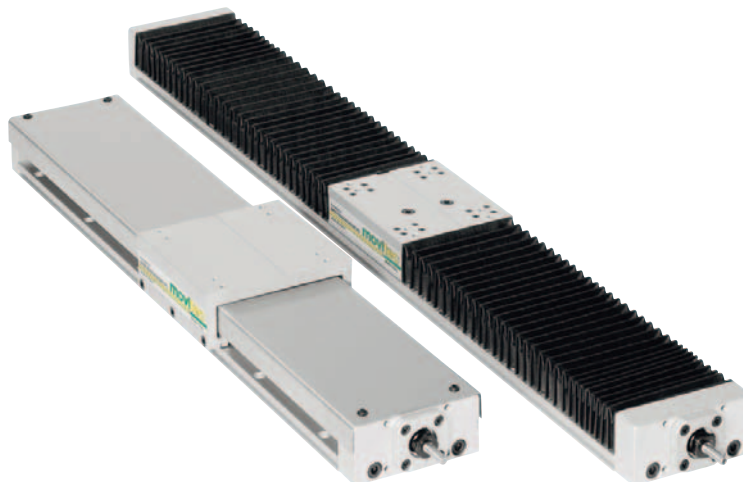


“Piccola” Micro Linear Tables

The “Piccola” Micro Linear Tables are manufactured from anodised aluminium in three sizes: 050, 075 and 100. For special applications they may also be supplied in stainless steel. In this case both the drives and guiding systems are provided in non-corrosive materials. The minimum stroke is 20 mm up to maximum 500 mm, depending on the size. “Piccola” is the right solution for reduced space and medium loads.



Drives

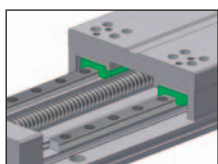
A wide range of drives is available:

- rolled or ground ball screws, Ø 6–10 mm, pitch 1–10 mm, ISO 5 or ISO 7
- “Speedy” high-helix lead screws, Ø 6–10 mm, pitch 5–35 mm, ISO 7 (standard) or ISO 5 (on request)
- “Rondo” round thread lead screws, Ø x pitch 6x2 / 8x2 / 10x3 mm, ISO 9 (standard) or ISO 7 (on request)

Guiding system

There are four different standard types of guiding systems available:

- **LVP** with micro linear rail guides



and three versions with prismatic guides:

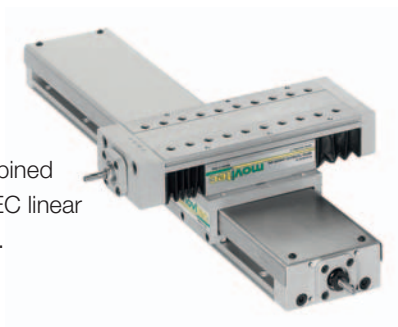
- **LVV** with slideways
- **LVX** with cross roller guides
- **LVZ** with linear ball bearings.

Application

“Piccola” is suitable for

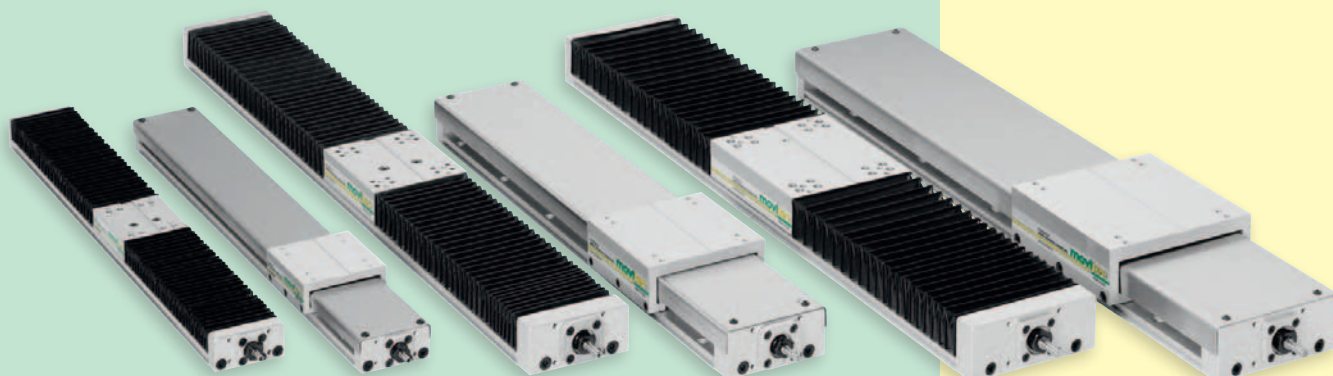
- Micromechanics
- Laser industries
- Biomedical
- Prototypes
- Silk-screen printing

and so on, and can be easily combined together or with any other MOVITEC linear system to build multi axis systems.

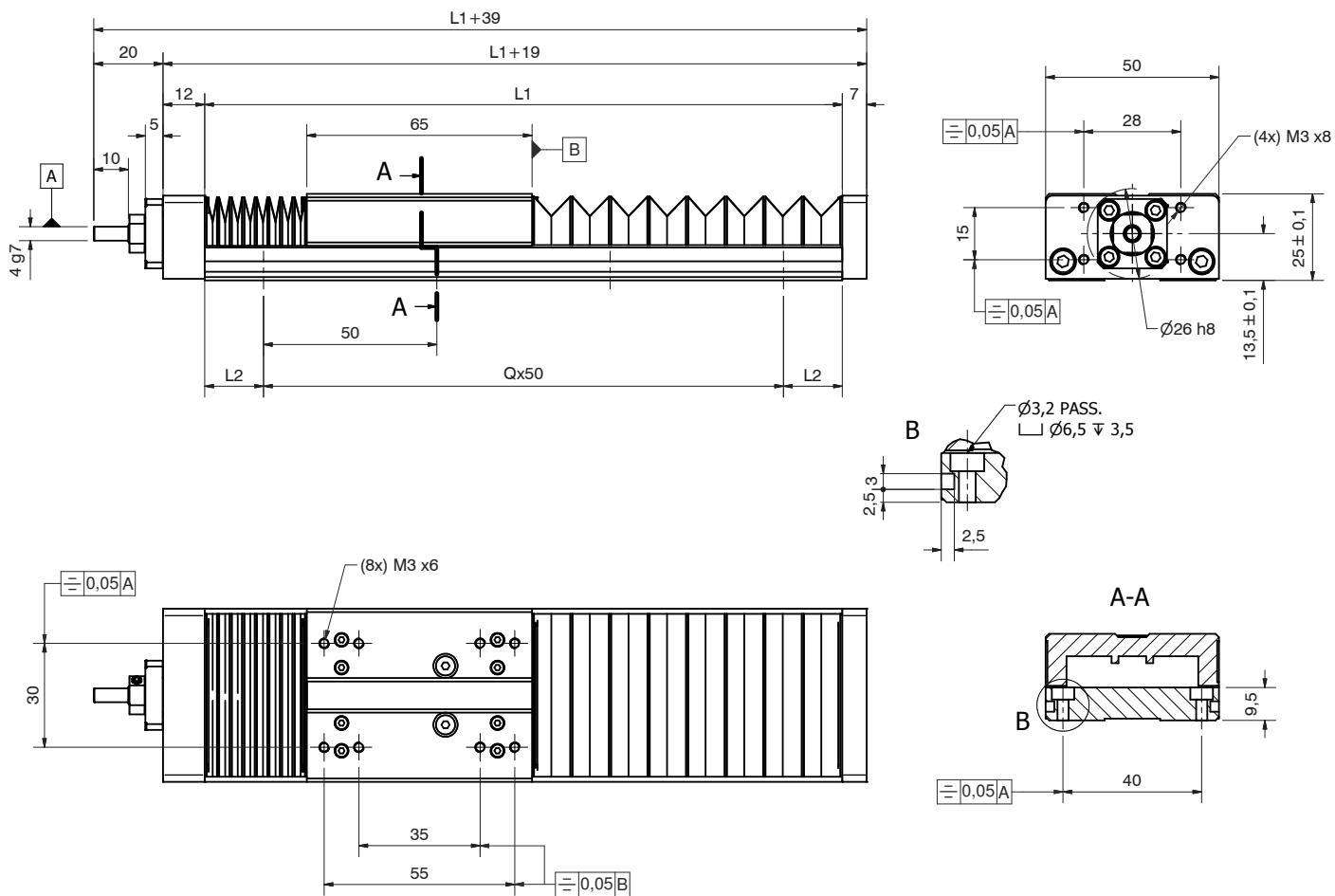


Product	“Piccola” Micro Linear Tables LV type	LVP	LVV	LVX	LVZ
Drive	V – Rolled ball screws	•	•	•	•
	V – Ground ball screws	•	•	•	•
	V – “Speedy” high-helix lead screws	•	•	•	•
	V – “Rondo” round thread lead screws	•	•	•	•
Guide	P – Linear rail guides (standard)	•	–	–	–
	V – Slideways	–	•	–	–
	X – Cross roller guides	–	–	•	–
	Z – Linear ball bearings	–	–	–	•
Size	050	•	•	•	•
	075	•	•	•	•
	100	•	•	•	•
Material	A – Aluminium	•	•	•	•
	X – Stainless steel	•	•	•	•
Strike	[mm]	20–500			
Protection	S – Expansion bellows	•	•	•	•
	M – Metal cover	•	•	•	•
Options	Extra drillings	•	•	•	•
	Lubrication	•	•	•	•
	Limit switches	•	•	•	•
	Direct motor mount with coupling	•	•	•	•
	Lateral motor mount with belt gear	•	•	•	•
	Measuring systems	•	•	•	•
		•	•	•	•
Motors	BLDC brushless servomotors	•	•	•	•
	AC/DC servomotors	•	•	•	•
	Stepper motors	•	•	•	•
Controls	Linear controls	•	•	•	•
	Path controls for 2, 3 and more axes	•	•	•	•

Example _____	L V P 075 A 0350 S
Product _____	
L = "Piccola" Micro Linear Tables	
Drive _____	
V = screw drive	
Guiding system _____	
P = linear rail guides (standard)	
V = slideways	
X = cross roller guides	
Z = linear ball bearings	
Size _____	
050 = profile width 50 mm	
075 = profile width 75 mm	
100 = profile width 100 mm	
Material _____	
A = aluminium (standard)	
X = stainless steel	
Stroke [mm]; 0020–0500 (other strokes on request) _____	
Protection _____	
S = expansion bellows (standard)	
M = metal cover	



“Piccola” Micro Linear Tables with screw drive (LV), size 050, made of aluminium (A)* and with expansion bellows (S)



Dimensions				Entire product		Carriage (fixed base plate)		Base plate (fixed carriage)			
Stroke s	L ₁	L ₂	Q	Weight m _t	Gravity center z _G	Weight m _c	Gravity center z _G	Weight m _b	Gravity center z _G		
[mm]	[mm]	[mm]	[-]	[kg]	[mm]	[kg]	[mm]	[kg]	[mm]		
20	124	37	1	0.40	12	0.11	13	0.29	10		
40	154	27	2	0.45	12			0.34	9		
60	184	17	3	0.50	11			0.39	9		
80	218	34	3	0.55	11			0.44	9		
100	248	24	4	0.60	11			0.49	9		
120	278	39	4	0.65	11			0.54	9		
140	314	32	5	0.70	10			0.59	9		
160	344	22	6	0.75	10			0.64	9		
180	374	37	6	0.80	10			0.69	9		
200	408	29	7	0.85	10			0.74	9		
250	484	17	9	0.98	10			0.86	9		
300	564	32	10	1.10	10			1.00	9		
				m _t = 0.0025 · s + 0.35		m _c = 0.11 kg		m _b = m _t - m _c			

* on request also available in stainless steel (X)

[illegible]

* on request also available in stainless steel (X)

For the LV 050 the following screw drives are available. Please contact us for drive optimization.

Screw drive	d ₀ [mm]	Pitch [mm]	d ₂ [mm]	v _{max} carriage ¹⁾ [m/min]	ISO	Lead accuracy [μm/300 mm]	Repeat- ability [μm]	Backlash ²⁾ [mm]	Effi- ciency h [-]	Operating temperature [°C]	Load rates dyn. stat. C [N] C ₀ [N]	
Rolled ball screws	6	1	5.0	2.7...6.0	7	52	±15	0.03	≥ 0.9	-20° / +80°	600	1000
		2	4.6	5.0...12.0							1700	2300
Ground ball screws	6	1	5.4	2.9...4.5	5	23	±10	≤ 0.01	≥ 0.9	-20° / +80°	580	730
		2	5.4	5.8...9.0							500	550
Speedy , rolled	6	25	6.3	85.0...150.0	9	100	±50	0.05...0.1	0.5 to 0.75	-40° / +60°	F _{per.}	400
	6.35	6.35	4.4	15.1...19.05							F _{per.}	850
	6.35	12.7	4.6	31.5...76.2							F _{per.}	800
Rondo , rolled	6	2	4.5	4.9...12.0	9	100	±50	0.05...0.1	0.4 to 0.5	-40° / +60°	F _{per.}	600

¹⁾ Calculations based on a max. rotational speed of 6000 min⁻¹ for rolled ball screws and 4000 min⁻¹ for ground ball screws.

²⁾ IMPEX standard backlash for ball screws = 0,03 mm (ISO 7)
 Reduced backlash up to ≤ 0,01 mm (ISO 7) available
 Zero backlash available with preloaded nuts. Preload = 3% of C₀ (ISO 5)

Permissible maximum load F_{per} based on circumferential speed:

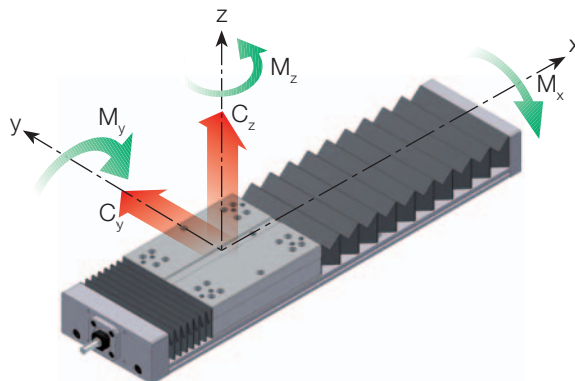
$$F_{\text{per}} = C_0 \cdot f_L [\text{N}]$$

C₀ = static load [N]

f_L = load factor [-] for POM-C nuts

circumferential speed v _c [m/min]	load factor f _L [-]
5	0.95
10	0.75
20	0.45
30	0.37
40	0.12
50	0.08

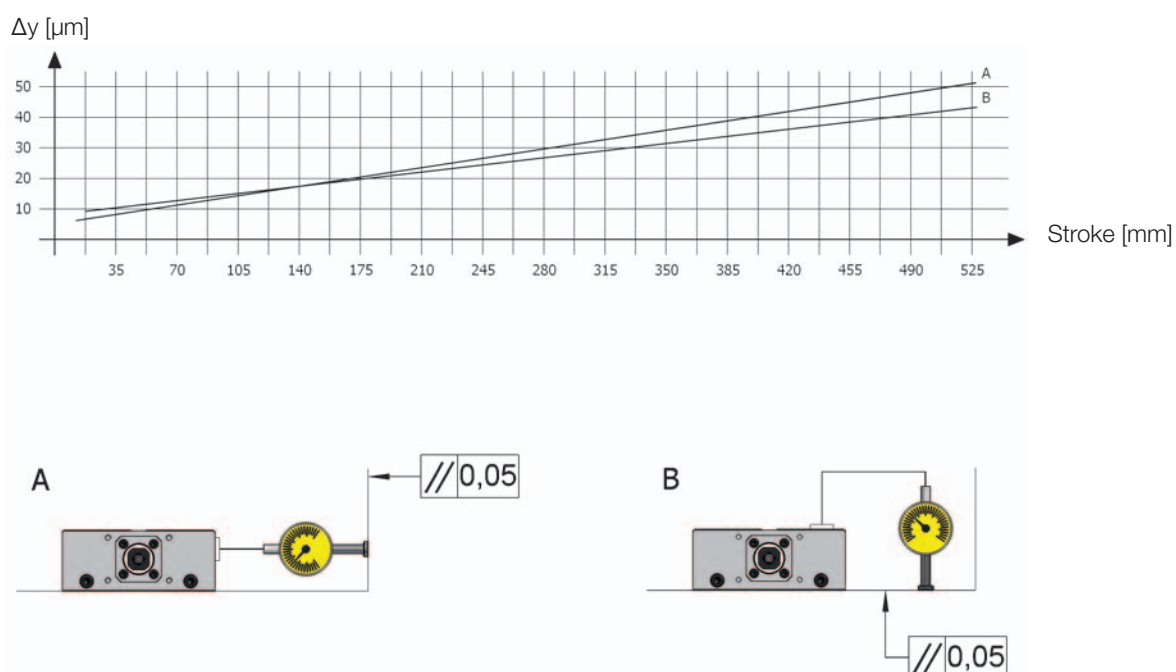
Load Rates and Torque



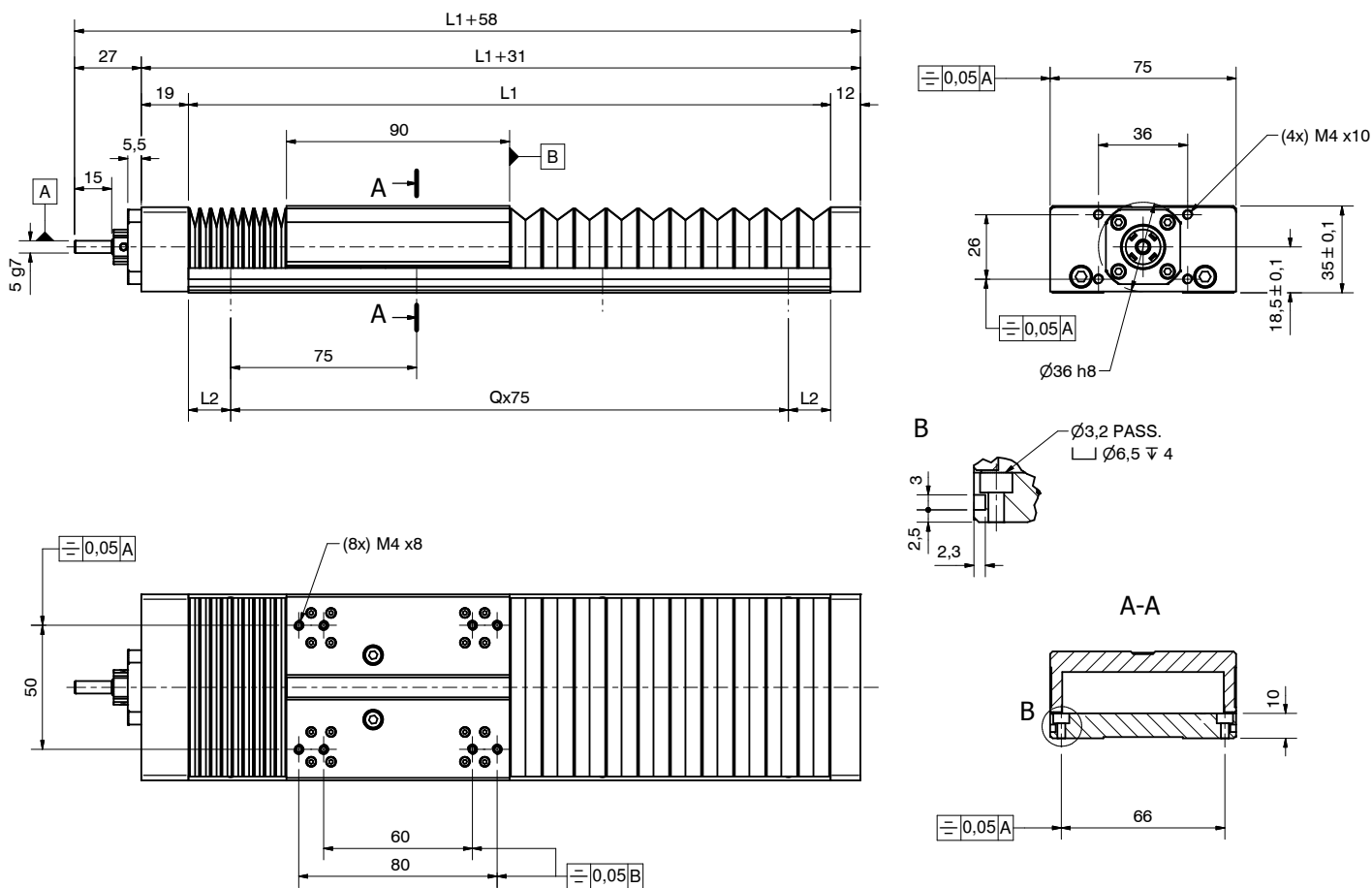
Guiding System	Safety factor s	Load rates [N]						Torque [Nm]					
		C_y dyn.	stat.	C_z - dyn.	stat.	C_z + dyn.	stat.	M_x dyn.	stat.	M_y dyn.	stat.	M_z dyn.	stat.
LVP – linear rail guides	10	141	211	225	337	225	337	4	5	6	8	4	6
	5	282	422	450	674	450	674	8	10	12	16	8	12

values valid for standard carriage length = 65 mm

Accuracy



“Piccola” Micro Linear Tables with screw drive (LV), size 075, made of aluminium (A)* and with expansion bellows (S)



Dimensions				Entire product		Carriage (fixed base plate)		Base plate (fixed carriage)			
Stroke s	L ₁	L ₂	Q	Weight m _t	Gravity center z _G	Weight m _c	Gravity center z _G	Weight m _b	Gravity center z _G		
[mm]	[mm]	[mm]	[-]	[kg]	[mm]	[kg]	[mm]	[kg]	[mm]		
30	163	44	1	1.11	17	0.4	11	0.71	13		
60	214	32	2	1.23	16			0.83	12		
90	259	17	3	1.36	15			0.96	12		
120	303	39	3	1.49	15			1.09	12		
150	354	27	4	1.62	15			1.22	12		
180	404	52	4	1.74	14			1.34	11		
210	449	37	5	1.87	14			1.47	11		
240	494	22	6	2.00	14			1.60	11		
270	544	47	6	2.12	13			1.72	11		
300	593	34	7	2.25	13			1.85	11		
350	668	34	8	2.46	13			2.06	11		
400	749	37	9	2.67	13			2.27	11		

* on request also available in stainless steel (X)

Technical drawing of a mechanical part, showing three views: front view, top view, and side view.

Front View Dimensions:

- Overall length: $L1 + 58$
- Overall width: 92
- Left offset: 27
- Offset to first hole: 19
- Distance between holes: 90
- Right offset: 12
- Bottom offset: 5,5
- Distance from bottom edge to centerline: 15
- Distance from centerline to first hole: 75
- Distance from centerline to last hole: $Q \times 75$
- Bottom offset: $L2$

Top View Dimensions:

- Overall length: 75
- Overall width: 46
- Distance from left edge to centerline: 36
- Distance from centerline to last hole: 18,5 ± 0,1
- Distance from bottom edge to centerline: 18,5 ± 0,1
- Distance from bottom edge to last hole: 46 ± 0,1
- Mounting holes: (4x) M4 x10
- Section line A-A

Side View Dimensions:

- Overall height: 65
- Distance from top edge to centerline: 3
- Distance from centerline to last hole: 2,5
- Distance from bottom edge to centerline: 2,3
- Mounting holes: (8x) M4x8
- Section line B-B

Section A-A:

- Overall length: 66
- Distance from left edge to centerline: 36
- Distance from centerline to last hole: 18,5 ± 0,1
- Distance from bottom edge to centerline: 18,5 ± 0,1
- Distance from bottom edge to last hole: 46 ± 0,1
- Mounting holes: (8x) M4x8

Section B-B:

- Overall height: 65
- Distance from top edge to centerline: 3
- Distance from centerline to last hole: 2,5
- Distance from bottom edge to centerline: 2,3
- Mounting holes: (8x) M4x8

* on request also available in stainless steel (X)

For the LV 075 the following screw drives are available. Please contact us for drive optimization.

Screw drive	d ₀ [mm]	Pitch [mm]	d ₂ [mm]	v _{max} carriage ¹⁾ [m/min]	ISO	Lead accuracy [μm/300 mm]	Repeat- ability [μm]	Backlash ²⁾ [mm]	Effi- ciency h [-]	Operating temperature [°C]	Load rates dyn. stat. C [N] C ₀ [N]	
Rolled ball screws	8	1	7.0	2.1...6.0	7	52	±15	0.03	≥ 0.9	-20° / +80°	700	1200
		1.5	6.7	3.1...9.0				0.04			800	1300
		2	6.5	4.0...12.0				0.06			2000	3200
		2.5	6.6	5.0...15.0				0.06			2000	3200
		3	6.7	6.1...18.0				0.05			950	1500
Ground ball screws	8	1	7.4	2.1...3.2	5	23	±10	≤ 0.01	≥ 0.9	-20° / +80°	850	1150
		2	6.7	4.1...8.4							2000	2300
		2.5	6.7	5.1...10.5							2050	2300
		3	6.7	6.1...12.6							1450	1550
		4	6.7	8.2...16.8							2000	2300
		5	6.7	10.2...20.0							1450	1660
Speedy high- helix lead screws, rolled	7.5	7.5	5.9	13.5...35.4	9	100	±50	0.05...0.1	0.5 to 0.75	-40° / +60°	F _{per.}	450
	8	10	5.5	16.7...60.0							F _{per.}	800
	8	12	5.9	21.5...72.0							F _{per.}	800
	8	15	5.9	26.9...90.0							F _{per.}	850
	8	30	7.5	68.5...180.0							F _{per.}	500
	7.94	12.7	5.8	21.3...76.2							F _{per.}	1100
Rondo , rolled	8	2	6.5	4.0...12.0	9	100	±50	0.05...0.1	0.4 to 0.5	-40° / +60°	F _{per.}	800

¹⁾ Calculations based on a max. rotational speed of 6000 min⁻¹ for rolled ball screws and 4000 min⁻¹ for ground ball screws.

²⁾ IMPEX standard backlash for ball screws = 0,03 mm (ISO 7)

Reduced backlash up to ≤ 0,01 mm (ISO 7) available

Zero backlash available with preloaded nuts. Preload = 3% of C₀ (ISO 5)

Permissible maximum load F_{per} based on circumferential speed:

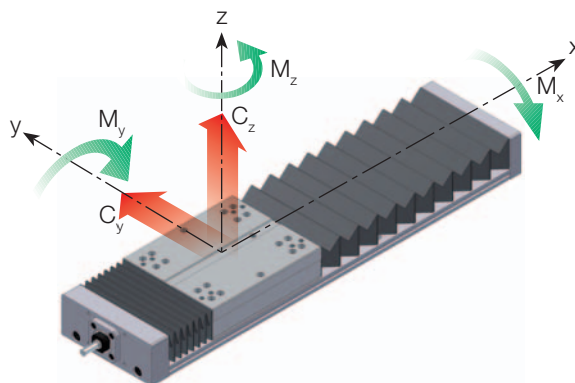
$$F_{\text{per}} = C_0 \cdot f_L \cdot [N]$$

C₀ = static load [N]

f_L = load factor [-] for POM-C nuts

circumferential speed v _c [m/min]	load factor f _L [-]
5	0.95
10	0.75
20	0.45
30	0.37
40	0.12
50	0.08

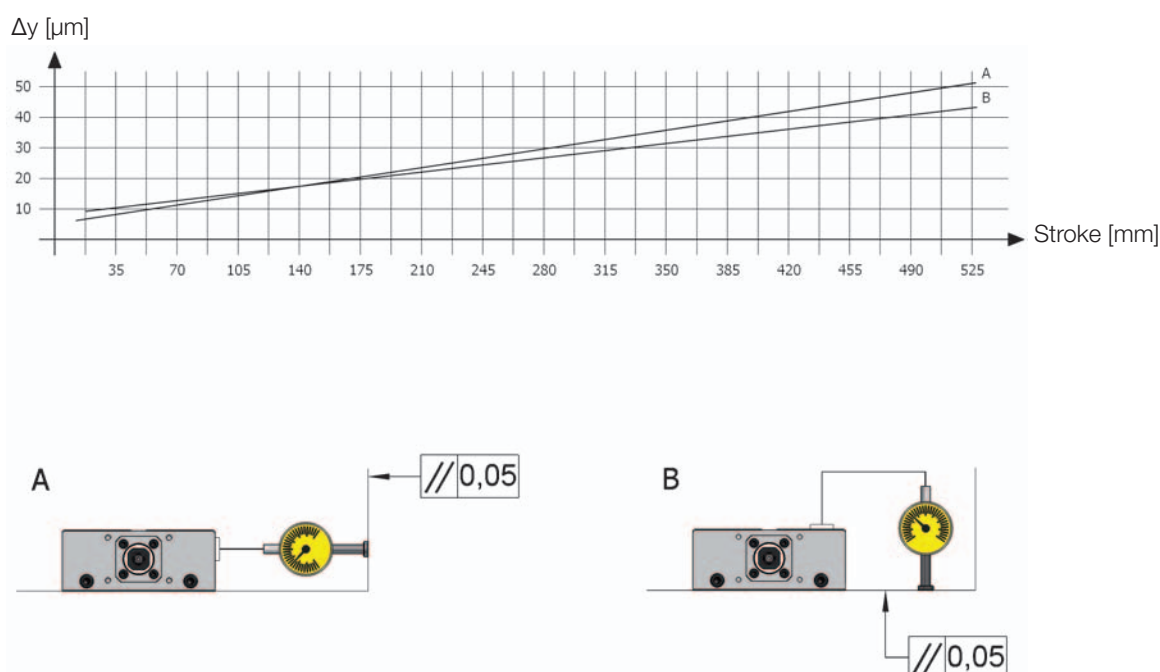
Load Rates and Torque



Guiding System	Safety factor s	Load rates [N]						Torque [Nm]					
		C_y dyn.	stat.	C_z - dyn.	stat.	C_z + dyn.	stat.	M_x dyn.	stat.	M_y dyn.	stat.	M_z dyn.	stat.
LVP – linear rail guides	10	333	473	532	756	532	756	13	18	16	23	12	18
	5	666	946	1064	1512	1064	1512	26	36	32	46	24	36

values valid for standard carriage length = 90 mm

Accuracy



Technical drawing of a mechanical assembly, showing three views: front view, top view, and detail views.

Front View: Shows the overall length and internal components. Key dimensions include: total length $L1+58$, distance from left end to start of internal features $L1+31$, distance from left end to center of internal features $L1$, distance from left end to center of internal features 120 , distance from left end to center of internal features 100 , and distance from left end to center of internal features $Qx100$. Section lines A-A and B-B are indicated.

Top View: Shows the width and internal features. Key dimensions include: total width 100 , distance from left end to center of internal features 40 , distance from left end to center of internal features 28 , distance from left end to center of internal features $21 \pm 0,1$, and distance from left end to center of internal features $40 \pm 0,1$. Section lines A-A and B-B are indicated.

Detail View B: Shows a cross-section of the internal features. Key dimensions include: total width 100 , distance from left end to center of internal features 40 , distance from left end to center of internal features 28 , distance from left end to center of internal features $21 \pm 0,1$, and distance from left end to center of internal features $40 \pm 0,1$. Section lines A-A and B-B are indicated.

Section A-A: Shows a cross-section of the internal features. Key dimensions include: total width 100 , distance from left end to center of internal features 40 , distance from left end to center of internal features 28 , distance from left end to center of internal features $21 \pm 0,1$, and distance from left end to center of internal features $40 \pm 0,1$. Section lines A-A and B-B are indicated.

* on request also available in stainless steel (X)

[illegible]

* on request also available in stainless steel (X)

For the LV 100 the following screw drives are available. Please contact us for drive optimization.

Screw drive	d ₀ [mm]	Pitch [mm]	d ₂ [mm]	v _{max} carriage ¹⁾ [m/min]	ISO	Lead accuracy [μm/300 mm]	Repeat-ability [μm]	Backlash ²⁾ [mm]	Efficiency h [-]	Operating temperature [°C]	Load rates dyn. stat. C [N] C ₀ [N]	
Rolled ball screws	10	2	8.2	3.5...12.0	7	52	±15	0.06	≥ 0.9	-20° / +80°	2300	4000
		3	7.8	5.1...18.0							2800	5000
		10	7.9	17.0...60.0							2500	4500

Ground ball screws	10	2	8.7	3.8...8.0	5	23	±10	≤ 0.1	≥ 0.9	-20° / +80°	2400	2950
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Speedy high-helix lead screws, rolled	9	20	5.8	25.2...120.0	9	100	±50	0.05...0.1	0.5 to 0.75	-40° / +60°	F _{per.}	850
	9.7	25.4	6.4	35.3...152.4							F _{per.}	1200
	10	10	8.2	17.8...60.0							F _{per.}	600
	10	12	7.1	18.5...72.0							F _{per.}	1200
	10	35	8.9	67.7...210.0							F _{per.}	600

Rondo , rolled	10	3	7.8	5.1...18.0	9	100	±50	0.05...0.1	0.4 to 0.5	-40° / +60°	F _{per.}	1200
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¹⁾ Calculations based on a max. rotational speed of 6000 min⁻¹ for rolled ball screws and 4000 min⁻¹ for ground ball screws.

²⁾ IMPEX standard backlash for ball screws = 0,03 mm (ISO 7)
Reduced backlash up to ≤ 0,01 mm (ISO 7) available
Zero backlash available with preloaded nuts. Preload = 3% of C₀ (ISO 5)

Permissible maximum load F_{per} based on circumferential speed:

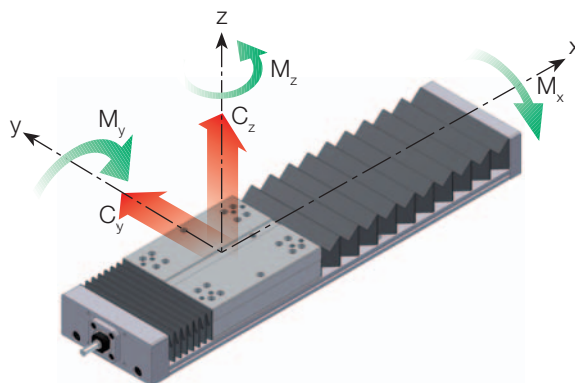
$$F_{per} = C_0 \cdot f_L [N]$$

C₀ = static load [N]

f_L = load factor [-] for POM-C nuts

circumferential speed v _c [m/min]	load factor f _L [-]
5	0.95
10	0.75
20	0.45
30	0.37
40	0.12
50	0.08

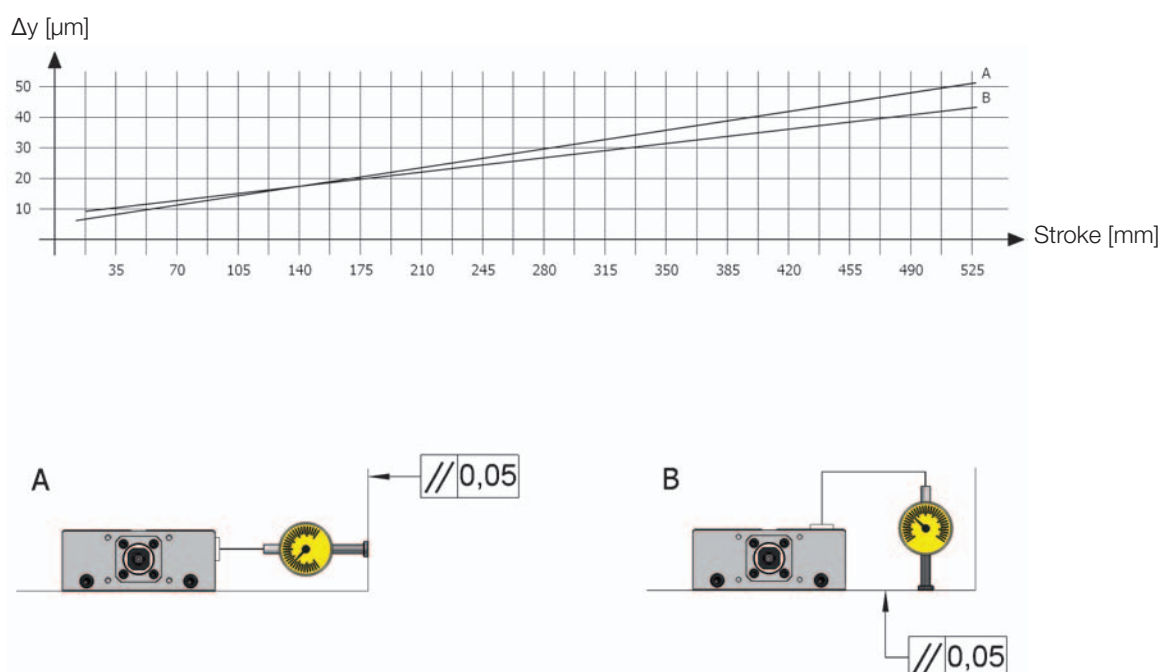
Load Rates and Torque



Guiding System	Safety factor s	Load rates [N]						Torque [Nm]					
		C _y dyn.	stat.	C _z - dyn.	stat.	C _z + dyn.	stat.	M _x dyn.	stat.	M _y dyn.	stat.	M _z dyn.	stat.
LVP – linear rail guides	10	453	690	724	1104	724	1104	23	34	33	50	25	38
	5	906	1380	1448	2208	1448	2208	46	68	66	100	50	76

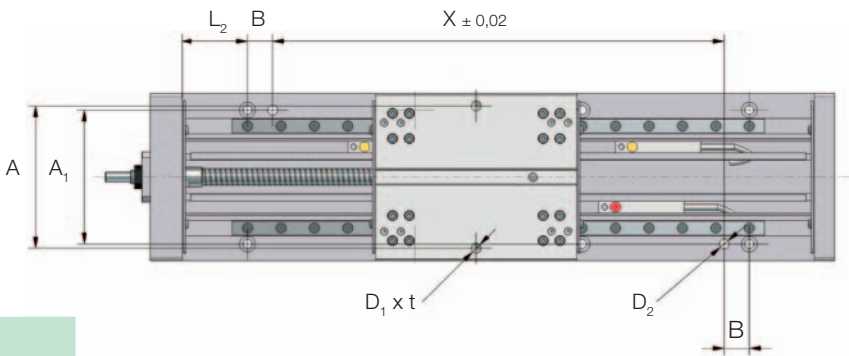
values valid for standard carriage length = 120 mm

Accuracy



Positioning holes

For accurate X-Y mounting or the fixing of accessories “Piccola” Micro Linear Tables are available with additional drill holes on top of the carriage and on the base plate.

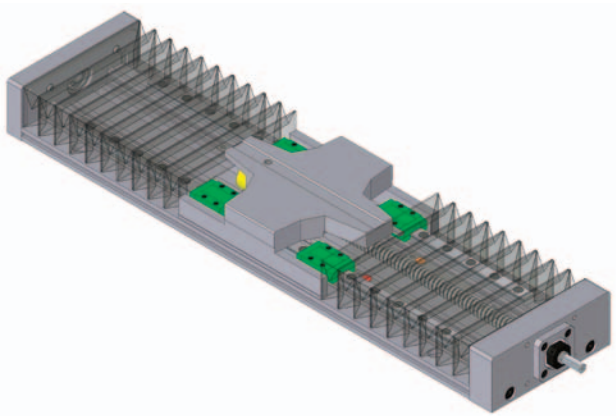


LV size	Carriage		Base plate		
	D ₁ x t [mm]	A ± 0,02 [mm]	D ₂ [mm]	A ₁ ± 0,02 [mm]	B [mm]
050	4 h7 x 6	42	4 h7	40	10
075	5 h7 x 8	65	5 h7	66	15
100	6 h7 x 9	85	6 h7	80	25

L₂ : see dimensins of corresponding LV size

Lubrication

“Piccola” Micro Linear Tables are stand-ard without lubrication. On request screw drives lubricated “for life” and linear rail guides with 4 “self lubricating” carriages are available (order code **K00**).

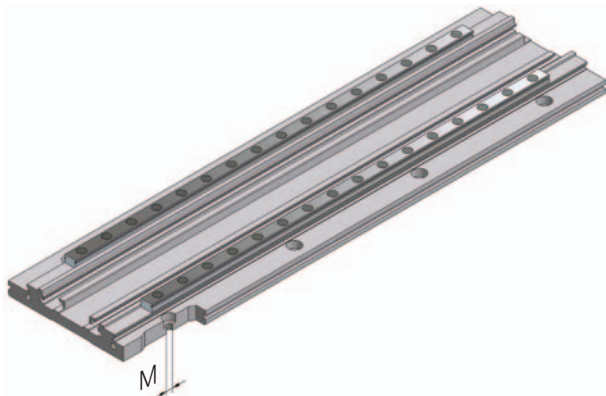


Base plates with tapping holes

In standard configuration spot-faced holes are drilled on the base plate.

On request tapping holes are available:

LV size	M [mm]
050	M4
075	M4
100	M6



Limit switches

All LV sizes can be fitted with limit switches. For LV 050 only external limit switches are possible. LV 075 and LV 100 may be equipped with internal, wired limit switches.

– Inductive limit switches:

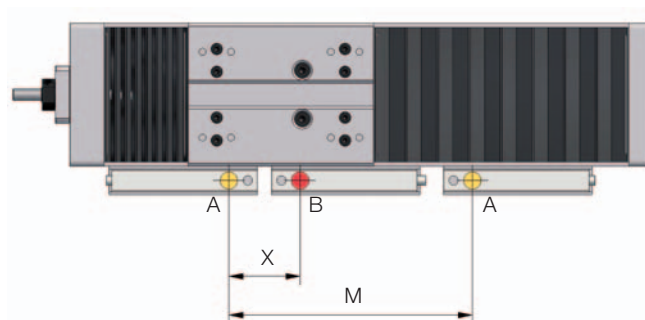
A : Inductive limit switches **PNP-NC**

B : Inductive limit switch **PNP-NO**

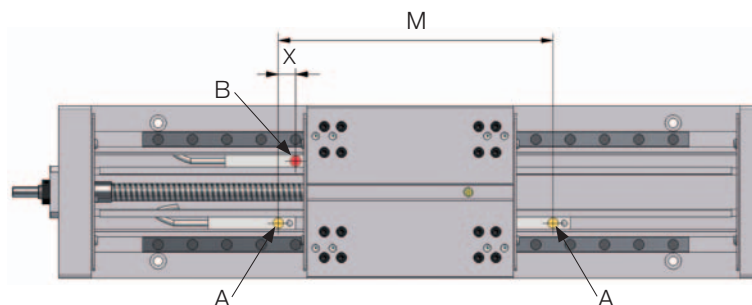
M : Nominal stroke

X : 10 mm (standard)

– LV 050: external limit switches



– LV 075 and LV 100: internal, wired limit switches



Configuration without pin connector		Inductive limit switches
Order code for limit switch mounting on right side (DX)	left side (SX)	
FA2	FA4	2x PNP-NC (emergency) 1x PNP-NO (reference limit switch, motor side)
FB2	FB4	2x PNP-NC (emergency) 1x PNP-NO (reference limit switch, opposite motor side)
FC2	FC4	2x PNP-NC (emergency)
FD2	FD4	1x PNP-NO (reference limit switch)

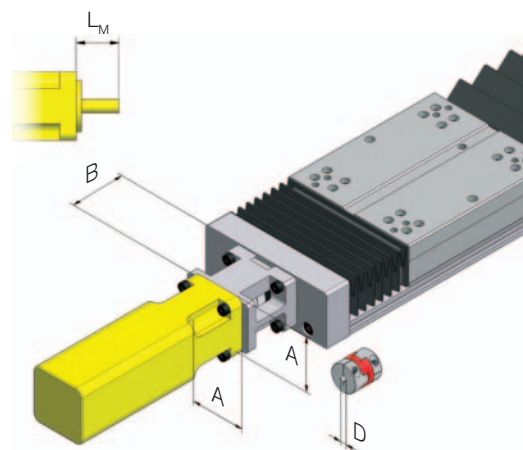
Motor mount

– Direct motor mount with coupling

Aluminium support and coupling with collet clamp.

LV size	□ A [mm]	B [mm]	Clamp size	max. Torque [Nm]	ø D min/max [mm]	Tightening torque of locking screw [Nm]
050	20–50	20 + L _M	MOS16	0,4	3/5	0,5
075	30–60	26 + L _M	MOS20	0,8	3/6	1
100	40–70	27 + L _M	MOS20	1,4	4,5/8	1

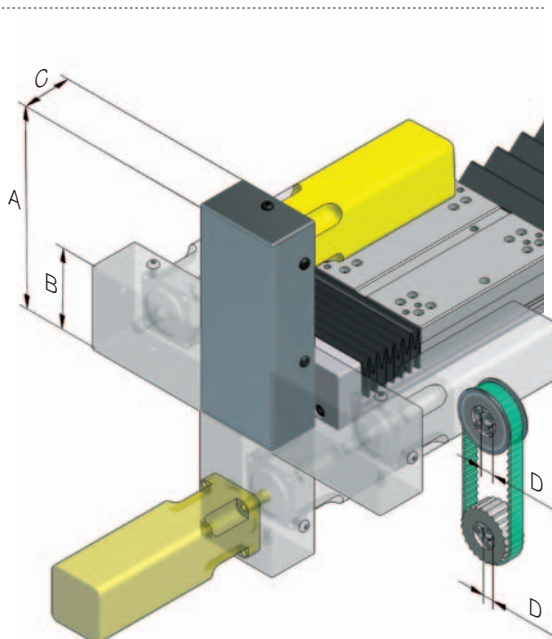
L_M: motor shaft length



– Lateral motor mount with belt gear

Aluminium support with belt, pulley and locking set.

LV size	A [mm]	B [mm]	C [mm]	Belt type	ø D min/max [mm]	Speed ratio [-]
050	90–120	40–55	25–35	...	8/9	1:1
075	100–150	40–65	25–45	...	5/10	(standard)
100	110–180	45–85	30–50	...	5/12	1:2 / 2:1

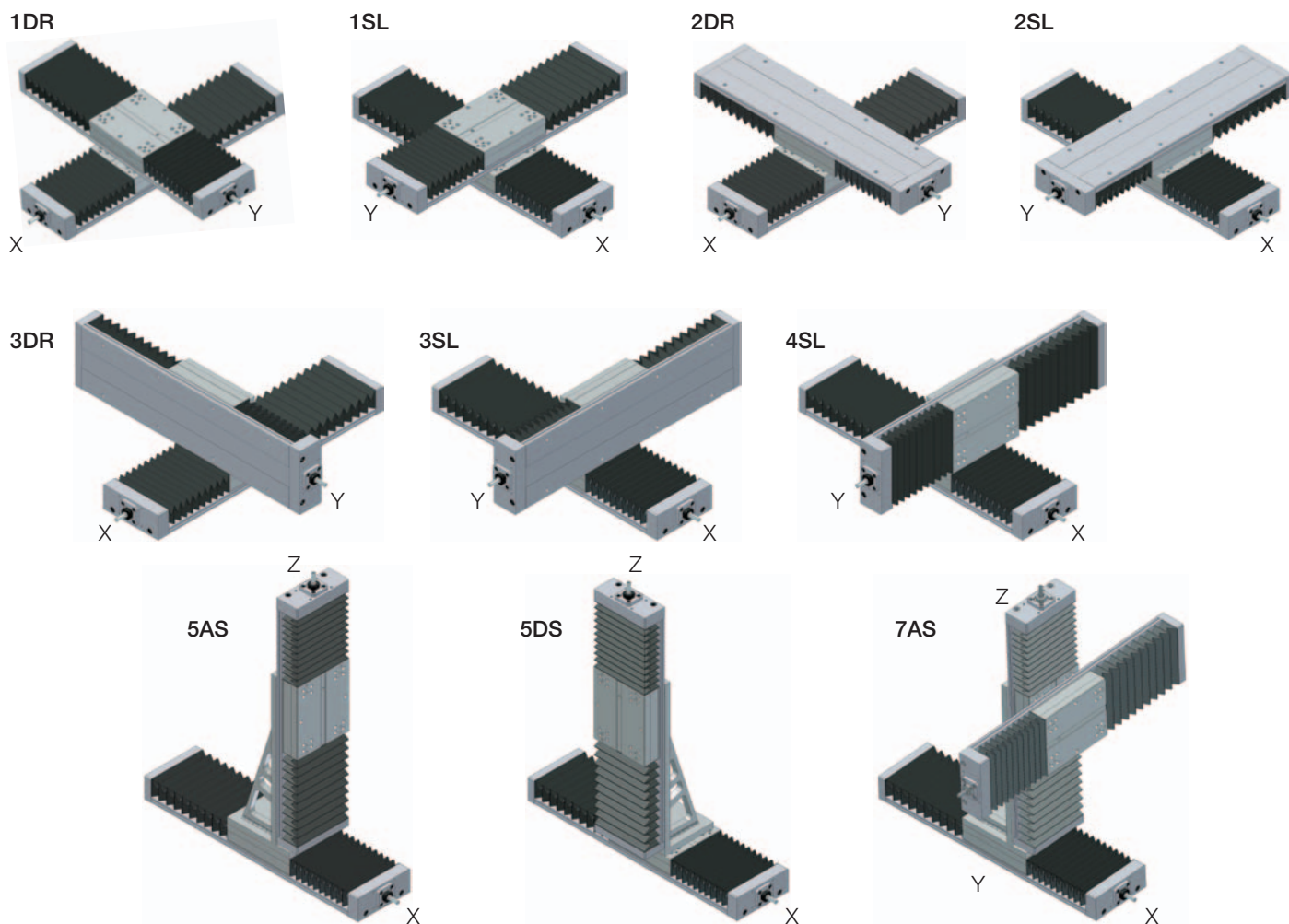


Measuring system

For LV 075 and LV 100 “Piccola” Micro Linear Tables linear measuring systems with resolutions of 0.1, 0.01, 0.005 or 0.001 mm are available. Outputs: RC transistor NPN (standard), OC open collector, LTD 26LS31 or sinusoidal SIN 1VPP.

Assembly examples

“Piccola” Micro Linear Tables can be combined to multi axes systems, but also easily assembled with any other MOVITEC products. Examples:



Complete, customer specific solutions

MOVITEC linear systems are the ideal components for customer-specific solutions. Thanks to their modular construction, very economic, application-oriented linear systems can be implemented in the shortest time.

