LINE TECH

KE

COMPACT UNITS

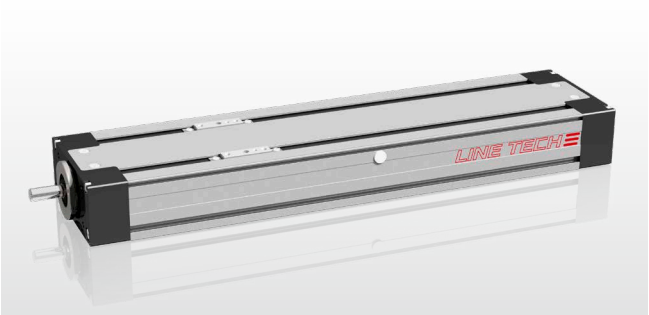
PRODUCT CATALOGUE

SWISS MADE LINEAR TECHNOLOGY

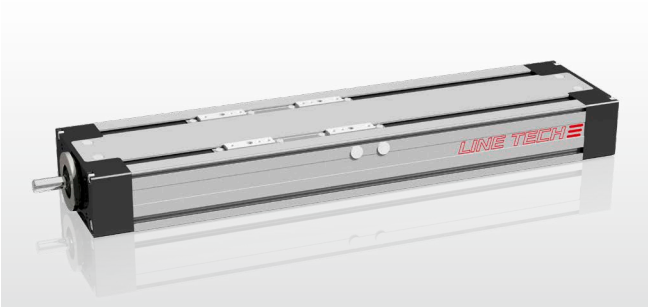
COMPACT UNITS

Product overview

KE...2...R...
Compact unit with one carriage and ball screw drive



KE...4...R...
Compact unit with two carriages and ball screw drive



KE...2...Z...
Compact unit with short carriage (2 runner blocks) and toothed belt drive

KE...4...Z...
Compact unit with long carriage (4 runner blocks) and toothed belt drive

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COMPACT UNITS

Product overview

LINE TECH compact units are precise, ready-to-install, modular linear systems with linear rail guides and ball screw or toothed belt drive, designed for high performance. Areas of application are linear systems for medium loads and high-precision requirements. Three sizes (KE**1**, KE**2** and KE**3 – with ball screw drive**) resp. one size (KE**2 – with toothed belt drive**) are currently available.

Advantages

- Compact size
- Optimal movement characteristics in conjunction with high load ratings and high rigidity provided by two (KE…2…) or four (KE…4…) integrated runner blocks
- Drive via ball screw or toothed belt
- Simple motor mounting via centring and mounting thread on the drive housing
- Lubrication via centralised lubrication points
- Customised layout for specific applications possible

Design

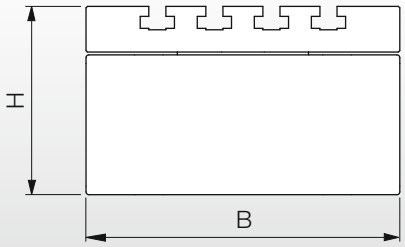
- Compact aluminium profile as base profile
- Ready-to-install compact units in any length
- Aluminium carriage

Options available on request

- Connecting plates (KE…V…)
- Motor attachments
- Limit switches
- Cross table mounting
- Multi-axis systems

KE...N...

KE...V...



Compact unit	Dimensions	Load ratings	
Type	B x H [mm]	C_0 [kN]	C [kN]
KE1.2...N...	90 x 40	11.2	6.5
KE1.2...V...	90 x 56	11.2	6.5
KE1.4...N...	90 x 40	22.5	13.0
KE1.4...V...	90 x 56	22.5	13.0
KE2.2...N...	110 x 50	35.0	18.0
KE2.2...V...	110 x 66	35.0	18.0
KE2.4...N...	110 x 50	70.0	36.0
KE2.4...V...	110 x 66	70.0	36.0
KE3.2...N...	145 x 65	59.9	34.2
KE3.2...V...	145 x 85	59.9	34.2
KE3.4...N...	145 x 65	119.9	68.4
KE3.4...V...	145 x 85	119.9	68.4

See pages 7 to 15 for further technical data.

COMPACT UNITS

Design fundamentals / Lubrication / Maintenance

LINE TECH Compact Units

LINE TECH compact units are modular, ready-to-install linear systems including the drive. Sealed guide elements are used in all sizes.
The guides and drive are protected against external influences such as dirt, debris, etc. by synthetic ribbons resp. by the toothed belt.
The base profile and cover profile are extruded aluminium alloy. Additional externally mounted limit switches in conjunction with motors and a control unit ensure the correct positioning of the carriage and prevent overshoot.
The design delivers very high performance with extremely compact dimensions.

Lubrication

The guide elements of LINE TECH compact units are pre-lubricated at the factory with Microlube GBU Y 131.

Correct and sufficient lubrication can significantly extend the service life of the compact units. Periodic lubrication should be conducted in accordance loads handled and field of application. In general, lubrication should be carried out every 500 hours.
All roller bearings used are lubricated for life and therefore require no maintenance.

Note: See pages 47–49 for information on the lubrication points.

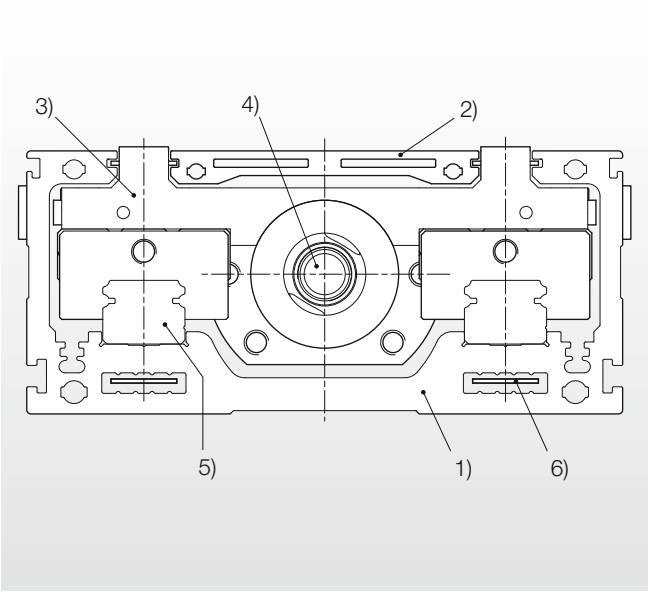
Maintenance

Except for periodic lubrication, LINE TECH compact units are maintenance free.

Operating temperature

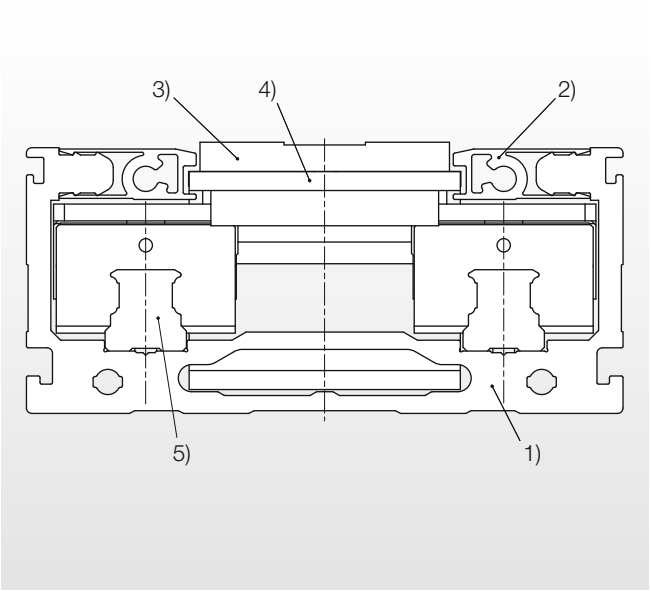
The permissible operating temperature of between 5 and 80 °C is determined by the plastic components.
The specifications of the respective manufacturers of motors and controls apply.

KE...R...
with ball screw drive



1) Base profil
2) Cover profile
3) One (KE…2…R…) or two (KE…4…R…) Carriages
4) Ball screw drive
5) Linear guide
6) Protective ribbons, circumferential

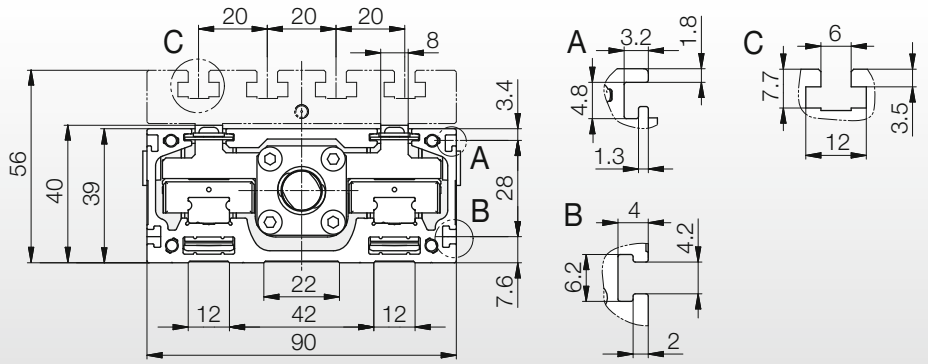
KE...Z...
with toothed belt drive



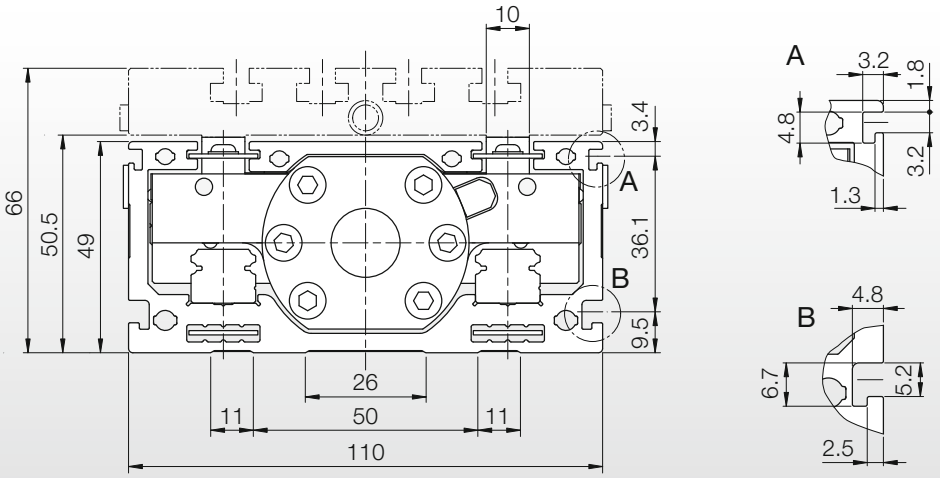
1) Base profile
2) Cover profile
3) Short (KE…4…Z…) or long (KE…4…Z…) Carriage
4) Toothed belt
5) Linear rail guide

Profile cross-sections KE...R...

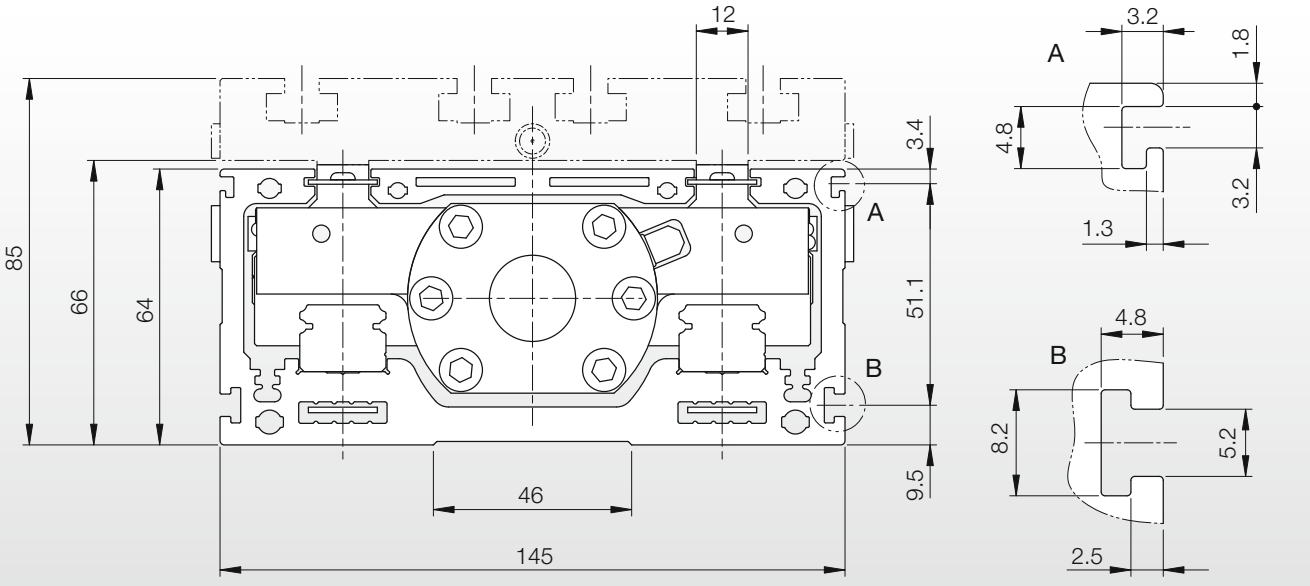
KE1...R...N



KE2...R...N



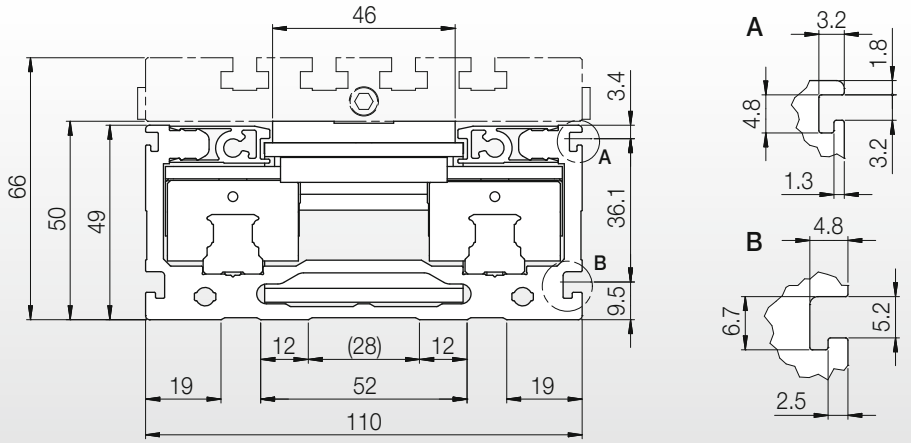
KE3...R...N



COMPACT UNIT WITH TOOTHED BELT DRIVE

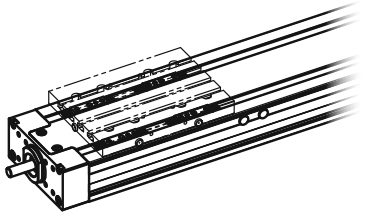
Cross section KE...Z...

KE2...Z...N



COMPACT UNITS WITH BALL SCREW DRIVE

Details for ball screw drive



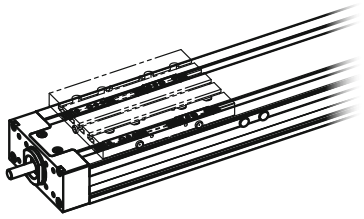
Details for ball screw drive (BSD)

KE	BSD	Axial load rates		Positioning accuracy	Repeating accuracy	Acceleration	Axial play		Idle torque
Size	d x p	C_0	C_{dyn}			a_{max}	Type	Axial play	
	[mm]	[N]	[N]	[µm/mm]	[mm]	[m/s²]		[mm]	[Nm]
KE1...R...	12 x 5	3333	3099	52/300	< 0.03 [1]	10.0	R	< 0.02	0.020
					< 0.01 [1]		V	—	0.090
	12 x 10	3333	3099	52/300	< 0.03 [1]	10.0	R	< 0.02	0.045
					< 0.01 [1]		V	—	0.180
KE2...R...	16 x 5	4551	4327	52/300	< 0.03 [1]	10.0	R	< 0.02	0.030
					< 0.01 [1]		V	—	0.100
	16 x 10	4551	4327	52/300	< 0.03 [1]	10.0	R	< 0.02	0.060
					< 0.01 [1]		V	—	0.200
	16 x 16	4551	4327	52/300	< 0.03 [1]	10.0	R	< 0.02	0.120
					< 0.01 [1]		V	—	0.320
KE3...R...	20 x 5	5705	4912	52/300	< 0.03 [1]	10.0	R	< 0.02	0.050
					< 0.01 [1]		V	—	0.120
	20 x 10	5705	4912	52/300	< 0.03 [1]	10.0	R	< 0.02	0.100
					< 0.01 [1]		V	—	0.250
	20 x 20	5705	4912	52/300	< 0.03 [1]	10.0	R	< 0.02	0.200
					< 0.01 [1]		V	—	0.400

d x p = screw diameter x thread pitch
[1] backlash not factored in
R = reduced play
V = preloaded

COMPACT UNITS WITH BALL SCREW DRIVE

General technical details for compact units



General technical details for compact units

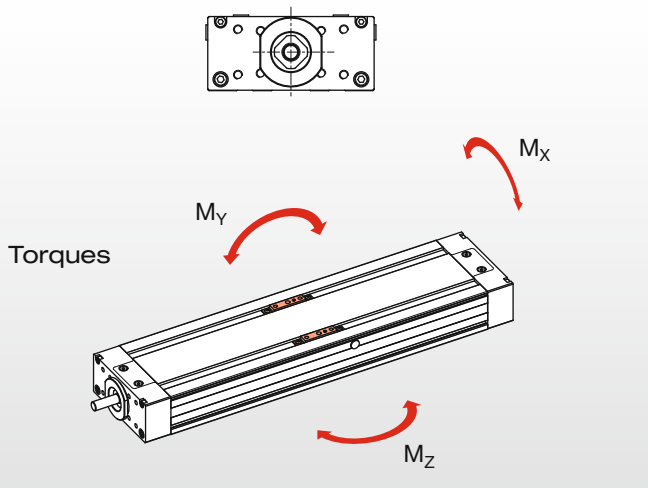
KE...R...	Movement speed		Moments of inertia		Stroke max.	Protective ribbons	Feed and friction force	Moved mass
	Guide	Drive	Z / Y / Y / Z					
Type	v_{max}	v_{max}	I_Y	I_Z			F_V	m_b
	[m/s]	[m/s]	[cm⁴]	[cm⁴]	[mm]		[N]	[kg]
KE1.2...R...	3.0	2)	11.5	95.5	1315	without	8.00	0.370
						with	12.00	
KE1.4...R...	3.0	2)	11.5	95.5	1250	without	12.00	0.680
						with	16.00	
KE2.2...R...	5.0	2)	29.4	242.5	1375	without	10.00	0.790
						with	15.00	
KE2.4...R...	5.0	2)	29.4	242.5	1290	without	15.00	1.370
						with	20.00	
KE3.2...R...	5.0	2)	93.3	746.0	1850	without	15.00	1.460
						with	20.00	
KE3.4...R...	5.0	2)	93.3	746.0	1750	without	20.00	2.470
						with	25.00	

2) for ball screw drive, dependent on rotational speed characteristics, spindle length and relevant critical rotational speed.

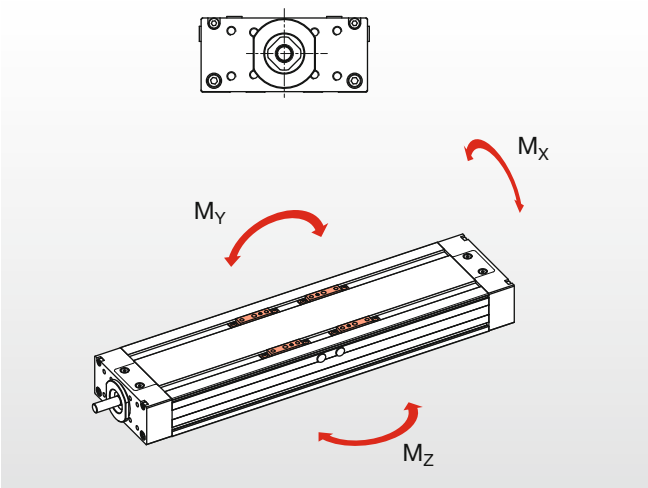
COMPACT UNITS WITH BALL SCREW DRIVE

Load ratings and torques

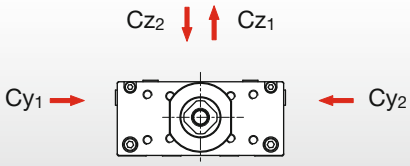
KE...2...R...
with one carriage



KE...4...R...
with two carriages



Load ratings



Compact unit Type	Maximum permissible load [kN]				Maximum permissible torque [Nm]					
	static		dynamic		static			dynamic		
	$C_{y0\,1,2}$	$C_{z0\,1,2}$	$C_{y1,2}$	$C_{z1,2}$	M_{x0}	M_{y0}	M_{z0}	M_x	M_y	M_z
KE1.2...R...	11.2	11.2	6.5	6.5	275	60	60	158	35	35
KE1.4...R...	22.5	22.5	13.0	13.0	550	330	330	316	210	210
KE2.2...R...	35.0	35.0	18.0	18.0	1064	204	204	590	226	226
KE2.4...R...	70.0	70.0	36.0	36.0	2120	1400	1392	1180	1180	1180
KE3.2...R...	59.9	59.9	34.2	34.2	2427	266	266	1507	202	202
KE3.4...R...	119.9	119.9	68.4	68.4	4854	2100	2100	3014	2044	2044

Note on dynamic load ratings and torques

The determination of dynamic load ratings and torques is based on a 50,000 m stroke. If comparative values must be calculated for a 100,000 m stroke, the values for M_x, M_y, M_z and C must be divided by the factor 1.26.

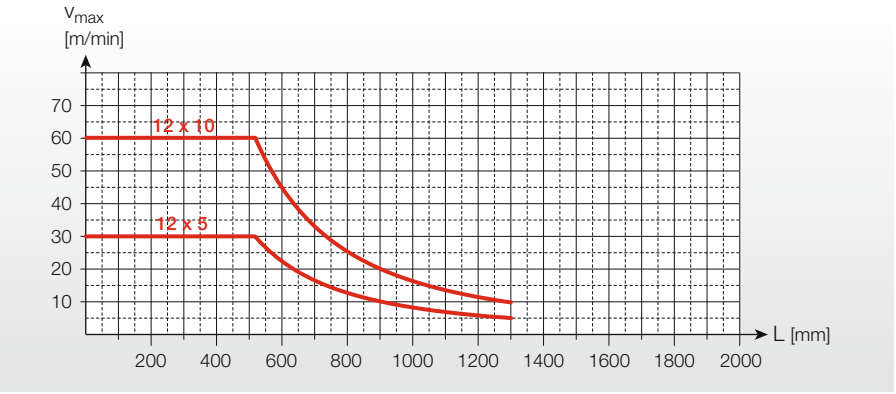
Expedient load

With a view to serviceable life, loads of less than 20% of the dynamic load ratings have generally proved to be expedient.

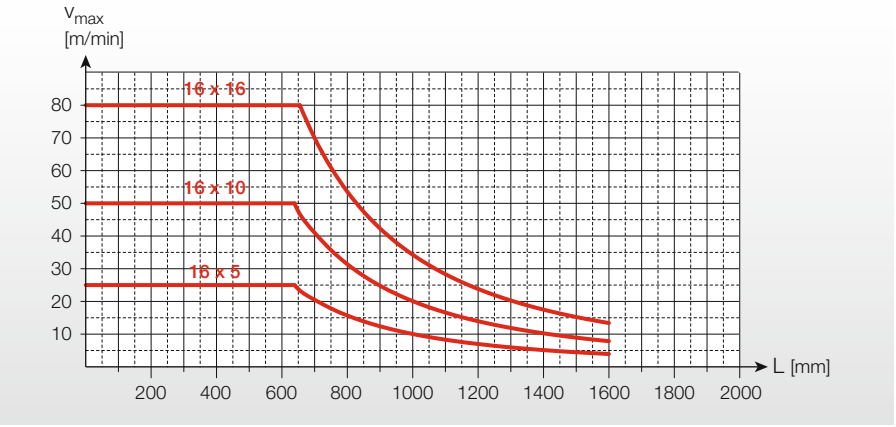
Permissible speeds

Permissible speeds...

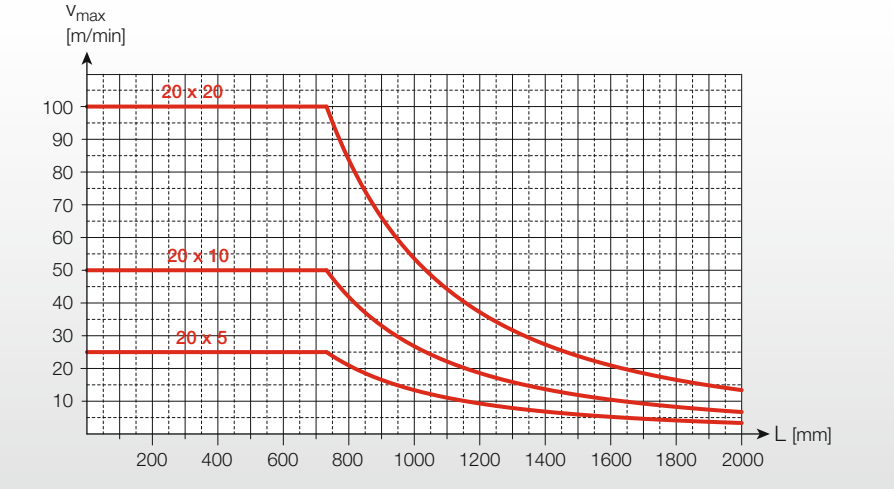
... for KE1...R... with ball screw drive ø 12 x ... [1)]



... for KE2...R... with ball screw drive ø 16 x ... [1)]



... for KE3...R... with ball screw drive ø 20 x ... [1)]



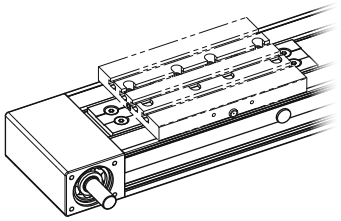
Attention:
For ball screw drive, note the rotational speed characteristics, spindle length and relevant critical rotational speed.

Please also note the motor speeds!

[1)] higher accuracy on request
L = overall length of compact unit

COMPACT UNIT WITH TOOTHED BELT DRIVE

Data for toothed belt drive



Technical data for toothed belt drive

KE...Z...	Toothed belt drive				Axial load rating	Positioning accuracy	Repeating accuracy	Accel-eration
Size	Type/Pitch	Toothed pinion $d_3 \times l_R$ [mm]	Stroke/R [mm]	Elongation 2) [mm/m]	F [N]	[µ/mm]	.../1000 mm [mm]	a_{max} [m/s²]
KE2...Z...	HTD5M	38.2 x 54	120	0.084	1)	200/1000 2)	< 0.20 2)	50.0 1)

$d_3 \times l_R$ = Pinion diameter x Pinion width

1) Depends on speed and load
➞ see "Permissible speeds" chart on page 13
2) Belt elongation/metre [mm/m] per 100 N tensile force

General technical data for compact units with toothed belt drive

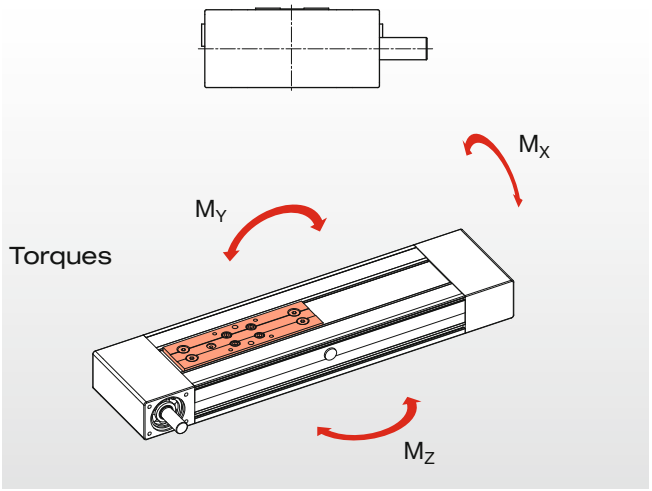
KE...Z...	Travel speed		Area moment of inertia		Stroke 4) max.	Feed and friction force	Mass transported
	Guide	Drive					
Type	v_{max} [m/min]	v_{max} [m/min]	I_Y [cm⁴]	I_Z [cm⁴]	[mm]	F_V [N]	m_b [kg]
KE2.2...Z...	300	3)	32.7	282.9	5700	20	1.29
KE2.4...Z...	300	3)	32.7	282.9	5700	40	2.24

3) Depends on load, rotation speed, and permissible travel speed of the guides
➞ see "Permissible speeds" chart on page 13
4) Longer strokes on request

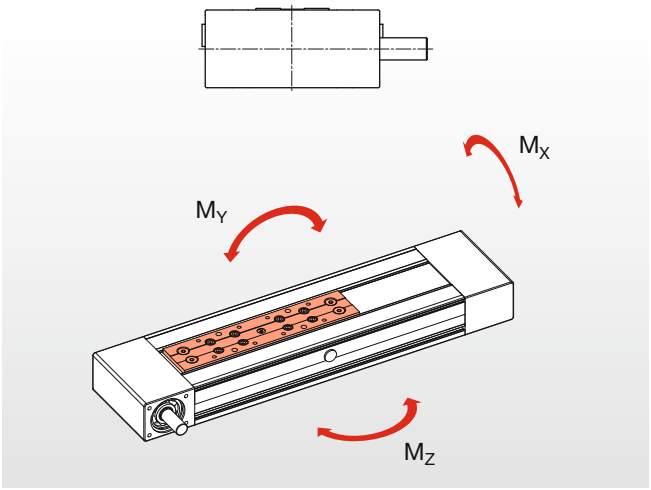
COMPACT UNIT WITH TOOTHED BELT DRIVE

Load ratings and torques

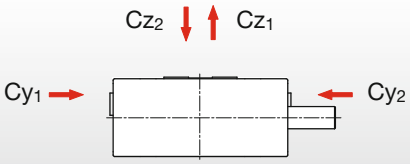
KE2.2...Z...
with short carriage (2 runner blocks)



KE2.4...Z...
with long carriage (4 runner blocks)



Load ratings



Compact unit	Maximum permissible forces [kN]				Maximum permissible torques [Nm]					
Type	static		dynamic		static			dynamic		
	$C_{y_{0\,1,2}}$	$C_{z_{0\,1,2}}$	$C_{y_{1,2}}$	$C_{z_{1,2}}$	M_{x_0}	M_{y_0}	M_{z_0}	M_x	M_y	M_z
KE2.2...Z...	35	35	18	18	1064	204	204	590	226	226
KE2.4...Z...	70	70	36	36	2120	1926	1820	1180	1542	1542

Permissible speed

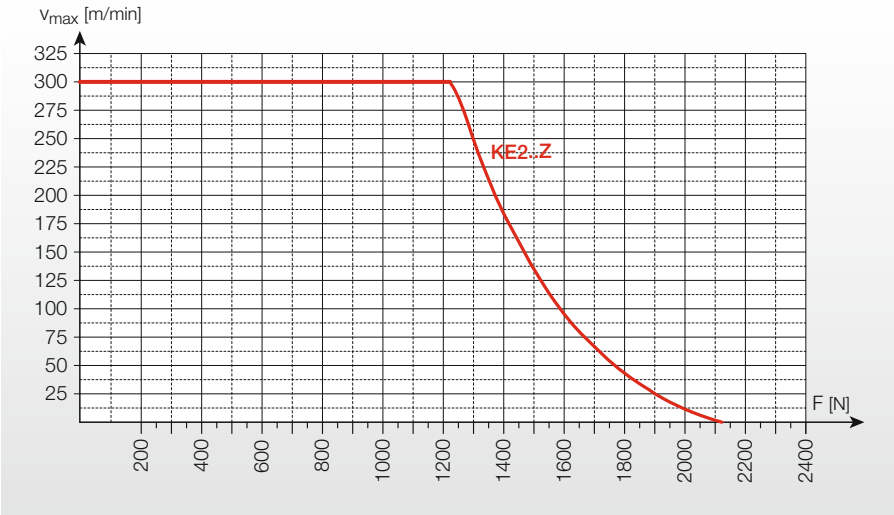
Permissible speeds...

F = axial load

Attention:
With toothed belt drive, the permissible travelling speed of the linear rail guides and the load F are critical!

Please also note the motor speeds!

... for KE2...Z... with toothed belt drive



Permissible deflection (1/2; for KE1... and KE2...)

Permissible deflection

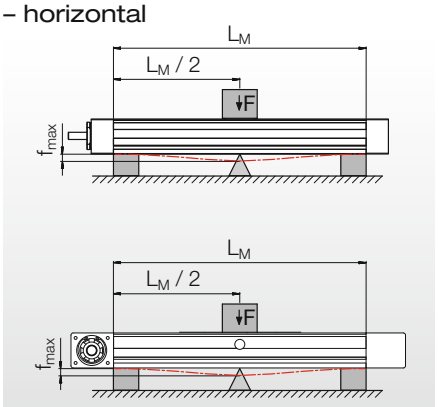
Compact modules may be mounted self-supporting regardless of the drive type. However, the deflection (which limits the possible load) must be taken into consideration.
If the maximum permissible deflection is exceeded, the compact units must be additionally supported.

The maximum permissible deflection is limited by the maximum deflection angle of 5'. This value being exceeded will have an impact on the unit's life-cycle.
If increased demands are made on system accuracy we recommend supporting the linear modules along its entire length.

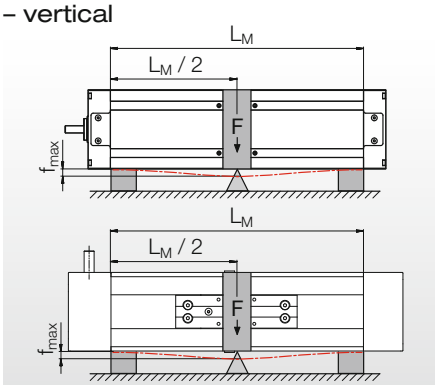
The following diagrams apply for:
- Firm clamping (40–50 mm per side)
- 3–4 screws per side
- Solid base

Mounting positions:

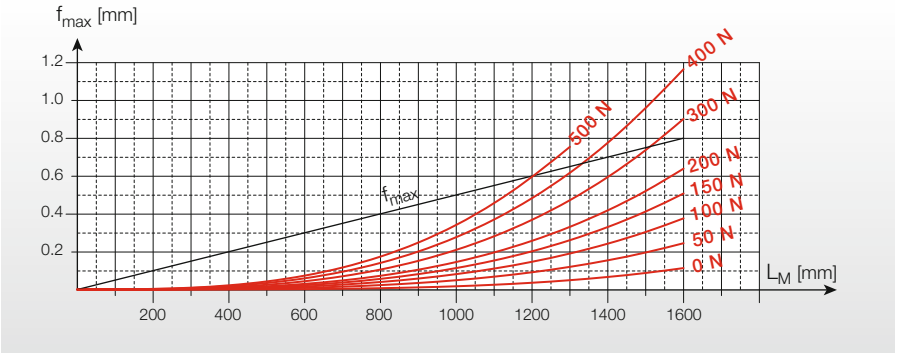
– horizontal



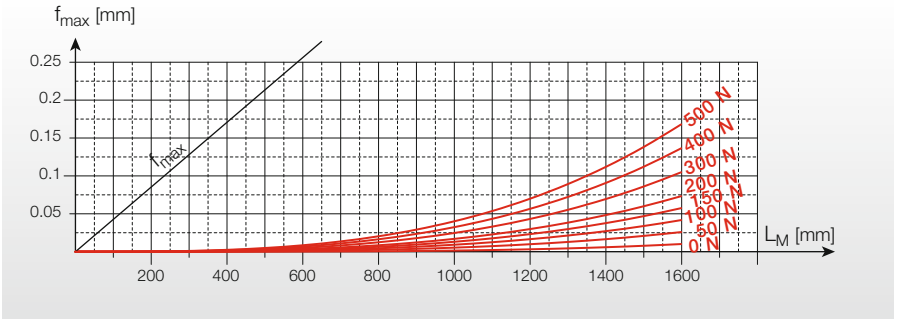
– vertical



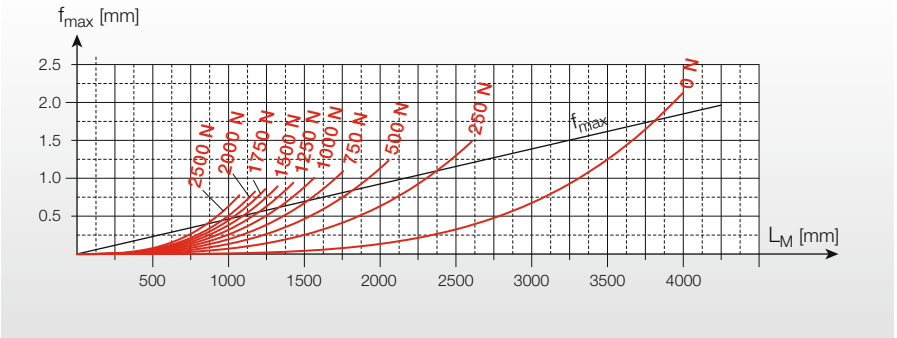
KE1...R... horizontal



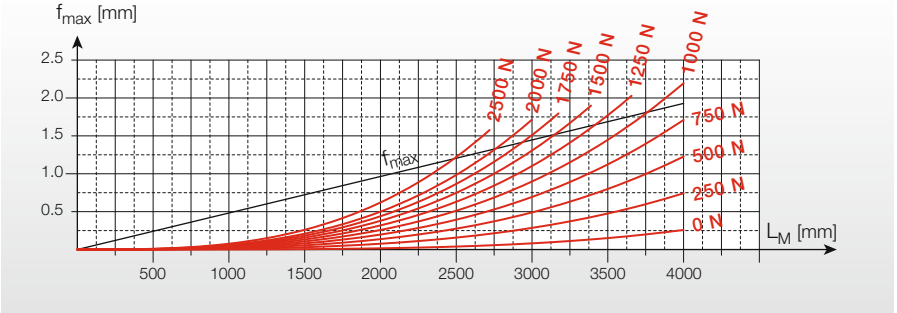
KE1...R... vertical



KE2...R/Z... horizontal

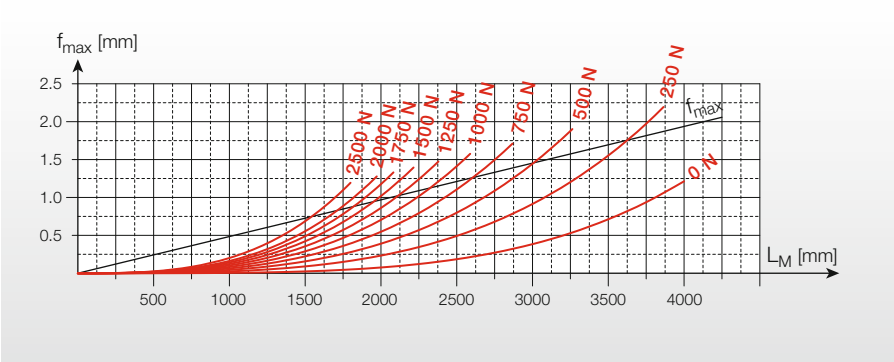


KE2...R/Z... vertical

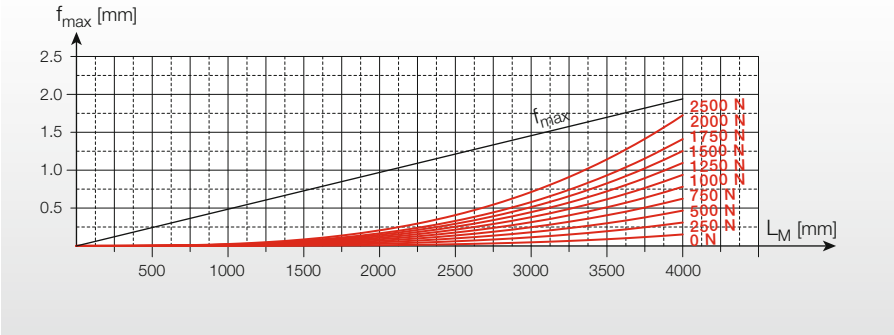


Permissible deflection (2/2; for KE3...)

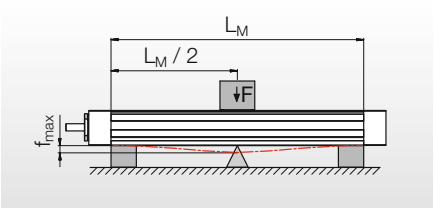
KE3...R... horizontal



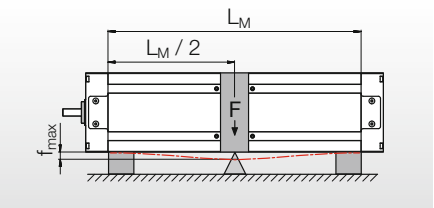
KE3...R... vertical



Mounting positions:
– horizontal



– vertical



COMPACT UNITS WITH BALL SCREW DRIVE

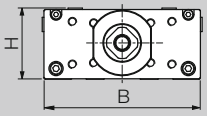
Designation system

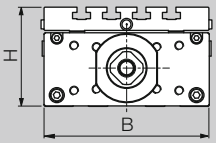
Compact unit (sample designation)

KE | 2 | . | 2 | . | 0200 | A | R | 005 | . | 0 | .

Design
KE = compact unit with linear guides

Size
1 = size 90 mm
2 = size 110 mm
3 = size 145 mm





Size	KE...N... B x H [mm]	KE...V... B x H [mm]
1	90 x 40	90 x 56
2	110 x 50	110 x 66
3	145 x 65	145 x 85

Configuration
2 = 2 runner blocks (1 carriage)
4 = 4 runner blocks (2 carriages)

Stroke absolut [mm]

Protective covering
A = synthetic ribbons ***
N = without protective ribbons

Drive
R = rolled ball screw ***
N = without drive

Stroke per revolution [mm]
005 / 010 = size 1; ball screw with a pitch of 5 or 10 mm
005 / 010 / 016 = size 2; ball screw with a pitch of 5, 10 or 16 mm
005 / 010 / 020 = size 3; ball screw with a pitch of 5, 10 or 20 mm
... = other pitch [1)]

Limit switches
0 = without limit switch
1 = 2 limit switches, reference point at front (drive side); limit switch designs N and C are possible
2 = 2 limit switches, reference point at rear (opposite drive side); limit switch designs N and C are possible
3 = 2 limit switches + additional reference switch at front (drive side); only limit switch design N is possible
4 = 2 limit switches + additional reference switch at rear (opposite drive side); only limit switch design N is possible

* seen from motor opposite side towards motor
** available for lateral motor mounting only
*** standard version
1) on request

01 . 0 N - N 7 R N N N

5 8 3 _ _ _ → 583... = Drawing type

Buffers

N = with integrated buffers

Limit switch design

N = with plain-end cable, L = 2.0 m ***
C = with connector plug M8 (with max. 2 limit switches; see p. 16)

Mounting position of limit switches

N = without limit switches ***
L = limit switches mounting left *
R = limit switches mounting right *

Preload ball screw drive (BSD)

V = BSD preloaded ***
R = BSD with reduced play
N = without drive

Tolerance class ball screw (BSD)

7 = Tolerance class BSD: T7 (52 µm/300 mm) ***
N = without drive

Connecting plate (see pages 40/41)

N = without connecting plate ***
V = with connecting plate

Motor mounting

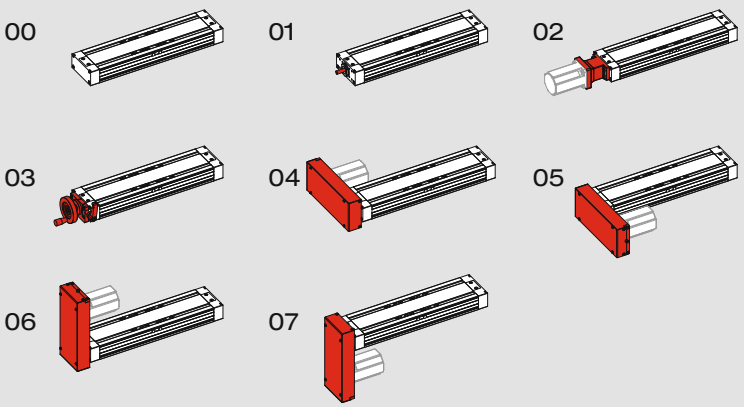
N = without motor mounting ***
F = mounting plate for standard motor
S = mounting plate for special motor

Reduction

0 = without reduction (1:1) ***
1 = reduction 1:1.5 **
2 = reduction 1:2 **

Delivery condition (see page 18)

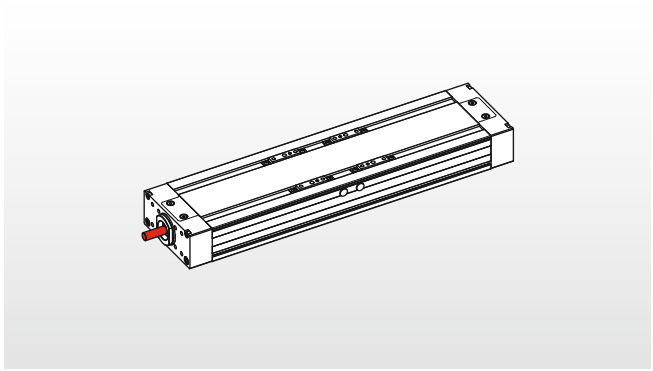
00 = without drive
01 = free spindle end ***
02 = with coupling and intermediate plate
03 = with crank and clamp
04 = set up for lateral motor mounting right *
05 = set up for lateral motor mounting left *
06 = set up for lateral motor mounting top
07 = set up for lateral motor mounting bottom



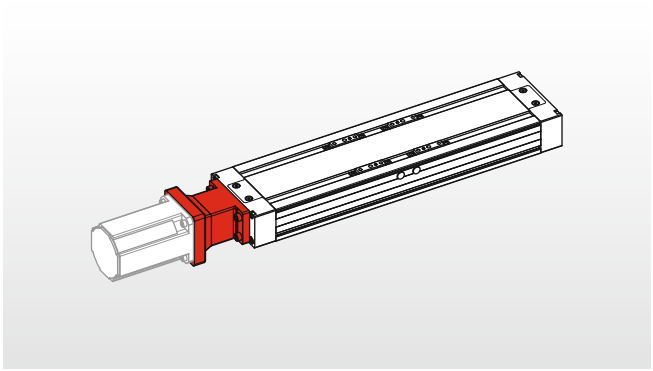
Motor fitting preparation – delivery conditions with ball screw drive

LINE TECH compact units with ball screw drive can be ordered in various delivery conditions in preparation for motor mounting.
Dimensions see pages 36/37.

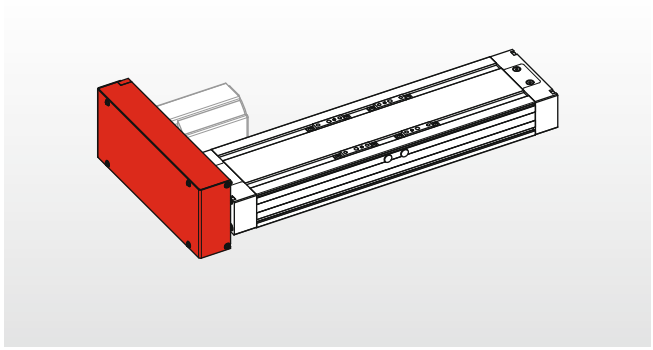
Delivery condition 01
Free spindle end



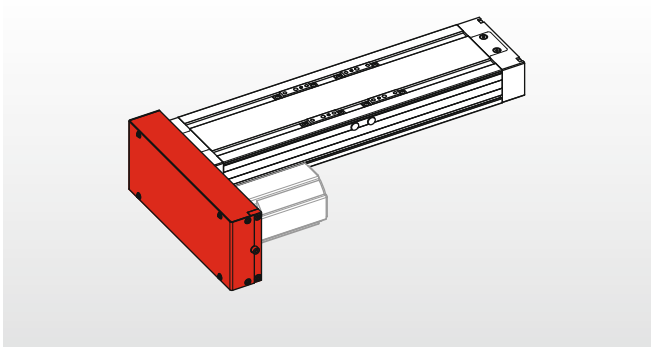
Delivery condition 02
With coupling and intermediate plate



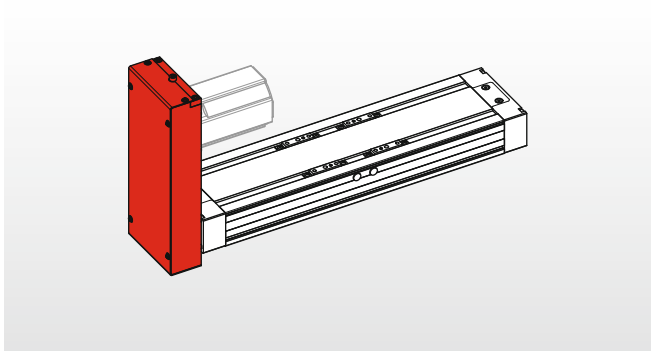
Delivery condition 04
Belt drive housing for side motor mounting right*



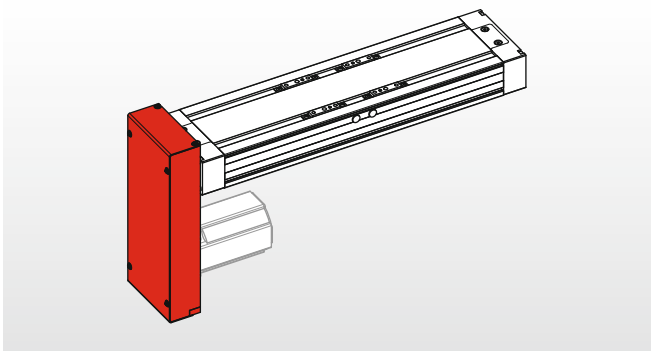
Delivery condition 05
Belt drive housing for side motor mounting left*



Delivery condition 06
Belt drive housing for lateral motor mounting top



Delivery condition 07
Belt drive housing for lateral motor mounting bottom

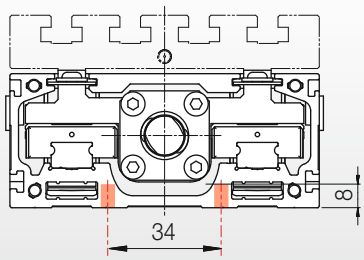


* seen from motor opposite side towards motor

COMPACT UNIT WITH BALL SCREW DRIVE

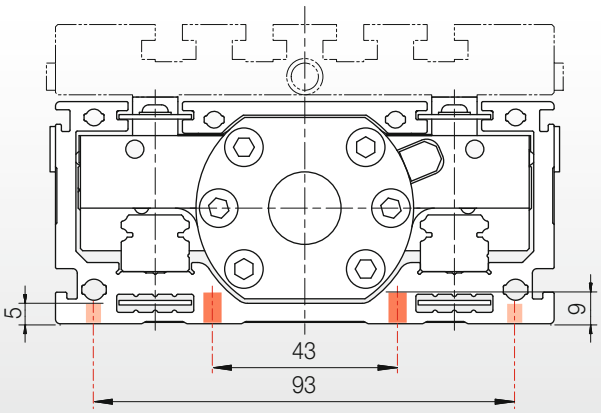
Areas for optional additional threads or holes in the base profile *

KE1...R...



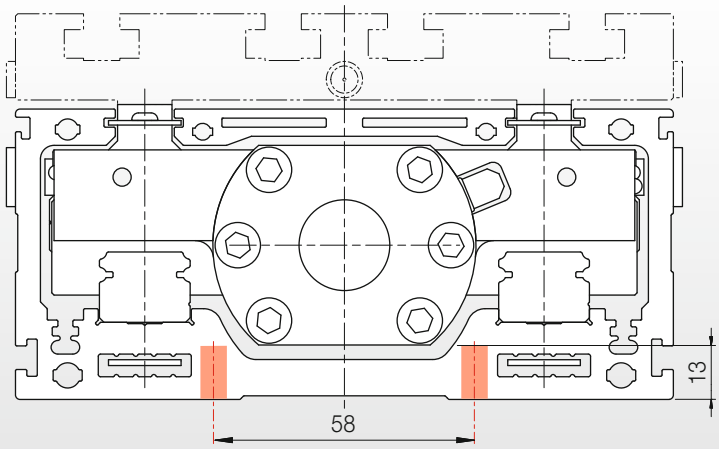
Positions for optional threaded holes ≤ M4 x 8 mm or positioning holes ≤ ø4 x 8 mm

KE2...R...



Positions for optional threaded holes ≤ M5 x 9 mm or positioning holes ≤ ø5 x 9 mm
Positions for optional threaded holes ≤ M4 x 5 mm or positioning holes ≤ ø4 x 5 mm

KE3...R...

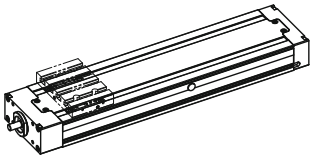


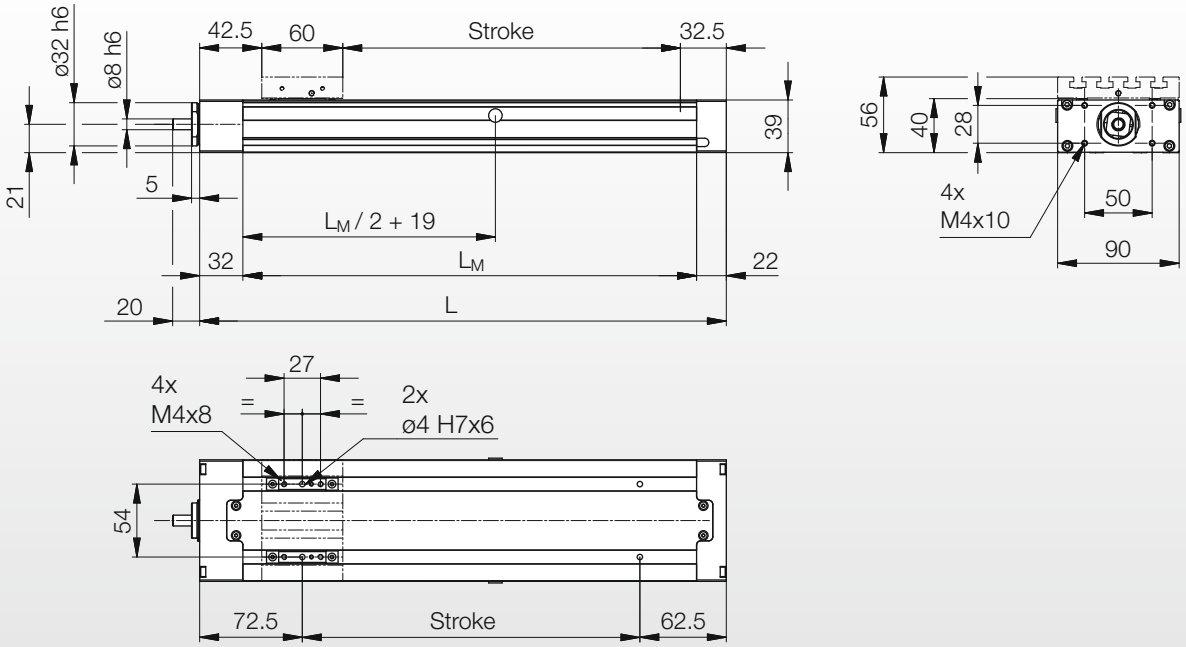
Positions for optional threaded holes ≤ M6 x 13 mm or positioning holes ≤ ø6 x 13 mm

* along the entire profile length L_M, see pages 20–25

COMPACT UNIT KE1.2...R...

with 1 carriage and ball screw drive

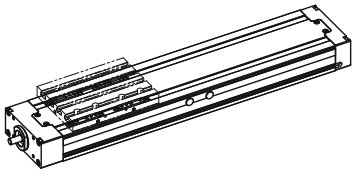


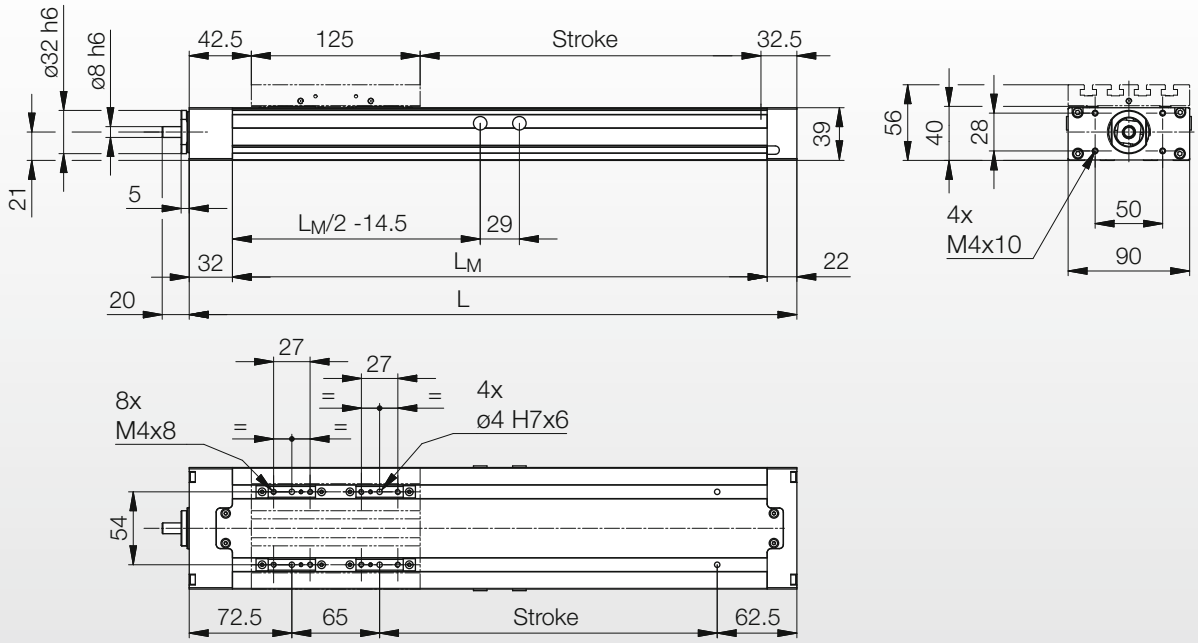


Nominal size	Dimensions				
Designation	L [mm]	L_M [mm]	Length ball screw [mm]	Length protective ribbon [mm]	Weight [kg]
KE1.2...R...	Stroke + 135	L – 54	L + 12	2 x Stroke + 220	1.77 kg + 0.410 kg/100 mm Stroke

COMPACT UNIT KE1.4...R...

with 2 carriages and ball screw drive

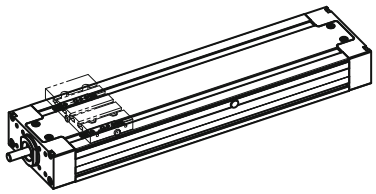


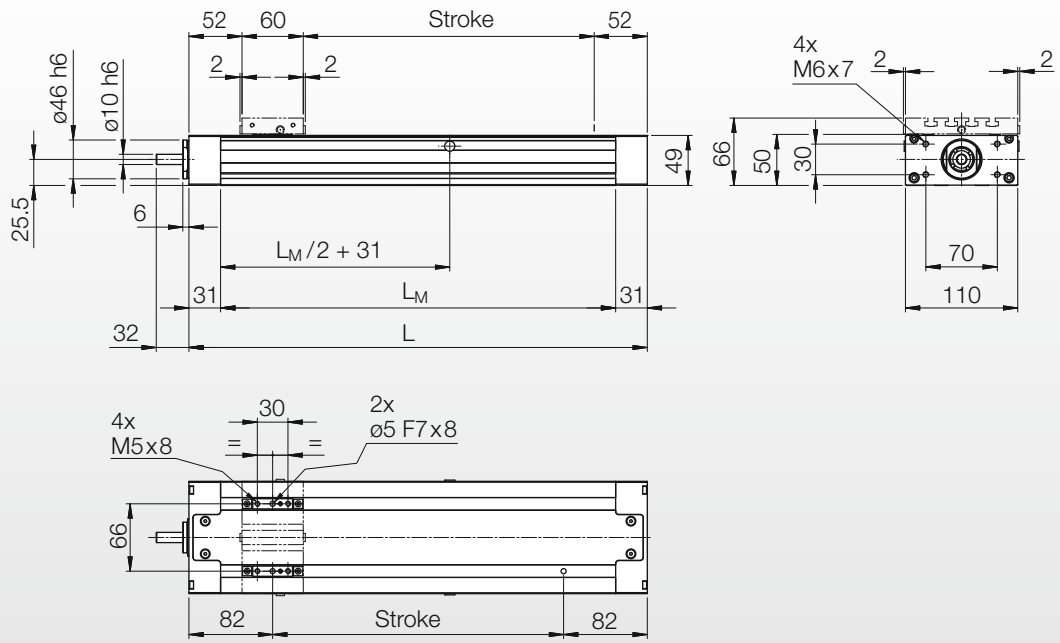


Nominal size	Dimensions				
Designation	L [mm]	L_M [mm]	Length ball screw [mm]	Length protective ribbon [mm]	Weight [kg]
KE1.4...R...	Stroke + 200	L – 54	L + 12	2 x Stroke + 285	2.35 kg + 0.410 kg/100 mm Stroke

COMPACT UNIT KE2.2...R...

with 1 carriage and ball screw drive

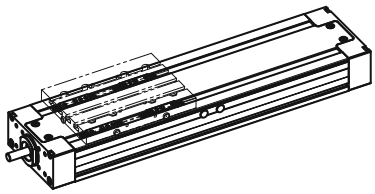


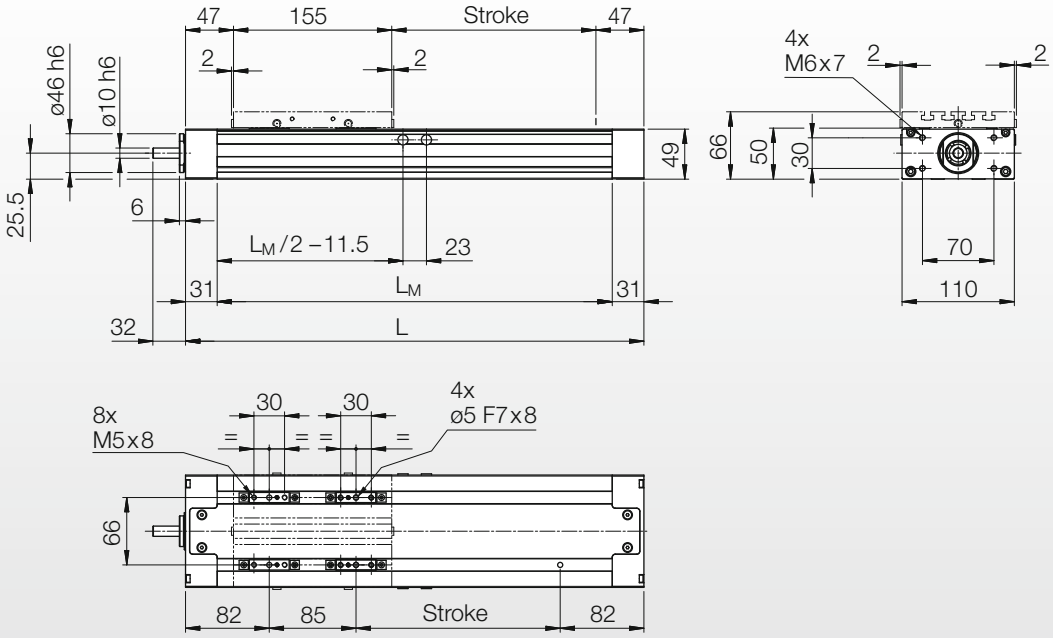


Nominal size	Dimensions				
Designation	L [mm]	L_M [mm]	Length ball screw [mm]	Length protective ribbon [mm]	Weight [kg]
KE2.2...R...N	Stroke + 164	L – 62	L + 16	2 x Stroke + 294	1.90 kg + 0.852 kg/100 mm Stroke

COMPACT UNIT KE2.4...R...

with 2 carriages and ball screw drive

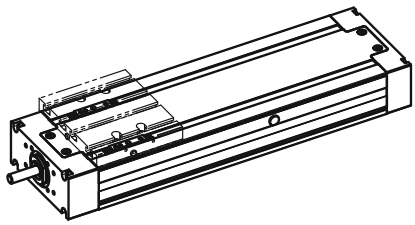


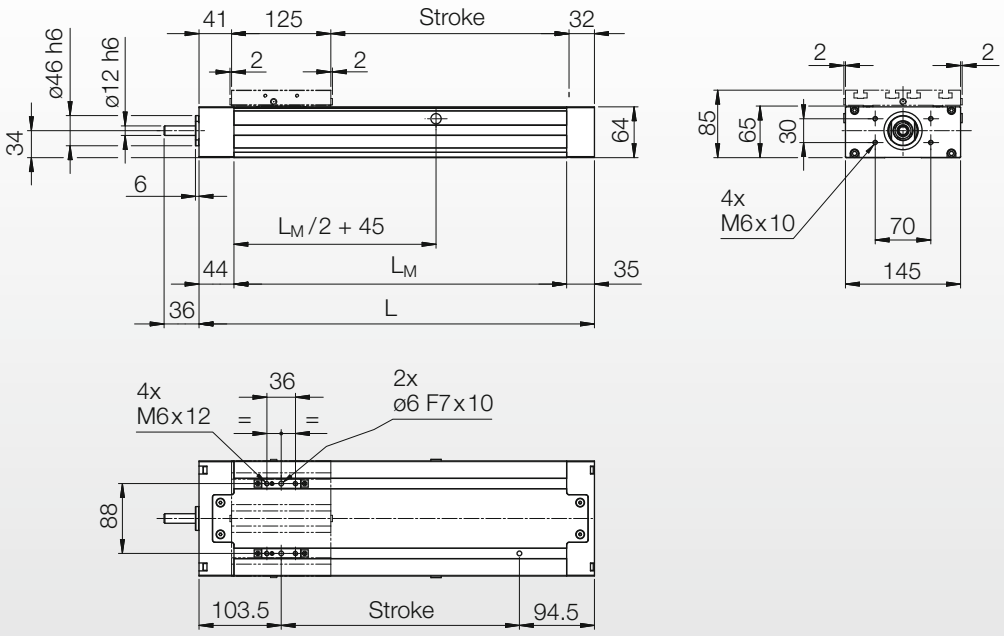


Nominal size	Dimensions				
Designation	L [mm]	L_M [mm]	Length ball screw [mm]	Length protective ribbon [mm]	Weight [kg]
KE2.4...R...N	Stroke + 249	L – 62	L + 16	2 x Stroke + 379	3.25 kg + 0.852 kg/100 mm Stroke

COMPACT UNIT KE3.2...R...

with 1 carriage and ball screw drive

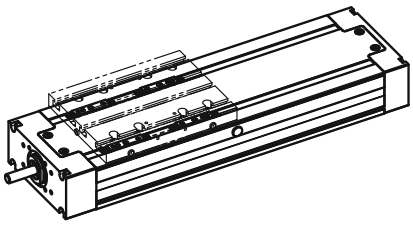


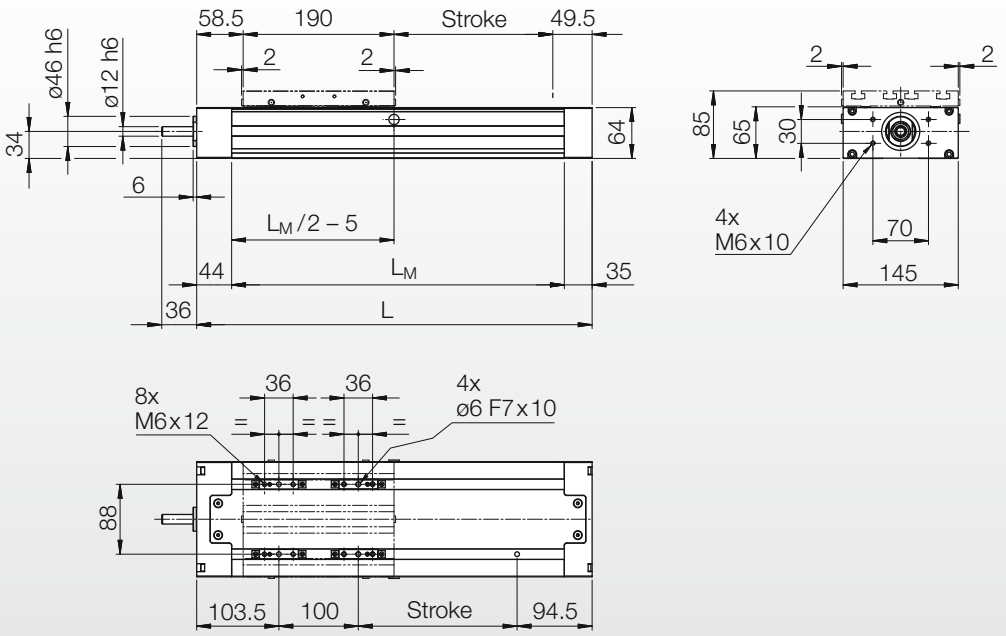


Nominal size	Dimensions				
Designation	L [mm]	L_M [mm]	Length ball screw [mm]	Length protective ribbon [mm]	Weight [kg]
KE3.2...R...	Stroke + 198	L – 79	L + 17	2 x Stroke + 354	5.40 kg + 1.232 kg/100 mm Stroke

COMPACT UNIT KE3.4...R...

with 2 carriages and ball screw drive





Nominal size	Dimensions				
Designation	L [mm]	L_M [mm]	Length ball screw [mm]	Length protective ribbon [mm]	Weight [kg]
KE3.4...R...	Stroke + 298	L – 79	L + 17	2 x Stroke + 454	7.62 kg + 1.232 kg/100 mm Stroke

COMPACT UNIT WITH TOOTHED BELT DRIVE

Designation system

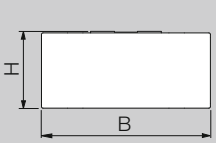
Compact unit (Designation example) KE 2 . 2 . 0500 N Z 120 . 0 .

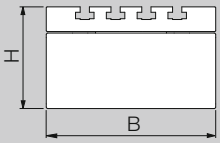
Design

KE = Compact unit with linear rail guides

Size (BxH)

2 = Size 110 mm





Size	KE...N... B x H [mm]	KE...V... B x H [mm]
2	110 x 50	110 x 66

Configuration

2 = 2 runner blocks (short carriage)
4 = 4 runner blocks (long carriage)

Stroke absolute [mm]

Covering

N = without cover

Drive

Z = Toothed belt drive

Stroke per revolution [mm]

120 = Size 2 – toothed belt with 120 mm stroke per revolution

Limit switches (see pages 34)

0 = without limit switches
1 = with 2 limit switches with plain-end cable (L = 2.0 m)
2 = with 2 limit switches with connector plug M8
3 = with 3 limit switches with plain-end cable (L = 2.0 m), reference switch at front (motor side) **
4 = with 3 limit switches with plain-end cable (L = 2.0 m), reference switch at rear (opposite motor side) **

* View towards motor from the opposite side
** Possible only with limit switch versions with plain-end cable
*** Standard version

12 . 0 N - N N N N N

5 8 4 _ _ → 584... = Drawing type

Buffers

N = with integrated buffers

Limit switch installation position (see page 34)

N = without limit switch
L = left *
R = right *

Gearbox mounting (see page 30)

N = without connecting plate
D = top / rear
E = top / front
F = rear / bottom
G = rear / top
H = front / top
K = front / bottom
L = bottom / front
M = bottom / rear

Drive shaft

N = Standard drive shaft ***
H = Shaft for angular gearbox HPG030
S = Shaft for angular gearbox HPG045

Connecting plate (see pages 42/43)

N = without connecting plate ***
V = with connecting plate

Motor mounting

N = without motor mount ***
F = Connecting plate for standard motor
S = Connecting plate for special motor

Gear ratio (for available gear ratios HPG030/HPG045 see page 39)

0 = none (without gearbox)
X = i = 1 : _____ (gear ratio)

Delivery condition (see pages 28/29)

11 = Free shaft end right *
12 = Free shaft end left *

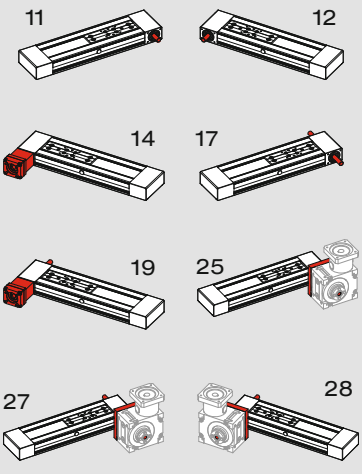
13 = Shaft end right with coupling and intermediate flange *
14 = Shaft end left with coupling and intermediate flange *

17 = Free shaft ends on both sides (continuous shaft)

18 = Shaft end on both sides, with coupling and intermediate flange on right *
19 = Shaft end on both sides, with coupling and intermediate flange on left *

25 = Shaft end right with gearbox connecting plate *
26 = Left shaft end with gearbox connecting plate *

27 = Shaft end on both sides, with gearbox connecting plate on the right *
28 = Shaft end on both sides, with gearbox connecting plate on the left *



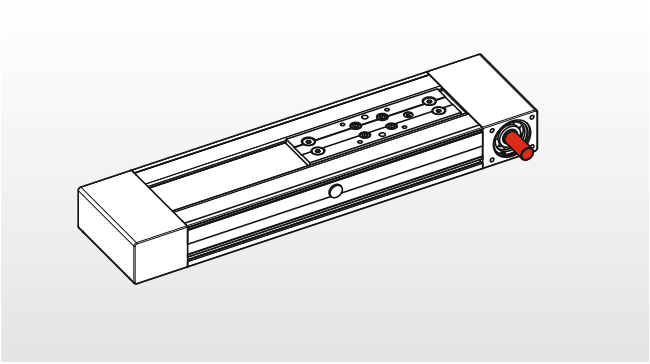
COMPACT UNIT WITH TOOTHED BELT DRIVE

Notes on selection » Preparation for motor mounting (1/3)

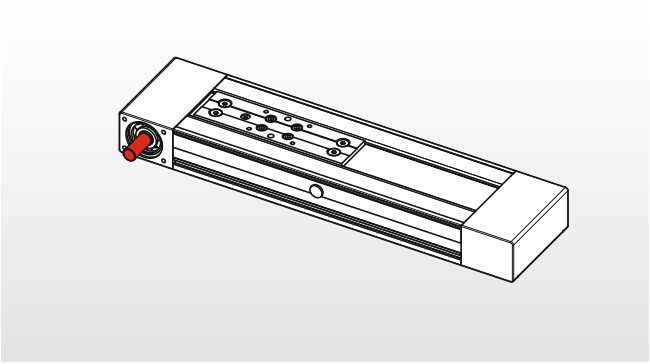
Preparation for motor mounting – delivery conditions with toothed belt drive

LINE TECH compact units with toothed belt drive can be ordered in various delivery conditions in preparation for motor mounting. For dimensions, see pages 38/39.

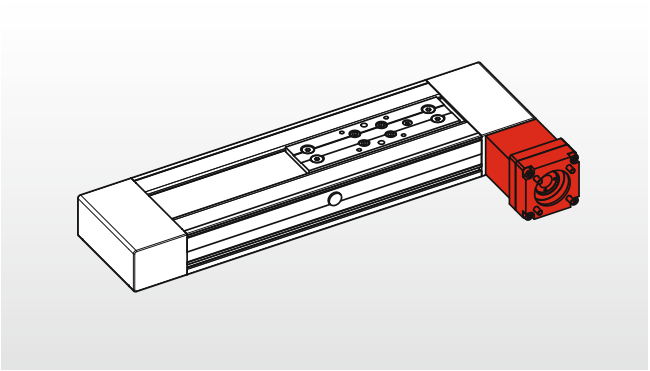
Delivery condition 11
Free shaft end on right *



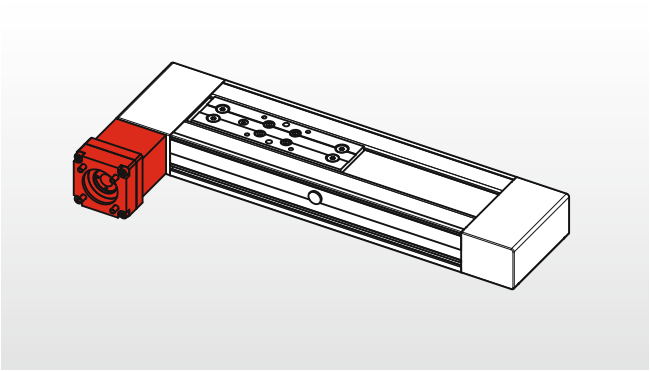
Delivery condition 12
Free shaft end on left *



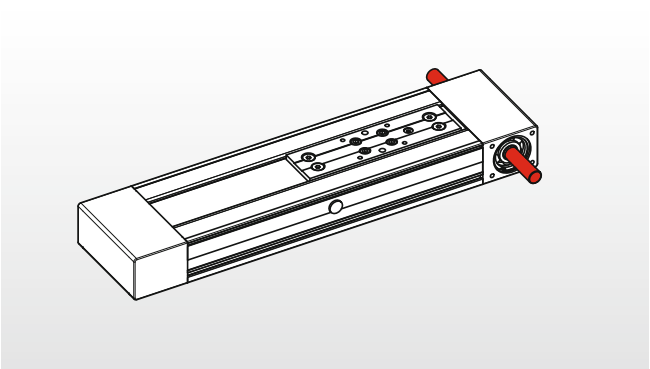
Delivery condition 13
Shaft end on right* with coupling and motor flange



Delivery condition 14
Shaft end on left* with coupling and motor flange



Delivery condition 17
Free shaft ends on both sides

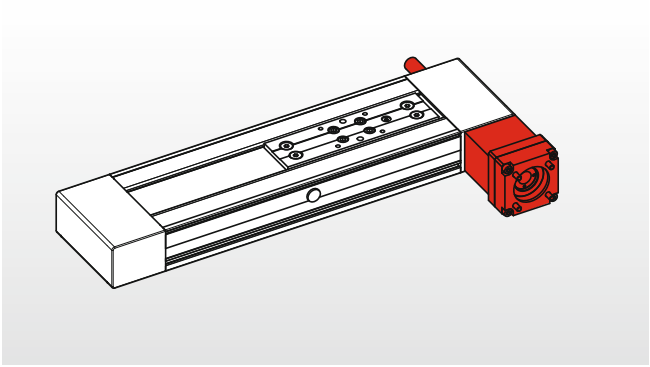


* View towards motor from the opposite side

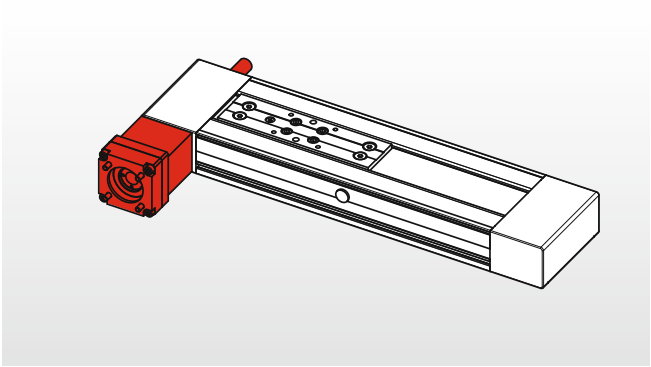
COMPACT UNIT WITH TOOTHED BELT DRIVE

Notes on selection » Preparation for motor mounting (2/3)

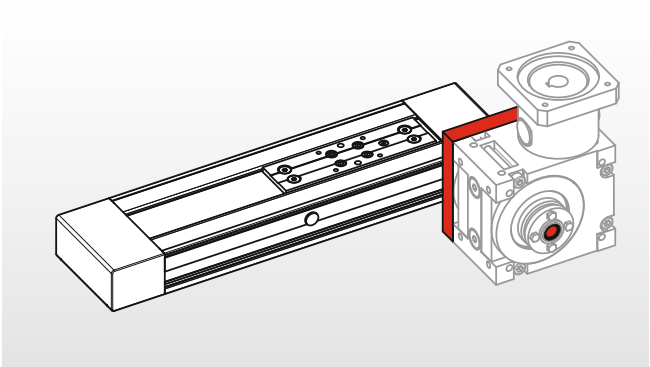
Delivery condition 18
Shaft ends on both sides, right* with coupling and motor flange



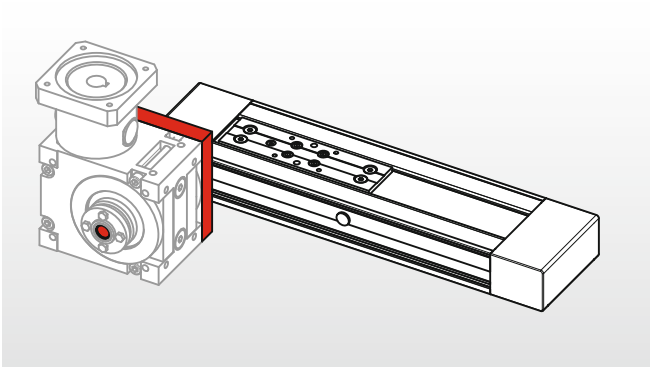
Delivery condition 19
Shaft ends on both sides, left* with coupling and motor flange



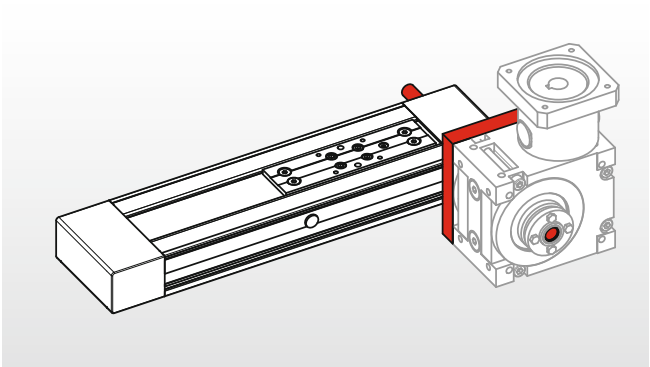
Delivery condition 25
Shaft end on right* with gearbox connecting plate



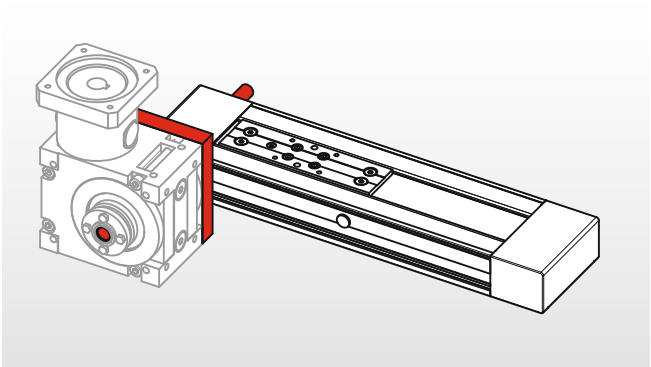
Delivery condition 26
Shaft end on left* with gearbox connecting plate



Delivery condition 27
Shaft ends on both sides, right* with gearbox connecting plate



Delivery condition 28
Shaft ends on both sides, left* with gearbox connecting plate



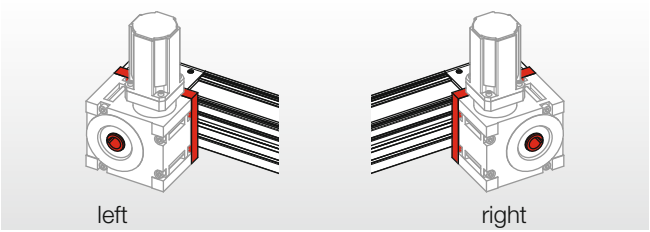
* View towards motor from the opposite side

Preparation for motor mounting – Mounting options (orientation) of angular gearboxes

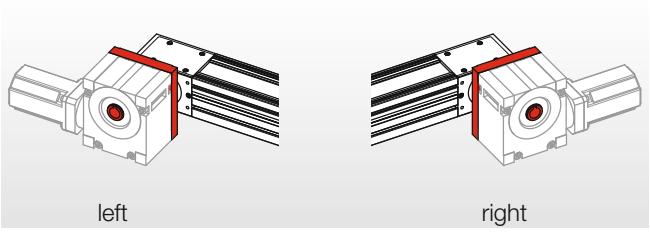
For delivery conditions 25 to 28 (see page 29), the gearbox connecting plate can be pre-assembled in different ways depending on the desired gearbox mounting or motor position:

Gearbox mounting D
Gearbox mounted rear* and top

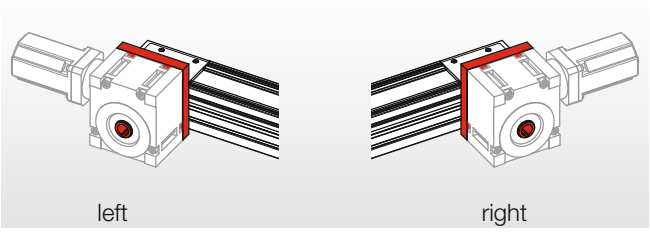
Gearbox mounting E
Gearbox mounted front* and top



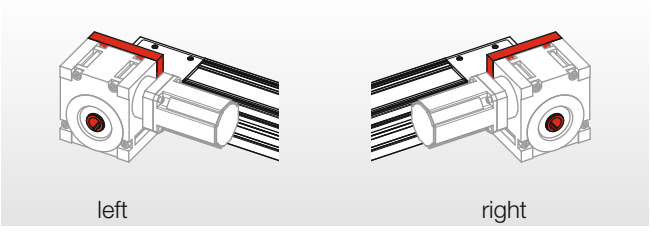
Gearbox mounting F
Gearbox mounted rear* and bottom



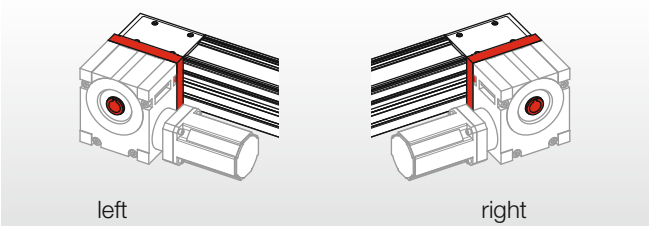
Gearbox mounting G
Gearbox mounted rear* and top



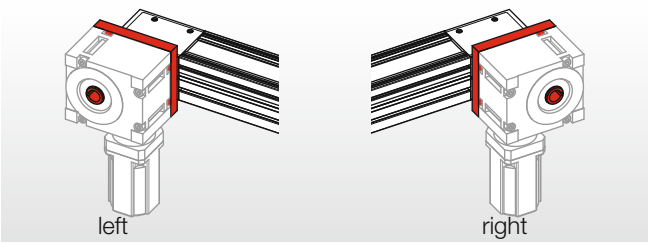
Gearbox mounting H
Gearbox mounted front* and top



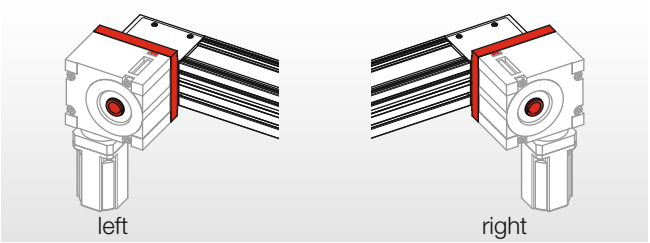
Gearbox mounting K
Gearbox mounted front* and bottom



Gearbox mounting L
Gearbox mounted front* and bottom



Gearbox mounting M
Gearbox mounted rear* and bottom

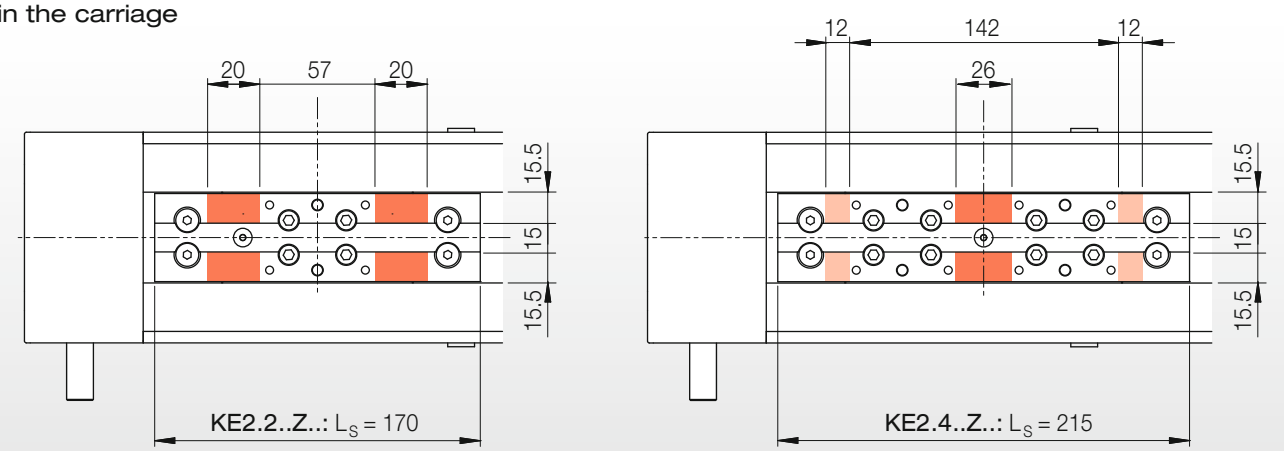


* View towards motor from the opposite side

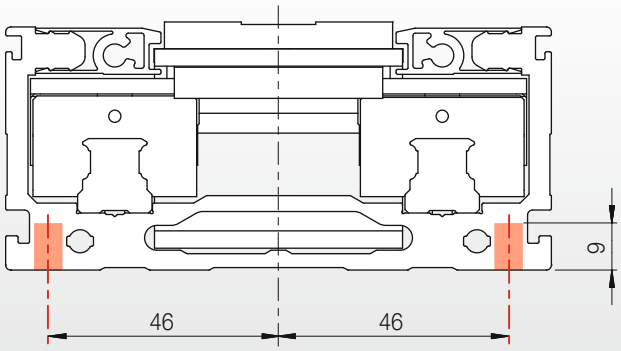
COMPACT UNIT WITH TOOTHED BELT DRIVE

Areas for optional additional threads or holes ...

... in the carriage



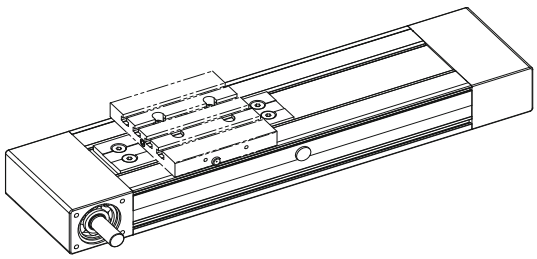
... in the base profile (along the entire profile length L_M, see pages 32/33)

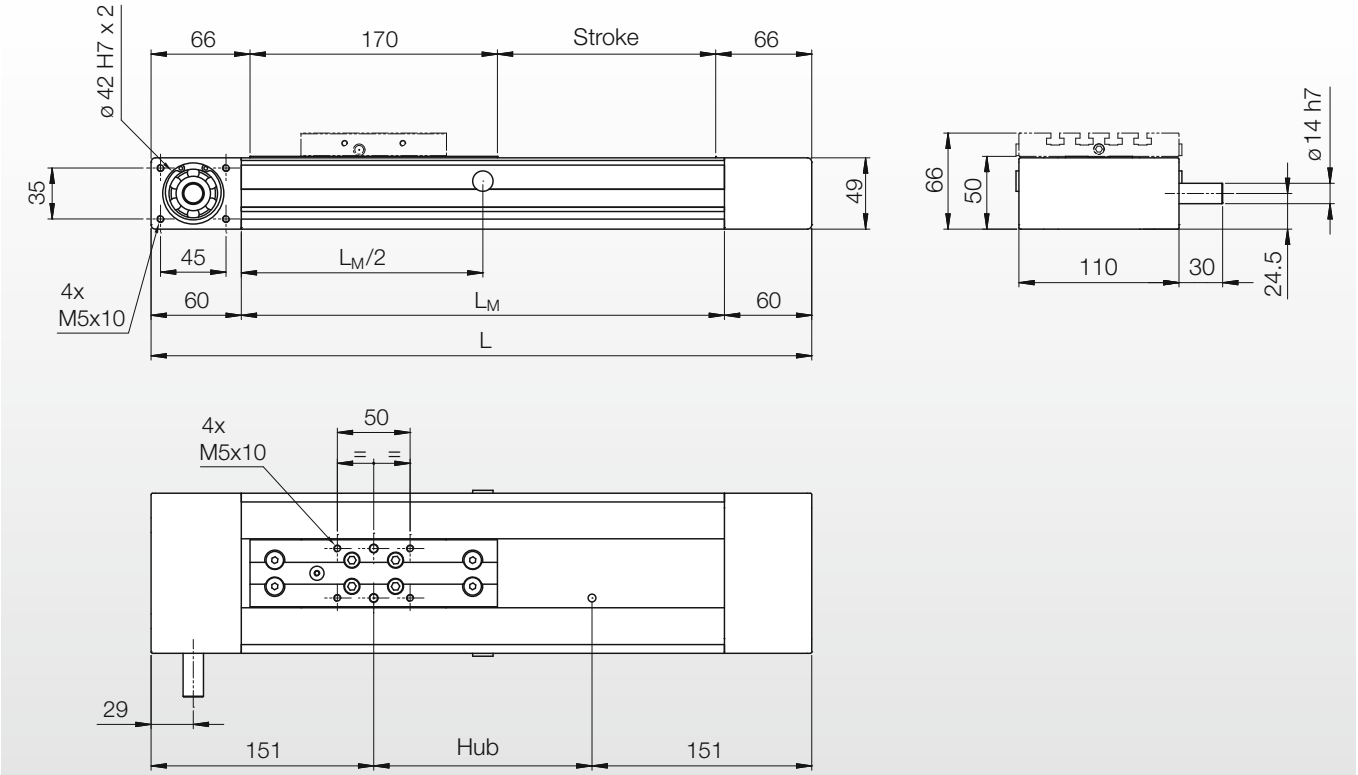


Positions for optional threaded holes ≤ M5 x 9 mm or positioning holes ≤ ø 5 x 9 mm

COMPACT UNIT KE2.2...Z...

with 2 runner blocks (short carriage) and toothed belt drive

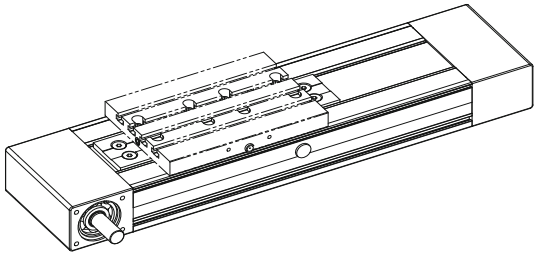


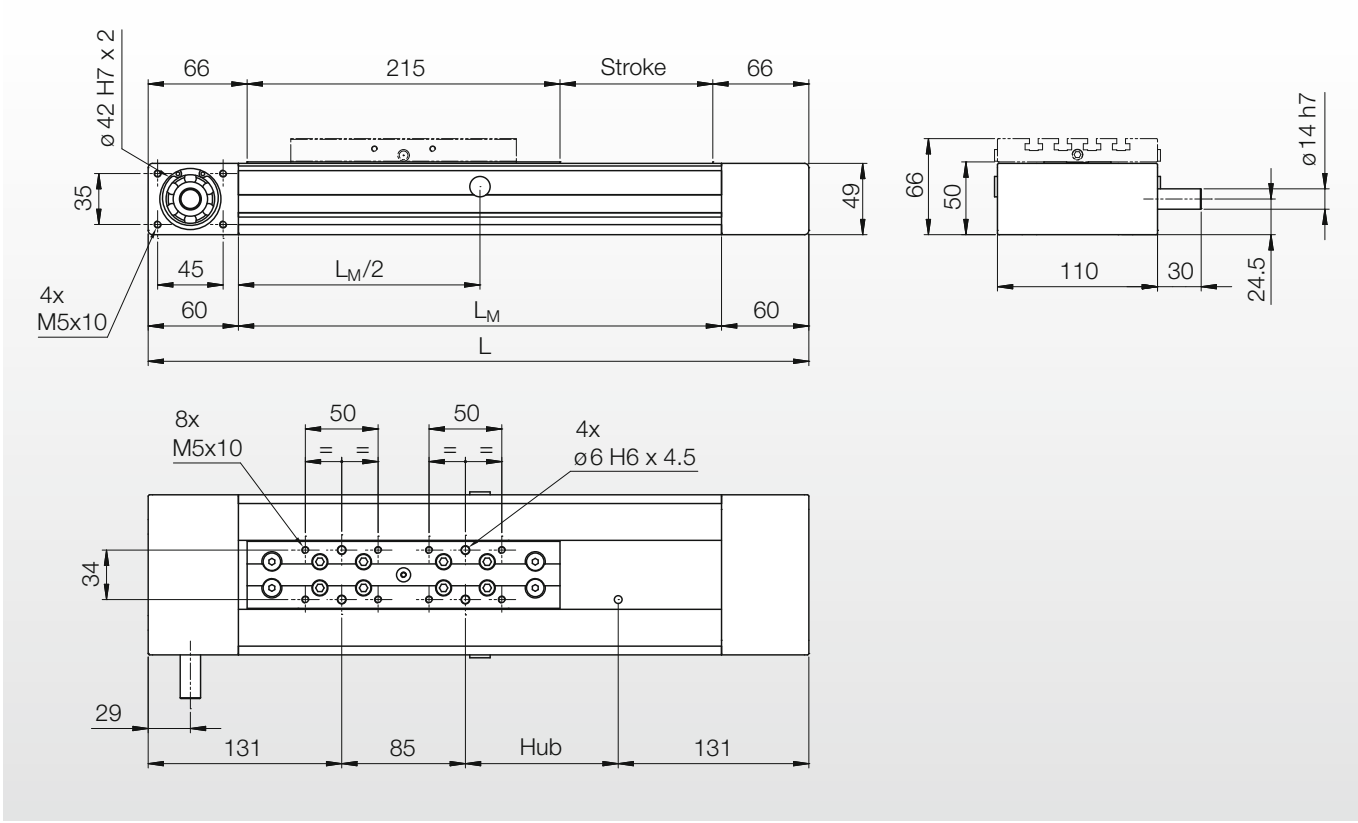


Nominal size	Dimensions			
Designation	L [mm]	L_M [mm]	Belt length [mm]	Weight [kg]
KE2.2...Z...	Stroke + 302	L – 120	2 x Stroke + 480	4.12 kg + 0.720 kg/100 mm Stroke

COMPACT UNIT KE2.4...Z...

with 4 runner blocks (long carriage) and toothed belt drive





Nominal size	Dimensions			
Designation	L [mm]	L_M [mm]	Belt length [mm]	Weight [kg]
KE2.4...Z...	Stroke + 347	L – 120	2 x Stroke + 535	5.22 kg + 0.720 kg/100 mm Stroke

COMPACT UNIT

Limit switch installation; for all drive types

Limit switches

Operated in conjunction with a control unit, limit switches are necessary to limit the stroke (prevent carriage overshoot) and to establish a reference point for setting the zero point.

LINE TECH uses the following inductive limit switches as standard

– PNP opener (PNP-NC)
  Power supply: 6...36 V DC
  Power consumption with no load:
  <12 mA
  Load: max. 200 mA

The following limit switches are also available on request:

– PNP opener (PNP-NC)
– PNP closer (PNP-NO)
– NPN opener (NPN-NC)
– NPN closer (NPN-NO)

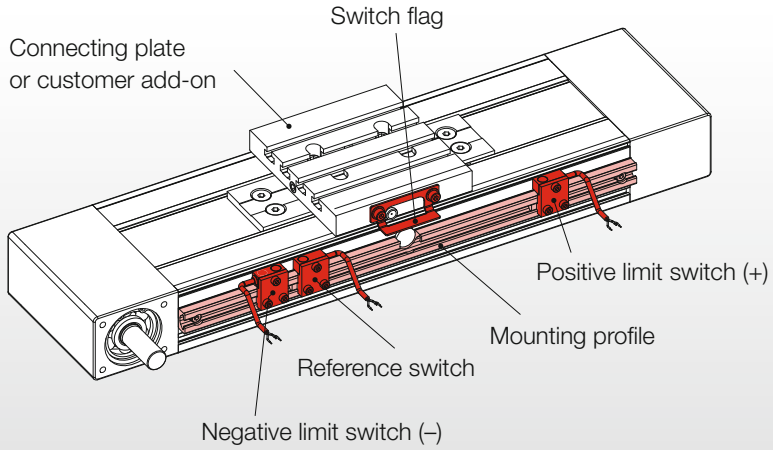
Note: The positive and negative limit switches are preset at the factory to a nominal stroke of 0 to +5 mm.

Installation position of the limit switches

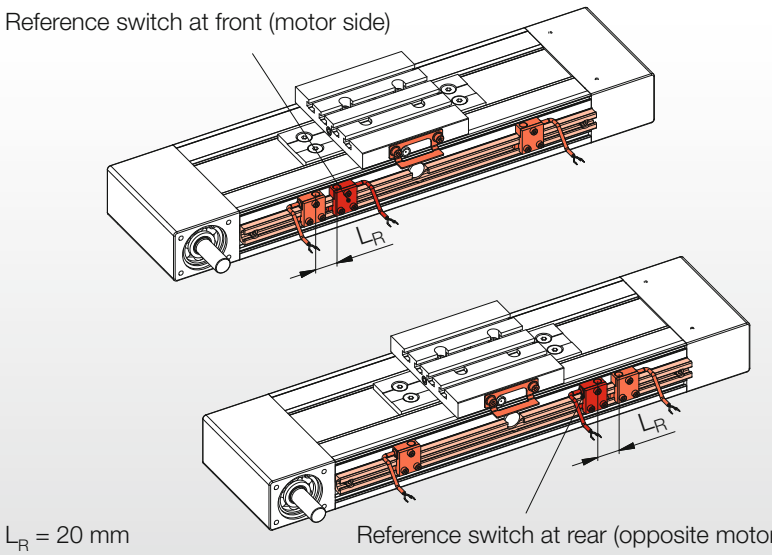
Installation positions of the limit switches are shown in the following illustrations. The reference point can be assigned to the positive (+) or negative (–) limit switch.

Special applications often require a separate reference-point switch mounted between the positive and negative limit switches. We refer to the limit switch that is closer to the motor mount (limit switch-control interface) as the front limit switch.

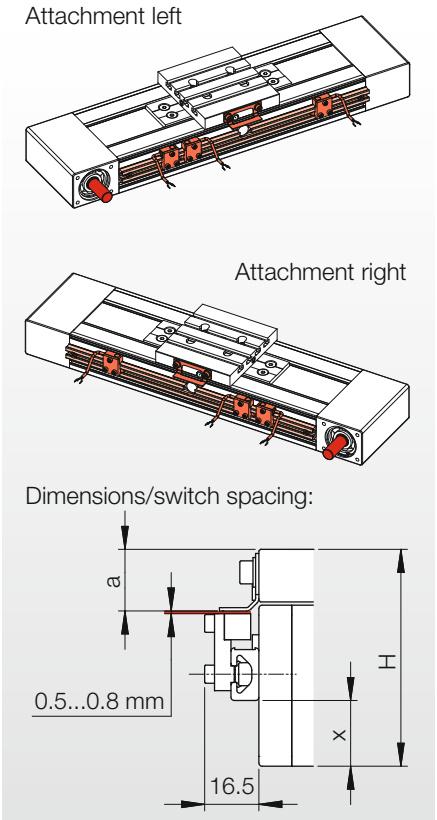
Overview of limit switch/reference switch mounting



Position of reference switch (L_R)



Limit switch installation



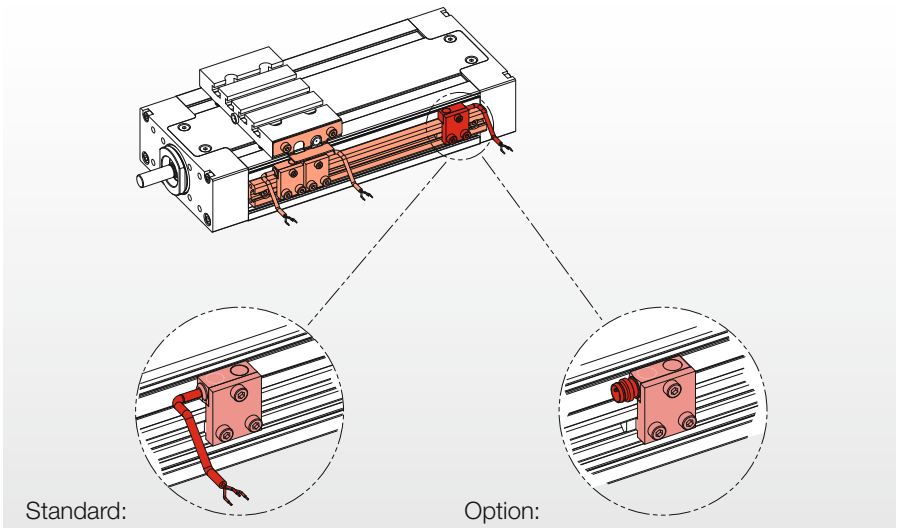
Size	Dimensions [mm]		
	x	a	H
KE1...R	3	17.5	56
KE2...R	13	17	66
KE2...Z	20	18.7	66
KE3...R	32.5	17	85

Limit switch design; for all drive types

Limit switch design KE1/2/3...R...

Limit switches are supplied with plain-end cables (length 2 m) as standard (order code N).

As an option, the limit switches can also be supplied with an M8 connector plug (order code C; with max. 2 limit switches).



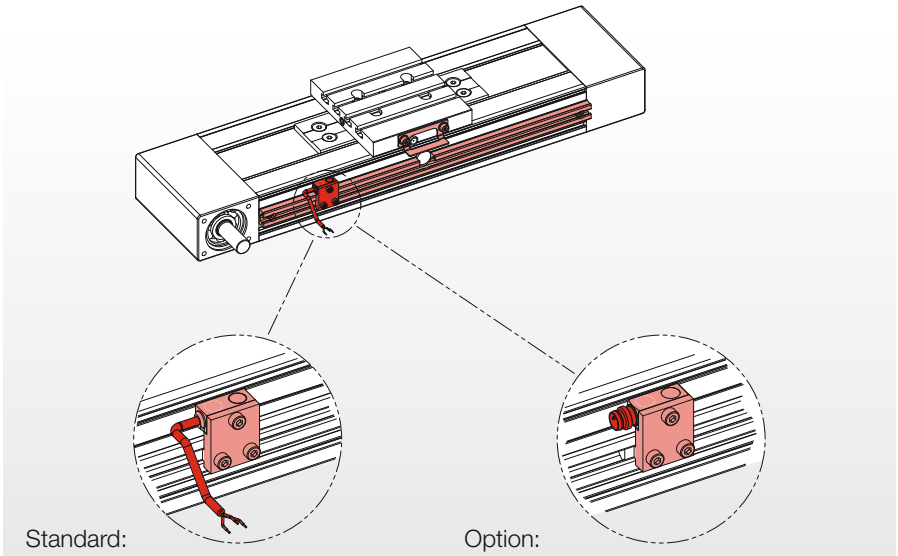
Standard:
Plain-end cable (L = 2 m)
(order code N)

Option:
Limit switch with plug M8
(order code C; with max. 2 limit switches)

Limit switch design KE2...Z...

Limit switches are supplied with plain-end cables (length 2 m) as standard (Order Code 1, 3 or 4).

As an option, the limit switches can also be supplied with an M8 connector plug (Order Code 2).



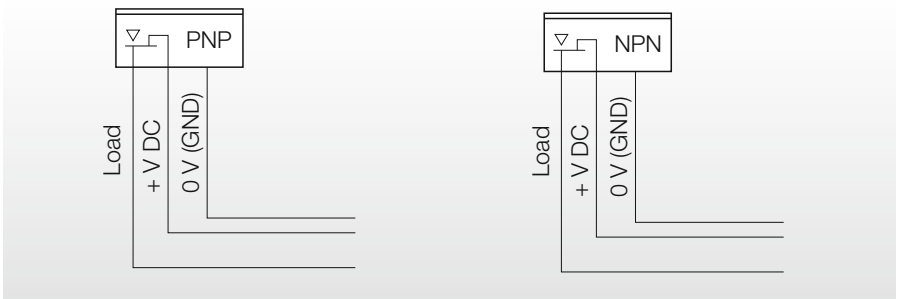
Standard:
Plain-end cable (L = 2 m)
(Order Code 1, 3 or 4)

Option:
Limit switch with plug M8
(Order Code 2)

Limit switch wiring diagram

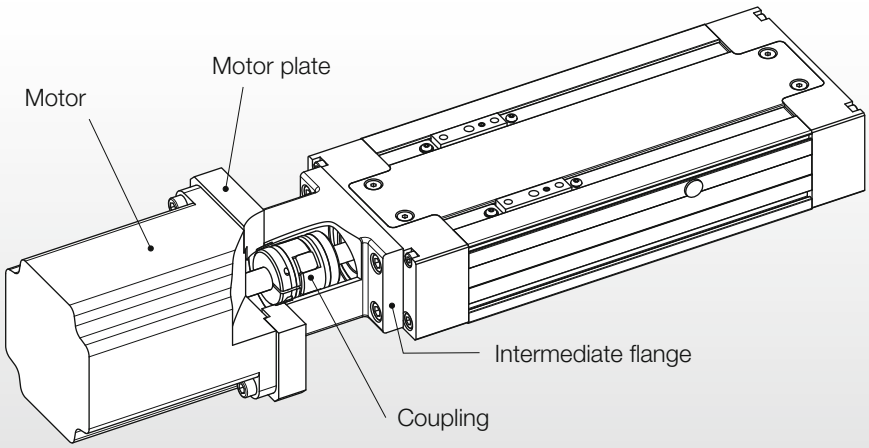
Colour code legend for the adjacent diagrams:

Load = black (BK)
+V DC = brown (BN)
0 V (GND) = blue (BU)

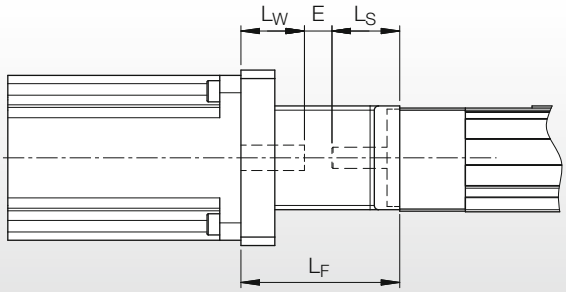


Dimensions for motor mounting; straight fit

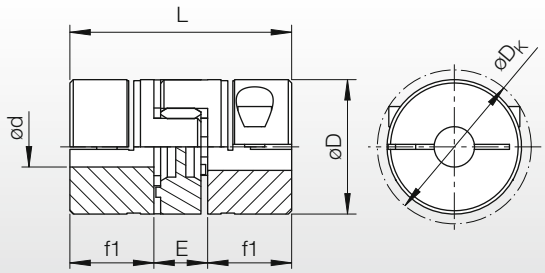
Straight motor mounting



Length of motor mounting



Coupling

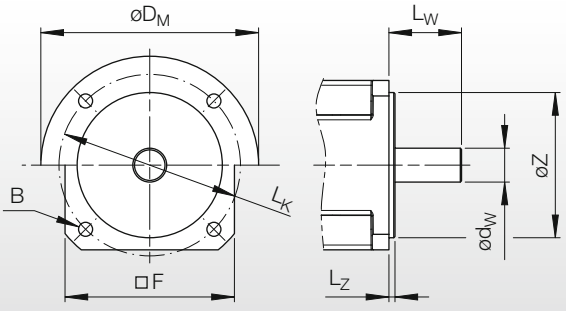


Nominal size	Dimensions			Coupling
	L_F ±2 [mm]	L_S [mm]	Weight * [kg]	if L_W > f1
KE1…R…	$L_S + E + L_W$	20	0.350	Size 12
KE2…R…		32	0.500	Size 14
KE2…R…		32	0.580	Size 19
KE3…R…		36	0.640	Size 19

Dimensions [mm]							Drive torque [Nm]	
Size	L	ø D	ø d	f1	E	ø D_K	T_N	T_{max}
12	34	25	≤ 12	11	12	27.5	5.0	18
14	35	30	≤ 16	11	13	32.2	6.3	25
19	66	40	≤ 20	25	16	43	17	34

* flange including coupling

Motor dimensions **

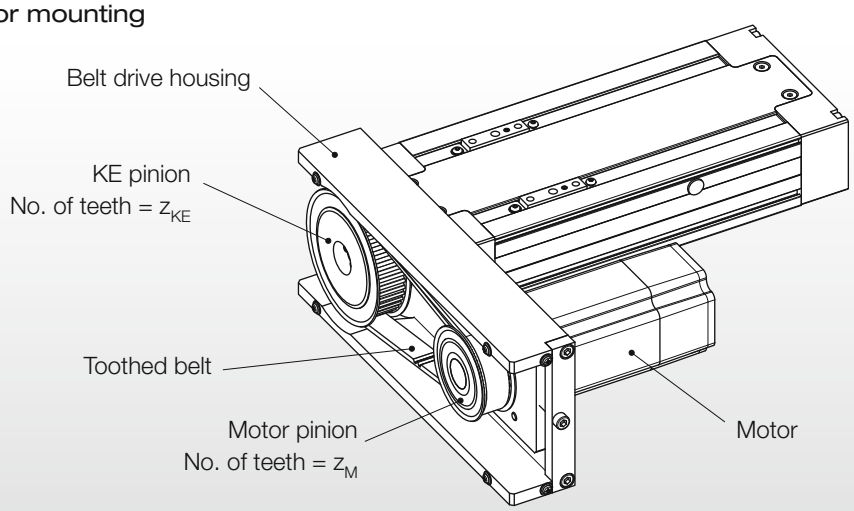


** the following dimensions are required to determine the motor mounting:

ø D_M _____ [mm]		L_W _____ [mm]	
B _____ [mm]		ø d_W _____ [mm]	
□F _____ [mm]		L_Z _____ [mm]	
L_K _____ [mm]		øZ _____ [mm]	

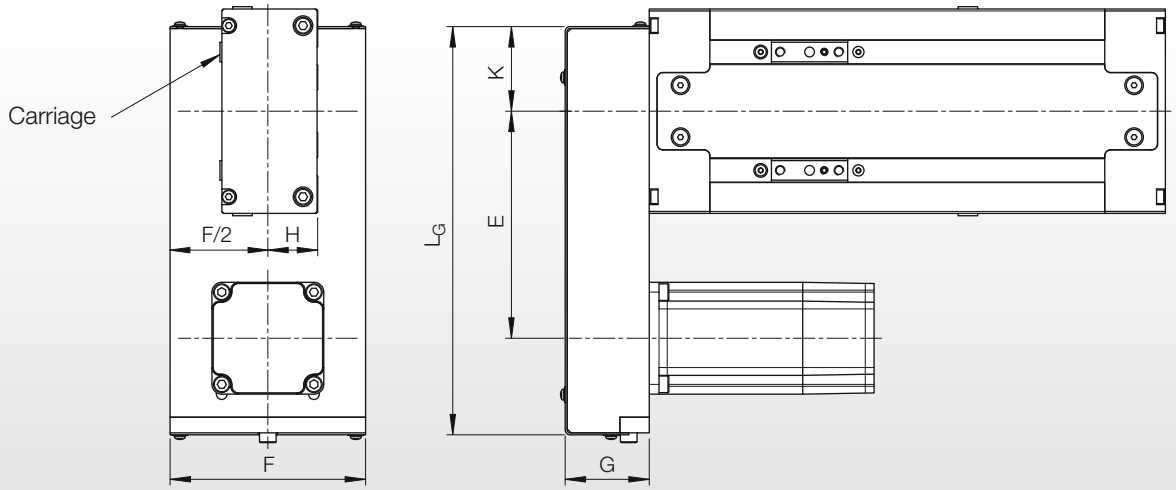
Dimensions for motor mounting; lateral fit

Lateral motor mounting



$i = z_M : z_{KE}$

Dimensions for lateral motor mounting

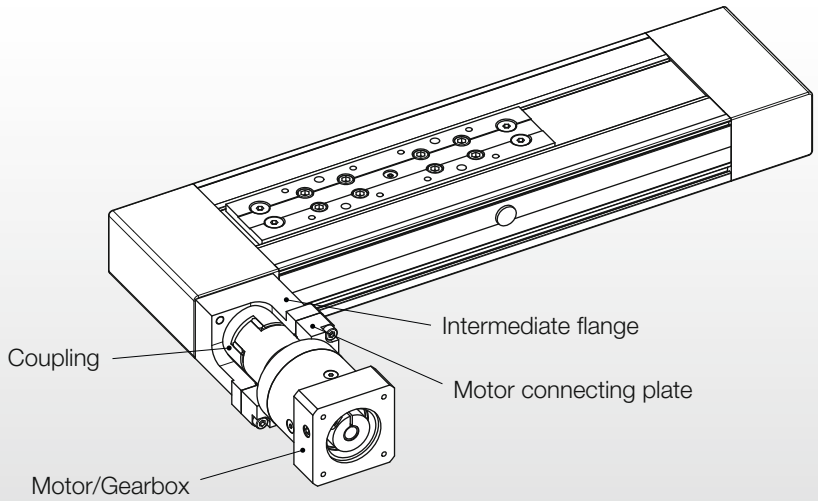


Nominal size	Dimensions [mm]							No. of teeth		Max.	Belt length	Weight
	i	E	F	G*	H	K	L_G	z_M	z_{KE}	ød_W	[mm]	[kg]
KE1...R...	1:1	90.5…104 (92.5)	80	41	21	39	180	28	28	ø16	325	0.860
	1:1.5	90.5…104 (99.4)						28	42	ø16	375	0.990
	1:2	90.5…104 (94.8)						21	42	ø10	350	0.980
KE2...R...	1:1	130…135 (132.5)	100	43	43	46	247	32	32	ø19	425	1.600
	1:1.5	131…139 (136.9)						32	48	ø19	475	1.800
	1:2	131.5…135.5 (133.6)						24	48	ø12	450	1.700
KE3...R...	1:1	130...135 (132.5)	100	43	54	46	247	32	32	ø19	425	1.600
	1:1.5	131...139 (136.9)						32	48	ø19	475	1.800
	1:2	131.5...135.5 (133.6)						24	48	ø12	450	1.700

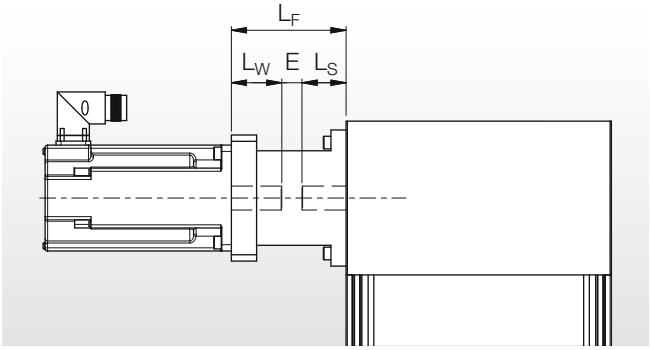
COMPACT UNIT WITH TOOTHED BELT DRIVE

Dimensions of mounted motor; straight attachment

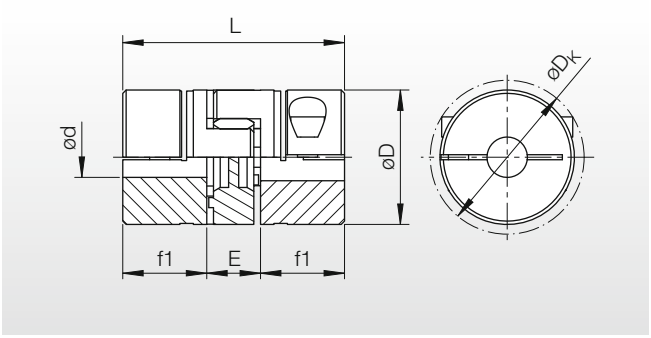
Straight motor attachment



Length of attached motor



Coupling



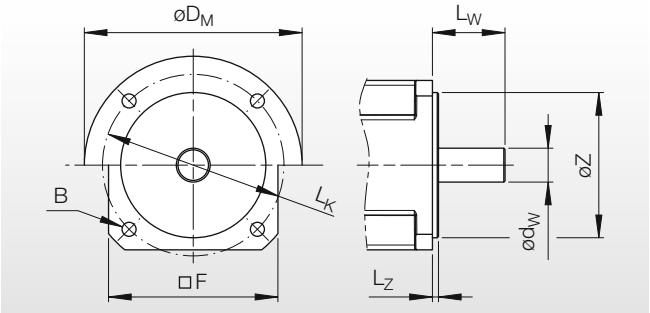
Nominal size	Dimensions L_F ±2 [mm]	L_S [mm]	Weight * [kg]	Coupling if L_W > f1
KE2...Z...	$L_S + E + L_W$	30	0.300	Size 14
		30	0.590	Size 19

* Flange including coupling

Dimensions [mm] Size [1]	L	øD	ød	f1	E	øDK	Drive torque [Nm] TN	Tmax
14	35	30	≤16	11	13	32.2	6.3	25
19	66	40	≤20	25	16	40 [2]	17	34

[1] Depends on motor torque
[2] Coupling with clamping ring hub required

Motor dimensions **



** Dimensions required for determining motor attachment:

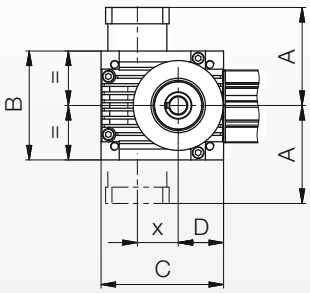
$øD_M$	_____ [mm]	L_W	_____ [mm]
B	_____ [mm]	$ød_W$	_____ [mm]
□ F	_____ [mm]	L_Z	_____ [mm]
L_K	_____ [mm]	øZ	_____ [mm]
Motor torque max.		_____	[Nm]
Motor speed max.		_____	[min^{-1}]

COMPACT UNIT WITH TOOTHED BELT DRIVE

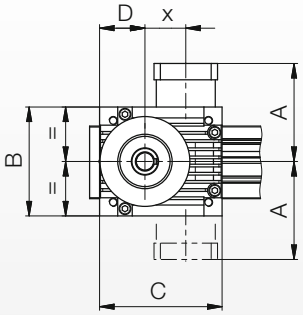
Dimensions of mounted motor; gearbox mounting

Gearbox mounting dimensions

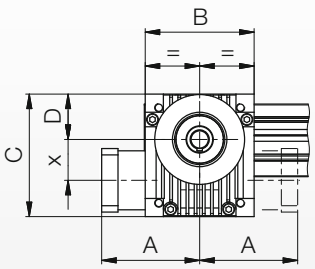
Mounting options: D + M



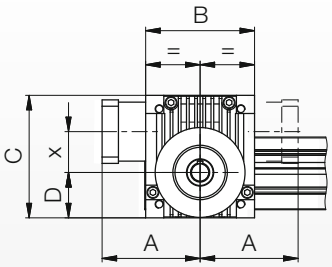
Mounting options: E + L



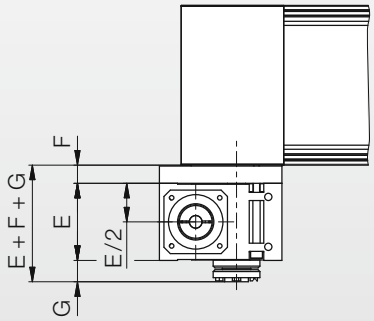
Mounting options: F + K



Mounting options: G + H



Mounting options see page 14



High-performance servo angular gearbox
HPG030 or HPG045 [1)]

Nominal size	Gearbox type	Housing dimensions [mm]									Weight	Gearbox
		x	L_W	A	B	C	D	E	F	G	[kg]	[kg]
KE2..Z...	HPG030	30	20...33	85	90	100	40	65	12	18.5	0.900	2.020
	HPG045 [1)]	45	20...33	98	120	135	50	85	20	23.5	1.600	4.100
		45	33...43	108								4.200

L_W = Length of motor shaft (see page 38)

Gearbox type depends on torque and speed:
- HPG030: max. output torque on the gearbox journal 21 Nm
- HPG045: max. output torque on the gearbox journal 90 Nm
- HPG030 / HPG045: max. input speed 6000 min^{-1}

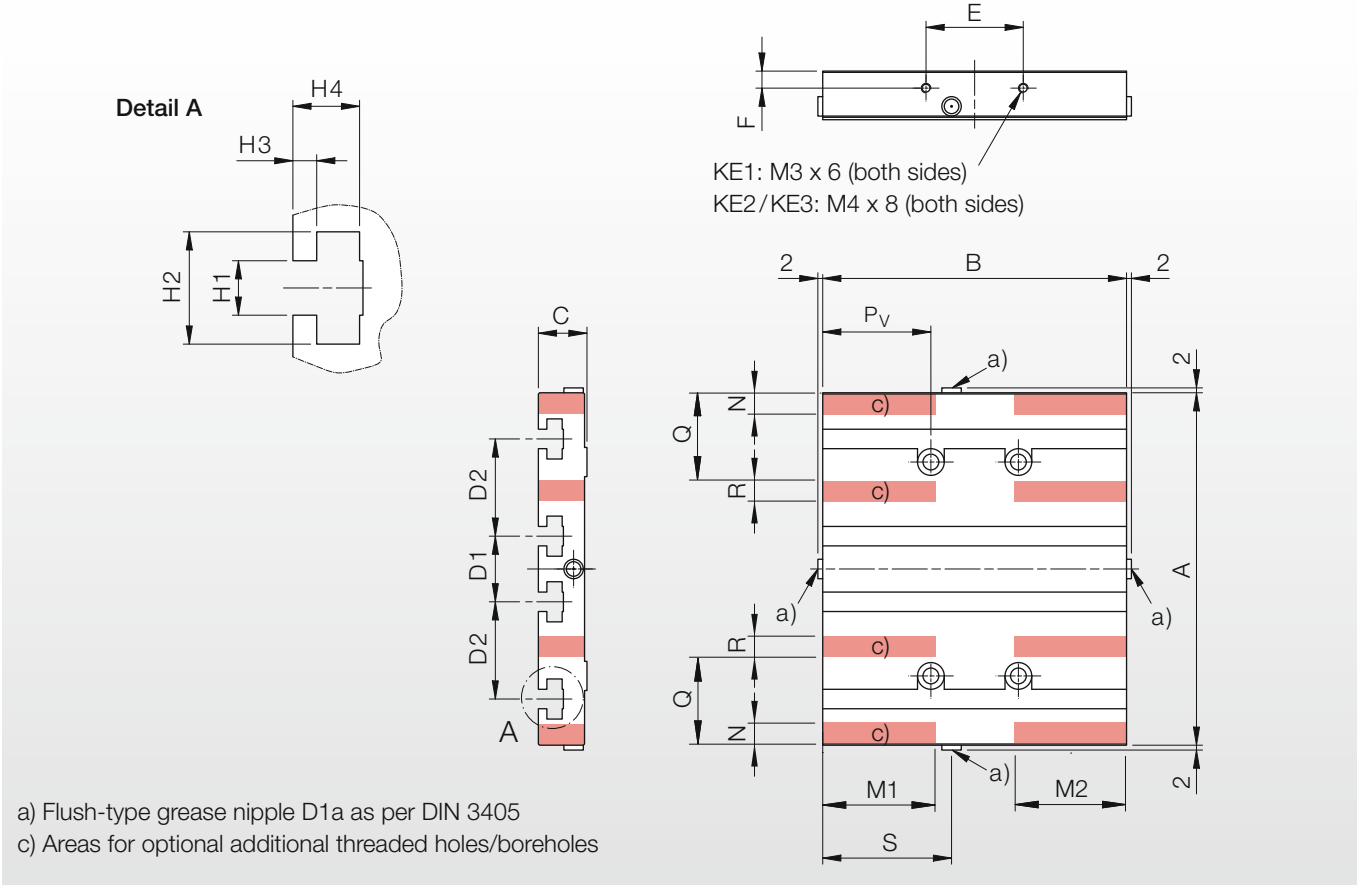
Available gear ratios for both gearbox types: 1:2 / 3 / 4 / 5 / 6 / 8 / 10 / 13.33 / 16 / 24 / 30 / 47 / 60

[1)] when using the HPG045 gearbox, the customer must provide additional torque support

Connecting plates for KE...2...R... with 1 carriage

Aluminium connecting plates for LINE-TECH compact units broaden the mounting options. They also permit position-independent greasing, as sufficient grease points are available on the connecting plates.

Dimensions



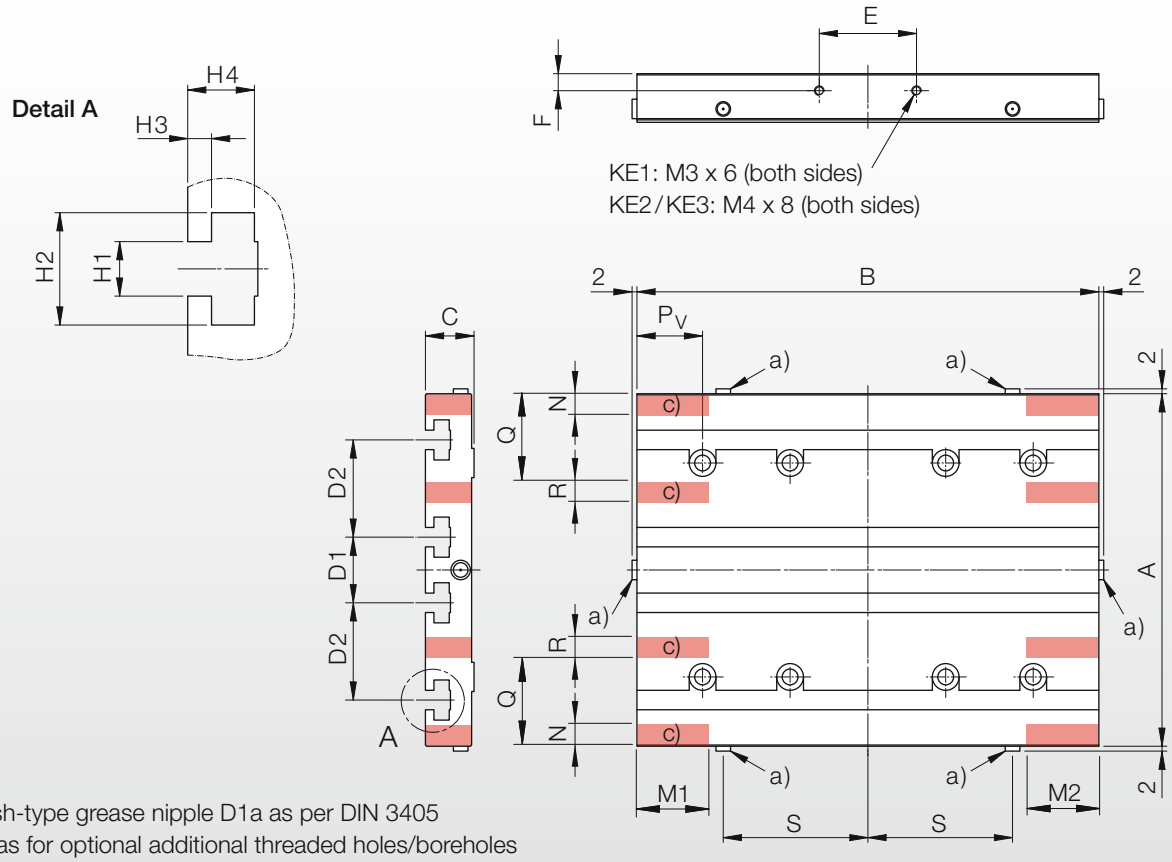
a) Flush-type grease nipple D1a as per DIN 3405
c) Areas for optional additional threaded holes/boreholes

Nominal size	Dimensions connecting plate [mm]													Weight	Item no.
	A	B	C	D1	D2	E	F	H1	H2	H3	H4	P_V	S	[kg]	
KE1.2...R...	90	60	16	20	20	30	8.5	6	12.0	3.5	7.7	16.5	37.0	0.183	G-10921
KE2.2...R...	110	60	16	20	20	40	7	6	12.0	3.5	7.7	15	37.5	0.213	G-10923
KE3.2...R...	145	125	20	27	40	40	7	8	16.5	3.5	9.8	44.5	53.0	0.727	G-10925

Nominal size	Dimensions of areas for optional additional threaded holes/boreholes [mm]				
	N	Q	R	M1	M2
KE1.2...R...	8.5	21.5	7	12	12
KE2.2...R...	–	31.5	7	17	17
KE3.2...R...	10	35	15	30	30

Connecting plates for KE...4...R... with 2 carriages

Dimensions



a) Flush-type grease nipple D1a as per DIN 3405
c) Areas for optional additional threaded holes/boreholes

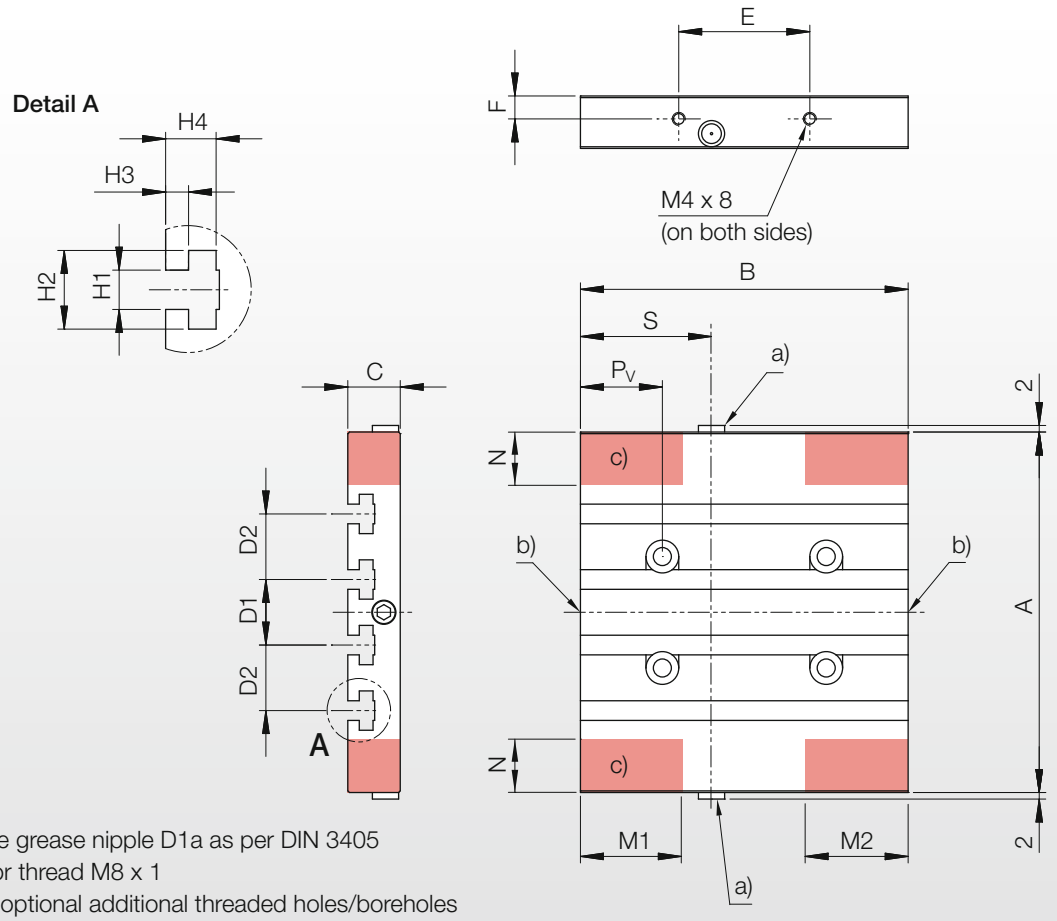
Nominal size	Dimensions connecting plate [mm]													Weight	Item no.
	A	B	C	D1	D2	E	F	H1	H2	H3	H4	P_V	S	[kg]	
KE1.4...R...	90	125	16	20	20	30	8.5	6	12.0	3.5	7.7	16.5	25.7	0.385	G-10922
KE2.4...R...	110	155	16	20	20	40	7	6	12.0	3.5	7.7	20	35.0	0.565	G-10924
KE3.4...R...	145	190	20	27	40	40	7	8	16.5	3.5	9.8	27	59.5	1.100	G-10926

Nominal size	Dimensions of areas for optional additional threaded holes/boreholes [mm]				
	N	Q	R	M1	M2
KE1.4...R...	8.5	21.5	7	30	30
KE2.4...R...	18	31.5	7	30	30
KE3.4...R...	10	35	15	30	30

COMPACT UNIT WITH TOOTHED BELT DRIVE

Connecting plate for KE2.2...Z... with short carriage (2 runner blocks)

Dimensions



a) Flush-type grease nipple D1a as per DIN 3405
b) Connector thread M8 x 1
c) Areas for optional additional threaded holes/boreholes

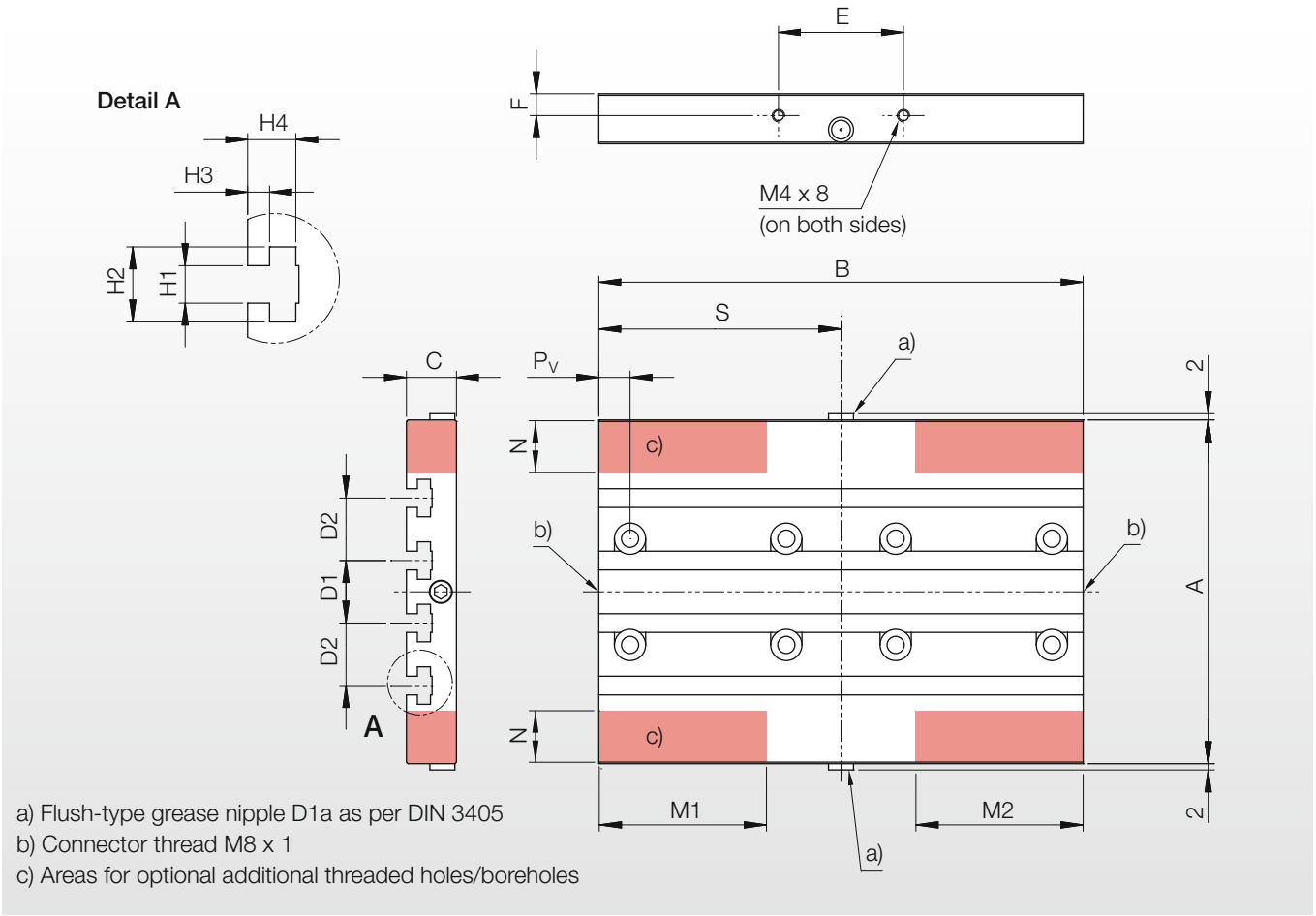
Nominal size	Dimensions connecting plate [mm]													Weight	Item no.
	A	B	C	D1	D2	E	F	H1	H2	H3	H4	P_V	S	[kg]	
KE2.2...Z...	110	100	16	20	20	40	7	6	12.0	3.5	7.7	25	40	0.402	G-10738

Nominal size	Dimensions of areas for optional additional threaded holes/boreholes [mm]		
	N	M1	M2
KE2.4...Z...	18	27	27

COMPACT UNIT WITH TOOTHED BELT DRIVE

Connecting plate for KE2.4...Z... with long carriage (4 runner blocks)

Dimensions



Nominal size	Dimensions connecting plate [mm]													Weight	Item no.
	A	B	C	D1	D2	E	F	H1	H2	H3	H4	P_V	S	[kg]	
KE2.4...Z...	110	155	16	20	20	40	7	6	12.0	3.5	7.7	10	77.5	0.626	G-10739

Nominal size	Dimensions of areas for optional additional threaded holes/boreholes [mm]		
	N	M1	M2
KE2.4...Z...	18	54	54

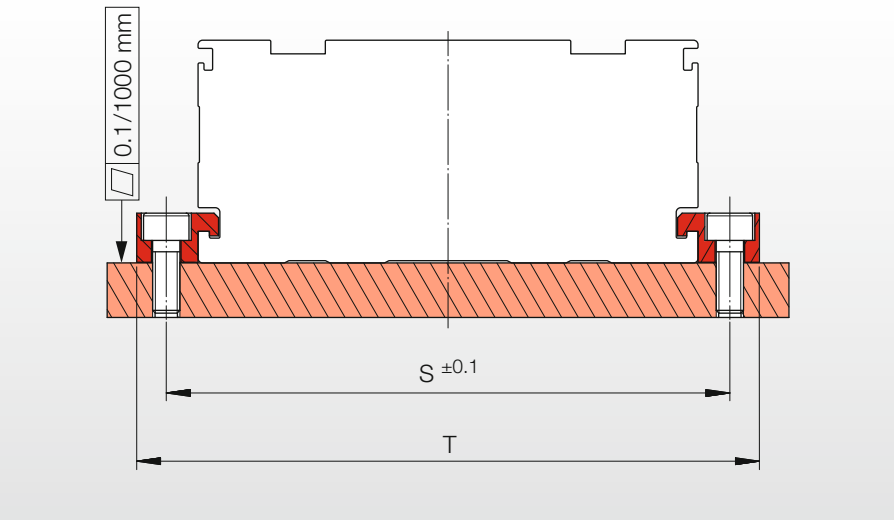
Mounting accessories; clamping brackets

Mounting options

The compact units are attached using clamping brackets

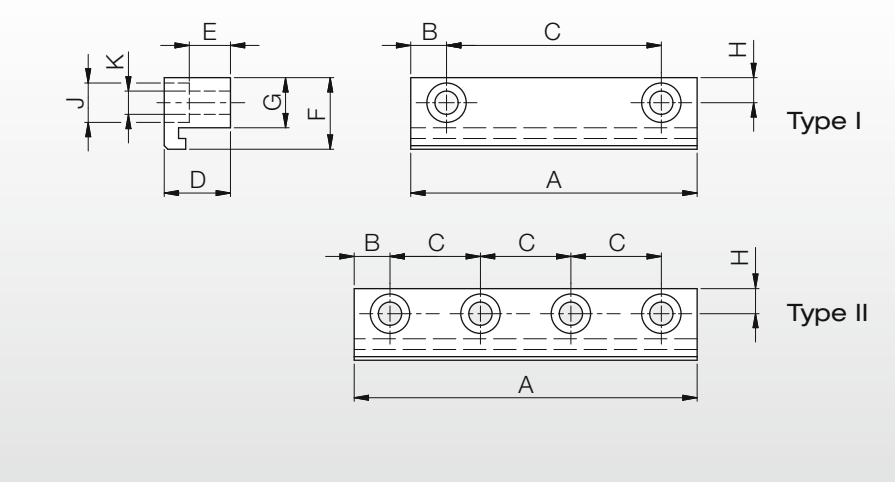
Attention: The compact units are to be attached to or supported by the base profile only, not the end plates.

Nominal size	Dimensions [mm] S	T
KE1…	102	112
KE2…	126	140
KE3…	161	175



Clamps

Recommended number of clamps:
4 per metre and side.



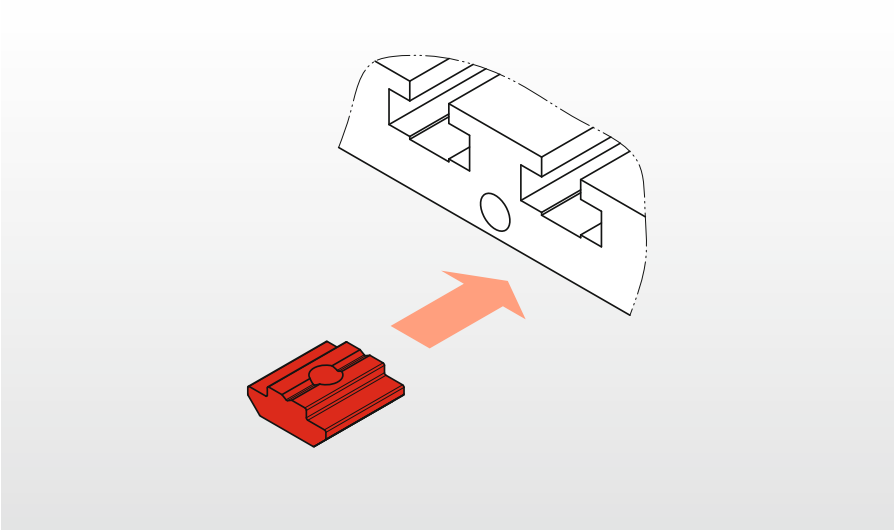
Nominal size	Type	A	B	C	D	E	F	G*	H	J	K	Weight [kg]	Item no.
KE1…	I	35	7.5	20	7.6	2.6	14.5	11	5	ø8	ø4.5	0.021	P-54434
	II	80	10	20								0.048	P-54435
KE2/3…	I	60	10	40	10.5	4.5	19.5	15	7	ø11	ø6.5	0.072	P-54179
	II	80		20								0.118	P-54181

Attachment accessories; T-slot nuts for connector plates

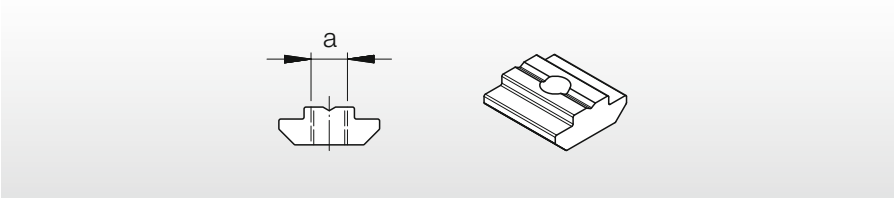
T-slot nuts

T-nuts with the corresponding T-slot width can be used to mount add-on parts on the connector plates (KE...V...).

Note: The T-nuts must be able to be inserted from the side.



T-nut types NS6 and NS8 can be used in line with the T-slot width (see connector plates, pages 40–43).
T-slot nuts are available from LINE TECH. Size, material and connection thread as per the following order system must be defined as the order number.
The available types are listed opposite.



Dimensions [mm]		Material
T-slot width	a (thread)	
6 (KE1 / KE2)	M4 / M5 / M6	Steel
8 (KE3)	M4 / M5 / M6 / M8	Steel

Ordering system for T-slot nuts

Designation example:

Basic key					
NS	6	St	M5	–	KE

NS = T-slot nut

T-slot width » see connecting plates p. 40–43
6
8

KE = for Compact units (Connecting plates)

Thread » size a as per table above
M4 / M5 / M6

Material
St = Steel

COMPACT UNITS

Cross table mountings

Cross tables

LINE TECH compact units are also available as cross table units. Four mounting types are possible. The designation system opposite applies.

Cross table mounting layout AC and AD are fitted using clamps. The lower unit must always be the version with two carriages resp. long carriage and connector plate (KE…**4**…**V**…). For mounting layouts BC and BD, a special intermediate plate is fitted to the top units in addition.
The individual compact units must be ordered separately.

Accuracy

Standard accuracy for cross table mountings is 0.1 mm/300 mm stroke.
Higher accuracy on request.

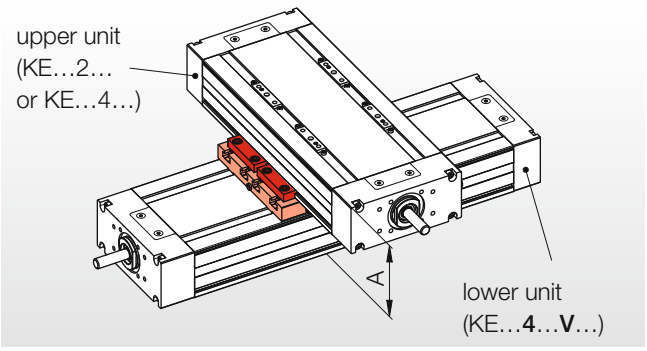
Designation system

KM . KE3 / KE2 . AC

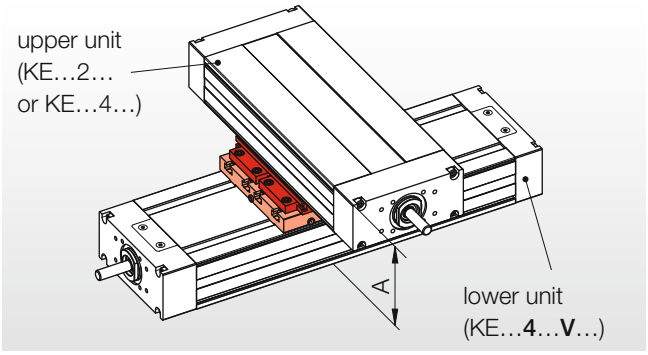
- **Cross table mounting**
- **Abbreviation for lower unit**
  KE1 / KE2 / KE3 (Version KE…**4**…V… is required!)
- **Abbreviation for upper unit**
  KE1 / KE2 / KE3
- **Mounting type**
  AC / AD / BC / BD

Dimension A [mm]		upper unit					
		KE1...		KE2...		KE3...	
Mounting type		A..	B..	A..	B..	A..	B..
lower unit	KE1.4...V...	96	112	not possible			
	KE2.4...V...	106	122	116	132	not possible	
	KE3.4...V...	on request		135	151	150	169

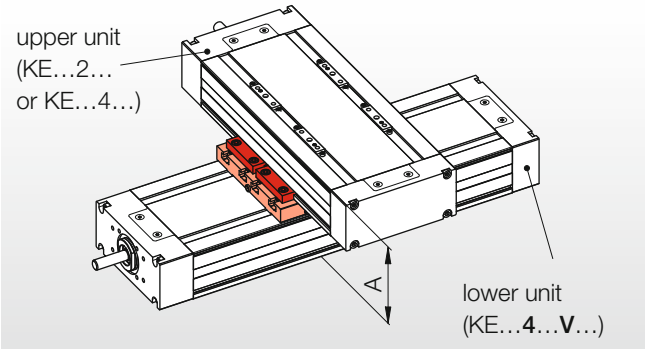
Mounting layout AC



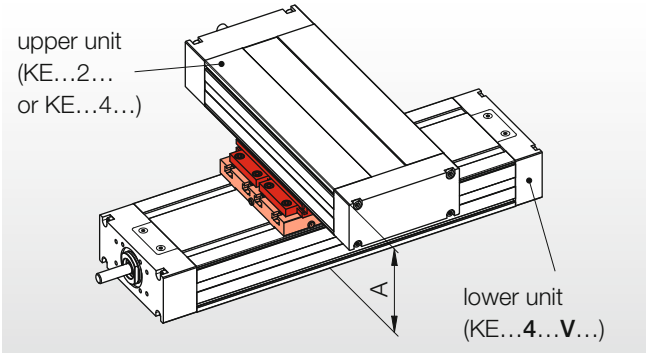
Mounting layout BC



Mounting layout AD

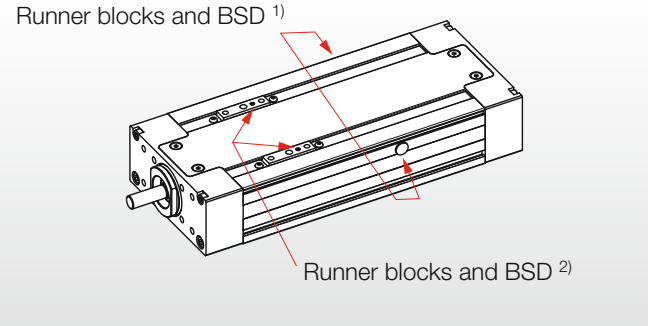


Mounting layout BD

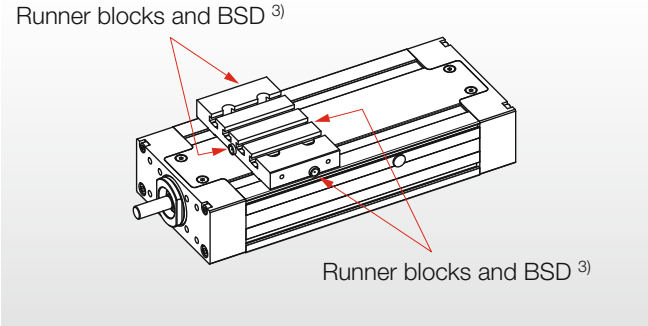


Grease points

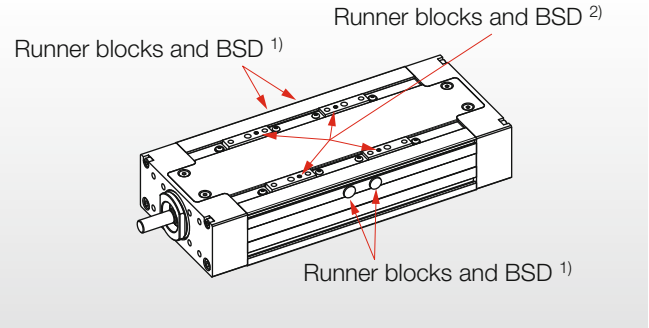
KE...2...R...N...



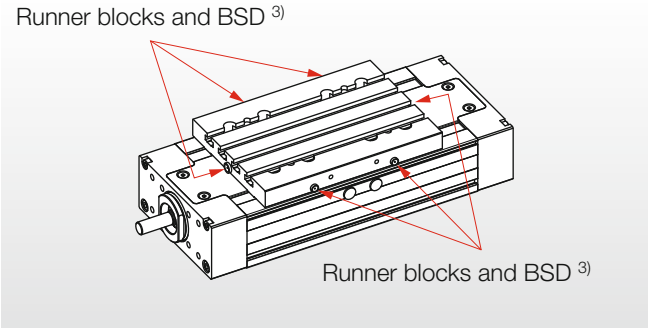
KE...2...R...V...



KE...4...R...N...



KE...4...R...V...



Grease points

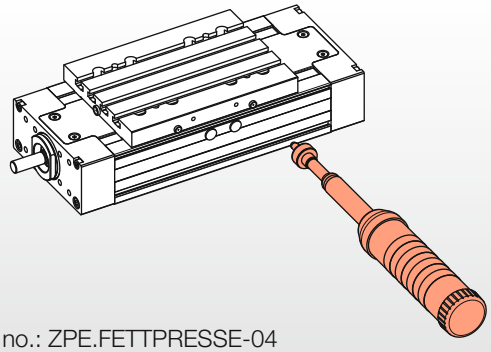
Different lubricating nipples are on the compact units:

1) Lubrication nipples to DIN 3405; the cover caps must be removed for lubrication. The lubrication positions are as in the table below.
2) The connection is as per the interface for customer add-on, page 49; the lubrication positions are not dependent on stroke.
3) Lubrication nipples to DIN 3405; the lubrication positions are not dependent on stroke.

Standard grease

LINE TECH recommends the following grease for lubrication:
Microlube GBU Y 131

Grease gun



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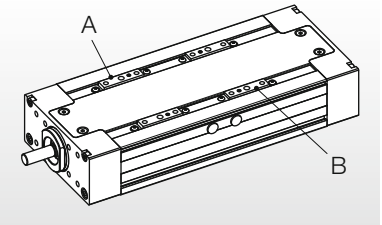
Carriage position for lubrication by the base profile



Stroke position [mm]	KE type KE1.2…	KE1.4…	KE2.2…	KE2.4…	KE3.2…	KE3.4…
A: first carriage	Stroke /2	Stroke /2	Stroke /2	Stroke /2	Stroke /2	Stroke /2
B: second carriage	–	Stroke /2	–	Stroke /2	–	Stroke /2 –10

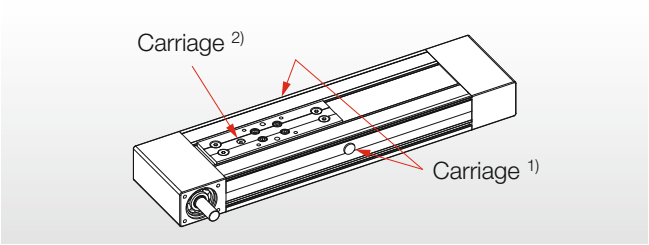
Lubrication points

Lubrication points

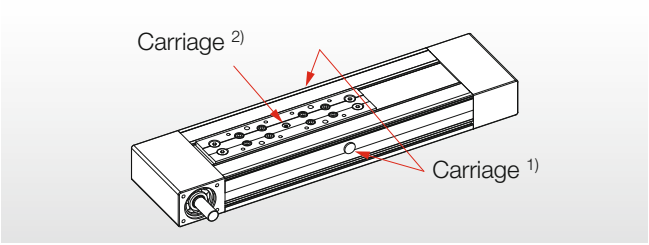
LINE TECH compact units KE…Z… are designed so that lubrication is required at one point only.
The following lubrication options are available:

Lubrication through the base profile

KE...2...Z...N...

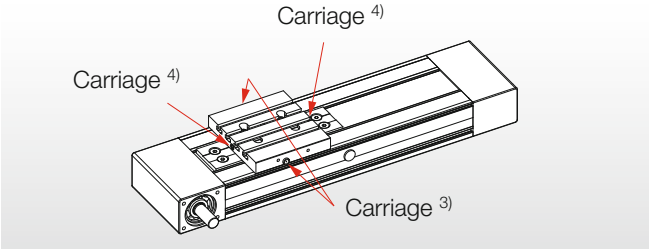


KE...4...Z...N...

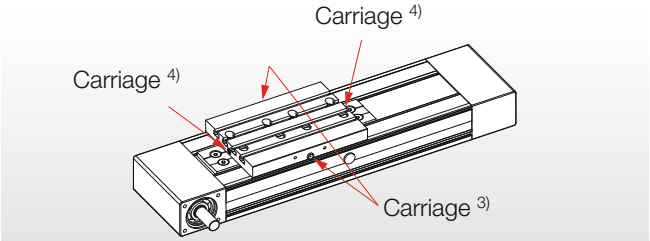


Lubrication through the connecting plate

KE...2...Z...V...

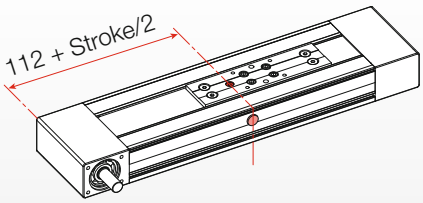


KE...4...Z...V...



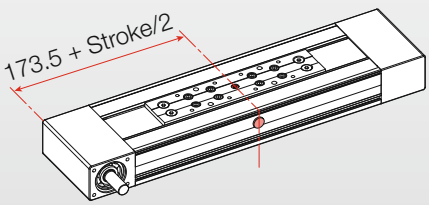
Carriage positions for lubrication through the base profile

KE...2...Z...N...



Align the lubrication point of the carriage with the lubrication nipple on the base profile.

KE...4...Z...N...



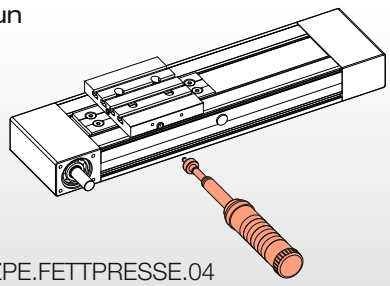
Various grease nipples are used on the LINE TECH compact units:

1) Grease nipple as per DIN 3405; the cover caps must be removed for lubrication. Lubrication positions according to the illustrations shown here.
2) Connection as per interface for customer add-ons, page 49; the lubrication positions are independent of the stroke.
3) Grease nipple as per DIN 3405; the lubrication positions are independent of the stroke.
4) Connection thread M8x1 (optional lubrication possibility).

Standard grease

LINE TECH recommends the following standard grease:
– Microlube GBU Y 131

Grease gun



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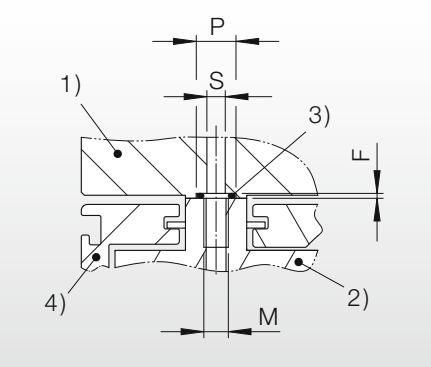
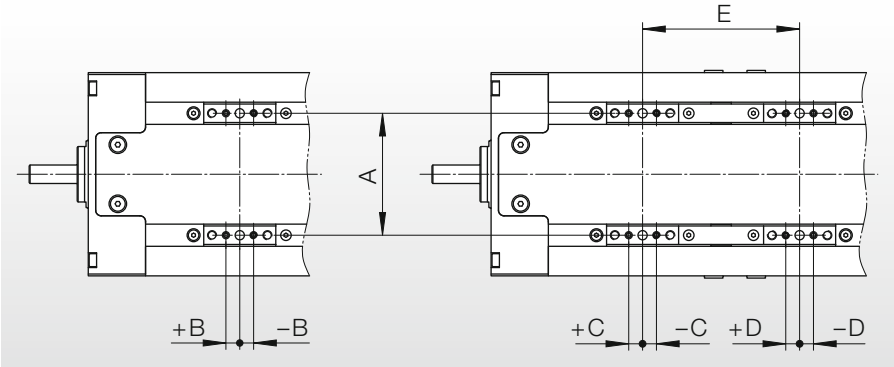
Lubrication points for customer add-on

Interfaces for lubrication connections for customer add-ons

The lubrication connections in the carriages are sealed with a grub screw as standard.
To be able to use these lubrication points, the grub screws must be removed at each position.

KE...R...



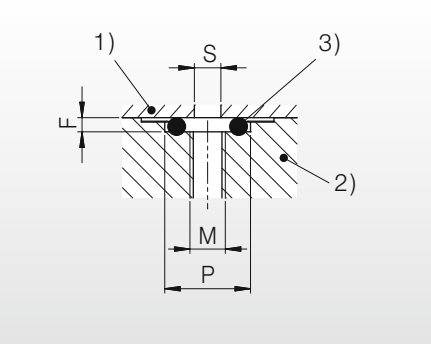


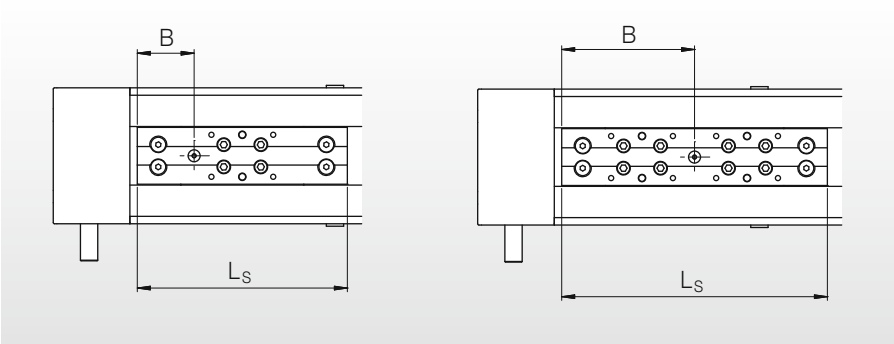
1) Add-on by customer
2) Carriage
3) O-Ring
4) Base profile

Dimensions [mm]

Size	A	B	C	D	E	F	M	P	S	O-ring
KE1...R...	54	-6.8	-6.8	6.8	65	0.8	M3	ø6.5	ø3	ø4x1
KE2...R...	66	-7.5	-7.5	7.5	85	0.8	M4	ø6.5	ø3	ø4x1
KE3...R...	88	11.5	11.5	-11.5	100	0.8	M5	ø6.5	ø3	ø4x1

KE...Z...



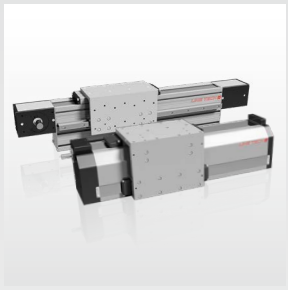


1) Add-on by customer
2) KE carriage
3) O-ring

Dimensions [mm]

Size	L_S	B	F	M	P	S [1]	O-ring [1]
KE2.2...Z...	170	46	1.6	M4	ø9	ø3	ø5x2
KE2.4...Z...	215	107.5	1.6	M4	ø9	ø3	ø5x2









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