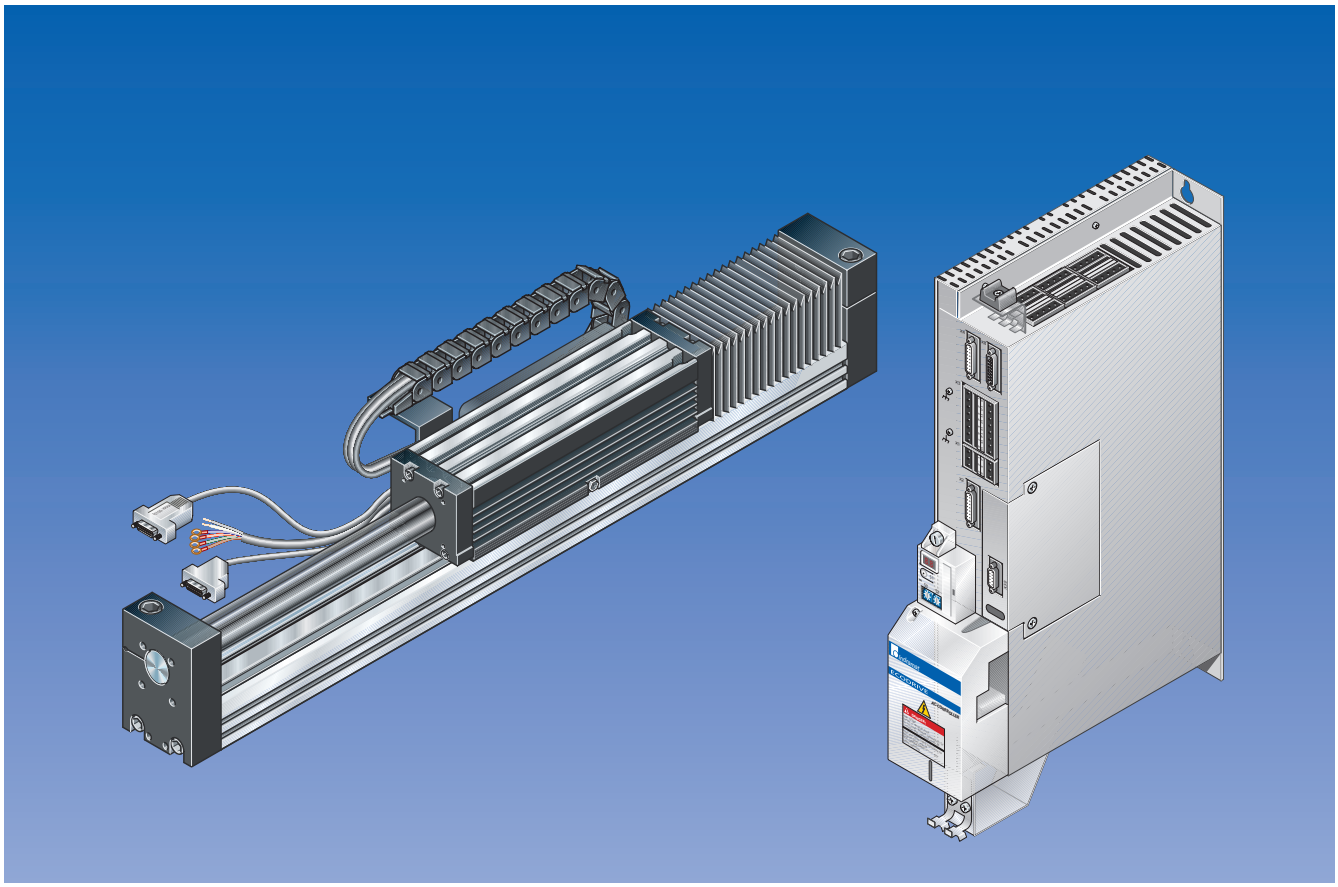
engineering
mannesmann
Rexroth



STAR – Linear Modules LKL
open type

Back to Overview

RE 82 425/2000-02

Rexroth
STAR
Star

STAR – Linear Motion Technology

Ball Rail Systems	Standard Ball Rail Systems	
	Ball Rail Systems with Aluminum Runner Blocks	
	Super Ball Rail Systems	
	Wide Ball Rail Systems	
	Accessories	
	Miniature Ball Rail Systems	
	Cam Roller Guides	
Roller Rail Systems		
Linear Bushings and Shafts	Linear Bushings	
	Linear Sets	
	Shafts	
	Shaft Support Rails	
	Shaft Support Blocks	
	Ball Transfer Units	
	Other Engineering Components	
Screw Drives		
Linear Motion Systems	Linear Motion Slides	• Ball Screw Drive • Toothed Belt Drive
	Linear Modules	• Linear Motor
		• Toothed Belt Drive • Rack and Pinion Drive • Pneumatic Drive • Ball Screw Drive
	Compact Modules	• Ball Screw Drive
	Precision Modules	• Ball Screw Drive
	Ball Rail Tables	• Ball Screw Drive • Linear Motor
	ALU-STAR Profile System	
	Controllers, Motors, Electrical Accessories	
	Linear Actuators	

Linear Modules LKL, open type

STAR – Linear Modules LKL, open type
Product Overview

Take the direct route to success: our Linear Module with Linear Motor!

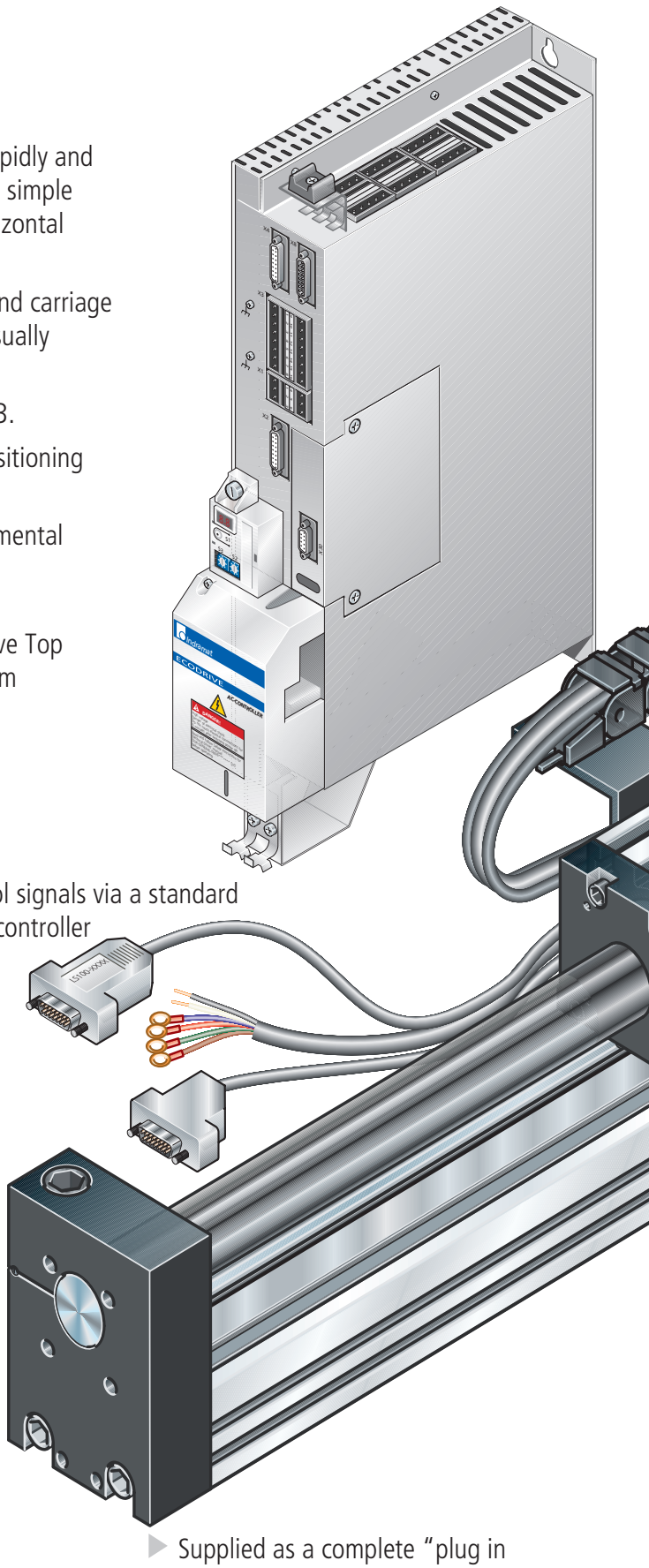
Linear Modules LKL will help you to solve linear motion tasks rapidly and cost-effectively in a wide variety of different applications – from simple single-axis systems to complex multi-axis configurations for horizontal operation.

The combination of synchronous linear motor, ball rail system and carriage substantially reduces the complexity of mechanical structures usually needed for a linear motion axis.

The system is controlled via a standard servo controller DKC**.3.

This controller is available with analog, stepping motor, and positioning interfaces, or with a Sercos interface or fieldbus interfaces.

As an option, linear modules LKL can be supplied with an incremental linear encoder.



▶ Convenient Drive Top start-up program

▶ Control signals via a standard servo controller

▶ Cost savings through shorter cycle times

▶ Supplied as a complete "plug in and go" linear module with matching servo amplifier

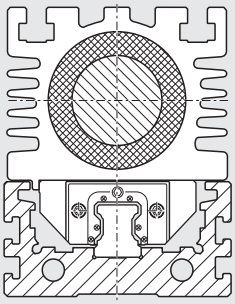
Application examples:
(preferably for horizontal operation)

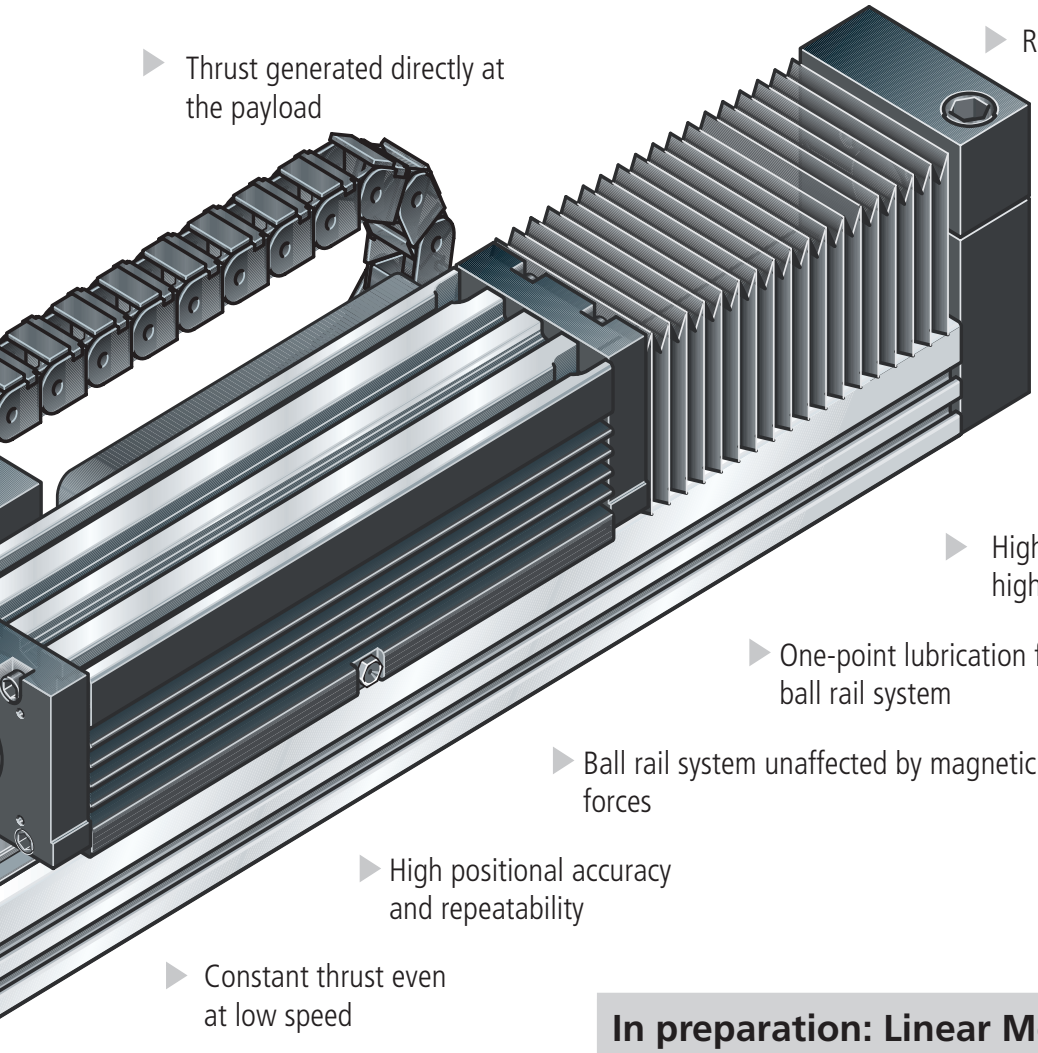
- Factory automation systems
- Medical and biomedical equipment
- Scanning and printing systems
- Electronics and the packaging industry

Not suitable for machining of ferrous materials.

Mounting instructions:
See RDEFI 82 473

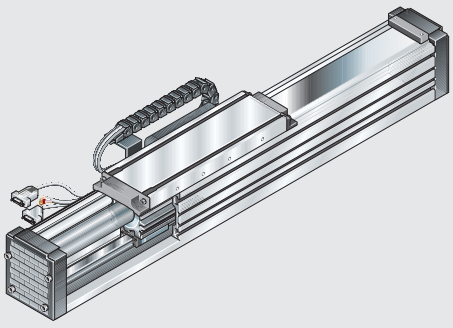
Linear Module LKL

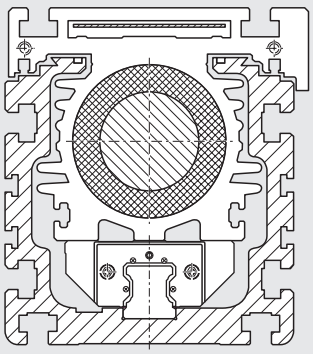




- Thrust generated directly at the payload
- Rapid implementation
- Silent operation
- High speed range, high dynamic response
- One-point lubrication for ball rail system
- Ball rail system unaffected by magnetic forces
- High positional accuracy and repeatability
- Constant thrust even at low speed

In preparation: Linear Module MKL 20-110





STAR – Linear Modules LKL, open type
Product Overview

The Drive Unit

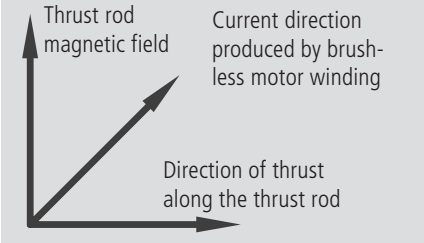
Basic principle

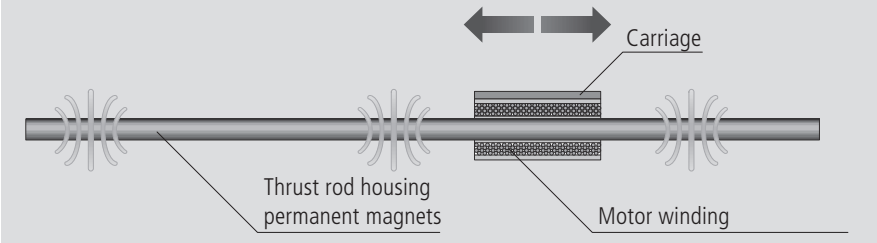
The key mechanical components of Linear Modules LKL are the "carriage" (primary part) and the permanently magnetized "thrust rod" (secondary part). A Ball Rail System supports and guides the carriage and its payload. The result is a remarkably simple mechanical arrangement.

The carriage and the thrust rod do not come into contact with each other, the weight of the payload being transmitted to the Ball Rail System only.

Unlike rotary drive systems, the linear motor comprises no moving parts and is consequently wear and maintenance free.

The drive system is therefore ideal for 24-hour operation. It also eliminates the need for additional rotary to linear conversion mechanisms. Because there is no backlash, positional repeatability is outstanding and is maintained for life.





The advantages

Easy to install and use

Complete linear unit. No need to source individual components.

Commutation is determined via Hall effect sensors during the cut-in stage. Consequently there is no need for a commutation cycle and the reference cycle can be initiated immediately after powering up.

High speed range

Unbroken linear thrust over the entire speed range.

For bellows-type protective cover, please consult us.

Precise motion and high dynamic response for life

Thrust generated directly at the payload. All motor forces are in the direction of travel only.
No need for rotary to linear conversion mechanisms, no gears and thus no backlash. Non critical alignment.

Ultra low EMI generation

3-phase primary part with low inductance. No open coils.

Permits higher load cycle rates

Excellent heat dissipation.

No forced cooling required.

Maintenance free

No internal moving parts, no wear and no motor maintenance.

Only the Ball Rail System requires maintenance.

Safety Notes

Warning

Danger for people with pacemakers!
The drive unit generates strong magnetic fields (even when switched off!) which can under certain circumstances affect the functioning of pacemakers.
This could cause health problems. We therefore advise people with pacemakers to keep clear of the drive unit. We also recommend to mark hazard zones with a warning sign.

Caution

Risk of injury or damage to the drive unit through improper handling or non-specialist installation!

- Mounting or dismounting only by expert personnel and using suitable tools. Please note that the use of ferromagnetic materials can give rise to extremely high forces of attraction. Wrong handling could result in crushed hands or limbs.
- Provide additional external hydraulic shock absorbers in the end positions.

Caution

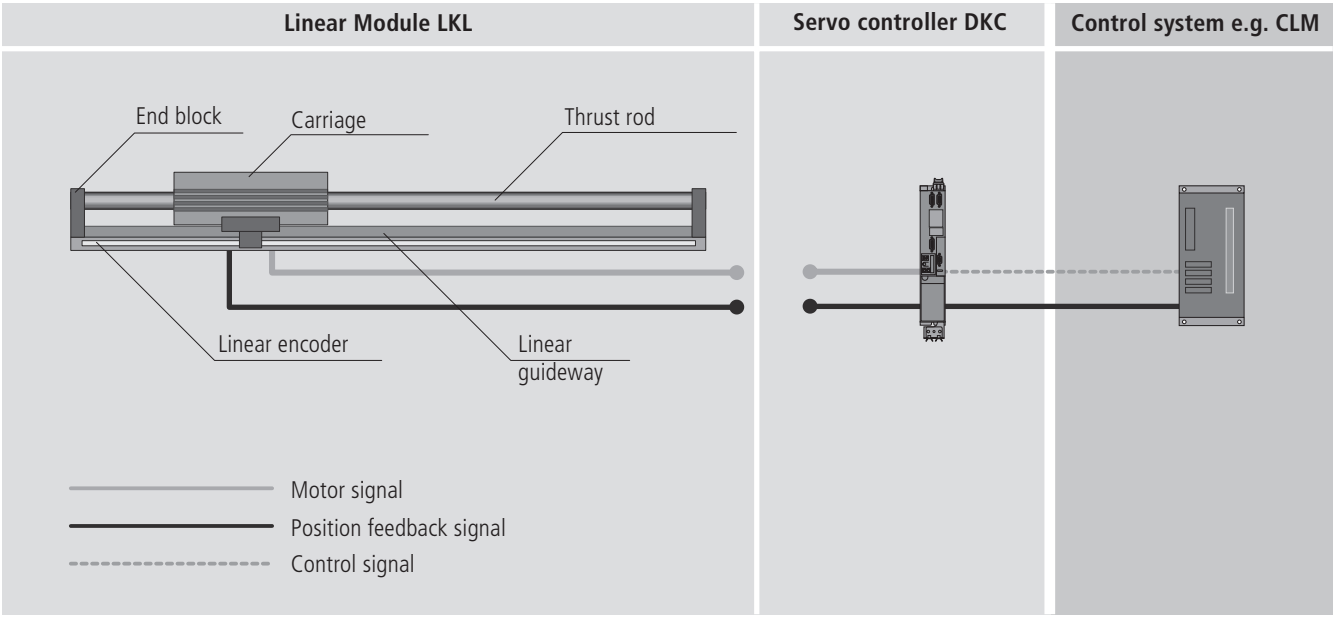
Interference with on-board electronic systems in transportation (e.g., aircraft) due to strong magnetic fields! It is therefore vital to observe the relevant rules and regulations when transporting drive units.

The Control System

Basic principle

Rexroth Star offers a matching servo controller for the Linear Module LKL. This powers the linear motor as well as constituting the interface to a master control system.

An incremental linear encoder system integrated in the mechanical structure signals the carriage's actual position to the control system position loop.



The advantages

Interface

The following interfaces are available for the DKC servo controller:

DKC 11.3/DKC 01.3
- Analog interface
- With stepping motor interface
- With positioning interface for 64 positions

DKC 02.3
- With SERCOS interface

DKC 03.3
- With PROFIBUS-DP interface for 64 positions

DKC 04.3
- With INTERBUS interface for 64 positions

DKC 05.3
- With CANopen interface for 64 positions

DKC 06.3
- With DeviceNET interface for 64 positions

Optional: Incremental linear encoder

Ready for connection to the linear measuring inputs in your control unit.

Matching servo controller DKC**.3

Designed for easy connection to max. 230V and easy installation.
Diagnostic interface as standard.
Convenient Drive Top start-up program.

STAR – Linear Modules LKL, open type
Type Designation with Load Capacities

Type designation (size)

Linear Modules are designated according to **type** and **size**.

Linear Module LKL (example) =	Type			Size	
	L	K	L	15	– 70

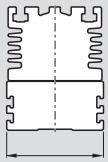
System = Linear module, open type (L)

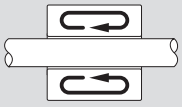
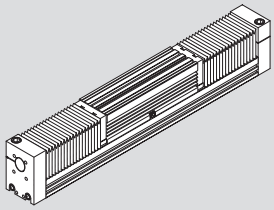
Guideway = Ball Rail System (K)

Drive unit = Linear motor (L)

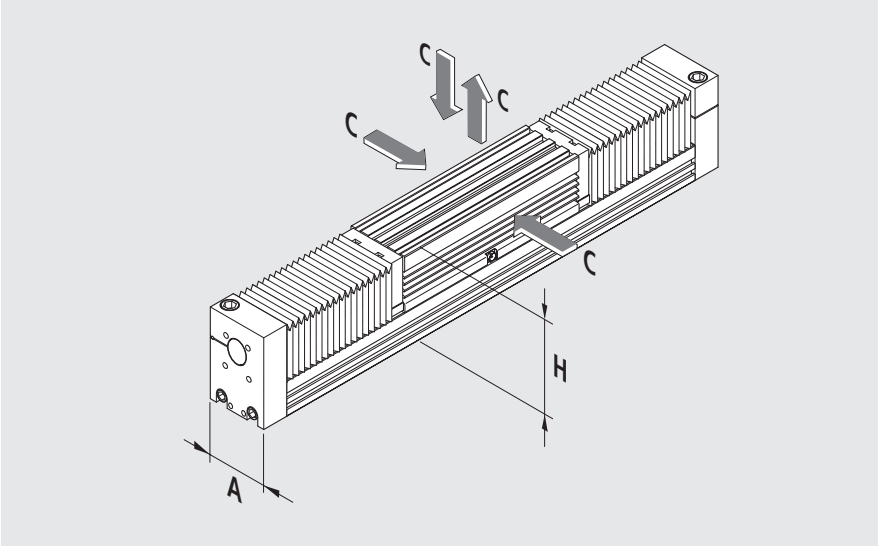
Dimensions of guideway =

Frame dimensions =



	Type	Guideway	Drive Unit	Linear Module	
STAR – Linear Modules	**LKL**	 **Ball Rail System**	 **Linear Motor**		

Linear module overview with permissible loads



Suitable load

Linear Modules LKL are particularly suitable for highly dynamic positioning of light, evenly distributed loads. Especially in manufacturing chains they can usually reduce cycle times and therefore considerably increase productivity. In contrast to planar linear actuators, this system offers the special advantage that the rail system is not subjected to additional magnetic loads.

Application conditions

Preferably for horizontal operation.

	Linear Module	Max. thrust (N)	Dimensions A x H (mm)	- Dyn. load capacity C (N)
	LKL 15 - 70	550	70 x 90	6820
	LKL 20 - 85	1300	85 x 110	23550

STAR – Linear Modules LKL , open type
Technical Data

General technical data

Linear Module	Motor	Carriage length (mm)	Dynamic load capacity C (N)	Dynamic moment M_t (Nm)	Dynamic moment M_L (Nm)	Moved mass[1] (kg)	Maximum length L_{max} (mm)	Planar moment of inertia I_x (cm^4)	Planar moment of inertia I_y (cm^4)	Frict. drag[2] (N)	Number of runner blocks
LKL 15-70	LD 2504	119	6000	57	31	1.5	1600	11.05	57.44	7.5	1
	LD 2506	170	6820	64	434	2.1				15	2
	LD 2508	221	6820	64	608	2.6				15	2
	LD 2510	272	6820	64	730	3.1				15	2
LKL 20-85	LD 3804	163	15590	194	846	3.5	2000	15.93	105.40	26	2
	LD 3806	234	23550	308	1483	4.6					
	LD 3808	305	23550	308	2673	5.6					
	LD 3810	376	23550	308	3509	6.5					

[1] Excluding the mass of cables and the input power cable protective chain (0.6 kg/m).
[2] Carriage without input power cable protective chain and bellows.

Motor data

	LD 3810	LD 3808	LD 3806	LD 3804	LD2510	LD 2508	LD 2506	LD 2504
Peak thrust (N)	990	780	580	380	470	375	280	180
Peak speed (m/s)	2.6	3.2	4.5	6.5*)	5.2*)	6.5*)	8*)	11*)
Peak acceleration (m/s^2)	148	134	120	101	146	138	126	115
Force constant (N/A)	99	79	58	38	47	38	28	19
Continuous current (A)	3	3.09	3.24	3.57	2.67	2.82	3.05	3.22
Continuous thrust at 20°C (N)	297	244	188	136	125	109	85	61
Counter-emf constant (V/m/s)	115	91	68	44	55	44	33	22
Phase-to-phase resistance at 20°C (Ω)	16.4	13.5	10	6.7	13.4	10.8	8.2	5.4
Min. phase-to-phase inductance (mH)	17.4	14.6	11.9	7.5	11.7	8.3	6.2	4.2
Electrical time constant of motor (ms)	1.06	1.08	1.19	1.12	0.87	0.77	0.76	0.76

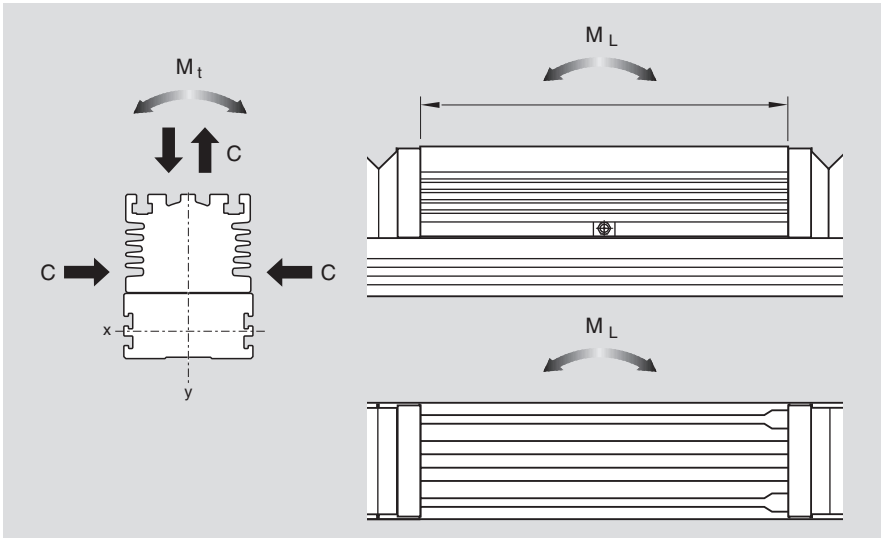
Protection IP 54
Max. operating temperature 80°C.
*) Maximum speed 5 m/s - limited by Ball Rail System.

Control signals via digital controller DKC**.3 (1 x 230 V connection)

(see catalog RE 82 701 "Controllers, Motors, Electrical Accessories")

Note on dynamic load capacities and moments

The dynamic load capacities and moments are based on 100,000 m travel.
However, a travel of just 50,000 m is often taken as a basis.
If this is the case, for comparison purposes:
Multiply values **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ from the STAR table by 1.26.



Mass

Mass calculation does not include switches

Mass formula:

Mass (kg/mm) · length L (mm) + mass of all parts of fixed length (carriage, etc.) (kg)

Linear Module	Carriage length (mm)	Mass (kg)
LKL 15-70	119	0.0079 · L + 2.17
	170	0.0079 · L + 2.77
	221	0.0079 · L + 3.27
	272	0.0079 · L + 3.77
LKL 20-85	163	0.0138 · L + 4.42
	234	0.0138 · L + 5.52
	305	0.0138 · L + 6.52
	376	0.0138 · L + 7.42

Structure

1 Frame
2 Carriage
3 Thrust rod
4 End block
5 Guide rail
6 Guideway end plate (only LKL 15-70 with L > 600 mm, LKL 20-85 with L > 800 mm)
7 Buffer (for option without bellows)
8 Bellows

Attachments:

9 Power cable chain
10 Socket/plug
11 Proximity switch
11a Reference switch/ proximity switch
12 Switching cam
13 Cable duct

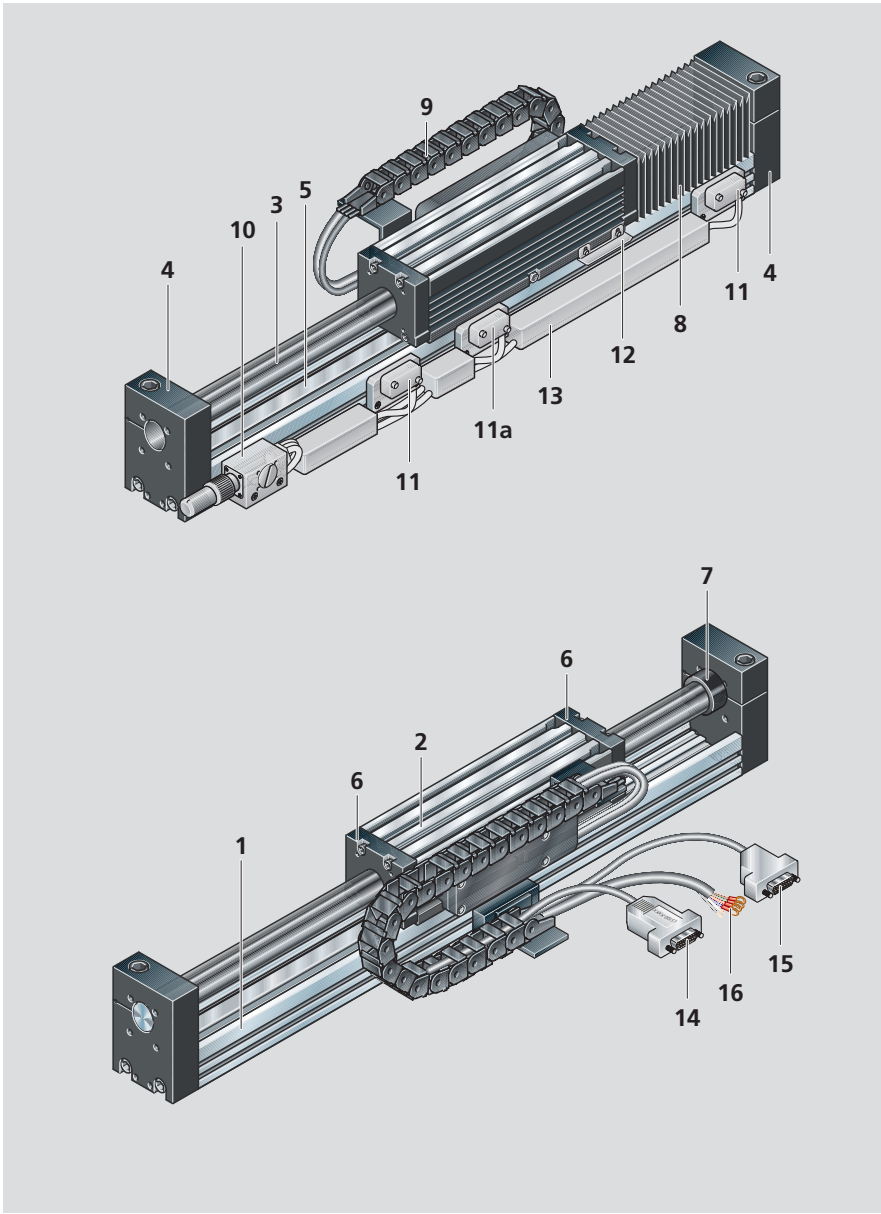
Cable set:

14 Linear encoder
15 Hall effect sensor
16 Motor cable

⚠ **Bellows:**

max. speed	3 m/s
max. length	1600 mm

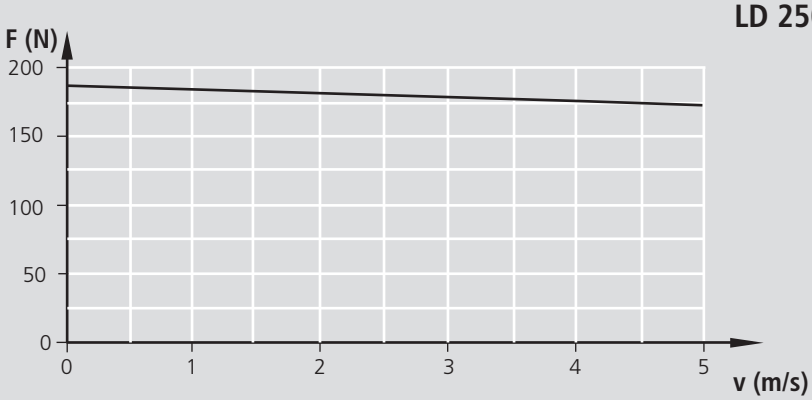
Non-compliance with the above values may result in premature failure.



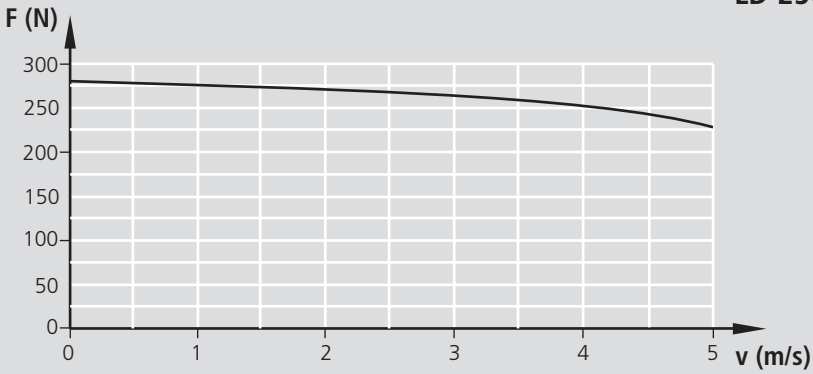
STAR – Linear Module LKL 15–70, open type
Technical Data

Maximum thrust (N)

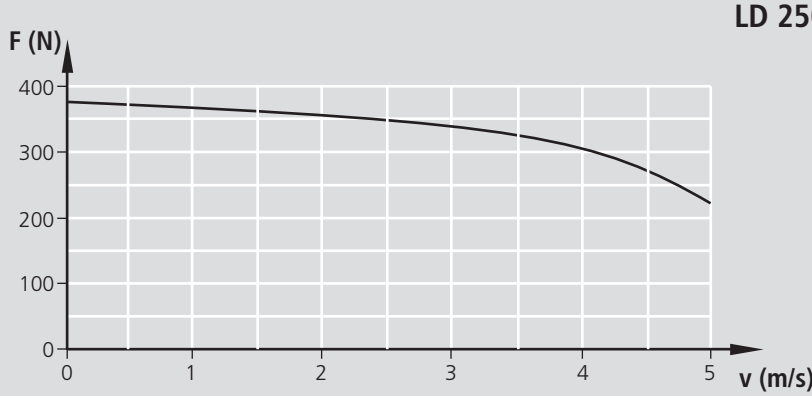
LD 2504



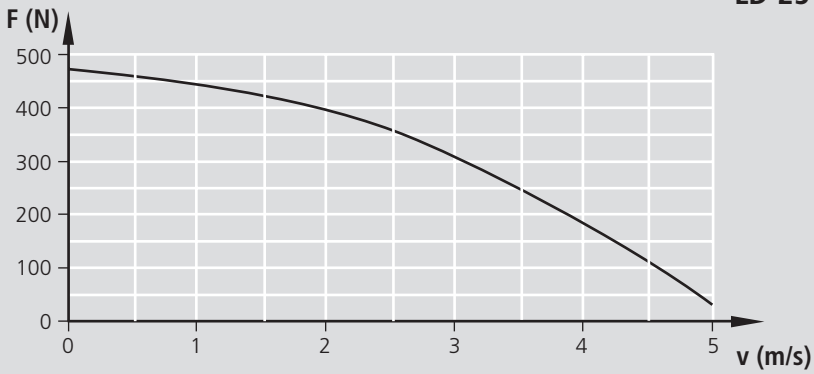
LD 2506



LD 2508

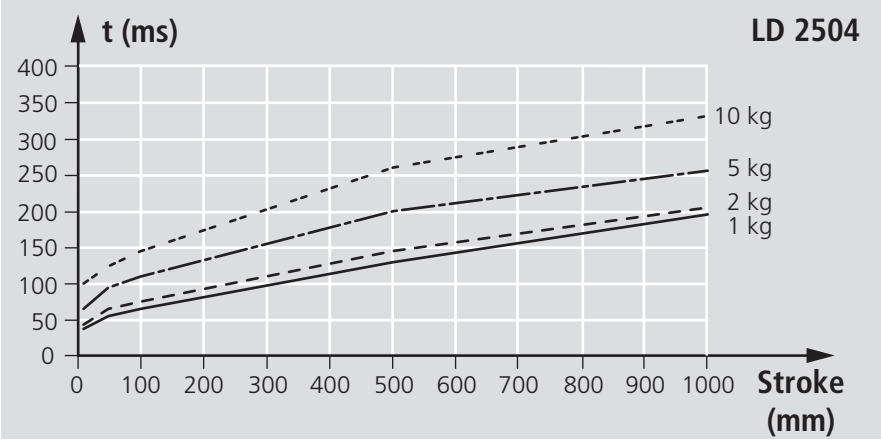


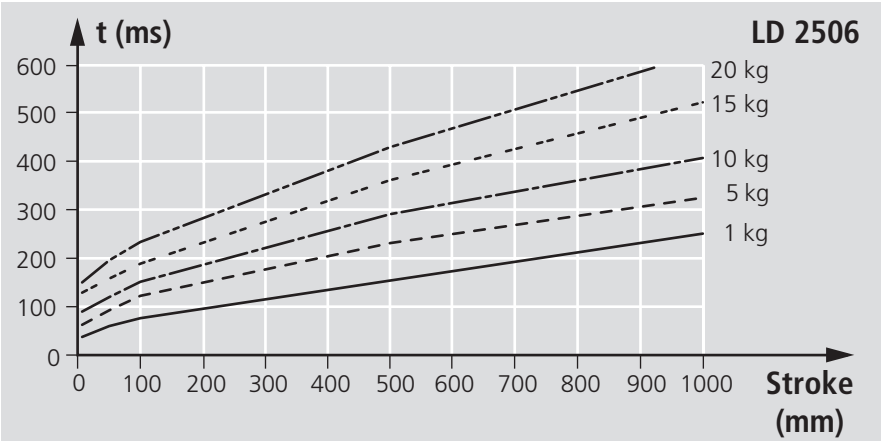
LD 2510

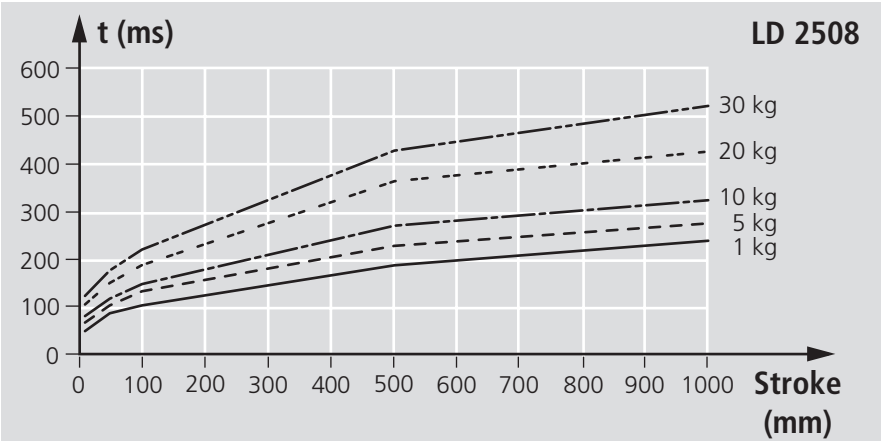


—— **320 VDC bus**

Time vs. Displacement curves for horizontal operation with varying payloads, determined at 25% duty cycle

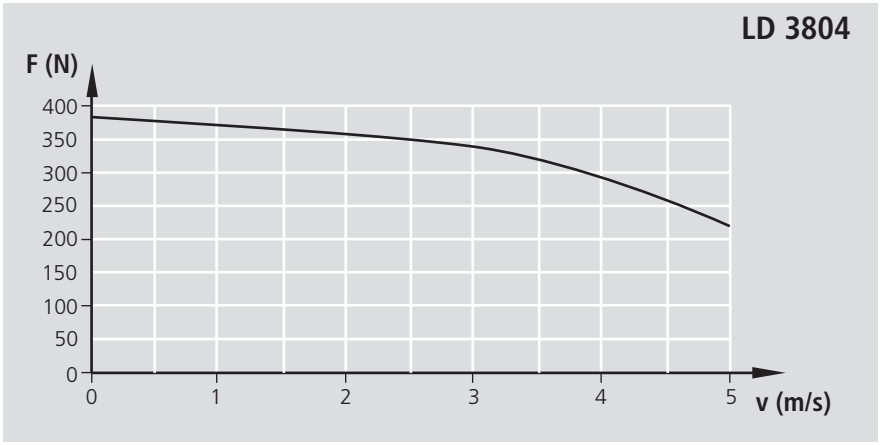


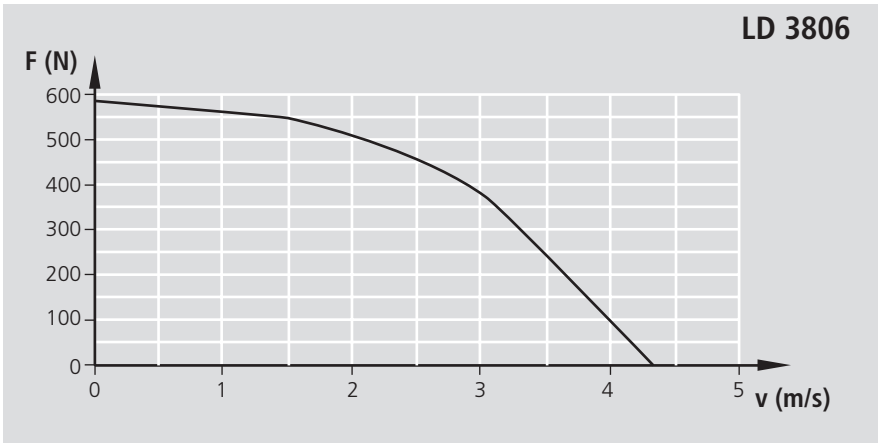


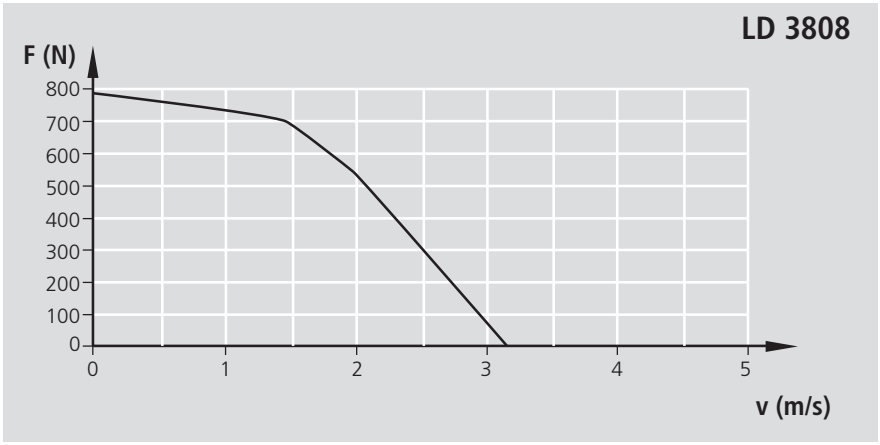


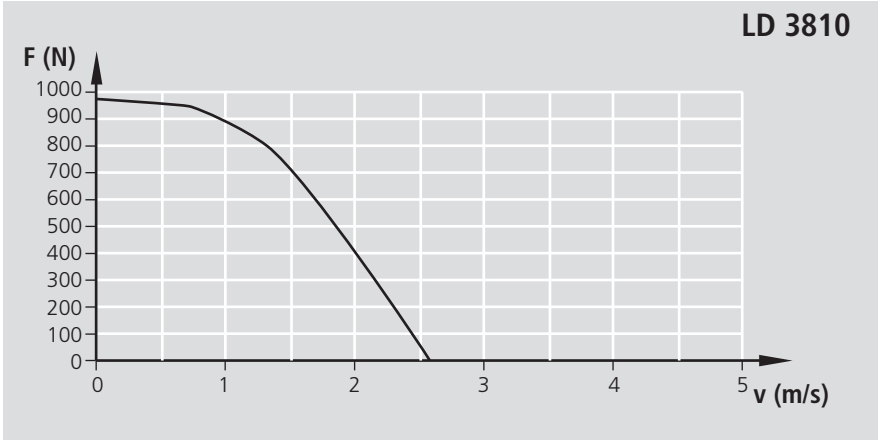
STAR – Linear Module LKL 20–85, open type
Technical Data

Maximum thrust (N)



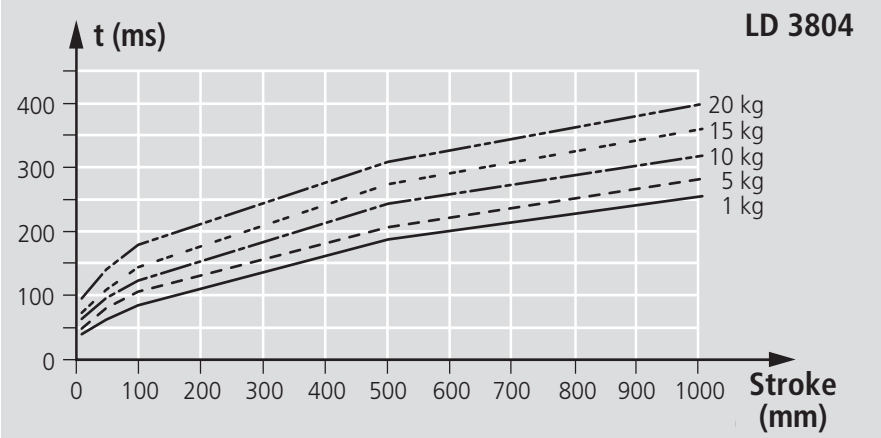


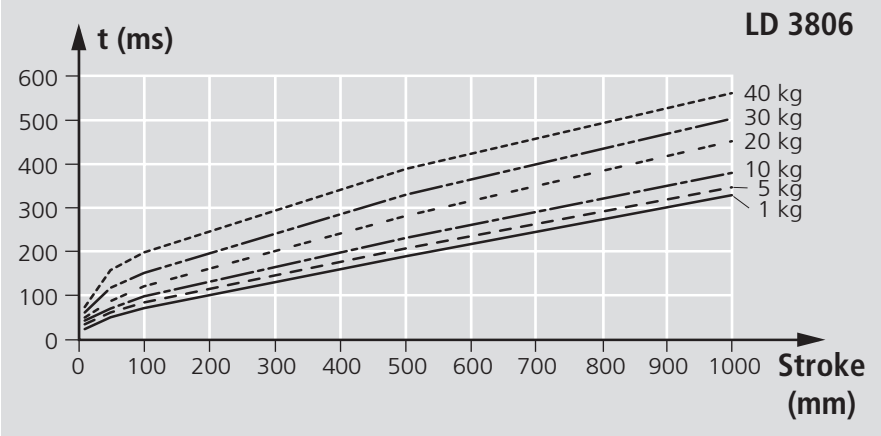


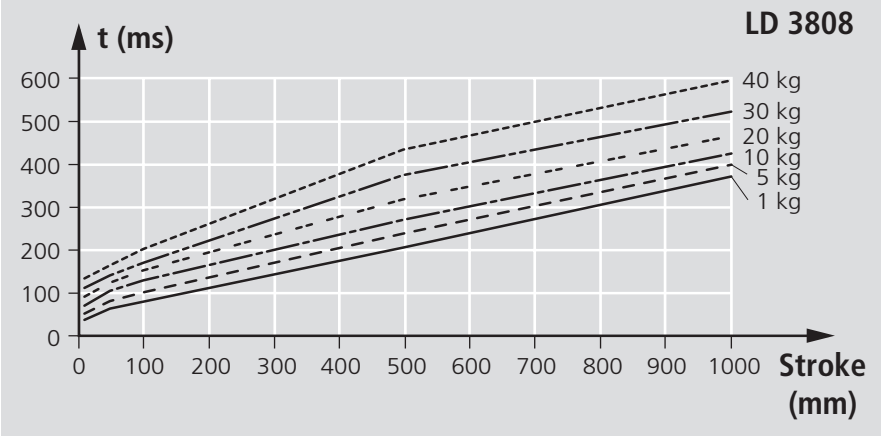


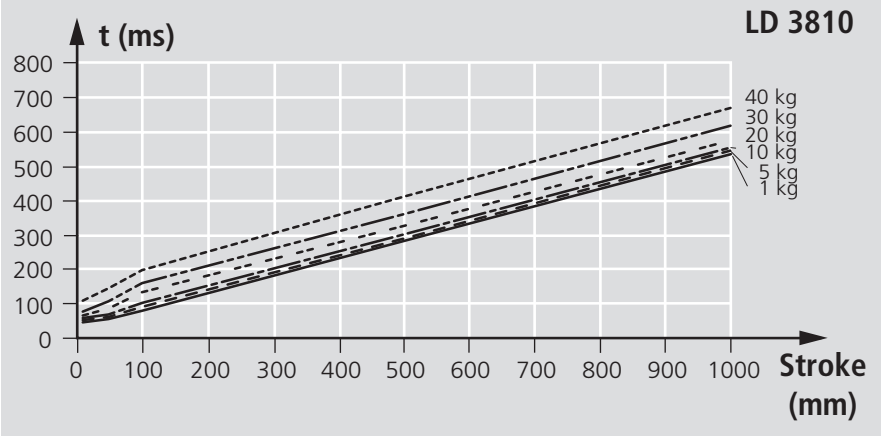
—— 320 VDC bus

Time vs. Displacement curves for horizontal operation with varying payloads, determined at 25% duty cycle

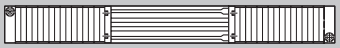
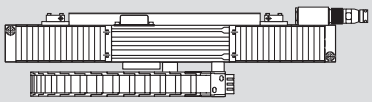
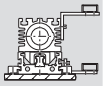
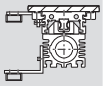
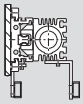
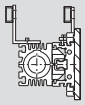








STAR – Linear Module LKL 15–70, open type
Components and Ordering Data

Part number 0355-400-00, (....) mm Length of cable set (....) mm*	Type (....) (and dimension drawing)	Guideway (..)	Drive unit (..)	Carriage (..)
without drive unit (OA) 	**OA01** **(03.45.00)**	01	00	L_T = 119 mm 11 L_T = 170 mm 12 L_T = 221 mm 13 L_T = 272 mm 14
with drive unit (MA) Switches  Power input cable	 **MA01** **(03.45.10)**	01	LD 2504 01	L_T = 119 mm 01 for L > 600 L_T = 149 mm 06
	 **MA02** **(03.45.11)**		LD 2506 02	L_T = 170 mm 02 for L > 600 L_T = 200 mm 07
	 **MA03** **(03.45.12)**		LD 2508 03	L_T = 221 mm 03 for L > 600 L_T = 251 mm 08
	 **MA04** **(03.45.13)**		LD 2510 04	L_T = 272 mm 04 for L > 600 L_T = 302 mm 09

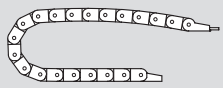
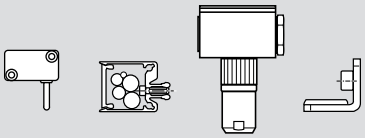
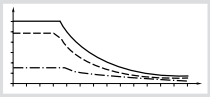
For controller and servo amplifier see "Controllers" catalog

* Specify length of cable set in increments of 0.5 m measured from the cable exit on the frame, max. cable length 18 m (for longer lengths, please consult us)

Order example

Ordering data		Description
Linear Module LKL		Linear Module, open type
(Part number): 0355-400-00	950 mm	LKL 15-70, length (L) = 950 mm
Length of cable set	= 3500 mm	Length of cable set = 3500 mm
Type	= MA01	with drive unit
Guideway	= 01	ball rail system
Drive unit	= 03	motor LD2508
Carriage	= 03	carriage with length L_T = 251 mm
Power input cable	= 01	with flexible protective chain
Cover	= 01	PU bellows
Linear encoder	= 01	magnetic encoder
1st switch	= 11	PNP NC
2nd switch	= 11	PNP NC
3rd switch (reference)	= 13	PNP NO
Cable duct	= 20	cable duct
Socket/plug	= 17	socket/plug on switch side
Switching cam	= 16	with switching cam for switch activation
Documentation	= 02	measurement report: frictional drag

Please check that the selected combination is a permissible one
(load capacities and moments, motor data, etc.)!

Power input cable ..	Cover ..		Linear encoder ..	1st, 2nd switch ..	Documentation ..	
						
	without	PU bellows		Socket/plug .. Switching cam .. Cable duct ..	Standard report	Measurement report
without 00	00	01	without 00	without 00	01	02 Frictional drag
without 00	00	02	without 00	Switches*: PNP NC 11 PNP NO 13		05 Positioning accuracy
with 01			magnetic 01	Cable duct* length = L 20		
				Socket/plug* 17		
				Switching cam* 16		

* Supplied unmounted along with the module

Calculating the linear module length L

With bellows
- max. speed 3 m/s
- Non-compliance with the values indicated may result in premature failure.

Length L = (stroke + 2 · excess travel) · 1.372 + carriage length[1] L_T + 39 mm

Without bellows

Length L = (stroke + 2 · excess travel) + carriage length[1] L_T + 40 mm

[1] Please note: When L > 600, carriage will be longer.

Effective stroke

See dimension drawing for effective stroke, excess travel, carriage length L_T

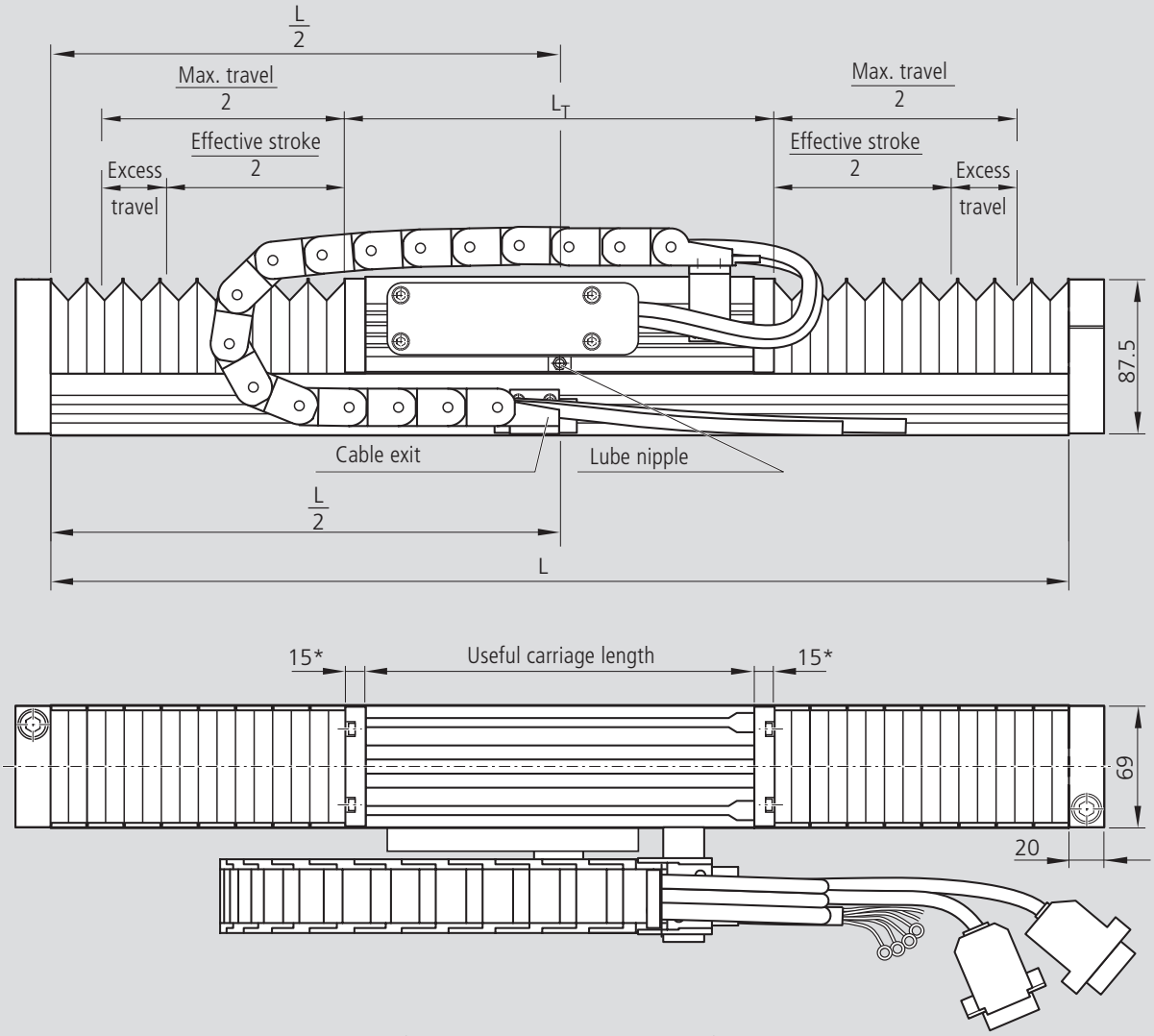
Effective stroke = max. travel - 2 · excess travel

If the linear module is to operate reliably, the excess travel must be greater than the braking distance.

The braking distance can be assumed to be equal to the acceleration distance.

We recommend that customers mount shock absorbers at the mass center of gravity to reduce excess travel.

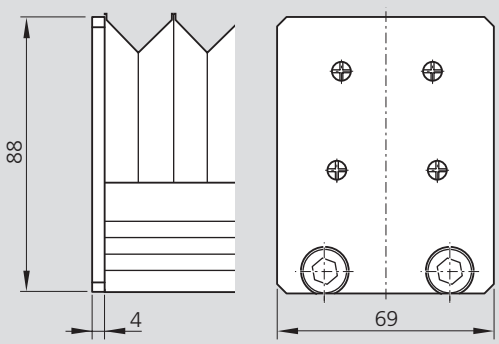
STAR – Linear Module LKL 15–70, open type
Dimension Drawings



* Guideway end plate at both ends when L > 600 mm (please note carriage option number).

03.45.00

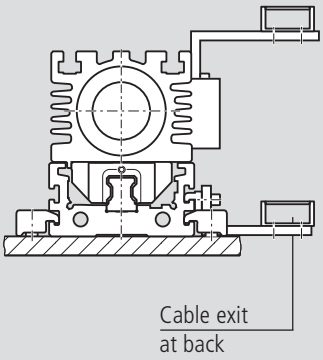
Type (OA01)



03.45.10

Standard mounting

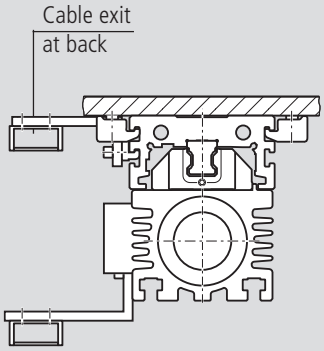
Type (MA01)

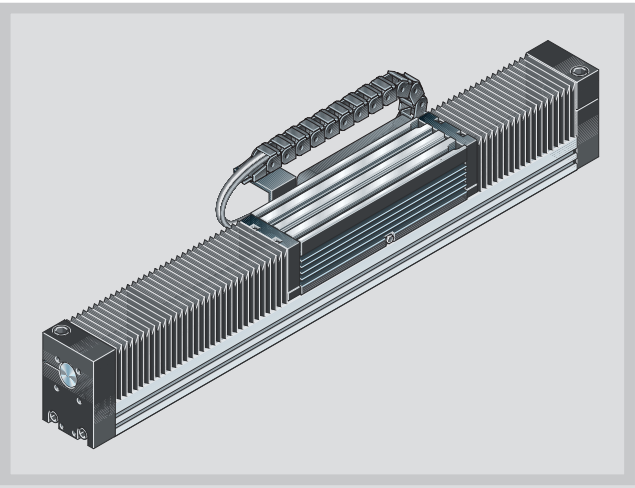


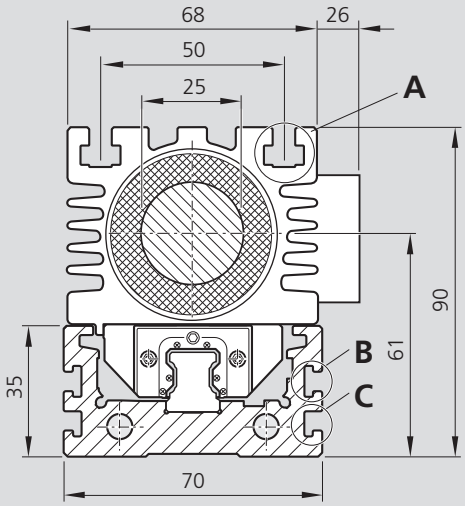
03.45.11

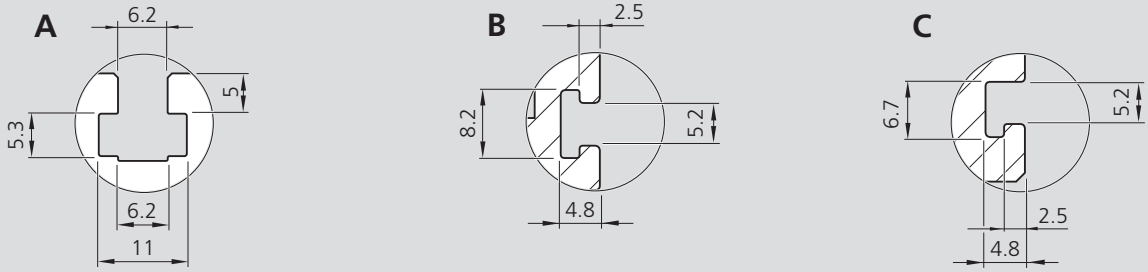
Overhead mounting

Type (MA02)





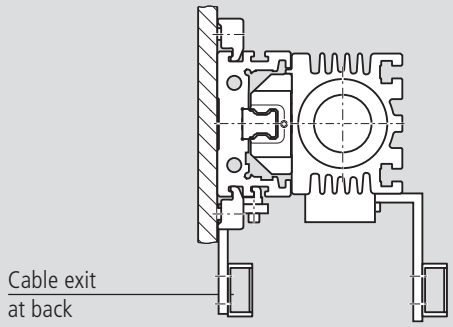




For mounting of power cable chain, see chapter "Power Cable Chain"

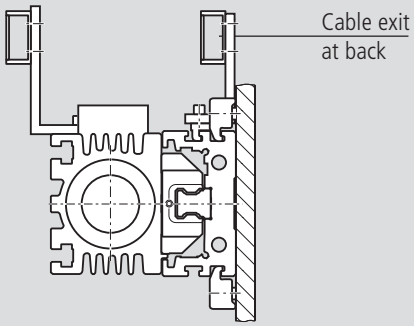
03.45.12

Left-hand mounting
Type (MA03)

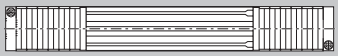
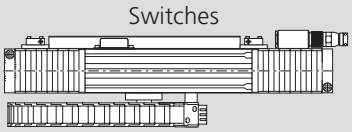
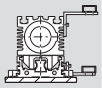
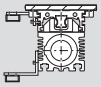
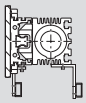
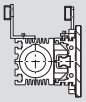


03.45.13

Right-hand mounting
Type (MA04)



STAR – Linear Module LKL 20–85, open type
Components and Ordering Data

Part number 0355-500-00, (....) mm Length of cable set (....) mm*	Type (....) (and dimension drawing)	Guideway (..)	Drive unit (..)	Carriage (..)
without drive unit (OA) 	**OA01** (03.55.00)	01	00	L_T = 163 mm 11 L_T = 234 mm 12 L_T = 305 mm 13 L_T = 376 mm 14
with drive unit (MA)  Switches Power input cable	 **MA01** (03.55.10)	01	LD 3804 01	L_T = 163 mm 01 for L > 800 L_T = 193 mm 06
	 **MA02** (03.55.11)		LD 3806 02	L_T = 234 mm 02 for L > 800 L_T = 264 mm 07
	 **MA03** (03.55.12)		LD 3808 03	L_T = 305 mm 03 for L > 800 L_T = 335 mm 08
	 **MA04** (03.55.13)		LD 3810 04	L_T = 376 mm 03 for L > 800 L_T = 406 mm 09

For controller and servo amplifier see "Controllers" catalog

* Specify length of cable set in increments of 0.5 m measured from the cable exit on the frame, max. cable length 18 m (for longer lengths, please consult us)

Order example

Ordering data		Description
Linear Module LKL		Linear Module, open type
(Part number): 0355-500-00	950 mm	LKL 20-85, length (L) = 950 mm
Length of cable set	= 2000 mm	Length of cable set = 2000 mm
Type	= MA01	with drive unit
Guideway	= 01	ball rail system
Drive unit	= 03	motor LD3808
Carriage	= 02	carriage with length L_T = 264 mm
Power input cable	= 01	with flexible protective chain
Cover	= 01	PU bellows
Linear encoder	= 01	magnetic encoder
1st switch	= 11	PNP NC
2nd switch	= 11	PNP NC
3rd switch (reference)	= 13	PNP NO
Cable duct	= 20	cable duct
Socket/plug	= 17	socket/plug on switch side
Switching cam	= 16	with switching cam for switch activation
Documentation	= 02	measurement report: frictional drag

Please check that the selected combination is a permissible one
(load capacities and moments, motor data, etc.)!

	Power input cable (..)	Cover (..)		Linear encoder (..)	1st, 2nd switch (..)	Documentation (..)	
		without	PU bellows		Socket/plug (..) Switching cam (..) Cable duct (..)	Standard report	Measure-ment report
	without (00)	(00)	(01)	without (00)	**without** (00)	(01)	(02) Frictional drag
	without (00)	(00)	(02)	without (00)	**Switches*:** **PNP NC** (11) **PNP NO** (13) **Cable duct* length = L** (20) **Socket/plug*** (17) **Switching cam*** (16)		(05) Position-ing accuracy
	with (01)	(00)	(02)	magnetic (01)			

* Supplied unmounted along with the module

Calculating the linear module length L

With bellows
- max. speed 3 m/s
- max. length 1600 mm
- Non-compliance with the values indicated may result in premature failure.

Length L = (stroke + 2 · excess travel) · 1.372 + carriage length[1)] L_T + 39 mm

Without bellows

Length L = (stroke + 2 · excess travel) + carriage length[1)] L_T + 40 mm

[1)] Please note: When L > 800, carriage will be longer.

Effective stroke

See dimension drawing for effective stroke, excess travel, carriage length L_T

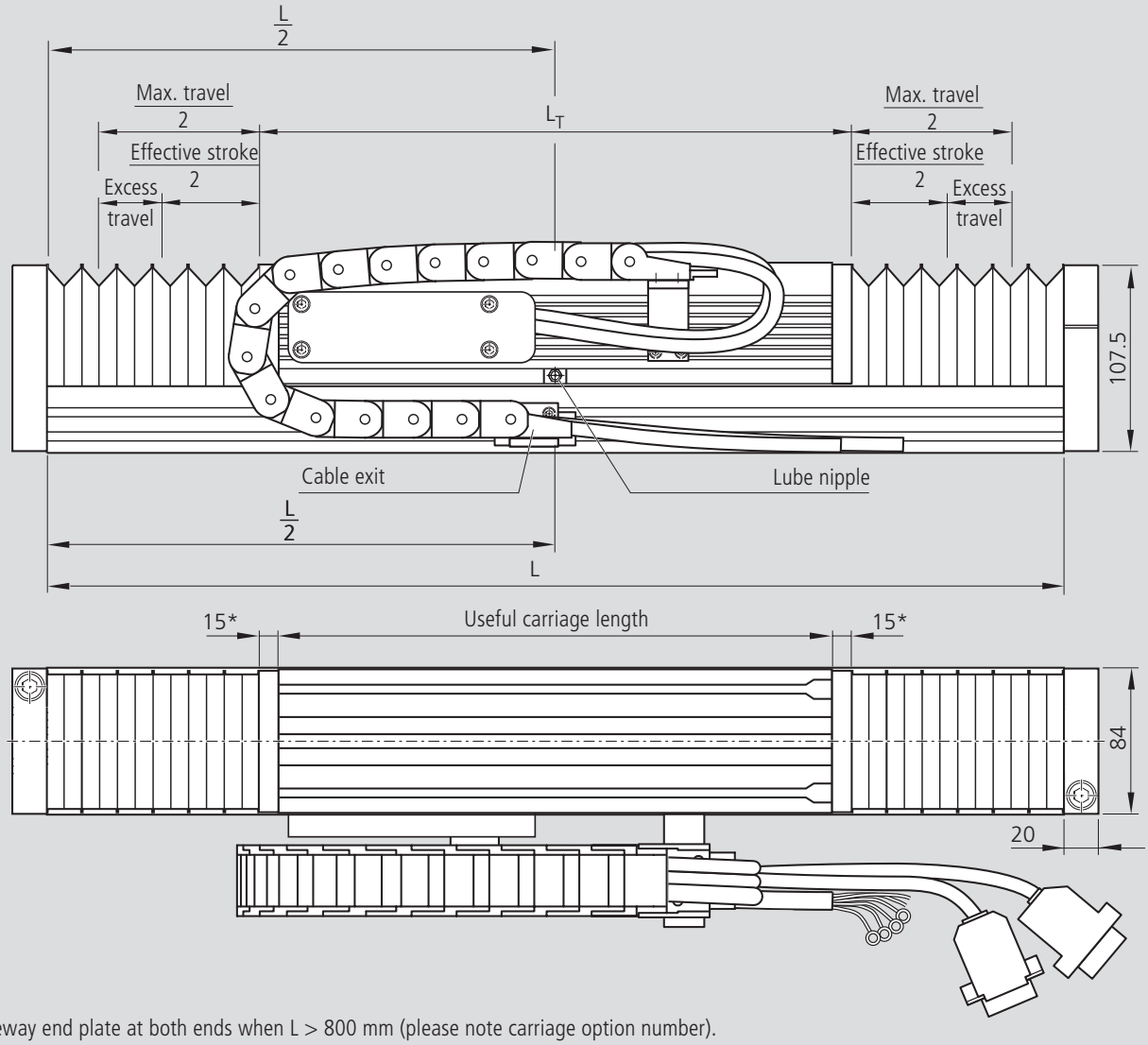
Effective stroke = max. travel - 2 · excess travel

If the linear module is to operate reliably, the excess travel must be greater than the braking distance.

The braking distance can be assumed to be equal to the acceleration distance.

We recommend that customers mount shock absorbers at the mass center of gravity to reduce excess travel.

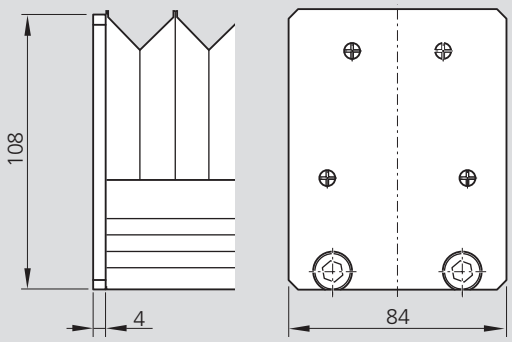
STAR – Linear Module LKL 20–85, open type
Dimension Drawings



* Guideway end plate at both ends when L > 800 mm (please note carriage option number).

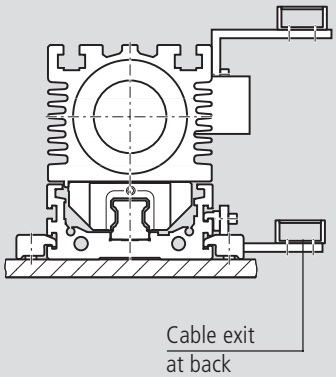
03.55.00

Type (OA01)



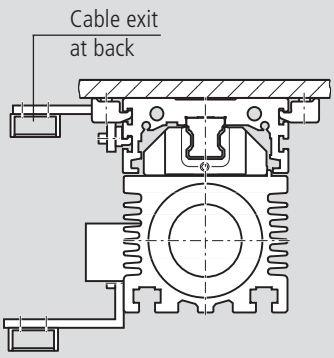
03.55.10

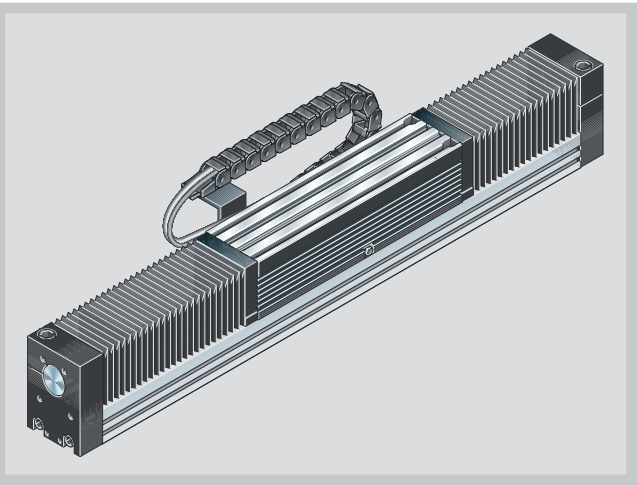
Standard mounting
Type (MA01)

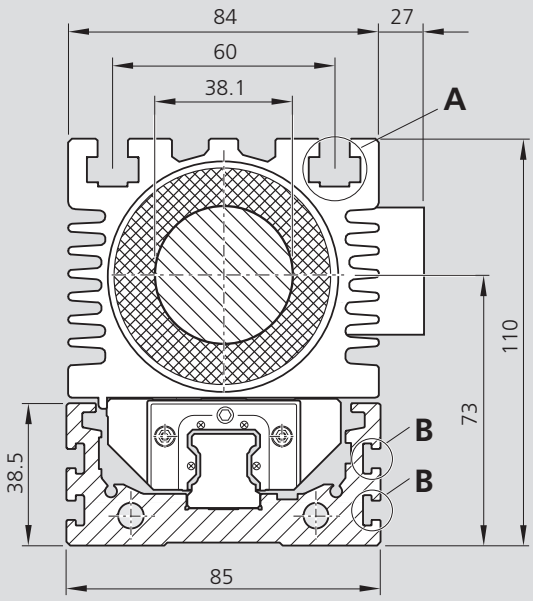


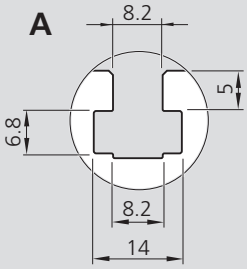
03.55.11

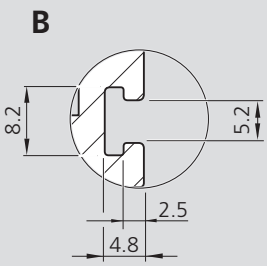
Overhead mounting
Type (MA02)







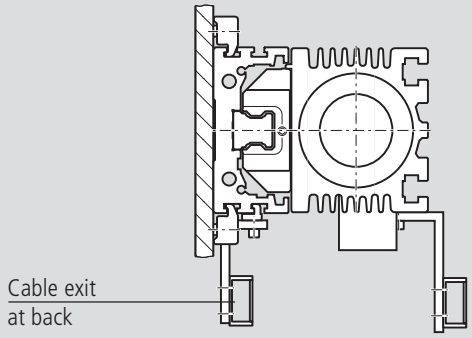




For mounting of power cable chain, see chapter "Power Cable Chain"

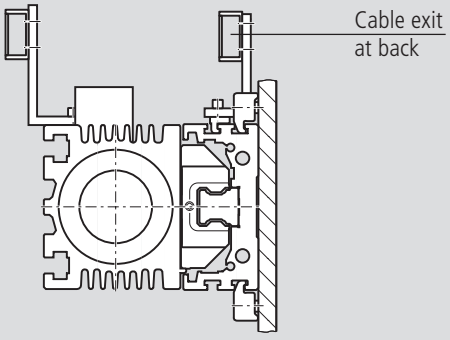
03.55.12

Left-hand mounting
Type (MA03)

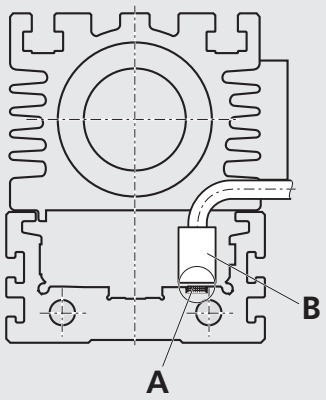


03.55.13

Right-hand mounting
Type (MA04)

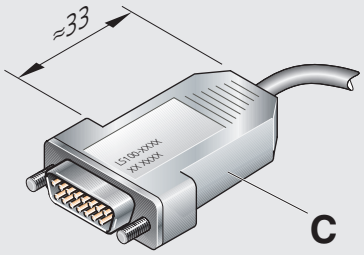


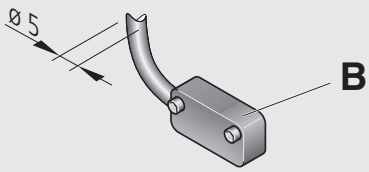
STAR – Linear Modules LKL, open type
Linear Encoder, incremental



A: Magnetized strip MB 100	
Width	5 mm
Pole spacing	1 mm
Temperature coefficient	(11±1) x 10^{-6} / K
Operating temperature	-20°C to +70°C
Accuracy (measuring system only)	(±0.01 + 0.01 x L) mm [L in m]; at T_{amb} = 20°C
Reference mark	none

B: Magnetic sensor Type A	
Operating temperature	-20°C to +70°C
Protection	IP67
Cable length	equal to length of motor cable (max. 18 m)
Storage temperature	-20°C to +85°C
Air humidity	100% dewing permissible
Protection of housing	IP67
Type of cable	PUR (polyurethane), oil-resistant
Vibration resistance [5...2000 Hz]	20 g
Shock resistance	200 g at 11 ms





C: Plug with amplifier electronics	
Power supply	5±5% V DC
Output signals	analog sine/cosine similar
Amplitude/level	typically 1Vpp (load independent) - differential, with connection resistance R = 120 Ω to 1 kΩ tolerance 10% (±0.1 V)
Amplitude ratio sine/cosine	±10% (±0.1 V)
Offset sine/cosine	±0.5% (±5 mV)
El. connection	DSUB connector, 15 pins, female
Immunity class	3, to IEC 801
Certification	CE
Signal period	1000 µm
Travel speed	max. 50 m/s
Reversal range U, to VDI 3441 (repeatability)	20 µm
Working temperature of connector	0°C to +60°C

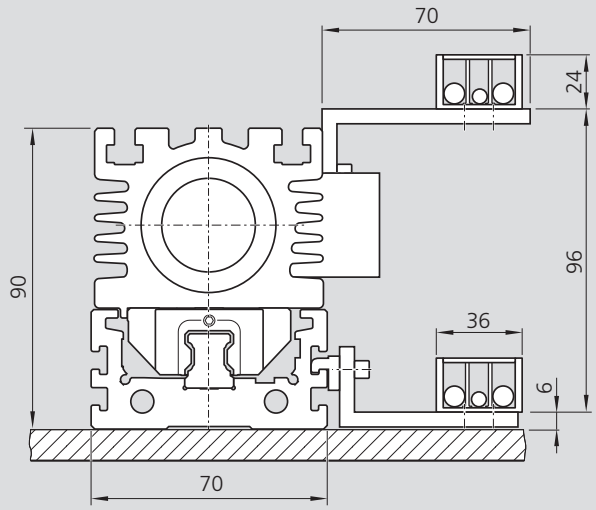
⚠ The total system accuracy of Linear Module LKL is influenced by the linear encoder system, by the reproducibility of the reference switch, by the straightness of the frame, and by the mounting base.

Power Cable Chain

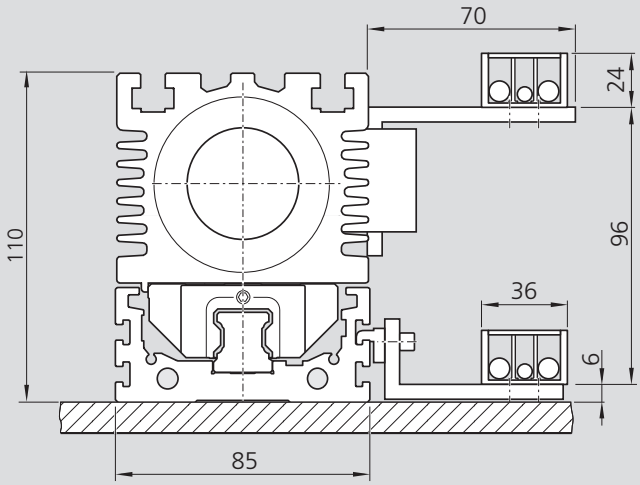
The power cable chain is firmly secured to the carriage by means of an angle bracket. For ease of alignment this bracket can be slid along the frame when the set screws have been loosened.

With type 2504 motors, the bracket cannot be attached to the side of the carriage, as the carriage is too short. In this case the customer has to mount the bracket on the superstructure or in the T-slot of the carriage.

LKL 15-70

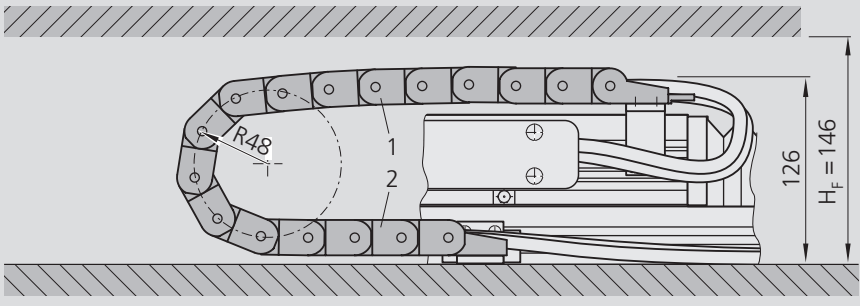


LKL 20-85



Required mounting space

In the case of cantilever mounting of the power cable chain, "pre-tensioning" results in a cambered top half of the chain loop (1). Dimension H_F indicates the required mounting height necessitated by this pre-tensioning. The pre-tensioning allows for greater cantilever lengths and increases service life and operational reliability.



The power cable chains are suitable for cantilever operation.
If however the bottom half of the chain loop (2) rests upon a supporting surface, this surface has to be completely smooth (no webs).

In dirty environments, make sure that no dirt accumulates in the path of the power cable chain.

STAR – Linear Modules LKL, open type
Switch Mounting

Switching system overview

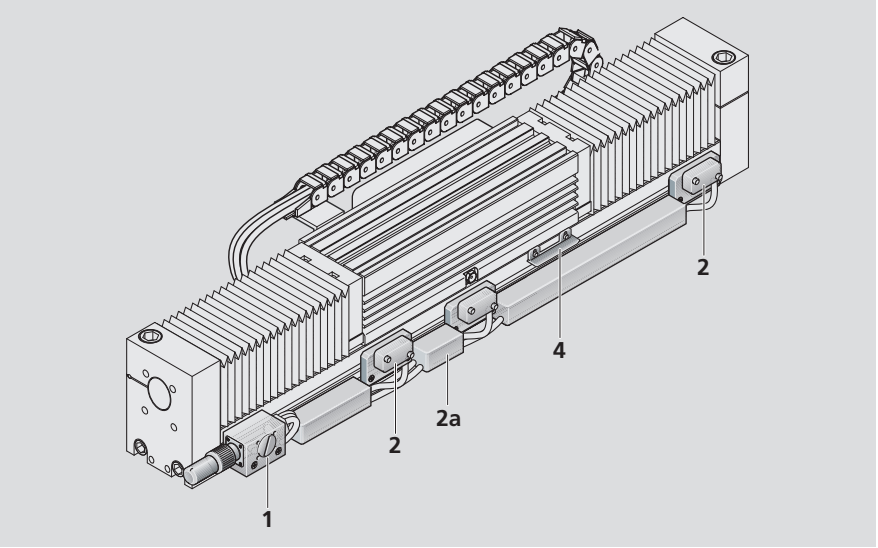
1 Socket/plug

2 Proximity switches (with mounting accessories)

2a Reference switch/ proximity switch

3 Cable duct (aluminum alloy)

4 Switching cam



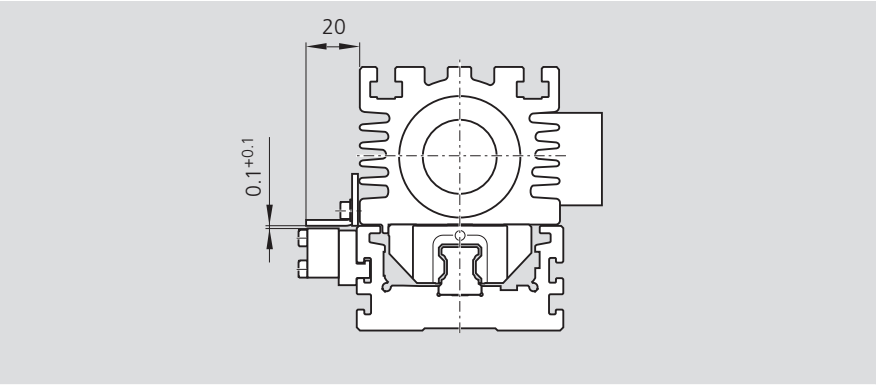
Switches

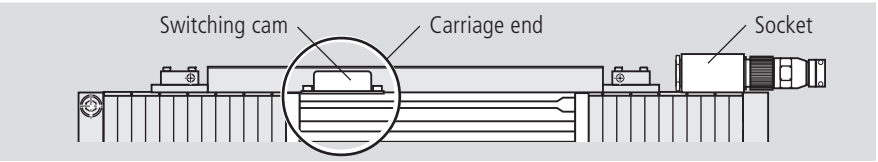
Mounting instructions:

The switches are supplied loose.

Switches may only be mounted on one side of the linear module (opposite the power input cable). **Do not mount the switches until the linear module has been fixed to its base.**

Insert the plate-mounted switches in the T-slots in the frame and fix them with two set screws.



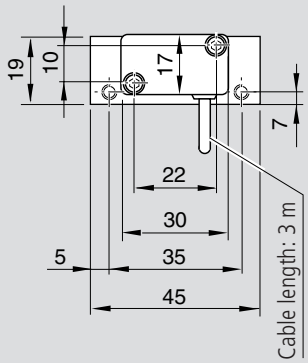


⚠ The switching cam may only be mounted on the carriage end furthest away from the socket. Adjust the switching gap from 0.1 to 0.2 mm on mounting.

Proximity switch (technical data)

Miniature switch with potted cable (3 x 0.14 mm² Unitronic)	
Switch housing type	= NO
Mini sensor	= Type A DIN 41635
Operating voltage	= 10 to 30 V DC
Residual ripple factor	= ≤ 10%
Load	= 200 mA
Idling current	= ≤ 20 mA
Switching frequency	= max. 1500 Hz
Temperature sensitivity of cut-in point	= ≤ 4 µm/K
Slope of output signal	= ≥ 1V/µs
Reproducibility of cut-in point to EN 50008	= ≤ 0.1 mm

Proximity switch with mounting plate



Socket and plug

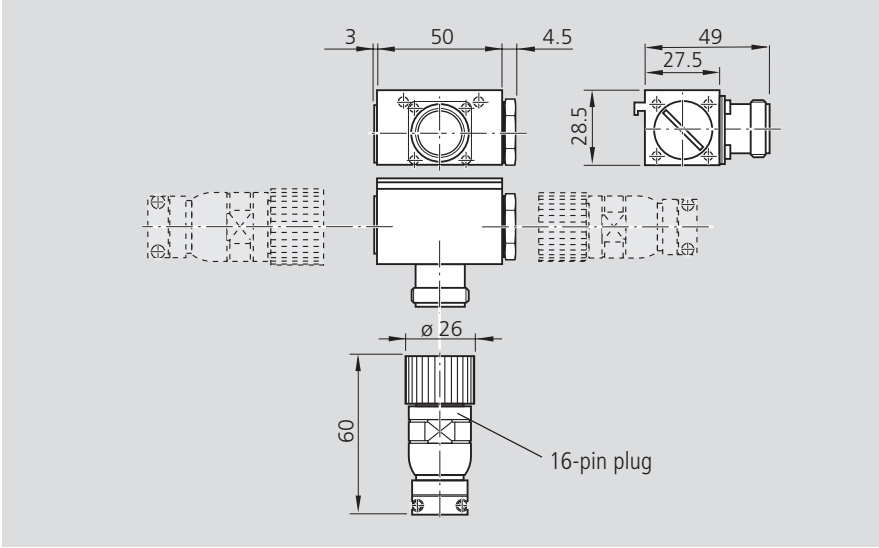
– Fix the socket to the side with the switches.

The socket and plug have 16 pins each.

The socket and switches are not wired. The switch activation points can thus be optimized during start-up.

A plug is provided.

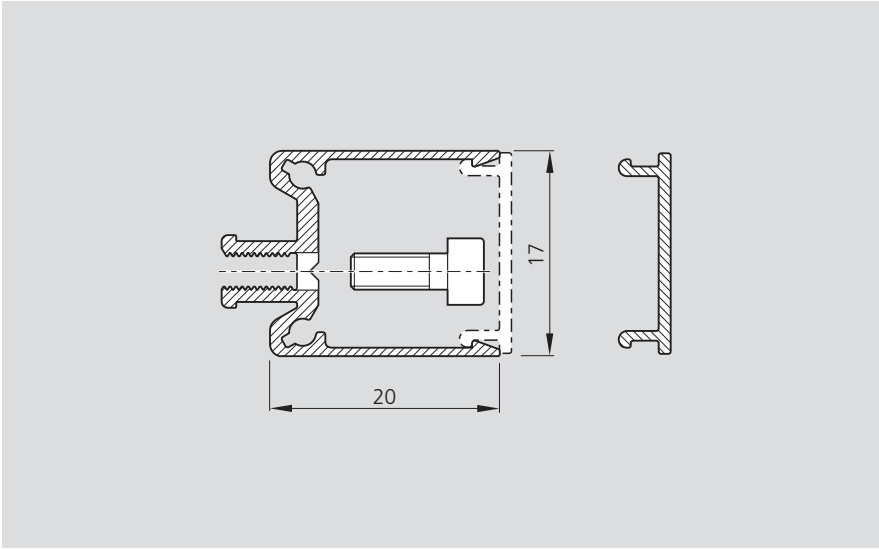
The plug can be mounted in three directions (see figure).



Cable duct

– Clip the duct into the T-slot in the frame and fix it in place with the mounting screw.

– Mounting screws and cable grommets are provided.



Ordering switches and mounting accessories

The part numbers are listed in the table.

Mounting accessories can be ordered separately.

Item		Part numbers
1	**Socket-plug**	0399-800-70
2	**Proximity switch**	
	- mounting accessories without switch	1175-001-52
	- PNP NC	8453-040-01
	- NPN NC	8453-040-02
	- PNP NO	8453-040-03
	- NPN NO	8453-040-04
3	**Cable duct**	0399-800-06
4	**Switching cam**	0399-800-71

STAR – Linear Modules LKL, open type
Mounting Instructions

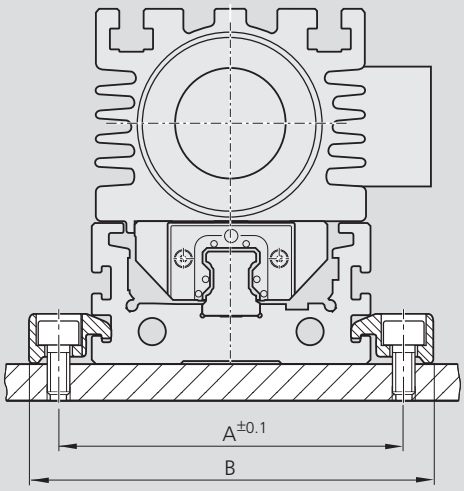
General information

The linear module is mounted using special clamping fixtures.

When mounting the linear modules, observe the maximum tightening torques as indicated in the table.

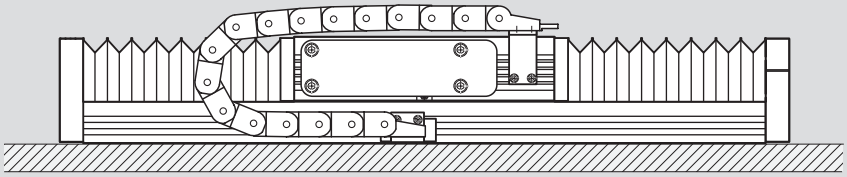
Size	A (mm)	B (mm)
15-70	86	100
20-85	101	115

Mounting with clamping fixtures



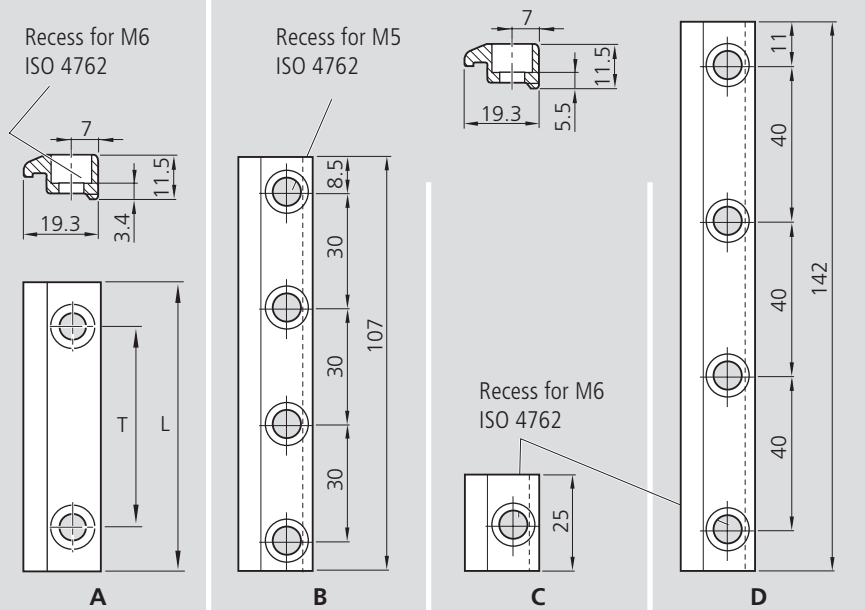
⚠ Do not fix the linear module by the end blocks!
The frame is the main stress-bearing structure!
Wherever possible, it has to be supported over its entire length.

The flatness of the supporting surface must be of the required accuracy.



Recommended number of clamping fixtures: with 1 hole, 6 per meter and side
with 4 holes, 3 per meter and side
with 2 holes, 4 per meter and side

Clamping fixtures



	Part numbers		
T = 50 **L** = 72 0375-510-09	0375-410-02	0375-510-00	0375-510-02
T = 40 **L** = 62 0375-510-11			

Tightening torques for mounting screws
with friction factor 0.125

strength class 8.8

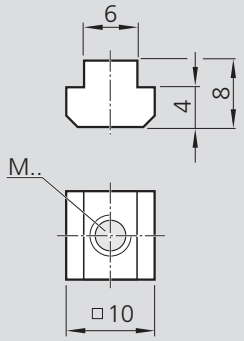
8.8	M5	M6
Nm	5.5	9.5

Mounting accessories for carriage superstructure

T-nuts

to DIN 508

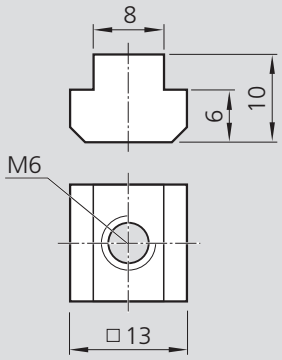
Size 15–70



Part number

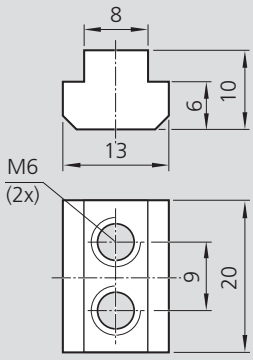
M4: 8447-004-01
M5: 8447-005-01

Size 20–85



Part number

8447-001-01



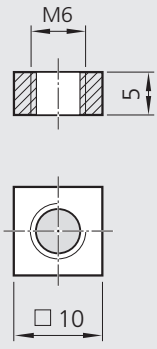
Part number

0391-750-03

Square nuts

to DIN 557

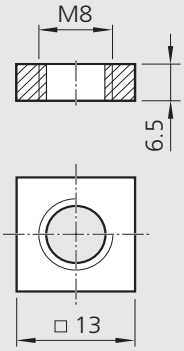
Size 15–70



Part number

8442-003-00

Size 20–85



Part number

8442-004-00

STAR – Linear Modules LKL, open type
Documentation

Standard report

Option 01

The standard report serves to confirm that the checks listed in the report have been carried out and that the measured values lie within the permissible tolerances.

Checks listed in the standard report:

– functional checks of mechanical components
– functional checks of electrical components
– design is in accordance with order confirmation

Frictional drag

Option 02

The moment of friction is measured over the entire travel range.

Positioning accuracy

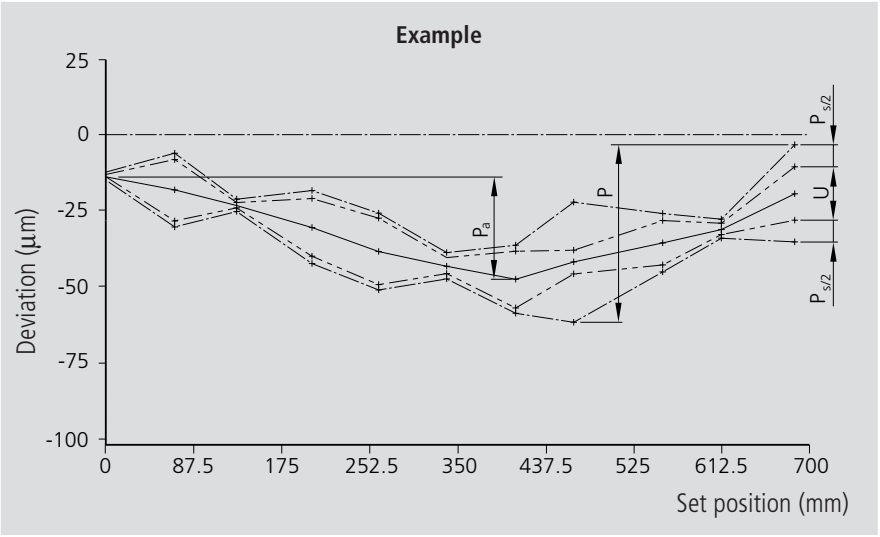
Option 05

to VDI/DGQ 3441

Measurement points are selected at irregular intervals along the travel. This allows even periodical deviations to be detected during positioning.

Each measurement point is approached several times from both sides.

This gives the following parameters:



Positioning accuracy P

The positioning accuracy corresponds to the total deviation.

It encompasses all the systematic and random deviations during positioning.

The positioning accuracy takes the following characteristic values into consideration:

– position deviation
– reversal range
– position variation range

Position deviation P_a

The position deviation corresponds to the maximum difference arising in the mean values of all the measurement points. It describes systematic deviations.

Reversal range U

The reversal range corresponds to the difference in mean values of the two approach directions. The reversal range is determined at every measurement point. It describes systematic deviations.

Position variation range P_s

The position variation range describes the effects of random deviations. It is determined at every measurement point.

STAR – Linear Modules LKL, open type
Inquiry/Order Form

Rexroth Star GmbH

D-97419 Schweinfurt

Telephone +49-9721-937-0
Telefax (general) +49-9721-937-275
Telefax (direct) +49-9721-937-350

STAR Linear Modules

Order example: Linear Module LKL 15-70, open type

Ordering data		Description
Linear Module LKL		Linear Module, open type
(Part number): 0355-400-00, 950 mm		LKL 15-70, length (L) = 950 mm
Length of cable set	= 3500 mm	Length of cable set = 3500 mm
Type	= MA01	with drive unit
Guideway	= 01	ball rail system
Drive unit	= 03	Motor LD2508
Carriage	= 03	carriage with length L_T = 251 mm
Power input cable	= 01	with flexible protective chain
Cover	= 01	PU bellows
Linear encoder	= 01	magnetic encoder
1st switch	= 11	PNP NC
2nd switch	= 11	PNP NC
3rd switch (reference)	= 13	PNP NO
Cable duct	= 20	cable duct
Socket/plug	= 17	socket/plug on switch side
Switching cam	= 16	with switching cam for switch activation
Documentation	= 02	measurement report: frictional drag

To be completed by customer: Inquiry ☐ / Order ☐

Linear Module

(Part number): _____ - _____ - _____, length _____ mm

Length of cable set = _____ mm

Type	= ☐☐☐☐
Guideway	= ☐☐
Drive unit	= ☐☐
Carriage	= ☐☐
Power input cable	= ☐☐
Cover	= ☐☐
Linear encoder	= ☐☐
1st switch	= ☐☐
2nd switch	= ☐☐
3rd switch (reference)	= ☐☐
Cable duct	= ☐☐
Socket/plug	= ☐☐
Switching cam	= ☐☐
Documentation	= ☐☐

Quantity ____ pcs, _____ per month, _____ per year, per order, or_____

Remarks:

From

Company: _____ **Name:** _____

Address: _____ **Department:** _____

_____ **Telephone:** _____

_____ **Telefax:** _____

engineering
mannesmann
Rexroth

REG. NO.
1617 - 03

Rexroth Star GmbH
D-97419 Schweinfurt
Germany

Telephone +49-9721-937-0

Telefax (general) +49-9721-937-275

Telefax (direct) +49-9721-937-250

www.rexroth-star.com

Linear Modules LKL
open type
RE 82 425/2000-02

Printed in Germany - p 2000

Rexroth
Star