

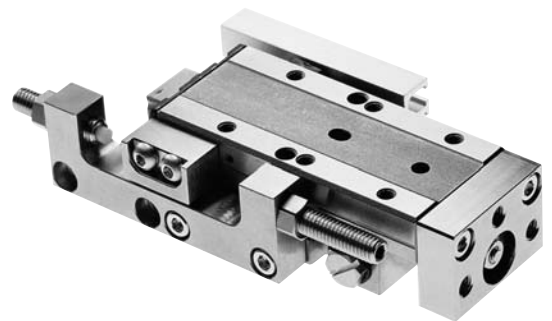
Precision linear slide tables
Double acting
Non- magnetic and magnetic
Ø 10 and 12 mm

Ideal for applications demanding precise movement

Light weight

Magnetic switching for positional feedback

Excellent service life



Technical Data

Medium:

Compressed air, filtered, lubricated or non-lubricated

Operation:

Double acting precision slide table with external guide

Operating pressure:

1,5 to 7 bar (2 to 7 bar for models with shock absorbers)

Operating temperature:

+ 5°C* to + 60°C

Piston diameters:

10 and 12mm

Stroke lengths:

15, 30, 45 mm (Ø 10 mm)

20, 30, 45, 60 mm (Ø 12 mm)

Operating speed:

400 mm/s maximum

Materials:

Slide table: stainless steel

Body: stainless steel

End plate: nickel plated carbon steel

Piston rod: stainless steel

External nuts and bolts: nickel plated carbon steel

Stroke adjustment bolts and blocks: nickel plated steel

Stroke adjustment bolts with rubber stops: stainless steel
and synthetic rubber

Shock absorbers: brass alloy

Elastomers: synthetic rubber

Ordering information

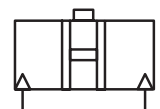
See page 2

Alternative models

See page 2



Non-magnetic



Magnetic





Alternative Cylinders

Symbol	Model (non-magnetic piston)	Symbol	Model (magnetic piston)	Description	Page
	M/261100/IR1		M/261100/MR1	Without stroke adjustment	8
	M/261100/IR3		M/261100/MR3	With push and pull side stroke adjustment, metal stops	10
	M/261100/IR4		M/261100/MR4	With push and pull side stroke adjustment, shock absorbers	11
	M/261100/IR5		M/261100/MR5	Push side stroke adjustment, rubber stop	10
	M/261100/IR6		M/261100/MR6	With push and pull side stroke adjustment, rubber stops	10
	M/261100/IR7		M/261100/MR7	Push side stroke adjustment, metal stop	10
	M/261100/IR8		M/261100/MR8	Push side stroke adjustment, shock absorber	11
	M/261100/IR*/I		M/261100/MR*/I	Standard location of stroke adjusters and switch rail	8 + 10
	M/261100/IR*/S		M/261100/MR*/S	Symmetrical location of stroke adjusters and switch rail	9 + 10

Model Codes

M/2611**/*R**/*P/**

Piston diameter (mm)	Substitute
10	10
12	12
Piston	Substitute
Magnetic*	M
Non-magnetic	I
Stroke adjustment	Substitute
No stroke adjustment	1
In and outstroke adjustment with metal stops	3
In and outstroke adjustment with shock absorbers	4
Out stroke adjustment with rubber stop	5
In and outstroke adjustment with rubber stops	6
Out stroke adjustment with metal stop	7
Out stroke adjustment with shock absorber	8

Stroke length (mm)	Substitute
60 mm max.	
Location of switch rail and stroke adjusters	Substitute
Standard	I
Symmetric	S

Standard strokes

ø mm	Standard stroke (mm)				
	15	20	30	45	60
10	●		●	●	
12		●	●	●	●

Ordering examples

Slide table

To order a Ø 12 mm precision slide table magnetic, push and pull side stroke adjustment with rubber stops and a 20 mm stroke length

quote: **M/261112/MR6/IP/20**

Switches

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

quote: **M/419/EAU/1**



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

Accessories

	Stroke adjustment bolt (metal stop) pull side	Stroke adjustment bolt (metal stop) push side	Stroke adjustment bolt (rubber stop) pull side	Stroke adjustment bolt (rubber stop) push side	Push side stroke adjustment assembly (metal stop) standard	Push side stroke adjustment assembly (metal stop) symmetric
∅						
10	M/P73424/3	M/P73424/2	M/P73425/3	M/P73425/2	QM/261110/I7/*	QM/261110/S7/*
12	M/P73424/6	M/P73424/5	M/P73425/6	M/P73425/5	QM/261112/I7/*	QM/261112/S7/*

	Push side stroke adjustment assembly (rubber stop) standard	Push side stroke adjustment assembly (rubber stop) symmetric	Push side stroke adjustment assembly (shock absorber) standard	Push side stroke adjustment assembly (shock absorber) symmetric	Switch rail standard	Switch rail symmetric
∅						
10	QM/261110/I5/*	QM/261110/S5/*	QM/261110/I8/*	QM/261110/S8/*	M/P73430/2/*	M/P73429/2/*
12	QM/261112/I5/*	QM/261112/S5/*	QM/261112/I8/*	QM/261112/S8/*	M/P73430/3/*	M/P73429/3/*

	Push and pull side stroke adjustment assembly (rubber stop)	Push and pull side stroke adjustment assembly (metal stop)	Push and pull side stroke adjustment assembly (shock absorber)	Shock absorber	Magnet
∅					
10	QM/261110/6/*	QM/261110/3/*	QM/261110/4/*	M/P73454/1	M/P73431/3
12	QM/261112/6/*	QM/261112/3/*	QM/261112/4/*	M/P73454/1	M/P73431/3

* Insert standard stroke length (∅ 10 mm: 15, 30 and 45 mm; ∅ 12 mm: 20, 30, 45 and 60 mm)



Forces, stroke adjustment range, energy absorption

Theoretical force

ø mm	Theoretical force (N) at 6 bar	
	Outstroke	Instroke
10	47	40
12	68	56

Maximum loads

ø mm	Model	Maximum load (kg)
10	No stroke adjustment	0,8
10	With stroke adjustment (metal stop)	0,3
10	With stroke adjustment (rubber stop)	0,8
10	With stroke adjustment (shock absorbers)	1,6
12	No stroke adjustment	1,2
12	With stroke adjustment (metal stop)	0,5
12	With stroke adjustment (rubber stop)	1,2
12	With stroke adjustment (shock absorbers)	2,0

For models with shock absorbers – when installed vertically the load should not force the shock absorber to the end of its stroke. In these cases the load mass should be $\leq 20\%$ of the theoretical force of the unit (see 'Theoretical Forces' table above).

Stroke adjustment range

Push side stroke adjuster		
ø mm	Rubber or metal stops	Shock absorbers
10	-15 mm on both sides	-19 mm both sides
12	-15 mm on both sides	-18 mm both sides

Push and pull side stroke adjusters		
ø mm	Rubber or metal stops	Shock absorbers
10	-15 mm on push sides	-19 mm push sides
10	-5 mm on pull sides	-16 mm pull sides
12	-15 mm on push sides	-18 mm push sides
12	-5 mm on pull sides	-16 mm pull 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 energy collision is the total of all these.

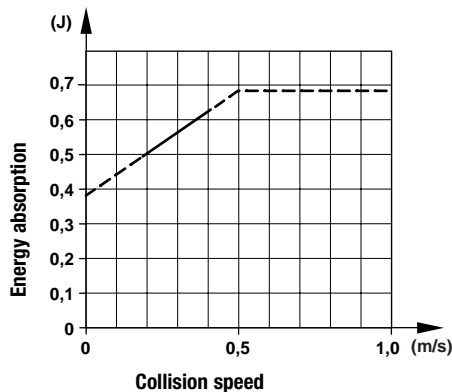
See the shock absorber specifications and energy absorption graphs below to select the correct product.

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

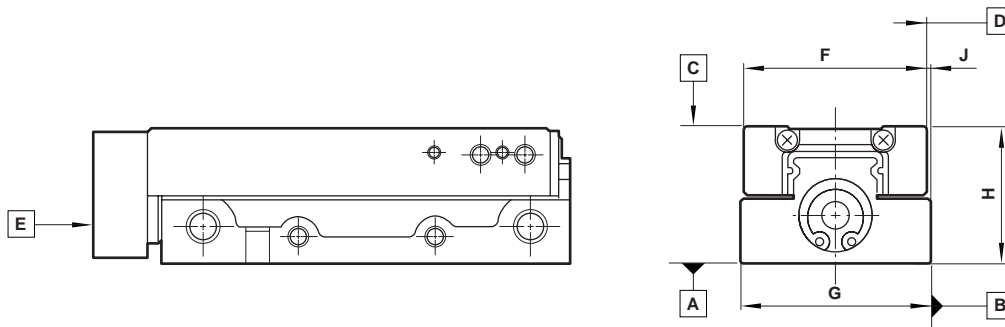
ø 10 and 12 mm

Energy absorption graph





Accuracy

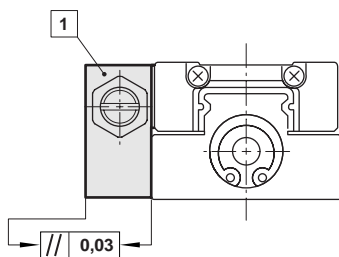


Standard (mm)

Model	Ø	Stroke	Parallelism Plane C with respect to plane A	Parallelism Plane D with respect to plane B	Running parallelism Plane C with respect to plane A	Running parallelism Plane D with respect to plane B	Squareness Plane E with respect to plane A	Squareness Plane E with respect to plane B
M/261010/.R././...	10	15	0,02	0,02	0,004	0,004	0,15	0,15
M/261010/.R././...	10	30	0,02	0,02	0,004	0,004	0,15	0,15
M/261010/.R././...	10	45	0,02	0,02	0,004	0,004	0,15	0,15
M/261012/.R././...	12	20	0,02	0,02	0,004	0,004	0,15	0,15
M/261012/.R././...	12	30	0,02	0,02	0,004	0,004	0,15	0,15
M/261012/.R././...	12	45	0,02	0,02	0,004	0,004	0,15	0,15
M/261012/.R././...	12	60	0,02	0,02	0,006	0,006	0,15	0,15

Model	Ø	Stroke	Tolerance of dimension			
			F	G	H	J
M/261010/.R././...	10	15	±0,2	±0,2	±0,05	±0,025
M/261010/.R././...	10	30	±0,2	±0,2	±0,05	±0,025
M/261010/.R././...	10	45	±0,2	±0,2	±0,05	±0,025
M/261012/.R././...	12	20	±0,2	±0,2	±0,05	±0,025
M/261012/.R././...	12	30	±0,2	±0,2	±0,05	±0,025
M/261012/.R././...	12	45	±0,2	±0,2	±0,05	±0,025
M/261012/.R././...	12	60	±0,2	±0,2	±0,05	±0,025

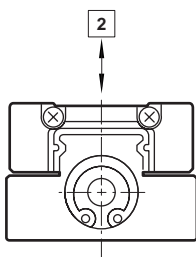
Parallelism of adjuster block



1 Adjustment block

On models with stroke adjustment, the side plane of the adjustment block can be used as a datum plane for installation. Parallelism = 0,03mm.

Radial clearance and preloading (mm)



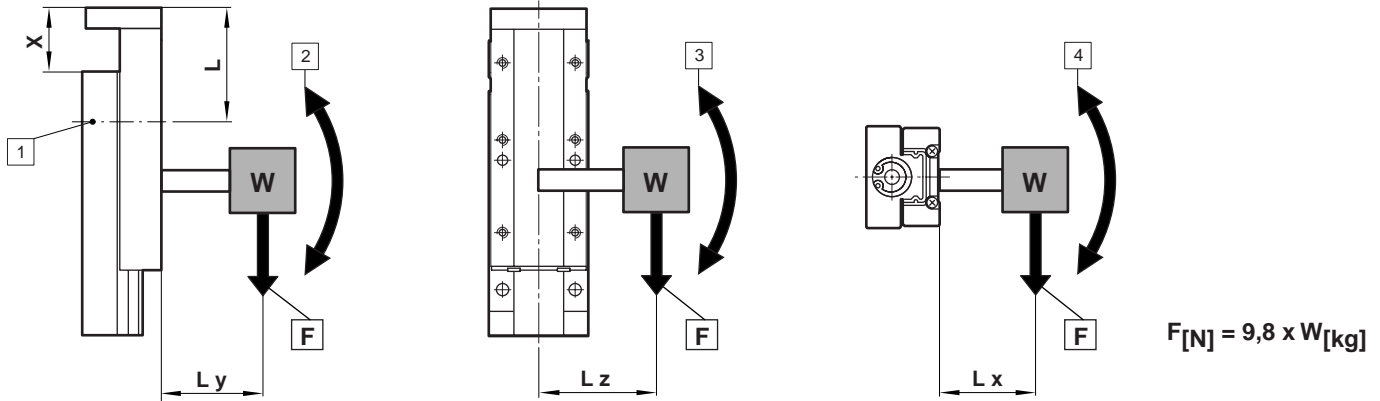
Radial clearance means clearance in vertical direction (see left) under constant light load. To minimise this clearance and increase rigidity, all bearings used for M/261100 are preloaded.

Ø	Radial clearance (mm)
10	$0 \approx -0,0025$
12	$0 \approx -0,003$

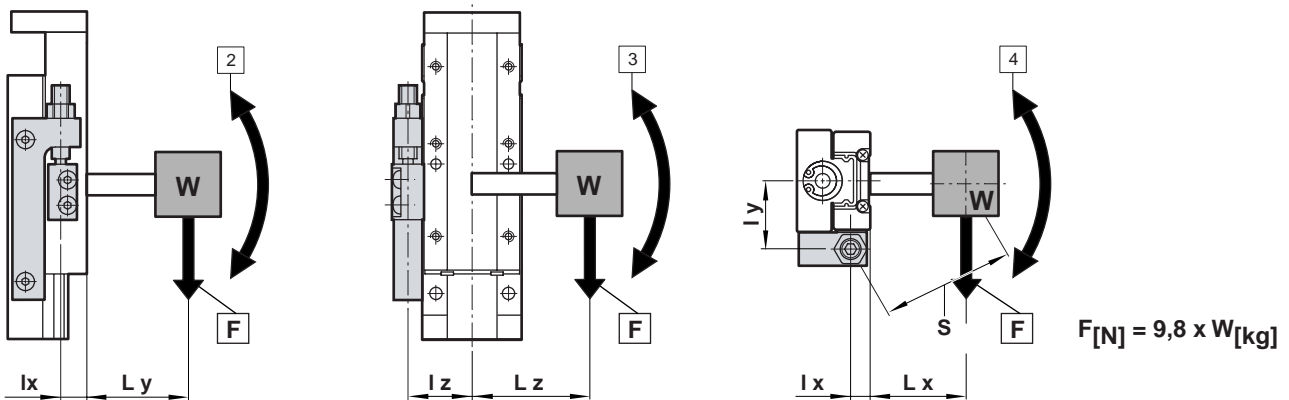


Moments

Without stroke adjusters



With stroke adjusters



- 1 Guide centre line
- 2 Moment My
- 3 Moment Mz
- 4 Moment Mx

Theoretical moments

ø mm	Theoretical moments (Nm)		
	Mx	My	Mz
10	1,9	1,8	2,0
12	3,8	3,0	3,4

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 guide and load's centre of gravity (mm).

Calculated values should not exceed those in the 'Theoretical moments' table

Position of guide centre line

Model	ø	Stroke	Guide centre line position L
M/261010/R././.	10	15	(X/2) + 0,035
M/261010/R././.	10	30	(X/2) + 0,043
M/261010/R././.	10	45	(X/2) + 0,050
M/261012/R././.	12	20	(X/2) + 0,039
M/261012/R././.	12	30	(X/2) + 0,044
M/261012/R././.	12	45	(X/2) + 0,052
M/261012/R././.	12	60	(X/2) + 0,059

Position of stopper centre line

Model	ø	Metal stopper, rubber stopper		Shock absorber	
		lx	lz	lx	lz
M/261010/R././.	10	0,0060	0,0180	0,0065	0,0200
M/261012/R././.	12	0,0060	0,0215	0,0065	0,0225

W (kg): mass of a loaded work

F (N): gravity acting on a loaded work

L (m): distance between front face of table and guide centre line

X (m): distance between front face of table and body end plane

Lx, Ly and Lz (m): distance between guide centre line and centre of gravity of loaded work

lx and lz (m): distance between guide centre line and stopper

S (m): distance between centre of gravity of loaded work and stopper

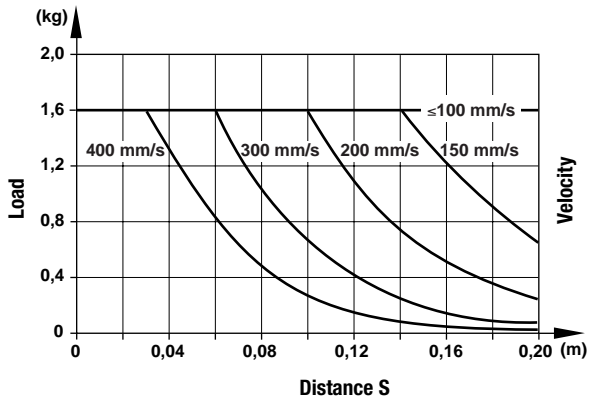


Maximum mass

When a linear slide table stops at the end of its 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' on the 'Moments' drawing on page .06 that details rolling moment M_x for models with stroke adjusters). These graphs can be used as a guide to the allowable values of the load.

∅ 10 mm



∅ 12 mm

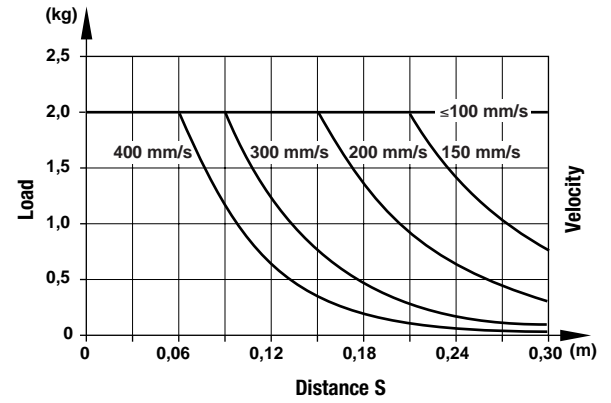
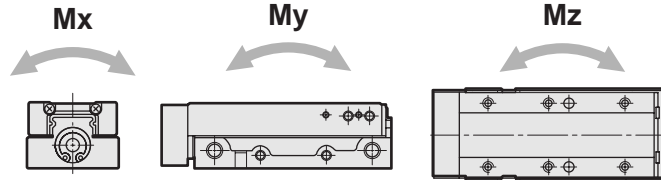


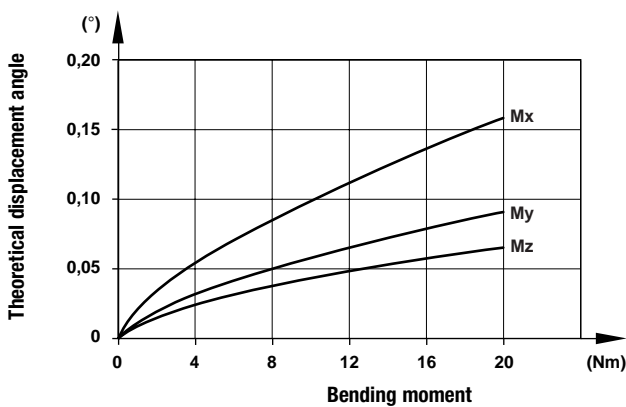
Table deflection angle

The bearings are preloaded, but the table may incline under external load (moment) due to elastic deformation

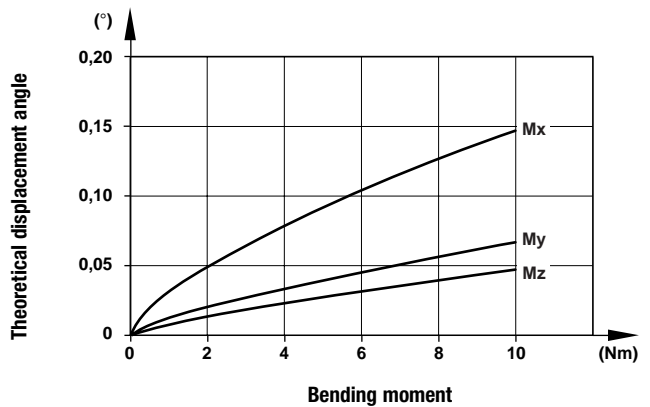
of balls and races. Graphs below show the deflection angle of the table in relation to the appropriate moment.



∅ 10 mm

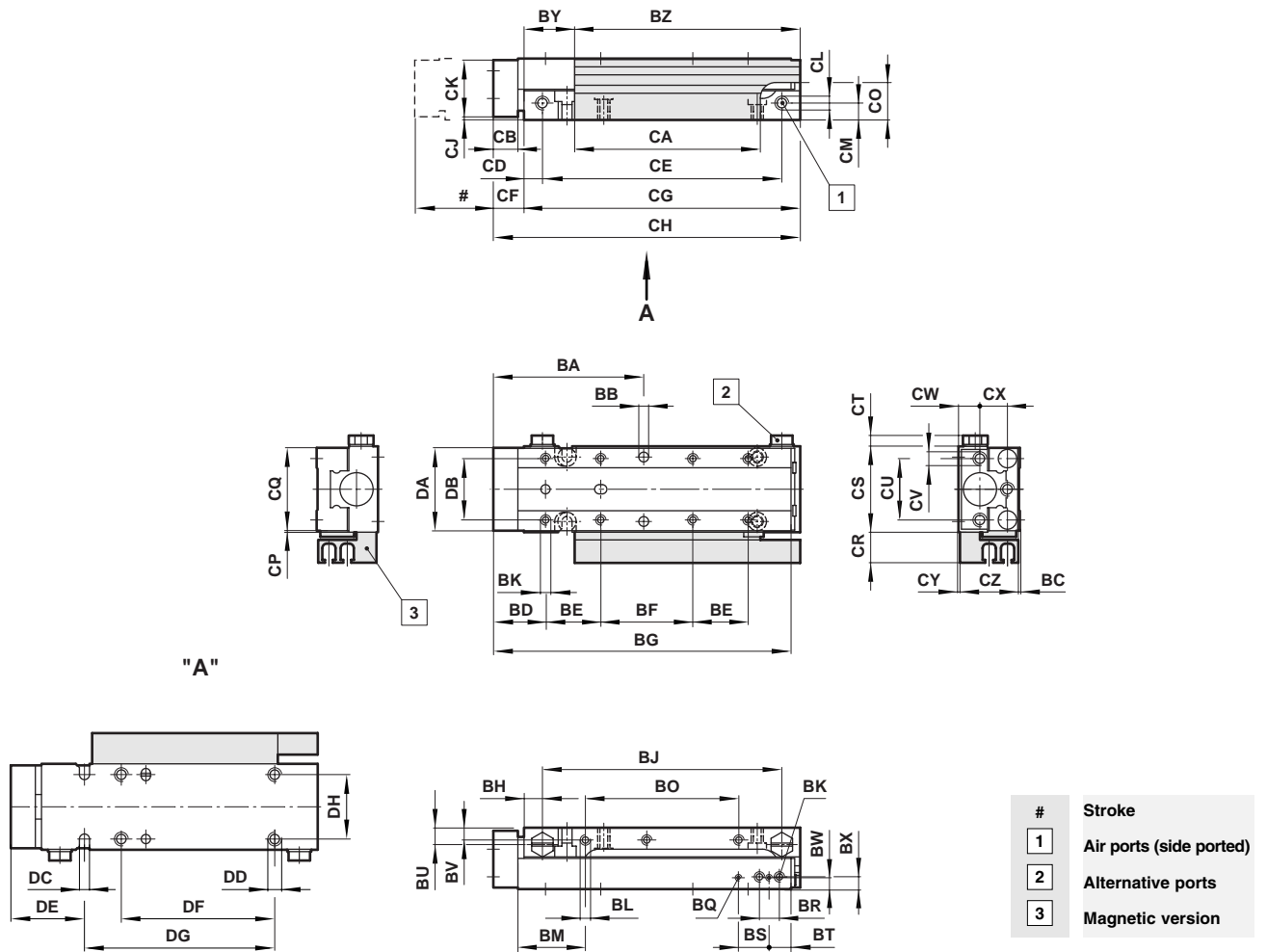


∅ 12 mm





M/26111./R./I. Standard side tables (ø 10 and 12 mm)



Model	ø	øBB	BC	BD	BH	BK	BL	BM	BQ	BR	BS	BT	BU
M/261110/..	10	3,2	0,5	17	6	M3 x 3 deep	M3 x 5 deep	20	M2 x 3 deep	6,5	10	7,2	5,5
M/261112/..	12	4	1	20	6	M3 x 4 deep	M3 x 5 deep	23	M2 x 3 deep	6,5	10	8,1	5,5

Model	ø	BV	BW	BX	BY	CB	CD	CF	CJ	CK	CL	CM	CO	CP	CQ	CR
M/261110/..	10	4	3,7	4	16,5	8	6	10	1	18,5	M5	5,5	12,2	0,5 ±0,025	27 ^{±0,2}	10
M/261112/..	12	5,5	4,2	4,5	18,5	8	6	10	1	20,5	M5	5,5	13,7	0,5 ±0,025	32 ^{±0,2}	10

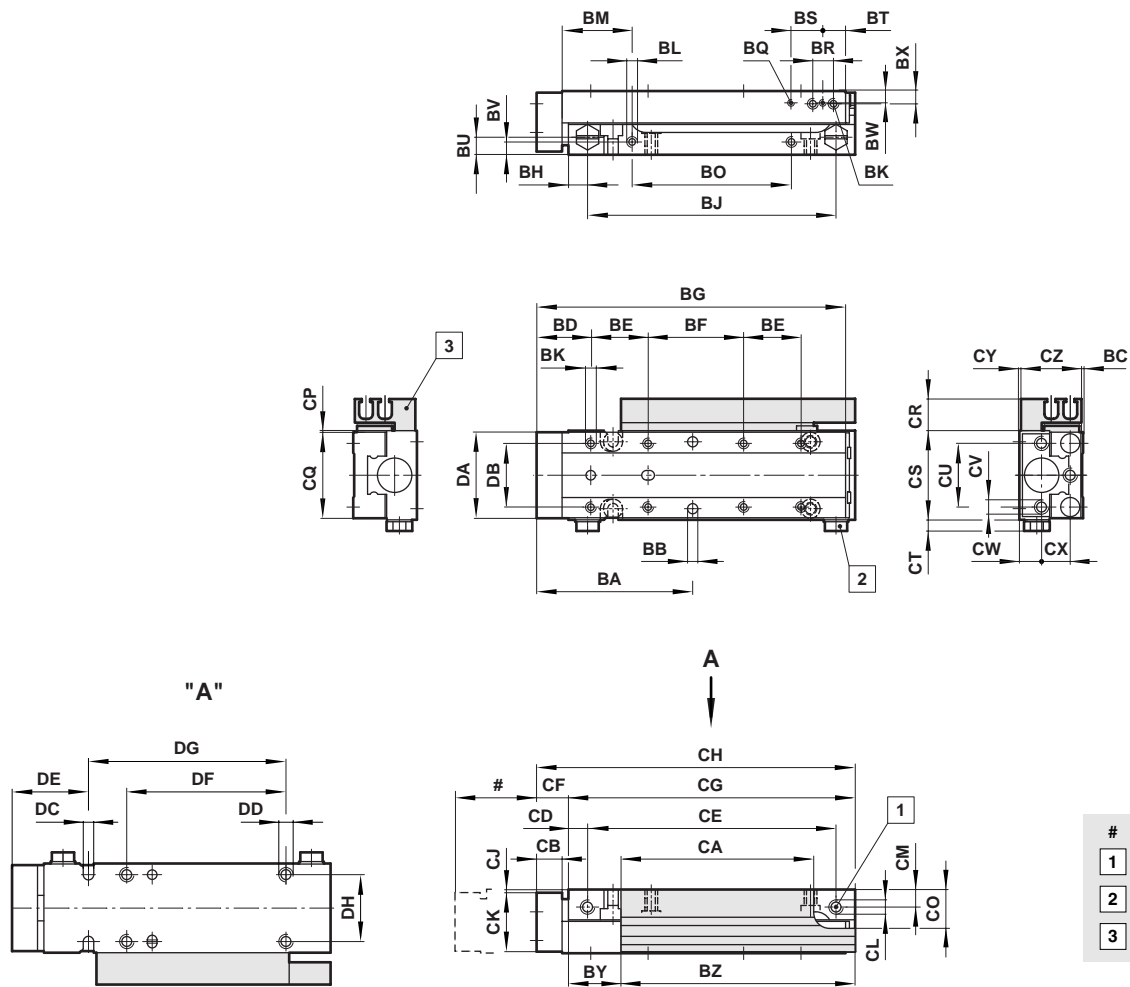
Model	ø	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DE	DH
M/261110/..	10	28 ^{-0,2}	3,5	20	M4 x 8 deep	7	9	0,5	19	27	21	3,3	24	21
M/261112/..	12	33 ^{-0,2}	3,5	24	M4 x 8 deep	8	9	2	19	32	25	4,4	25	24

Model	Stroke	BA	BE	BF	BG	BJ	BO	BZ	CA	CE	CG	CH
M/261110./R1/IP/15	15	39	18	-	67	48	20	43,5	30,5	48	60	70
M/261110./R1/IP/30	30	44	18	15	82	63	35	58,5	45,5	63	75	85
M/261110./R1/IP/45	45	49	18	30	97	78	50	73,5	60,5	78	90	100
M/261112./R1/IP/20	20	45	20	-	75	54	20	47,5	34,5	54	66	76
M/261112./R1/IP/30	30	53	25	-	85	64	30	57,5	44,5	64	76	86
M/261112./R1/IP/45	45	53	25	15	100	79	45	72,5	59,5	79	91	101
M/261112./R1/IP/60	60	53	25	30	115	94	60	87,5	74,5	94	106	116

Model	Stroke	DF	DG	Weight kg	Magnet kg
M/261110./R1/IP/15	15	20	32	0,230	0,015
M/261110./R1/IP/30	30	35	47	0,270	0,020
M/261110./R1/IP/45	45	50	62	0,320	0,025
M/261112./R1/IP/20	20	20	36	0,320	0,017
M/261112./R1/IP/30	30	30	46	0,370	0,020
M/261112./R1/IP/45	45	45	61	0,425	0,025
M/261112./R1/IP/60	60	60	76	0,495	0,030



M/26111./R./S. Symmetric slide tables (ø 10 and 12 mm)



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

Model	ø	øBB	BC	BD	BH	BK	BL	BM	BQ	BR	BS	BT	BU
M/261110/..	10	3,2	0,5	17	6	M3 x 3 deep	M3 x 5 deep	20	M2 x 3 deep	6,5	10	7,2	5,5
M/261112/..	12	4	1	20	6	M3 x 4 deep	M3 x 5 deep	23	M2 x 3 deep	6,5	10	8,1	5,5

Model	ø	BV	BW	BX	BY	CB	CD	CF	CJ	CK	CL	CM	CO	CP	CQ	CR
M/261110/..	10	4	3,7	4	16,5	8	6	10	1	18,5	M5	5,5	12,2	0,5 ±0,025	27 ^{+0,2}	10
M/261112/..	12	5,5	4,2	4,5	18,5	8	6	10	1	20,5	M5	5,5	13,7	0,5 ±0,025	32 ^{+0,2}	10

Model	ø	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DE	DH
M/261110/..	10	28 ^{+0,2}	3,5	20	M4 x 8 deep	7	9	0,5	19	27	21	3,3	24	21
M/261112/..	12	33 ^{+0,2}	3,5	24	M4 x 8 deep	8	9	2	19	32	25	4,4	25	24

Model	Stroke	BA	BE	BF	BG	BJ	BO	BZ	CA	CE	CG	CH
M/261110./R1/SP/15	15	39	18	-	67	48	20	43,5	30,5	48	60	70
M/261110./R1/SP/30	30	44	18	15	82	63	35	58,5	45,5	63	75	85
M/261110./R1/SP/45	45	49	18	30	97	78	50	73,5	60,5	78	90	100
M/261112./R1/SP/20	20	45	20	-	75	54	20	47,5	34,5	54	66	76
M/261112./R1/SP/30	30	53	25	-	85	64	30	57,5	44,5	64	76	86
M/261112./R1/SP/45	45	53	25	15	100	79	45	72,5	59,5	79	91	101
M/261112./R1/SP/60	60	53	25	30	115	94	60	87,5	74,5	94	106	116

Model	Stroke	DF	DG	Weight kg	Magnet kg
M/261110./R1/SP/15	15	20	32	0,230	0,015
M/261110./R1/SP/30	30	35	47	0,270	0,020
M/261110./R1/SP/45	45	50	62	0,320	0,025
M/261112./R1/SP/20	20	20	36	0,320	0,017
M/261112./R1/SP/30	30	30	46	0,370	0,020
M/261112./R1/SP/45	45	45	61	0,425	0,025
M/261112./R1/SP/60	60	60	76	0,495	0,030

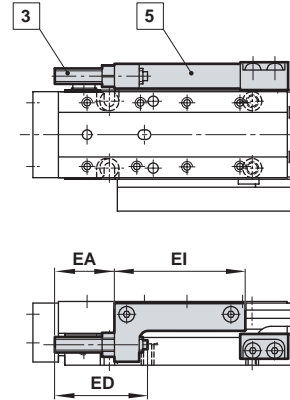
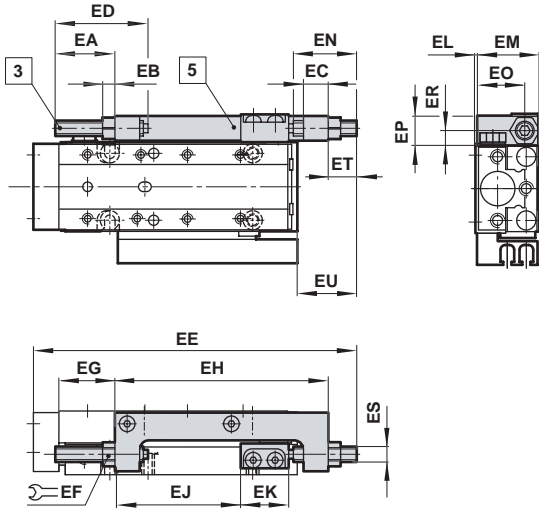


M/26111./R3/..., Standard precision linear slide table with push and pull side stroke adjustment, metal stops

M/26111./R6/..., Standard precision linear slide table with push and pull side stroke adjustment, rubber stops

M/26111./R7/..., Standard precision linear slide table with push side stroke adjustment, metal stop

M/26111./R5/..., Standard precision linear slide table with push side stroke adjustment, rubber stop



- 3 Adjuster bolt
- 5 Adjuster block

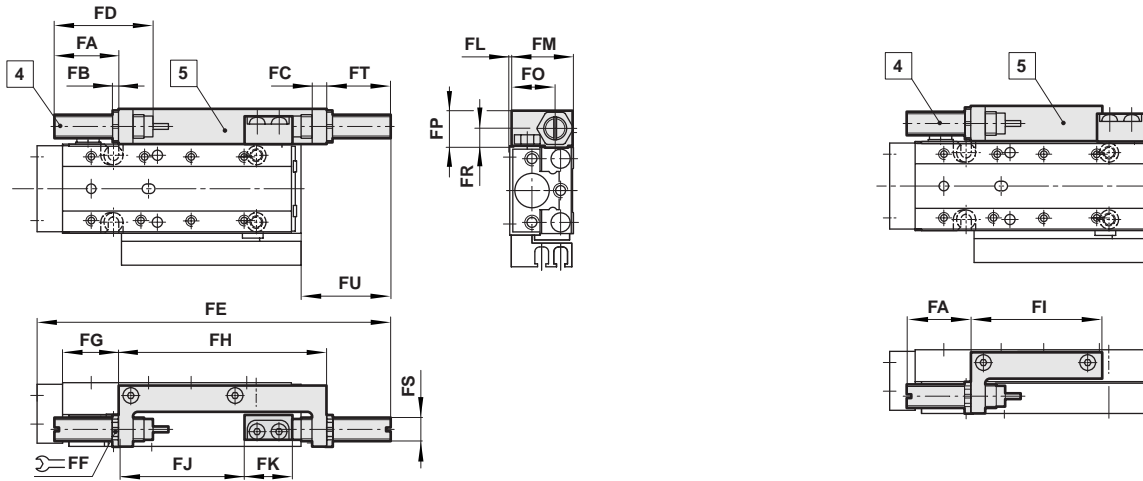
Model	EA	EB	EC	ED	EF	EG	EK	EL	EM	EN	EO	EP	ER	ES	ET	EU
M/261110./R./...	max. 19,3	4	8	30	7	16,5	15,5	0,5	19	22	13,5	8	4	M5	max. 9,2	19,7
M/261112./R./...	max. 19,8	5	7,5	30	8	19	15,5	0,5	21	22	15,5	10	5	M6	max. 9,7	20,7

Model	Stroke	EE	EH	EI	EJ	weight kg slide table	weight kg push side stroke adjustment basic model +	weight kg push and pull side stroke adjustment basic model +
M/261110./R././15	15	max. 89,7	54	27	25,7	0,230	0,035	0,055
M/261110./R././30	30	max. 104,7	69	42	40,7	0,270	0,045	0,065
M/261110./R././45	45	max. 119,7	84	57	55,7	0,320	0,055	0,075
M/261112./R././20	20	max. 96,7	58	28	30,2	0,320	0,045	0,080
M/261112./R././30	30	max. 106,7	68	38	40,2	0,370	0,055	0,090
M/261112./R././45	45	max. 121,7	83	53	55,2	0,425	0,070	0,105
M/261112./R././60	60	max. 136,7	98	68	70,2	0,495	0,085	0,120



M/26111./R4/..., Standard precision linear slide table with push and pull side stroke adjustment, shock absorbers

M/26111./R8/..., Standard precision linear slide table with push side stroke adjustment, shock absorber



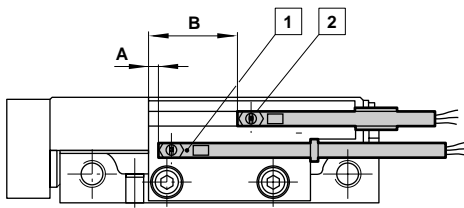
- 4 Shock absorber
- 5 Adjuster block

Model	FA	FB	FC	FD	FF	FG	FK	FL	FM	FO	FP	FR	FS	FT	FU
M/261110./R./..	max. 21,3	2	4,2	32	11	16,5	15,5	0,5	19	13	12	6	M8	max. 18,2	max. 29,7
M/261112./R./..	max. 20,8	2	4,7	32	11	18	15,5	0,5	21	15	12	6	M8	max. 18,7	max. 30,7

Model	Stroke	FE	FH	FI	FJ	weight kg slide table	weight kg push side stroke adjustment basic model +	weight kg push and pull side stroke adjustment basic model +
M/261110./R././15	15	max. 99,7	55	max. 27	25,7	0,230	0,045	0,075
M/261110./R././30	30	max. 114,7	70	max. 42	40,7	0,270	0,055	0,085
M/261110./R././45	45	max. 129,7	85	max. 57	55,7	0,320	0,065	0,095
M/261112./R././20	20	max. 106,7	60	max. 29	31,2	0,320	0,055	0,095
M/261112./R././30	30	max. 116,7	70	max. 39	41,2	0,370	0,065	0,105
M/261112./R././45	45	max. 131,7	85	max. 54	56,2	0,425	0,075	0,115
M/261112./R././60	60	max. 146,7	100	max. 69	71,2	0,495	0,090	0,130



Switches



- 1** Switch
- 2** Fixing screw

Reed switches

ø mm	stroke	Setting position	
		A	B
10	15	1,3	16,3
10	30	1,3	31,3
10	45	1,3	46,3
12	20	1,4	21,4
12	30	1,4	31,4
12	45	1,4	46,4
12	60	1,4	61,4

Solid state switches

ø mm	stroke	Setting position	
		A	B
10	15	3,3	18,3
10	30	3,3	33,3
10	45	3,3	48,3
12	20	3,4	23,4
12	30	3,4	33,4
12	45	3,4	48,4
12	60	3,4	63,4

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.