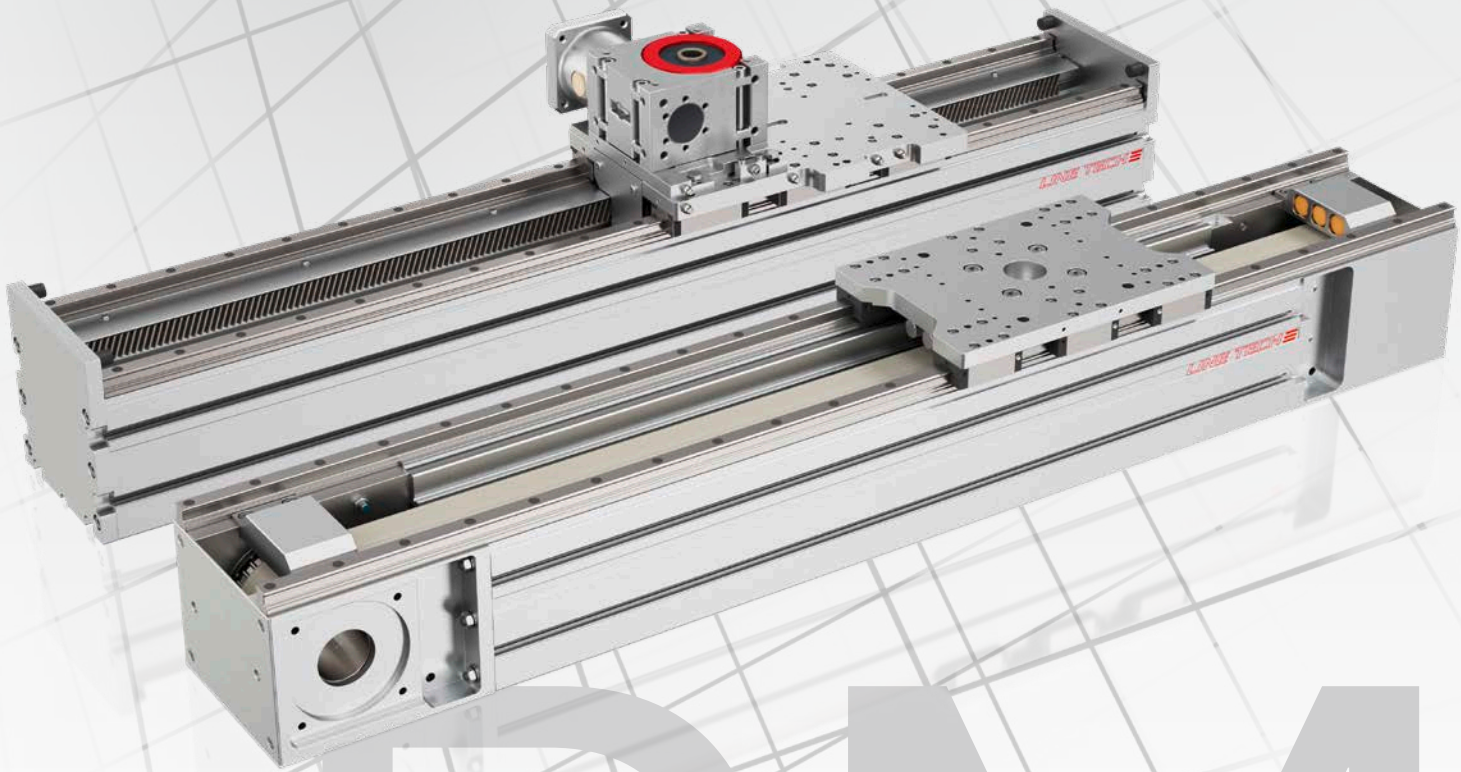
LINE TECH



DM

DYNAMIC MODULES

PRODUCT CATALOGUE

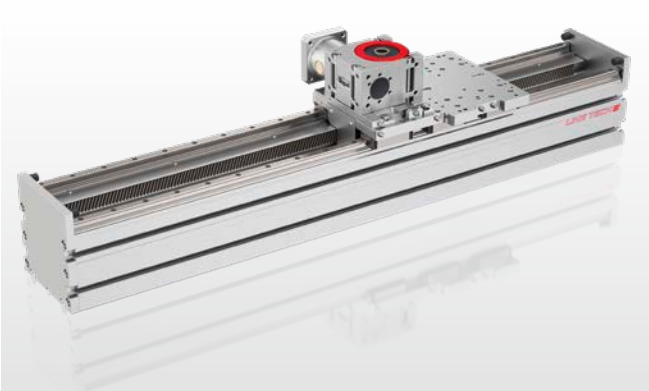
V09-23

SWISS MADE LINEAR TECHNOLOGY

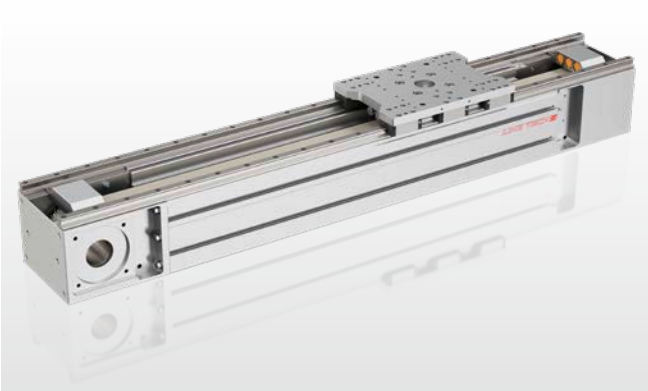
DYNAMIC MODULES

Product Overview

DM...ZS...
Dynamic module with rack and pinion drive



DM...ZR...
Dynamic module with toothed belt drive



DYNAMIC MODULES

Product Overview

LINE TECH dynamic modules are ready-to-install linear axes driven by rack and pinion (DM...ZS...) or toothed belts (DM...ZR...). These dynamic modules meet the highest standards of dynamics and service life and can achieve very fast cycle times under high loads. Thanks to the special design of the extruded aluminium profile, the compact base profile has high torsional rigidity and is also suitable for self-supporting applications. Two sizes (DM**2**… and DM**3**…) are currently available.

Advantages

- Compact size
- Optimal movement characteristics in conjunction with high load ratings and high rigidity provided by two integrated zero-play linear rail guides
- Drive via either rack and pinion (DM…ZS…) or toothed belt (DM…ZR…)
- Simple gearbox mounting via centring and mounting thread on the drive housing or on the carriage plate

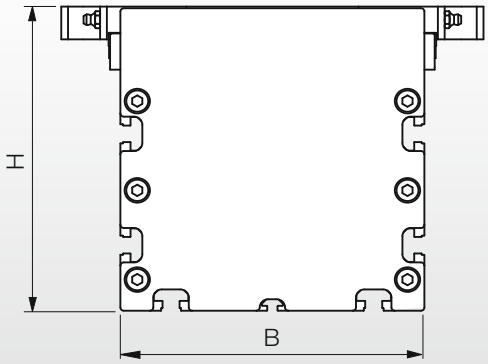
Design

- Compact aluminium profile as base profile
- Ready-to-install dynamic modules in any length
- Aluminium carriage

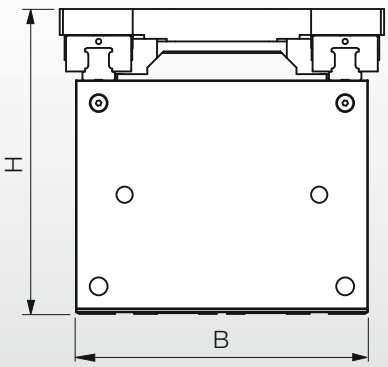
Options available on request

- Motor attachments
- Special carriages
- Multi-axis systems

DM...ZS...



DM...ZR...



Dynamic module	Dimensions	Load ratings	
Typ	B x H [mm]	C_0 [kN]	C_{50} [kN]
DM2.ZS...	180 x 188	192.6	131.3
DM2.ZR...	180 x 188	162.0	116.3
DM3.ZS...	220 x 241	311.5	208.8
DM3.ZR...	220 x 231	311.5	208.8

See pages 8 to 14 for for further technical data.

DYNAMIC MODULES

Design / Lubrication / Maintenance

LINE TECH Dynamic Modules

LINE TECH dynamic modules with rack and pinion drive or toothed belt drive are modular, ready-to-install linear systems including the drive. Sealed guide elements are used in all sizes. The extruded base profile is aluminium alloy.
Optional integrated limit switches protect against overshooting; prepared mounting points are provided as standard.
Additional external sensors can be used in conjunction with the motor and control unit to ensure the correct positioning of the carriage by means of a switch flag and sensor holder.
The design delivers very high performance with extremely compact dimensions.

Lubrication

The guide elements of LINE TECH dynamic modules are pre-lubricated at the factory with Microlube GBU Y 131.
Attention: See the instructions on page 30 for lubricating the rack and pinion drive!

Correct and sufficient lubrication can significantly extend the service life of the dynamic modules. 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 30/31 for information on the lubrication points.

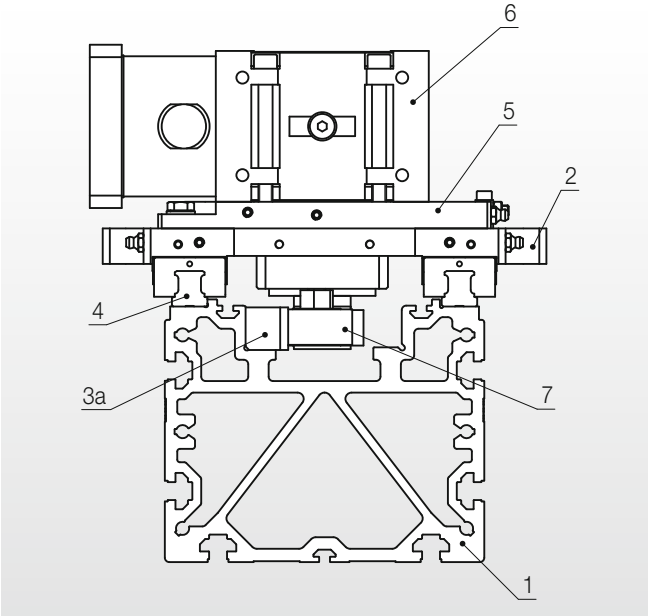
Maintenance

Except for periodic lubrication, LINE TECH dynamic modules are maintenance free.

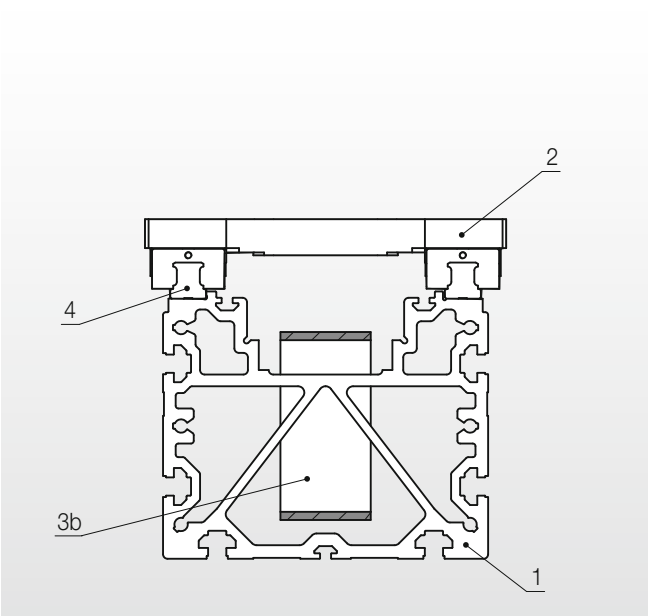
Operating temperature

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.

DM...ZS...
with rack and pinion drive



DM...ZR...
with toothed belt drive



1) Base profile
2) Carriage
3a) Toothed rack
3b) Toothed belt
4) Linear rail guide
5) Gearbox mounting plate
6) Gearbox
7) Drive and lubrication pinion

DYNAMIC MODULES

Mounting type

When determining the layout of linear units, the method of mounting is usually disregarded (undefined support points » Order code A (Designation systems » see pages 16/24)). In this case, any unevenness of the mounting surface can be carried over to the linear module (assuming that the mounting surface is stiffer than the base profile).
Because the base profile of our dynamic modules is very rigid, other mounting options are also available: The final mounting situation of each module can be taken into account already during the processing of the base profile – support points predefined by the customer can be incorporated into the JIT production process (defined support points » Order code B).
If an extremely high level of precision is required for the linear movement, the defined support points can also be machined. These then serve as the clamping surface for machining the guide rail supports, allowing even greater precision of movement to be achieved (machined support points » Order code C).
Please provide us with your defined support points (» Order code B/C) (number, position, width) and we will manufacture your dynamic module according to your application-specific requirements and give it a unique ID number.

Installation orientation

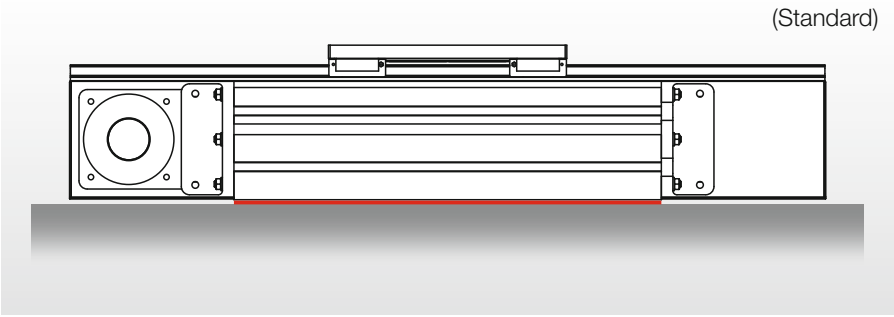
The standard installation position of linear units is horizontal (as shown) or overhead. If your application requires a vertical or lateral installation position, please contact our technical sales department in advance.

Undefined support points

Order code A (Standard)

Undefined support points for the base profile (unmachined).

» Straightness 0.8 mm/1000 m

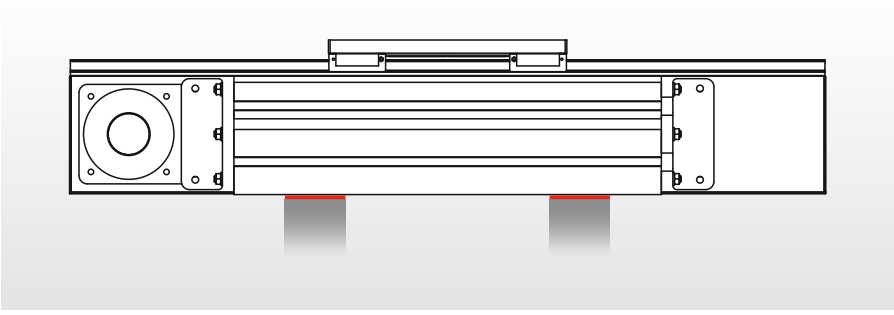


Defined support points

Order code B

Defined support points for the base profile (unmachined).

» Straightness 0.4 mm/1000 mm

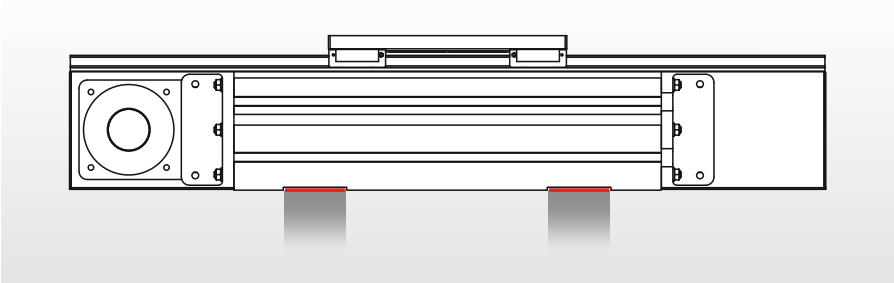


Machined support points

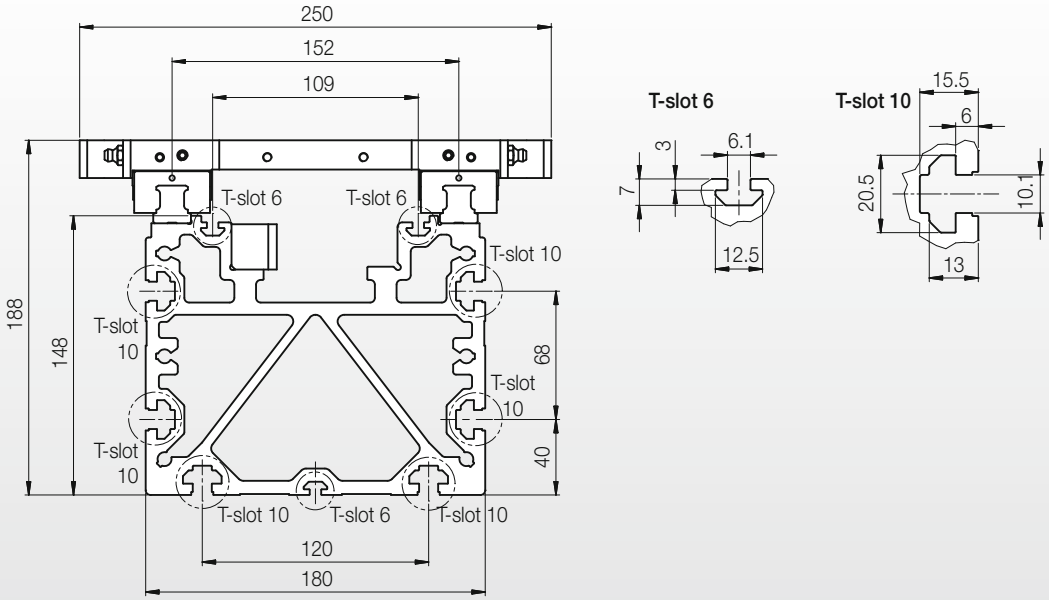
Order code C

Overmilled defined support points for the base profile.

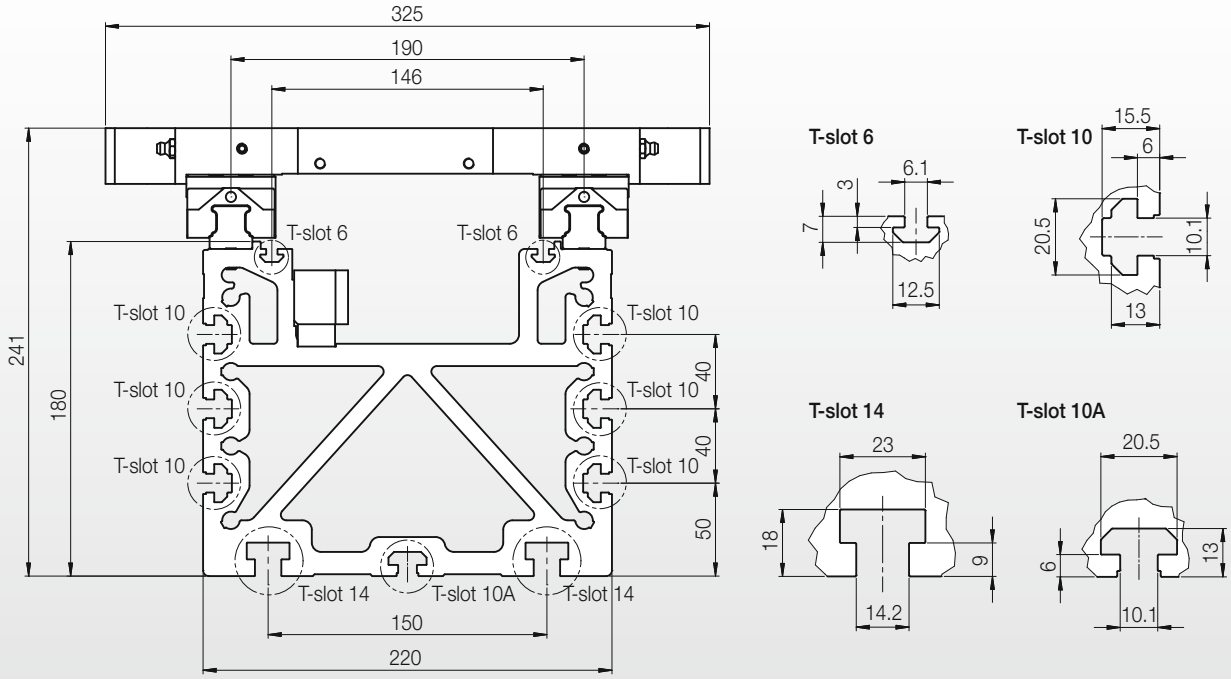
» Straightness 0.2 mm/1000 mm



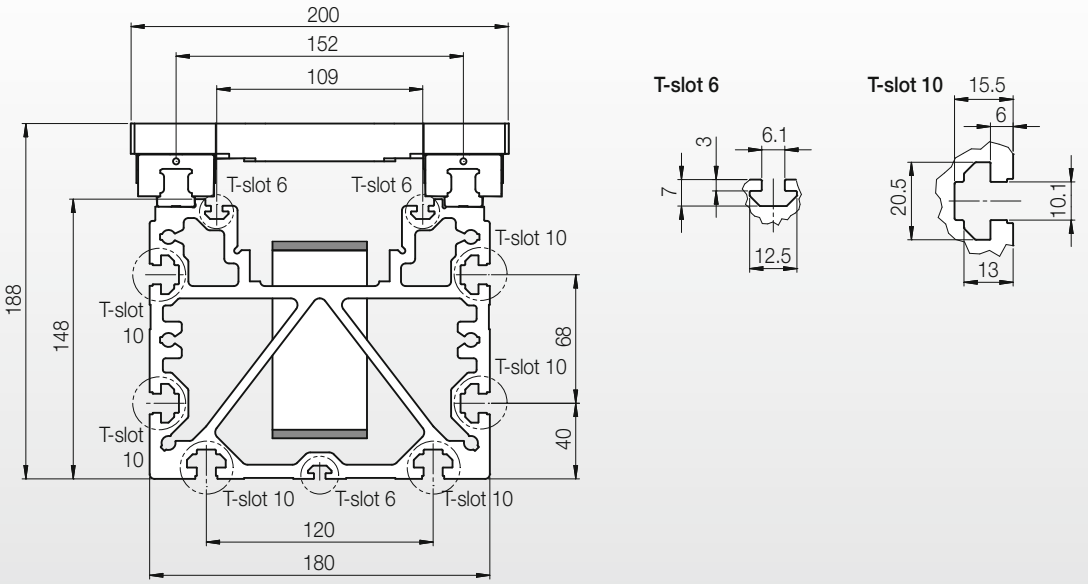
Cross section DM2.ZS...



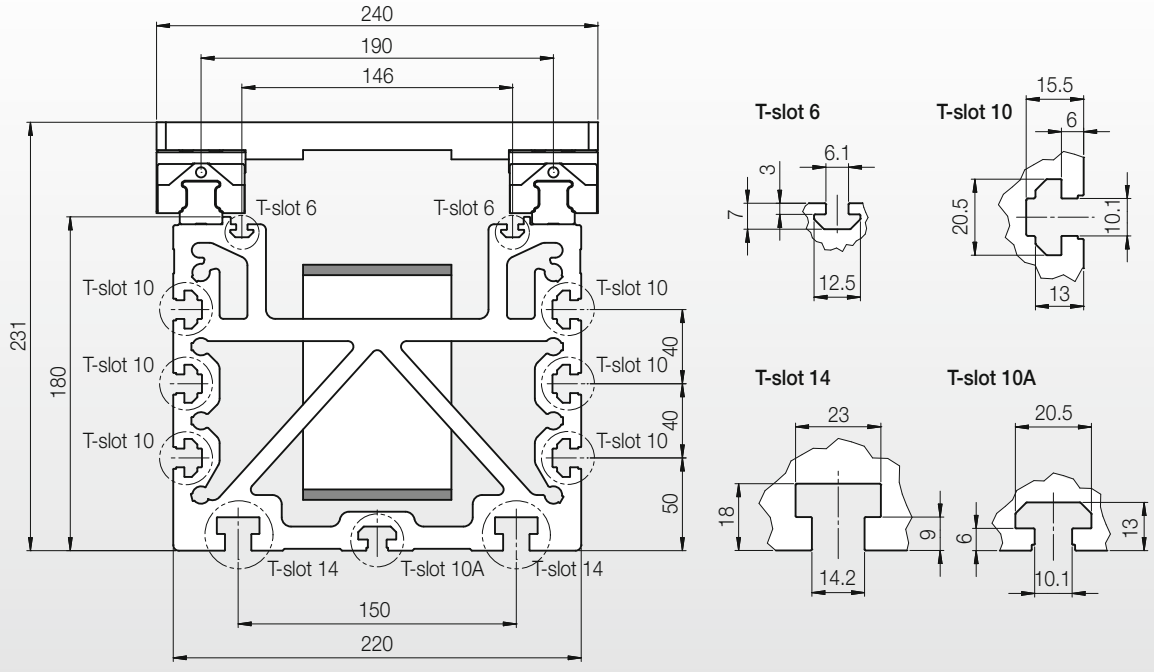
Cross section DM3.ZS...



Cross section DM2.ZR...

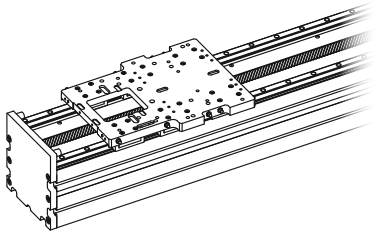


Cross section DM3.ZR...



DYNAMIC MODULES WITH RACK AND PINION DRIVE

Rack and pinion drive data

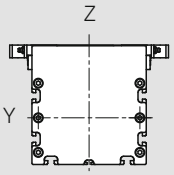


Technical data

DM	Rack and pinion drive	Axial load rating	Positioning accuracy	Repeating accuracy	Acceleration
Size	Stroke/R [mm]	F [N]	[µ/mm]	…/1000 mm [mm]	a_{max} [m/s²]
DM2.ZS...	133.332 (42.441 x π)	…… [1]	36/1000 [2]	± 0.02 [2]	50 [3]
DM3.ZS...	160.001 (50.93 x π)	…… [1]	37/1000 [2]	± 0.02 [2]	50 [3]

[1] Depends on speed and load
➞ see "Permissible speeds" charts on pages 10/11 (DM2.ZS…) and 12/13 (DM3.ZS…)
[2] Without considering backlash and load
[3] Maximum possible value; precise value for your specific application to be determined with our technical sales department

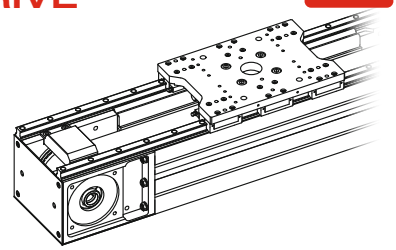
General technical data for dynamic modules with rack and pinion drive

DM	Travel speed		Area moment of inertia		Stroke max.	Feed and friction force	Mass/carriage transported (without gearbox)
	Guide	Drive					
Type	v_{max} [m/min]	v_{max} [m/min]	I_Y [cm⁴]	I_Z [cm⁴]	[mm]	F_V [N]	m_b [kg]
DM2.ZS...	360 [6]	[4]	1780	3184	5550 (1 carriage) [5] 5200 (2 carriages) [5]	50 [7]	7.8
DM3.ZS...	360 [6]	[4]	4352	8260	5450 (1 carriage) [5] 5000 (2 carriages) [5]	60 [7]	16.0

[4] Depends on load and gear ratio
➞ see "Permissible speeds" charts on pages 10/11 (DM2.ZS…) and 12/13 (DM3.ZS…)
[5] Longer strokes on request
[6] Higher speeds on request
[7] Without idling-torque gearbox; this is dependent on the gear ratio

DYNAMIC MODULES WITH TOOTHED BELT DRIVE

Toothed belt drive data

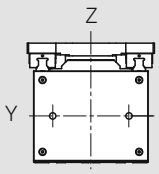


Technical data

DM	Toothed belt drive		Axial load rating	Positioning accuracy	Repeating accuracy	Acceleration
Size	Stroke/R [mm]	Elongation [3] [mm/m]	F [N]	[µ/mm]	…/1000 mm [mm]	a_{max} [m/s²]
DM2.ZR...	320	0.037	..... [1]	200/1000 [2]	± 0.05 [2]	50.0 [4]
DM3.ZR...	392	0.023	..... [1]	200/1000 [2]	± 0.05 [2]	50.0 [4]

[1] Depends on speed and load
→ see "Permissible speeds" chart on page 14
[2] Without considering backlash and load
[3] Belt elongation/metre [mm/m] per 100 N tensile force
[4] Maximum possible value; precise value for your specific application to be determined with our technical sales department

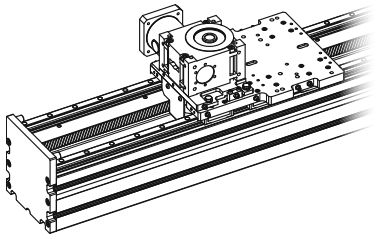
General technical data for dynamic modules with toothed belt drive

DM	Travel speed		Area moment of inertia		Stroke max.	Feed and friction force	Mass transported
							
Type	Guide v_{max} [m/min]	Drive v_{max} [m/min]	I_Y [cm⁴]	I_Z [cm⁴]	[mm]	F_V [N]	m_b [kg]
DM2.ZR...A/B/C...[8]	360 [7]	[5]	1780	3184	5880 [6]	65	6.4
DM2.ZR...D/E/F...[8]	360 [7]	[5]	1780	3184	5880 [6]	80	7.2
DM3.ZR...A/B/C...[8]	360 [7]	[5]	5183	8917	5770 [6]	80	12.3
DM3.ZR...D/E/F...[8]	360 [7]	[5]	5183	8917	5770 [6]	100	13.7

[5] Depends on load, rotation speed, and permissible travel speed of the guides
→ see "Permissible speeds" chart on page 14
[6] Longer strokes on request
[7] Higher speeds on request
[8] …A/B/C… = 4 runner blocks / …D/E/F… = 6 runner blocks

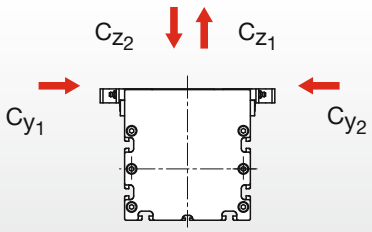
DYNAMIC MODULES WITH RACK AND PINION DRIVE

Data for DM2.ZS... with angular gearbox

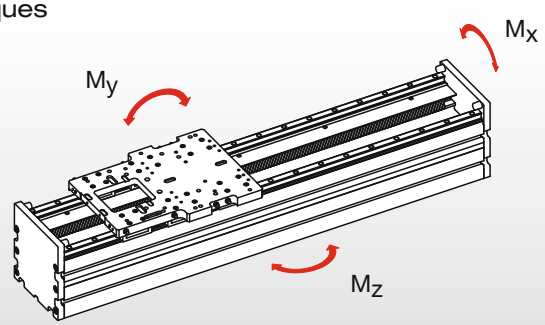


Load ratings and torques of the linear rail guides

Load ratings



Torques



Dynamic module	Maximum permissible forces [kN]				Maximum permissible torques [Nm]					
Type	static		dynamic		static			dynamic		
	$C_{y_{0\,1,2}}$	$C_{z_{0\,1,2}}$	$C_{y_{1,2\,50}}$	$C_{z_{1,2\,50}}$	M_{x_0}	M_{y_0}	M_{z_0}	$M_{x\,50}$	$M_{y\,50}$	$M_{z\,50}$
DM2.ZS...	192.6	192.6	131.3	131.3	14630	15110	15110	9980	10620	10620

Permissible speeds of DM2.ZS... with angular gearbox versus selected gear ratio.

Gearbox type: **HPG045-DM2.ZS**
» see page 19

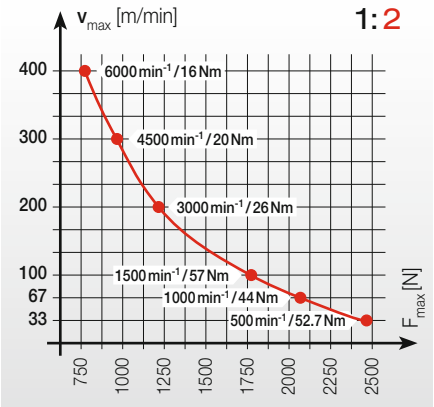
Available gear ratios i [–]:
1:2 / 3 / 4 / 5 / 6 / 8 / 10 / 13.33 / 16 / 24 / 30 / 47 / 60

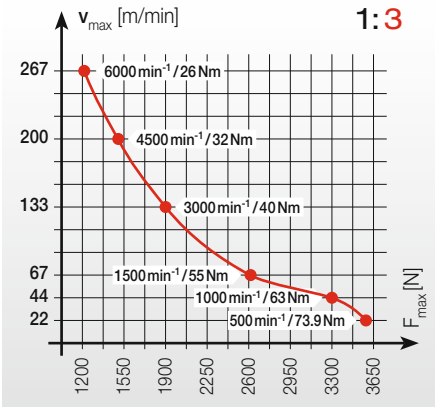
Corresponding gearbox input values for the intersection points [•] of v_{max} und F_{max} in the graphs:
n_E [min^{-1}] **/ M_E** [Nm]

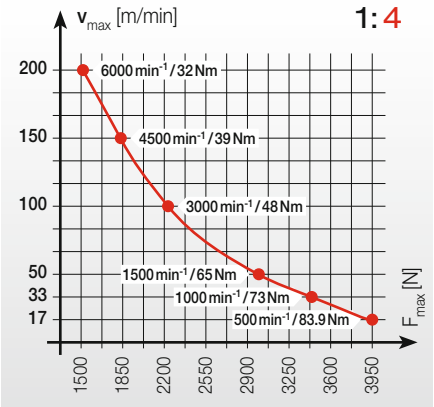
whereby

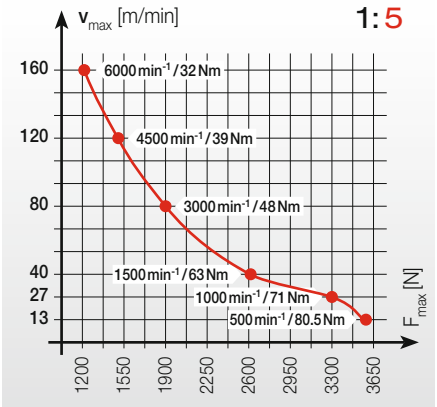
i	[–]	= Gear ratio
n_E	[min^{-1}]	= Input speed
M_E	[Nm]	= Input torque
F_{max}	[N]	= Max. axial load
v_{max}	[m/min]	= Max. speed

Please contact us for a detailed configuration for your application.



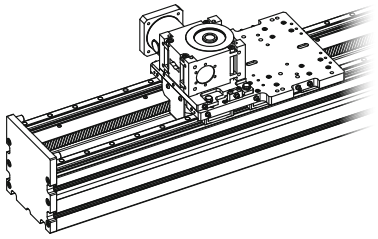




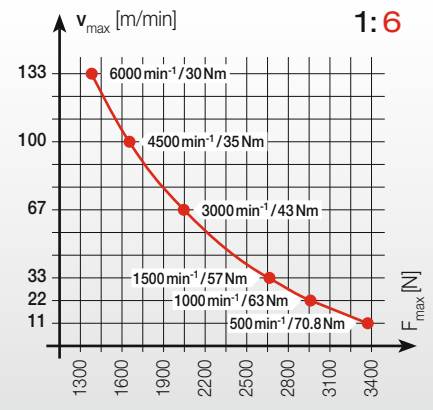


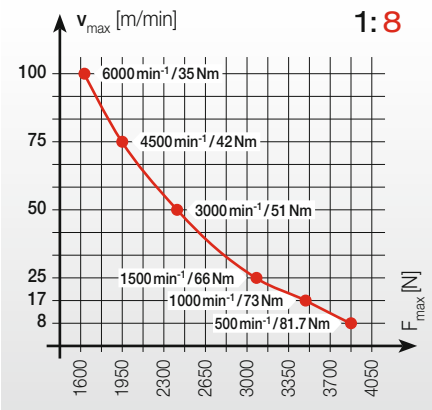
DYNAMIC MODULES WITH RACK AND PINION DRIVE

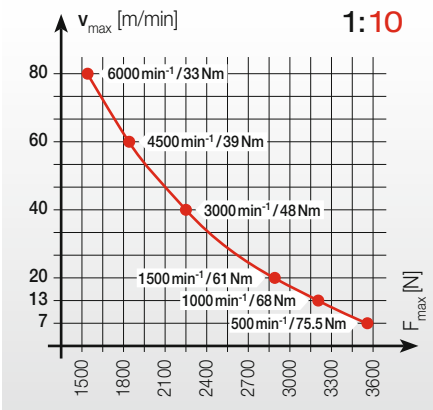
Data for DM2.ZS... with angular gearbox

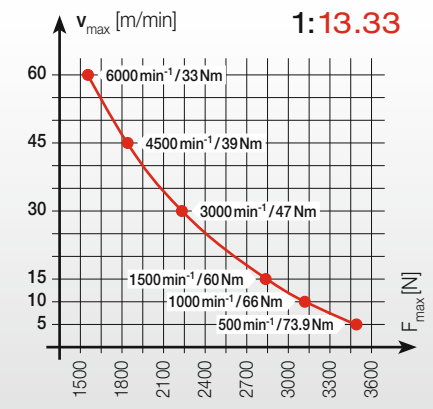


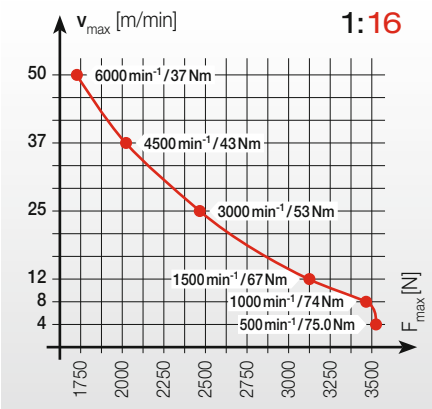
Permissible speeds of DM2.ZS... with angular gearbox (continued)

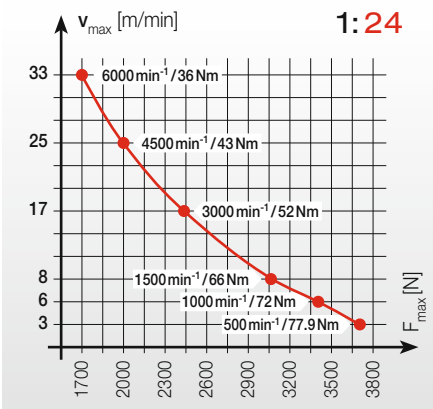


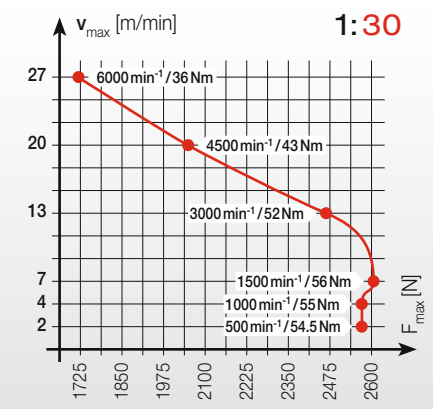


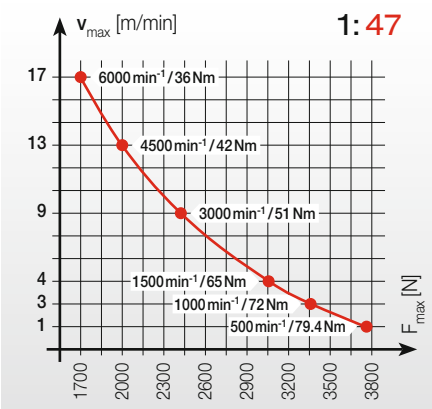


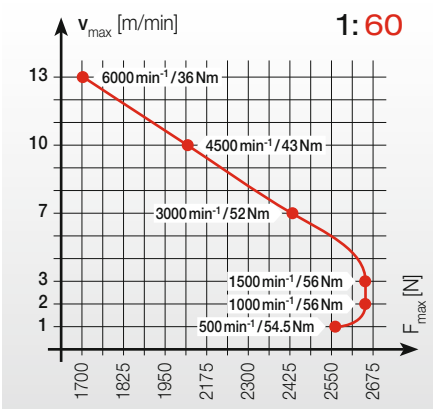






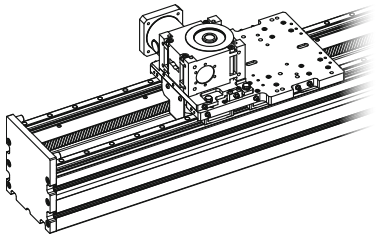






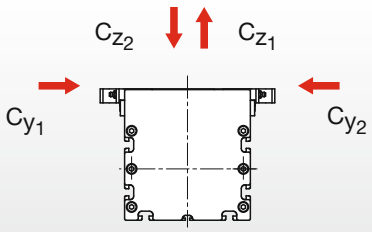
DYNAMIC MODULES WITH RACK AND PINION DRIVE

Data for DM3.ZS... with angular gearbox

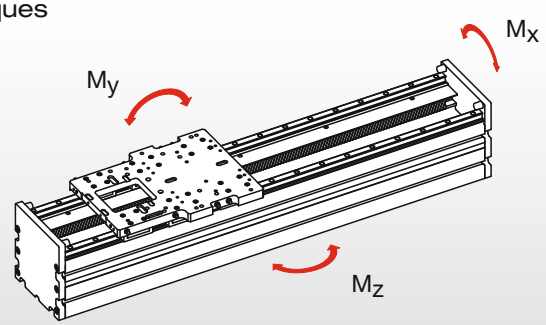


Load ratings and torques of the linear rail guides

Load ratings



Torques



Dynamic module	Maximum permissible forces [kN]				Maximum permissible torques [Nm]					
Type	static		dynamic		static			dynamic		
	$C_{y_{0\,1,2}}$	$C_{z_{0\,1,2}}$	$C_{y_{1,2\,50}}$	$C_{z_{1,2\,50}}$	M_{x_0}	M_{y_0}	M_{z_0}	$M_{x\,50}$	$M_{y\,50}$	$M_{z\,50}$
DM3.ZS...	311.5	311.5	208.8	208.8	29600	35950	35950	19840	24470	24470

Permissible speeds of DM3.ZS... with angular gearbox versus selected gear ratio.

Gearbox type: **HPG060-DM3.ZS**
» see page 19

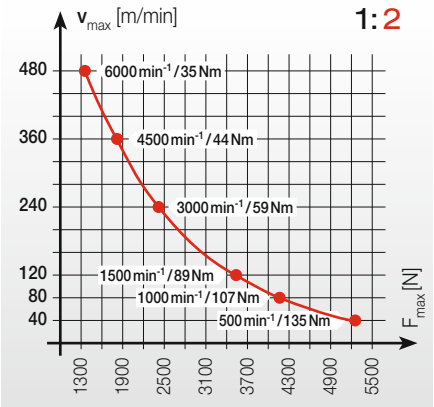
Available gear ratios i [–]:
1:2 / 3 / 4 / 5 / 6 / 8 / 10 / 13.33 / 16 / 24 / 30 / 47 / 60

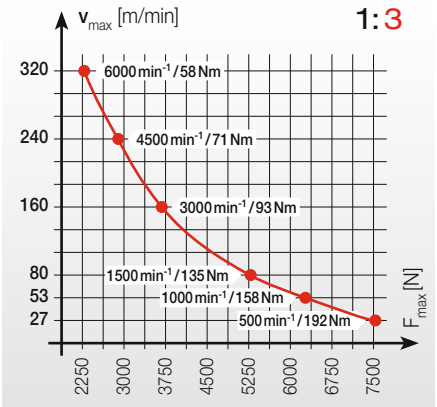
Corresponding gearbox input values for the intersection points [•] of v_{max} und F_{max} in the graphs:
n_E [min^{-1}] **/ M_E** [Nm]

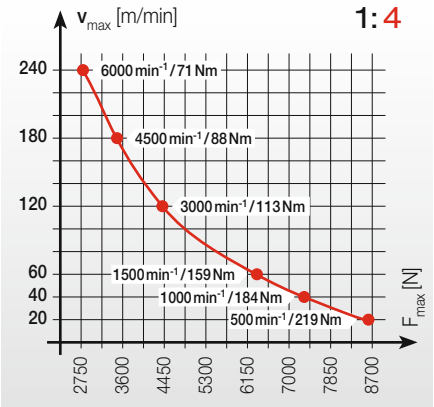
whereby

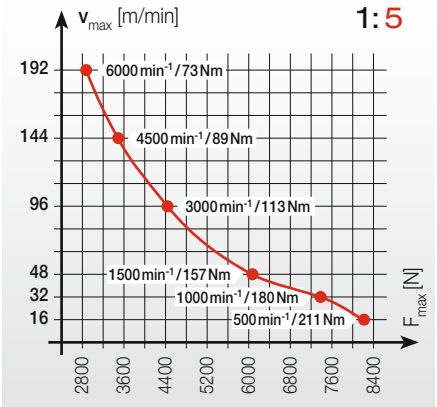
i	[–]	= Gear ratio
n_E	[min^{-1}]	= Input speed
M_E	[Nm]	= Input torque
F_{max}	[N]	= Max. axial load
v_{max}	[m/min]	= Max. speed

Please contact us for a detailed configuration for your application.



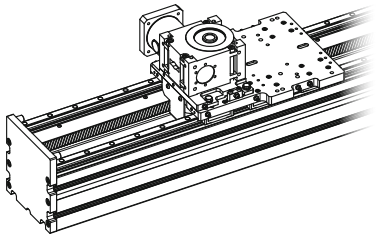




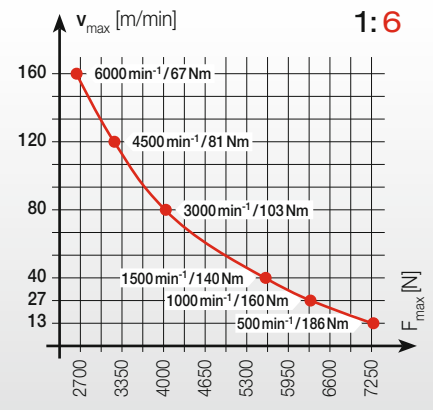


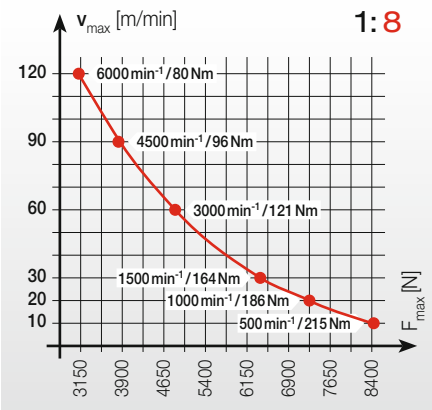
DYNAMIC MODULES WITH RACK AND PINION DRIVE

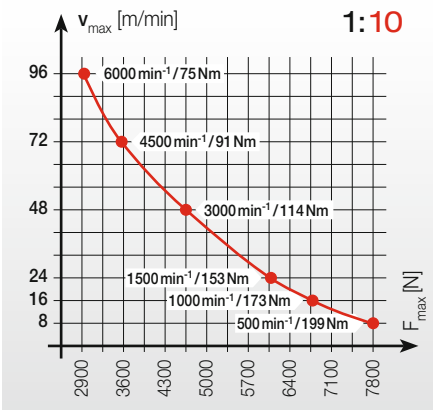
Data for DM3.ZS... with angular gearbox

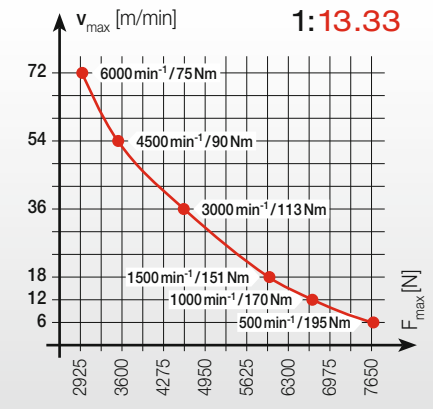


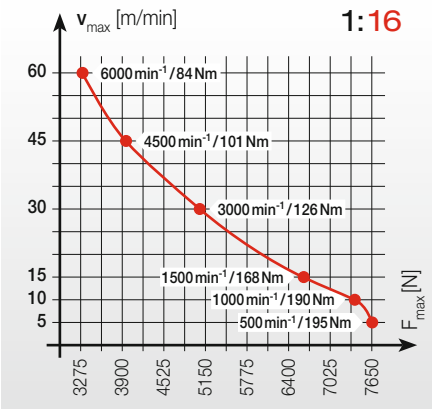
Permissible speeds of DM3.ZS... with angular gearbox (continued)

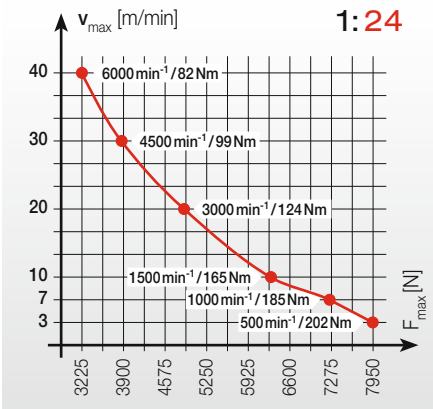


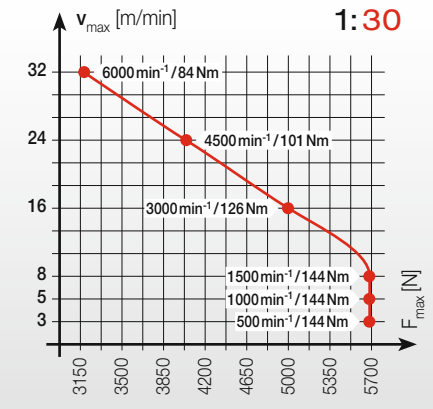


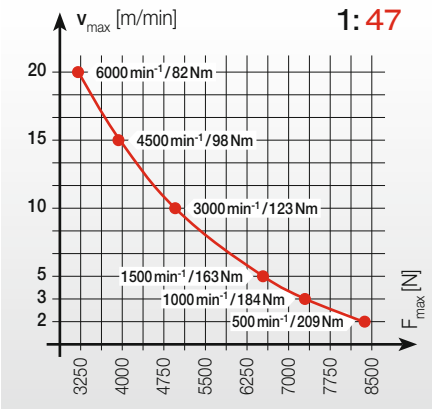


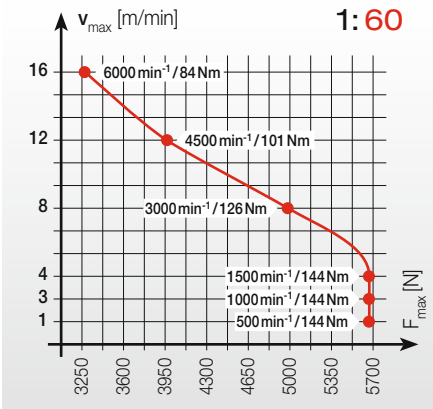






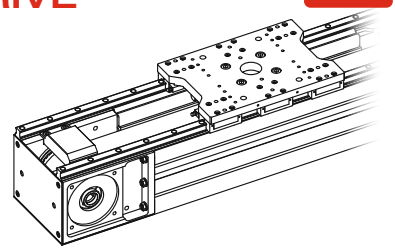






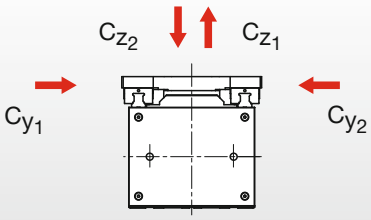
DYNAMIC MODULES WITH TOOTHED BELT DRIVE

Data for DM2.ZR... / DM3.ZR...

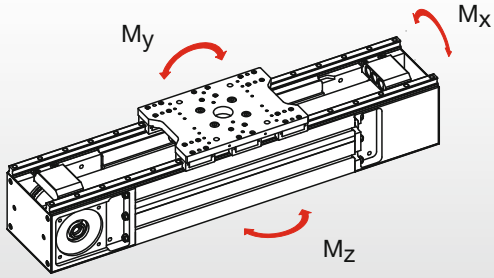


Load ratings and torques of the linear rail guides

Load ratings



Torques



Dynamic module	Maximum permissible forces [kN]				Maximum permissible torques [Nm]					
Type	static		dynamic		static			dynamic		
	$C_{y_{0\,1,2}}$	$C_{z_{0\,1,2}}$	$C_{y_{1,2\,50}}$	$C_{z_{1,2\,50}}$	M_{x_0}	M_{y_0}	M_{z_0}	$M_{x\,50}$	$M_{y\,50}$	$M_{z\,50}$
DM2.ZR...A/B/C...[1)]	108	108	77.5	77.5	8200	11880	11880	5900	8530	8530
DM2.ZR...D/E/F...[1)]	162.0	162.0	116.3	116.3	12310	12080	12080	8840	8790	8790
DM3.ZR...A/B/C...[1)]	207.7	207.7	139.2	139.2	19730	35310	35310	13220	23670	23670
DM3.ZR...D/E/F...[1)]	311.5	311.5	208.8	208.8	29600	35950	35950	19840	24470	24470

[1)] ...A/B/C... = 4 runner blocks / ...D/E/F... = 6 runner blocks » see designation system on page 24

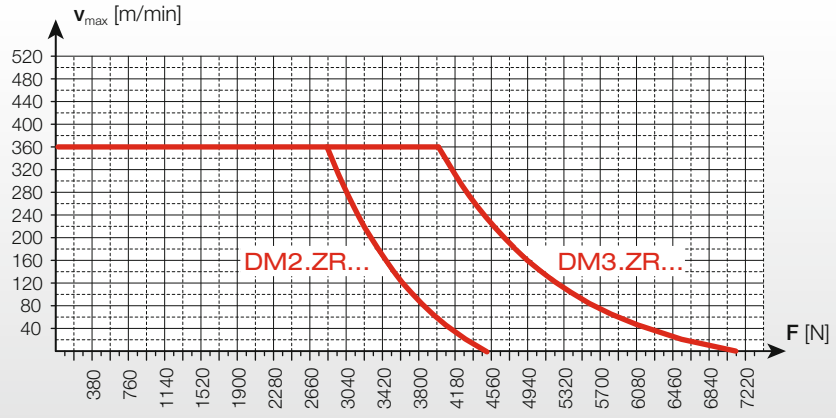
Note on dynamic load ratings and torques

The values given for the dynamic load ratings and torques are based on a stroke travel of 50 km. If comparative values are to be calculated for a stroke travel of 100 km, the values $M_{x_{50}}$, $M_{y_{50}}$, $M_{z_{50}}$ and C_{50} must be divided by a factor of 1.26.

Reasonable loads

With regard to service life, loads of less than 20% of the dynamic load ratings have generally proved to be reasonable.

Permissible speeds of DM...ZR...



F = axial load

DYNAMIC MODULES – APPLICATION EXAMPLE

LINE TECH system solutions

In addition to the development and production of a wide range of linear axes, LINE TECH specialises in the design, layout, and production of multi-axis system solutions. We have been supporting our customers with engineering services and supplying application-specific optimised linear systems since 1993.
Of course, we also serve our customers with installation and commissioning on request. As part of our after-sales service, we remain available to answer any questions and address any problems throughout the entire service life of our products.

Example: 3-axis, high-dynamics handling system for large parts in an electroplating line

This application consists of two X-axes with rack and pinion drive and a 2270 mm stroke as the basis, as well as a gantry with a 2610 mm stroke, also with rack and pinion drive. For the central drive of the motorised X-axes, connecting shafts with metal bellows couplings are used, which ensures absolutely backlash-free torque transmission and precise positioning of the gantry, even with highly dynamic movements.

The Y-axis with its large unsupported span and 2610 mm stroke makes use of the rigid base profile of the dynamic modules. To utilise the stroke of the Z-axis optimally and compactly, the connection to the Y-axis is made with a customised support adapted to the specific application.

LINE TECH linear units used

X-axes: 2x dynamic modules (size 2) with rack and pinion drive, stroke 2270 mm
(DM2.ZS.2270.AABB.10 / DM2.ZS.2270.AABA.10)

Y-axis: 1x dynamic module (size 2) with rack and pinion drive, stroke 2610 mm
(DM2.ZS.2610.CBAB.10)

Z-axis: 1x positioning unit (size 3) with ball screw drive and bellows cover, stroke 450 mm, from the LINE TECH product range

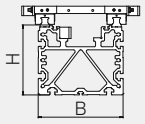
DYNAMIC MODULES WITH RACK AND PINION DRIVE

Designation system for DM...ZS...

Dynamic module with rack and pinion drive	Basic key								
Designation example:	DM	2	.	ZS	.	2400	.	A	A

Design
DM = Dynamic module with linear rail guide

Size (cross section of base profile)
2 = B 180 x H 148 mm
3 = B 220 x H 180 mm



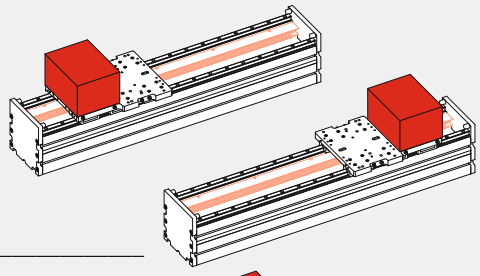
Drive type
ZS = Rack and pinion

Stroke absolute [mm]
$Stroke_{max}$ DM2.ZS... = 5550 mm / $Stroke_{max}$ DM3.ZS... = 5450 mm / longer strokes available on request

Mounting type » see page 5
A = undefined support points **
B = defined support points
C = machined support points

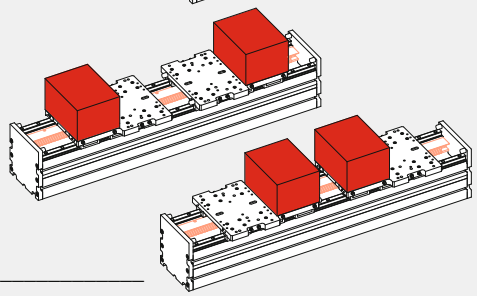
Carriages

A = 1 carriage with gearbox on left *



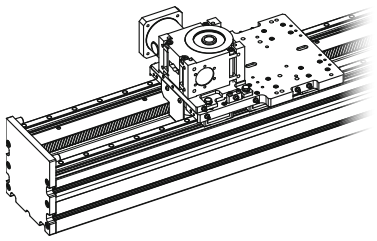
B = 1 carriage with gearbox on right *

C = 2 carriages with gearboxes outward *



D = 2 carriages with gearboxes inward *

Other configurations are possible to meet specific requirements



Basic key				Customer-specific modifications
A	A	.	08	– XXXX

ID number

XXXX = Unique identification number reflecting mounting type B/C, gearbox configuration, or customer-specific modifications (number assigned by LINE TECH)

Gear ratio » see page 18 for available gear ratios

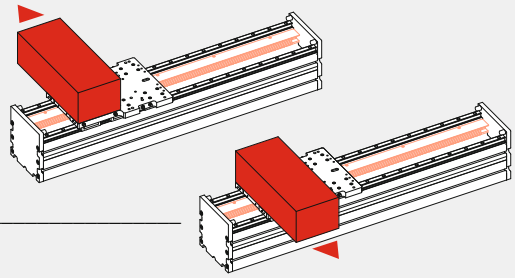
02 = 1:2
03 = 1:3
XX = 1:XX

Available gear ratios:
1:2 (› **02**) / 3 (› **03**) / 4 (› **04**) / 5 (› **05**) / 6 (› **06**) / 8 (› **08**) / 10 (› **10**) / 13.33 (› **13**) / 16 (› **16**) / 24 (› **24**) / 30 (› **30**) / 47 (› **47**) / 60 (› **60**)

Gearbox mounting orientation

A = rear * (toothed rack side) ** _____

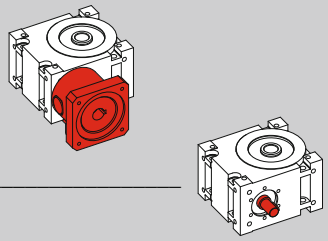
B = front * _____



Gearbox » see page 18 for available gear ratios

A = Angular gearbox with motor flange ** _____

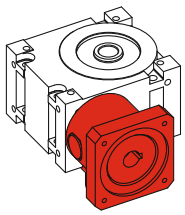
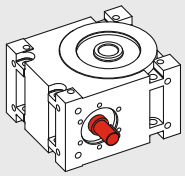
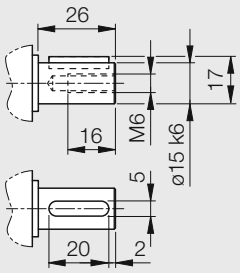
B = Angular gearbox with drive shaft _____



* View from side without toothed rack toward side with toothed rack
** Standard version

Gearbox range

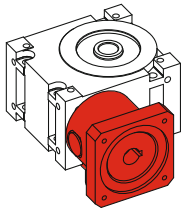
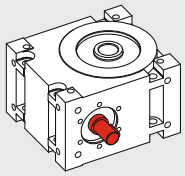
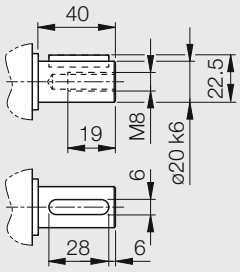
DM2.ZS... Standard gearboxes

Gearbox design type		Drive	Gearbox type	Mounting geometry
Angular gearbox with motor flange		Electric motor	HPG045-DM2.ZS	
Angular gearbox with drive shaft		Connecting shaft for belt drive	HPG045-DM2.ZS	

Information required by LINE TECH to configure a gearbox:

– Desired gear ratio
  Available gear ratios: 1:2 / 3 / 4 / 5 / 6 / 8 / 10 / 13.33 / 16 / 24 / 30 / 47 / 60
– Desired motor (provided by customer)

DM2.ZS... Standard gearboxes

Gearbox design type		Drive	Gearbox type	Mounting geometry
Angular gearbox with motor flange		Electric motor	HPG060-DM3.ZS	
Angular gearbox with drive shaft		Connecting shaft for belt drive	HPG060-DM3.ZS	

Information required by LINE TECH to configure a gearbox:

– Desired gear ratio
  Available gear ratios: 1:2 / 3 / 4 / 5 / 6 / 8 / 10 / 13.33 / 16 / 24 / 30 / 47 / 60
– Desired motor (provided by customer)

DYNAMIC MODULES – APPLICATION EXAMPLE

LINE TECH system solutions

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Of course, we also serve our customers with installation and commissioning on request. As part of our after-sales service, we remain available to answer any questions and address any problems throughout the entire service life of our products.

Example: 3-axis system consisting of 6 modules for handling battery systems in the e-mobility sector

This project benefited greatly from LINE TECH's core competencies: detailed technical consulting in the preliminary phase, engineering (design with service life calculation, calculation of the necessary motor torques), and development of the design solution including in-house JIT production and assembly.
The system enables the highly dynamic movement of large loads with extremely short cycle times. It is designed to be highly integrated into the process and saves the customer the need for complex and space-consuming additional constructions.
The main gantry performs the main handling and achieves positioning at the X-Y-Z coordinates. The Y-stroke of 1440 mm is precisely adapted to the application and assembly line conditions.
The secondary gantry extends the system's handling options in the X/Z directions in a cost-effective and space-saving manner.

LINE TECH linear units used

X-axes: 2x dynamic modules (size 3) with rack and pinion drive, stroke 3500 mm
(DM3.ZS.3500.AFAA.10 / DM3.ZS.3500.AEAB.10)

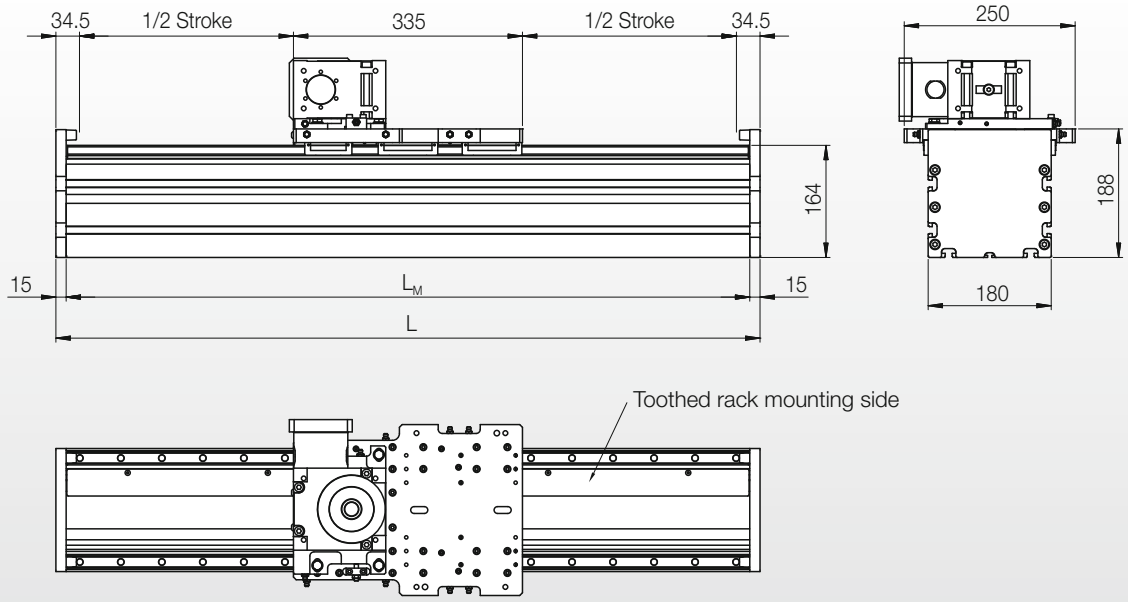
Y-axes: 1x special axis with elevated rigidity based on dynamic module (size 3) with rack and pinion drive, stroke 1440 mm
1x plain carrier without Y drive but with independent X and Z drives

Z-axes: 1x positioning unit (size 3, PE3) with ball screw drive, bellows cover, and rear stiffening profile, stroke 1200 mm, from the LINE TECH product range
1x compact unit (size 3, KE3) with ball screw drive and rear stiffening profile, stroke 1200 mm, from the LINE TECH product range

DYNAMIC MODULE DM2.ZS...

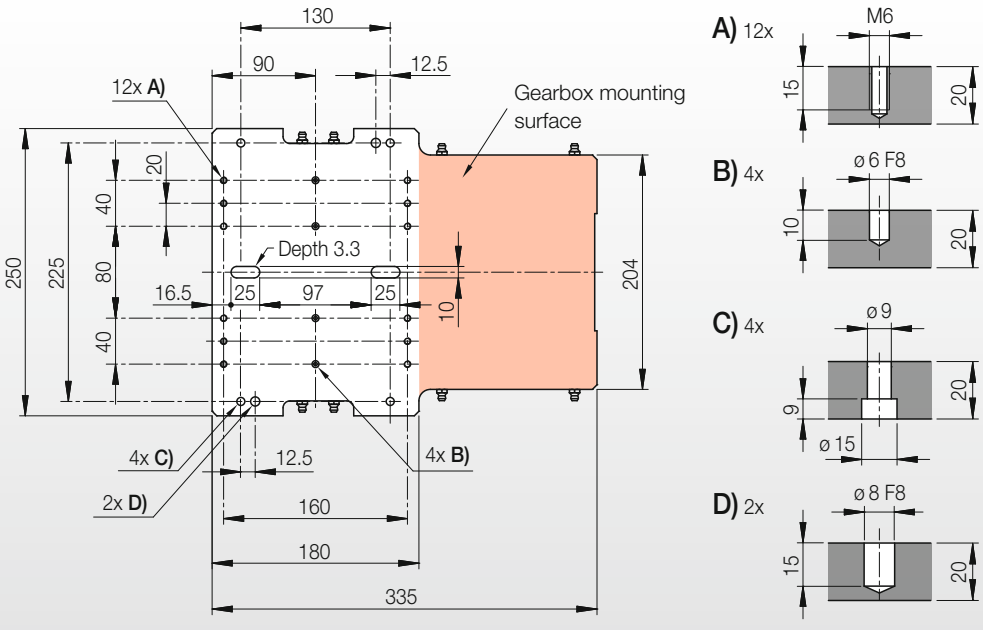
Dimensions with toothed rack – 1 carriage

– 1 carriage with gearbox on the left (Order code **Carriage = A**) or with gearbox on the right (Order code **Carriage = B**)



Nominal size	Dimensions		
Designation	L [mm]	L_M [mm]	Weight (excluding gearbox) [kg]
DM2.ZS...A/B...	Stroke + 404	L – 30	21.39 kg + 3.06 kg/100 mm Stroke

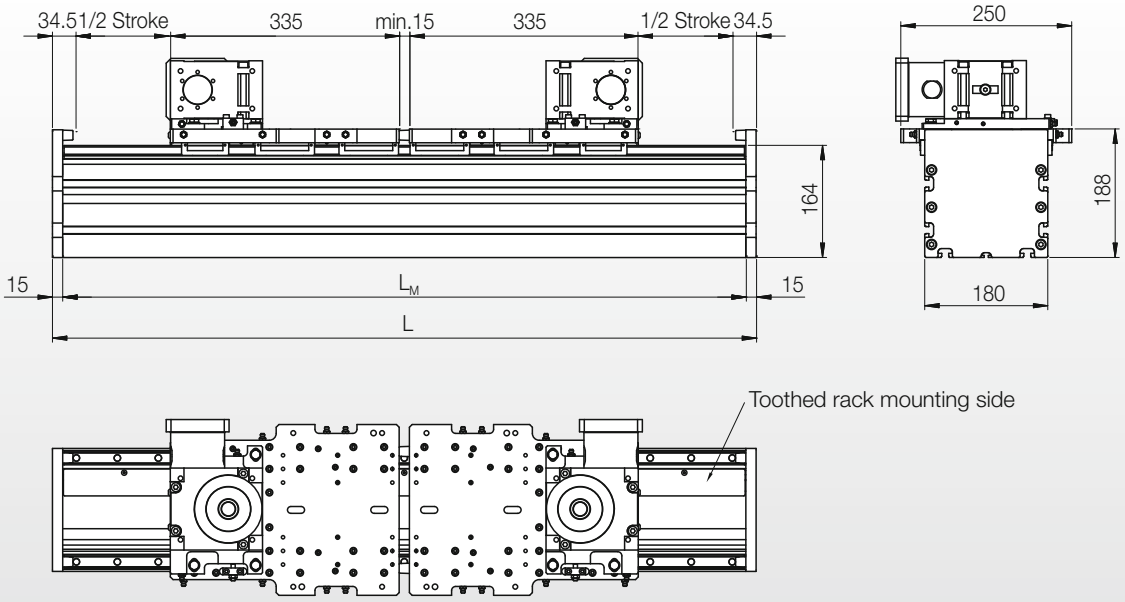
Dimensions of DM2.ZS carriage plate



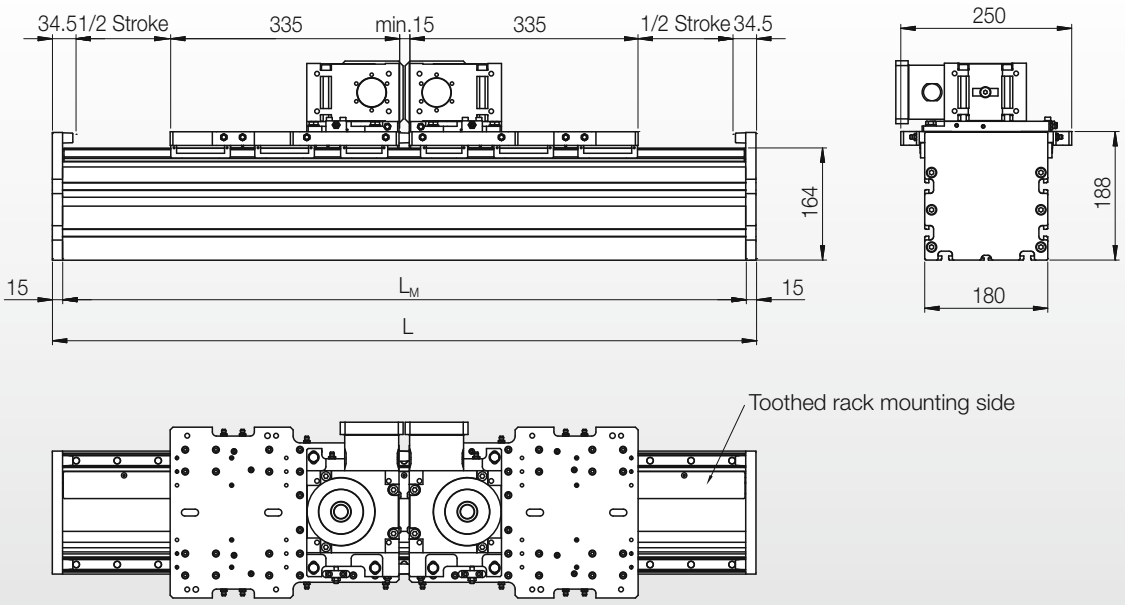
DYNAMIC MODULE DM2.ZS...

Dimensions with toothed rack – 2 carriages

– 2 carriages with gearboxes outward (Order code **Carriage = C**)



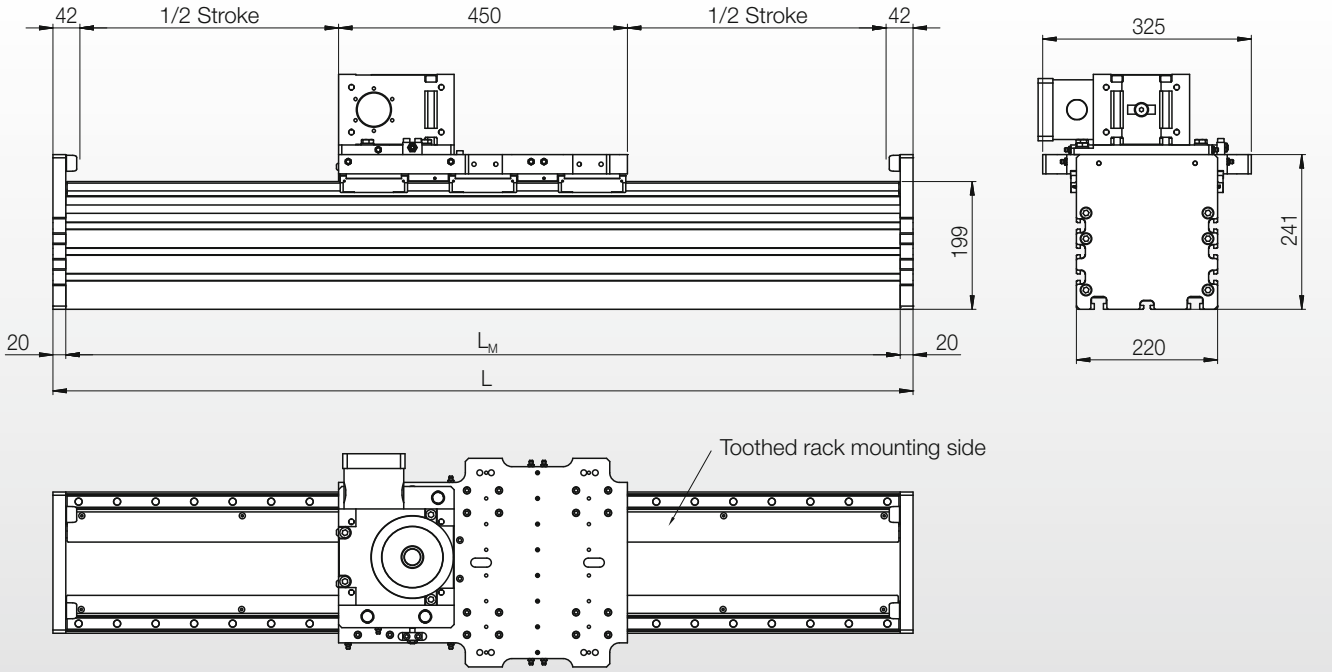
– 2 carriages with gearboxes inward (Order code **Carriage = D**)



Nominal size	Dimensions		
Designation	L [mm]	L_M [mm]	Weight (excluding gearbox) [kg]
DM2.ZS...C/D...	Stroke + 754	L – 30	44.55 kg + 3.06 kg/100 mm Stroke

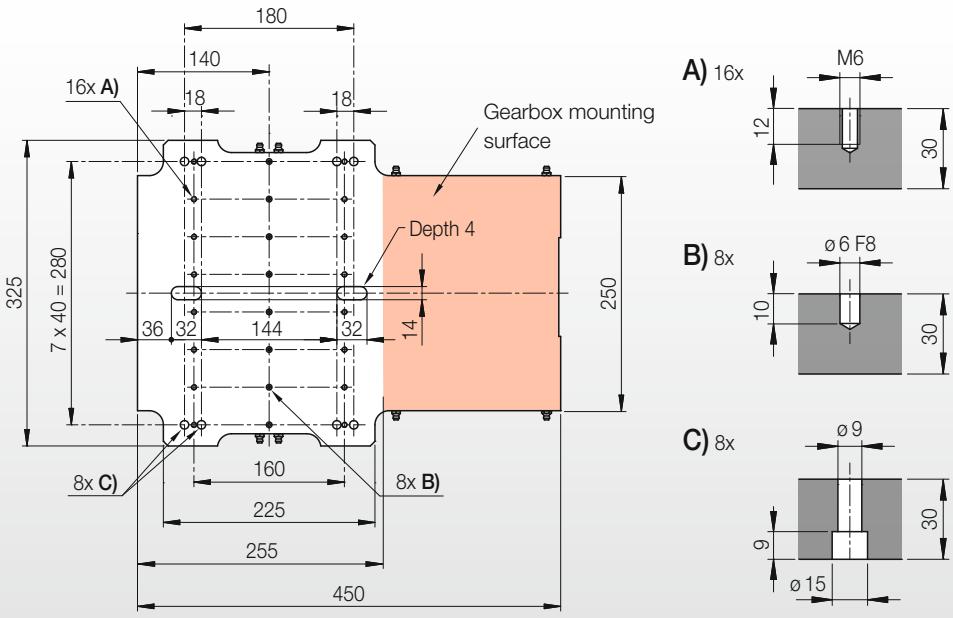
Dimensions with toothed rack – 1 carriage

– 1 carriage with gearbox on the left (Order code **Carriage = A**) or with gearbox on the right (Order code **Carriage = B**)



Nominal size	Dimensions		
Designation	L [mm]	L_M [mm]	Weight (excluding gearbox) [kg]
DM3.ZS...A/B...	Stroke + 534	L – 40	55.6 kg + 5.0 kg/100 mm Stroke

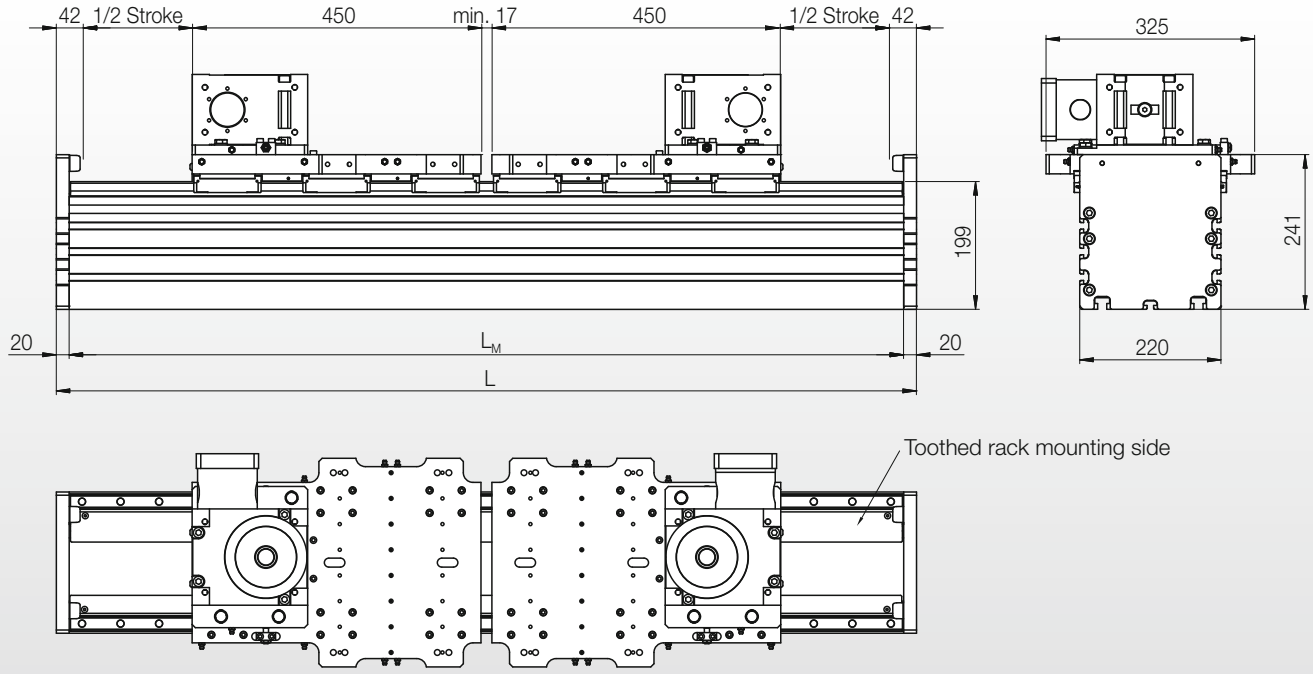
Dimensions of DM3.ZS carriage plate



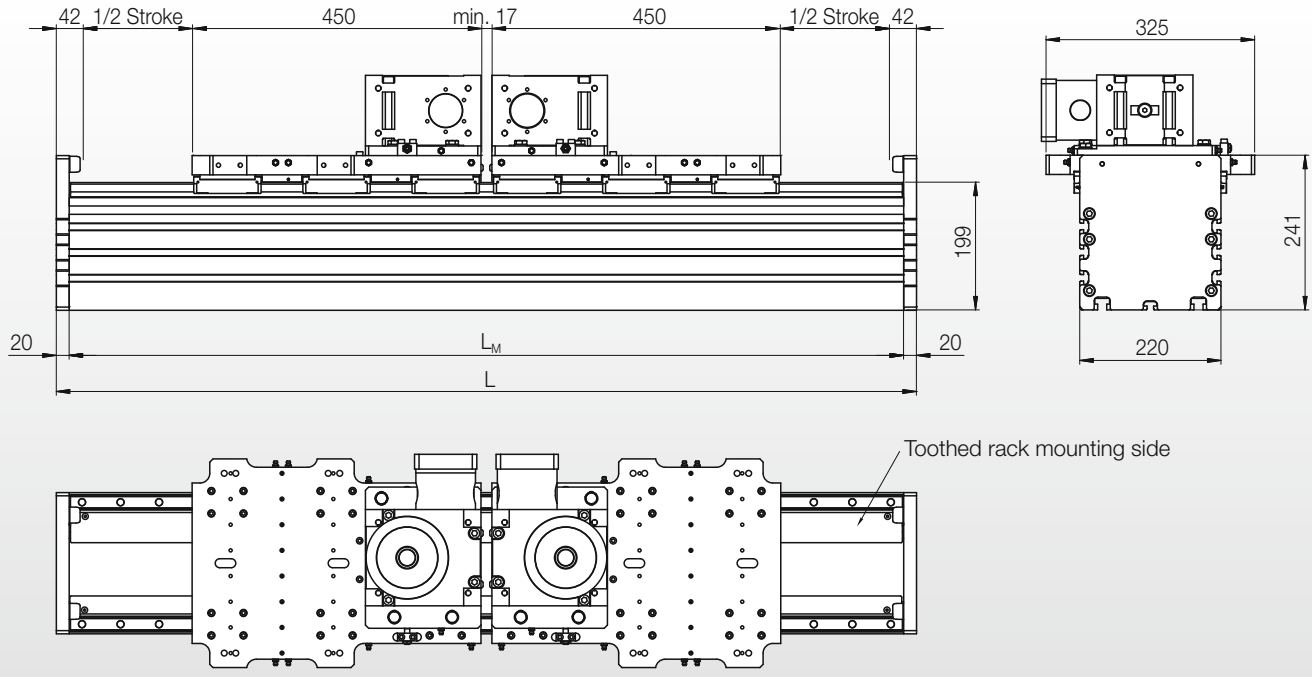
DYNAMIC MODULE DM3.ZS...

Dimensions with toothed rack – 2 carriages

– 2 carriages with gearboxes outward (Order code **Carriage = C**)



– 2 carriages with gearboxes inward (Order code **Carriage = D**)



Nominal size	Dimensions		
Designation	L [mm]	L_M [mm]	Weight (excluding gearbox) [kg]
DM3.ZS...C/D...	Stroke + 1001	L – 40	95.1 kg + 5.0 kg/100 mm Stroke

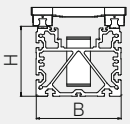
DYNAMIC MODULES WITH TOOTHED BELT DRIVE

Designation system for DM...ZR...

Dynamic module with toothed belt drive	Basic key									Customer-specific modifications
Designation example:	DM	2	.	ZR	.	2400	.	A	A	–	0000

Design
DM = Dynamic module with linear rail guide

Size (cross section of base profile)
2 = B 180 x H 148 mm
3 = B 220 x H 180 mm



Drive type
ZR = Toothed belt

Stroke absolute [mm] (longer strokes available on request)
DM2 = 360 mm / 420 mm / 480 mm / … every 60 mm … / 5760 mm / 5820 mm / 5880 mm
DM3 = 430 mm / 490 mm / 550 mm / … every 60 mm … / 5650 mm / 5710 mm / 5770 mm

Mounting type » see page 5
A = undefined support points **
B = defined support points
C = machined support points

Carriages » for details see pages 28–29, for lubrication see page 31

A = 4 runner blocks **

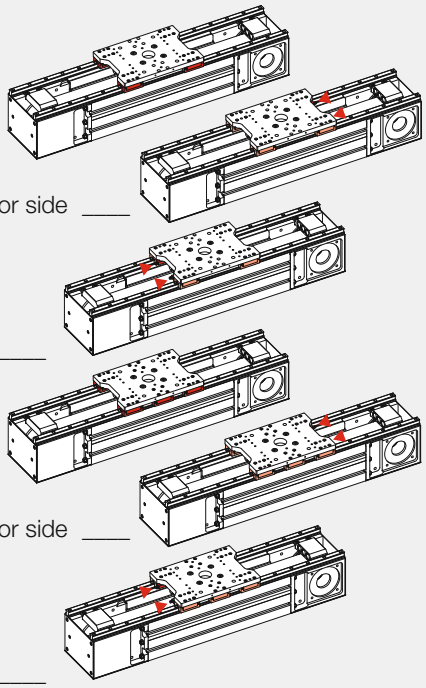
B = 4 runner blocks with centralised lubrication points on the motor side

C = 4 runner blocks with centralised lubrication points on side opposite the motor

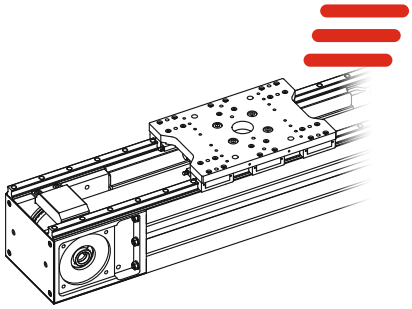
D = 6 runner blocks

E = 6 runner blocks with centralised lubrication points on the motor side

F = 6 runner blocks with centralised lubrication points on side opposite the motor



ID number
0000 = Standard (no customisation)
XXXX = Unique identification number reflecting mounting type B/C or customised modifications (number assigned by LINE TECH)



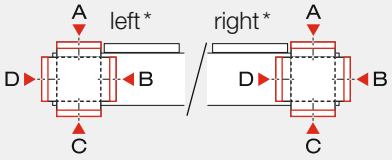
Options				Gearbox mounting	
– N	N	N	– N	N	

Gearbox mounting orientation

N = without mounted gearbox
A = 0° **
B = 90°
C = 180°
D = 270°

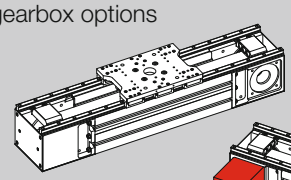
– with straight gearbox:
Access to grub screw of clamping set of the gearbox/motor connection

– with angular gearbox:
Orientation of motor mounting flange

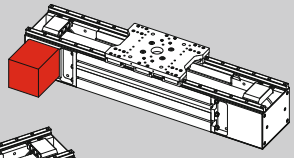


Delivery condition » see page 26 for available gearbox options

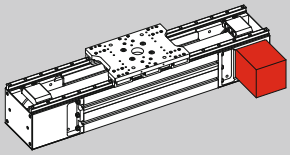
N = without gearbox **



A = Gearbox on left * fully assembled

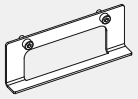


B = Gearbox on right * fully assembled



Switch flag

N = none **
A = mounted on left *
B = mounted on right *

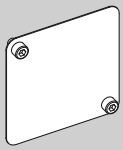


» see page 32

Matching sensor holder as accessory » see page 33

Cover plate

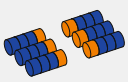
N = none **
A = mounted on left *
B = mounted on right *



» see page 32

Buffers

N = none **
A = with pre-installed high-performance PU buffers

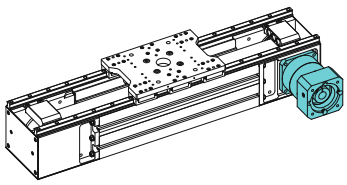
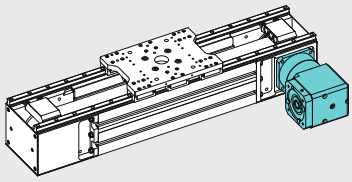


» see page 32

* View towards motor from side opposite motor
** Standard version

Gearbox options DM...ZR...

DM2.ZR... standard gear boxes

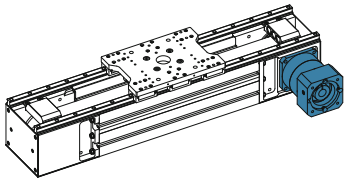
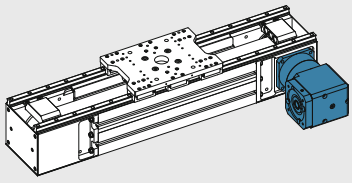
Gearbox design type		Gearbox type	Configuration link
Planetary gearbox		PLQE120	
Angular gearbox		WPLQE120	

The following parameters can be specified to suit application-specific requirements:
1. «Gear ratio»
2. «Lubrication»
3. «Drive version» – available options may depend on the chosen motor
4. «Motor interface»

This standard value must remain unchanged: Output shaft ▸ «smooth output shaft»

» **You can configure your gearbox yourself using the corresponding QR code. This gives us your complete gearbox item number. If you would like LINE TECH to configure your gearbox, please give us your specifications for parameters 1 to 4 above.**

DM3.ZR... standard gear boxes

Gearbox design type		Gearbox type	Flange *	Configuration link
Planetary gearbox		AE120	P1110400001 (previous no.: PF140001)	
Angular gearbox		AER120	P1110400001 (previous no.: PF140001)	

* The gearbox mounting flange (dynamic module mounting side) is a required part and is included with gearboxes provided by LINE TECH. If the gearbox is to be provided by the customer, this flange must be procured separately!

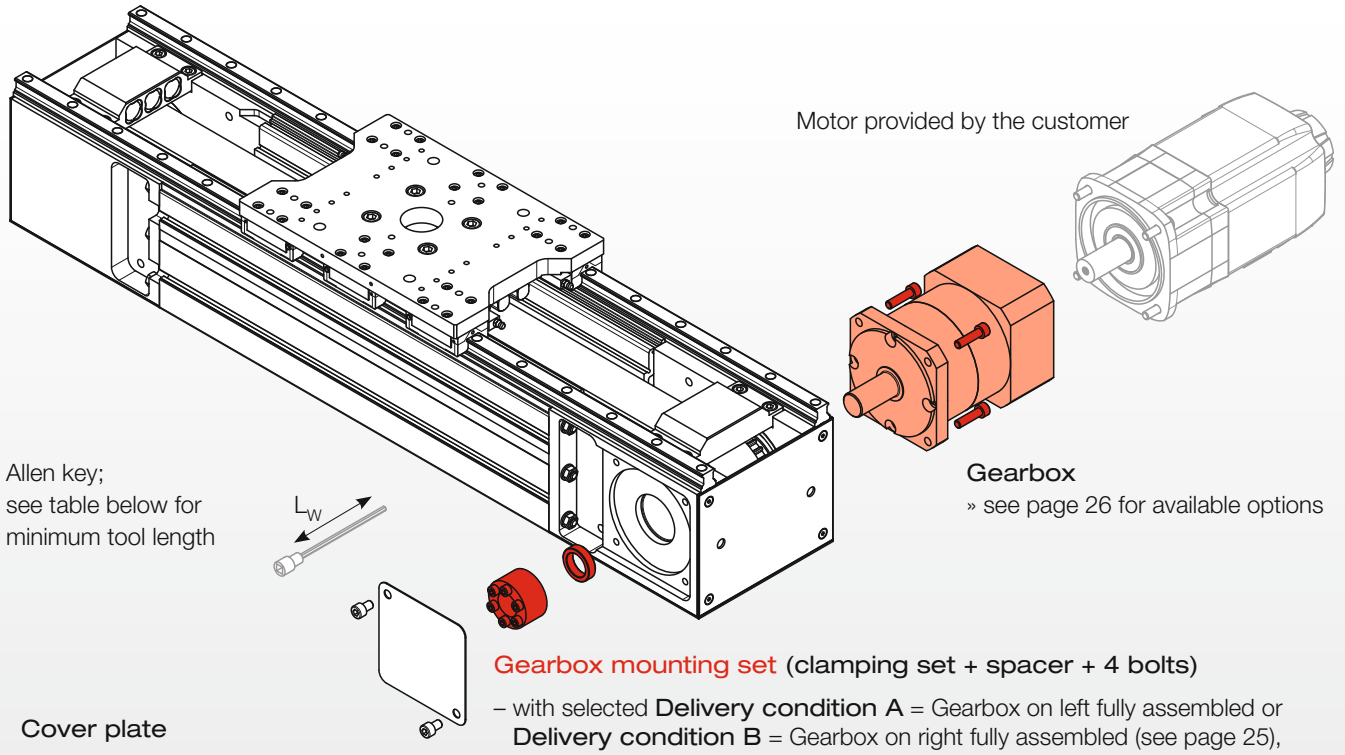
The following parameters can be specified to suit application-specific requirements:
1. «Gear ratio»
2. «Motor interface»

» **You can configure your gearbox yourself using the corresponding QR code. This gives us your complete gearbox item number. If you would like LINE TECH to configure your gearbox, please give us your specifications for parameters 1 and 2 above.**

DYNAMIC MODULE WITH TOOTHED BELT DRIVE

Gearbox mounting DM...ZR...A/B...

Gearbox mounting principle (straight planetary gearbox or angular gearbox)



Cover plate

– included as an option in the LINE TECH scope of delivery (order code **A/B**) and pre-installed (see page 25)

or

– supplied individually as a LINE TECH accessory (see page 32):
  – DM2.ZR ▸ Item no. G-60011
  – DM3.ZR ▸ Item no. G-60025

Gearbox mounting set (clamping set + spacer + 4 bolts)

– with selected **Delivery condition A** = Gearbox on left fully assembled or **Delivery condition B** = Gearbox on right fully assembled (see page 25), included in the LINE TECH scope of delivery and fully assembled

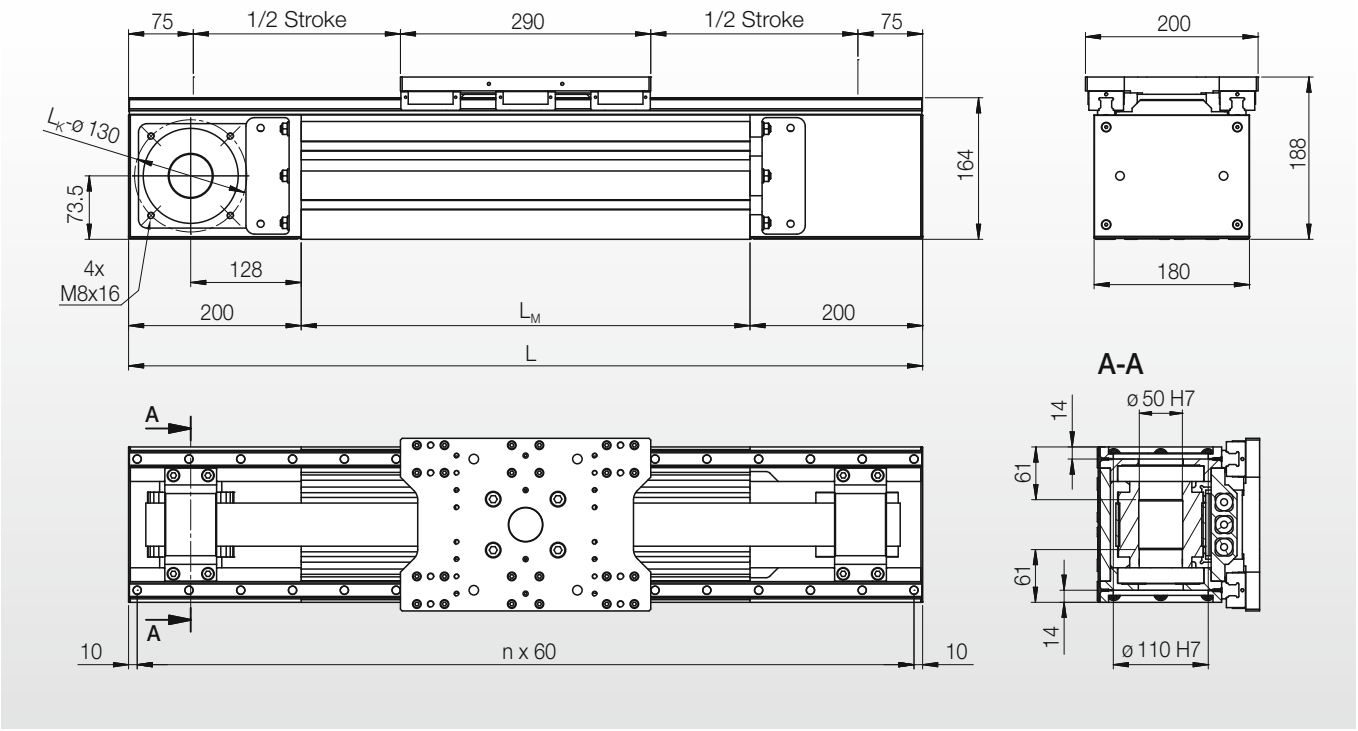
or

– with selected **Delivery condition N** = without gearbox (» gearbox provided by customer), to be ordered separately and supplied individually as a LINE TECH accessory (see page 32):
  – DM2.ZR ▸ Item no. G-60010
  – DM3.ZR ▸ Item no. G-60024

Nominal size	Clamping set			Allen key (provided by customer)	
	Bolts	Torque [Nm]	Condition	Size [mm]	Tool length L_W [mm]
DM2...ZR...	6 x M6	14	Oiled, without additives	5	**≥ 120**
DM3...ZR...	6 x M6	16.5	Oiled, without additives	5	**≥ 140**

DYNAMIC MODULE DM2.ZR...

Dimensions with toothed belt drive

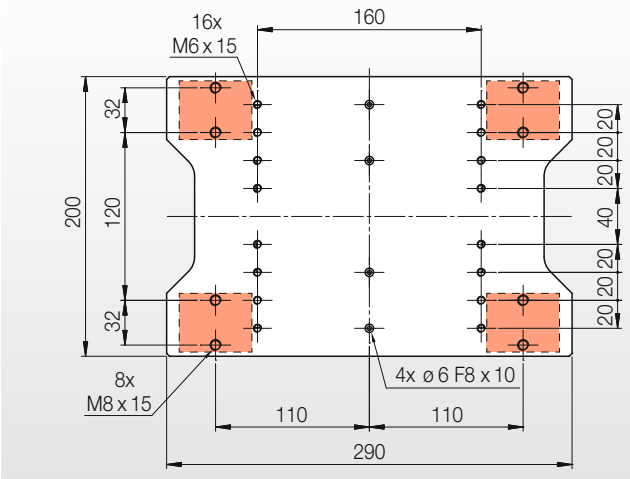


Nominal size Designation	Dimensions L [mm]	L_M [mm]	Belt length [mm]	Weight (excluding gearbox) [kg]
DM2.ZR...A/B/C...	Stroke * + 440	L – 400	2 x Stroke + 880	24.34 kg + 2.688 kg/100 mm Stroke
DM2.ZR...D/E/F...	Stroke * + 440	L – 400	2 x Stroke + 880	25.11 kg + 2.688 kg/100 mm Stroke

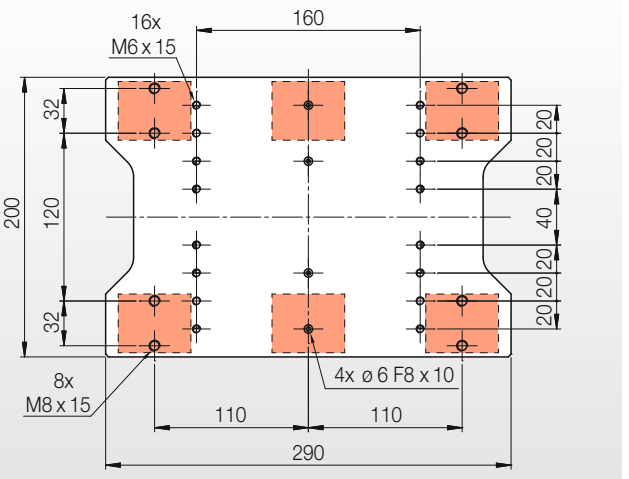
* **Please note** – the stroke can be specified in the following increments only: **Stroke = n x 60**
Example: Stroke = 360 mm / 420 mm / 480 mm / … every 60 mm … / 5760 mm / 5820 mm / 5880 mm

Dimensions of DM2.ZR... carriage plates

DM2.ZR...A/B/C... with 4 runner blocks

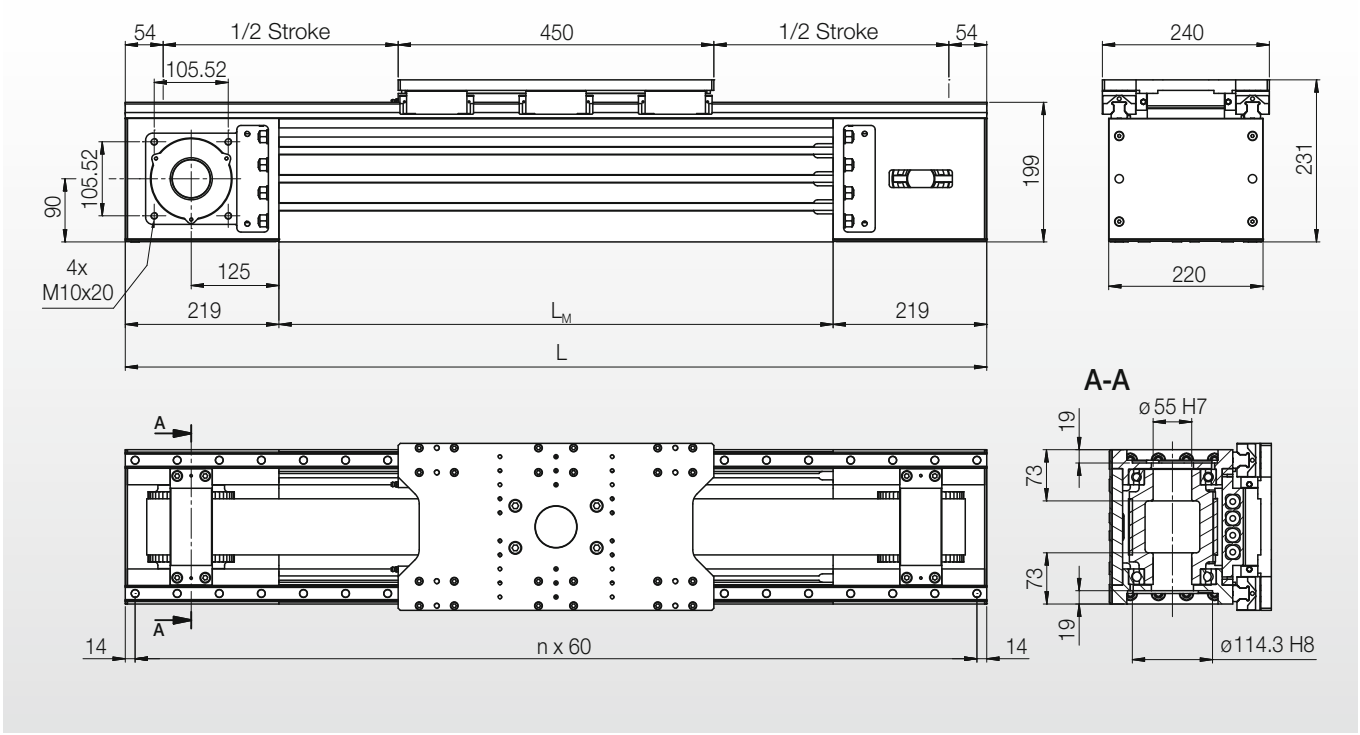


DM2.ZR...D/E/F... with 6 runner blocks



DYNAMIC MODULE DM3.ZR...

Dimensions with toothed belt drive

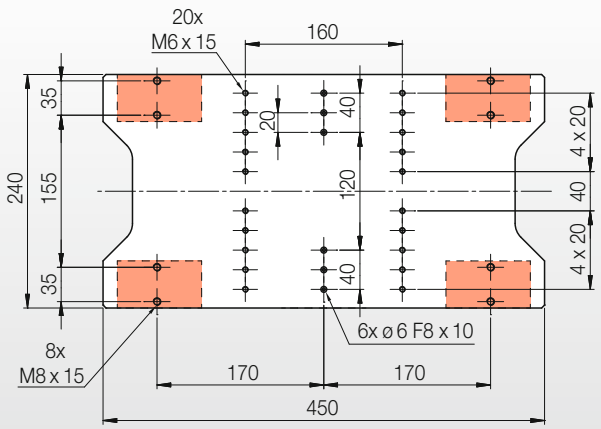


Nominal size Designation	Dimensions L [mm]	 L_M [mm]	 Belt length [mm]	 Weight (excluding gearbox) [kg]
DM3.ZR...A/B/C...	Stroke * + 558	L – 438	2 x Stroke + 1124	55.1 kg + 4.63 kg/100 mm Stroke
DM3.ZR...D/E/F...	Stroke * + 558	L – 438	2 x Stroke + 1124	56.5 kg + 4.63 kg/100 mm Stroke

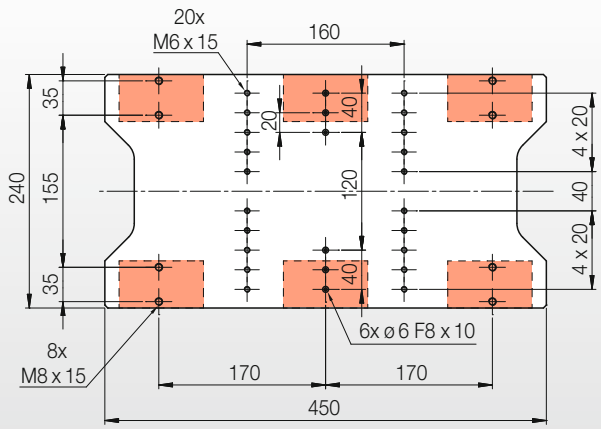
* **Please note** – the stroke can be specified in the following increments only: **Stroke = 10 + n x 60**
Example: Stroke = 430 mm / 490 mm / 550 mm / … every 60 mm … / 5650 mm / 5710 mm / 5770 mm

Dimensions of DM3.ZR... carriage plates

DM3.ZR...A/B/C... with 4 runner blocks

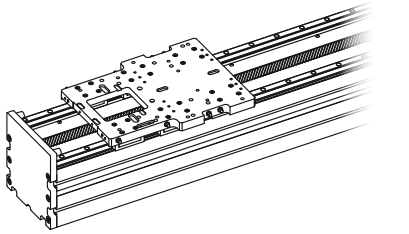


DM3.ZR...D/E/F... with 6 runner blocks



DYNAMIC MODULES WITH RACK AND PINION DRIVE

Lubrication points for DM...ZS...



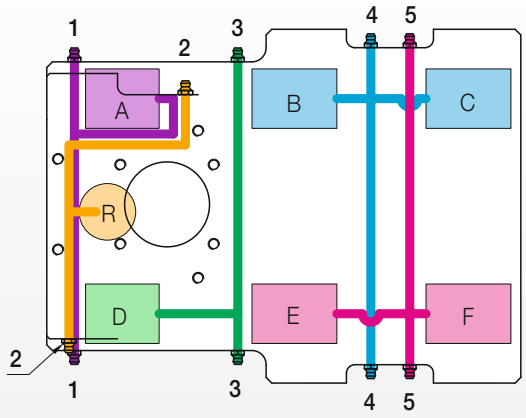
Lubrication of the runner blocks and the toothed rack (DM2/DM3.ZS...)

- The lubrication points are located on the carriage and are fitted with M6 grease nipples (DIN 71412 A).
- Recommended grease gun: ZPE.FETTPRESSE.03 (with attachment 01.528)
- Recommended standard greases:
  - Lubrication points **1 / 3 / 4 / 5: Microlube GBU Y 131** (pre-lubricated ex works)
  - Lubrication point **2: Klübersynth G 34-130** (not pre-lubricated; **must be lubricated during commissioning!**)

DM2.ZS... (versions left/right or outside/inside)
(Order Code for **Carriage = A/B/C/D** » see page 16)

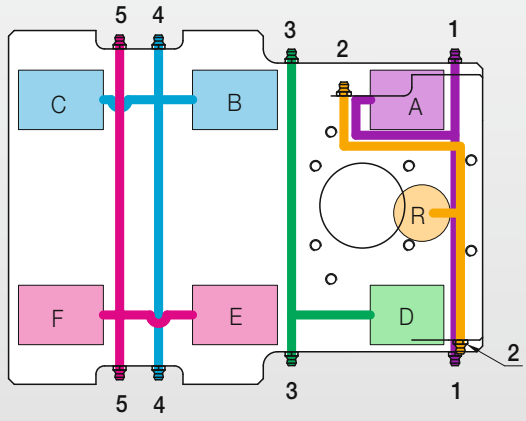
Version left (A) / outside (C) / inside (D)

Use only 1 connection per lubrication point.



Version right (B) / inside (D) / outside (C)

Use only 1 connection per lubrication point

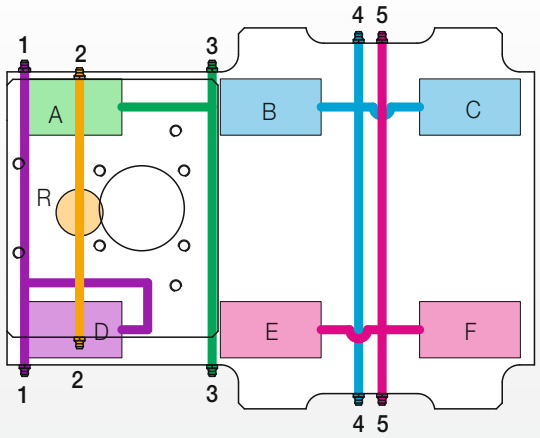


Lubrication point	Object	Lubrication point	Object
1	A *	4	B + C *
2	R **	5	E + F *
3	D *		

DM3.ZS... (versions left/right or outside/inside)
(Order Code for **Carriage = A/B/C/D** » see page 16)

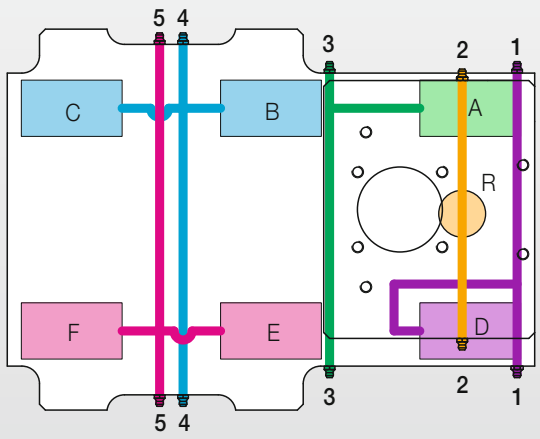
Version left (A) / outside (C) / inside (D)

Use only 1 connection per lubrication point.



Version right (B) / inside (D) / outside (C)

Use only 1 connection per lubrication point

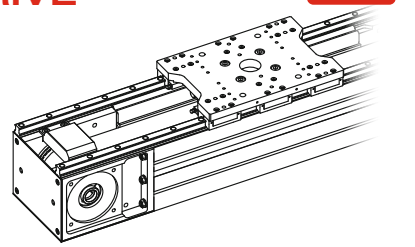


Lubrication point	Object	Lubrication point	Object
1	D *	4	B + C *
2	R **	5	E + F *
3	A *		

* Runner block ** Toothed rack

DYNAMIC MODULES WITH TOOTHED BELT DRIVE

Lubrication points for DM...ZR...

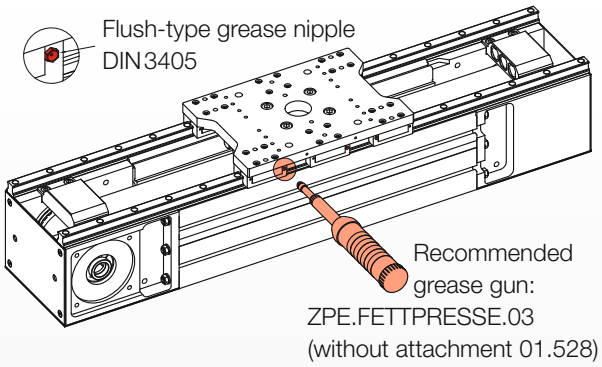


Lubrication of the runner blocks (DM2/DM3.ZR...)

– The lubrication points are located on the carriage.
– Recommended standard grease: **Microlube GBU Y 131** (pre-lubricated ex works)

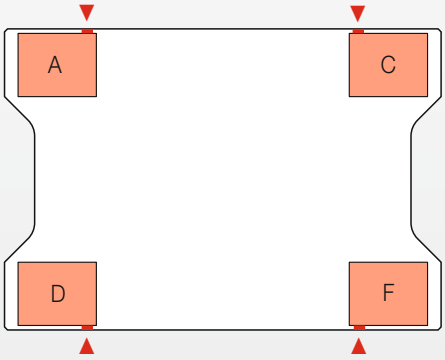
Standard: Individual lubrication points

(Order code **A** or **D** » see page 24)



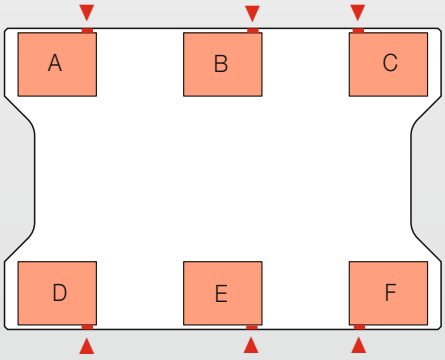
DM2/DM3.ZR...A... with 4 runner blocks

Lubrication of each of the 4 individual lubrication points (A, C, D, F) is required.



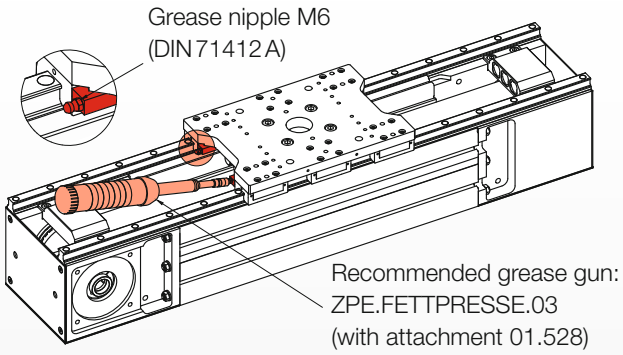
DM2/DM3.ZR...D... with 6 runner blocks

Lubrication of each of the 6 individual lubrication points (A...F) is required



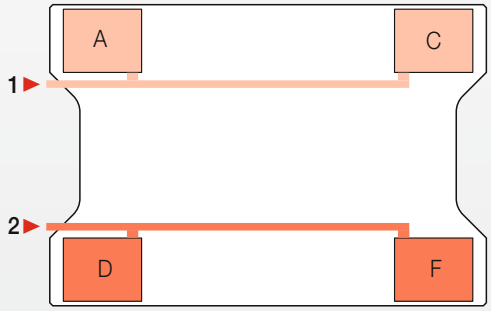
Centralised lubrication: with lubrication strips

(Order code **B** or **C** or else **E** or **F** » see page 24)



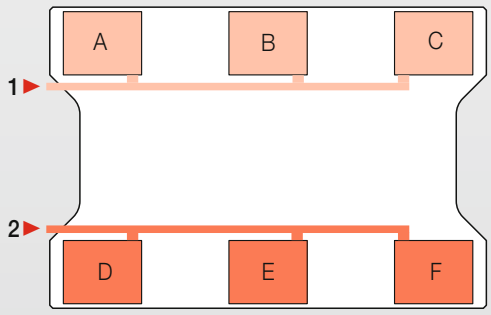
DM2/DM3.ZR...B/C... with centralised lubrication on motor side / opposite motor side

Lubrication of the two centralised lubrication points **1** (A + C) and **2** (D + F) is required.



DM2/DM3.ZR...E/F... with centralised lubrication on motor side / opposite motor side

Lubrication of the two centralised lubrication points **1** (A + B + C) and **2** (D + E + F) is required.

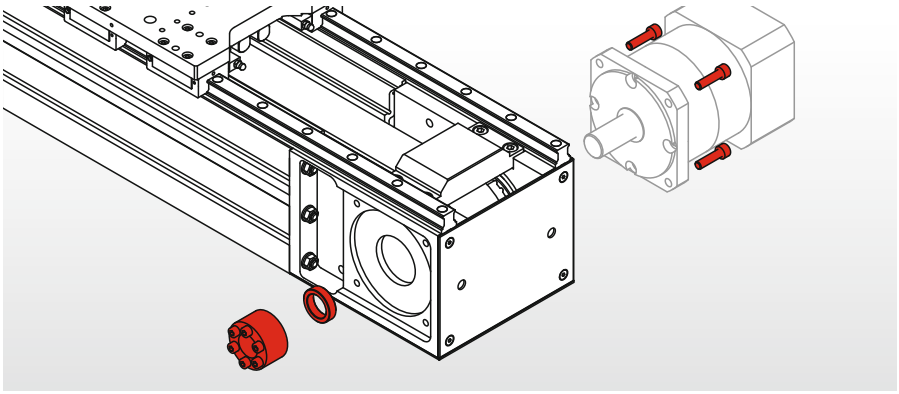


Options and accessories for DM...ZR...

Gearbox mounting set

For mounting standard gearboxes (see page 26).
When ordering as an option* » designation system p. 25: Order code **A/B**

When ordered as a separate accessory:
– DM2.ZR ▸ Item no. G-60010
– DM3.ZR ▸ Item no. G-60024

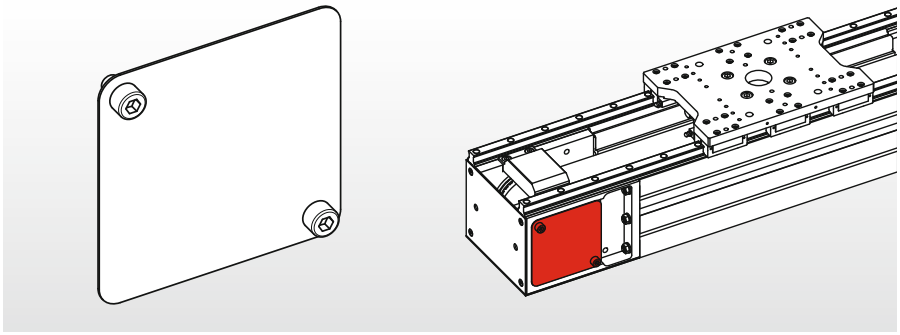


Cover plate

To cover the open hollow shaft opposite the gearbox.

When ordering as an option* » designation system p. 25: Order code **A/B**

When ordered as a separate accessory:
– DM2.ZR ▸ Item no. G-60011
– DM3.ZR ▸ Item no. G-60025

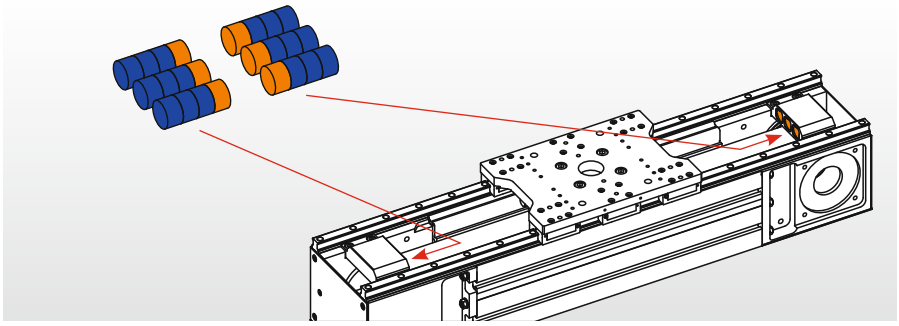


High-performance PU buffers

For optimal protection of all components in the event of a malfunction.

When ordering as an option* » designation system p. 25: Order code **A**

When ordered as a separate accessory:
– DM2.ZR ▸ Item no. G-60012
– DM3.ZR ▸ Item no. G-60026

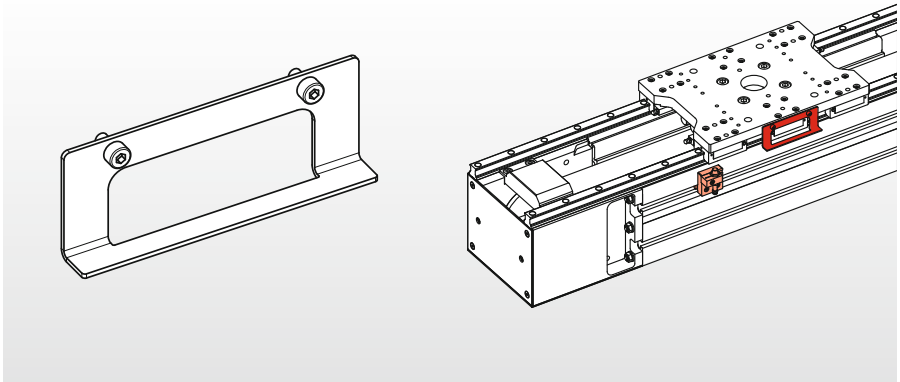


Switch flag

For triggering additional external sensors (with LINE TECH sensor holder Item. no. G-10796, see p. 33, or a solution provided by the customer)

When ordering as an option* » designation system p. 25: Order code **A/B**

When ordered as a separate accessory:
– DM2.ZR ▸ Item no. G-60013
– DM3.ZR ▸ Art.-Nr. G-60027



* Included in the LINE TECH scope of delivery and fully assembled

Options and accessories for DM...ZR...

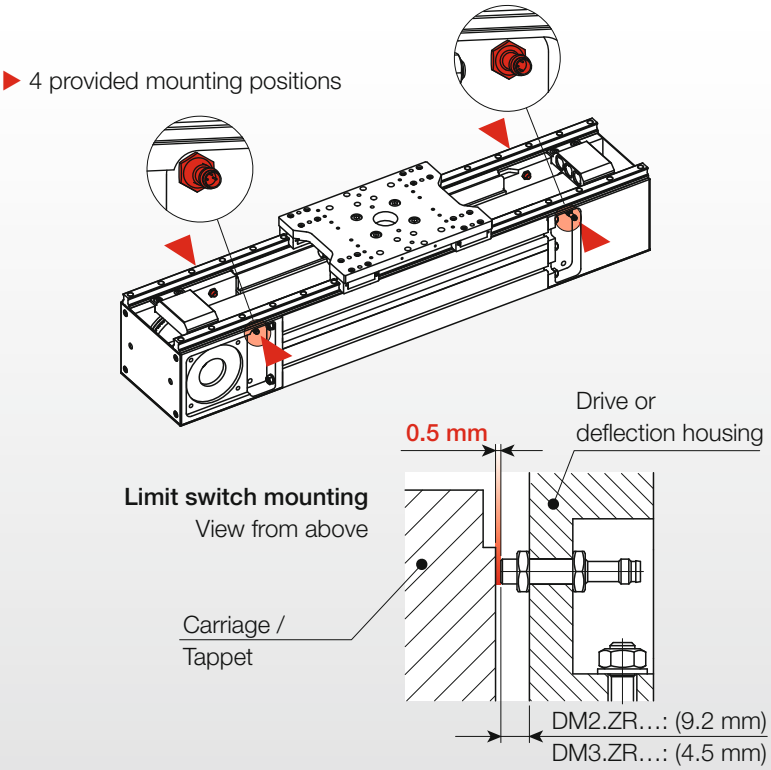
Limit switch

Limit switches are used in conjunction with a control unit to limit the stroke and establish a reference point for setting the zero point. Limit switches are activated shortly after the end of the working stroke (distance between limit switches is greater than the working stroke).

For mounting, the end plates have mounting holes on each side, either threaded M8x1 (DM3.ZR...) or 8.2 mm ø through-holes (DM2.ZR...). The limit switches are triggered by a tappet on the carriage.

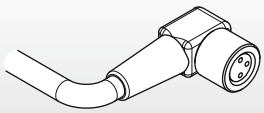
LINE TECH offers inductive limit switches with an M8 connector plug as standard:

– PNP opener (PNP-NC)
  ▸ Item no. I08H004



Limit switch cable

For connecting, LINE TECH recommends cables with an M8 cable socket, angled, with loose connection wires:
– with 2 m cable ▸ Item no. S56-02M (standard)
– with 5 m cable ▸ Item no. S56-05M
– with 10 m cable ▸ Item no. S56-10M

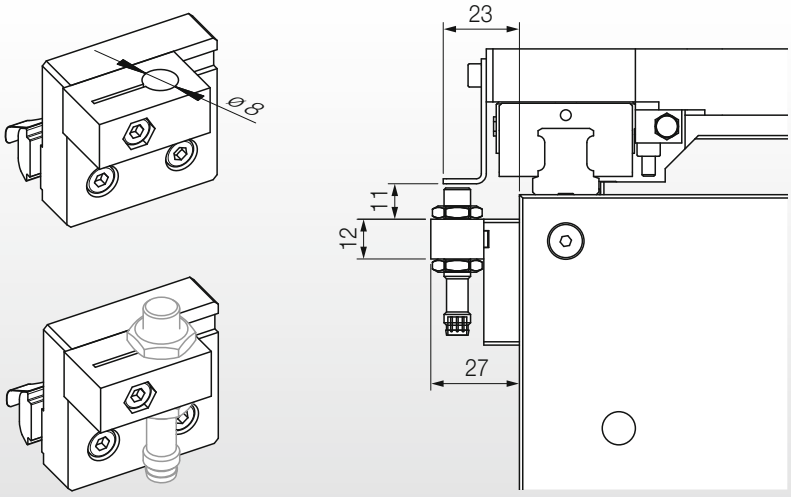


Sensor holder

For mounting additional external sensors with 8 mm ø, LINE TECH recommends the use of sensor holders:
▸ Item no. G-10796 (without sensor)

Matching sensor:
– PNP opener (PNP-NC)
  ▸ Item no. I08H004

Attention: With this sensor holder, the position of the carriage in relation to the working stroke can be detected as follows:
– DM2.ZR » up to 30 mm before the end of the working stroke
– DM3.ZR » full working stroke



Mounting accessories; Clamps

Mounting options

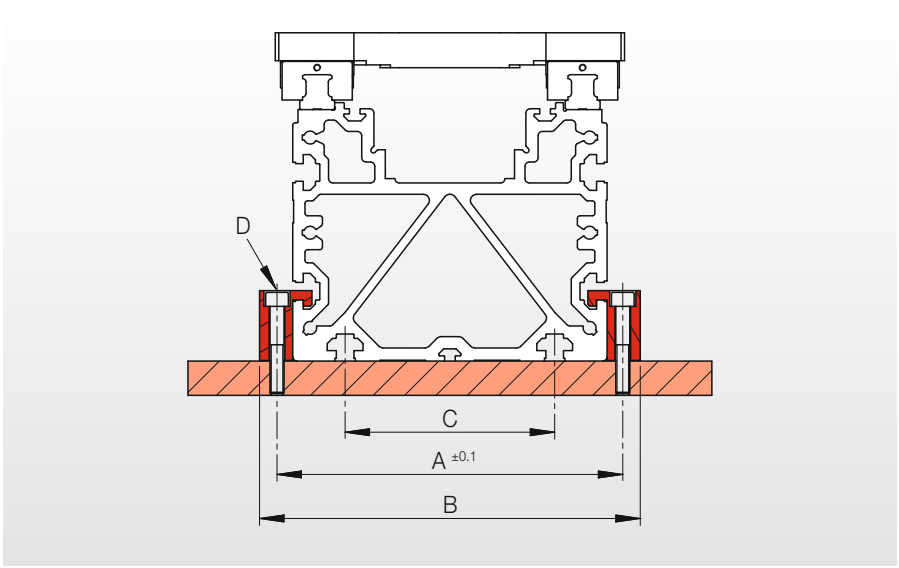
The dynamic modules are attached using clamps or T-slot nuts.

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

Nominal size	Dimensions [mm]			
	A	B	C	D (DIN912)
DM2...	198	218	120	M8x50 [1]
DM3...	238	258	150	M8x60 [1]

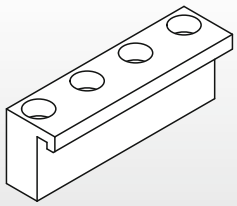
[1] Recommended bolt length

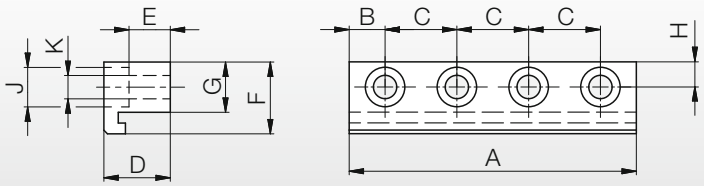
DM2... / DM3...



Clamps

Recommended number of clamps:
3 per metre per side



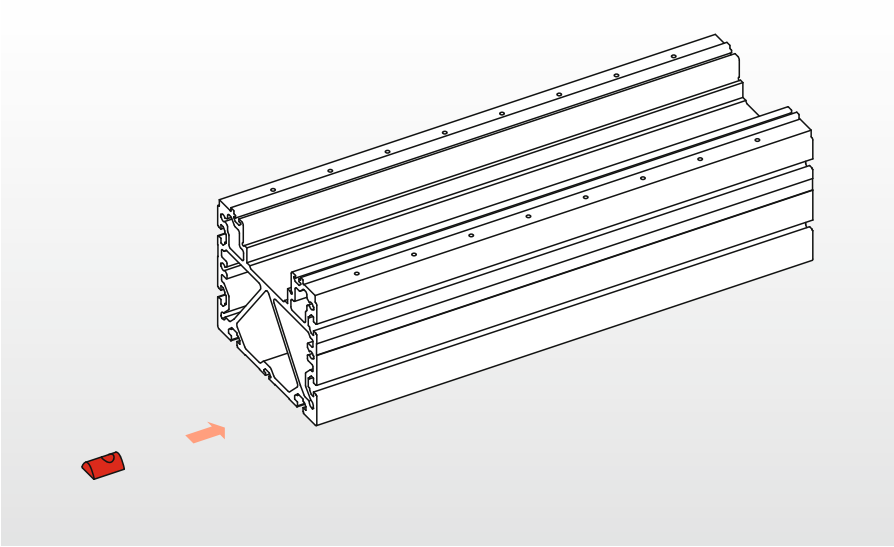


Nominal size	Dimensions [mm]										Weight	Item no.
	A	B	C	D	E	F	G	H	J	K	[kg]	
DM2...	110	10	30	40	31	30	19	10	ø15	ø9	0.610	P-55247
DM3...	110	10	30	50	41	30	19	10	ø15	ø9	0.754	P-54856

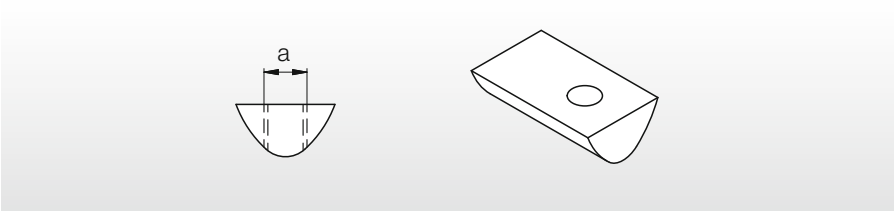
Mounting accessories; T-slot nuts

T-slot nuts

T-nuts properly sized for the corresponding T-slot can be used for fastening attachments and add-ons to the base profile.



Depending on the T-slot width (see profile cross sections, pages 6/7), T-nuts type NS6, NS10, or NS14 can be used.
The T-nuts are available from LINE TECH.
The size, material, and threading must be defined as the ordering number as per the ordering system below.
The available types are listed on the right.



Dimensions [mm]		Material
T-slot width	a (thread)	
T-slot 6	M4 / M5 / M6	Galvanised steel
T-slot 10 / 10A	M4 / M5 / M6 / M8	Galvanised steel
T-slot 14	M12	Galvanised steel

Ordering system for T-slot nuts

	Basic key					
Designation example:	NS	6	St	M5	–	DM

NS = T-slot nut

T-slot width » see profile cross sections, pages 6/7
6 = T-slot 6
10 = T-slot 10 / 10A
14 = T-slot 14

DM = for Dynamic module

Thread » size a as per table above
M4 / M5 / M6 / M8 / M12

Material
St = Galvanised steel

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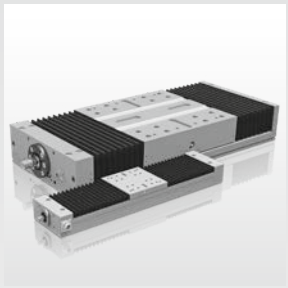
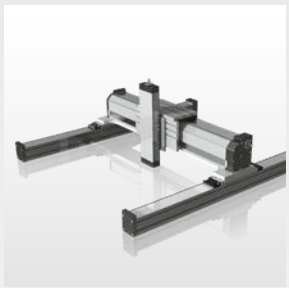







Version: 04-2024 E

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