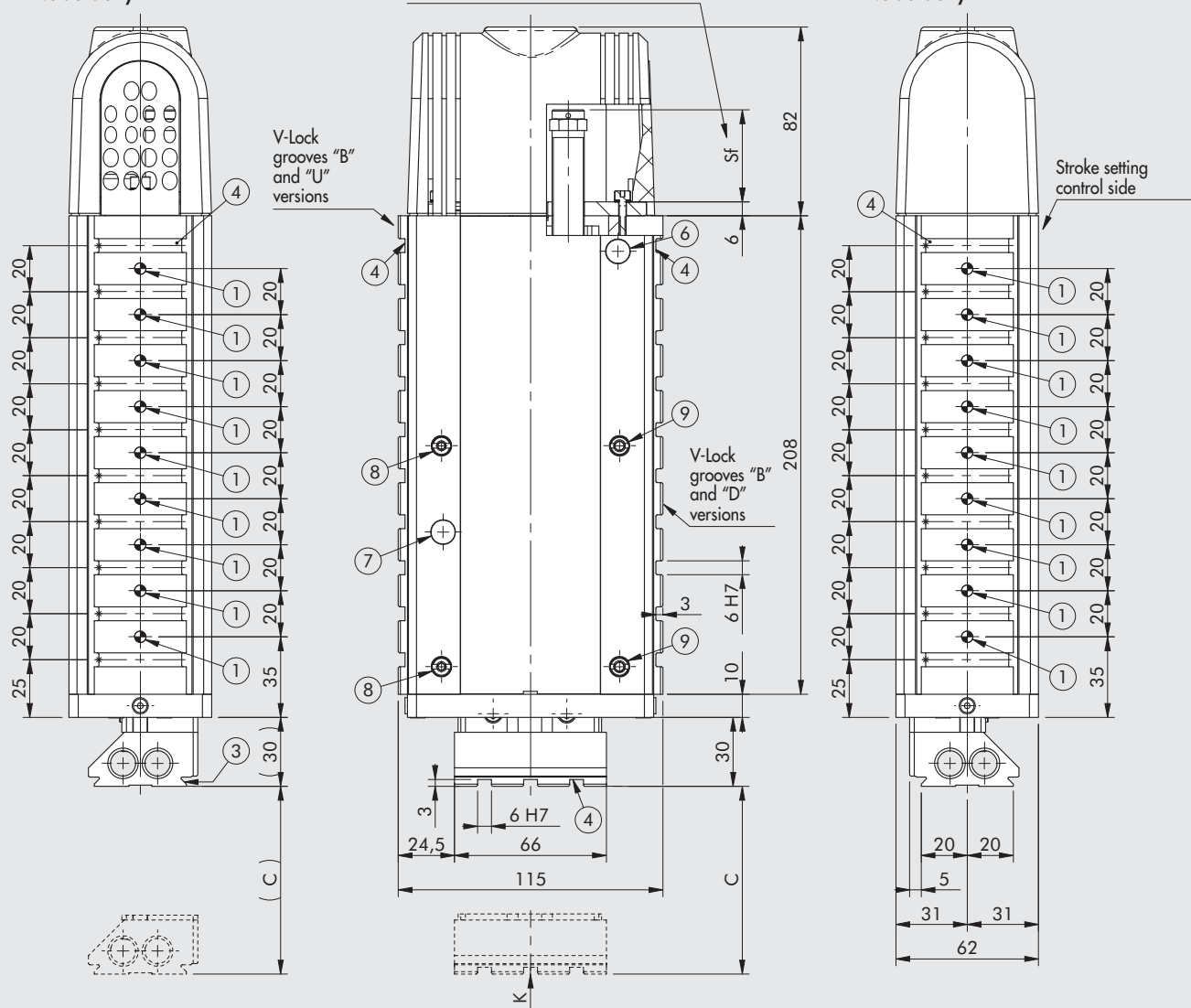
IMPORTANT. The LEPK-1-60-V-B can hold maximum 10 V-Lock grooves and hence a maximum of 9 Ø5 H7 pinholes.

DIMENSIONS OF THE LEPK-1-90-V-A LINEAR UNIT (Vertical, 2 positions)

The V-Lock grooves on this side are the "B" and "D" versions only

The Sf value is obtained from the diagram of forces page A3.102

The V-Lock grooves on this side are the "B" and "U" versions only



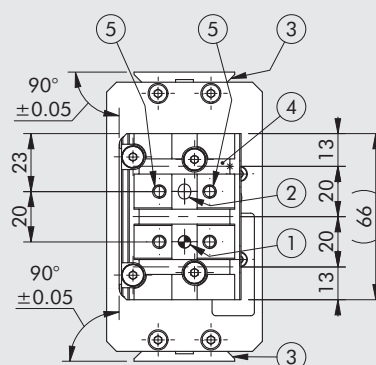
- ① Holes for centring pins
- ② Centring slot
- ③ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ④ Slot for "V-Lock" precision key
- ⑤ Threaded holes for fixing
- ⑥ Sensor LED inspection hole for the retracted position ("0")
- ⑦ Sensor LED inspection hole for the extended position
- ⑧ Eccentric rod for backlash take-up
- ⑨ Centric rod

IMPORTANT!

The drawing shows the code K101AV00090B02510K with the maximum number of V-Lock grooves (version BOTH)

Code	Description	C
K101AV00090000000K	LEPK-1-90-V-A	15 to 90
K101AV00090B-----K		
K101AV00090D-----K		
K101AV00090U-----K		
K101AS200900000000K	LEPK-1-90-V-A without spring	
K101AS20090B-----K		
K101AS20090D-----K		
K101AS20090U-----K		

VIED FROM "K"



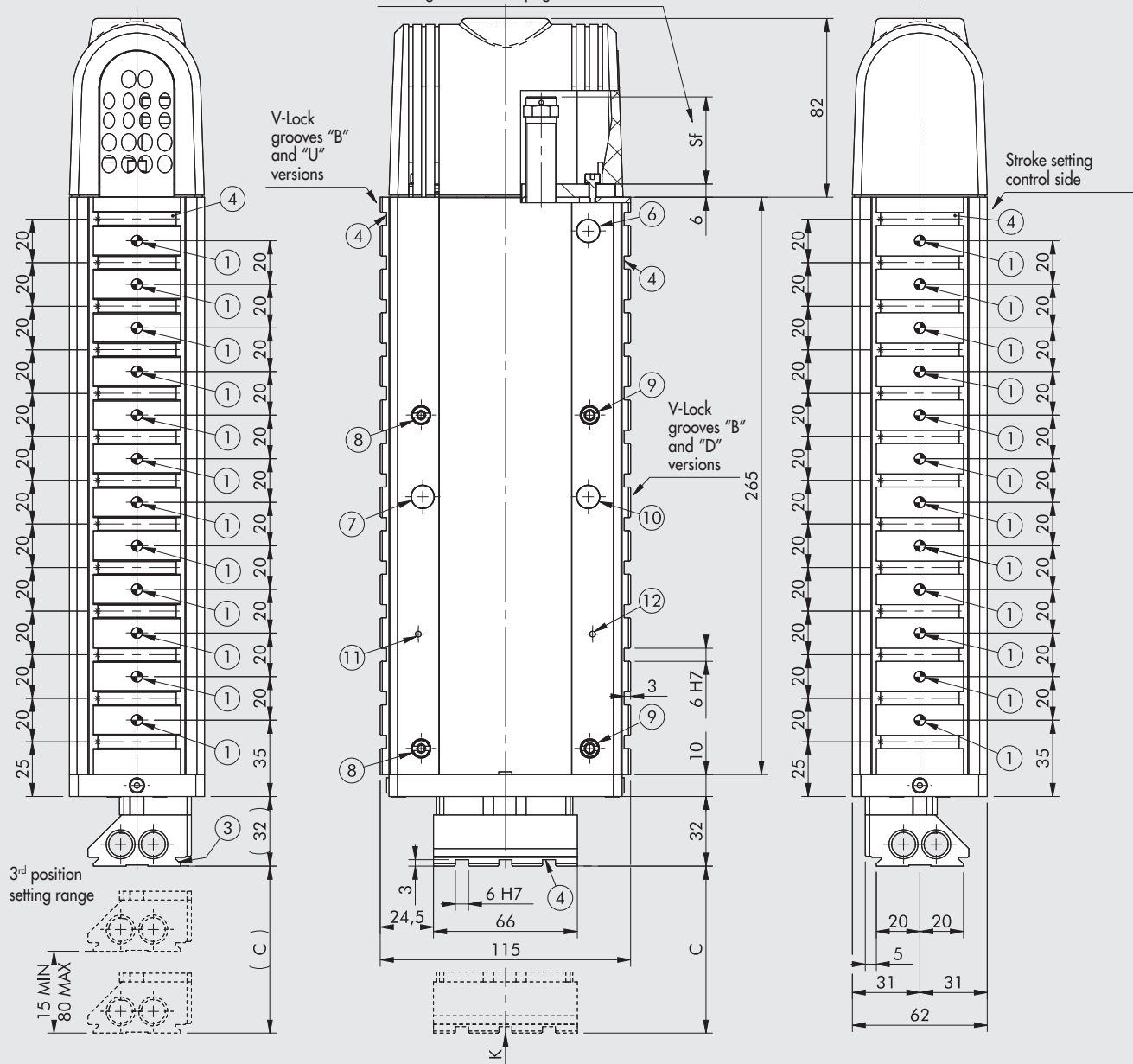
IMPORTANT. The LEPK-1-90-V-A can hold maximum 10 V-Lock grooves and hence a maximum of 9 Ø5 H7 pinholes.

DIMENSIONS OF THE LEPK-1-90-V-B LINEAR UNIT (Vertical, 3 positions)

The V-Lock grooves on this side are the "B" and "D" versions only

The Sf value is obtained from the diagram of forces page A3.102

The V-Lock grooves on this side are the "B" and "U" versions only



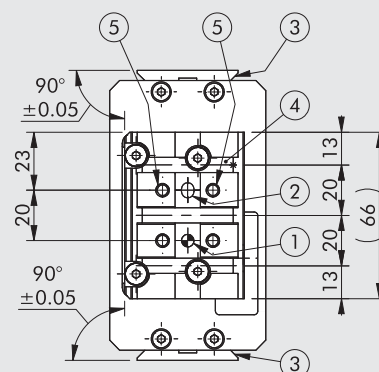
- ① Holes for centring pins
- ② Centring slot
- ③ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ④ Slot for "V-Lock" precision key
- ⑤ Threaded holes for fixing
- ⑥ Sensor LED inspection hole for the retracted position ("0")
- ⑦ Sensor LED inspection hole for the extended position
- ⑧ Eccentric rod for backlash take-up
- ⑨ Centric rod
- ⑩ Sensor LED inspection hole for 3rd position
- ⑪ Sensor LED inspection hole for 3rd position DISABLED
- ⑫ Sensor LED inspection hole for 3rd position ENABLED

IMPORTANT!

The drawing shows the code K101BV00090B02513K with the maximum number of V-Lock grooves (version BOTH)

Code	Description	C
K101BV00090000000K	LEPK-1-90-V-B	15 to 90
K101BV00090B _____ K		
K101BV00090D _____ K		
K101BV00090U _____ K		
K101BS200900000000K	LEPK-1-90-V-B without spring	
K101BS20090B _____ K		
K101BS20090D _____ K		
K101BS20090U _____ K		

VIEWED FROM "K"



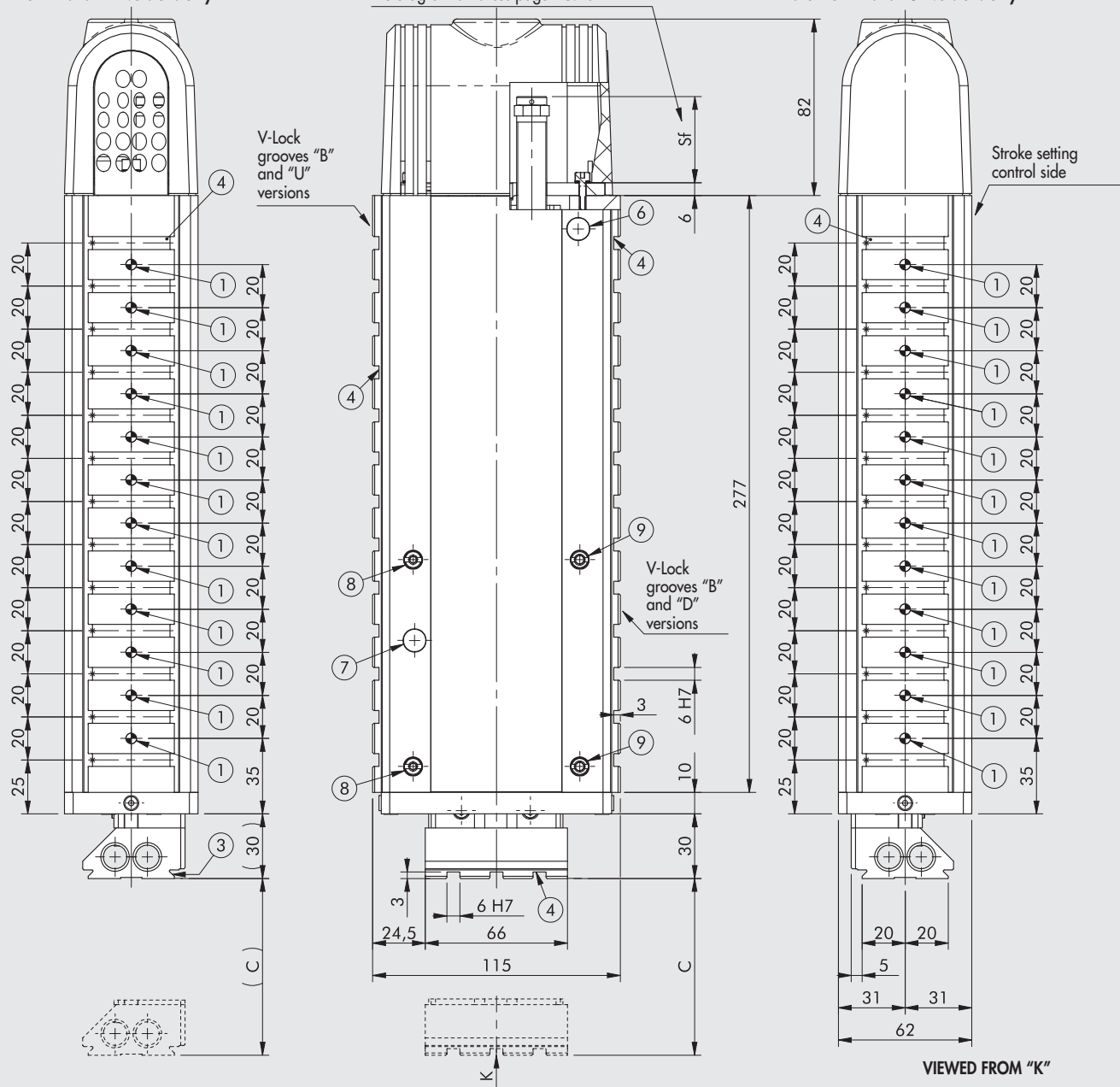
IMPORTANT. The LEPK-1-90-V-B can hold maximum 13 V-Lock grooves and hence a maximum of 12 Ø5 H7 pinholes.

DIMENSIONS OF THE LEPK-1-160-V-A LINEAR UNIT (Vertical, 2 positions)

The V-Lock grooves on this side are the "B" and "D" versions only

The Sf value is obtained from the diagram of forces page A3.102

The V-Lock grooves on this side are the "B" and "U" versions only

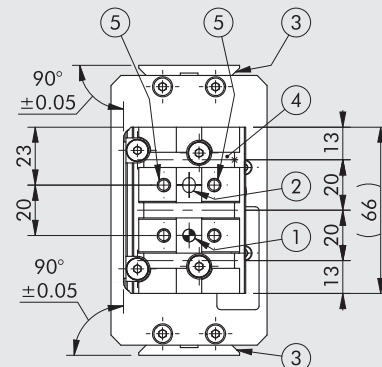


- ① Holes for centring pins
- ② Centring slot
- ③ Dovetail for "V-Lock" fixing.
For standard dimensions, see chapter V-Lock adaptors
- ④ Slot for "V-Lock" precision key
- ⑤ Threaded holes for fixing
- ⑥ Sensor LED inspection hole for the retracted position ("0")
- ⑦ Sensor LED inspection hole for the extended position
- ⑧ Eccentric rod for backlash take-up
- ⑨ Centric rod

IMPORTANT!

The drawing shows the code K101AV00160B02513K with the maximum number of V-Lock grooves (version BOTH)

Code	Description	C
K101AV00160000000K		
K101AV00160B	LEPK-1-160-V-A	15 to 160
K101AV00160D		
K101AV00160U		
K101AS20160000000K		
K101AS20160B	LEPK-1-160-V-A without spring	
K101AS20160D		
K101AS20160U		



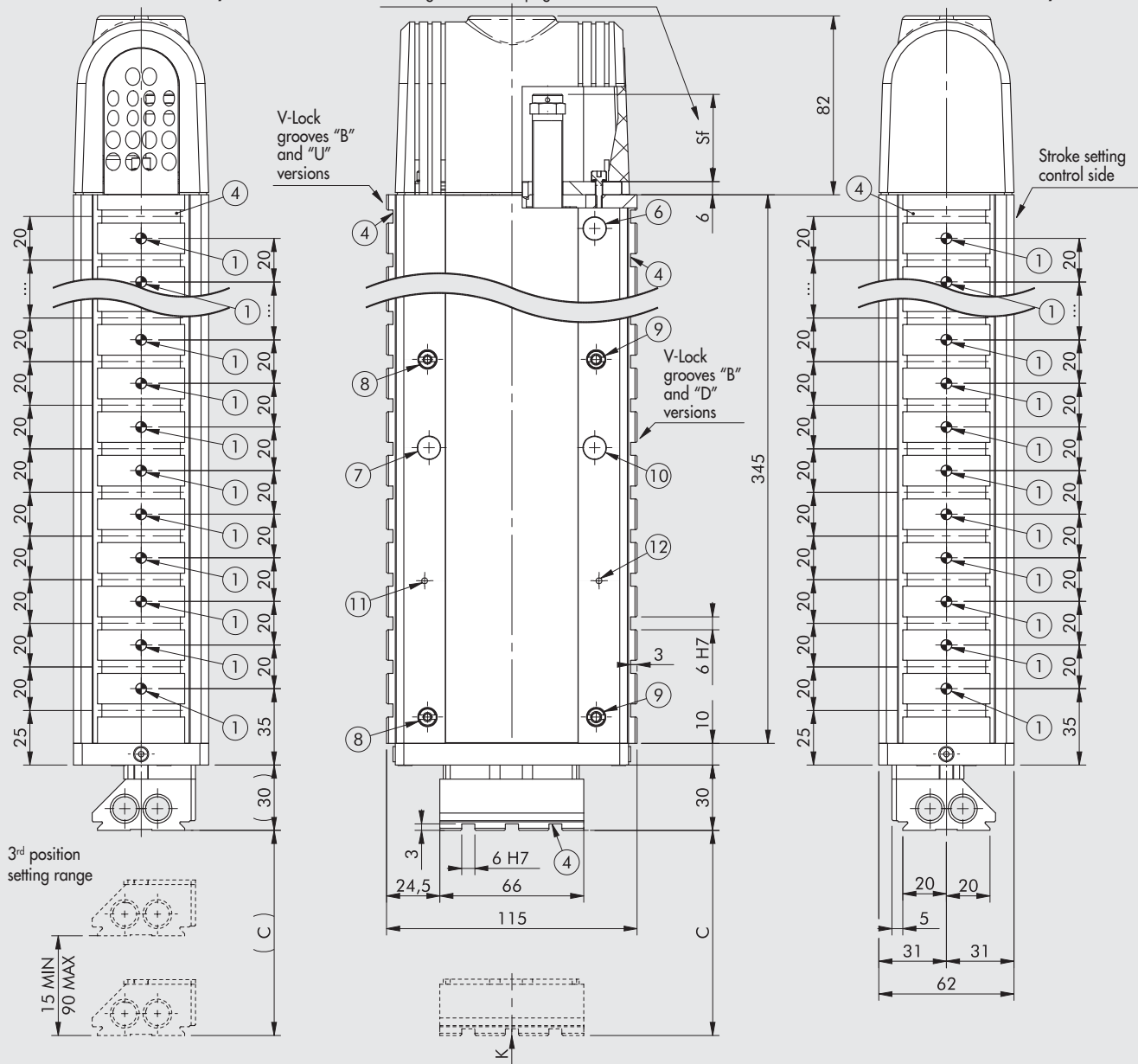
IMPORTANT. The LEPK-1-160-V-A can hold maximum 13 grooves and hence a maximum of 12 Ø5 H7 pinholes.

DIMENSIONS OF THE LEPK-1-160-V-B LINEAR UNIT (Vertical, 3 positions)

The V-Lock grooves on this side are the "B" and "D" versions only

The Sf value is obtained from the diagram of forces page **A3.102**

The V-Lock grooves on this side are the "B" and "U" versions only



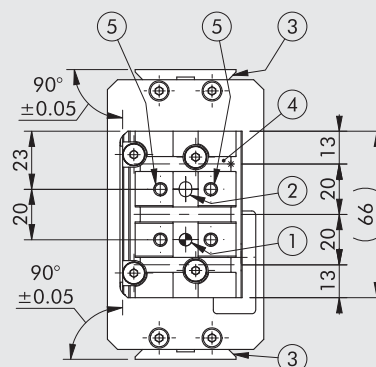
- ① Holes for centring pins
- ② Centring slot
- ③ Dovetail for "V-Lock" fixing.
For standard dimensions, see **chapter V-Lock adaptors**
- ④ Slot for "V-Lock" precision key
- ⑤ Threaded holes for fixing
- ⑥ Sensor LED inspection hole for the retracted position ("0")
- ⑦ Sensor LED inspection hole for the extended position
- ⑧ Eccentric rod for backlash take-up
- ⑨ Centric rod
- ⑩ Sensor LED inspection hole for 3rd position
- ⑪ Sensor LED inspection hole for 3rd position
DISABLED
- ⑫ Sensor LED inspection hole for 3rd position
ENABLED

IMPORTANT!

The drawing shows the code K101BV00160B02517K with the maximum number of V-Lock grooves (version BOTH)

Code	Description	C
K101BV00160000000K		
K101BV00160B _ _ _ _ _ K	LEPK-1-160-V-B	
K101BV00160D _ _ _ _ _ K		
K101BV00160U _ _ _ _ _ K		
K101BS20160000000K		
K101BS20160B _ _ _ _ _ K	LEPK-1-160-V-B	
K101BS20160D _ _ _ _ _ K	without spring	
K101BS20160U _ _ _ _ _ K		

VIEWED FROM "K"



IMPORTANT. The LEPK-1-160-V-B can hold maximum 17 V-Lock grooves and hence a maximum of 16 Ø5 H7 pinholes.

KEY TO CODES

K10	1	A	H	0	0	090	0	000	00	K
	SIZE	POSITION	ORIENTATION			STROKE	V-Lock CONNECTION	V-Lock POSITION	Number of V-Lock GROOVES	FAMILY
Linear units series LEPK	1 Size 1 2 Size 2	A 2 positions B 3 positions	H Horizontal V Vertical (with return spring) S Vertical (without return spring)	0 Inductive sensors (with terminal board) 2 Inductive sensors (without terminal board)		▼ 060 ◆ 090 ◆ 160 + 225 * 320 * 450	0 None B Grooves above and below D Grooves below U Grooves above	□ 000 None ▲ --- Position	□ 00 None ■ -- Number of grooves	K V-Lock

◀ Available only in horizontal orientation (H).

● Standard for the version with vertical orientation (V).

▼ Only size 1 - V/S

◆ Only size 1 - V/S/H

+ Only size 1 - H

* Only size 2 - H

□ Always use when "V-Lock connection" is equal to "0" (none)

▲ For connecting V-Lock "B" - "D" - "U" minimum value "025", the following values vary by steps of 20 mm (e.g. "045", "065" and "085").

For mounting options, see page A3.103

■ The maximum number of possible grooves is:

LEPK 1-60-V/S-A = n. 08

LEPK 1-60-V/S-B = n. 10

LEPK 1-90-V/S-A = n. 10

LEPK 1-90-V/S-B = n. 13

LEPK 1-90-H-A = n. 10

LEPK 1-90-H-B = n. 13

LEPK 1-160-H-A = n. 13

LEPK 1-160-H-B = n. 17

N.B.: The number of Ø5 H7 pinholes always coincides with the number of grooves ordered less 1.

For mounting options, see page A3.103

LEPK 1-160-V/S-A = n. 13

LEPK 1-160-V/S-B = n. 17

LEPK 1-225-H-A = n. 23

LEPK 1-225-H-B = n. 23

LEPK 2-320-H-A = n. 24

LEPK 2-320-H-B = n. 29

LEPK 2-450-H-A = n. 35

LEPK 2-450-H-B = n. 35

ORDERING CODES

Code	Description	Code	Description
LEPK-1 HORIZONTAL			
K101AH00090000000K	LEPK-1-90-H-A without V-Lock	K101AH20225U__K	LEPK-1-225-H-A V-Lock below
K101AH00090B__K	LEPK-1-90-H-A V-Lock above and below	K101BH00225000000K	LEPK-1-225-H-B without V-Lock
K101AH00090D__K	LEPK-1-90-H-A V-Lock above	K101BH00225B__K	LEPK-1-225-H-B V-Lock above and below
K101AH00090U__K	LEPK-1-90-H-A V-Lock below	K101BH00225D__K	LEPK-1-225-H-B V-Lock above
K101AH20090000000K	LEPK-1-90-H-A without V-Lock	K101BH00225U__K	LEPK-1-225-H-B V-Lock below
K101AH20090B__K	LEPK-1-90-H-A V-Lock above and below	K101BH20225000000K	LEPK-1-225-H-B without V-Lock
K101AH20090D__K	LEPK-1-90-H-A V-Lock above	K101BH20225B__K	LEPK-1-225-H-B V-Lock above and below
K101AH20090U__K	LEPK-1-90-H-A V-Lock below	K101BH20225D__K	LEPK-1-225-H-B V-Lock above
K101BH00090000000K	LEPK-1-90-H-B without V-Lock	K101BH20225U__K	LEPK-1-225-H-B V-Lock below
K101BH00090B__K	LEPK-1-90-H-B V-Lock above and below		
K101BH00090D__K	LEPK-1-90-H-B V-Lock above	LEPK-1 VERTICAL	
K101BH00090U__K	LEPK-1-90-H-B V-Lock below	K101AS20060000000K	LEPK-1-60-S-A without V-Lock
K101BH20090000000K	LEPK-1-90-H-B without V-Lock	K101AS20060B__K	LEPK-1-60-S-A V-Lock above and below
K101BH20090B__K	LEPK-1-90-H-B V-Lock above and below	K101AS20060D__K	LEPK-1-60-S-A V-Lock above
K101BH20090D__K	LEPK-1-90-H-B V-Lock above	K101AS20060U__K	LEPK-1-60-S-A V-Lock below
K101BH20090U__K	LEPK-1-90-H-B V-Lock below	K101AV20060000000K	LEPK-1-60-V-A without V-Lock
K101AH00160000000K	LEPK-1-160-H-A without V-Lock	K101AV20060B__K	LEPK-1-60-V-A V-Lock above and below
K101AH00160B__K	LEPK-1-160-H-A V-Lock above and below	K101AV20060D__K	LEPK-1-60-V-A V-Lock above
K101AH00160D__K	LEPK-1-160-H-A V-Lock above	K101AV20060U__K	LEPK-1-60-V-A V-Lock below
K101AH00160U__K	LEPK-1-160-H-A V-Lock below	K101BS20060000000K	LEPK-1-60-S-B without V-Lock
K101AH20160000000K	LEPK-1-160-H-A without V-Lock	K101BS20060B__K	LEPK-1-60-S-B V-Lock above and below
K101AH20160B__K	LEPK-1-160-H-A V-Lock above and below	K101BS20060D__K	LEPK-1-60-S-B V-Lock above
K101AH20160D__K	LEPK-1-160-H-A V-Lock above	K101BS20060U__K	LEPK-1-60-S-B V-Lock below
K101AH20160U__K	LEPK-1-160-H-A V-Lock below	K101BV20060000000K	LEPK-1-60-V-B without V-Lock
K101BH00160000000K	LEPK-1-160-H-B without V-Lock	K101BV20060B__K	LEPK-1-60-V-B V-Lock above and below
K101BH00160B__K	LEPK-1-160-H-B V-Lock above and below	K101BV20060D__K	LEPK-1-60-V-B V-Lock above
K101BH00160D__K	LEPK-1-160-H-B V-Lock above	K101BV20060U__K	LEPK-1-60-V-B V-Lock below
K101BH00160U__K	LEPK-1-160-H-B V-Lock below	K101AS20090000000K	LEPK-1-90-S-A without V-Lock
K101BH20160000000K	LEPK-1-160-H-B without V-Lock	K101AS20090B__K	LEPK-1-90-S-A V-Lock above and below
K101BH20160B__K	LEPK-1-160-H-B V-Lock above and below	K101AS20090D__K	LEPK-1-90-S-A V-Lock above
K101BH20160D__K	LEPK-1-160-H-B V-Lock above	K101AS20090U__K	LEPK-1-90-S-A V-Lock below
K101BH20160U__K	LEPK-1-160-H-B V-Lock below	K101AV20090000000K	LEPK-1-90-V-A without V-Lock
K101AH00225000000K	LEPK-1-225-H-A without V-Lock	K101AV20090B__K	LEPK-1-90-V-A V-Lock above and below
K101AH00225B__K	LEPK-1-225-H-A V-Lock above and below	K101AV20090D__K	LEPK-1-90-V-A V-Lock above
K101AH00225D__K	LEPK-1-225-H-A V-Lock above	K101AV20090U__K	LEPK-1-90-V-A V-Lock below
K101AH00225U__K	LEPK-1-225-H-A V-Lock below	K101BS20090000000K	LEPK-1-90-S-B without V-Lock
K101AH20225000000K	LEPK-1-225-H-A without V-Lock	K101BS20090B__K	LEPK-1-90-S-B V-Lock above and below
K101AH20225B__K	LEPK-1-225-H-A V-Lock above and below	K101BS20090D__K	LEPK-1-90-S-B V-Lock above
K101AH20225D__K	LEPK-1-225-H-A V-Lock above	K101BS20090U__K	LEPK-1-90-S-B V-Lock below

NOTES