

Synchronous Linear Motors L1S Series



- NeFeB magnets for optimized peak force to mass ratio
- Different voltage constants for DC bus voltages of 560 V_{DC} or 330 V_{DC}
- All motor parts completely encapsulated for excellent protection
- Peak forces from 135 N up to 7500 N for a large variety of applications
- Water-cooling for increased continuous performance requirements (optional)
- Perfectly controllable due to low electrical time constants
- Simple and cost-effective design due to modular concept
- Integrated thermal overload protection against machine failures
- Modular design of magnetic ways for simple usage and installation
- Highly flexible, shielded cable for easy electrical connection

Rugged Design

The simple and cost-effective design of our linear motors provides a 100% duty cycle. Their ruggedness and reliability distinguishes them for continuous operation even under extreme ambient conditions. Highly flexible EMC cables instead of expensive connectors result in cost reduction and minimum space requirements. The integration of the thermo switch connector into the motor cable additionally reduces cabling efforts.

Due to its vacuum encapsulation the slide is fully protected (IP 55) even without any costly housing. The herewith achieved weight reduction even enlarges the already existing high acceleration capability. A complete encapsulation of the magnetic ways avoids damages of the magnets during mounting and operation.

All these features stand for a high quality, field optimized and nevertheless easy-to-handle linear drive.

Extended Performance Range

Development and design of the new L1S series are based on the sound experience of the successful LS series. The additional optimization results in the following improvements:

Up to 50 % higher peak force and 30 % higher continuous force at the same frame size and outer dimensions compared to the former LS series motors.

At the same time the range of available frame sizes has been enlarged. The new range covers synchronous linear motors with forces from 135 N up to 7500 N and offers a perfect solution for almost every drive task.

The combination of several slides on one magnetic way allows the realization of multi-axis applications as well as a force multiplication with coupled slides.

Seven frame sizes, each of them at least available in two slide lengths, enable the choice of a perfect motor even under difficult mechanical mounting conditions.

A balanced selection of voltage constants for DC bus voltages of either 330 V_{DC} or 560V_{DC} allows an ideal combination of thrust force (motor size) and power at minimized costs depending on the individual machine concept and the requested amplifier.

The optional water-cooling allows an increase of the continuous power of up to 100 % and prevents any unintentional expansion of the machine body by keeping the temperature at the machine-motor-interface on a constant level.

Modular Concept

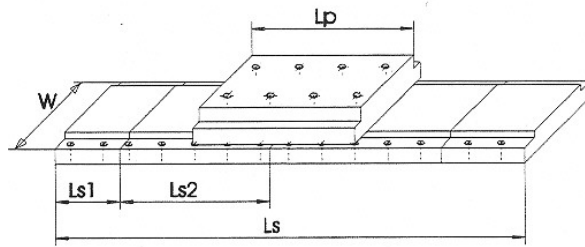
The modular conception of the synchronous linear motors offers a great variety of combinations and enables easy mounting.

The requested thrust force is achieved by combining suitable a slide length with an appropriate width of the magnetic way. The necessary effective stroke is realized by putting together several magnetic ways which are available in three different lengths (see also figure).

Due to this modular construction the magnet material can be reduced to the quantity which is really necessary for the realization of the requested effective stroke. Furthermore the easy handling of the short elements simplifies the mounting of the motor. All together the modular concept results in a substantial cost reduction.

If you should not be able to find a suitable drive combination out of our standard components our team will be pleased to assist you in finding the perfect solution for your application.

Modular Design



$$T = \sum L_{sn} - L_P$$

- L_p = slide length
- L_{s1} = length of magnetic way 1
- L_{s2} = length of magnetic way 2
- W = width of magnetic way
- T = effective stroke
- ∑ L_{sn} = sum of all magnetic way lengths

Technical Data

Mechanical Data

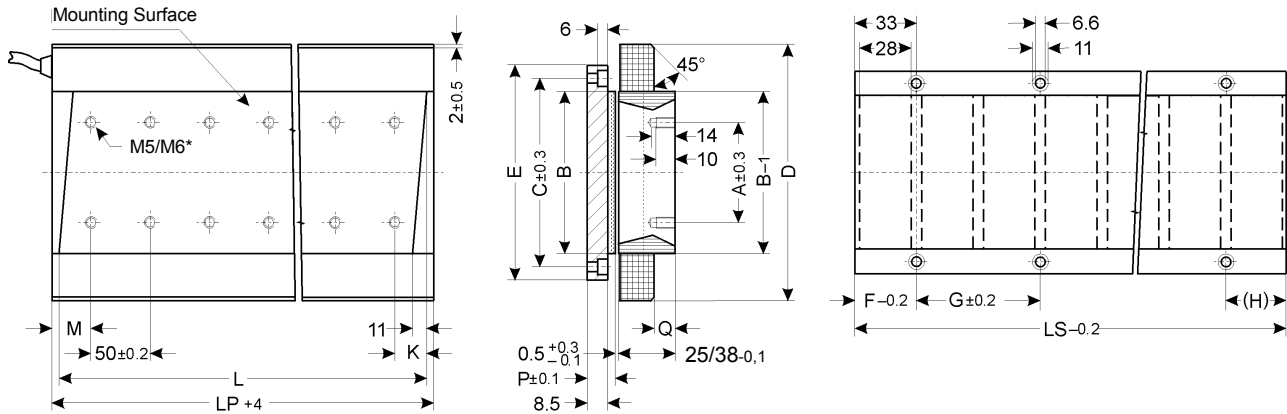
		L1S025P-1108-EL	L1S050P-1708-KL	L1S050P-2608-GL	L1S075P-3208-KL	L1S080P-4111-NH	L1S120P-4711-LH	L1S160P-6511-RH
Peak Force	F _{PEAK} N	135	460	725	1400	2400	4200	7200
Continuous Force (without cooling)	F _{NC} N	30	80	130	240	450	1000	2200
Continuous Force (water cooling)	F _{WC} N	-	240	370	620	1000	2050	4500
Attraction Force	F _A N	440	1400	2250	4000	5600	11000	24000
Max. Acceleration	A _{MAX} m/s ²	260	353	345	400	177	195	194
Max. Ambient Temperature	T _{umax} °C	40	40	40	40	40	40	40
Mech. Air Gap (-0,1; +0,3)	δ _{MECH} mm	0,4	0,4	0,4	0,5	0,5	0,5	0,5
Protection Class		IP55	IP55	IP55	IP55	IP55	IP55	IP55

Electrical Data

DC Bus Voltage	U _Z V _{DC}	330	330	330	330	560	560	560
Max. Speed without Load	V ₀ m/s	9,0	4,0	5,2	3,6	3,3	4,6	1,8
Back EMF Constant	K _E Vsm ⁻¹	18,4	41,5	32,6	47,5	97,1	70,9	181,9
Force Constant	k _F N/A	34,1	70,0	57,5	88,6	176,5	125,0	310
Max. Current	I _{PEAK} A	5,5	7,0	17,0	22,0	16,0	41,0	30,0
Continuous Current (without cooling)	I _{NC} A	0,78	1,0	2,0	2,4	2,4	8,4	6,3
Continuous Current (water cooling)	I _{WC} A	-	3,1	5,5	6,6	5,6	16,6	12,6
Insulation Class		F	F	F	F	F	F	F

further types available upon request

Mechanical Dimensions



all sizes in mm, 45° angle only on motors size L1S080/120/160
 * M5 for motor size L1S025/050/075, M6 for motor size L1S080/120/160

		A	B	C	D	E	F	G	H	K	L	LP	LS	M	P	Q	Weight (kg)
L1S025P-1108-EL-X0	Slide	15	25		70					14	88	94		17		6.2	0,52
L1S025S-0624	Magnetic Ways		25	42		56	24	48	24				144		12		0,6
L1S025S-0824			25	42		56	24	48	24				192		12		0,8
L1S025S-1024			25	42		56	24	48	24				240		12		1,0
L1S050P-1708-KL-X0	Slide	30	50		95					18	136	142		21		6.2	1,3
L1S050S-0624	Magnetic Ways		50	66		80	24	48	24				144		12		0,85
L1S050S-0824			50	66		80	24	48	24				192		12		1,14
L1S050S-1024			50	66		80	24	48	24				240		12		1,42
L1S050P-2608-GL-X0	Slide	30	50		95					29	208	214		32		6.2	2,0
L1S050S-0624	Magnetic Ways		50	66		80	24	48	24				144		12		0,85
L1S050S-0824			50	66		80	24	48	24				192		12		1,14
L1S050S-1024			50	66		80	24	48	24				240		12		1,42
L1S075P-3208-KL-X0	Slide	35	75		120					28	256	262		31		6.2	3,5
L1S075S-0624	Magnetic Ways		75	92		106	24	48	24				144		12		1,21
L1S075S-0824			75	92		106	24	48	24				192		12		1,62
L1S075S-1024			75	92		106	24	48	24				240		12		2,0
L1S080P-4111-NH-X0	Slide	40	80		140					25,5	451	456		28		8.2	13,2
L1S080S-0633	Magnetic Ways		80	98		114	33	66	33				198		14		2,2
L1S080S-0833			80	98		114	33	66	33				264		14		2,96
L1S080S-1033			80	98		114	33	66	33				330		14		3,7
L1S120P-4711-LH-X0	Slide	60	120		180					33,5	517	523		36,5		8.2	21,5
L1S120S-0633	Magnetic Ways		120	138		154	33	66	33				198		14		3,06
L1S120S-0833			120	138		154	33	66	33				264		14		4,13
L1S120S-1033			120	138		154	33	66	33				330		14		5,16
L1S160P-6511-RH-X0	Slide	80	160		230					32,5	715	720		35		8.2	37,0
L1S160S-0633	Magnetic Ways		160	178		194	33	66	33				198		14		4,0
L1S160S-0833			160	178		194	33	66	33				264		14		5,92
L1S160S-1033			160	178		194	33	66	33				330		14		7,4

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subject to change without notice