M/261300/..

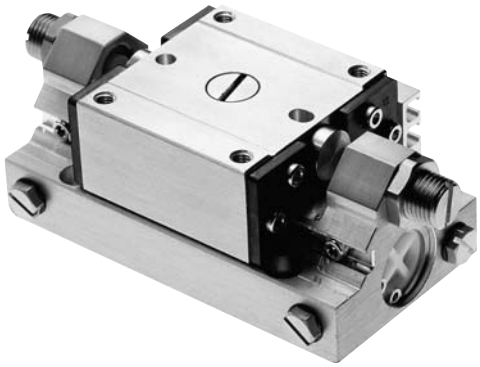
Compact linear slide tables
Double acting
Non- magnetic and magnetic
Ø 10 and 16 mm

Short, smooth, low friction movement within a set envelope make these units ideal for many applications such as clamping and positioning

Light weight

Magnetic switching for positional feedback

Excellent service life



Technical Data

Medium:
Compressed air, filtered, lubricated or non-lubricated

Operation:
Double acting compact slide table with external guide

Operating pressure:
1 to 7 bar

Operating temperature:
+5°C to +60°C

Piston diameters:
10 and 16 mm

Stroke lengths:
10, 20, 30 mm

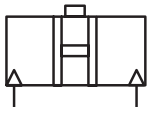
Operating speed:
400 mm/s maximum (10 or 20 mm stroke)
350 mm/s maximum (30 mm stroke)

Materials:
Body: aluminium
Slide table: aluminium (stoppers: nickel plated hardened steel; dust seals: nitrile rubber; Allen bolts: nickel plated steel)
Stroke adjustment bolts (rubber stop): stainless steel, rubber
Stroke adjustment bolt nuts: nickel plated carbon steel
End covers: synthetic resin
End cover circlips: nickel plated steel
Shock absorbers: nickel plated copper alloy
(Ø16 mm nickel plated carbon steel)
Elastomers: synthetic rubber

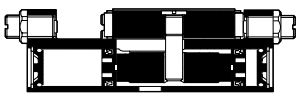
Ordering information
See page 2

Alternative models
See page 2

Non-magnetic



Magnetic



Alternative models

Symbol	Model (non-magnetic)	Symbol	Model (magnetic)	Description	Page
	M/261300/IR6		M/261300/MR6	In and outstroke adjustment, rubber stops	9
	M/261300/IR9		M/261300/MR9	In and outstroke adjustment, shock absorbers	10

Model Codes

M/2613✶✶/✶R✶/IP/✶✶

Piston diameter (mm)	Substitute
10	**10**
16	**16**

Type	Substitute
Magnetic	**M**
Non-magnetic	**I**

Stroke lengths (mm)	Substitute
10	**10**
20	**20**
30	**30**

Stroke adjustment	Substitute
In and outstroke adjustment, rubber stops	**6**
In and outstroke adjustment, shock absorbers	**9**

Standard strokes

ø	Standard stroke (mm)		
mm	10	20	30
10	●	●	●
16	●	●	●

Ordering examples

Slide table

To order a Ø 10 mm compact slide table, magnetic, in and outstroke adjustment with rubber stops and a 20 mm stroke length

quote: **M/261310/MR6/IP/20**

Switches

To order a three wire solid state switch with LED indication, 1 m cable and 90° cable connection, specify part number

quote: **M/421/EAN/1**

Warning

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under 'Technical Data'.

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult NORGREN.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes.

The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.
System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.
System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.

Accessories

Model	ø	Stroke adjustment bolt (rubber stop)	Shock absorber	Magnet (with fixing screws)	Switch rail (with fixing bolts) 10 mm stroke	20 mm stroke	30 mm stroke
							
M/261310/.R./../..	10	M/P73425/8	M/P73454/1	M/P73431/1	M/P73427/3	M/P73427/4	M/P73427/5
M/261316/.R./../..	16	M/P73425/9	M/P73454/2	M/P73431/1	M/P73427/6	M/P73427/7	M/P73427/8

Switches with LED

Reed In-line cable	Reed 90° cable	Solid state In-line cable	Solid state 90° cable
			
M/369/LSU/1	M/370/LSU/1	M/418/EAU/1	M/419/EAU/1
M/369/LSU/3	M/370/LSU/3	M/418/EAU/3	M/419/EAU/3
		M/420/EAN/1	M/421/EAN/1
		M/420/EAN/3	M/421/EAN/3

Model Reed	Solid state	Voltage V d.c	Current max.	Temperature °C	Output	Protection rating	Cable wire, material	Cable type	Cable length	Page
M/369/LSU/1	—	12 to 24	24	+5 to +60	—	IP 67	PVC 2 x 0,18	In-line	1 m	N/UK **4.3.**091
M/369/LSU/3	—	12 to 24	24	+5 to +60	—	IP 67	PVC 2 x 0,18	In-line	3 m	N/UK **4.3.**091
M/370/LSU/1	—	12 to 24	24	+5 to +60	—	IP 67	PVC 2 x 0,18	90°	1 m	N/UK **4.3.**091
M/370/LSU/3	—	12 to 24	24	+5 to +60	—	IP 67	PVC 2 x 0,18	90°	3 m	N/UK **4.3.**091
—	M/418/EAU/1	12 to 24	40	+5 to +60	PNP	IP 67	PVC 2 x 0,15	In-line	1 m	N/UK **4.3.**093
—	M/418/EAU/3	12 to 24	40	+5 to +60	PNP	IP 67	PVC 2 x 0,15	In-line	3 m	N/UK **4.3.**093
—	M/419/EAU/1	12 to 24	40	+5 to +60	PNP	IP 67	PVC 2 x 0,15	90°	1 m	N/UK **4.3.**093
—	M/419/EAU/3	12 to 24	40	+5 to +60	PNP	IP 67	PVC 2 x 0,15	90°	3 m	N/UK **4.3.**093
—	M/420/EAN/1	5 to 24	50	+5 to +60	NPN	IP 67	PVC 3 x 0,18	In-line	1 m	N/UK **4.3.**093
—	M/420/EAN/3	5 to 24	50	+5 to +60	NPN	IP 67	PVC 3 x 0,18	In-line	3 m	N/UK **4.3.**093
—	M/421/EAN/1	5 to 24	50	+5 to +60	NPN	IP 67	PVC 3 x 0,18	90°	1 m	N/UK **4.3.**093
—	M/421/EAN/3	5 to 24	50	+5 to +60	NPN	IP 67	PVC 3 x 0,18	90°	3 m	N/UK **4.3.**093

Forces, stroke adjustment range, energy absorption

Theoretical force

ø mm	Theoretical force (N) at 6 bar
10	47
16	120

Stroke adjustment range

ø mm	Rubber stops	Shock absorbers
10	-7 mm both sides	-19 mm both sides
16	-6 mm both sides	-30 mm both sides

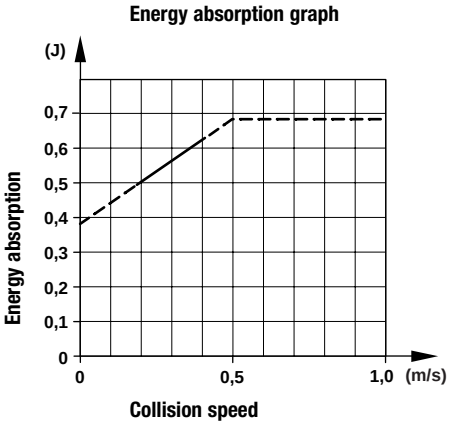
Shock absorber collision energy

The energy that the shock absorber must absorb consists of three elements: kinetic energy, energy of cylinder thrust and energy due to gravity. The collision energy is the total of all these.
See the shock absorber specifications and energy absorption graphs below to select the correct product.

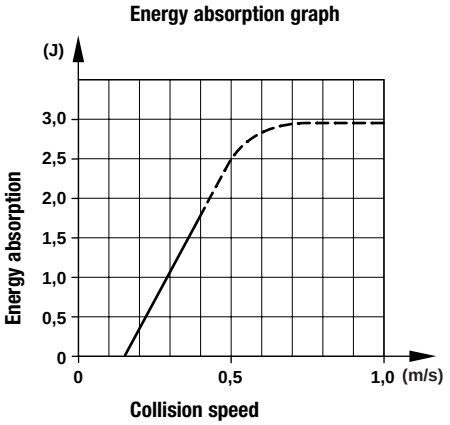
Specification of shock absorbers

Model	Stroke (mm)	Energy absorption J {kgf x m}	Energy absorption per minute J / minute {kgf x m / minute}	Collision speed m / sec.	Usage frequency c.p.m.	Service temperature °C	Piston rod return force N {kgf}
M/P73454/1	5	0,68 {0,07} or less	22,8 (2,3) or less	1 or less	60 or less	-5 ~ 70°	4,9 {0,5} or less
M/P73454/2	10	3,0 {0,3} or less	60,8 (6,2) or less	1 or less	60 or less	-5 ~ 70°	4,9 {0,5} or less

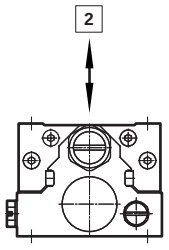
ø 10 mm



ø 16 mm



Radial clearance and preloading (mm)

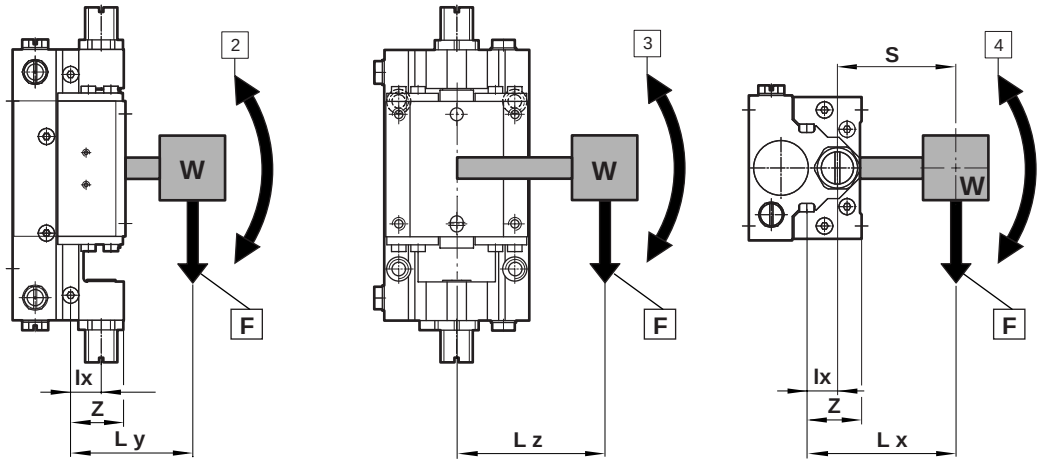


ø mm	Radial clearance
10	+0,001≈ +0,005
16	+0,001≈ +0,005

2 Radial clearance

Radial clearance means clearance in the vertical direction (see left figure) under constant light load. To minimise this clearance and increase rigidity, all bearings used for M/261300 are preloaded.

Forces, moments and loads



$F_{[N]} = 9{,}8 \times W_{[kg]}$

2	Moment My
3	Moment Mz
4	Moment Mx

Theoretical moments

ø mm	Stroke mm	Theoretical moments (Nm) Mx	My	Mz
10	10	1,2	0,6	0,6
10	20	1,4	0,9	0,9
10	30	1,8	1,3	1,3
16	10	2,7	1,2	1,2
16	20	2,8	1,4	1,4
16	30	3,6	1,9	1,9

To calculate a theoretical moment use the following formula -
Gravity acting on load (9,8) x mass of load (kg) x distance between centre line of linear slide table and load's centre of gravity (m).

Example: Mx (Nm)= 9,8 x W (kg) x Lx (m)

Calculated values should not exceed those in the table.

Maximum load

Models fitted with rubber stops

ø mm	Stroke mm	Operating speed (mm/s) 50 to 150	175	200	250	300	350	400
10	10	0,8	0,7	0,5	0,3	0,2	-	0,15
10	20	0,8	0,8	0,6	0,45	0,3	-	0,2
10	30	0,8	0,8	0,7	0,6	0,5	0,3	-
16	10	2	1,85	1,4	0,85	0,6	-	0,4
16	20	2	2	1,6	1	0,7	-	0,45
16	30	2	2	1,8	1,4	1,05	0,6	-

Maximum loads in kg

Models fitted with shock absorbers

ø mm	Stroke mm	Operating speed (mm/s) 50 to 100	150	175	200	250	300	350	400
10	10	1,6	1,3	0,95	0,7	0,45	0,3	-	0,2
10	20	1,6	1,6	1,4	1	0,7	0,5	-	0,3
10	30	1,6	1,6	1,6	1,3	1,15	0,78	0,45	-
16	10	4	3,5	2,5	2	1,25	0,75	-	0,5
16	20	4	4	3,2	2,5	1,5	1	-	0,6
16	30	4	4	4	3,5	2,2	1,5	0,8	-

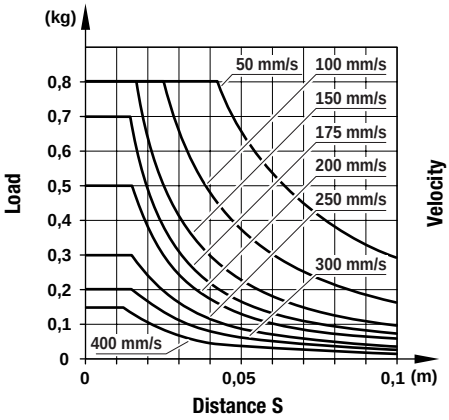
Maximum loads in kg

Maximum mass

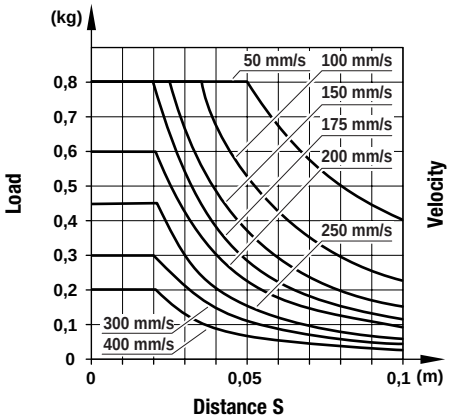
When a linear slide table stops at the end of it's stroke a force is generated due to the inertia of the load. The value of this force depends on various conditions. The graphs below consider the speed of movement, mass of the load and the distance between the load's centre of gravity and the stroke adjustment bolt of the linear slide table (dimension S in the drawing on page .05 that details rolling moment Mx). These graphs can be used as a guide to the allowable values of the load.

Models fitted with rubber stops

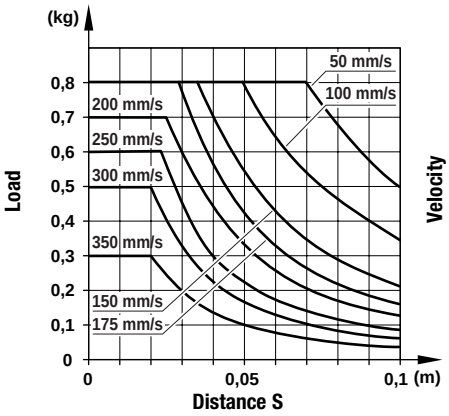
ø 10 mm, stroke 10 mm



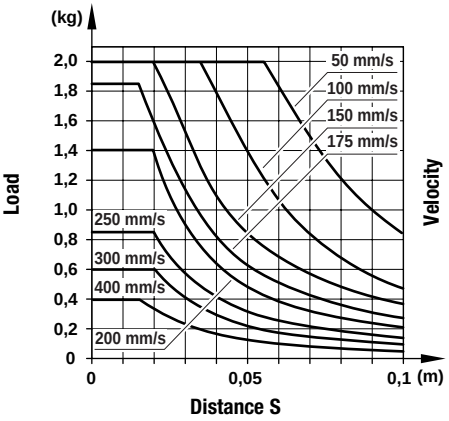
ø 10 mm, stroke 20 mm



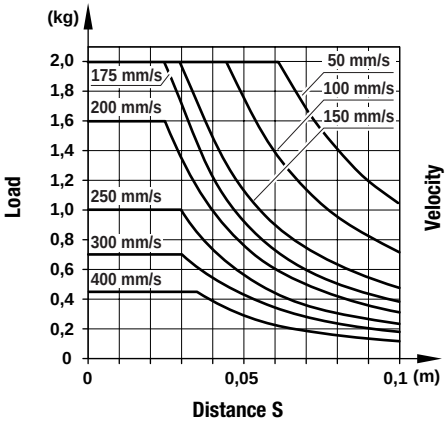
ø 10 mm, stroke 30 mm



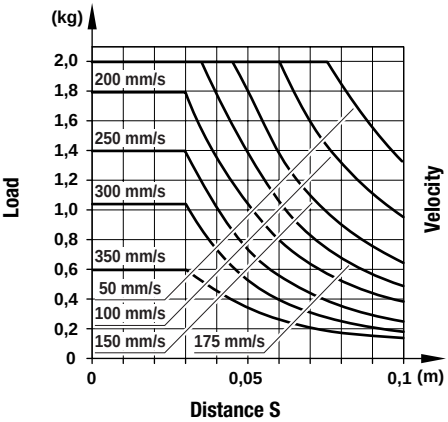
ø 16 mm, stroke 10 mm



ø 16 mm, stroke 20 mm

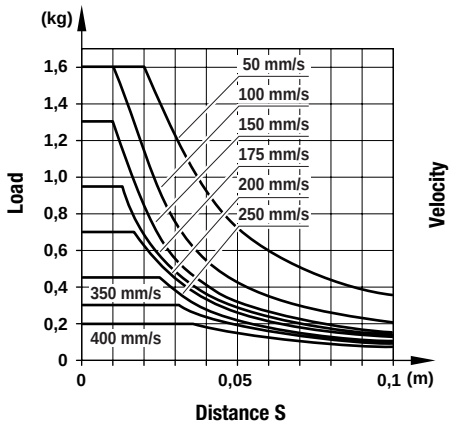


ø 16 mm, stroke 30 mm

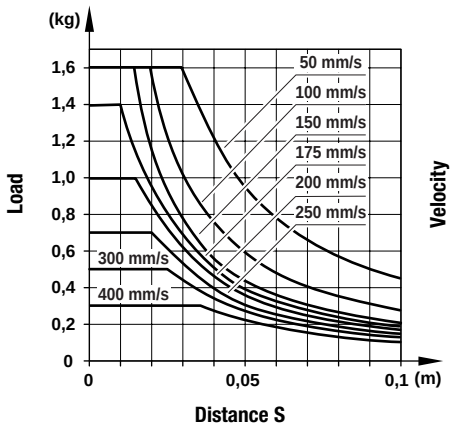


Slide tables with shock absorbers

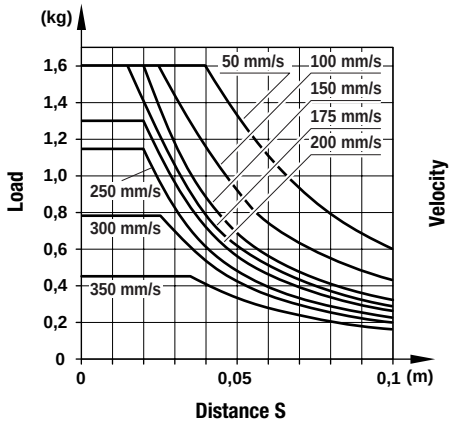
ø 10 mm, stroke 10 mm



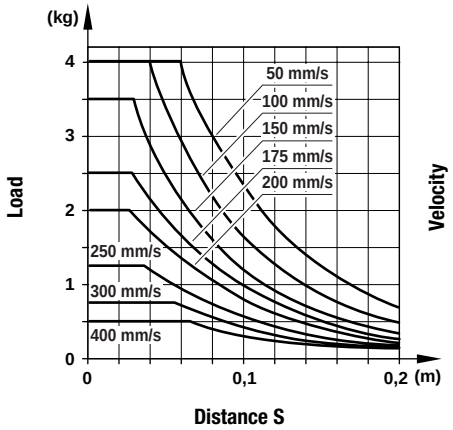
ø 10 mm, stroke 20 mm



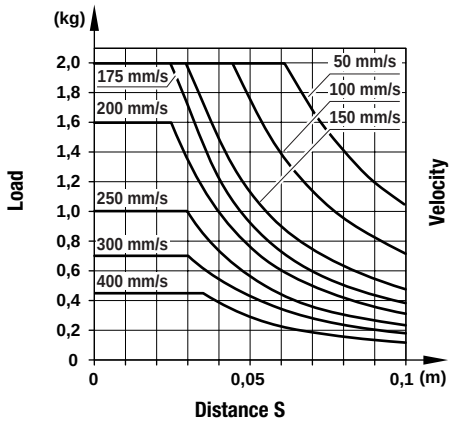
ø 10 mm, stroke 30 mm



ø 16 mm, stroke 10 mm



ø 16 mm, stroke 20 mm



ø 16 mm, stroke 30 mm

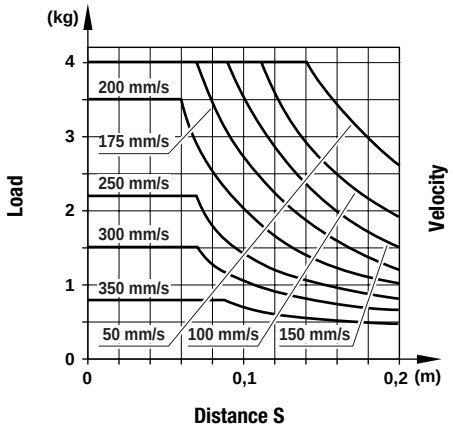
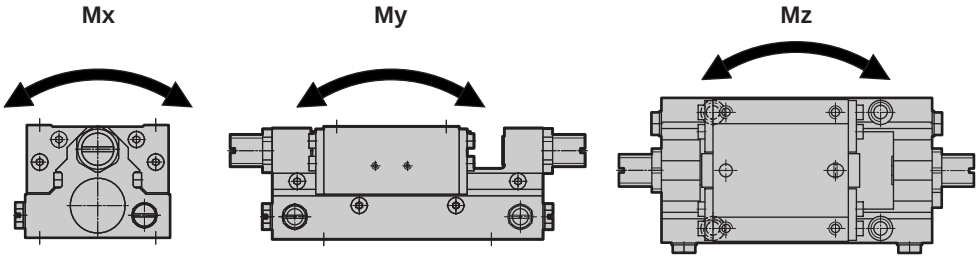
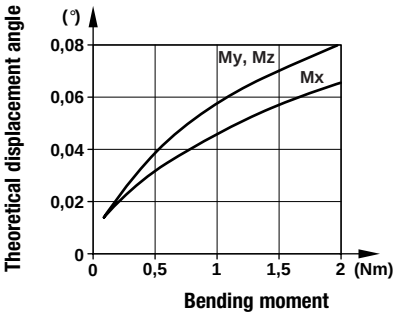


Table deflection angle

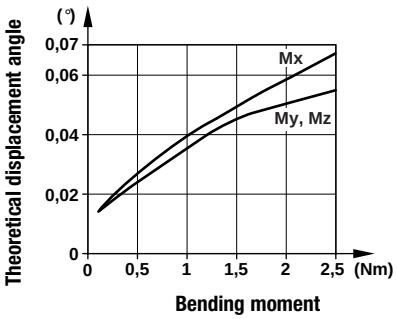
The bearings are preloaded, but the table may incline under external load (moment) due to elastic deformation of balls and races. Graphs below show the deflection angle of the table in relation to the appropriate moment.



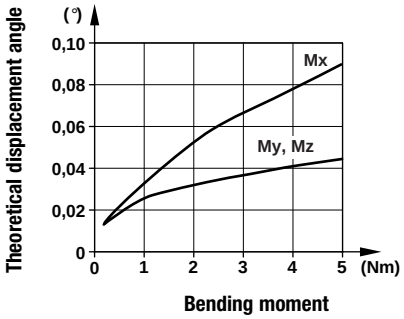
ø 10 mm, stroke 10 mm



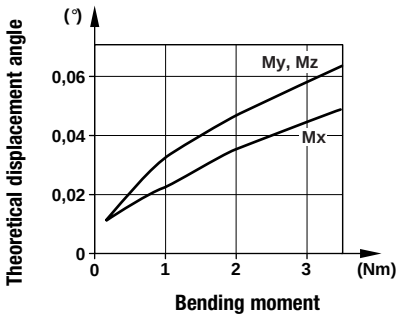
ø 10 mm, stroke 20 mm



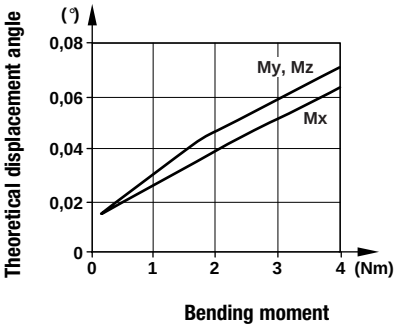
ø 10 mm, stroke 30 mm



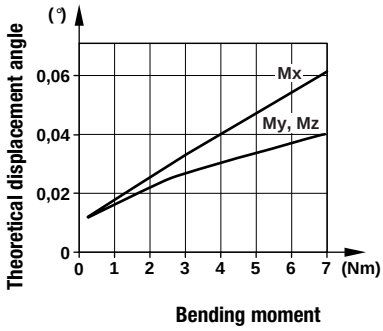
ø 16 mm, stroke 10 mm



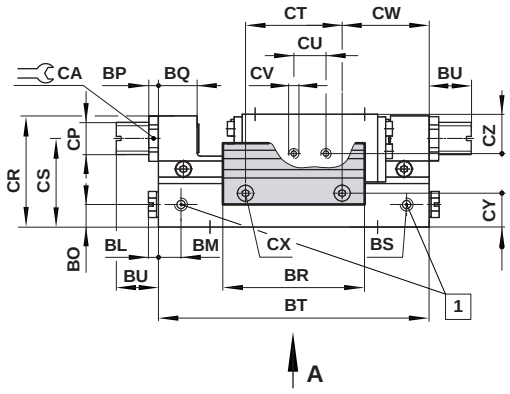
ø 16 mm, stroke 20 mm

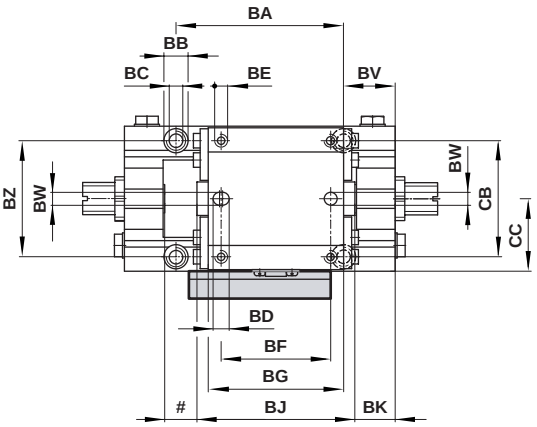


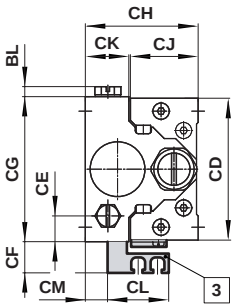
ø 16 mm, stroke 30 mm



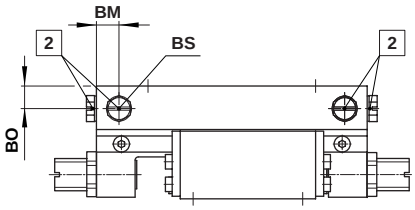
M/2613../.R/.. Standard slide tables (ø 10 and 16 mm)

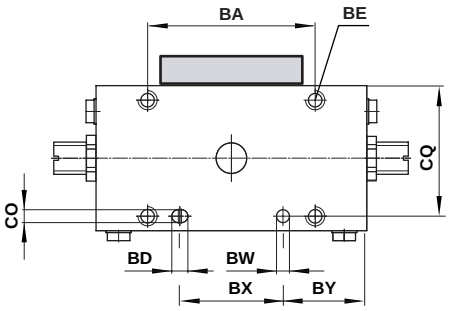






"A"





#	Stroke
1	Air ports (side ported)
2	Alternative ports
3	Magnetic version

Model	ø	ø BB	ø BC	BD	BE	BK	BL	BM	BO	BP	BQ	BS		
M/261310/..	10	6 x 3,5 deep	3,3	4	M4 x 6 deep	10,5	3,1	6,5	5,5	2	10	M5		
M/261316/..	16	7,5 x 4,5 deep	4,3	5	M5 x 9 deep	12,5	3,1	7	7	3	12	M5		

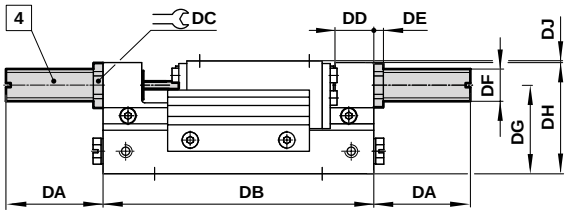
	ø	BU	BW	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CJ	CK
M/261310/..	10	max. 9,5	3 x 3 deep	26	11	25	16,5	33 ±0,2	7	8,5	34 ±0,2	28	18	9,5
M/261316/..	16	max. 9,5	4	36	13	36	22	44 ±0,2	8	8,5	45 ±0,2	35	21	13,5

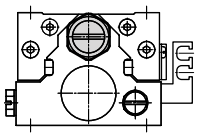
		CL	CM	CO	CP	CQ	CR	CS	CU	CV	CX	CY	CZ
M/261310/..	10	19	3	3*	M8	30 ±0,1	27,5	21,5	10	M2	M3	6,5	9,2
M/261316/..	16	19	7	4*	M10 x 1	40,5 ±0,1	34,5	27,5	10	M2	M3	10,5	12,2

* +0,06 +0,012

Model	ø	Stroke	BA	BF	BG	BJ	BR	BT	BX	BY	CT	CW	Weight kg	Magnet kg
M/261310/..	10	10	44	26	35	41	44	72	24	24	30	21	0,16	0,02
M/261310/..	10	20	68	40	49	55	54	96	48	24	40	28	0,21	0,02
M/261310/..	10	30	96	60	68	74	64	125	76	24,5	50	37,5	0,27	0,03
M/261316/..	16	10	52	34	42	49	44	84	32	26	30	27	0,28	0,02
M/261316/..	16	20	72	44	52	59	54	104	52	26	40	32	0,34	0,02
M/261316/..	16	30	100	62	70	77	64	132	80	26	50	41	0,41	0,03

M/2613../.R9/... Slide table with shock absorbers (ø 10 and 16 mm)



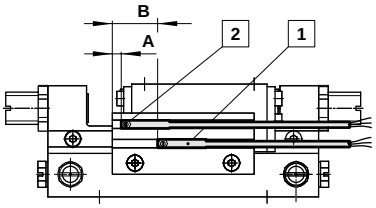


4 Shock absorber

Model	ø	DA	DC	DD	DE	DF	DG	DH	DJ
M/261310/..	10	max. 21,5	11	10	2	M8	21,5	27,5	-
M/261316/..	16	max. 37,5	13	12	3	M10	27,5	34,5	0,1

Model	ø	Stroke	DB	Weight kg	Magnet kg
M/261310/..	10	10	72	0,17	0,02
M/261310/..	10	20	96	0,22	0,02
M/261310/..	10	30	125	0,28	0,03
M/261316/..	16	10	84	0,32	0,02
M/261316/..	16	20	104	0,39	0,02
M/261316/..	16	30	132	0,45	0,03

Switches



1 Switch
2 Fixing screw

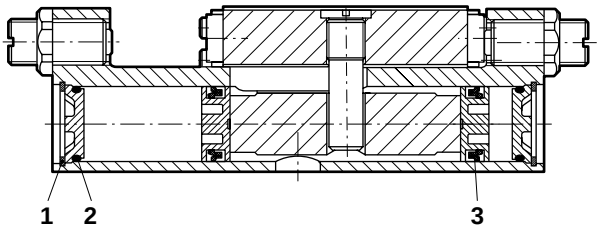
Reed switches

ø mm	stroke	Setting position A	Setting position B
10	10	5	15
10	20	5	25
10	30	5	35
16	10	5	15
16	20	5	25
16	30	5	35

Solid state switches

ø mm	stroke	Setting position A	Setting position B
10	10	7	17
10	20	7	27
10	30	7	37
16	10	7	17
16	20	7	27
16	30	7	37

Spares



Ø mm	Spares kit	Comprising Item	Description	Quantity
10	QM/261310/00	1	Circlip	2
16	QM/261316/00	2	O'-ring	2
		3	Piston seal	2