



Dynamic by Design



The New Linear Units KLE

High performance and compact.

item compact Linear Units combine the functionality of a linear guide with an integrated belt drive in a minimum of space. They are suitable for high-speed positioning jobs, are quiet in travel and feature low-wear, heavy-duty drive elements.

The benefits at a glance:

- Powerful yet compact
- Long service life and easy running thanks to large Rollers
- All internal functional elements covered by the Timing Belt and protected against contact and soiling
- Greater safety, since no moving external parts
- Available in the modular dimensions of Lines 6 and 8
- item profile grooves for securing and assembling add-on parts
- Low maintenance; all elements accessible from outside
- Axis lengths can be customised, up to max. housing length of 6000 mm
- Motors are easily attached using universal coupling elements included in the Drive Set
- Several Linear Units can be synchronised with a single drive motor
- Integrated fastening of Proximity Switches and integrated cable routing
- Modular design ensures short delivery times

Linear Units KLE are augmented by a range of useful accessories that enable simple attachment of slide constructions and drive modules.



Carriage Plates

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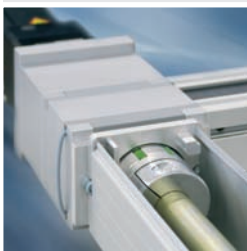
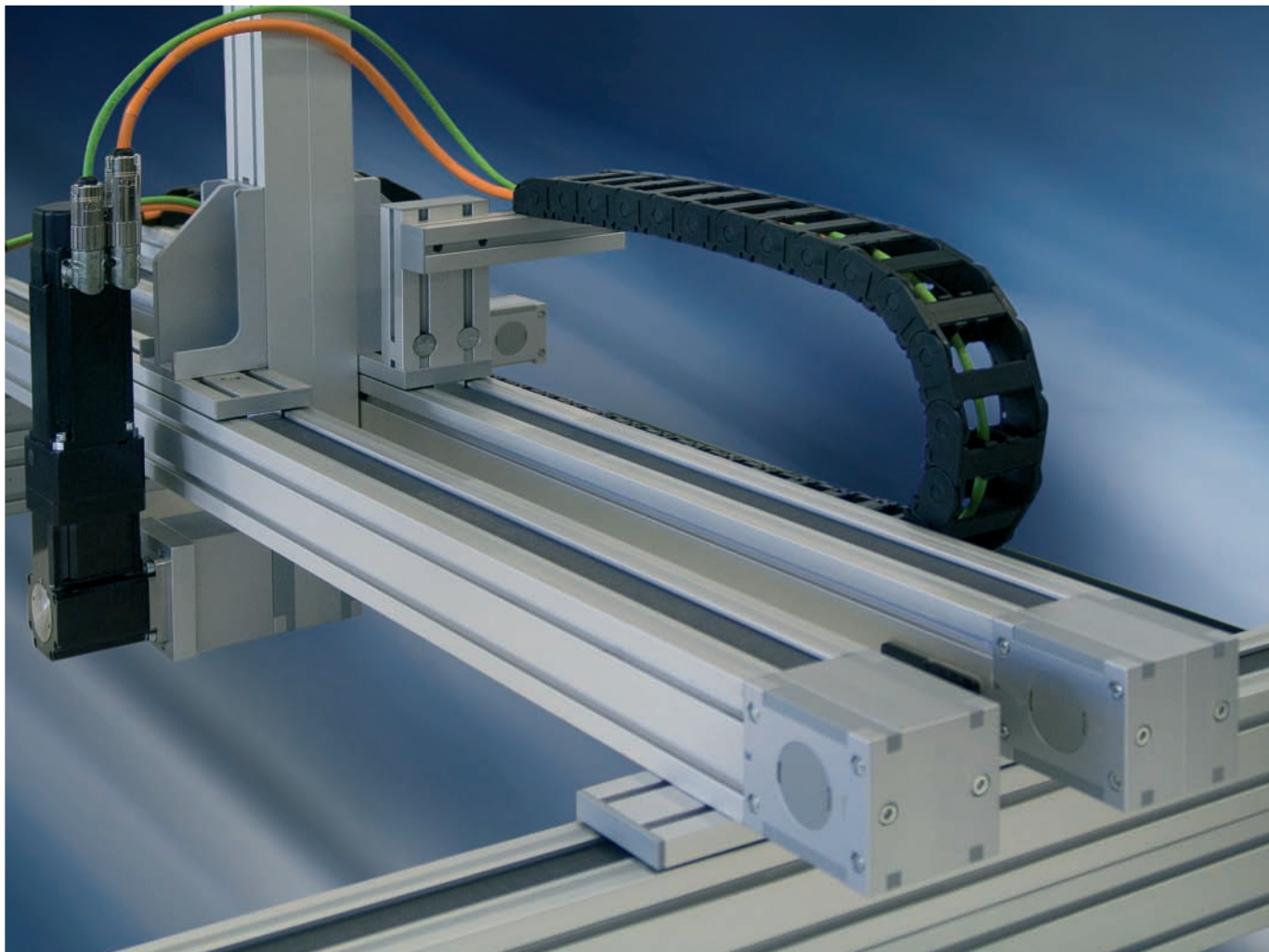
Prefabricated or customised means of attaching moving parts to the KLE. When used with multi-axis systems, the Carriage Plate also forms a stable fastening for interconnected Linear Units.



Drive Sets

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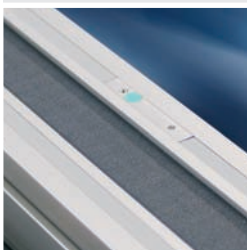
The Drive Sets enable all motors to be connected easily to Drive Units of the KLE. This modular concept has the benefit of low processing requirements and rigid torque transmission.



Synchronising Sets

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Several KLEs can be connected to parallel, coupled drive systems using prepared Synchronising Sets. No further processing is required other than cutting the Connecting Shaft to length.

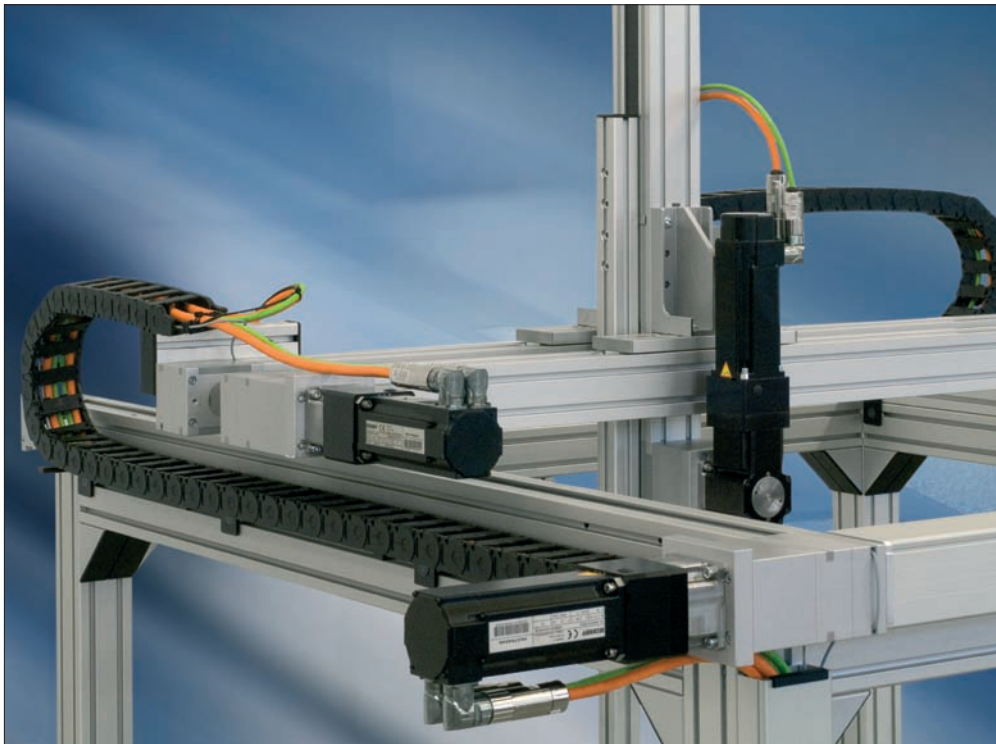


Proximity Switches

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Special profile grooves in the KLE housings allow free placement of integrated Proximity Switches (up to 4 per Linear Unit). Reference and terminal points can thus be defined using the standard Slide switching plate.

Compact Linear Units KLE



Linear Units KLE are available in two versions, in the modular dimensions of Lines 6 and 8. They have different load-bearing capacities depending on the guide and drive elements used. The item profile grooves in the housing profile provide various options for KLE installation and securing to the machine structure.

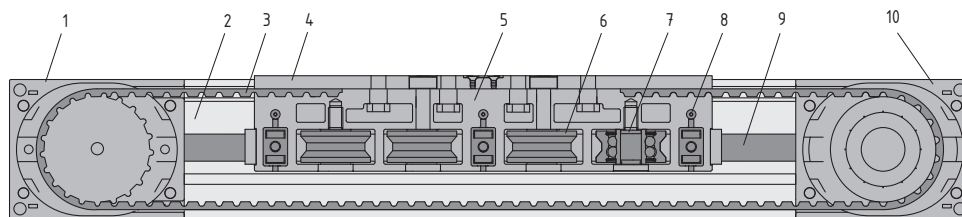
All guide and drive elements are protected inside the sturdy housing profile. This integrated construction reduces possible malfunctions caused by contamination and cuts the risks posed by moving parts.

KLEs can be built in housings of any length up to 6000 mm thanks to the modular design principle. KLEs of type LR are provided with roller-bearing Slides on guiding shafts and are driven by Timing Belts. Covered by the Timing Belt, the roller guide runs inside the housing where it is fully protected.

The motor drive of a KLE is provided by the drive unit via Drive Sets with coupling elements (partially prepared in advance for this purpose).

This modular drive concept using the drive units means that any chosen motors can be adapted. It is also possible to link two KLEs using Synchronising Sets. The drive is provided by the Drive Unit via coupling elements with an elastic dampening effect. The second, non-driven Reverse Unit of the KLE is used to tension the Timing Belt.

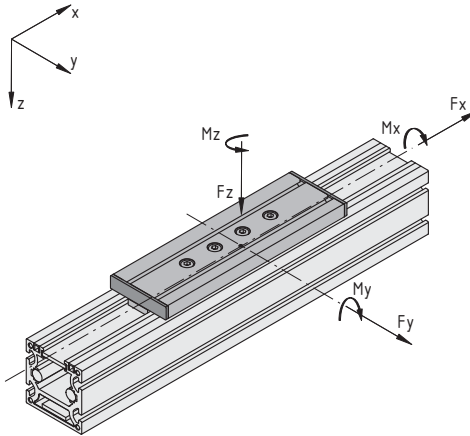
The KLEs will be supplied completely assembled and ready to run by your item partner. The modular design, with no need for complex machining, results in short delivery times and facilitates installation and maintenance.



- 1 Drive Unit KLE with connection facility for drive motor and synchronisation
- 2 Profile KLE
- 3 Timing Belt AT with PA fabric backing
- 4 Cover Plate for Slide KLE
- 5 Slide KLE with belt clamping

- 6 Rollers, adjustable
- 7 Rollers, fixed
- 8 Lubricating Systems
- 9 Shaft
- 10 Reverse Unit KLE with integrated Timing Belt tensioning device

Load Specifications

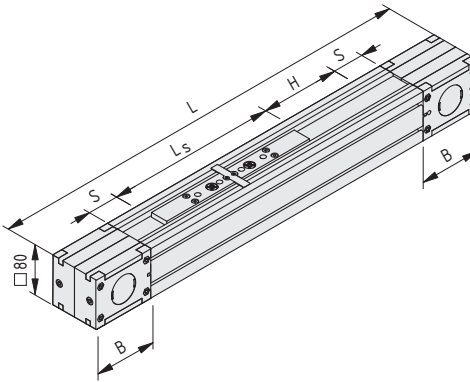


Simplified method for determining the maximum permissible load for the Roller Guides of a KLE:

KLE	$M_{x\ max}$ [Nm]	$M_{y\ max}$ [Nm]	$M_{z\ max}$ [Nm]	$F_{y\ max}$ [N]	$F_{z\ max}$ [N]
6 60x60	25	50	100	750	500
8 80x80	50	100	150	1,500	1,000

$$\frac{|M_x|}{M_{x\ max}} + \frac{|M_y|}{M_{y\ max}} + \frac{|M_z|}{M_{z\ max}} + \frac{|F_y|}{F_{y\ max}} + \frac{|F_z|}{F_{z\ max}} \leq 1$$

Determination of the Stroke Length



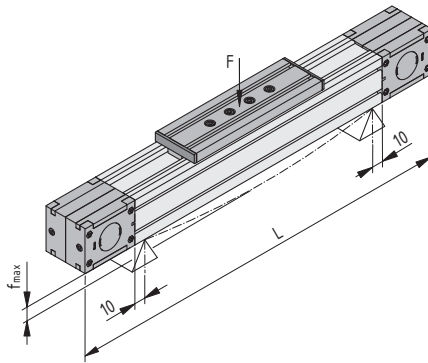
To obtain a specific working stroke H, the total length L of a KLE can be derived from the following diagram:

$$L = 2 \times B + 2 \times S + L_s + H$$

[mm]	KLE 6 60x60	KLE 8 80x80
Housing length B	75.0	100.0
Safety distance S	26.0	63.5
Slide length L_s	198.0	273.0

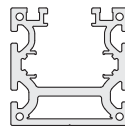
Note: The stated safety distances S apply for average operating conditions. Depending on the application (speed, load), other safety distances may be required.

Deflection



The maximum deflection f_{max} of the system is governed by the dimension of the profile cross-section, the free profile length and the force applied. It should not exceed 1mm/m.

The KLE profile must be given appropriate support if the linearity of movement has to be very precise.



The moments of inertia of the profiles provide the basis for calculating the deflection:

	Profile KLE 6 60x60	Profile KLE 8 80x80
I_y	44.32 cm ⁴	135.59 cm ⁴
I_z	57.46 cm ⁴	179.77 cm ⁴
I_t	7.23 cm ⁴	20.31 cm ⁴
W_y	13.08 cm ³	29.88 cm ³
W_z	19.15 cm ³	44.94 cm ³

The formula for the calculation depends on the load scenario (see Comprehensive Catalogue, Section 1.1).

**Linear Units
KLE**



Complete Linear Units with variable stroke length (H), Drive Unit and Reverse Unit, housing profile with integrated Roller Guide on hardened guiding shafts, preset free of play. Timing Belt in guide grooves functioning as labyrinth seal, Timing Belt tensioning device integrated in Reverse Unit, ball-bearing-mounted pulleys.

Guide slide with quadruple roller-bearing mounting, oil-lubricated roller contact (re-lubrication every 6 months or every 2500 km)

Acceleration: max. 10 m/s²
Travel speed: max. 10 m/s

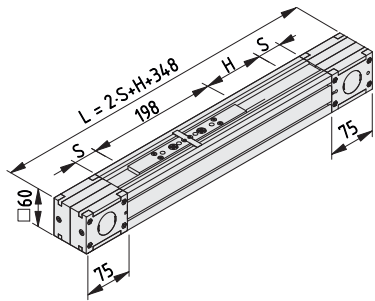
The KLEs exhibit high precision and low-vibration linear movement.

The repeat accuracy is ± 0.1 mm.

The mass of a KLE can be determined from the overall length of the KLE Housing Profile (without payload):

$$m = m_1 + H \times m_2$$

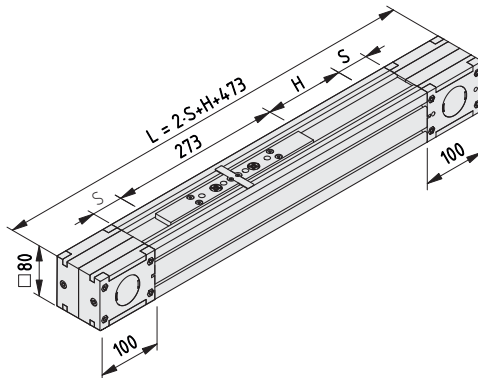
www.item.info



Linear Unit KLE 6 60x60 LR

$L_{min} = 400$ mm
 $S_{min} = 26$ mm
 $H_{max} = 5749$ mm
 $m_1 = 4.8$ kg
 $m_2 = 5$ g/mm

1 pce. 0.0.605.07



Linear Unit KLE 8 80x80 LR

$L_{min} = 600$ mm
 $S_{min} = 63.5$ mm
 $H_{max} = 5600$ mm
 $m_1 = 11.6$ kg
 $m_2 = 8.8$ g/mm

1 pce. 0.0.605.02

Track Oil for Linear Guides

Synthetic lubrication oil ISO VG 460
Content: 250 ml (bottle)
 $m = 285$ g

1 pce. 0.0.612.75

Oil Can for Linear Guides

Die-cast zinc
Pump-action oil dispenser Al with pointed tip
Content: 200 ml
 $m = 600$ g

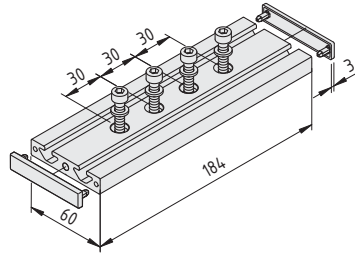
1 pce. 0.0.612.74

Carriage Plate



The standardised Carriage Plate KLE is a universal means of securing attachments to the moving slide of the KLE. It has already been provided with all necessary fastening holes and elements.

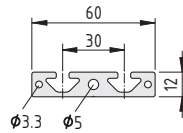
Profiles X 6 60x12 and X 8 80x16 with appropriate Caps are available for constructing Carriage Plates of customised lengths.



Carriage Plate KLE 6 60x60

- Profile X 6 60x12, Al natural
- 2 Caps X 6 60x12, PA-GF, grey
- 4 Hexagon Socket Head Cap Screws DIN 912-M6x25, St, bright zinc-plated
- 4 Washers DIN 433-6.4, St, bright zinc-plated
- m = 275 g

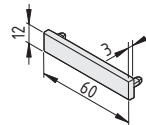
1 set 0.0.609.25



Profile X 6 60x12

- Al, anodized
- A = 4.82 cm² I_x = 0.71 cm⁴ I_y = 15.56 cm⁴
- m = 1.30 kg/m W_x = 1.11 cm³ W_y = 5.18 cm³

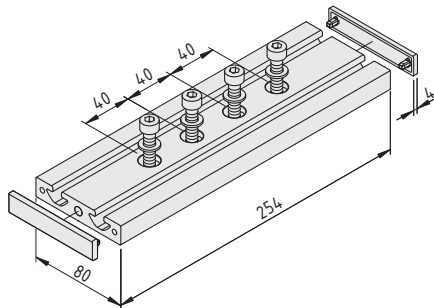
natural, cut-off max. 3000 mm 0.0.609.32



Cap X 6 60x12

- PA-GF
- m = 2.5 g

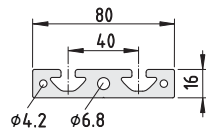
grey, similar to RAL 7042, 1 pce. 0.0.609.29



Carriage Plate KLE 8 80x80

- Profile X 8 80x16, Al natural
- 2 Caps 8 80x16, PA-GF, grey
- 4 Hexagon Socket Head Cap Screws DIN 912-M8x30, St, bright zinc-plated
- 4 Washers DIN 433-8.4, St, bright zinc-plated
- m = 675 g

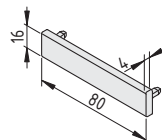
1 set 0.0.609.24



Profile X 8 80x16

- Al, anodized
- A = 9.23 cm² I_x = 2.33 cm⁴ I_y = 52.01 cm⁴
- m = 2.49 kg/m W_x = 2.74 cm³ W_y = 13.00 cm³

natural, cut-off max. 3000 mm 0.0.609.34

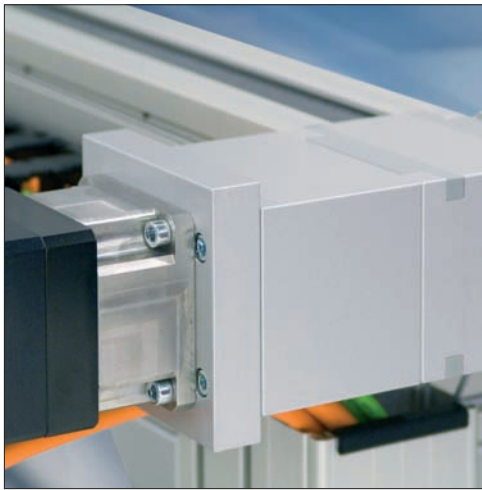


Cap X 8 80x16

- PA-GF
- m = 6 g

grey, similar to RAL 7042, 1 pce. 0.0.609.28

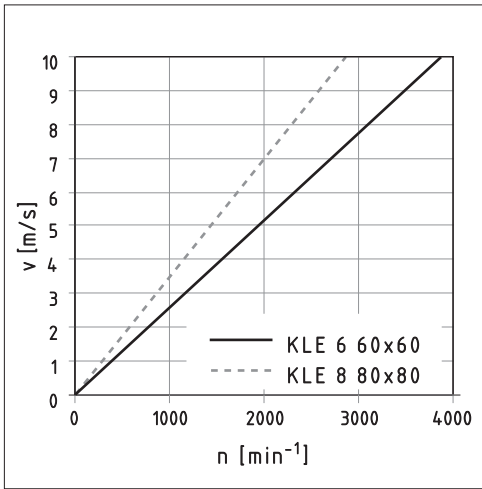
Drive Sets



The relevant Drive Set is attached to the Drive Unit for driving a KLE. This Drive Set consists of a Coupling Half for connection to the pulley, a Coupling Half for connection to the motor shaft, a Coupling Housing with Adapter Plate for connecting the motor to the housing of the Drive Unit, a Centring Piece and fastening material.

The prepared Coupling Half and the hub of the pulley are connected with positive locking and bolted together. The elastic Coupling Insert transmits the drive torque free of play.

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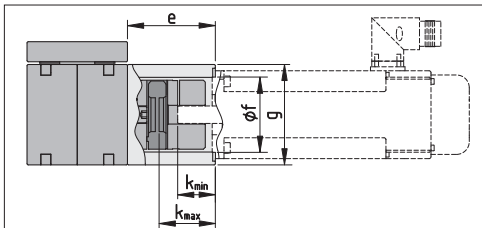


Transmission ratios of Drive Units KLE

The effective radius of the pulleys is

KLE 6 60x60: $r_w = 24.5$ mm

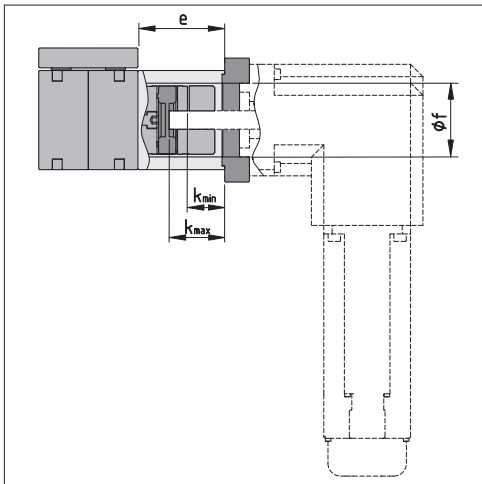
KLE 8 80x80: $r_w = 33.5$ mm



The Drive Set is designed so that the interface may be easily machined to suit the motor being attached:

> The universal Coupling Half bore is machined to accommodate the motor shafts. Parallel keyways or similar can be added if necessary.

> The Adapter Plate can be machined to suit the motor plate. Consequently, virtually any motor can be used for driving a KLE.

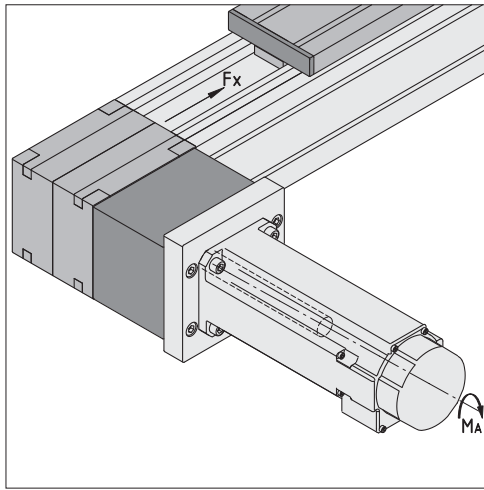


The Centring Piece supplied must always be fitted between the housing parts to prevent alignment errors during assembly.

The permissible drive torques for the Drive Units and coupling must be taken into account when specifying the motor. To increase the rigidity of the drive connection, it may be necessary to use a profile construction to support the motor.

[mm]	KLE 6 60x60	KLE 8 80x80
e	62	70
$\varnothing f_{min}$	47	59.5
g	60	80
k_{min}	34	30
k_{max}	38	44

The hubs of the Couplings Halves can be bored up to the diameter of the motor/gearbox shafts. For higher drive torques, a key to DIN 6885 T1 is recommended.

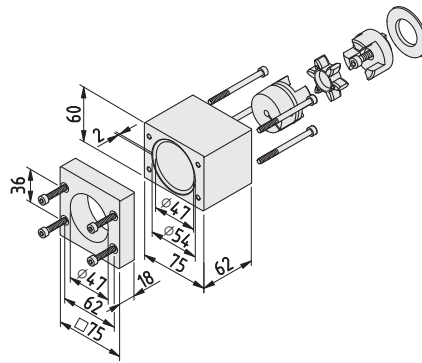


Simplified method for determining the maximum permissible load for the drive elements of a KLE:

Clamping connection of motor shaft to coupling	KLE 6 60x60	KLE 8 80x80
Clamping screw	M6	M6
Tightening torque [Nm]	10.5	10.5
Hole diameter D[mm] of motor shaft	D6-D20	D8-D28
Transferrable drive torque $M_{A \max}$ [Nm]	12	30

Rigid connection of motor shaft to coupling (e.g. with key)	KLE 6 60x60	KLE 8 80x80
Transferrable drive torque $M_{A \max}$ [Nm]	12	50

Permissible operating load of Drive Unit for $v_{\text{mean}} = 1.5 \text{ m/s}$	KLE 6 60x60	KLE 8 80x80
$F_{x \max}$ [N]	500	1,500

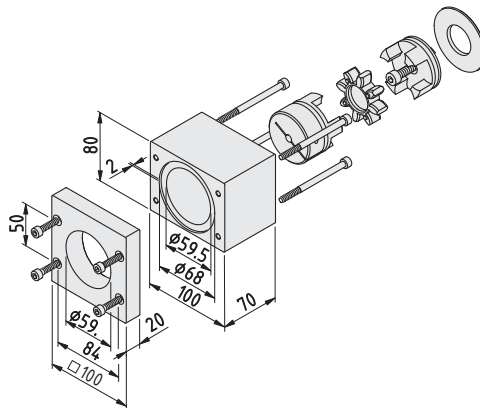


Drive Set KLE 6 60x60

- Coupling Housing, KLE 6 60x60, Al
- Coupling Half D40 KLE 6 60x60, Al
- Coupling Half D40/D5, Al
- Coupling Insert D40, PU 64 Sh D, green
- Centring Piece D40 KLE 6 60x60
- Adapter Plate KLE 6 60x60
- 4 Hexagon Socket Head Cap Screws DIN 912-M5x25, St, bright zinc-plated
- 4 Hexagon Socket Head Cap Screws DIN 912-M5x65, St, bright zinc-plated
- Hexagon Socket Head Cap Screw DIN 912-M6x20, St, bright zinc-plated
- $m = 911 \text{ g}$

1 set

0.0.609.80



Drive Set KLE 8 80x80

- Coupling Housing, KLE 8 80x80, Al
- Coupling Half D55 KLE 8 80x80, Al
- Coupling Half D55/D8, Al
- Coupling Insert D55, PU 64 Sh D, grün
- Centring Piece D55 KLE 8 80x80
- Adapter Plate KLE 8 80x80
- 4 Hexagon Socket Head Cap Screws DIN 912-M6x25, St, bright zinc-plated
- 4 Hexagon Socket Head Cap Screws DIN 912-M6x85, St, bright zinc-plated
- Hexagon Socket Head Cap Screw DIN 912-M8x25, St, bright zinc-plated
- $m = 1750 \text{ g}$

1 set

0.0.609.77

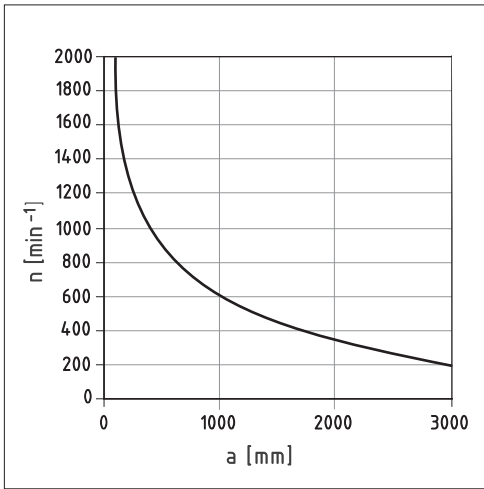
Synchronising Sets



To synchronise two Linear Units KLE, the corresponding Synchronising Sets are available. Each of these contains two complete couplings for connecting the Drive Unit pulleys.

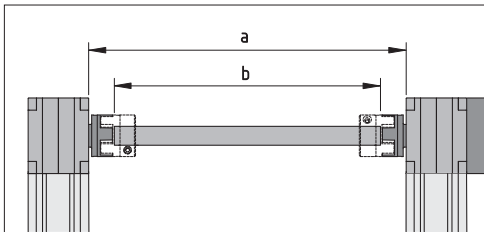
Note: When designing the drive for synchronised KLEs, the permissible drive torques of the components, in particular the coupling on the motor side, must be taken into account.

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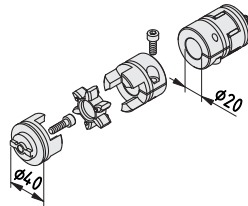
The permissible speed of the Synchroniser Shaft depends on its length.

n = Rotational speed of the Synchroniser Shaft
a = Distance between Linear Units



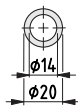
A suitable Tube St (sawn to length) turns the Synchronising Set into a complete Synchroniser Shaft.

	KLE 6 60x60	KLE 8 80x80
Tube	D20x3 St	D25x3 St
b	a - 65 mm	a - 70 mm
a	Distance between Linear Units	



Synchronising Set KLE 6 60x60
 2 Coupling Halves D40 KLE 6 60x60, Al
 2 Coupling Halves D40/D20, Al
 2 Coupling Inserts D40, PU 64 Sh D, green
 2 Hexagon Socket Head Cap Screws DIN 912-M6x20, St, bright zinc-plated
 m = 285 g

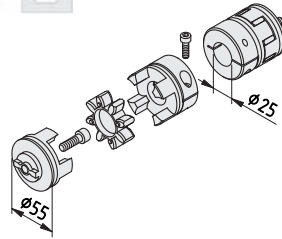
1 set 0.0.609.81



Tube D20x3 St

$I_t = 1.19 \text{ cm}^4$
 $W_t = 1.19 \text{ cm}^3$
 m = 1.26 kg/m

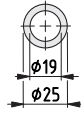
bright zinc-plated, cut-off max. 6000 mm 0.0.609.86



Synchronising Set KLE 8 80x80

2 Coupling Halves D55 KLE 8 80x80, Al
 2 Coupling Halves D55/D25, Al
 2 Coupling Inserts D55, PU 64 Sh D, green
 2 Hexagon Socket Head Cap Screws DIN 912-M8x25,
 St, bright zinc-plated
 m = 715 g

1 set 0.0.609.78

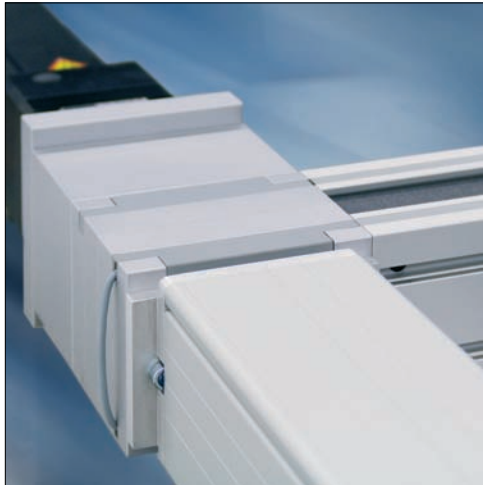


Tube D25x3 St

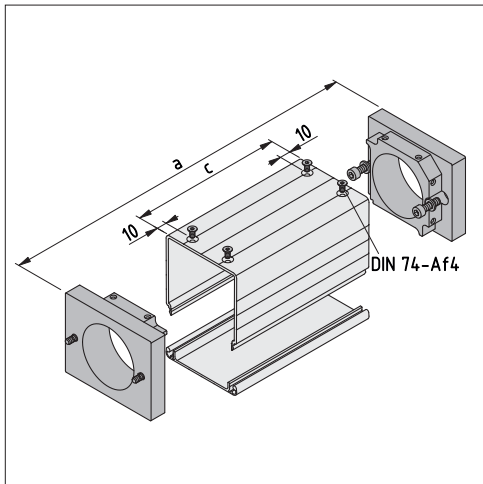
$I_t = 2.55 \text{ cm}^4$
 $W_t = 2.04 \text{ cm}^3$
 m = 1.63 kg/m

bright zinc-plated, cut-off max. 6000 mm 0.0.609.83

**Synchroniser
 Shaft Cover**



Where added safety is required, a protective housing consisting of conduit elements and a Synchroniser Shaft Cover Set can be constructed over the Synchroniser Shaft.



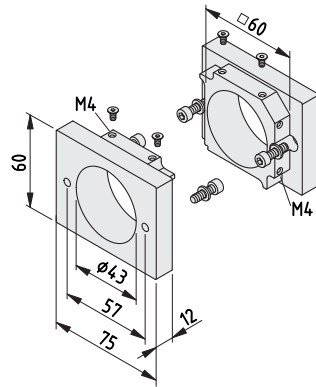
The components contained in the Synchroniser Shaft Cover Set are used to secure the conduit elements between the Drive Units of the KLEs.

KLE 6 60x60:
 Conduit Profile U 60x60 E and Lid Profile D60 E
 c = a - 24 mm (Adapter Plate thickness = 12 mm)

KLE 8 80x80:
 Conduit Profile U 80x80 E and Lid Profile D80 E
 c = a - 32 mm (Adapter Plate thickness = 16 mm)

a = Distance between Linear Units
 c = Length of conduit elements

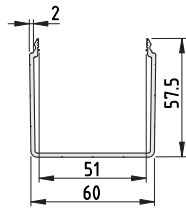
The Conduit Profiles must be provided with countersink DIN 74-Af4 to secure them.



Synchroniser Shaft Cover Set KLE 6 60x60

2 Synchroniser Adapter Plates KLE 6 60x60, Al
 4 Hexagon Socket Head Cap Screws DIN 912-M5x16, St, bright zinc-plated
 4 Washers DIN 433-5,3, St, bright zinc-plated
 4 Countersunk Screws DIN 7991-M4x8, St, bright zinc-plated
 m = 300 g

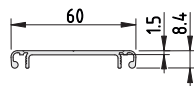
1 set 0.0.612.46



Conduit Profile U 60x60 E

Al, anodized
 A = 3.38 cm²
 m = 0.91 kg/m

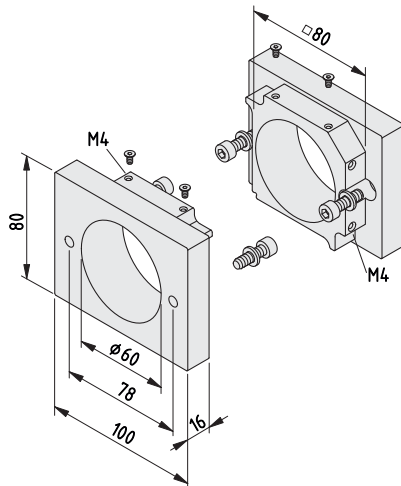
natural, cut-off max. 3000 mm 7.0.002.91



Lid Profile D60 E

Al, anodized
 A = 1.50 cm²
 m = 0.41 kg/m

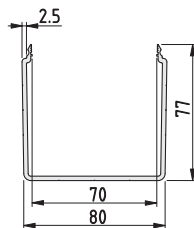
natural, cut-off max. 3000 mm 7.0.002.87



Synchroniser Shaft Cover Set KLE 8 80x80

2 Synchroniser Adapter Plates KLE 8 80x80, Al
 4 Hexagon Socket Head Cap Screws DIN 912-M6x20, St, bright zinc-plated
 4 Washers DIN 433-6,4, St, verzinkt
 4 Countersunk Screws DIN 7991-M4x8, St, bright zinc-plated
 m = 625 g

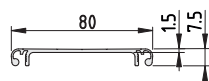
1 set 0.0.612.45



Conduit Profile U 80x80 E

Al, anodized
 A = 5.61 cm²
 m = 1.52 kg/m

natural, cut-off max. 3000 mm 7.0.002.74



Lid Profile D80 E

Al, anodized
 A = 2.12 cm²
 m = 0.57 kg/m

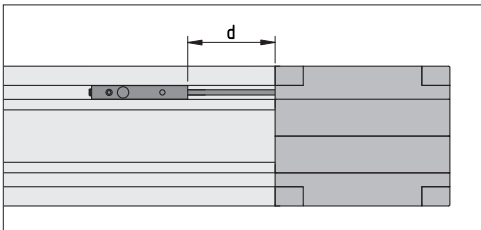
natural, cut-off max. 3000 mm 7.0.002.73

Proximity Switches



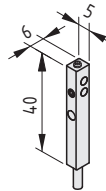
The housings of Linear Units KLE have been prepared for installing Proximity Switches. Two special grooves on the open side of the profiles are used to accommodate the switches and cables. The grooves are sealed with Cover Profiles; the feed cables running to the Proximity Switches can be run under and are protected by the Cover Profiles. Breaks must be made in the Cover Profiles in areas where switches are located. The Proximity Switches are actuated by means of a switching plate that has two switching lugs and is secured to the Slide. The design of the switching plate and the two separate grooves in Housing Profiles KLE means it is possible to attach up to 4 independent Proximity Switches for referencing and terminal position recognition on one KLE.

There are 2 different inductive Proximity Switches (1 NO and 1 NC) for each size. The switches are clamped in the groove.



KLE 6 60x60: $d_{\min} = 80 \text{ mm} + S$
 KLE 8 80x80: $d_{\min} = 100 \text{ mm} + S$

Note: The Cover Profiles must be interrupted at the locations of Proximity Switches.



Proximity Switch KLE 6 60x60 - 1NO

Inductive Proximity Switch, positive switching
 Housing Al, anodized, natural
 Fixing mechanism, fixing screws
 Voltage = 10...30 V DC
 Switching current = 150 mA; Operating distance = 2 mm
 Cable, grey, l = 10 m; d = 3 mm
 m = 125 g

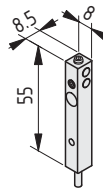
1 pce.

0.0.609.31

Proximity Switch KLE 6 60x60 - 1NC

1 pce.

0.0.604.41



Proximity Switch KLE 8 80x80 - 1NO

Inductive Proximity Switch, positive switching
 Housing Al, anodized, natural
 Fixing mechanism, fixing screws
 Voltage = 10...30 V DC
 Switching current = 150 mA; Operating distance = 2 mm
 Cable, grey, l = 10 m; d = 3 mm
 m = 125 g

1 pce.

0.0.609.30

Proximity Switch KLE 8 80x80 - 1NC

1 pce.

0.0.600.59

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 item Industrietechnik GmbH

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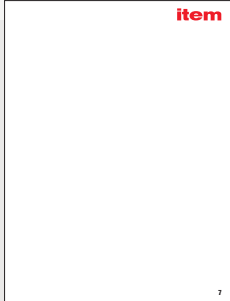
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- Adjustable Foot X 8 PA, L-Based Foot X 8
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- Panel Clamp X 6-8 X and Support Arm X
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- Magnetic Catch X and Magnetic Door Stop X

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- ESD Fasteners
- Angle Bracket 12 240x240 Al
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- Telescope 8 80x40

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