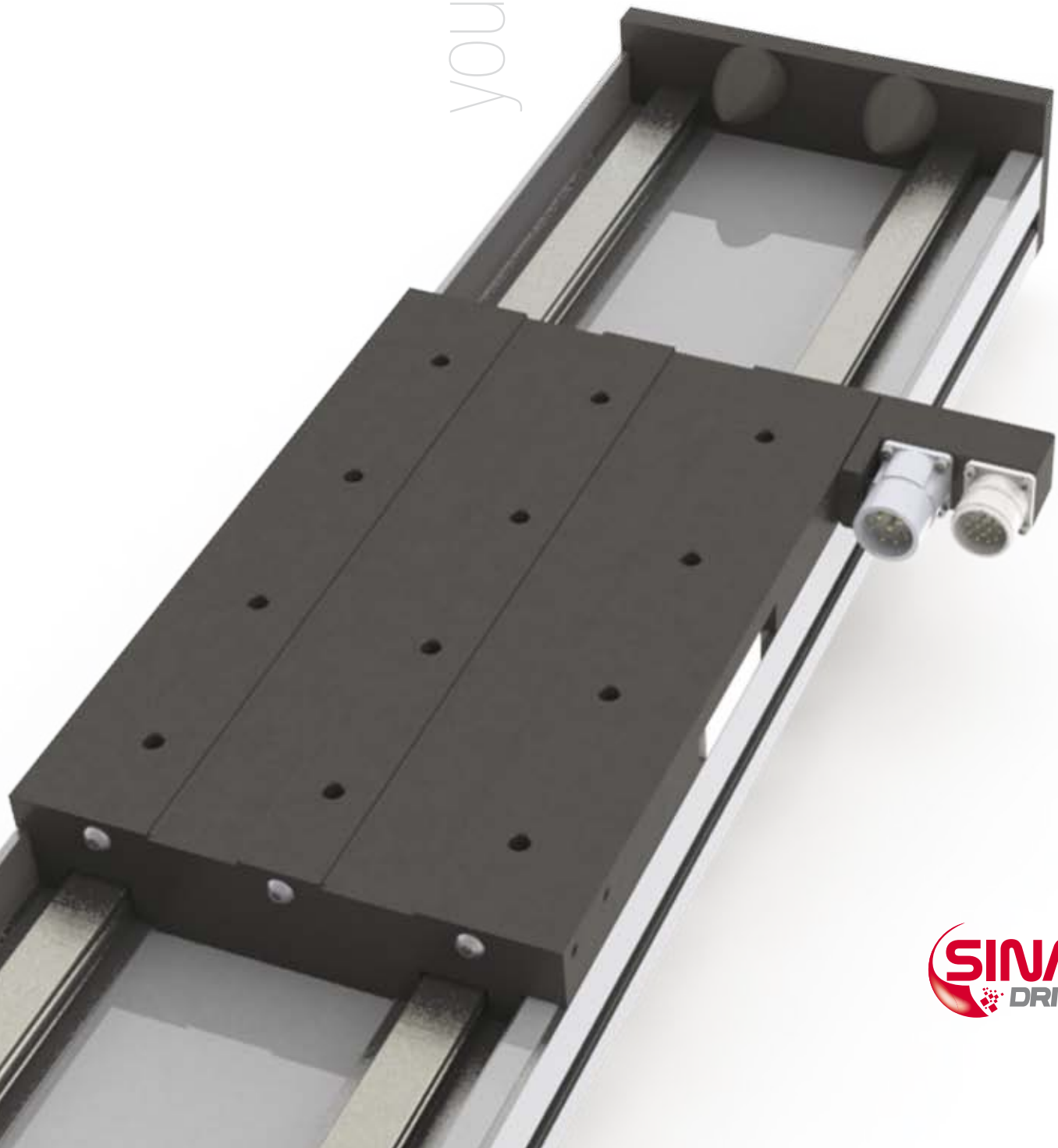


your key to success



Linear Units based on Direct Drives technologies



Introduction

The ever growing needs of machines for automatic assembly, demand high quality and reliance for all components, specially those that have to make millions of cycles. As a competent partner in electromechanical solutions, SINADRIVES provides innovative products for **fast and precise positioning**. Thanks to standard plug-ready linear units, we can offer **customized and flexible solutions** for packaging, plastics, pharmaceutical, or photovoltaic sectors.

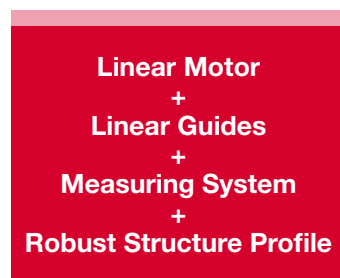
The objective of SINADRIVES linear units is to make the work of technicians and engineers easier. Ready 3D models, assembled with power chains, as well as different multi axis combinations provide solutions ready for fast and precise positioning. Everything is included: profile, guides, linear motor, measuring system, end blocks, plug M23 connectors, limit switches, and power chain. The linear motor based on synchronous technology, offers considerable advantages in dynamics, accuracy, and durability. The integrated oil supply in the guide allows to operate without any maintenance. MLE and MLU motors are compatible with the best amplifiers of the world market. Just use your usual amplifier to achieve a fast commissioning of your application.

MLE Series

All linear units of MLE series are fully integrated and ready for plug and play. The powerful iron core motor in combination with the most compact linear unit provide an opportunity to integrate them in high speed applications.

MLU Series

The MLU series are fully integrated linear units with ironless motors. Their light weight and compact design offer a good choice for a wide range of pharmaceutical and medical applications.

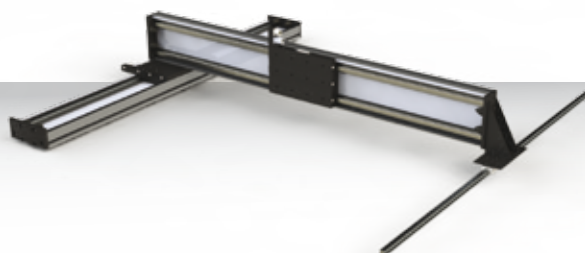
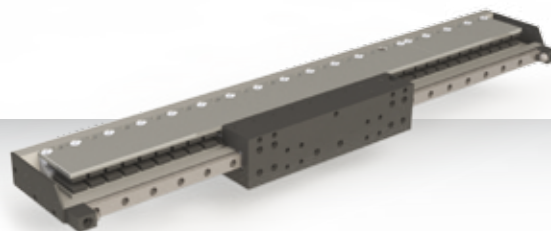
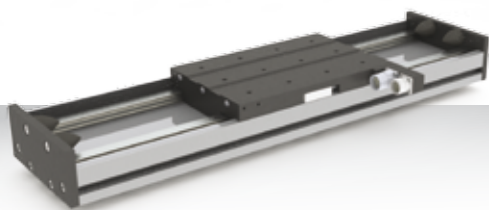


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Plug Solutions from **SINADRIVES**

Our Solutions

your key to success

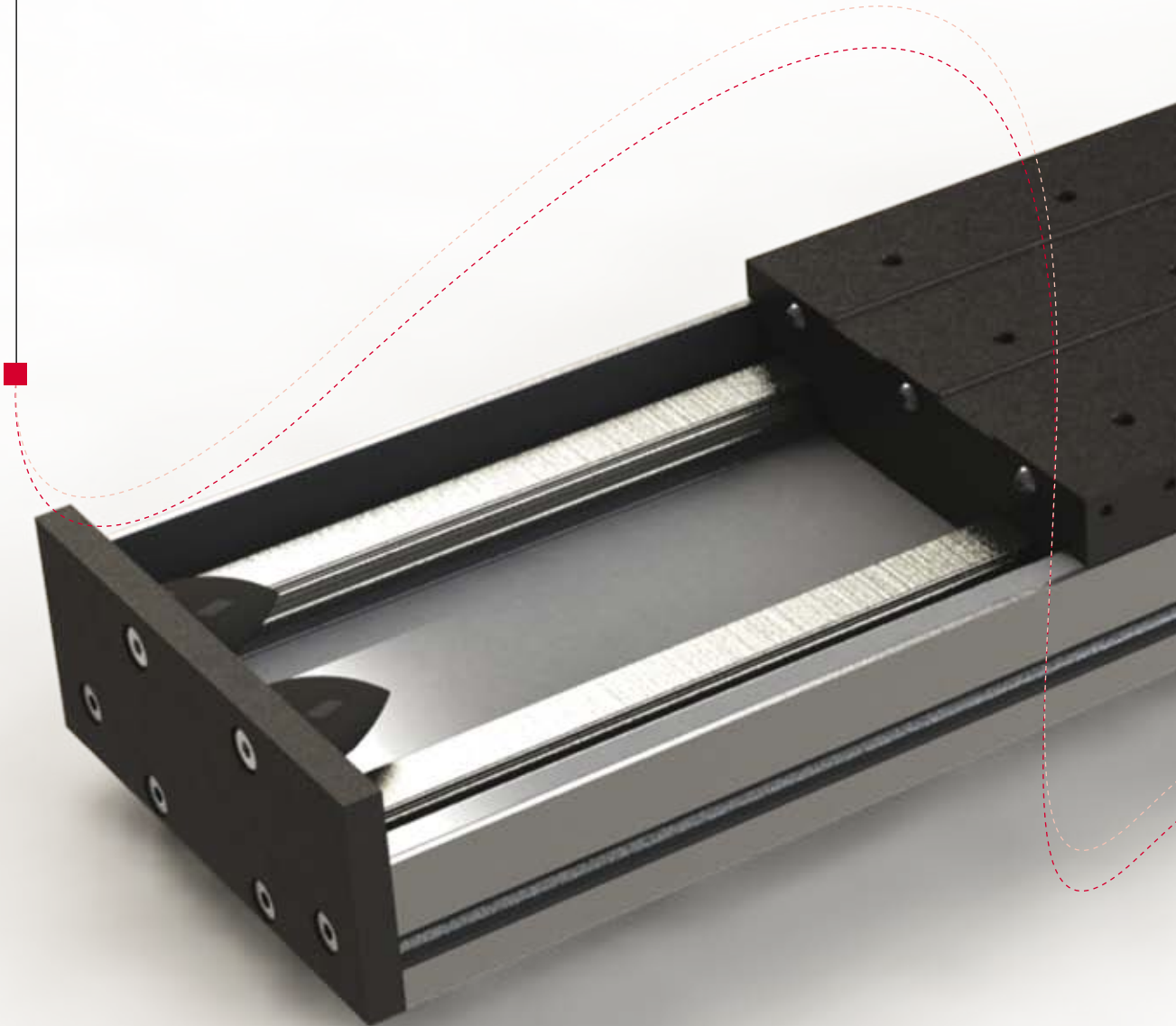


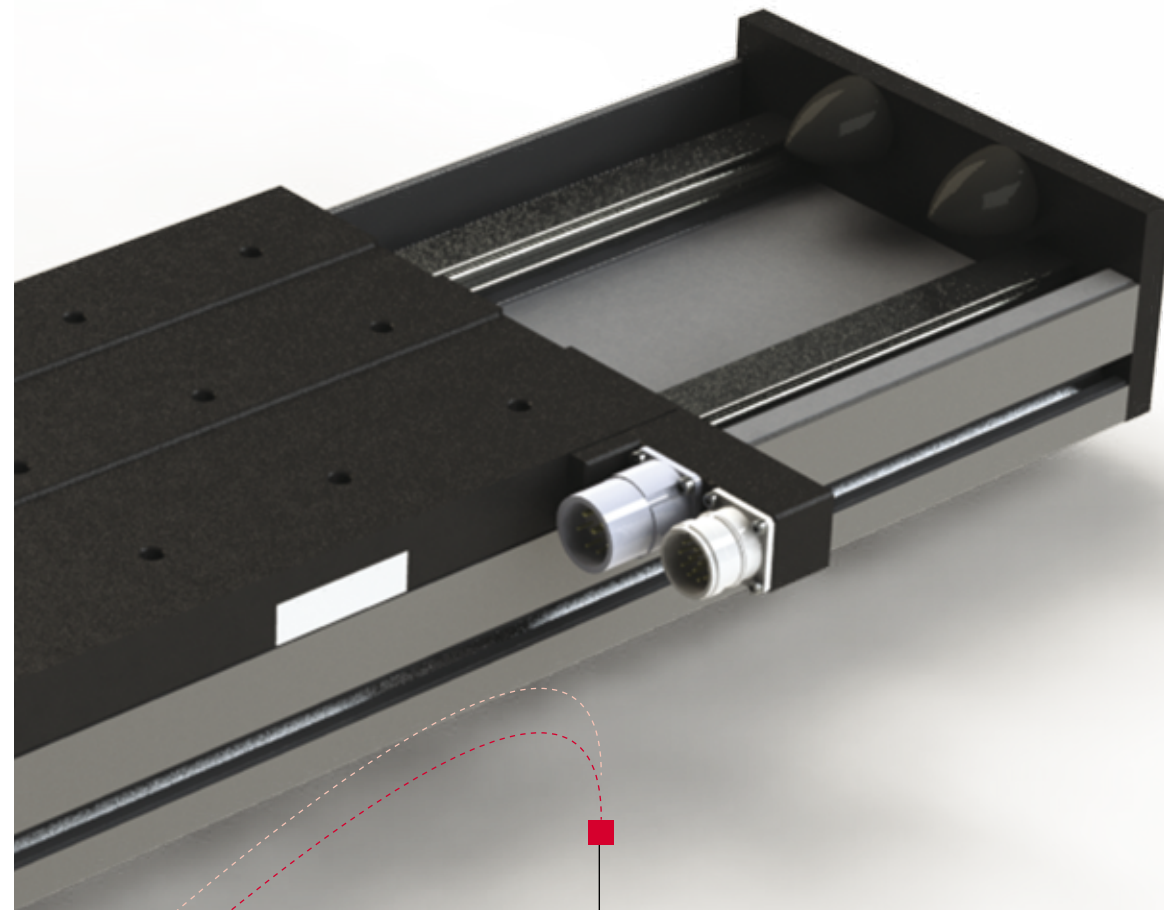
Our Features

your key to success

ML units

1. Maintenance free linear unit ready for applications requiring high dynamics, high accuracy, and high durability.
2. Fully integrated linear units with linear motor, linear guide, measuring system, end switches and power chain.
3. High end linear motor suitable for the semiconductor and packaging industries.
4. Absolute measuring system with 1 Vpp output with 40 μm period and 1 μm repeatable accuracy.

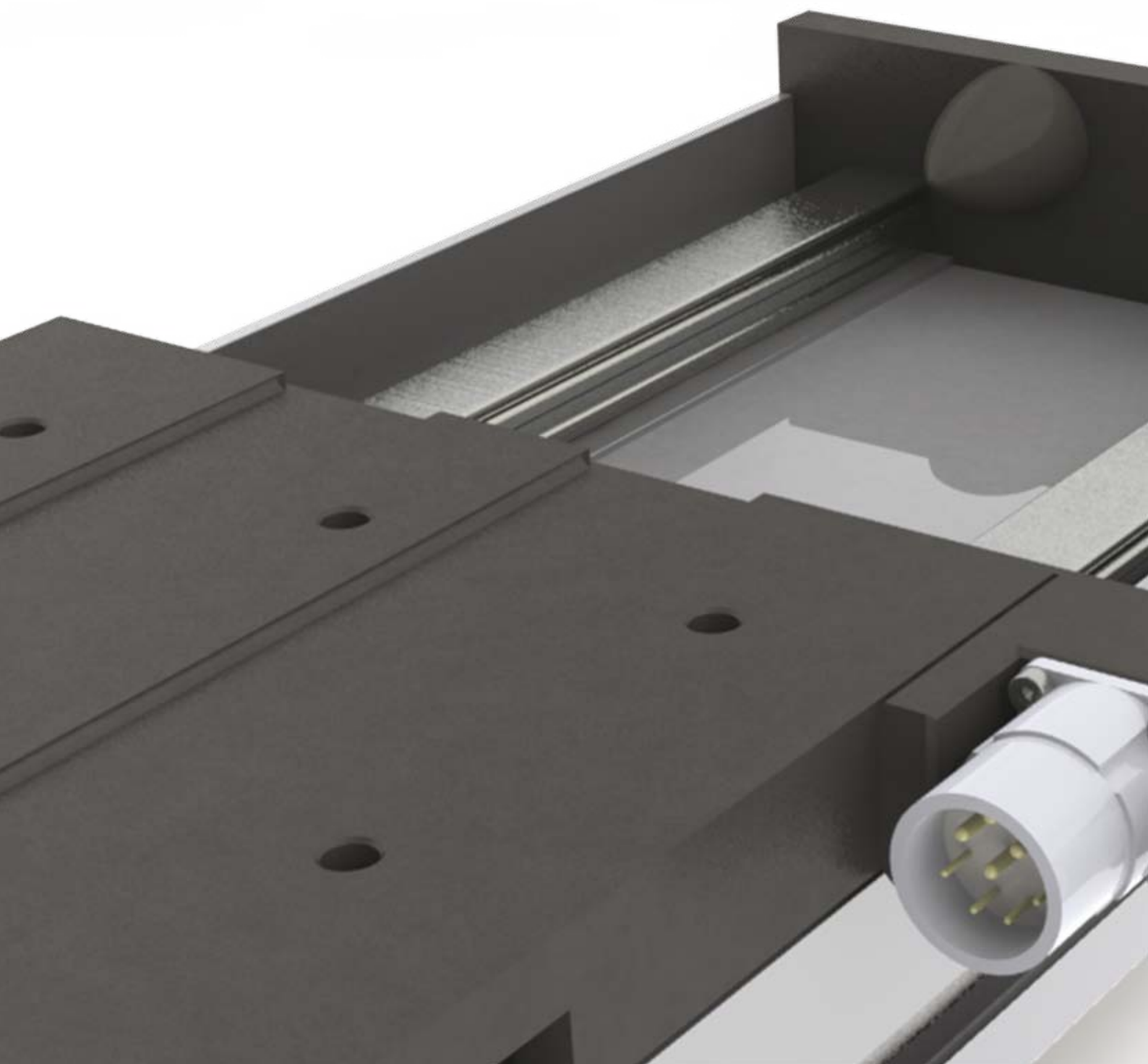




- 5.** Complete wired M23 connectors. Ready to connect on servocontroller.
- 6.** High load capacity linear guide with integrated lubrication supply up to 40.000 km.
- 7.** Fully integrated power chain with mounting pieces.
- 8.** Optional stainless guide protection and cover protection against dust.

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Chapter 1

Chapter 2

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Chapter 5

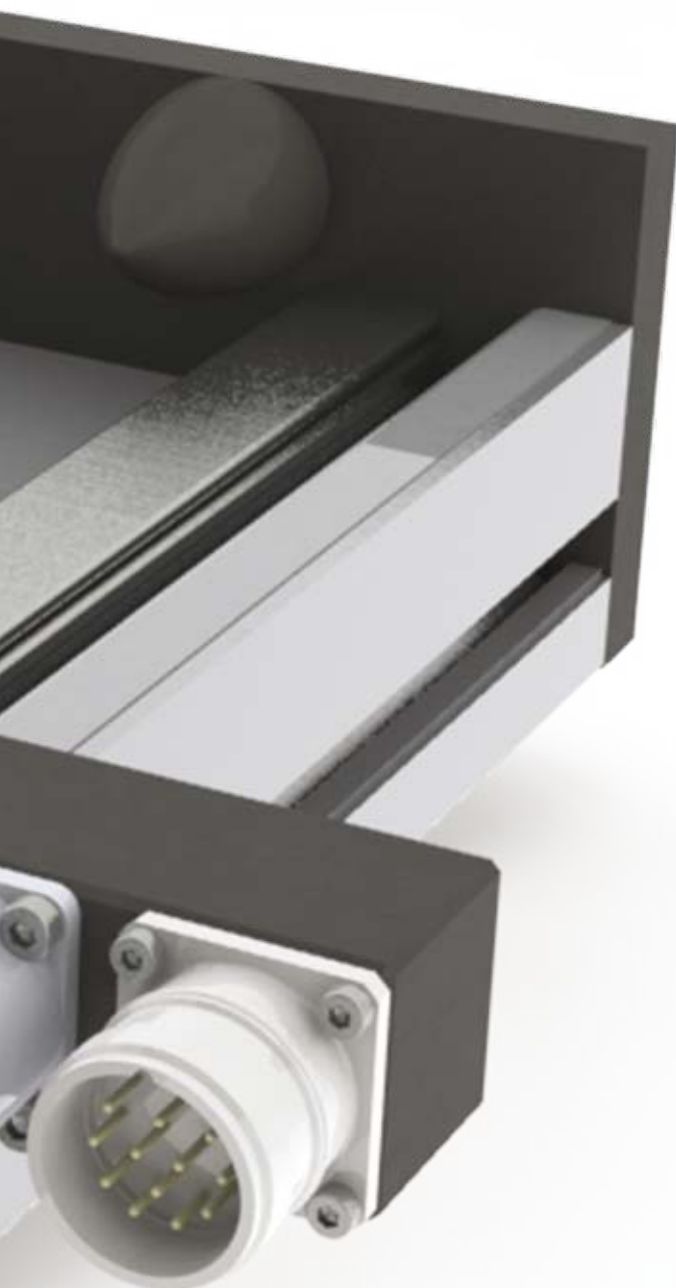
MLE linear units

MLU linear units

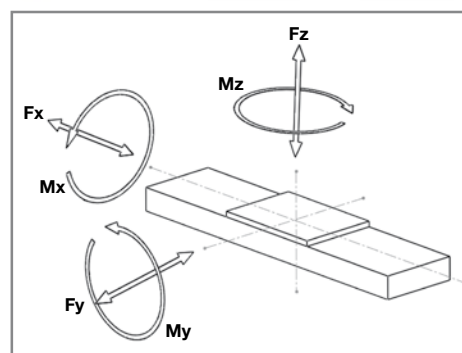
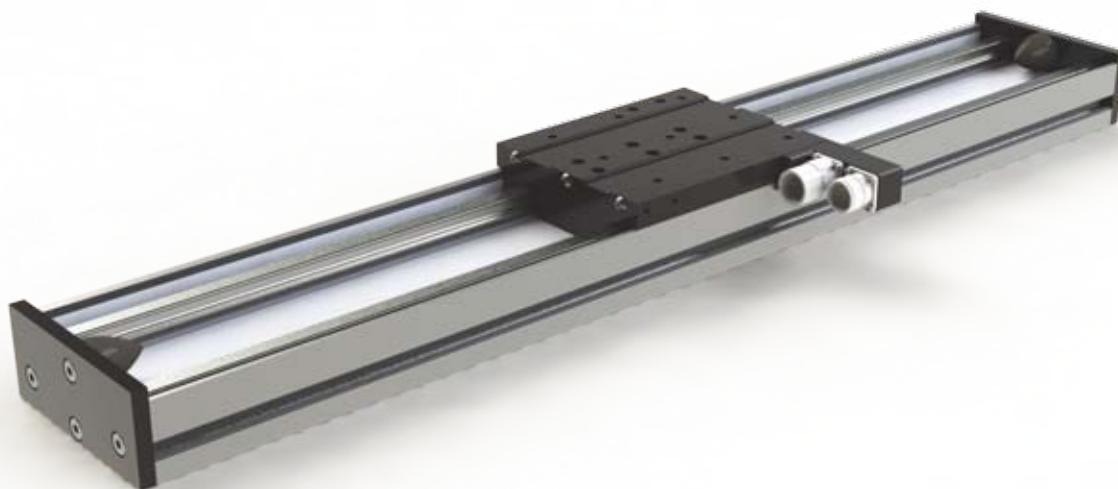
Accessories and spare parts

Technical guide

Order Code



Chapter 1 MLE linear units

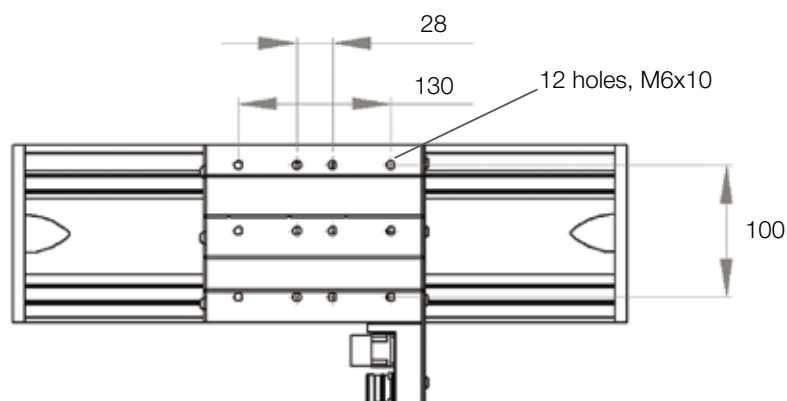
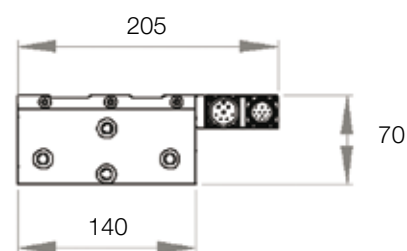
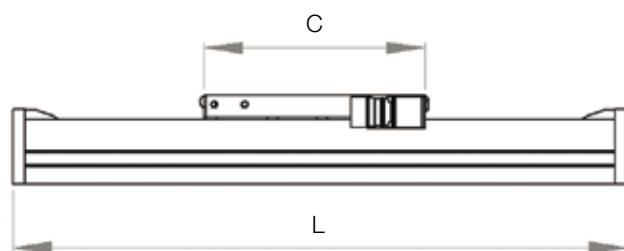


Maximum Length without joints: up to 4.000 mm
 Mounting position: as required
 For other code descriptions please see the "order code" chapter 5

Mechanical specifications

		MLE 30105		MLE 30210		MLE 30420	
		HS	HR	HS	HR	HS	HR
Linear motor features							
Maximum speed at 560Vdc	m/s				5		
Continuous force aircooled F_x ¹⁾	N		55		105		210
Peak force F_{xp}	N		105		210		420
Nominal current	A		1,6		3,1		6,0
Peak current	A		3,0		6,0		12,0
Guidance features							
F_y	N	1500	1500	1500	1500	1500	1500
F_z	N	1000	1000	1000	1000	1000	1000
M_x	Nm	180	180	180	180	180	180
M_y	Nm	200	280	280	320	320	400
M_z	Nm	200	280	280	320	320	400
Structure profile features							
Geometrical moments of inertia L_x	mm ⁴				3,72x10 ⁵		
Geometrical moments of inertia L_y	mm ⁴				55,58x10 ⁵		
Elastic module	N/mm ²				70000		
Weight of carriage							
Weight	kg	2,6	2,8	3,2	3,6	4	4,4
Weight of 100 mm	kg				1,5		

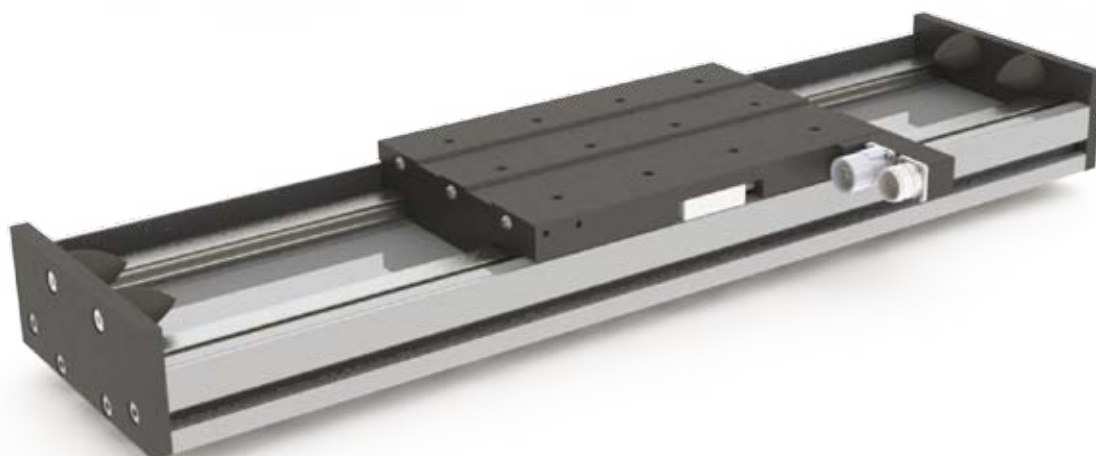
¹⁾ depending on application, cooling surface, air speed, and temperature



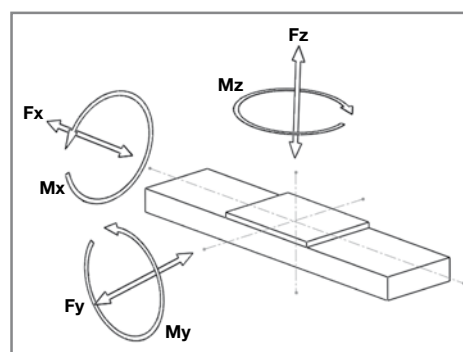
*Drawing only for reference, corresponds to the MLE 30210.
Please ask for ready 3D files.*

Choice of stroke

Stroke / Length		MLE 30105		MLE 30210		MLE 30420	
		S	R	S	R	S	R
L, mm	Code						
368	00368	148	104	104	-	-	-
464	00464	244	200	200	102	102	24
560	00560	340	296	296	198	198	120
608	00608	388	344	344	246	246	168
656	00656	436	392	392	294	294	216
704	00704	484	440	440	342	342	264
752	00752	532	488	488	390	390	312
800	00800	580	536	536	438	438	360
848	00848	628	584	584	486	486	408
944	00944	724	680	680	582	582	504
992	00992	772	728	728	630	630	552
1040	01040	820	776	776	678	678	600
1088	01088	868	824	824	726	726	648
1136	01136	916	872	872	774	774	696
1184	01184	964	920	920	822	822	744
1232	01232	1012	968	968	870	870	792
1328	01328	1108	1064	1064	966	966	888
1376	01376	1156	1112	1112	1014	1014	936
1424	01424	1204	1160	1160	1062	1062	984
1472	01472	1252	1208	1208	1110	1110	1032
1520	01520	1300	1256	1256	1158	1158	1080
1808	01808	1588	1544	1544	1446	1446	1368
2000	02000	1780	1736	1736	1638	1638	1560
2384	02384	2164	2120	2120	2022	2022	1944
2528	02528	2308	2264	2264	2166	2166	2088
2768	02768	2548	2504	2504	2406	2406	2328
2912	02912	2692	2648	2648	2550	2550	2472
3151	03151	2932	2888	2888	2790	2790	2712
3536	03536	3316	3272	3272	3174	3174	3096
Carriage C, mm		130	174	174	272	272	350



Maximum Length without joints: up to 4.000 mm
Mounting position: as required
For other code descriptions please see the "order code" chapter 5

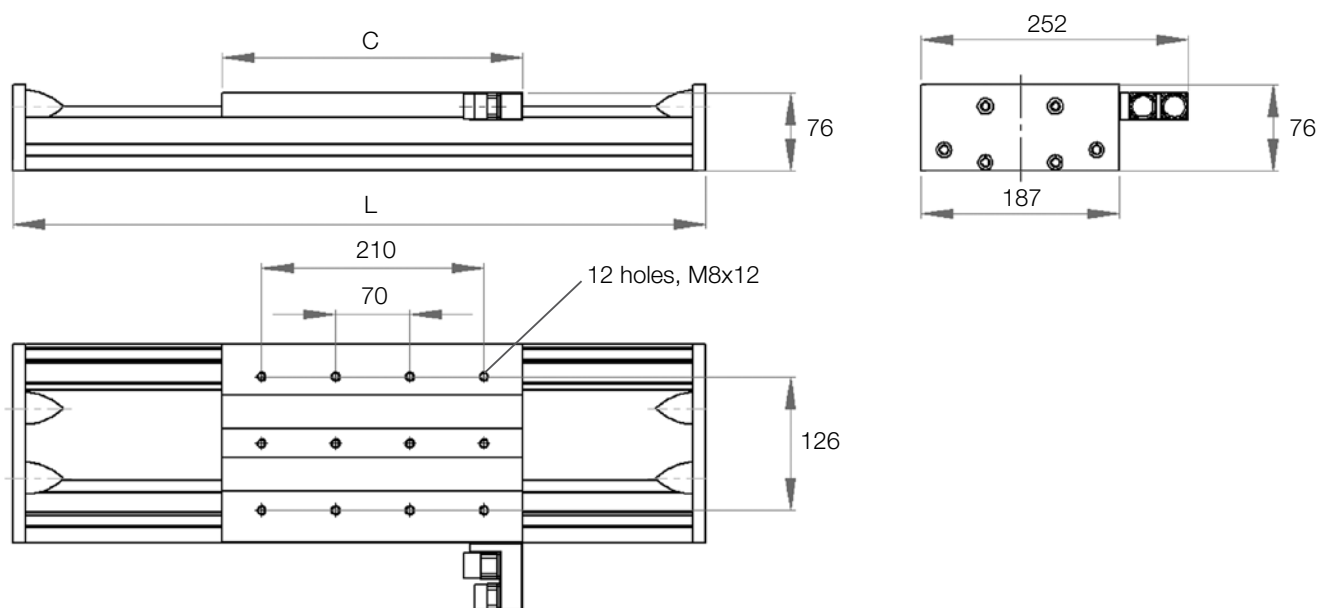


Mechanical specifications

		MLE 50400		MLE 50800		MLE 51000		MLE 51200		MLE 51600		
		S	R	S	R	S	R	S	R	S	R	
Linear motor features												
Maximum speed at 560Vdc	m/s						5					
Continuous force aircooled Fx ¹⁾	N	200		400		500		600		800		
Peak force Fxp	N	400		800		1000		1200		1600		
Nominal current	A	2,5		5,0		5,0		7,5		10,0		
Peak current	A	5,0		10,0		10,0		15,0		20,0		
Guidance features												
Fy	N	3000	3000	3000	3000	3000	4500	4500	4500	4500	4500	
Fz	N	2000	2000	2000	2000	2000	3000	3000	3000	3000	3000	
Mx	Nm	450	450	450	450	450	750	750	750	750	750	
My	Nm	600	700	700	750	750	1000	1000	1500	1500	2000	
Mz	Nm	600	700	700	750	750	1000	1000	1500	1500	2000	
Structure profile features												
Geometrical moments of inertia Lx	mm ⁴						5,6x10 ⁵					
Geometrical moments of inertia Ly	mm ⁴						144,63x10 ⁵					
Elastic module	N/mm ²						70000					
Weight of carriage												
Weight	kg	5	5,7	6,0	6,3	6,9	7,3	7,9	10	14	16	
Weight of 100 mm	kg						1,9					

¹⁾ depending on application, cooling surface, air speed, and temperature

Dimensions MLE 5



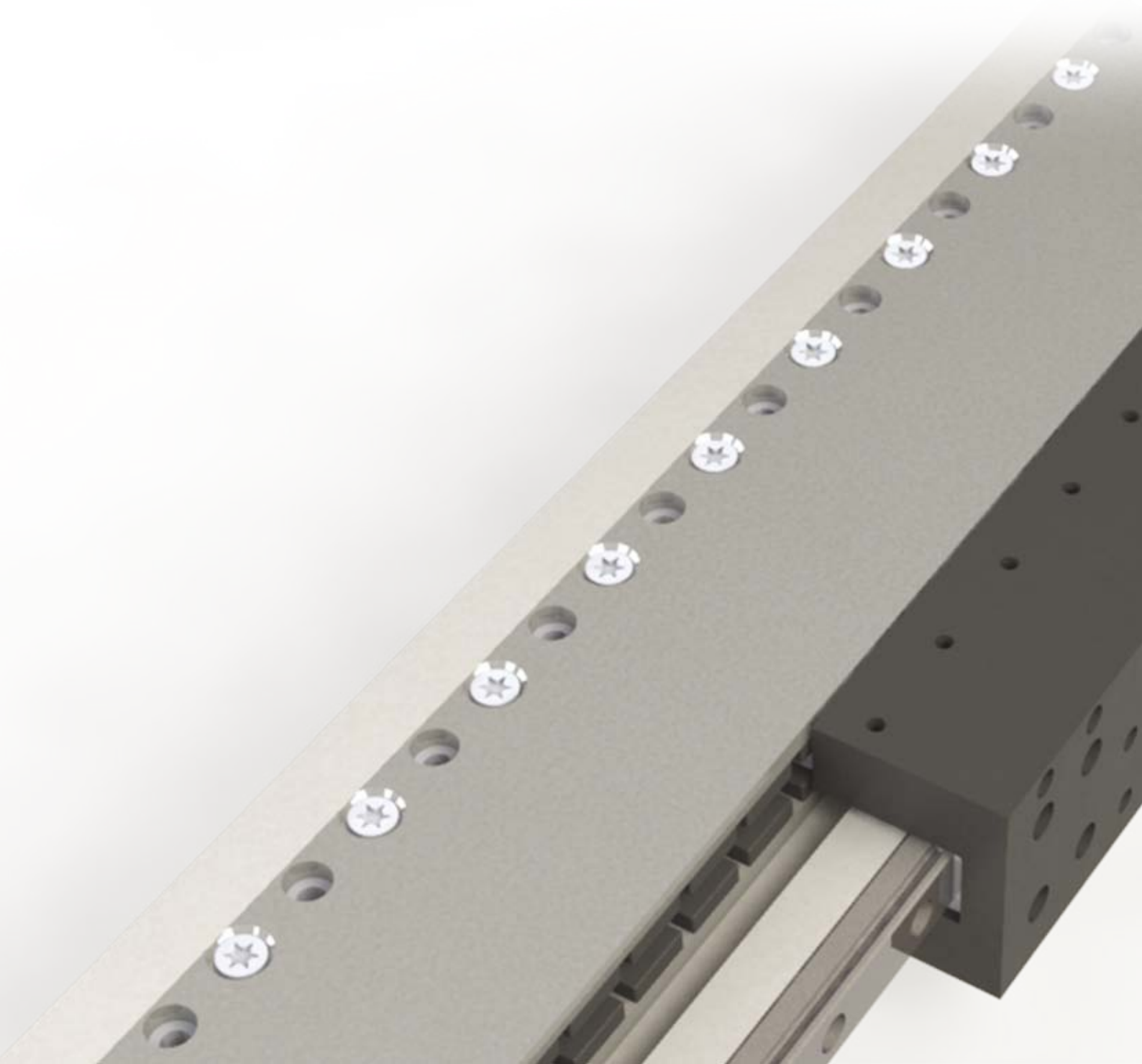
Drawing only for reference, corresponds to the MLE 50800. Please ask for ready 3D files.

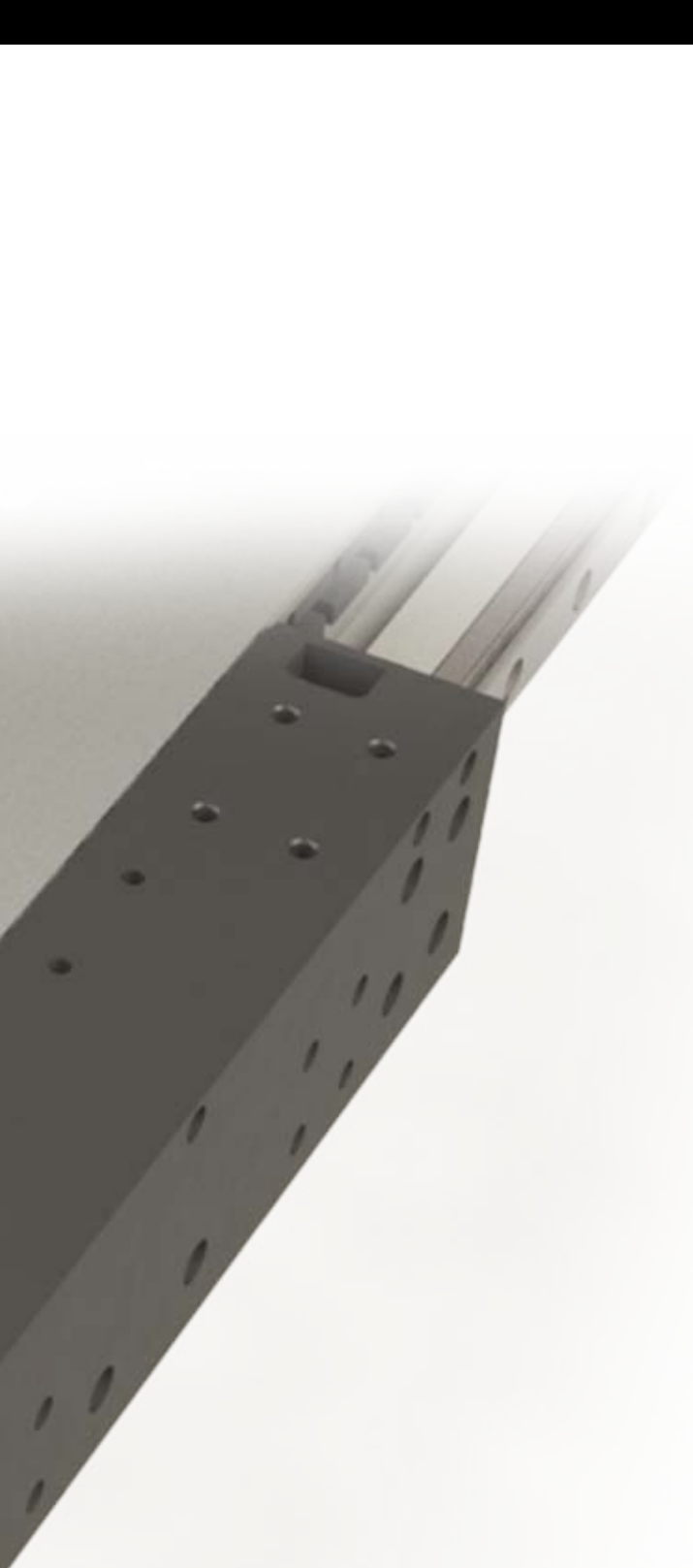
Choice of stroke

Stroke / Length		MLE 50400		MLE 50800		MLE 51000		MLE 51200		MLE 51600	
		S	R	S	R	S	R	S	R	S	R
L, mm	Code										
462	00462	116	84	84	34	34	-	-	-	-	-
558	00558	212	180	180	130	130	88	88	-	-	-
654	00654	308	276	276	226	226	184	184	52	52	-
750	00750	404	372	372	322	322	280	280	148	148	86
848	00848	500	468	468	418	418	376	376	244	244	182
942	00942	596	564	564	514	514	472	472	340	340	278
1038	01038	692	660	660	610	610	568	568	436	436	374
1134	01134	788	756	756	706	706	664	664	532	532	470
1230	01230	884	852	852	802	802	760	760	628	628	566
1326	01326	980	948	948	898	898	856	856	724	724	662
1422	01422	1076	1044	1044	994	994	952	952	820	820	758
1518	01518	1172	1140	1140	1090	1090	1048	1048	916	916	854
1614	01614	1268	1236	1236	1186	1186	1144	1144	1012	1012	950
1710	01710	1364	1332	1332	1282	1282	1240	1240	1108	1108	1046
1806	01806	1460	1428	1428	1378	1378	1336	1336	1204	1204	1142
1902	01902	1556	1524	1524	1474	1474	1432	1432	1300	1300	1238
1998	01998	1652	1620	1620	1570	1570	1528	1528	1396	1396	1334
2094	02094	1748	1716	1716	1666	1666	1624	1624	1492	1492	1430
2382	02382	2036	2004	2004	1954	1954	1912	1912	1780	1780	1718
2670	02670	2324	2292	2292	2242	2242	2200	2200	2068	2068	2006
2958	02958	2612	2580	2580	2530	2530	2488	2488	2356	2356	2294
3246	03246	2900	2868	2868	2818	2818	2776	2776	2644	2644	2582
3534	03534	3188	3156	3156	3106	3106	3064	3064	2932	2932	2870
3822	03822	3476	3444	3444	3394	3394	3352	3352	3220	3220	3158
Carriage C, mm		252	284	284	334	334	376	376	508	508	570

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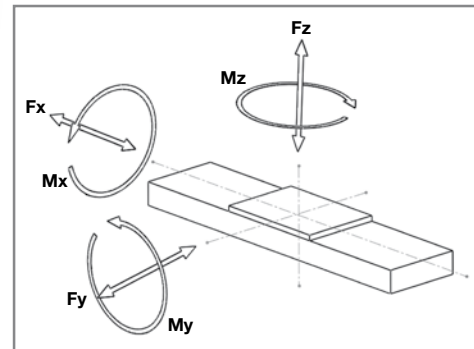
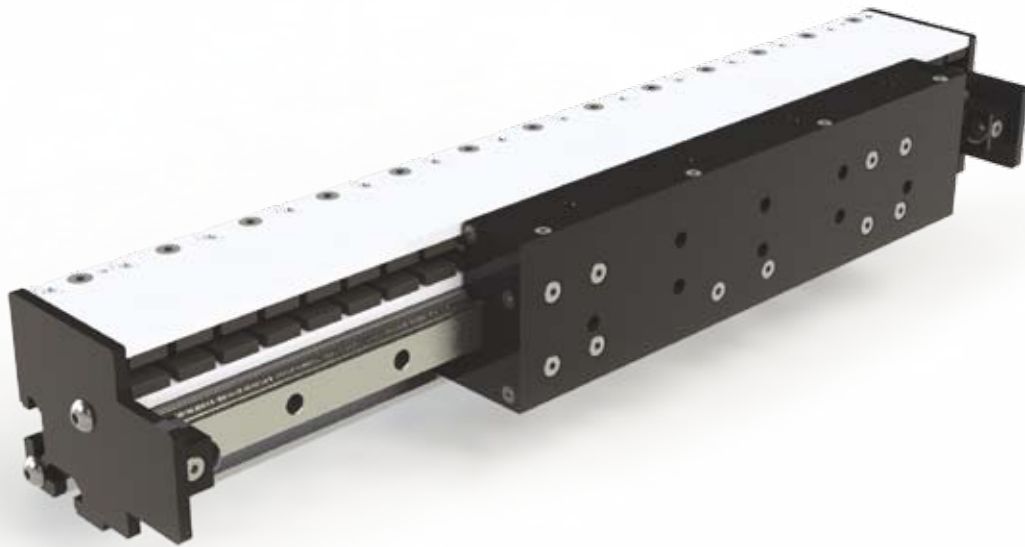
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Chapter 2 **MLU linear units**



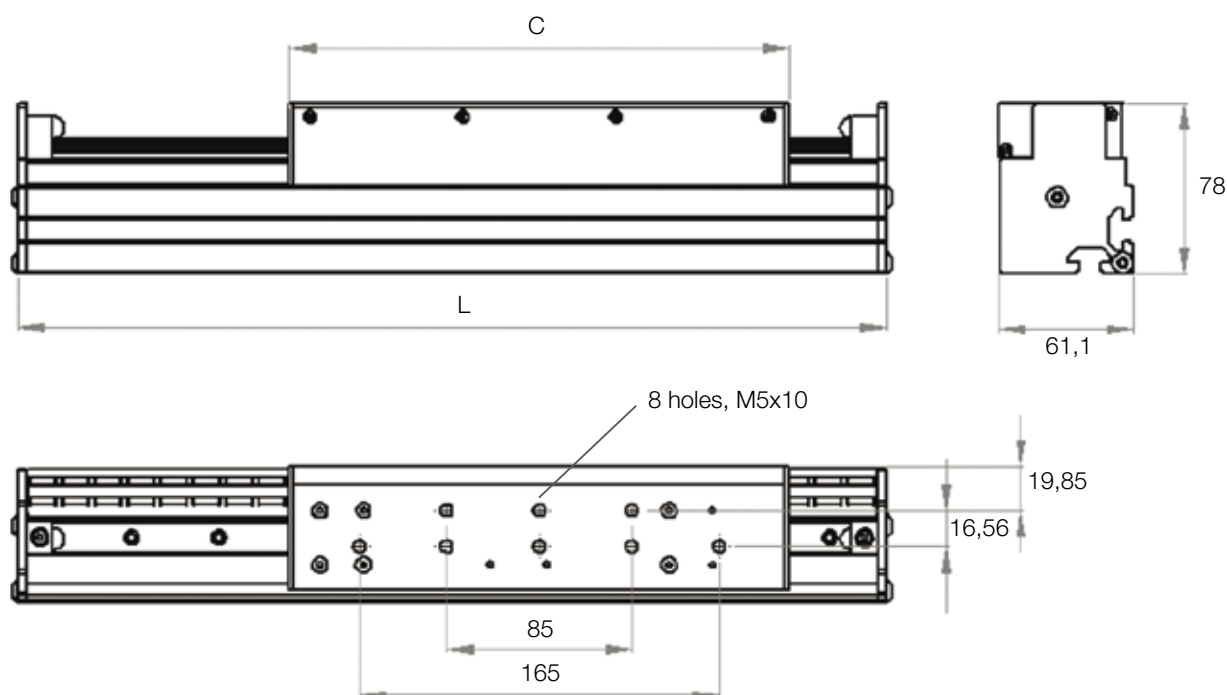
Maximum Length without joints: up to 3.000 mm
 Mounting position: as required
 For other code descriptions please see the "order code" chapter 5

Mechanical specifications

		MLU30100	MLU30200		MLU30300		MLU30400	
		R	S	R	S	R	S	R
Linear motor features								
Maximum speed at 300Vdc	m/s	5						
Continuous force aircooled F_x ¹⁾	N	29	58	87	116			
Peak force F_{xp}	N	100	200	300	400			
Nominal current	A	0,8	1,6	2,4	3,2			
Peak current	A	2,8	5,5	8,3	11,0			
Guidance features								
F_y	N	520	520	520	520	520	520	750
F_z	N	520	520	520	520	520	520	750
M_x	Nm	15	15	15	15	15	15	25
M_y	Nm	70	70	87	87	100	100	125
M_z	Nm	70	70	87	87	100	100	125
Structure profile features								
Geometrical moments of inertia L_x	mm ⁴	1,44x10 ⁵						
Geometrical moments of inertia L_y	mm ⁴	2,42x10 ⁵						
Elastic module	N/mm ²	70000						
Weight of carriage								
Weight	kg	0,6	0,65	1,0	1,5	1,6	2	2,4
Weight of 100 mm	kg	0,7						

¹⁾ depending on application, cooling surface, air speed, and temperature

Dimensions MLU 3



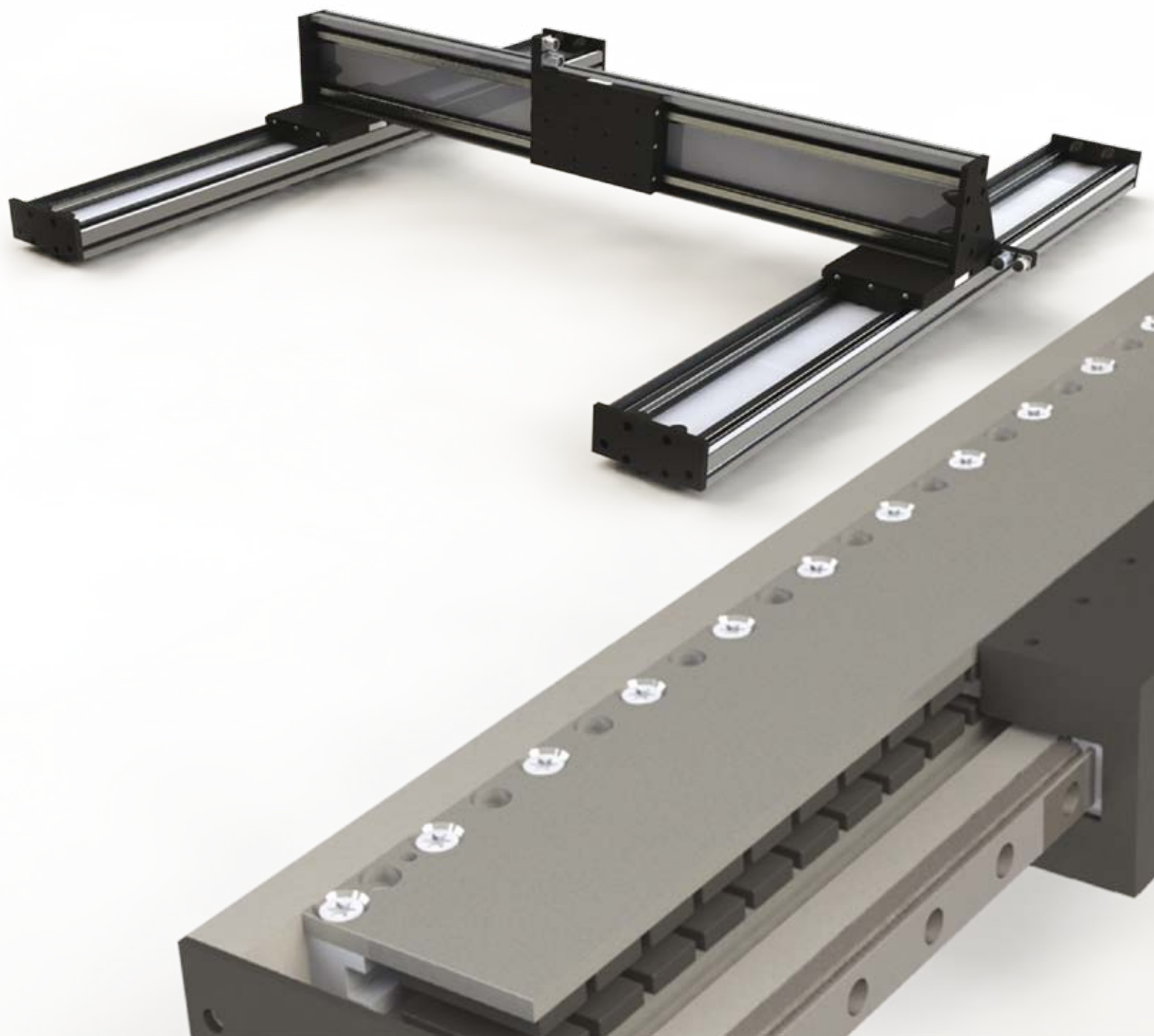
Drawing only for reference. Please ask for ready 3D files.

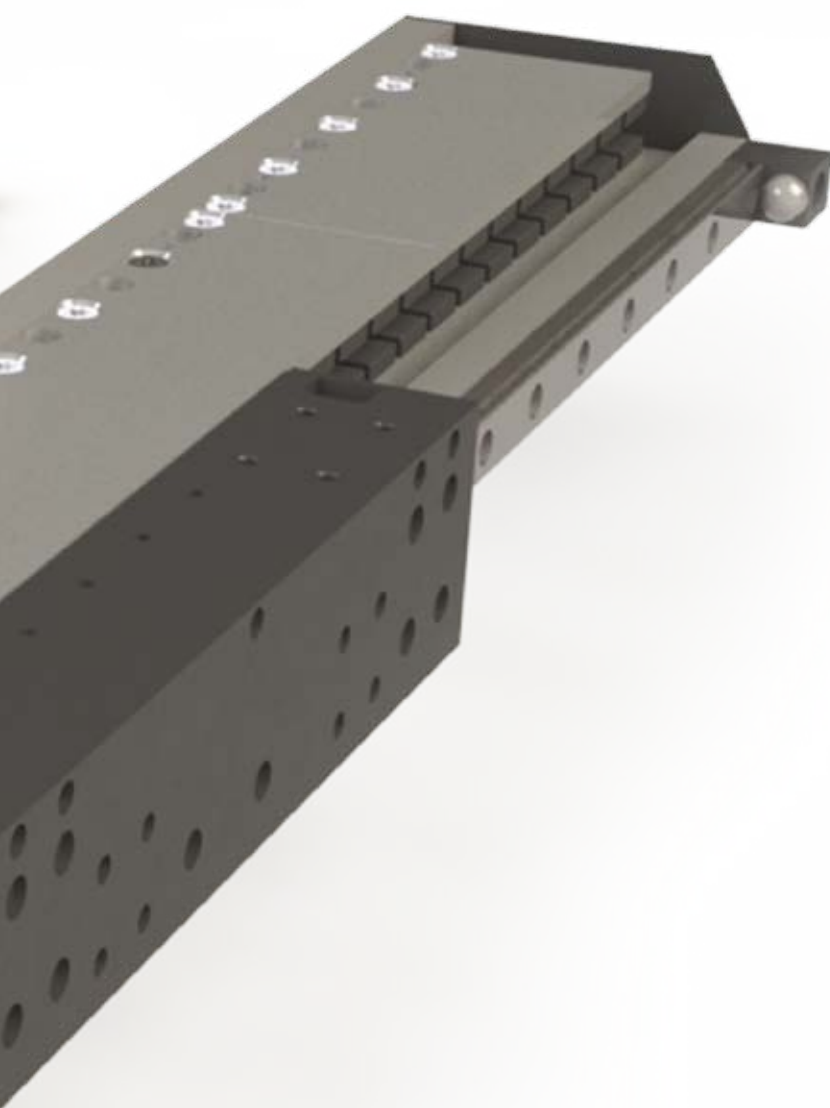
Choice of stroke

Stroke / Length		MLU30100		MLU 30200		MLU 30300		MLU 30400	
		R	S	R	S	R	S	R	
L, mm	Code								
308	00308	112	112	37	37	-	-	-	
398	00398	202	202	127	127	94	94	64	
458	00458	262	262	187	187	154	154	124	
548	00548	352	352	277	277	244	244	214	
698	00698	502	502	427	427	394	394	364	
788	00788	592	592	517	517	484	484	454	
848	00848	652	652	577	577	544	544	514	
938	00938	742	742	667	667	634	634	604	
1088	01088	892	892	817	817	784	784	754	
1178	01178	982	982	907	907	874	874	844	
1238	01238	1042	1042	967	967	934	934	904	
1338	01338	1132	1132	1057	1057	1024	1024	994	
1478	01478	1282	1282	1207	1207	1174	1174	1144	
1568	01568	1372	1372	1297	1297	1264	1264	1234	
1628	01628	1432	1432	1357	1357	1324	1324	1294	
1718	01718	1522	1522	1447	1447	1414	1414	1384	
1868	01868	1672	1672	1597	1597	1564	1564	1534	
Carriage C, mm		154	154	229	229	262	262	292	

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Accessories and spare parts

T-slot nut, M8



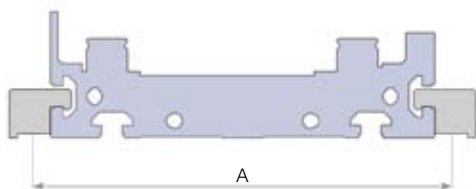
Sample Code: A02001-10
T-slot nut M8, pack 10 units

Angle Connector 40x40x40



Sample Code: A02101
Angle connector for screw M8

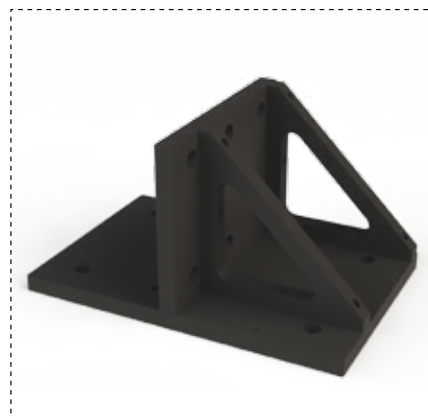
Mounting Set



Linear Unit	Part number	A
MLE3xxxxx	A02501	157
MLE5xxxxx	A02501	204

Sample Code: A02501
Mounting set (2 pieces)

Mounting Plate



Linear Unit	Part number
MLE3xxxxx	A022E3
MLE5xxxxx	A022E5

Sample Code: A022E3
Mounting plate for MLE 30210

Limit Switch



Description	Part number
Limit Switch set for MLE3	A00502-12
Limit Switch set for MLE5	A00502-11
Limit Switch set for MLU3	A00502-13
Limit Switch	A00502-10

Sample Code: A00502-11
Limit Switch set (2 pieces) for MLE50800

■ Carriage



Linear Unit	Part number
MLE3xxxx	A02C000
MLE5xxxx	B04C000
MLU3xxxx	C02C000

Sample Code: A02C000
 Standard carriage for MLE30210HS

■ Block



Linear Unit	Part number
MLE3xxxx	F0023XXXX302
MLE5xxxx	F0025XXXX302
MLU3xxxx	F0053XXXX302

Sample Code: F00230210302
 Block for MLE30210

■ Guide



Linear Unit	Part number
MLE3xxxx	F0023XXXX102
MLE5xxxx	F0025XXXX102
MLU3xxxx	F0053XXXX102

Sample Code: F00250800102-00750
 Guide for MLE50800-00750, 750 mm long

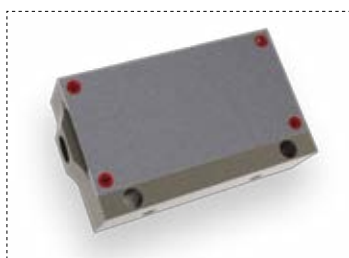
■ Measuring Tape



Linear Unit	Part number
MLE3xxxx	F002XXXXX113
MLE5xxxx	F002XXXXX113
MLU3xxxx	F002XXXXX113

Sample Code: F00250800113-00750
 Measuring tape for MLE50800-00750, 750 mm long

■ Measuring Sensor



Linear Unit	Part number
MLE3xxxx	F002XXXXX310
MLE5xxxx	F002XXXXX310
MLU3xxxx	F002XXXXX310

Sample Code: F00250800310
 Measuring sensor for MLE50800



Inquiry Form

Company:

Phone:

Contact person:

E-mail:

Application:

Number of axis:

Stroke for each axis:

Speed / Acceleration:

Repeatability:

Position: ☐ horizontal ☐ vertical ☐ inclined angle:

Complete cycle description

.....

Moments and forces to be supported on the carriage

Fy Fz Mx My Mz other:

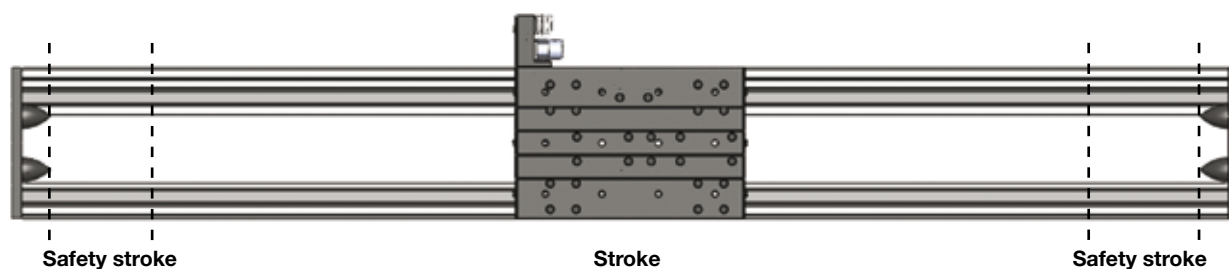
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Stroke calculation

The information about stroke provided in the catalogue does not include a safety stroke or the stroke needed for endswitching. For units with endswitches please subtract 100 mm from the stroke (50 mm on each side, minimum is 30 mm on each side).

The length of the safety stroke (stroke needed to stop carriage in case of errors or in case of going over the electronic limits) may depend on the speed and load. For an axis with a speed faster than 3 m/s, we suggest adding around 200 mm (100 mm for each end), and 100 mm (50 mm for each end) in applications with a speed under 2-3 m/s. For applications with a speed under 1 m/s a safety stroke is not needed.

Thanks to the special design of the mechanical end limits, MLE and MLU units can support big forces on the end blocks but they are designed to support these forces only in emergency cases and not in continuous use. If your application requires end blocks for prolonged usage (for example with gas cylinders) please contact our technical department.



Limits Switches

For different applications to ensure end limits you can choose mechanical switches. All MLE and MLU linear units integrate a “zero” signal by default.

Protection

In order to provide additional protection against external particles and dust, you can take the covered version. A specially designed steel profile protects the linear unit and offers more safety and durability.

In case of humidity environments, chrome protected linear guides and stainless screws are available. The stainless linear guides are available as standard solutions only for MLU units.

Lubrication

In order to ensure a long life to your application, the linear guides have to be lubricated after stroke of 1.000 - 2.000 km. If you need it, you can use a special option with forced lubrication to arrive up to 40.000 km.

Incremental Measuring Systems

In order to provide very smooth movement and to avoid jitters, you can choose measuring systems with 20 or 40 μm period. 1Vpp signal (sin/cos) helps you achieve very good positioning and excellent repeatability (up to $\pm 1 \mu\text{m}$). The output signal allows to find phase commutation and can be interpreted by all servoamplifiers on the market.

For semiabsolute positioning you can use reference coded marks integrated in the linear scale. With a short movement (less than 240 mm) the controller reads the absolute position of the carriage. This solution is recommended for a long axis or an axis with several carriages to avoid collisions.

Absolute measuring systems

For absolute positioning you can choose 100% absolute system with SSI protocol (1Vpp output is included too). The use of absolute measuring systems, where the current position immediately after power on is available, offer high security. You have actual position without the usual reference runs. The use of absolute measuring systems is especially advantageous for direct drives. When switching on the current position the commutation offset is immediately known and the motor can control immediately and is held in the control loop. Critical operating conditions, such as when switching on a direct drive on vertical applications or feeding after emergency stop, will be safely controlled. This solution is recommended for a long axis or an axis with several carriages to avoid collisions.

Incremental measuring system features

Signal period	μm	20 or 40
Signal output		1 Vpp
Repeatable	μm	± 1
Absolute accuracy	$\mu\text{m/m}$	± 10
Supply voltage	V	5
Supply current	mA	220

Absolute measuring system features

Signal period	μm	40
Signal output		1 Vpp+SSI
Repeatable	μm	± 1
Absolute accuracy	$\mu\text{m/m}$	± 10
Supply voltage	V	5
Supply current	mA	350

MLE Motor Data

MLE 3XXXXX

		MLE 30105N	MLE 30210N	MLE 30420N
Motor pitch	mm		24	
Maximum voltage ph-ph	V		600	
Continuous current	A	1,6	3,1	6,2
Peak current	A	3	6	12
Max. Power loss	W	55	110	220
Motor force constant ¹⁾	N/A	39	39	39
Back EMF	V/m/s		32	
Motor constant ²⁾	N ² /W	90	180	380
Resistance per phase ²⁾	Ω	5,6	2,8	1,33
Induction per phase	mH	35	18	8,6
Electrical time constant ²⁾	ms		6,5	
Thermal resistance	°C/W	1,4	0,7	0,38
Thermal time constant	s		75	
Temperature sensor		PTC 1 kΩ and KTY 21		

MLE 5XXXXX

		MLE 50400N	MLE 50800N	MLE 51000N	MLE 51200N	MLE 51600N
Motor pitch	mm			24		
Maximum voltage ph-ph	V			600		
Continuous current	A	2,5	5	5	7,5	10
Peak current	A	5	10	10	15	20
Max. Power loss	W	155	310	370	453	620
Motor force constant ¹⁾	N/A	93	93	112	93	93
Back EMF	V/m/s			76		
Motor constant ²⁾	N ² /W	370	740	970	1140	1480
Resistance per phase ²⁾	Ω	7,8	3,9	4,3	2,5	1,9
Induction per phase	mH	60	30	35	19	15
Electrical time constant ²⁾	ms			7,5		
Thermal resistance	°C/W	0,48	0,24	0,2	0,16	0,12
Thermal time constant	s			77		
Temperature sensor		PTC 1 kΩ and KTY 21				

MLU 3XXXXX

		MLU 30100N	MLU 30200N	MLU 30300N	MLU 30400N
Motor pitch	mm			30	
Maximum voltage ph-ph	V			300	
Continuous current	A	0,8	1,6	2,4	3,2
Peak current	A	2,8	5,5	8,3	11
Max. Power loss	W	47	95	142	190
Motor force constant ¹⁾	N/A			36,3	
Back EMF	V/m/s			30	
Motor constant ²⁾	N ² /W	24	48	71	95
Resistance per phase ²⁾	Ω	18,5	9,3	6,2	4,6
Induction per phase	mH	6	3	2	1,5
Electrical time constant ²⁾	ms			0,35	
Thermal resistance	°C/W	1,8	0,9	0,6	0,45
Temperature sensor		PTC 1 kΩ and KTY 21			

¹⁾ I < 0,6 I_p

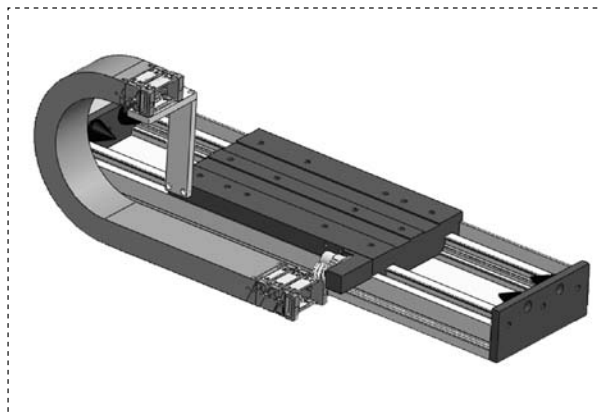
²⁾ at 25°C

■ Power chain

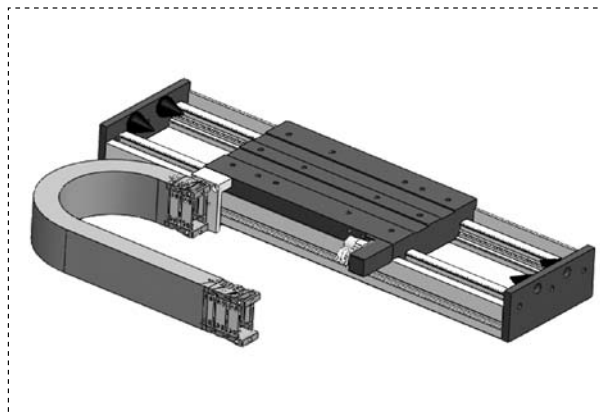
In order to provide the best and most comprehensive solution for your application, the linear units integrate power chains with different internal sections and a lot of mounting possibilities. You can save a lot of time and money, because you don't need to design special pieces for it.

■ Mounting possibilities

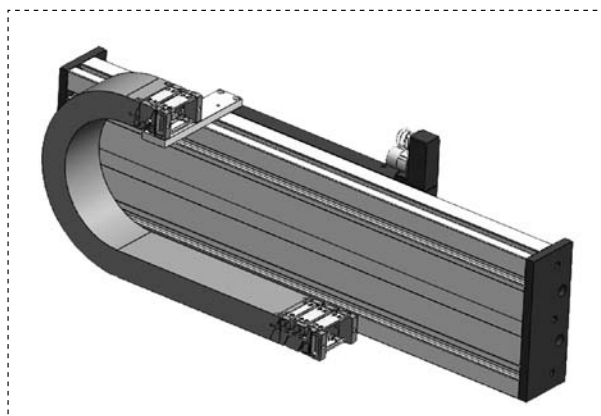
H - horizontally mounted



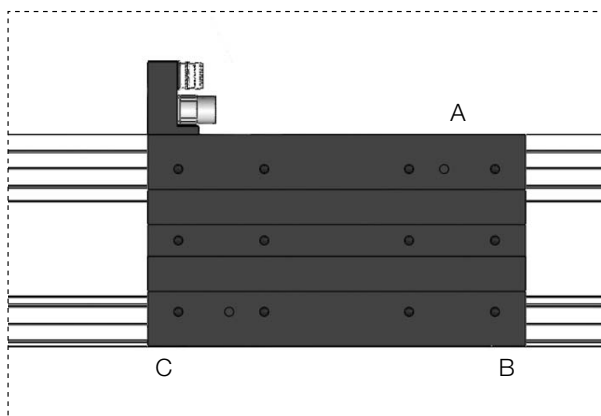
V - vertically mounted



S - side mounted

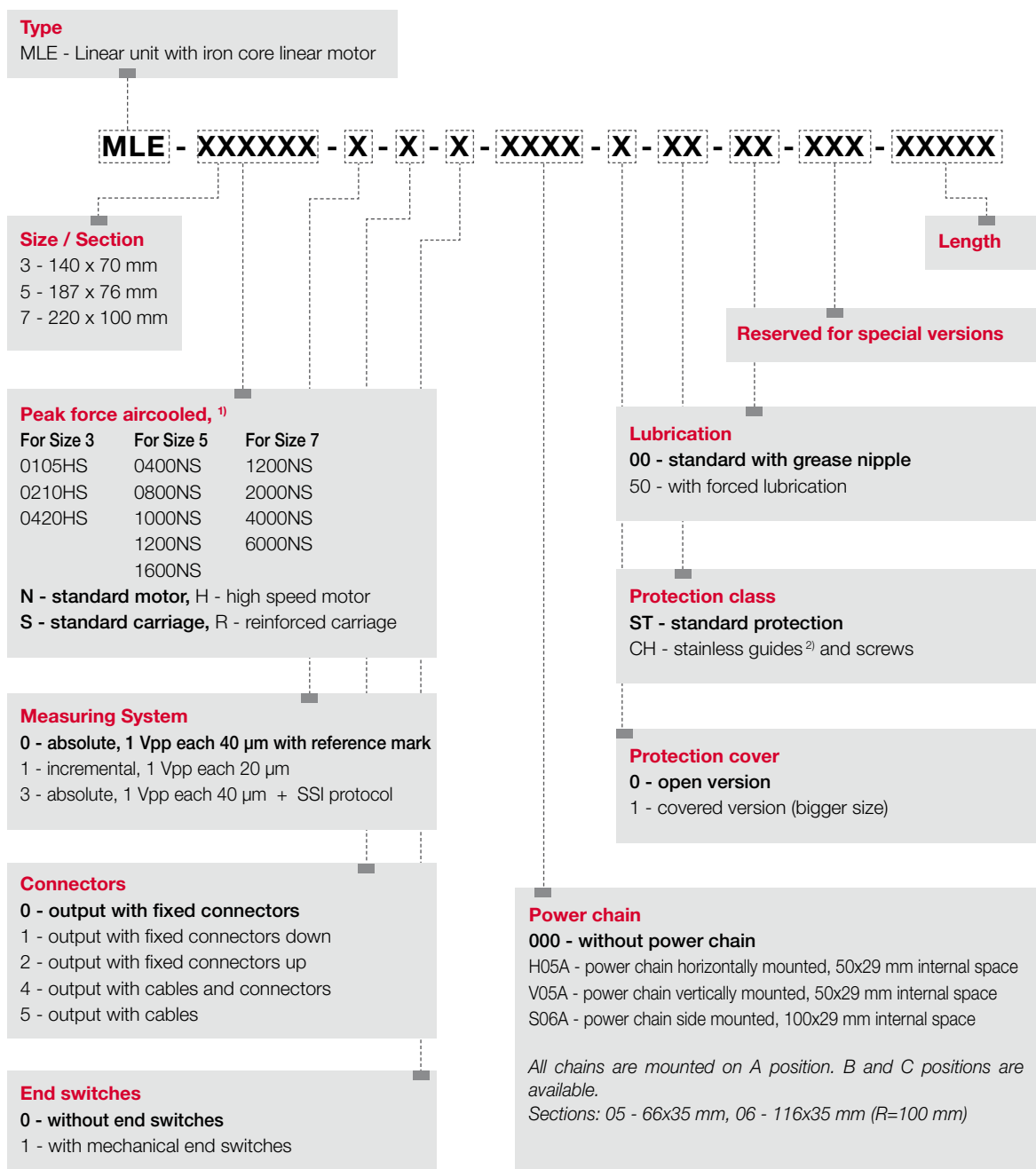


■ Mounting position



Chapter 1	MLE linear units
Chapter 2	MLU linear units
Chapter 3	Accessories and spare parts
Chapter 4	Technical guide
Chapter 5	Order Code

Chapter 5
Order Code



Code description for MLE units

Example 1:

MLE-50800NS-0-1-1-0000-0-ST-00-000-02382, Linear unit with integrated linear motor, size 5 with 187x76 mm section, standard linear motor 800 N peak force, standard carriage, 40 µm period measuring system, output with cable and connectors down, with mechanical endswitches, without power chain, open version without cover, standard protection, incorporated grease nipples, length 2382 mm, stroke 2004 mm.

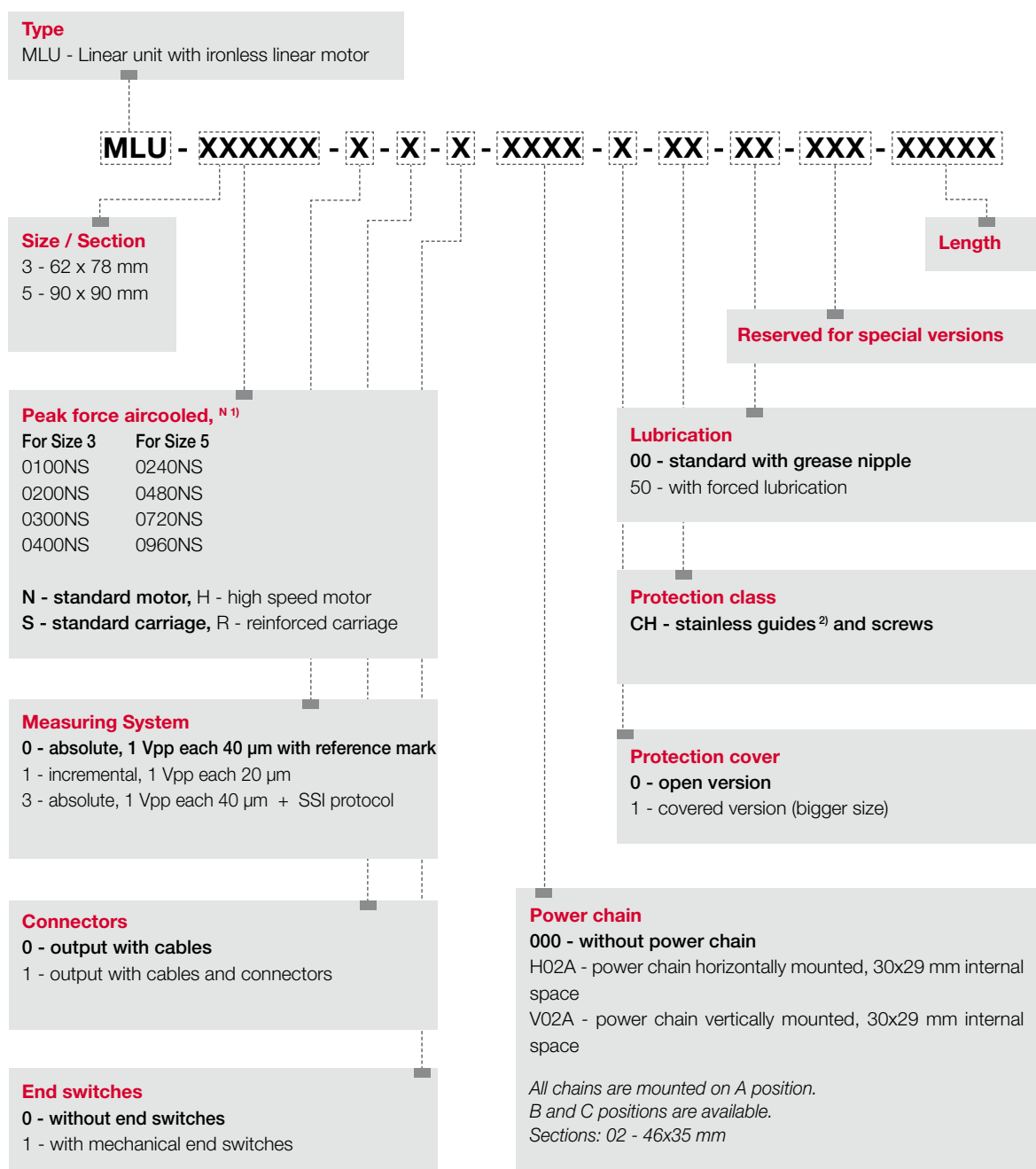
Example 2:

MLE-30210NR-1-0-0-H05A-1-CH-50-0-000-03536, Linear unit with integrated linear motor, size 3 with 140x70 mm section, standard linear motor 210 N peak force, reinforced carriage, 20 µm period measuring system, output with fixed connectors, without endswitches, with flat mounted power chain size 5 mounted on A position with 50x27 mm internal section, covered version, with stainless screws and chrome protected guides, incorporated forced lubrication oil supply, length 3536 mm, stroke 3272 mm.

¹⁾ Depends on cooling surface, air temperature and air flow speed

²⁾ Guides are chrome protected (black chromed). Stainless steel guides only on special request.

³⁾ Standard version is marked in bold



Code description for MLU units

Example 1:

MLU-30200NS-0-0-0-0000-0-CH-00-000-00788, Linear unit with integrated linear motor, size 3, standard linear motor 200 N peak force, standard carriage, 40 µm period measuring system, output with cables, without mechanical endswitches, without power chain, open version without cover, rail, carriage and balls made of stainless steel, incorporated grease nipples, length 788 mm, stroke 592 mm.

¹⁾ Depends on cooling surface, air temperature and air flow speed

²⁾ Guides, steel body of carriage and balls are made of stainless steel.

ELEKTROMECHANISCHE HUBZYLINDER

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M100 Hubzylinder Grundmodell



M205 Hubzylinder mit Planetengetriebe



M501 Hubzylinder mit Zahnriementrieb



M505 Hubzylinder mit Kegelradgetriebe



M601 Hubzylinder mit Schneckengetriebe



M605 Hubzylinder mit Direktantrieb