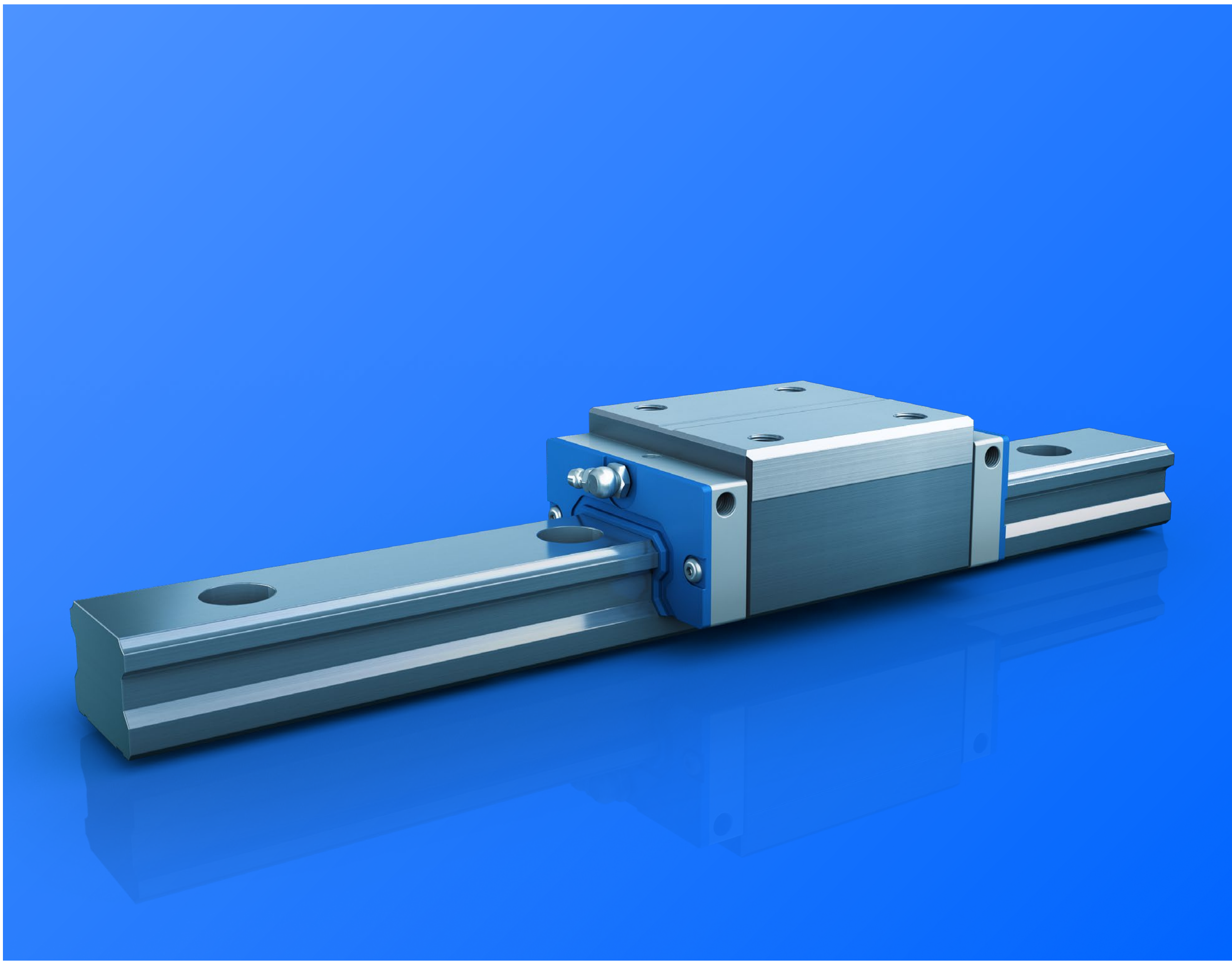
HYPEX

Linear Motion



LINEAR GUIDES

O nas
About Us

Podjetje HYPEX d.o.o. je proizvodno-trgovsko podjetje v zasebni lasti, ustanovljeno leta 1990. Pred leti smo zgradili sodoben poslovno proizvodni center v industrijski coni v Lescah, kjer je poleg poslovnih prostorov tudi veleprodajna trgovina, skladišča ter obrat proizvodnje.

Proizvodno-prodajni program smo v zadnjem času razširili, tako da danes nudimo veliko izbiro elementov industrijske avtomatizacije in industrijske opreme za strojegraditelje, vzdrževalce, inštalaterje in obrtnike tako doma kot v tujini.

Kot dobavitelj komponent ali celih sklopov iz lastne proizvodnje nudimo tudi proizvode drugih znanih in manj znanih proizvajalcev, katerih proizvodi morajo po kvaliteti in standardih ustrezati zahtevam sodobnega trga.

HYPEX d.o.o. is a production and trading company founded in 1990 and since then privately owned. Several years ago we built a modern business manufacturing center in the industrial zone in Lesce, where in addition to commercial premises we include wholesale trade, warehouse and manufacturing plant.

Production and sales program was recently expanded, so today we offer a great selection of elements of industrial automation and industrial equipment for engineers, repairers, installers and tradesmen both at home and abroad.

As a supplier of components or entire sets from our own production, we also offer products of other well-known and lesser-known producers whose products have the quality and standards to meet the requirements of the modern market.

Hypex proizvodi po kvaliteti
in standardih ustrezajo zahtevam
sodobnega trga.

Hypex products have the quality and
standards to meet the requirements
of the modern market.

Hypex prodajni program
Hypex Products

UNI-AIR PRIKLJUČKI
UNI-AIR FITTINGS

PROFILNA TEHNIKA
PROFILE TECHNICS

PROCESNA TEHNIKA
FLUID CONTROL

UNI-AIR PNEVMATIKA
UNI-AIR PNEUMATICS

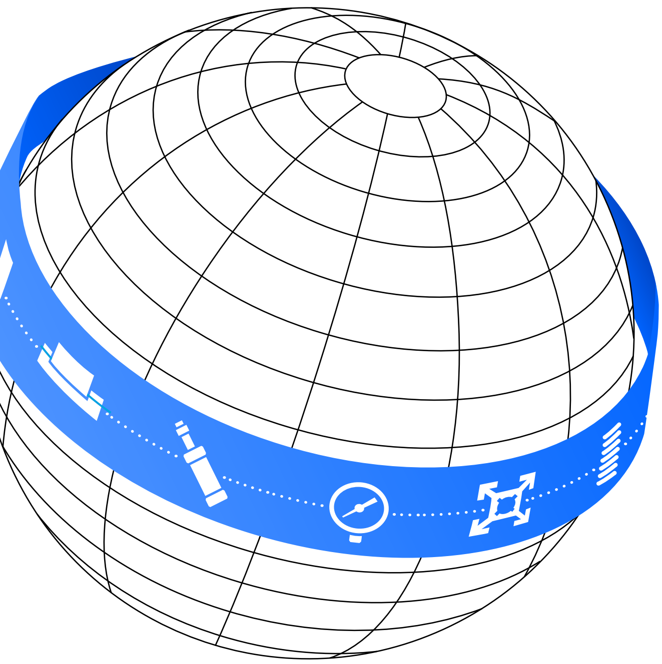
LINEARNA TEHNIKA
LINEAR MOTION TECHNOLOGY

- **TIRNA VODILA**
  LINEAR GUIDES
- **MINI TIRNA VODILA**
  MR MINIATURE LINEAR GUIDE SERIES
- **OKROGLA VODILA**
  ROUND GUIDES
- **VRETENA**
  BALL SCREW DRIVES

UNIMOTION LINEARNE ENOTE
UNIMOTION LINEAR UNITS

UNIMOTION ELEKTRIČNI CILINDRI
UNIMOTION ELECTRIC CYLINDERS

Hypex spletna trgovina
Hypex Online Store



Obiščite našo spletno trgovino: www.hypex.si

Spletna trgovina je jasno urejena in preprosta za uporabo. Vsebuje detajlne informacije, vključno s 3D CAD modeli, posameznih produktov.

Podrobnejše informacije o dostavi in vse ostale informacije so na voljo na spletu.

Visit our online store: www.hypex.si

Online store is clearly arranged and easy to use. It contains detailed product information, including 3D CAD models.

More information about shipping and all other information available on the web.

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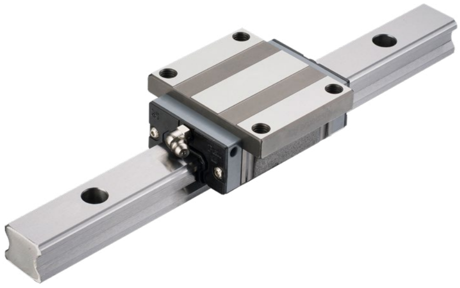

NON CAGE TYPE

FUTURES

- Four rows of steel balls with contact angle of 45°
- High accuracy and rigidity
- Same high load capacity in all directions (horizontal and vertical)
- Smooth traveling

LINEAR GUIDES – BGC

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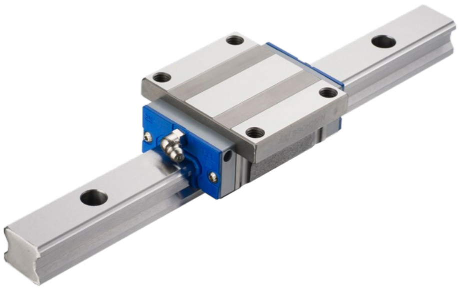

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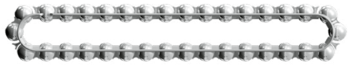

FUTURES

- Four rows of steel balls with contact angle of 45°
- High accuracy and rigidity
- Same high load capacity in all directions (horizontal and vertical)
- Smooth traveling
- For high speed applications
- Lower noise and vibrations

ACCESSORIES

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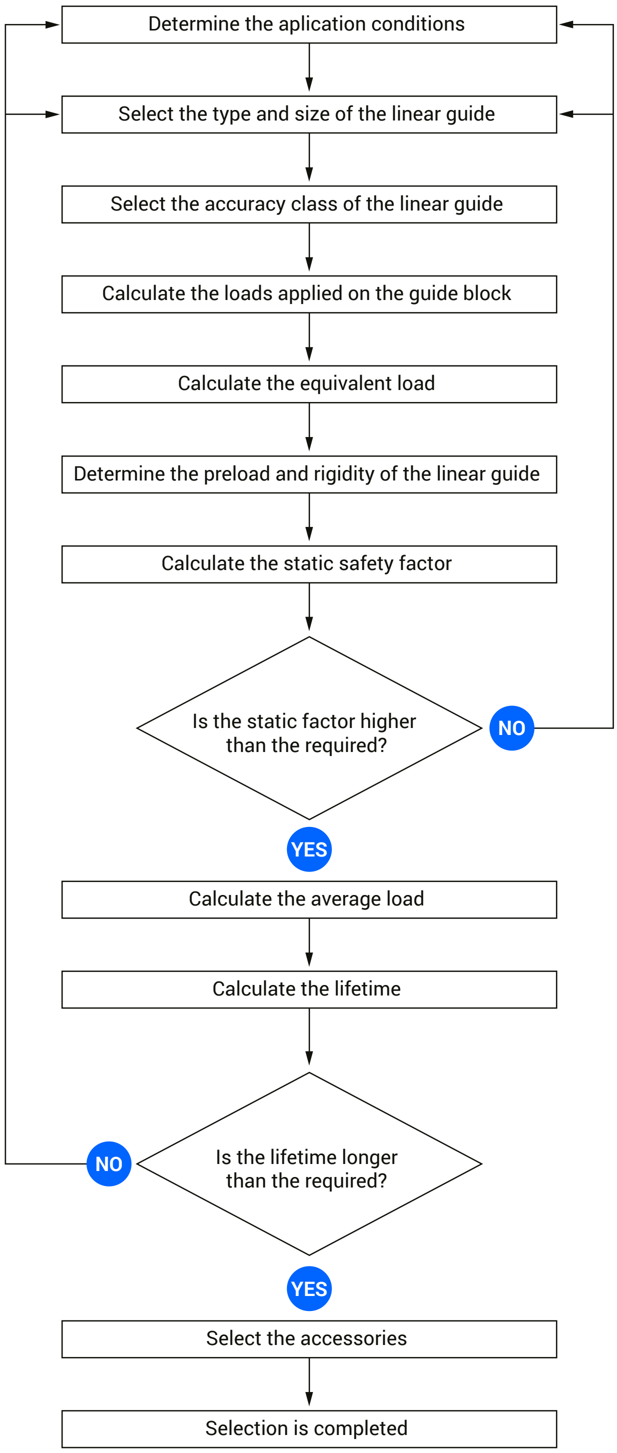
- Grease fittings
- Lubrication system (LS)
- Cover strip
- Clamping element

General information

HOW TO SELECT A LINEAR GUIDE



GENERAL TECHNICAL INFORMATION

Operating conditions

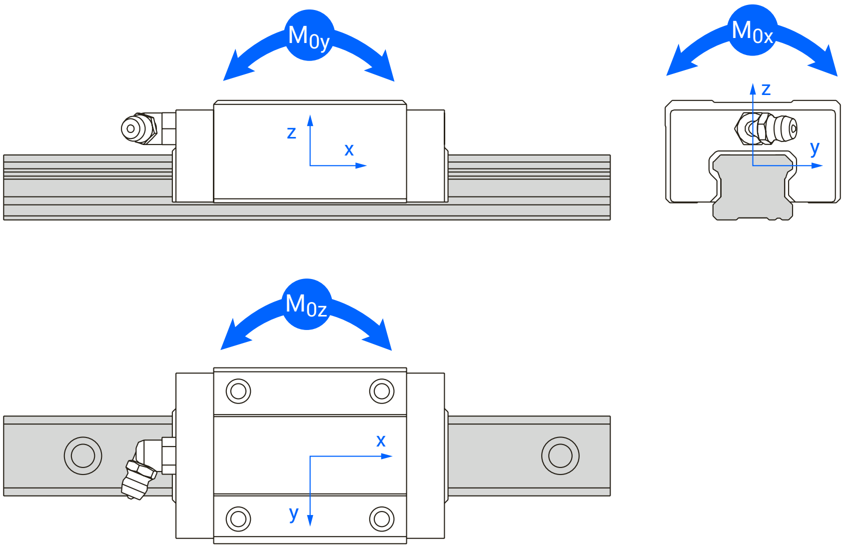
Maximum travel speed	5 m/s
Maximum acceleration	500 m/s²
Environmental temperature	0 °C – 80 °C

Basic static load rating C_0

When the linear guide is subjected to the excessive load, the groove (track) surfaces and the steel balls can be permanently deformed. At this point the linear guide will no longer operate smoothly. The basic static load rating C_0 is defined as the static load which causes a permanent overall deformation of 0,0001 times of the steel ball diameter. The values of C_0 can be found in the table for the particular linear guide.

Permissible static moment M_0

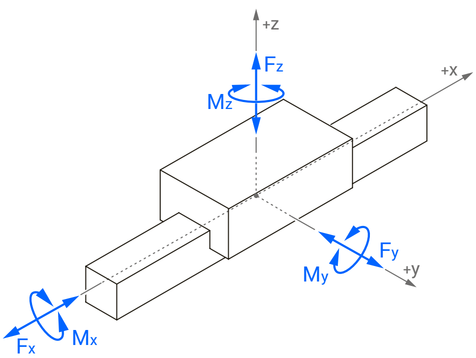
Permissible static moment is a moment which causes a load equivalent to the basic static load rating C_0. The permissible static moment is defined about the x, y, and z axis individually, i.e. M_{0x}, M_{0y} and M_{0z}, respectively (see figure below).



Equivalent static load P_0

Equivalent static load P_0 is defined as a single comparison static load, where the combination of all individually loads applied on the linear guide (in a certain load case) is taken into consideration.

$$P_0 = |F_y|+|F_z|+C_0\cdot\frac{|M_x|}{M_{0x}}+C_0\cdot\frac{|M_y|}{M_{0y}}+C_0\cdot\frac{|M_z|}{M_{0z}}$$



P_0	Equivalent static load	[N]
C_0	Basic static load rating	[N]
M_{0x}	Permissible static moment about the x axis	[Nm]
M_{0y}	Permissible static moment about the y axis	[Nm]
M_{0z}	Permissible static moment about the z axis	[Nm]
F_y	Force applied on the guide block in the y direction	[N]
F_z	Force applied on the guide block in the z direction	[N]
M_x	Moment applied on the guide block about the x axis	[Nm]
M_y	Moment applied on the guide block about the y axis	[Nm]
M_z	Moment applied on the guide block about the z axis	[Nm]

Static safety factor f_s

The static safety factor f_s is defined as the ratio between the basic static load rating C_0 (of the linear guide) and the equivalent static load applied on the linear guide P_0. The static safety factor f_s should never be lower than 1,0 and it is very important when the linear guide is subjected to the impact loads and vibrations. Recommended static safety factor are presented in the following table.

$$f_s = \frac{C_0}{P_0}$$

f_s	Static safety factor	
C_0	Basic static load rating	[N]
P_0	Equivalent static load	[N]

Recommended static safety factor

Operating condition	Loading condition	Min. f_s
Stationary	Light impact and vibrations	1,0 ~ 1,3
	Heavy impact and vibrations	2,0 ~ 3,0
Movement	Light impact and vibrations	1,0 ~ 1,5
	Heavy impact and vibrations	2,5 ~ 5,0

Nominal life L

Suppose a number of linear guides of the same type operated individually under the same conditions. After a certain period of time 90 % of them will not fail as a result of signs of fatigue on the contact surfaces, known as flaking. The total travel distance at this point is defined as the nominal life L.

Basic dynamic load rating C

The basic dynamic load rating C is defined as the load of constant direction and magnitude at which a linear guide achieves a nominal life of 50 km.

Permissible dynamic moment M_{dyn}

Permissible dynamic moment is a moment which causes a load equivalent to the basic dynamic load rating C. The permissible dynamic moment is defined about the x, y, and z axis individually, i.e. $M_{dyn\,x}$, $M_{dyn\,y}$ and $M_{dyn\,z}$, respectively.

Equivalent dynamic load P

Equivalent dynamic load P is defined as a single comparison dynamic load, where the combination of all individually loads applied on the linear guide (in a certain load case) is taken into consideration.

$$P = |F_y| + |F_z| + C \cdot \frac{|M_x|}{M_{dyn\,x}} + C \cdot \frac{|M_y|}{M_{dyn\,y}} + C \cdot \frac{|M_z|}{M_{dyn\,z}}$$

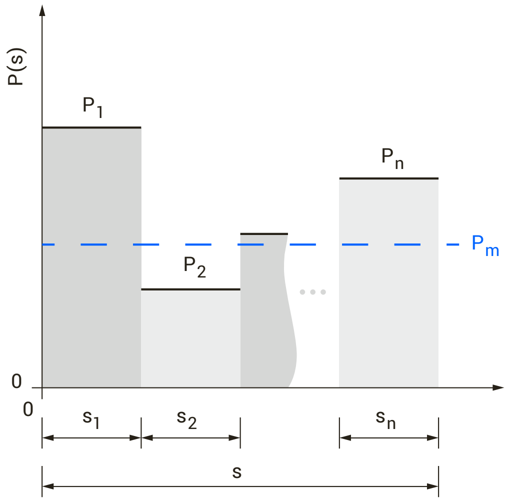
P	Equivalent dynamic load	[N]
C	Basic dynamic load rating	[N]
$M_{dyn\,x}$	Permissible dynamic moment about the x axis	[Nm]
$M_{dyn\,y}$	Permissible dynamic moment about the y axis	[Nm]
$M_{dyn\,z}$	Permissible dynamic moment about the z axis	[Nm]

Average load P_m

When the equivalent dynamic load P applied on a linear guide fluctuates, an average load P_m which will yield the same lifetime of a linear guide as the fluctuating load should be calculated. In the following, three common types of the load fluctuation are presented.

Incremental type

When the equivalent dynamic load fluctuates incrementally, the average load P_m may be calculated as follows (see figure below):

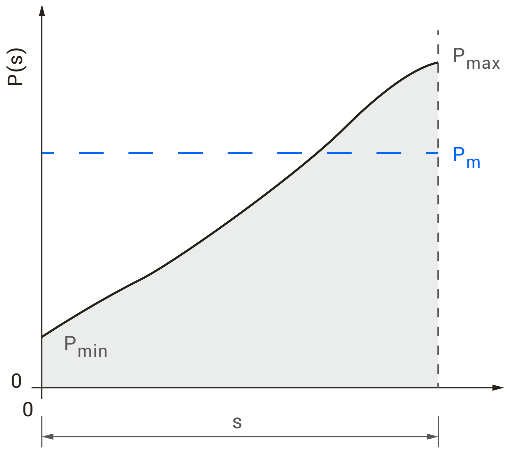


$$P_m = \sqrt[3]{\frac{1}{s} \cdot \left(P_1^3 \cdot s_1 + P_2^3 \cdot s_2 + \cdots + P_n^3 \cdot s_n\right)}$$

P_m	Average load	[N]
P_i	i-th equivalent dynamic load of a given incremental loading regime P(s), i ∊ {1,2,...,n}	[N]
s_i	i-th travel distance of a given incremental loading regime P(s), i ∊ {1,2,...,n}	[mm]
s	Total travel distance	[mm]
n	Number of increments	

Linear type

When the equivalent dynamic load fluctuation is almost linear, the average load P_m may be calculated as follows (see figure below):



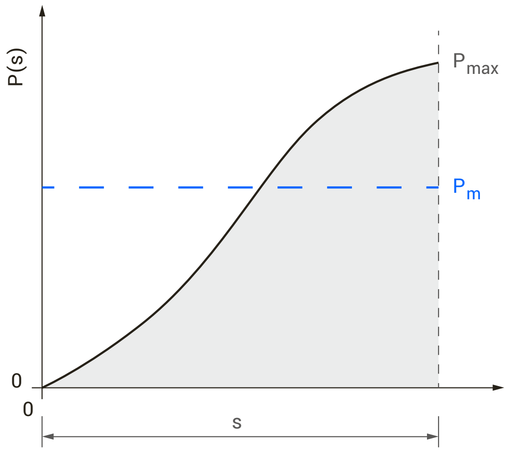
$$P_m = \frac{1}{3} \cdot (P_{min} + 2 \cdot P_{max})$$

P_{min}	Minimum value of fluctuating equivalent dynamic load	[N]
P_{max}	Maximum value of fluctuating equivalent dynamic load	[N]

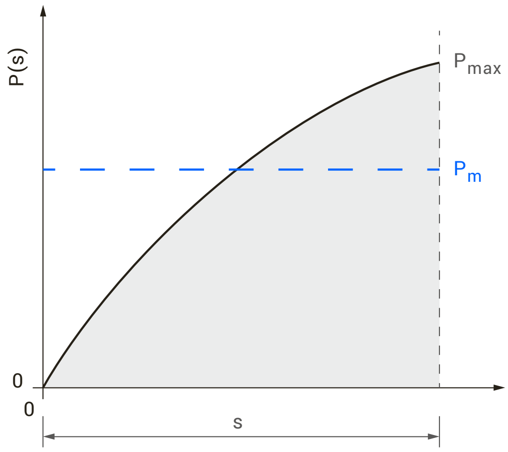
Sinusoidal type

When the equivalent dynamic load fluctuates similar to the sinusoidal wave as it is presented in the figures below, the average load P_m may be calculated as follows:

$$P_m = 0{,}65 \cdot P_{max}$$



$$P_m = 0{,}75 \cdot P_{max}$$



LIFETIME CALCULATIONS

Nominal life L

Nominal life L of the linear guides can be calculated by the following equations, where the basic dynamic load rating C and average load P_m applied on a linear guide are taken into consideration:

$$L = \left(\frac{C}{P_m}\right)^3 \cdot 50 \cdot 10^3$$

L	Nominal life	[m]

If the lifetime factors, i.e. hardness factor, temperature factor and load factor, are taken into consideration, the nominal life L can be calculated as follows:

$$L = \left(\frac{f_h \cdot f_t \cdot C}{f_w \cdot P_m}\right)^3 \cdot 50 \cdot 10^3$$

f_h	Hardness factor
f_t	Temperature factor
f_w	Load factor

Lifetime L_h

If total travel distance s of one cycle (in some cases s = 2 · stroke) and number of cycles per minute (cycle frequency) are known, the lifetime L_h can be calculated based on the nominal life.

$$L_h = \frac{L \cdot 10^3}{s \cdot n_m \cdot 60}$$

L_h	Lifetime	[h]
n_m	Number of cycles per minute	[cyc/min]
s	Total travel distance of one cycle	[mm]

Lifetime can also be calculated using the average travel speed v_m:

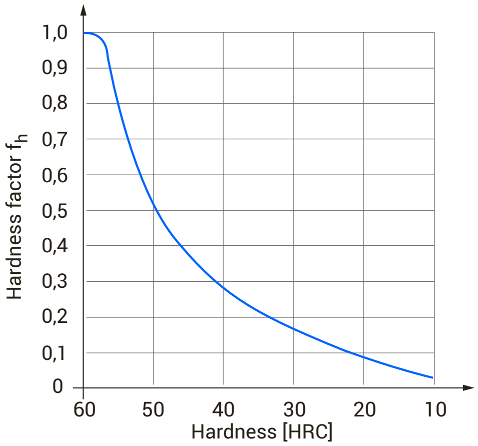
$$v_m = \frac{|v_1| \cdot t_1 + |v_2| \cdot t_2 + \dots + |v_n| \cdot t_n}{t_1 + t_2 + \dots + t_n}$$

$$L_h = \frac{L}{v_m \cdot 3600}$$

v_m	Average travel speed	[m/s]
v_i	i-th travel speed of a given incremental regime v(t), $i \in \{1,2,\dots,n\}$	[m/s]
t_i	i-th time of a given incremental regime v(t), $i \in \{1,2,\dots,n\}$	[s]

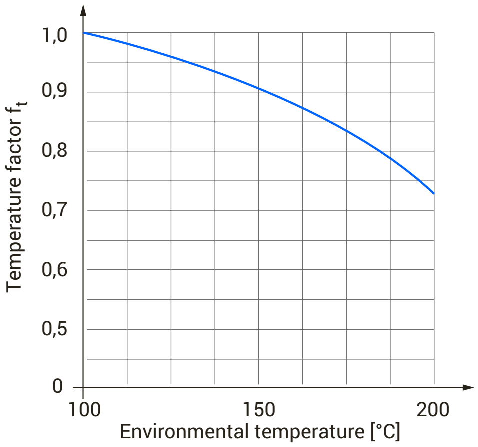
Hardness factor f_h

The hardness of the track surfaces and the steel balls of linear guides is 58 HRC. In this case the hardness factor is 1,0. For the applications where some other material with hardness below 58 HRC is required, the hardness factor f_h according to the following diagram should be used. In this case the basic dynamic and static load rating are reduced. Therefore, C and C_0 must be multiplied by the hardness factor f_h.



Temperature factor f_t

If the environmental temperature of the linear guide exceeds 100 °C during the operation the temperature factor needs to be considered. In this case the basic dynamic and static load rating are reduced. Therefore, C and C_0 must be multiplied by the temperature factor f_t. See the diagram below.



If the environmental temperature exceeds 80 °C, high-temperature material for the seals and the end plates must be used.

Load factor f_w

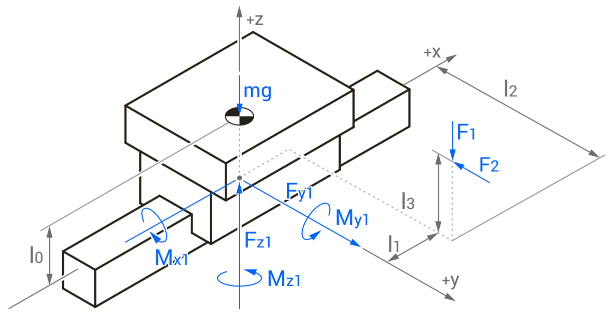
Lifetime of the linear guide can be reduced significantly if the impacts and vibrations as a result of high speed of a linear guide occur during the operation. The average load P_m must be multiplied by the load factor f_w. Since the effects of impacts and vibrations are difficult to determine, the empirical values of the load factor (according to the table presented below) should be taken into consideration.

Impact	Vibrations G	Travel speed v	f_w
Weak	G ≤ 0,5	Low v ≤ 0,15 m/s	1,0 ~ 1,5
Medium	0,5 < G ≤ 1,0	Medium 0,25 m/s < v ≤ 1 m/s	1,5 ~ 2,0
Strong	1,0 < G ≤ 2,0	High v > 1 m/s	2,0 ~ 3,5

LOADS APPLIED ON THE GUIDE BLOCK CALCULATION

In the following the calculations of the loads applied on the guide blocks are presented for some typical examples of the applications. The mass (inertia) of the plate, eccentric external forces and mounting style (number of guide blocks and rails, orientation position) are taken into consideration.

Example #1



Application conditions:

- Horizontal mounting position
- One rail with one block
- Mass of the table
- Two eccentric loads

Loads applied on the guide block:

$$F_{y1} = -F_2$$

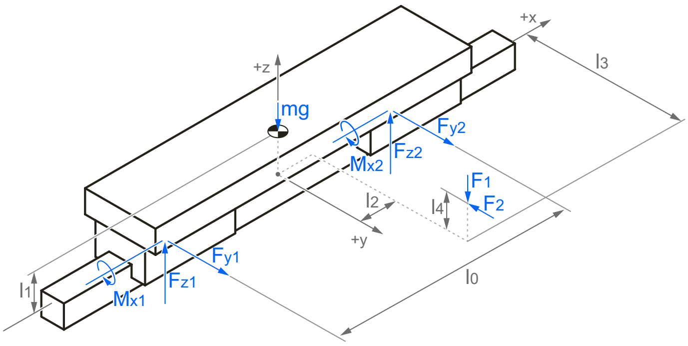
$$F_{z1} = -m \cdot g - F_1$$

$$M_{x1} = (F_1 \cdot l_2 - F_2 \cdot l_3) \cdot 10^{-3}$$

$$M_{y1} = -F_1 \cdot l_1 \cdot 10^{-3}$$

$$M_{z1} = F_2 \cdot l_1 \cdot 10^{-3}$$

Example #2



Application conditions:

- Horizontal mounting position
- One rail with two blocks
- Mass of the table
- Two eccentric loads

Loads applied on the guide block:

$$F_{y1} = -\frac{F_2}{2} + \frac{F_2 \cdot l_2}{l_0}$$

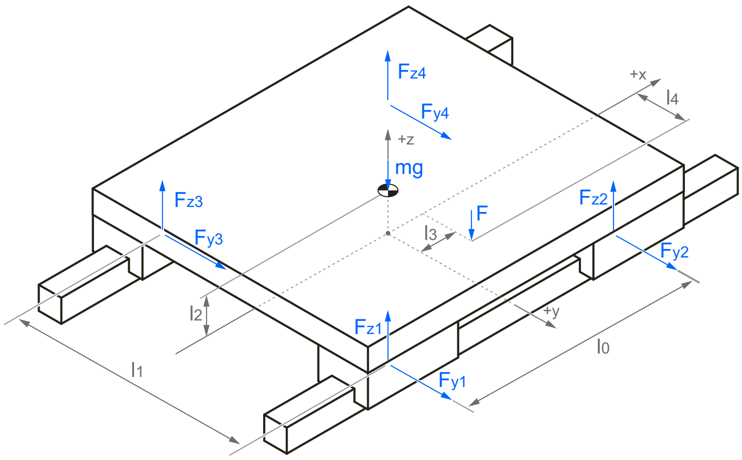
$$F_{y2} = -\frac{F_2}{2} - \frac{F_2 \cdot l_2}{l_0}$$

$$F_{z1} = -\frac{m \cdot g}{2} - \frac{F_1}{2} + \frac{F_1 \cdot l_2}{l_0}$$

$$F_{z2} = -\frac{m \cdot g}{2} - \frac{F_1}{2} - \frac{F_1 \cdot l_2}{l_0}$$

$$M_{x1} = M_{x2} = \left(\frac{F_1 \cdot l_3}{2} - \frac{F_2 \cdot l_4}{2}\right) \cdot 10^{-3}$$

Example #3



Application conditions:

- Horizontal mounting position
- Two rails arranged in parallel with two blocks per rail
- Mass of the table
- One excentric load

Loads applied on the guide block:

$$F_{y1} = F_{y2} = F_{y3} = F_{y4} = 0$$

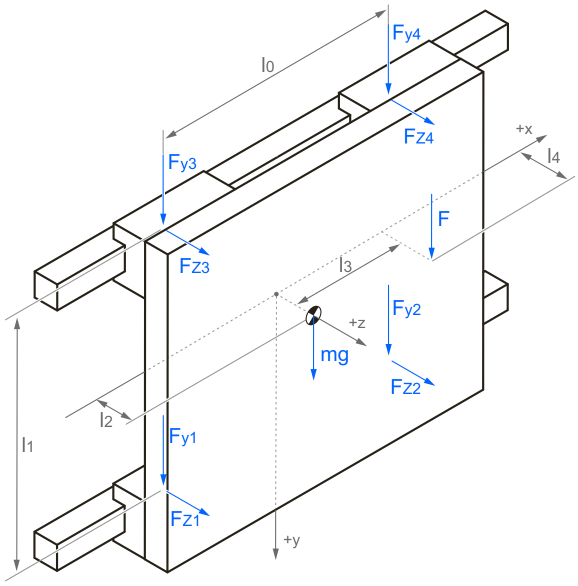
$$F_{z1} = -\frac{m \cdot g}{4} - \frac{F}{4} + \frac{F \cdot l_3}{2 \cdot l_0} - \frac{F \cdot l_4}{2 \cdot l_1}$$

$$F_{z2} = -\frac{m \cdot g}{4} - \frac{F}{4} - \frac{F \cdot l_3}{2 \cdot l_0} - \frac{F \cdot l_4}{2 \cdot l_1}$$

$$F_{z3} = -\frac{m \cdot g}{4} - \frac{F}{4} + \frac{F \cdot l_3}{2 \cdot l_0} + \frac{F \cdot l_4}{2 \cdot l_1}$$

$$F_{z4} = -\frac{m \cdot g}{4} - \frac{F}{4} - \frac{F \cdot l_3}{2 \cdot l_0} + \frac{F \cdot l_4}{2 \cdot l_1}$$

Example #4



Application conditions:

- Vertical mounting position
- Two rails arranged in parallel with two blocks per rail
- Mass of the table
- One excentric load

Loads applied on the guide block:

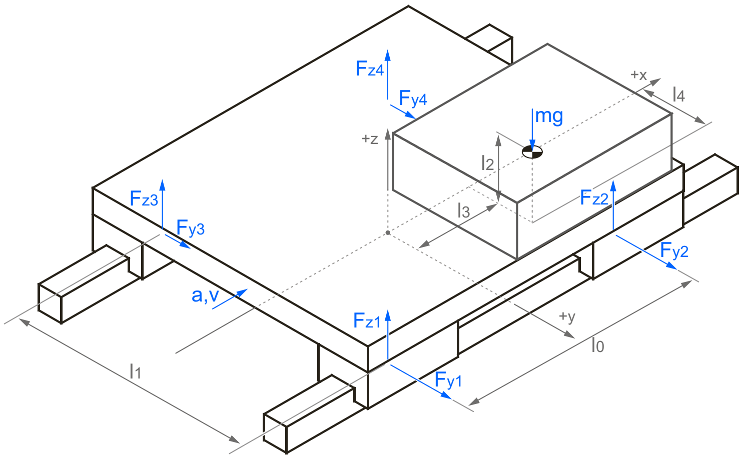
$$F_{y1} = F_{y3} = \frac{m \cdot g}{4} + \frac{F}{4} - \frac{F \cdot l_3}{2 \cdot l_0}$$

$$F_{y2} = F_{y4} = \frac{m \cdot g}{4} + \frac{F}{4} + \frac{F \cdot l_3}{2 \cdot l_0}$$

$$F_{z1} = F_{z2} = -\frac{m \cdot g \cdot l_2}{2 \cdot l_1} - \frac{F \cdot l_4}{2 \cdot l_1}$$

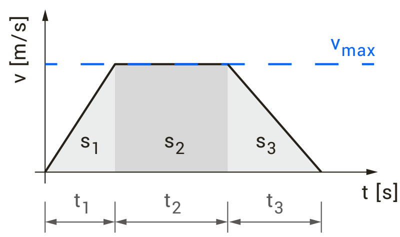
$$F_{z3} = F_{z4} = \frac{m \cdot g \cdot l_2}{2 \cdot l_1} + \frac{F \cdot l_4}{2 \cdot l_1}$$

Example #5



Application conditions:

- Horizontal mounting position
- Two rails arranged in parallel with two blocks per rail
- Mass of the table
- Travel speed as a function of time v(t):



Loads applied on the guide block:

- During the acceleration ($a_1 = v_{max}/t_1$):

$$F_{y1} = F_{y3} = -\frac{m \cdot a_1 \cdot l_4}{2 \cdot l_0}$$

$$F_{y2} = F_{y4} = \frac{m \cdot a_1 \cdot l_4}{2 \cdot l_0}$$

$$F_{z1} = -\frac{m \cdot g}{4} - \frac{m \cdot g \cdot l_4}{2 \cdot l_1} + \frac{m \cdot g \cdot l_3}{2 \cdot l_0} - \frac{m \cdot a_1 \cdot l_2}{2 \cdot l_0}$$

$$F_{z2} = -\frac{m \cdot g}{4} - \frac{m \cdot g \cdot l_4}{2 \cdot l_1} - \frac{m \cdot g \cdot l_3}{2 \cdot l_0} + \frac{m \cdot a_1 \cdot l_2}{2 \cdot l_0}$$

$$F_{z3} = -\frac{m \cdot g}{4} + \frac{m \cdot g \cdot l_4}{2 \cdot l_1} + \frac{m \cdot g \cdot l_3}{2 \cdot l_0} - \frac{m \cdot a_1 \cdot l_2}{2 \cdot l_0}$$

$$F_{z4} = -\frac{m \cdot g}{4} + \frac{m \cdot g \cdot l_4}{2 \cdot l_1} - \frac{m \cdot g \cdot l_3}{2 \cdot l_0} + \frac{m \cdot a_1 \cdot l_2}{2 \cdot l_0}$$

- During the constant travel speed ($a_2 = 0$ m/s²):

$$F_{y1} = F_{y2} = F_{y3} = F_{y4} = 0$$

$$F_{z1} = -\frac{m \cdot g}{4} - \frac{m \cdot g \cdot l_4}{2 \cdot l_1} + \frac{m \cdot g \cdot l_3}{2 \cdot l_0}$$

$$F_{z2} = -\frac{m \cdot g}{4} - \frac{m \cdot g \cdot l_4}{2 \cdot l_1} - \frac{m \cdot g \cdot l_3}{2 \cdot l_0}$$

$$F_{z3} = -\frac{m \cdot g}{4} + \frac{m \cdot g \cdot l_4}{2 \cdot l_1} + \frac{m \cdot g \cdot l_3}{2 \cdot l_0}$$

$$F_{z4} = -\frac{m \cdot g}{4} + \frac{m \cdot g \cdot l_4}{2 \cdot l_1} - \frac{m \cdot g \cdot l_3}{2 \cdot l_0}$$

- During the deceleration ($a_3 = -v_{max}/t_3$):

$$F_{y1} = F_{y3} = -\frac{m \cdot a_3 \cdot l_4}{2 \cdot l_0}$$

$$F_{y2} = F_{y4} = \frac{m \cdot a_3 \cdot l_4}{2 \cdot l_0}$$

$$F_{z1} = -\frac{m \cdot g}{4} - \frac{m \cdot g \cdot l_4}{2 \cdot l_1} + \frac{m \cdot g \cdot l_3}{2 \cdot l_0} - \frac{m \cdot a_3 \cdot l_2}{2 \cdot l_0}$$

$$F_{z2} = -\frac{m \cdot g}{4} - \frac{m \cdot g \cdot l_4}{2 \cdot l_1} - \frac{m \cdot g \cdot l_3}{2 \cdot l_0} + \frac{m \cdot a_3 \cdot l_2}{2 \cdot l_0}$$

$$F_{z3} = -\frac{m \cdot g}{4} + \frac{m \cdot g \cdot l_4}{2 \cdot l_1} + \frac{m \cdot g \cdot l_3}{2 \cdot l_0} - \frac{m \cdot a_3 \cdot l_2}{2 \cdot l_0}$$

$$F_{z4} = -\frac{m \cdot g}{4} + \frac{m \cdot g \cdot l_4}{2 \cdot l_1} - \frac{m \cdot g \cdot l_3}{2 \cdot l_0} + \frac{m \cdot a_3 \cdot l_2}{2 \cdot l_0}$$

F_y	Force applied on j-th guide block in the y direction	[N]
F_z	Force applied on j-th guide block in the z direction	[N]
M_x	Moment applied on j-th guide block about the x axis	[Nm]
M_y	Moment applied on j-th guide block about the y axis	[Nm]
M_z	Moment applied on j-th guide block about the z axis	[Nm]

m	Mass of the plate	[kg]
g	Gravity ≈ 9,81	[m/s²]
F, F_1, F_2	External force	[N]
l_0, l_1, l_2...	Distance between two guides blocks or distance from the reference coordinate system xyz	[mm]
a_i	Acceleration of the plate within i-th section of a given regime v(t)	[m/s²]

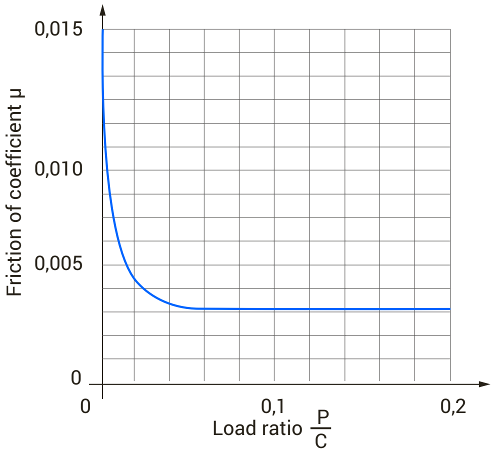
FRICTION OF THE LINEAR GUIDE

The frictional force of the linear guide varies according to the type of the linear guide (friction between the contact surfaces and friction of the seals), viscosity of lubricant, preload and the load which is applied on the guide block. Frictional force can be calculated as follows:

$$F_f = \mu \cdot W + f$$

F_f	Frictional force of the linear guide	[N]
μ	Coefficient of friction	
W	Load applied on the guide block	[N]
f	Sealing resistance	[N]

Coefficient of friction μ can be obtained from the diagram below, where the ratio between the equivalent dynamic load P and basic dynamic load rating C is taken into account. The values of sealing resistance f of the linear guide are presented in the following table.



Type	Sealing resistance f [N]	Type	Sealing resistance f [N]
BGX 15	0,3	BGC 15	0,45
BGX 20	0,4	BGC 20	0,6
BGX 25	0,45	BGC 25	0,7
BGX 30	0,7	BGC 30	0,9
BGX 35	1,0	BGC 35	1,2
BGX 45	1,2	BGC 45	1,8
BGX 55	1,4	BGC 55	2,0

ACCURACY CLASS

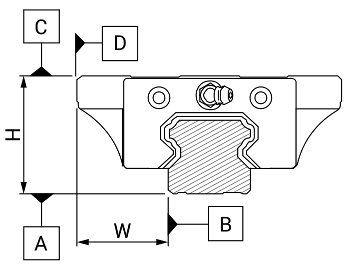
Five accuracy classes are available for BGX and BGC types of the linear guides. Accuracy classes depend on the dimensional deviations (height H and width W) and the running parallelism between guiding block and rail. Proper accuracy class needs to be select based on the application requirements.
In the table below the following dimensional deviations are presented:

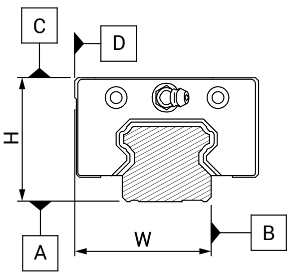
1. Maximum dimensional deviations of height H, which is measured between the top surface of the block and the bottom surface of the rail.
2. Maximum dimensional deviations of width W, which is measured between the lateral reference surface of the block and the lateral reference surface of the rail.
3. Maximum deviations of height H between several blocks on a rail (measured in the same rail position).
4. Maximum deviations of width W between several blocks on a rail (measured in the same rail position).

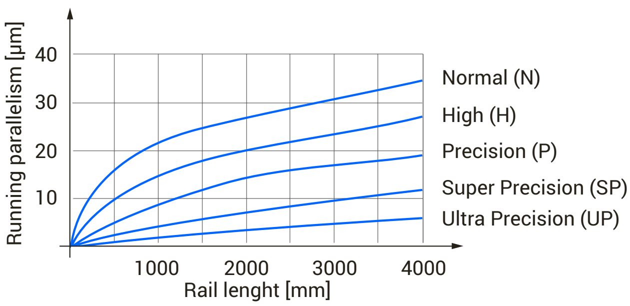
#	Dimensional deviation	Accuracy class [mm]				
		Normal (N)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
1	Height tolerance (H)	± 0,1	± 0,04	0 -0,04	0 -0,02	0 -0,01
2	Width tolerance (W)	± 0,1	± 0,04	0 -0,04	0 -0,02	0 -0,01
3	Height difference (ΔH)	0,03	0,02	0,01	0,005	0,003
4	Width difference (ΔH)	0,03	0,02	0,01	0,005	0,003

Accuracy classes N and H on stock (others on request).

The maximum running parallelism deviation between the top surface of the guide block C and the bottom surface of the rail A as a function of the rail length is presented in the following diagram. The same diagram is vailed for the maximum running parallelism deviation between the lateral reference surfaces of the block (D) and rail (B).







PRELOAD

The guide block can be preloaded (based on the oversizing of the balls) to increase the rigidity and eliminate the clearance. Proper preload needs to be select based on the application requirements. In the table below the preload for some common areas of applications are presented.

	Preload		
	Clearance / No Preload	Light Preload	Medium & Heavy Preload
Conditions	1. weak impact 2. 2 rails in pair 3. low accuracy 4. small resistance 5. small load	1. cantilever 2. single rail 3. light load 4. high accuracy	1. strong impact 2. strong vibration 3. heavy machining
Applications	1. welding machnice 2. chopping machnie 3. feeding mechanism 4. tool change mechanism 5. ordinary XY table 6. packing machine	1. NC lathe 2. EDM 3. precise XY table 4. ordinary Z-axis 5. industrial robot 6. PCB punching machine	1. machine tool 2. NC lathe and milling machine 3. feeding axis of grinder 4. tool feeding axis

In the case of the lifetime calculation the preload force (i.e. internal force that occurs on the contact surfaces of the linear guide) must be taken into consideration. The average load P_m must be increased for the preload forces, which can be found in the following table. It should be noted that for the preloaded systems the lifetime is reduced and the friction of the linear guide is increased.

Preload	Type	Preload force [N]
Clearance Free	ZF	0
No preload	Z0	0
Light preloaded	Z1	0,02 • C
Medium preloaded	Z2	0,05 • C
Heavy preloaded	Z3	0,07 • C

C	Basic dynamic load rating	[N]

In the case of even higher preload, please contact us.

Radial clearance

Radial clearance is defined as the total distance that the contact surfaces of the linear guide can be displaced in relation to each other in the radial direction.

Guide block	Preload type [µm]				
	ZF	Z0	Z1	Z2	Z3
BG 15	4 ~ 8	-3 ~ 3	-8 ~ -4	-13 ~ -9	-18 ~ -14
BG 20	4 ~ 8	-3 ~ 3	-8 ~ -4	-14 ~ -9	-19 ~ -14
BG 25	5 ~ 10	-4 ~ 4	-10 ~ -5	-17 ~ -11	-23 ~ -18
BG 30	5 ~ 11	-4 ~ 4	-11 ~ -5	-18 ~ -12	-25 ~ -19
BG 35	6 ~ 12	-5 ~ 5	-12 ~ -6	-20 ~ -13	-27 ~ -20
BG 45	7 ~ 15	-6 ~ 6	-15 ~ -7	-23 ~ -15	-32 ~ -24
BG 55	8 ~ 19	-7 ~ 7	-19 ~ -8	-29 ~ -20	-38 ~ -30

Preload type Z1 on stock (others on request).

Interchangeability

Preloaded linear guides cannot be made in all accuracy classes interchangeable, since otherwise the quality may not be ensured. For interchangeable linear guides the guide block and rail can be freely interchanged – guide block and rail can be ordered separately and fitted by the customer. Non-interchangeable linear guides are only available as preassembled. In the following table the interchangeability of linear guides is presented.

Accuracy class	Interchangeable		Non-interchangeable				
	H	N	UP	SP	P	H	N
Preload		ZF					
	Z0	Z0			Z0		
	Z1	Z1	Z1	Z1	Z1		
			Z2	Z2	Z2	Z2	Z2
			Z3	Z3	Z3		

RIGIDITY

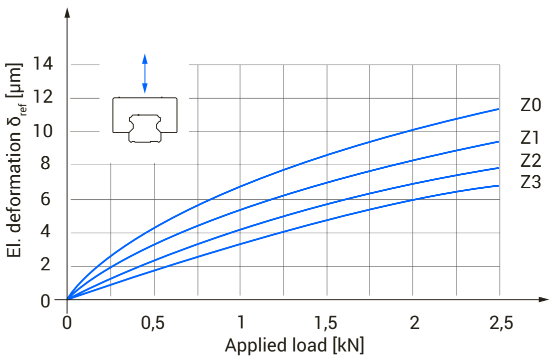
If the load is applied to the linear guide, the guide block will elastically deform (within the allowable load range specified in the table for the particular size of the linear guide). Therefore, the rigidity of the linear guide is defined as the ratio between the applied load (to the guide block) and the elastic deformation of the guide block. In order to reduce the elastic deformations the preload (Z0, Z1, Z2, Z3) should be taken into consideration, see the following diagrams.

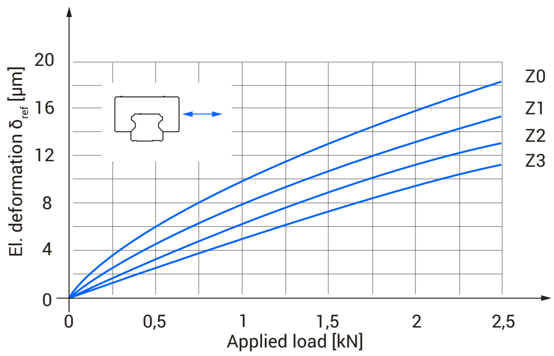
Reference diagrams of the elastic deformations as a function of the applied load together with the presented equations needs be used to determine the elastic deformation for the particular size and length of the guide block.

δ_{ref}	Reference deformation of the guide block	[µm]
δ_{el}	Elastic deformation for particular size and lenght of the guide block	[µm]

BG15

Reference diagrams for BG15:

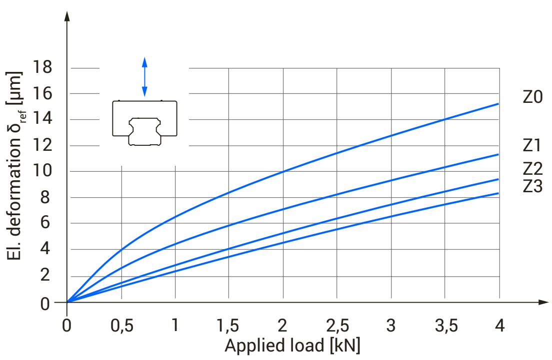


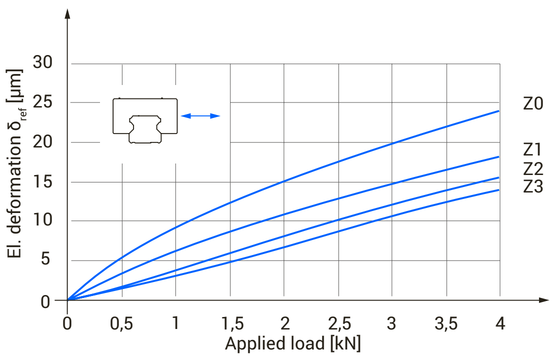


Guide block lenght		
15-L	15-N	15-S
$\delta_{el} = \delta_{ref} \cdot 0{,}843$	$\delta_{el} = \delta_{ref} \cdot 1{,}000$	$\delta_{el} = \delta_{ref} \cdot 1{,}811$

BG20

Reference diagrams for BG20:

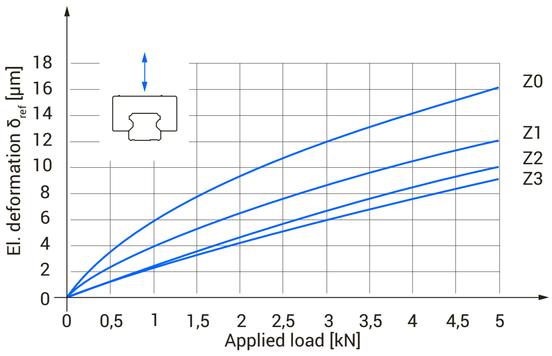


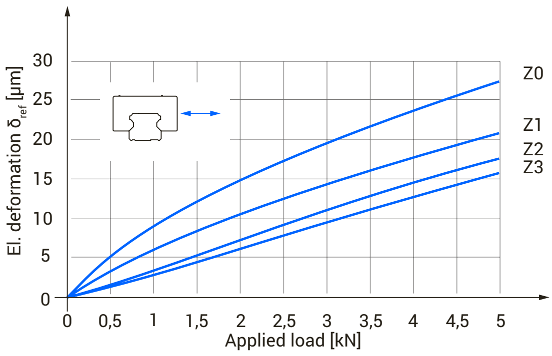


Guide block lenght			
20-E	20-L	20-N	20-S
$\delta_{el} = \delta_{ref} \cdot 0{,}634$	$\delta_{el} = \delta_{ref} \cdot 0{,}791$	$\delta_{el} = \delta_{ref} \cdot 1{,}000$	$\delta_{el} = \delta_{ref} \cdot 1{,}764$

BG25

Reference diagrams for BG25:

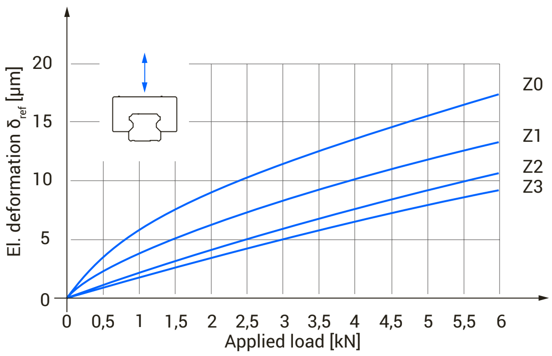


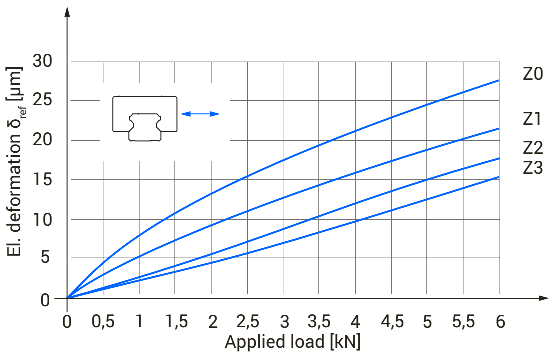


Guide block lenght			
25-E	25-L	25-N	25-S
$\delta_{el} = \delta_{ref} \cdot 0{,}662$	$\delta_{el} = \delta_{ref} \cdot 0{,}796$	$\delta_{el} = \delta_{ref} \cdot 1{,}000$	$\delta_{el} = \delta_{ref} \cdot 1{,}780$

BG30

Reference diagrams for BG30:

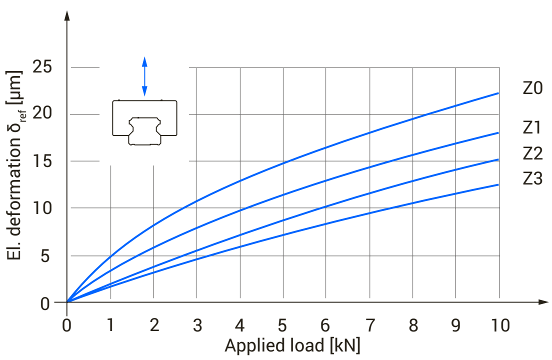


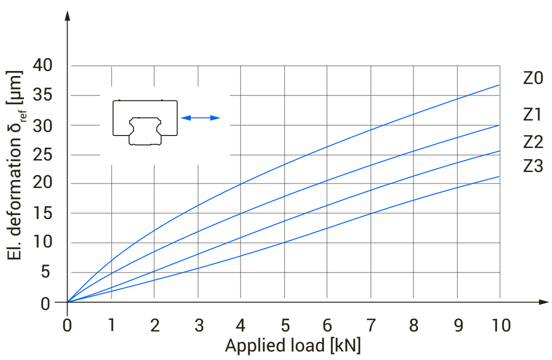


Guide block lenght			
30-E	30-L	30-N	30-S
$\delta_{el} = \delta_{ref} \cdot 0{,}655$	$\delta_{el} = \delta_{ref} \cdot 0{,}869$	$\delta_{el} = \delta_{ref} \cdot 1{,}000$	$\delta_{el} = \delta_{ref} \cdot 1{,}823$

BG35

Reference diagrams for BG35:

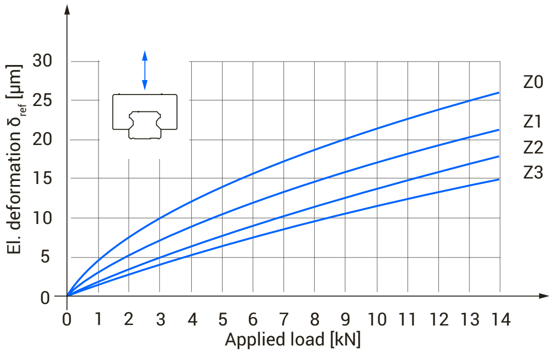


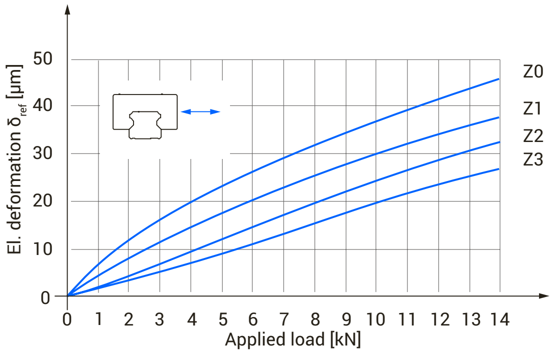


Guide block lenght			
35-E	35-L	35-N	35-S
$\delta_{el} = \delta_{ref} \cdot 0{,}657$	$\delta_{el} = \delta_{ref} \cdot 0{,}870$	$\delta_{el} = \delta_{ref} \cdot 1{,}000$	$\delta_{el} = \delta_{ref} \cdot 1{,}809$

BG45

Reference diagrams for BG45:

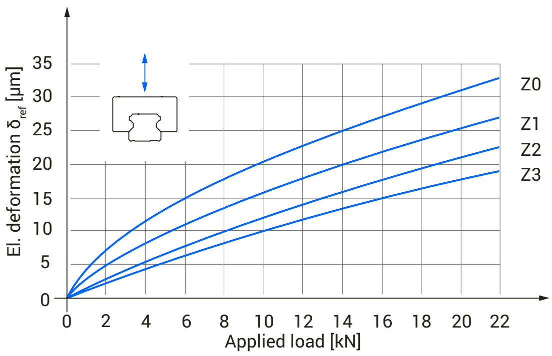


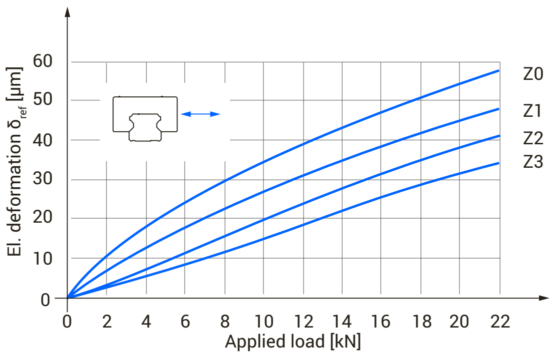


Guide block lenght		
45-E	45-L	45-N
$\delta_{el} = \delta_{ref} \cdot 0{,}676$	$\delta_{el} = \delta_{ref} \cdot 0{,}855$	$\delta_{el} = \delta_{ref} \cdot 1{,}000$

BG55

Reference diagrams for BG55:





Guide block lenght		
55-E	55-L	55-N
$\delta_{el} = \delta_{ref} \cdot 0{,}678$	$\delta_{el} = \delta_{ref} \cdot 0{,}753$	$\delta_{el} = \delta_{ref} \cdot 1{,}000$

LUBRICATION

Linear guide needs a sufficient amount of the lubricant (both grease and oil can be used), which is essential for optimal operating. The lubricant ensures a lubricating film between the steel balls and the track surfaces to reduce wear and friction. Furthermore, the lubricant protects the metallic surfaces against corrosion and contamination, reduces the noise and heating and lubricant's properties extend the lifetime of the linear guide. Linear guides are pre-lubricated before shipment.

Lubricant

Recommended grease for the lubrication: Lubcon TURMOGREASE LC 802 EP (K HC P 2/3 N -30).

Do not use the lubricant which contains any solid parts!

Lubrication quantities and intervals

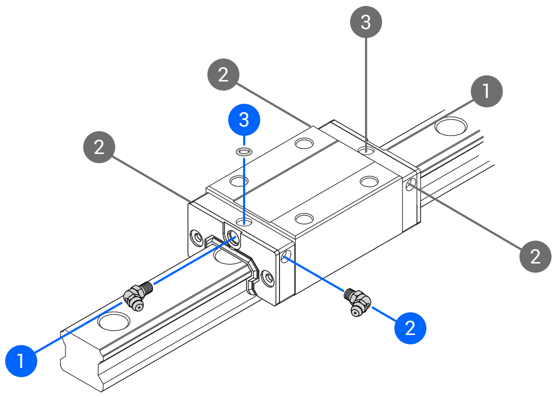
In the following table both initial lubrication (lubrication for initial operation) and re-lubrication amounts of the lubricant that have to be supplied to linear guide are presented.
- Grease lubrication: it is recommended to re-lubricate after 100 km of traveled distance or every six month. In the case of caged type of the guide block it is recommended to re-lubricate after 500 km of traveled distance or every year.
- Oil lubrication: it is recommended to re-lubricate every hour.

In the case of normal stroke (stroke is longer than double length of the guide block), it is sufficient to supply lubricant only through one grease fitting. In the case of short stroke (stroke is shorter than double length of the guide block), the lubricant must be supplied through two grease fittings, which are attached at both ends of the block.

Guide block No.	Guide block type	Grease Lubrication			Oil Lubrication		
		Initial lubrication [cm³]		Re-lubrication [cm³]	Initial lubrication [ml]		Re-lubrication [ml]
		Non cage	Cage		Non cage	Cage	
BG15	BS,FS	0,3	0,2	0,1	0,2	0,1	0,1
	BN,FN	0,4	0,3	0,2	0,2	0,1	0,1
	BL,FL	0,5	0,4	0,3	0,2	0,1	0,1
BG20	BS,FS	0,4	0,3	0,2	0,3	0,2	0,1
	BN,FN	0,6	0,5	0,3	0,4	0,3	0,2
	BL,FL	0,8	0,7	0,4	0,4	0,3	0,2
	BE,FE	1	0,9	0,5	0,5	0,4	0,2
BG25	BS,FS	0,8	0,7	0,4	0,4	0,3	0,1
	BN,FN	1	0,9	0,6	0,5	0,4	0,2
	BL,FL	2	1,9	1,2	0,6	0,5	0,2
	BE,FE	2,5	2,4	1,4	0,7	0,6	0,3
BG30	BS,FS	2	1,9	1,2	0,7	0,6	0,2
	BN,FN	2,5	2,4	1,4	0,9	0,8	0,2
	BL,FL	3	2,9	1,6	1	0,9	0,3
	BE,FE	3,5	3,4	1,8	1,2	1,1	0,3
BG35	BS,FS	3	2,9	1,6	0,9	0,8	0,2
	BN,FN	3,5	3,4	1,8	1,4	1,3	0,3
	BL,FL	4	3,9	2	1,5	1,4	0,3
	BE,FE	4,5	4,4	2,3	1,8	1,7	0,4
BG45	BN,FN	4	3,9	2	2	1,9	0,5
	BL,FL	5	4,9	2,5	2,3	2,2	0,5
	BE,FE	5,5	5,4	2,8	2,8	2,7	0,6
BG55	BN,FN	6	5,8	3	3,5	3,3	0,6
	BL,FL	8	7,8	4	4,5	4,3	0,6
	BE,FE	10	9,8	5	5,5	5,3	0,7

Lubrication ports

The lubricant can be supplied to the guide block through several lubrication ports. As standard (1) there are two lubrication ports located at both ends of the block (one of them is sealed with the set screw). As alternative (2, 3) there are also four lubrication ports located on both side of the block and two lubrication ports from the top (for both case the marked lubrication hole must be opened). Lubrication port locations are presented in the figure below. In the case of using the lubrication ports from the top, the O-ring is necessary to adjust the proper height and seal the connection.
For more information about the side and the top lubrication ports please contact us.



Standard grease fitting is included (NGS02 / NGX02 / NGX04).
For more info see section Accessories - Grease fittings.

DUST PROTECTION – SEAL COMBINATIONS

Entrance of dust or liquid particles and chips into the guide block may significantly reduce the lifetime, since the foreign substances may cause an abnormal wear of the track surfaces. Therefore, the proper sealing option of the linear guide needs to be select according to the environmental conditions of the application. The purpose of the sealing system is also to minimize the loss of the lubricant.
Linear guides can be combined with several sealing options to provide an optimal sealing system, see table below.

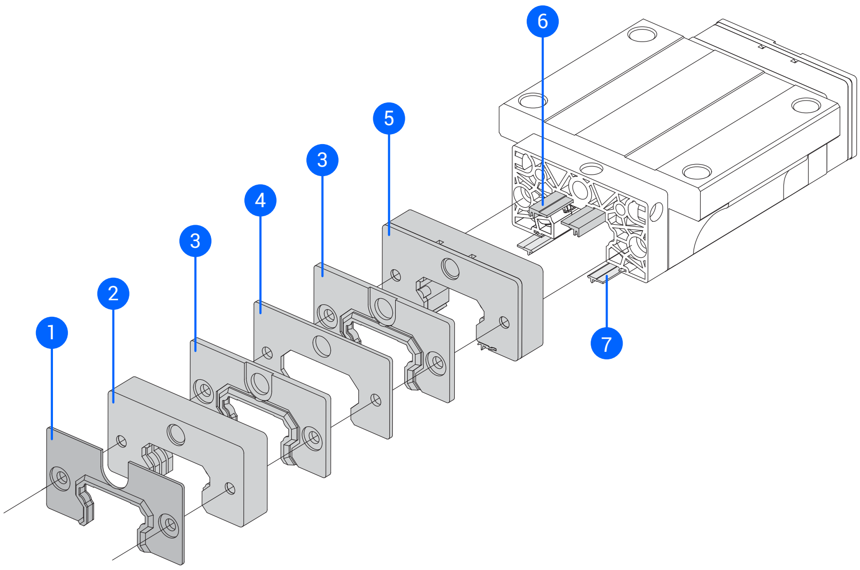
Standard Seals	
Code	Explanation
--	End seal + Side seal
UU	End seal
SS	End seal + Side seal + Inner seal
DD	Double seal + Side seal
EE	Double seal + Side Seal + Inner Seal
FF	End seal + Side seal + Inner seal + Scrapper
GG	Double seal + Side seal + Inner seal + Scrapper
ZZ	End seal + Side seal + Scrapper
KK	Double seal + Side seal + Scrapper

Low Friction Seals (LFS)	
Code	Explanation
AL	LFS + Side seal
UL	LFS
SL	LFS + Side seal + Inner seal
DL	Double LFS + Side seal
EL	Double LFS + Side seal + Inner seal
FL	LFS + Side seal + Inner seal + Scrapper
GL	Double LFS + Side seal + Inner seal + Scrapper
ZL	LFS + Side seal + Scrapper
KL	Double LFS + Side seal + Scrapper

Reinforced Side Seals (RSS)	
Code	Explanation
AB	End seal + RSS
SB	End seal + RSS + Inner seal
DB	Double seal + RSS
EB	Double seal + RSS + Inner seal
FB	Double seal + RSS + Inner seal + Scrapper
GB	Double seal + RSS + Inner seal + Scrapper
ZB	End seal + RSS + Scrapper
KB	Double seal + RSS + Scrapper

Standard seals -- and SS on stock (others on request).

The following sealing and lubrication elements are available:



1 – Scraper
2 – Multi-Layer-Scraper (MLS)
3 – End seal
4 – Spacer
5 – Lubrication system
6 – Inner seal
7 – Side seal

Scraper

– Sealing against coarse particles and chips from outside
– Protect the end seal from being damaged
– Not suitable as single sealing

End seal

– Sealing against fine particles and fluids from outside
– Minimize the loss of the lubricant
– Sealing for normal environmental conditions (little dirt and dust)

Multi-Layer-Scraper (MLS)

– Sealing in the case of extreme heavy contamination
– Stacking structure composed of three layers of scrapers
– Suitable also in combination with double seals and scraper

Lubrication system (LS)

– Self-lubrication system
– For longer re-lubrication intervals
– The lubrication oil is automatically spread over the track surfaces
– More information can be found in section Accessories

Inner seal

– Sealing the interior of the block against fine particles caught in the mounting holes of the rail
– Minimize the loss of the lubricant
– Improve the stability of the block
– Sealing for all environmental conditions

Side seal

– Sealing the interior of the block against fine particles from below
– Minimize the loss of the lubricant
– Sealing for all environmental conditions

Double seals

– Combination of two end seals and spacer
– Effective sealing against fine particles and fluids from outside
– Sealing in the case of heavy contamination (lot of dirt and dust)
– Suitable also in combination with scraper

Low friction seals (LFS)

– One lip seal
– Lower sealing (driving) resistance
– Smoothness
– Sealing in the case of low contamination

Reinforced Side Seals (RSS)

– Composed of solid material (ABS) and soft material (TPU) (note: standard side seal is made of Nylon, which has lower driving resistance)
– Seals fits the rail perfectly
– Optimum sealing against foreign particles

Thickness of a single sealing and lubrication element in mm

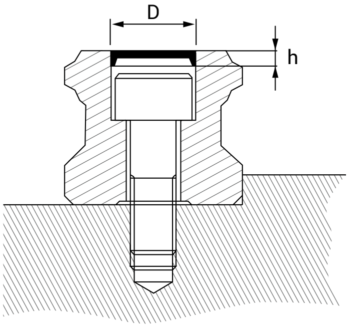
Block size	End seal	Double end seals	Scrapper	MLS	LS
15	2,5	5,50	1,60	6,5	10,3
20	3,2	6,70	2,10	6,5	10,3
25	2,75	6,25	2,20	7,0	10,3
30	3,5	7,50	2,30	9,0	10,3
35	4,0	8,50	2,30	9,0	10,5
45	4,5	9,50	3,00	9,0	13,0
55	4,5	9,50	2,80	9,0	13,0

It should be noted that the total length of the guide block varies according to the selected sealing option and needs to be increased by thickness of the individual sealing and lubrication element, which are presented in the table.

Rail dust protection

To avoid keeping the dust particles and chips in the mounting holes of the rail the following solutions are available:

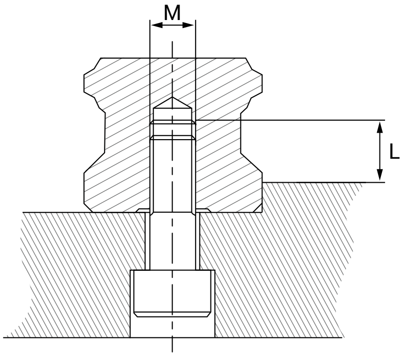
1. Rail caps:



Size	Dimension [mm]	
	Ø D	h
15	7,5	1,3
20	9,5	2,5
25	11,0	2,5
30	14,0	3,5
35	14,0	3,5
45	20,0	3,5
55	23,0	4,5

– Made of plastic material (dimensions can be found in the table on the left)
– Caps can be easily mounted using a plastic mallet aligned with hole after the rail is installed.

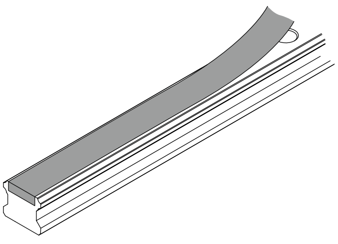
2. Tapped hole rail:



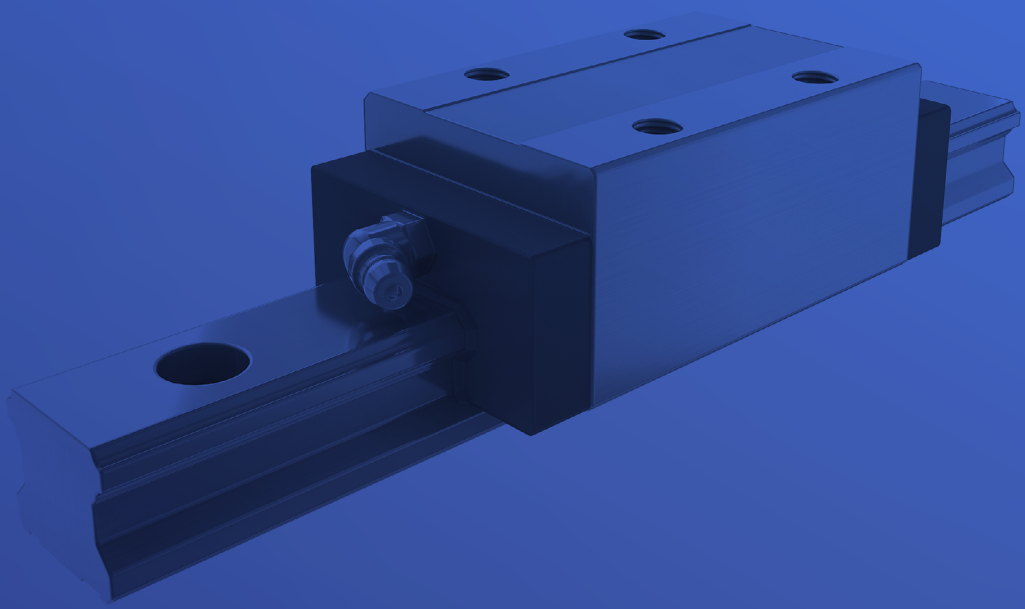
Rail size	Thread size M	Max. Thread length L [mm]
BG 15	M5	8
BG 20	M6	10
BG 25	M6	12
BG 30	M8	15
BG 35	M8	17
BG 45	M12	20
BG 55	M14	24

– Fastening the rail from below

3. Cover strip:

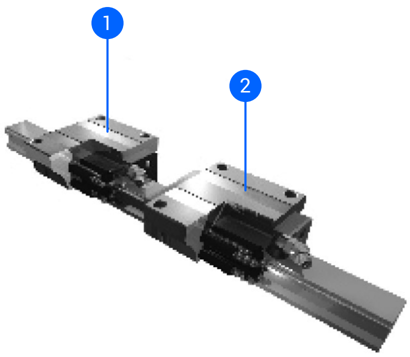


– For covering the top surface of the rail
– More information can be found in section Accessories



Linear guides – BG Series

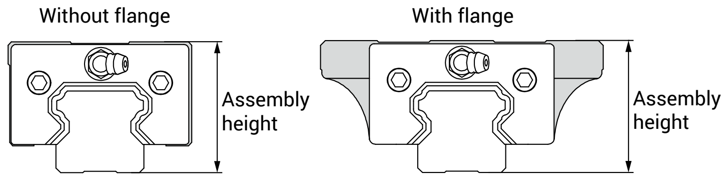
OVERVIEW



1 – BGX Non-Cage type
2 – BGC Cage type

Both BGX and BGC guide blocks with various assembly heights, flange types and length types are available, see figure below.

Guide blocks with flange have a larger mounting surface. Therefore they are more suitable for applications where higher loads are presented.

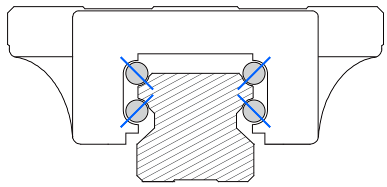


BGX – NON CAGE TYPE

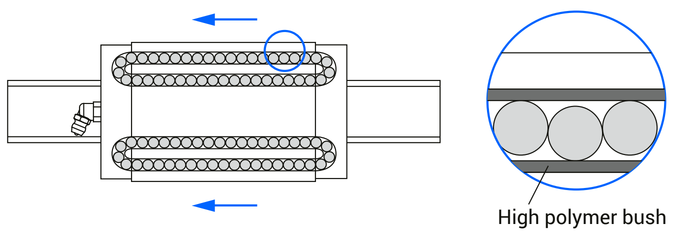
Features of the BGX type:

– Four rows of steel balls with contact angle of 45°
– High accuracy and rigidity
– Same high load capacity in all main directions
– Lubrication fittings can be mounted on all sides of the guide block
(bottom side is excluded)
– Low friction, light movement
– Various sealing options for different field of the applications
– Velocity of up to 1 m/s

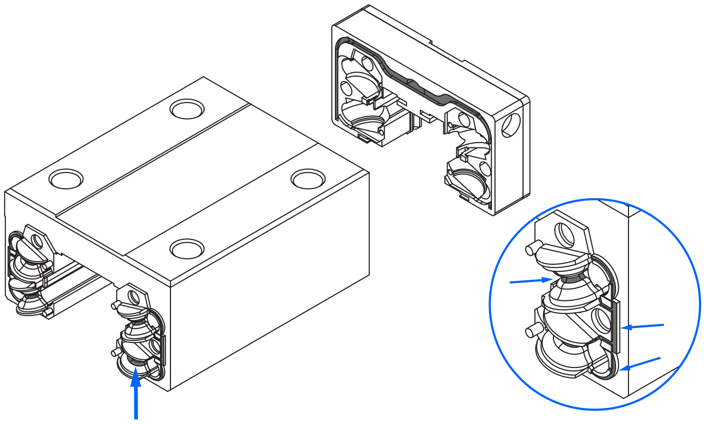
Due to the four rows of steel balls with a contact angle of 45 degree (between the track surfaces and the steel balls) the BGX linear guides can be subjected to the high loads. This design offers the same load capacity of the linear guide in all main directions no matter how the rail in positioned. In comparison with the two-groove gothic design, the four-groove design provides better rigidity, accuracy, higher stability and longer lifetime. In particular, the self-adjust capability allows smooth linear motions by absorbing the deviation of the mounting planes and the assembly errors.



BGX tubular muffling system, i.e. the high polymer bushes inserted in the guide block, highly reduces the collision of the steel balls and its resulting noise, especially at high travel speed. The high polymer bush also improves the lubrication and reduces the friction between the steel balls and the tube.



Design of the BGX circulation system allows a lot of additional space for retaining the lubricant, which is important for the re-lubrication intervals and the lifetime. BGX circulation system spreads the lubricant inside the guide block all over the contact surfaces in the case that linear guide moves. In the case of the stationary conditions the lubricant is returned to the lubricant retainer in the circulation system without loss of the lubricant.

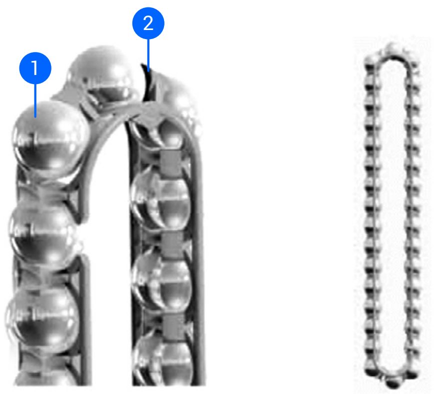


BGC – CAGE TYPE

Features of the BGC type (additionally to BGX):

– For high speed applications (up to 5 m/s)
– Smoother traveling
– Less running noise and vibrations
– Less heating generation
– Better retaining of the lubricant
– More evenly distributed load on the linear guide
– Higher dynamic load and moment capacities

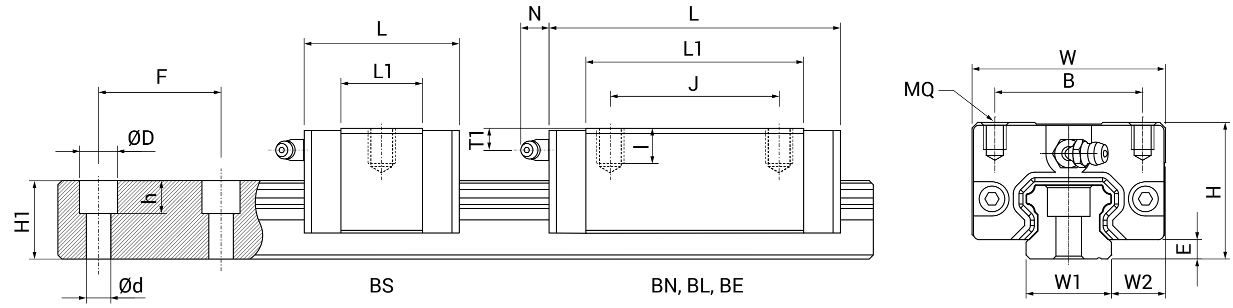
BGC type of the guide block offers all the features of the BGX type. As additional advantage the BGC type of the guide block is designed with the high polymer separator (which has a function of a cage) between the steel balls. Since the separator defines the constant distance between the steel balls, there is no collision between them and the load is more evenly distributed on the linear guide. This result in smoother traveling, less running noise and vibrations, less heating generation, higher reliable travel speed and better retaining of the lubricant on the contact surfaces (lubricant is retained in the space between two steel balls and the separator). Since the lubrication is more reliable, the lifetime of the BGC type is much longer. It should be noted that the dimensions of BGC and BGX types of the linear guides are the same (the same guide rail can be used).



1 – Steel ball
2 – High polymer separator

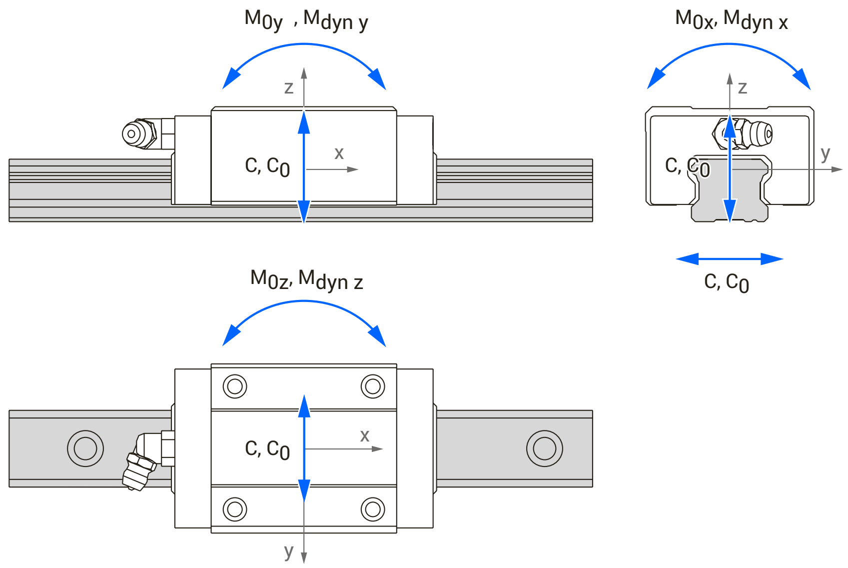
BGX / BGC SPECIFICATION TABLE

Guide block design properties:
Low assmebly and special assembly height (S and X)
Short, standard, long and extra long types with no flange (BS, BN, BL, BE)
Standard sealing option with end seals



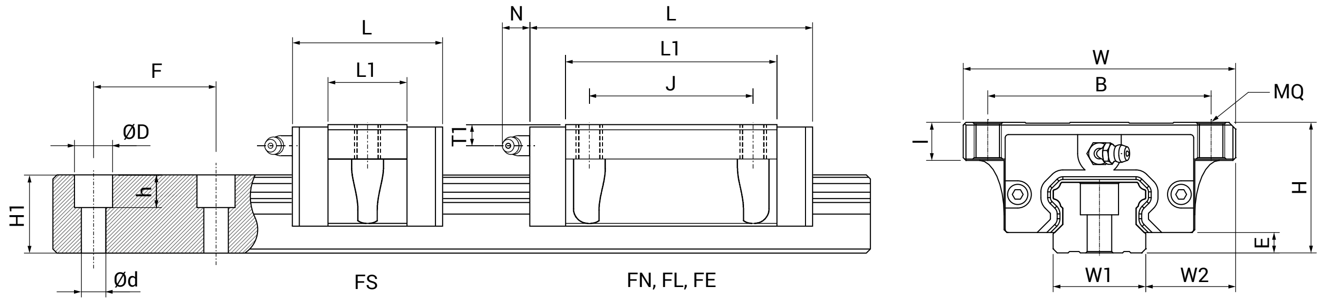
	Assembly [mm]				Block [mm]									Rail [mm]						Block	Rail
Model	H	W	W2	E	L	B	J	MQ	I	L1	Oil H	T1	N	W1	H1	F	d	D	h	kg	kg/m
S15BS	24	34	9,5	3,4	40,6	26	-	M4	4,8	22,2	M4x0,7	5,5	(5,7)	15	13,0	60	4,5	7,5	5,5	0,10	1,28
S15BN	24	34	9,5	3,4	58,6	26	26	M4	4,8	40,2	M4x0,7	5,5	(5,7)	15	13,0	60	4,5	7,5	5,5	0,17	1,28
S15BL	24	34	9,5	3,4	66,1	26	26	M4	4,8	47,7	M4x0,7	5,5	(5,7)	15	13,0	60	4,5	7,5	5,5	0,18	1,28
S20BS	28	42	11,0	4,5	49,1	32	-	M5	5,5	27,5	M6x1,0	5,1	(12,3)	20	16,3	60	6,0	9,5	8,5	0,17	2,15
S20BN	28	42	11,0	4,5	70,1	32	32	M5	5,5	48,5	M6x1,0	5,1	(12,3)	20	16,3	60	6,0	9,5	8,5	0,26	2,15
S25BS	33	48	12,5	5,8	54,0	35	-	M6	6,8	32,3	M6x1,0	7,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,21	2,88
S25BN	33	48	12,5	5,8	79,2	35	35	M6	6,8	57,5	M6x1,0	7,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,38	2,88
X25BN	36	48	12,5	5,8	79,2	35	35	M6	9,0	57,5	M6x1,0	10,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,40	2,88
X25BL	36	48	12,5	5,8	93,9	35	35	M6	9,0	72,2	M6x1,0	10,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,54	2,88
X25BE	36	48	12,5	5,8	108,6	35	50	M6	9,0	86,9	M6x1,0	10,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,67	2,88
S30BS	42	60	16,0	7,0	64,2	40	-	M8	10,0	37,2	M6x1,0	10,0	(11,7)	28	22,8	80	9,0	14,0	12,0	0,50	4,45
S30BN	42	60	16,0	7,0	94,8	40	40	M8	10,0	67,8	M6x1,0	10,0	(11,7)	28	22,8	80	9,0	14,0	12,0	0,80	4,45
S30BL	42	60	16,0	7,0	105,0	40	40	M8	10,0	78,0	M6x1,0	10,0	(11,7)	28	22,8	80	9,0	14,0	12,0	0,94	4,45
S30BE	42	60	16,0	7,0	130,5	40	60	M8	10,0	103,5	M6x1,0	10,0	(11,7)	28	22,8	80	9,0	14,0	12,0	1,16	4,45
S35BS*	48	70	18,0	7,5	75,5	50	-	M8	10,0	44,5	M6x1,0	11,5	(11,5)	34	26,0	80	9,0	14,0	12,0	0,80	6,25
S35BN	48	70	18,0	7,5	111,5	50	50	M8	10,0	80,5	M6x1,0	11,5	(11,5)	34	26,0	80	9,0	14,0	12,0	1,20	6,25
S35BL	48	70	18,0	7,5	123,5	50	50	M8	10,0	92,5	M6x1,0	11,5	(11,5)	34	26,0	80	9,0	14,0	12,0	1,40	6,25
S35BE	48	70	18,0	7,5	153,5	50	72	M8	10,0	122,5	M6x1,0	11,5	(11,5)	34	26,0	80	9,0	14,0	12,0	1,84	6,25
S45BN	60	86	20,5	8,9	129,0	60	60	M10	15,5	94,0	M8x1,25	14,4	(10,8)	45	31,1	105	14,0	20,0	17,0	1,64	9,60
S45BL	60	86	20,5	8,9	145,0	60	60	M10	15,5	110,0	M8x1,25	14,4	(10,8)	45	31,1	105	14,0	20,0	17,0	1,93	9,60
S45BE	60	86	20,5	8,9	174,0	60	80	M10	15,5	139,0	M8x1,25	14,4	(10,8)	45	31,1	105	14,0	20,0	17,0	2,42	9,60
S55BN*	70	100	23,5	12,7	155,0	75	75	M12	18,0	116,0	M8x1,25	14,0	(10,8)	53	38,0	120	16,0	23,0	20,0	2,67	13,80
S55BL*	70	100	23,5	12,7	193,0	75	75	M12	18,0	154,0	M8x1,25	14,0	(10,8)	53	38,0	120	16,0	23,0	20,0	3,57	13,80
S55BE	70	100	23,5	12,7	210,0	75	95	M12	18,0	171,0	M8x1,25	14,0	(10,8)	53	38,0	120	16,0	23,0	20,0	3,97	13,80

* On request



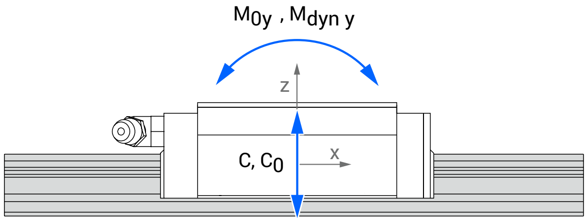
	Basic dynamic load rating [kN]		Basic static load rating [kN]	Permissible dynamic moment [Nm]						Permissible static moment [Nm]		
Model	C (BGX)	C (BGC)	C_0	$M_{dyn\ x}$ (BGX)	$M_{dyn\ y}$ (BGX)	$M_{dyn\ z}$ (BGX)	$M_{dyn\ x}$ (BGC)	$M_{dyn\ y}$ (BGC)	$M_{dyn\ z}$ (BGC)	M_{0x}	M_{0y}	M_{0z}
S15BS	4,6	5,7	9,8	32	15	15	40	19	19	68	32	32
S15BN	9,3	11,5	19,6	65	56	56	80	69	69	136	117	117
S15BL	11,3	13,9	23,7	78	81	81	96	99	99	164	169	169
S20BS	7,4	9,1	15,7	69	30	30	85	37	37	146	64	64
S20BN	14,3	17,7	30,5	134	103	103	165	128	128	285	220	220
S25BS	10,3	12,7	21,0	110	50	50	136	61	61	225	101	101
S25BN	20,1	24,8	41,1	215	172	172	265	212	212	440	352	352
X25BN	20,1	24,8	41,1	215	172	172	265	212	212	440	352	352
X25BL	25,9	31,9	52,8	278	279	279	342	343	343	566	568	568
X25BE	29,2	36,0	63,3	313	378	378	386	466	466	679	819	819
S30BS	14,7	18,2	27,0	191	82	82	236	101	101	350	150	150
S30BN	29,7	36,7	54,6	384	300	300	475	370	370	706	551	551
S30BL	38,5	47,5	70,7	498	447	447	615	552	552	915	821	821
S30BE	42,9	52,9	86,7	555	661	661	685	815	815	1122	1336	1336
S35BS	21,2	26,2	40,7	335	140	140	414	173	173	643	269	269
S35BN	42,4	52,3	81,1	670	508	508	827	627	627	1282	972	972
S35BL	52,9	65,4	101,4	836	728	728	1033	900	900	1602	1396	1396
S35BE	58,3	71,9	125,3	922	1064	1064	1137	1312	1312	1981	2286	2286
S45BN	58,0	71,6	108,9	1225	812	812	1512	1002	1002	2300	1524	1524
S45BL	69,0	85,1	129,5	1458	1131	1131	1798	1394	1394	2736	2122	2122
S45BE	79,7	98,4	163,3	1683	1649	1649	2078	2036	2036	3449	3379	3379
S55BN	69,8	86,2	133,4	1728	1206	1206	2134	1489	1489	3303	2304	2304
S55BL	94,2	116,3	178,9	2332	2159	2159	2879	2666	2666	4428	4101	4101
S55BE	127,7	157,7	253,6	3162	3252	3252	3905	4016	4016	6279	6458	6458

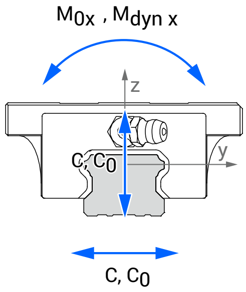
Guide block design properties:
Low assmebly and high assembly height (S and H)
Short, standard, long and extra long types with flange (FS, FN, FL, FE)
Standard sealing option with end seals

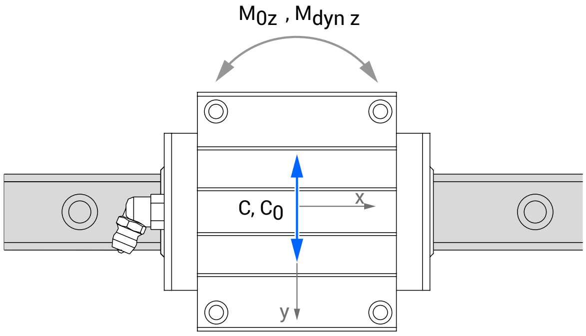


	Assembly [mm]				Block [mm]										Rail [mm]						Block	Rail
Model	H	W	W2	E	L	B	J	MQ	l	L1	Oil H	T1	N	W1	H1	F	d	D	h	kg	kg/m
H15FN	24	47	16,0	3,4	58,6	38	30	M5	7,5	40,2	M4x0,7	5,5	(5,7)	15	13,0	60	4,5	7,5	5,5	0,21	1,28
H15FL	24	47	16,0	3,4	66,1	38	30	M5	7,5	47,7	M4x0,7	5,5	(5,7)	15	13,0	60	4,5	7,5	5,5	0,23	1,28
S15FS	24	52	18,5	3,4	40,6	41	-	M5	7,5	22,2	M4x0,7	5,5	(5,7)	15	13,0	60	4,5	7,5	5,5	0,12	1,28
S15FN	24	52	18,5	3,4	58,6	41	26	M5	7,5	40,2	M4x0,7	5,5	(5,7)	15	13,0	60	4,5	7,5	5,5	0,19	1,28
H20FN	30	63	21,5	4,5	70,1	53	40	M6	9,0	48,5	M6x1,0	7,1	(12,3)	20	16,3	60	6,0	9,5	8,5	0,40	2,15
H20FL	30	63	21,5	4,5	82,9	53	40	M6	9,0	61,3	M6x1,0	7,1	(12,3)	20	16,3	60	6,0	9,5	8,5	0,46	2,15
H20FE*	30	63	21,5	4,5	98,1	53	40	M6	9,0	76,5	M6x1,0	7,1	(12,3)	20	16,3	60	6,0	9,5	8,5	0,61	2,15
S20FS*	28	59	19,5	4,5	49,1	49	-	M6	7,0	27,5	M6x1,0	5,1	(12,3)	20	16,3	60	6,0	9,5	8,5	0,18	2,15
S20FN	28	59	19,5	4,5	70,1	49	32	M6	7,0	48,5	M6x1,0	5,1	(12,3)	20	16,3	60	6,0	9,5	8,5	0,31	2,15
H25FN	36	70	23,5	5,8	79,2	57	45	M8	10,1	57,5	M6x1,0	10,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,57	2,88
H25FL	36	70	23,5	5,8	93,9	57	45	M8	10,1	72,2	M6x1,0	10,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,72	2,88
H25FE*	36	70	23,5	5,8	108,6	57	45	M8	10,1	86,9	M6x1,0	10,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,89	2,88
S25FS*	33	73	25,0	5,8	54,0	60	-	M8	7,1	32,3	M6x1,0	7,2	(12,3)	23	19,2	60	7,0	11,0	9,0	0,33	2,88
S25FN*	33	73	25,0	5,8	79,2	60	35	M8	7,1	57,5	M6x1,0	7,2	(12,3)	23	19,2	60	7,0	11,0	9,0	0,50	2,88
H30FS*	42	90	31,0	7,0	64,2	72	-	M10	12,0	37,2	M6x1,0	10,0	(11,7)	28	22,8	80	9,0	14,0	12,0	0,80	4,45
H30FN	42	90	31,0	7,0	94,8	72	52	M10	12,0	67,8	M6x1,0	10,0	(11,7)	28	22,8	80	9,0	14,0	12,0	1,10	4,45
H30FL	42	90	31,0	7,0	105,0	72	52	M10	12,0	78,0	M6x1,0	10,0	(11,7)	28	22,8	80	9,0	14,0	12,0	1,34	4,45
H30FE*	42	90	31,0	7,0	130,5	72	52	M10	12,0	103,5	M6x1,0	10,0	(11,7)	28	22,8	80	9,0	14,0	12,0	1,66	4,45
H35FS*	48	100	33,0	7,5	75,5	82	-	M10	14,0	44,5	M6x1,0	11,5	(11,5)	34	26,0	80	9,0	14,0	12,0	1,00	6,25
H35FN	48	100	33,0	7,5	111,5	82	62	M10	14,0	80,5	M6x1,0	11,5	(11,5)	34	26,0	80	9,0	14,0	12,0	1,50	6,25
H35FL	48	100	33,0	7,5	123,5	82	62	M10	14,0	92,5	M6x1,0	11,5	(11,5)	34	26,0	80	9,0	14,0	12,0	1,90	6,25
H35FE*	48	100	33,0	7,5	153,5	82	62	M10	14,0	122,5	M6x1,0	11,5	(11,5)	34	26,0	80	9,0	14,0	12,0	2,54	6,25
H45FN	60	120	37,5	8,9	129,0	100	80	M12	16,0	94,0	M8x1,25	14,4	(10,8)	45	31,1	105	14,0	20,0	17,0	2,27	9,60
H45FL	60	120	37,5	8,9	145,0	100	80	M12	16,0	110,0	M8x1,25	14,4	(10,8)	45	31,1	105	14,0	20,0	17,0	2,68	9,60
H45FE*	60	120	37,5	8,9	174,0	100	80	M12	16,0	139,0	M8x1,25	14,4	(10,8)	45	31,1	105	14,0	20,0	17,0	3,42	9,60
H55FN*	70	140	43,5	12,7	155,0	116	95	M14	19,0	116,0	M8x1,25	14,0	(10,8)	53	38,0	120	16,0	23,0	20,0	3,44	13,80
H55FL	70	140	43,5	12,7	193,0	116	95	M14	19,0	154,0	M8x1,25	14,0	(10,8)	53	38,0	120	16,0	23,0	20,0	4,63	13,80
H55FE	70	140	43,5	12,7	210,0	116	95	M14	19,0	171,0	M8x1,25	14,0	(10,8)	53	38,0	120	16,0	23,0	20,0	5,16	13,80

* On request

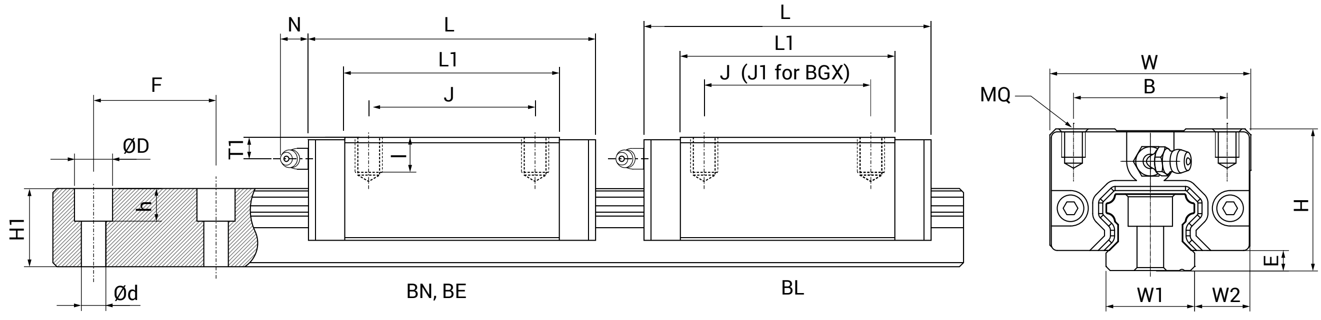






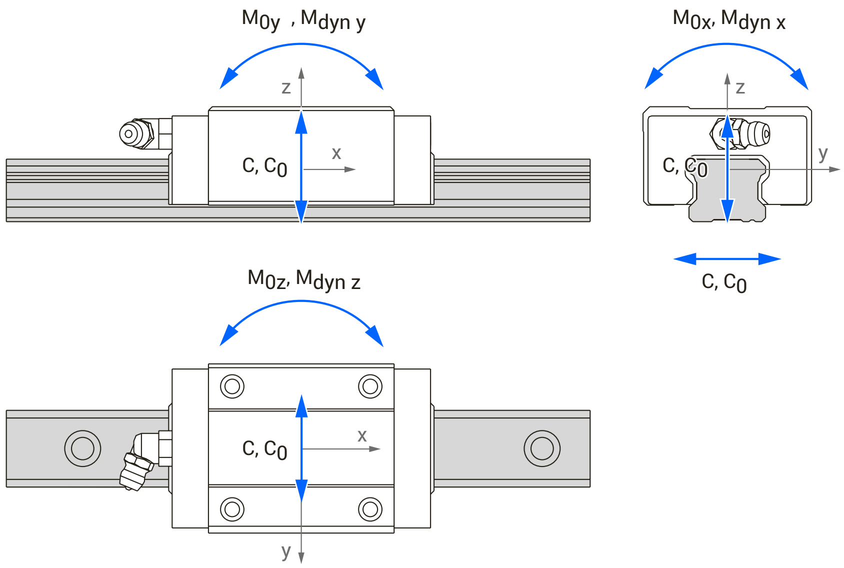
	Basic dynamic load rating [kN]		Basic static load rating [kN]	Permissible dynamic moment [Nm]						Permissible static moment [Nm]		
Model	**C (BGX)**	**C (BGC)**	**C_0**	**$M_{dyn\,x}$ (BGX)**	**$M_{dyn\,y}$ (BGX)**	**$M_{dyn\,z}$ (BGX)**	**$M_{dyn\,x}$ (BGC)**	**$M_{dyn\,y}$ (BGC)**	**$M_{dyn\,z}$ (BGC)**	**M_{0x}**	**M_{0y}**	**M_{0z}**
H15FN	9,3	11,5	19,6	65	56	56	80	69	69	136	117	117
H15FL	11,3	13,9	23,7	78	81	81	96	99	99	164	169	169
S15FS	4,6	5,7	9,8	32	15	15	40	19	19	68	32	32
S15FN	9,3	11,5	19,6	65	56	56	80	69	69	136	117	117
H20FN	14,3	17,7	30,5	134	103	103	165	128	128	285	220	220
H20FL	18,6	23,0	39,5	174	170	170	215	210	210	369	361	361
H20FE	22,1	27,3	48,9	206	252	252	255	311	311	456	557	557
S20FS	7,4	9,1	15,7	106	48	48	130	59	59	225	101	101
S20FN	14,3	17,7	30,5	134	103	103	165	128	128	285	220	220
H25FN	20,1	24,8	41,1	215	172	172	265	212	212	440	352	352
H25FL	25,9	31,9	52,8	278	279	279	342	343	343	566	568	568
H25FE	29,2	36,0	63,3	313	378	378	386	466	466	679	819	819
S25FS	10,3	12,7	21,0	110	50	50	136	61	61	225	101	101
S25FN	20,1	24,8	41,1	215	172	172	265	212	212	440	352	352
H30FS	14,7	18,2	27,0	191	82	82	236	101	101	350	150	150
H30FN	29,7	36,7	54,6	384	300	300	475	370	370	706	551	551
H30FL	38,5	47,5	70,7	498	447	447	615	552	552	915	821	821
H30FE	42,9	52,9	86,7	555	661	661	685	815	815	1122	1336	1336
H35FS	21,2	26,2	40,7	335	140	140	414	173	173	643	269	269
H35FN	42,4	52,3	81,1	670	508	508	827	627	627	1282	972	972
H35FL	52,9	65,4	101,4	836	728	728	1033	900	900	1602	1396	1396
H35FE	58,3	71,9	125,3	922	1064	1064	1137	1312	1312	1981	2286	2286
H45FN	58,0	71,6	108,9	1225	812	812	1512	1002	1002	2300	1524	1524
H45FL	69,0	85,1	129,5	1458	1131	1131	1798	1394	1394	2736	2122	2122
H45FE	79,7	98,4	163,3	1683	1649	1649	2078	2036	2036	3449	3379	3379
H55FN	69,8	86,2	133,4	1728	1206	1206	2134	1489	1489	3303	2304	2304
H55FL	94,2	116,3	178,9	2332	2159	2159	2879	2666	2666	4428	4101	4101
H55FE	127,7	157,7	253,6	3162	3252	3252	3905	4016	4016	6279	6458	6458

Guide block design properties:
High assembly height (H)
Standard, long and extra long types with no flange (BN, BL, BE)
Standard sealing option with end seals



	Assembly [mm]				Block [mm]										Rail [mm]						Block	Rail
Model	H	W	W2	E	L	B	J**	J1**	MQ	l	L1	Oil H	T1	N	W1	H1	F	d	D	h	kg	kg/m
H15BN	28	34	9,5	3,4	58,6	26	26	-	M4	6,0	40,2	M4x0,7	9,5	(5,7)	15	13,0	60	4,5	7,5	5,5	0,19	1,28
H20BN	30	44	12,0	4,5	70,1	32	36	-	M5	6,5	48,5	M6x1,0	7,1	(12,3)	20	16,3	60	6,0	9,5	8,5	0,31	2,15
H20BL	30	44	12,0	4,5	82,9	32	36	50	M5	6,5	61,3	M6x1,0	7,1	(12,3)	20	16,3	60	6,0	9,5	8,5	0,36	2,15
H20BE	30	44	12,0	4,5	98,1	32	50	-	M5	6,5	76,5	M6x1,0	7,1	(12,3)	20	16,3	60	6,0	9,5	8,5	0,47	2,15
H25BN	40	48	12,5	5,8	79,2	35	35	-	M6	9,0	57,5	M6x1,0	14,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,45	2,88
H25BL	40	48	12,5	5,8	93,9	35	35	50	M6	9,0	72,2	M6x1,0	14,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,66	2,88
H25BE	40	48	12,5	5,8	108,6	35	50	-	M6	9,0	86,9	M6x1,0	14,2	(12,2)	23	19,2	60	7,0	11,0	9,0	0,80	2,88
H30BN	45	60	16,0	7,0	94,8	40	40	-	M8	12,0	67,8	M6x1,0	13,0	(11,7)	28	22,8	80	9,0	14,0	12,0	0,91	4,45
H30BL	45	60	16,0	7,0	105,0	40	40	60	M8	12,0	78,0	M6x1,0	13,0	(11,7)	28	22,8	80	9,0	14,0	12,0	1,04	4,45
H30BE*	45	60	16,0	7,0	130,5	40	60	-	M8	12,0	103,5	M6x1,0	13,0	(11,7)	28	22,8	80	9,0	14,0	12,0	1,36	4,45
H35BN	55	70	18,0	7,5	111,5	50	50	-	M8	12,0	80,5	M6x1,0	18,5	(11,5)	34	26,0	80	9,0	14,0	12,0	1,50	6,25
H35BL	55	70	18,0	7,5	123,5	50	50	72	M8	12,0	92,5	M6x1,0	18,5	(11,5)	34	26,0	80	9,0	14,0	12,0	1,80	6,25
H35BE*	55	70	18,0	7,5	153,5	50	72	-	M8	12,0	122,5	M6x1,0	18,5	(11,5)	34	26,0	80	9,0	14,0	12,0	2,34	6,25
H45BN	70	86	20,5	8,9	129,0	60	60	-	M10	18,0	94,0	M8x1,25	24,4	(10,8)	45	31,1	105	14,0	20,0	17,0	2,28	9,60
H45BL	70	86	20,5	8,9	145,0	60	60	80	M10	18,0	110,0	M8x1,25	24,4	(10,8)	45	31,1	105	14,0	20,0	17,0	2,67	9,60
H45BE*	70	86	20,5	8,9	174,0	60	80	-	M10	18,0	139,0	M8x1,25	24,4	(10,8)	45	31,1	105	14,0	20,0	17,0	3,35	9,60
H55BN	80	100	23,5	12,7	155,0	75	75	-	M12	22,0	116,0	M8x1,25	24,0	(10,8)	53	38,0	120	16,0	23,0	20,0	3,42	13,80
H55BL*	80	100	23,5	12,7	193,0	75	75	95	M12	22,0	154,0	M8x1,25	24,0	(10,8)	53	38,0	120	16,0	23,0	20,0	4,57	13,80
H55BE*	80	100	23,5	12,7	210,0	75	95	-	M12	22,0	171,0	M8x1,25	24,0	(10,8)	53	38,0	120	16,0	23,0	20,0	5,08	13,80

* On request
** Dimension J is valied for BGC types and J1 for BGX types.



	Basic dynamic load rating [kN]		Basic static load rating [kN]	Permissible dynamic moment [Nm]						Permissible static moment [Nm]		
Model	C (BGX)	C (BGC)	C_0	$M_{dyn\,x}$ (BGX)	$M_{dyn\,y}$ (BGX)	$M_{dyn\,z}$ (BGX)	$M_{dyn\,x}$ (BGC)	$M_{dyn\,y}$ (BGC)	$M_{dyn\,z}$ (BGC)	M_{0x}	M_{0y}	M_{0z}
H15BN	9,3	11,5	19,6	65	56	56	80	69	69	136	117	117
H20BN	14,3	17,7	30,5	134	103	103	165	128	128	285	220	220
H20BL	18,6	23,0	39,5	174	170	170	215	210	210	369	361	361
H20BE	22,1	27,3	48,9	206	252	252	255	311	311	456	557	557
H25BN	20,1	24,8	41,1	215	172	172	265	212	212	440	352	352
H25BL	25,9	31,9	52,8	278	279	279	342	343	343	566	568	568
H25BE	29,2	36,0	63,3	313	378	378	386	466	466	679	819	819
H30BN	29,7	36,7	54,6	384	300	300	475	370	370	706	551	551
H30BL	38,5	47,5	70,7	498	447	447	615	552	552	915	821	821
H30BE	42,9	52,9	86,7	555	661	661	685	815	815	1122	1336	1336
H35BN	42,4	52,3	81,1	670	508	508	827	627	627	1282	972	972
H35BL	52,9	65,4	101,4	836	728	728	1033	900	900	1602	1396	1396
H35BE	58,3	71,9	125,3	922	1064	1064	1137	1312	1312	1981	2286	2286
H45BN	58,0	71,6	108,9	1225	812	812	1512	1002	1002	2300	1524	1524
H45BL	69,0	85,1	129,5	1458	1131	1131	1798	1394	1394	2736	2122	2122
H45BE	79,7	98,4	163,3	1683	1649	1649	2078	2036	2036	3449	3379	3379
H55BN	69,8	86,2	133,4	1728	1206	1206	2134	1489	1489	3303	2304	2304
H55BL	94,2	116,3	178,9	2332	2159	2159	2879	2666	2666	4428	4101	4101
H55BE	127,7	157,7	253,6	3162	3252	3252	3905	4016	4016	6279	6458	6458

How to order

GUIDE RAIL

BGR - 25 - N - 550 - 40 / G30

Rail type:
- **BGR:** Standard rail
- **BGRC:** Tapped hole rail

Size:
- 15, 20, 25, 30, 35, 45, 55

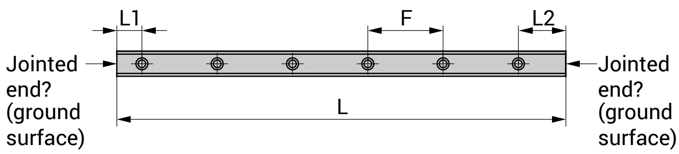
Accuracy class:
- **N:** Normal
- **H:** High

Rail length L [mm]

Starting hole pitch L1 [mm]

End hole pitch L2 [mm]
End hole pitch L2 is calculated based on L, L1 and pitch F

Jointed end:
- **Leave blank:** Without jointed end
- **G:** Jointed end (ground surface)



Unit: [mm]

Size	15	20	25	30	35	45	55
Pitch	60	60	60	80	80	105	120
L1, L2min	5	6	7	8	8	11	13
L1, L2max	55	54	53	72	72	94	107
Lmax	3940	3940	3940	3920	3920	3895	3880

GUIDE BLOCK

BGCH - 25 - BL -   - Z1 - N

Block type:
- **BGX:** Non-cage
- **BGC:** Cage

Assembly height:
- **H:** Heigh assembly
- **S:** Heigh assembly
- **X:** Special assembly

Size:
- 15, 20, 25, 30, 35, 45, 55

Type of flange and lenght:
- **BN:** No flange / standard
- **BL:** No flange / long
- **BE:** No flange / extra long
- **BS:** No flange / short
- **FN:** Flange / standard
- **FL:** Flange / long
- **FE:** Flange / extra long
- **FS:** Flange / short

Seal combination:
- **Leave blank:** With standard end + side seals
- **SS:** With standard end + side + inner seals

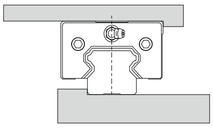
Preload:
- **Z1:** Light preload

Accuracy class:
- **N:** Normal
- **H:** High

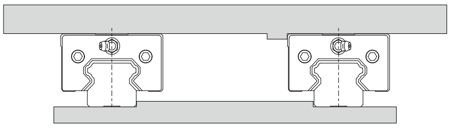
Mounting of the linear guide

COMMON MOUNTING STYLES

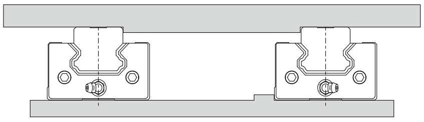
Rail with block:



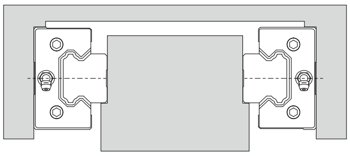
Two rails with mobile block:



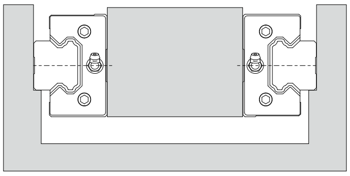
Two rails with permanently installed block:



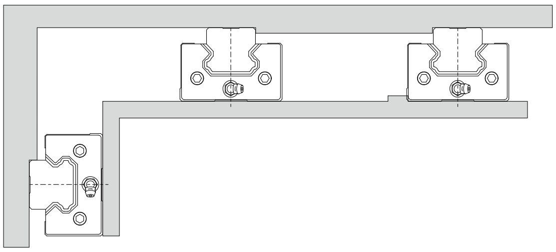
Two external blocks:



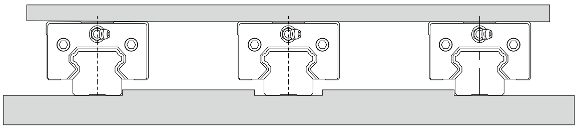
Two internal blocks:



Three rails with permanently installed block:



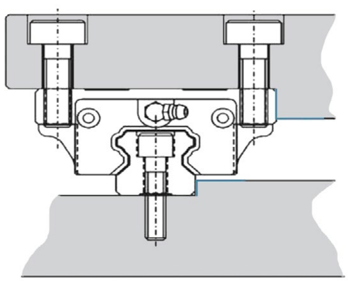
Three rails with mobile block:



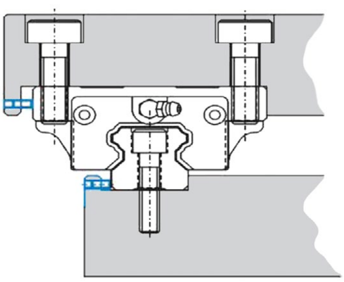
COMMON SECURING STYLES

In the case of presence of the vibrations, impacts or lateral loads, guide block or rail can be moved in the lateral direction (the required accuracy may be lost). To avoid mentioned problem the guide blocks and rails need to be secured. In the following five recommended styles for securing the guide blocks or rails are presented.

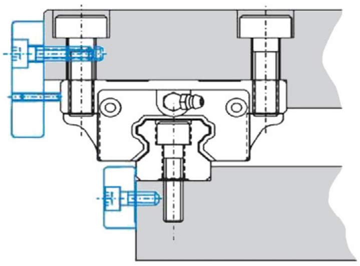
Securing with reference edge



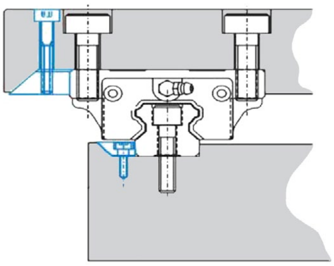
Securing with clamping screws



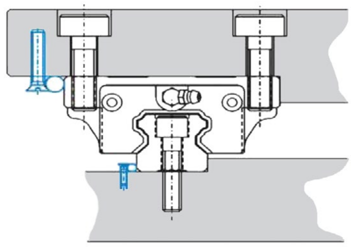
Securing with clamping plate



Securing with clamping strip

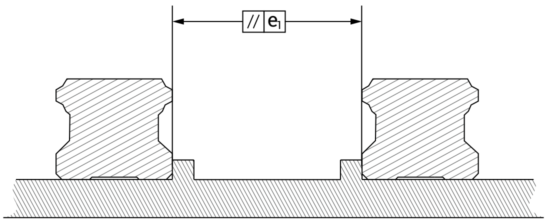


Securing with needle rollers



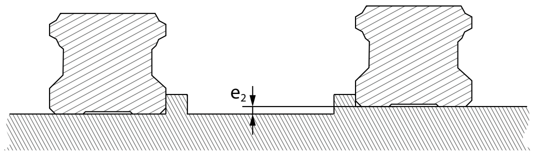
PERMISSIBLE MOUNTING SURFACE TOLERANCES

Parallelism tolerance between two rails e_1



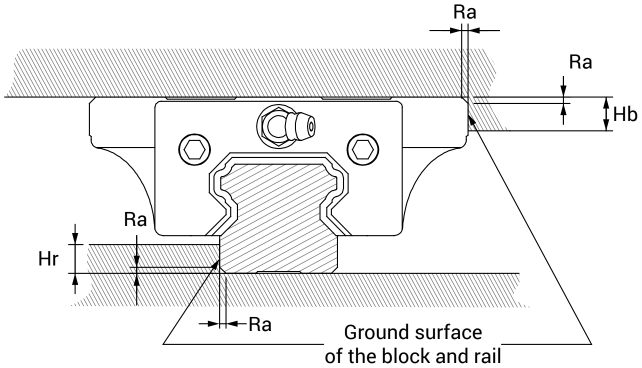
Rail size	e_1 [µm]				
	Preload				
	Z3	Z2	Z1	Z0	ZF
BG 15			18	25	35
BG 20		18	20	25	35
BG 25	15	20	22	30	42
BG 30	20	27	30	40	55
BG 35	22	30	35	50	68
BG 45	25	35	40	60	85
BG 55	30	45	50	70	95

Height tolerance between two rails e_2



Rail size	e_2 [µm]				
	Preload				
	Z3	Z2	Z1	Z0	ZF
BG 15			85	130	190
BG 20		50	85	130	190
BG 25	60	70	85	130	195
BG 30	80	90	110	170	250
BG 35	100	120	150	210	290
BG 45	100	140	170	250	350
BG 55	125	170	210	300	420

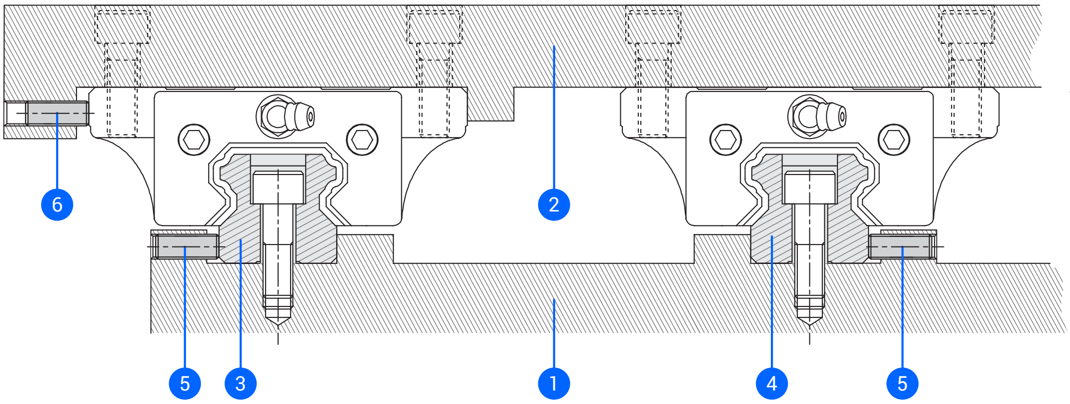
REFERENCE EDGES DIMENSIONS



Rail size	Maximum fillet radius Ra [mm]	Maximum height (rail) Hr [mm]	Maximum height (block) Hb [mm]
BG 15	0.6	3.1	5
BG 20	0.9	4.3	6
BG 25	1.1	5.6	7
BG 30	1.4	6.8	8
BG 35	1.4	7.3	9
BG 45	1.6	8.7	12
BG 55	1.6	11.8	17

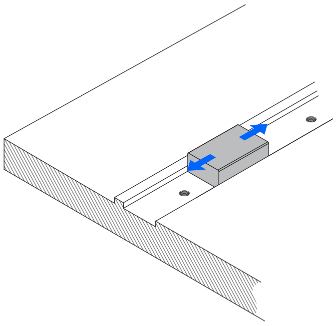
MOUNTING PROCEDURE

A typical example of application where two rails arranged in parallel are taken into consideration is presented in the figure below.

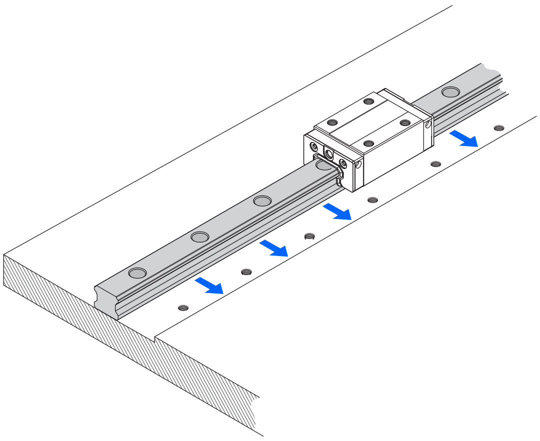


1 – Base
2 – Plate
3 – Reference rail
4 – Following rail
5 – Clamping screw of the rail
6 – Clamping screw of the block

Mounting of the rails

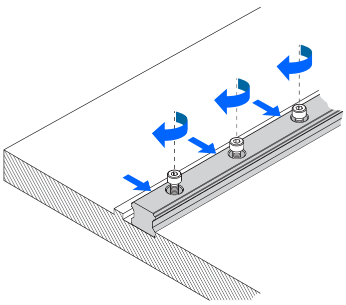


Step 1:
Clean up all the burrs and contamination particles from the surface of the base using the oilstone.

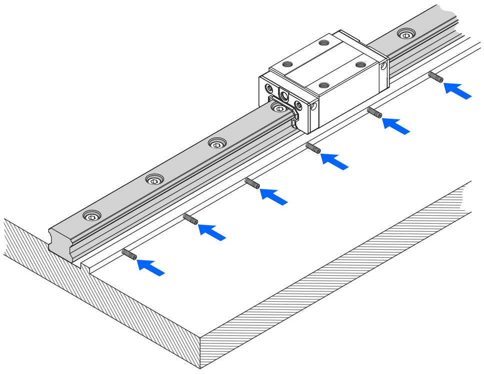


Step 2:
Place the reference rail gently on the surface of the base and align it with the reference edge.

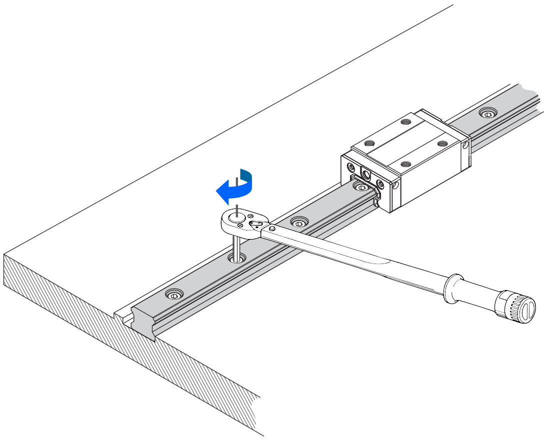
Make sure, that the reference edge and ground surface of the rail are in contact.



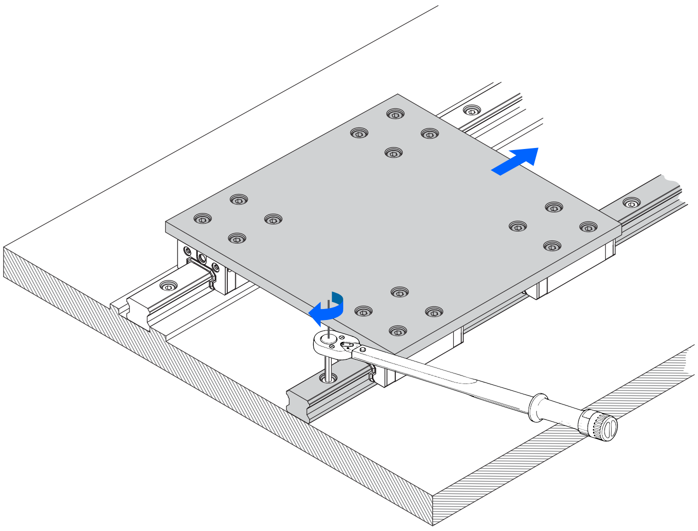
Step 3:
During the aligning, place the screws in the screw holes of the rail and tighten them slightly in the sequence from the center of the rail to the both ends.



Step 4:
Tighten the clamping screws in the sequence from the center of the rail to the both ends to achieve a good contact between rail and the reference edge.



Step 5:
Tighten the rail screws using the torque wrench (in the sequence from the center of the rail to the both ends). For the tightening torques of the screws please refer to the following table, where 12.9 property class of the screws and different material of the base are taken into consideration.

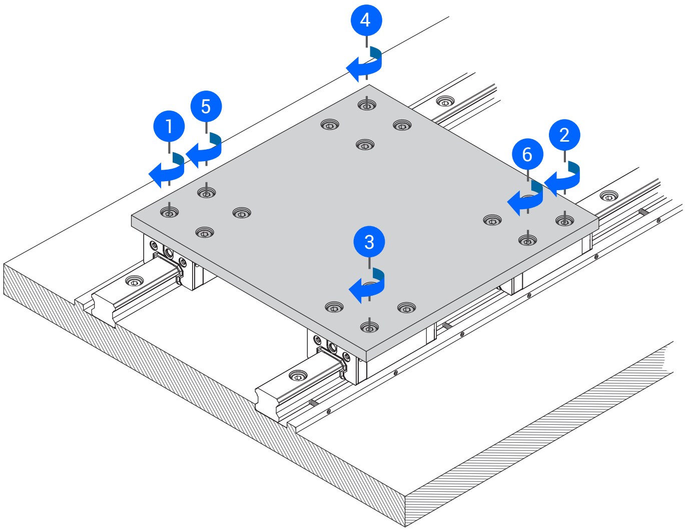


Step 6:
If there is a reference edge prepared for mounting of the following rail on the base than the following rail is mounted in the same way as the reference one.
Otherwise, the plate needs to be mounted on two blocks placed on the reference rail and on one block placed in the following rail first. Than during the moving of the plate from one end of the rails to other tighten the rail screws of the following rail.

The following rail can be also mounted using a gauge system, where the correct position of the following rail is established according to the position of the reference one.

Mounting of the plate

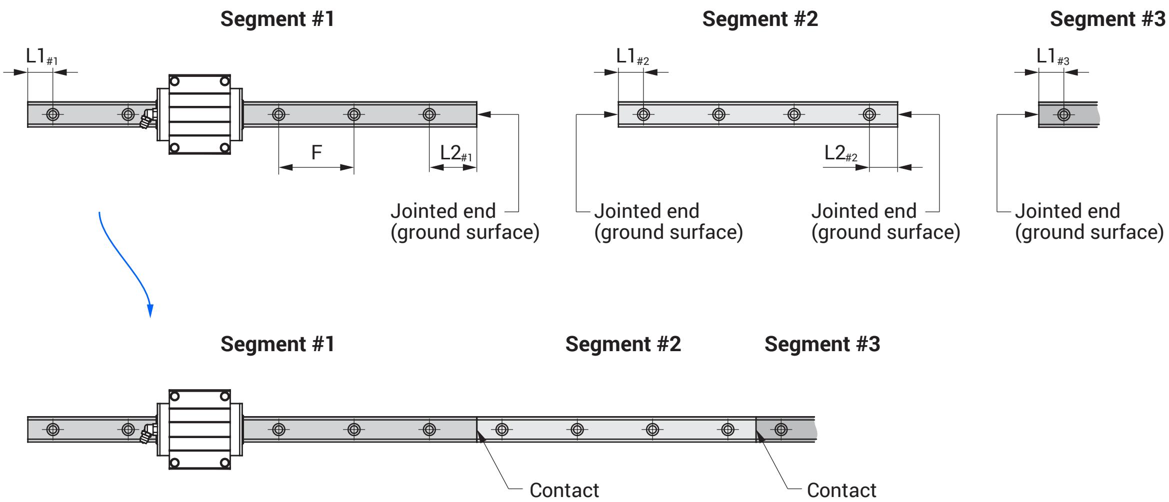
Place the plate carefully on the blocks of both rails. Align the plate to its reference edge and tighten the plate screws slightly. Tighten the clamping screws to achieve a good contact between reference edge and ground surface of the blocks. Finally, tighten the plate screws in the sequence presented in the figure below.



Screw size	Recommended tightening torque for the screws [Nm] (12.9 property class)		
	Steel	Cast Iron	Aluminum alloy
M 3	2	1,3	1
M 4	4	3	2
M 5	9	6	4
M 6	14	9	7
M 8	30	20	15
M 10	70	45	35
M 12	120	80	60
M 14	160	110	80
M 16	200	130	100

JOINTED RAIL

Rails can be assembled by several segments to achieve the desired length. Jointed rails must be assembled correctly, where the contact of ground ends of both jointed rail segments is ensured. In the case of ordering jointed rails each rail segment must be ordered separately, where the jointed segment's end must be clearly specified, please see the following figure and the ordering code.



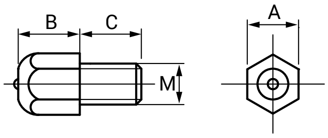
F	Pitch	[mm]
L1	Starting hole pitch	[mm]
L2	End hole pitch	[mm]

Accessories

GREASE FITTINGS

NGS series

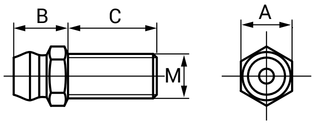
Grease nipple with 0 ° angle



Dimensions [mm]				
Type	A	B	C	M
NGS01	5	6	3,5	M4x0,7
NGS02*	5	6	6	M4x0,7
NGS03	5	6	9	M4x0,7

* Standard fitting

Suitability					
Block size	UU	ZZ	DD	KK	Side mounting
15	NGS02	NGS03	NGS03	NGS03	NGS01



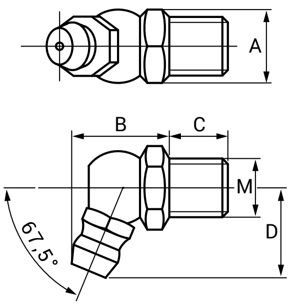
For the case of NGS04, 05, 06, 07 and 08

Dimensions [mm]				
Type	A	B	C	M
NGS04	8	7,3	5	M6x1,0
NGS05	8	7,3	7	M6x1,0
NGS06	8	7,3	12	M6x1,0
NGS07	10	10,2	8	M8x1,25
NGS08	10	10,2	12	M8x1,25

Suitability					
Block size	UU	ZZ	DD	KK	Side mounting
20	NGS05	NGS05	NGS05	NGS06	NGS04
25	NGS05	NGS05	NGS05	NGS06	NGS04
30	NGS05	NGS05	NGS06	NGS06	NGS05
35	NGS05	NGS05	NGS06	NGS06	NGS05
45	NGS07	NGS07	NGS08	NGS08	NGS07
55	NGS07	NGS07	NGS08	NGS08	NGS07

NGX series

Grease nipple with 67,5 ° angle



Dimensions [mm]					
Type	A	B	C	D	M
NGX01	8	13,5	5	11,4	M6x1,0
NGX02*	8	13,5	7	11,4	M6x1,0
NGX03	8	13,5	12	11,4	M6x1,0
NGX04*	10	13,3	8	12,3	M8x1,25
NGX05	10	13,3	12	12,3	M8x1,25

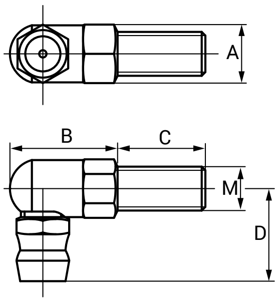
* Standard fitting

Suitability					
Block size	UU	ZZ	DD	KK	Side ** mounting
20	NGX02	NGX02	NGX02	NGX03	NGX01
25	NGX02	NGX02	NGX02	NGX03	NGX01
30	NGX02	NGX02	NGX03	NGX03	NGX02
35	NGX02	NGX02	NGX03	NGX03	NGX02
45	NGX04	NGX04	NGX05	NGX05	NGX04
55	NGX04	NGX04	NGX05	NGX05	NGX04

** Suitable only for the guide blocks without flange – Type of flange B

NGV series

Grease nipple with 90 ° angle



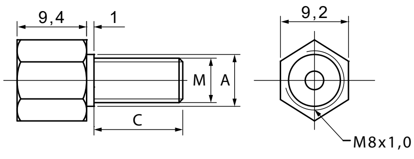
Dimensions [mm]					
Type	A	B	C	D	M
NGV01	8	14,7	5	12,7	M6x1,0
NGV02	8	14,7	7	12,7	M6x1,0
NGV03	8	14,7	12	12,7	M6x1,0
NGV04	10	12,5	8	13,0	M8x1,25
NGV05	10	12,5	12	13,0	M8x1,25

Suitability					
Block size	UU	ZZ	DD	KK	Side ** mounting
20	NGV02	NGV02	NGV02	NGV03	NGV01
25	NGV02	NGV02	NGV02	NGV03	NGV01
30	NGV02	NGX02	NGV03	NGV03	NGV02
35	NGV02	NGV02	NGV03	NGV03	NGV02
45	NGV04	NGV04	NGV05	NGV05	NGV04
55	NGV04	NGV04	NGV05	NGV05	NGV04

** Suitable only for the guide blocks without flange – Type of flange B

NSL series

Lubrication connection with 0 ° angle

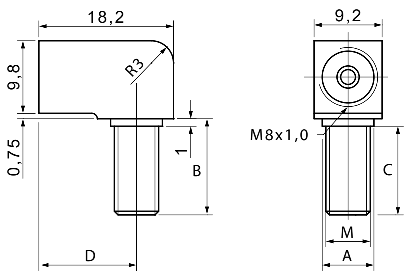


Dimensions [mm]			
Type	A	C	M
NLS01	7	5	M6x1,0
NLS02	7	7	M6x1,0
NLS03	7	12	M6x1,0
NLS04	9	8	M8x1,25
NLS05	9	12	M8x1,25

Suitability					
Block size	UU	ZZ	DD	KK	Side mounting
20	NLS02	NLS02	NLS03	NLS03	NLS01
25	NLS02	NLS02	NLS03	NLS03	NLS01
30	NLS02	NLS03	NLS03	NLS03	NLS02
35	NLS02	NLS03	NLS03	NLS03	NLS02
45	NLS04	NLS05	NLS05	NLS05	NLS04
55	NLS04	NLS05	NLS05	NLS05	NLS04

NLV series

Lubrication connection with 90 ° angle



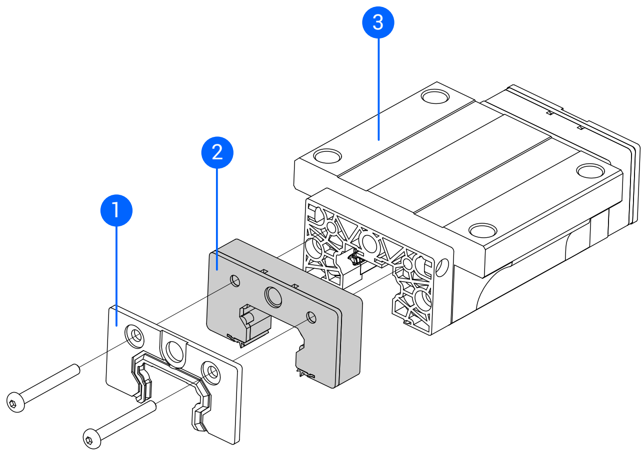
Dimensions [mm]					
Type	A	B	C	D	M
NLV01	7	6	5	13,2	M6x1,0
NLV02	7	8	7	13,2	M6x1,0
NLV03	7	13	12	13,2	M6x1,0
NLV04	9	9	8	13,2	M8x1,25
NLV05	9	13	12	13,2	M8x1,25

Suitability					
Block size	UU	ZZ	DD	KK	Side* mounting
20	NLV02	NLV02	NLV03	NLS03	NLV01
25	NLV02	NLV02	NLV03	NLS03	NLV01
30	NLV02	NLV03	NLV03	NLS03	NLV02
35	NLV02	NLV03	NLV03	NLS03	NLV02
45	NLV04	NLV05	NLV05	NLS05	NLV04
55	NLV04	NLV05	NLV05	NLS05	NLV04

* Suitable only for the guide blocks without flange – Type of flange B

LUBRICATION SYSTEM (LS)

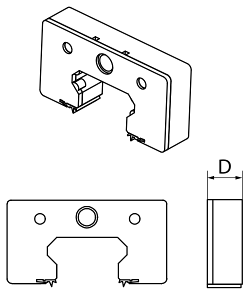
Self-lubrication system automatically spreads the lubrication oil to form the oil film all over the guide rail track surfaces to lubricate the rolling elements appropriately. Different from conventional lubrication loop, which delivers the lubrication oil directly to the rolling elements, the combination of the lubrication loop and the self-lubrication system (LS) provides more reliable lubrication.



1 – End seal
2 – Self-lubricate system (LS)
3 – Guide block

Lubrication oil of viscosity 100 ~ 400 needs to be used to ensure the expected lubrication effect.

Specifications of the self-lubrication system (LS)
In the following table the thickness of a single self-lubrication system (LS) and the capacity (volume) of the lubrication oil for all size of the guide blocks are presented.

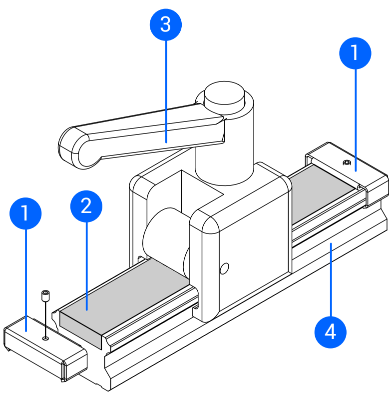


Guide block size	Thickness of a single self-lubrication system (LS) D [mm]	Volume of the lubrication oil V [cm³]
15 type	10,3	2,0
20 type	10,3	2,5
25 type	10,3	3,0
30 type	10,3	5,5
35 type	10,7	8,5
45 type	13,0	15,0
55 type	13,0	22,5

Performance of the self-lubrication system (LS)
It has been tested and proved that there was residual lubrication oil after 500 km of traveled distance if the recommended viscosity of the oil was taken into account. Here the excessive volume of the lubrication oil inside the guide block is collected by the capillary foam of the self-lubrication system.
It should be noted that the combination with all sealing options is possible, for more information please refer to Subsection **Dust protection – seal combinations**. The self-lubrication system (LS) also uses the same oil fittings as the standard guide block.

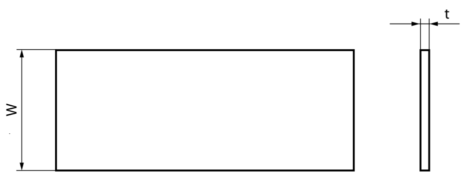
COVER STRIP

The cover strip covers the top surface of the rail to prevent the guide block from being damaged by the dust particles and chips keeping in the mounting holes of the rail. The cover strip is made of stainless steel material and is glued on the top surface of the rail. To secure the cover strip at both ends of the rail the stopper element is available, see the following figure. To mount the cover strip correctly the fixture tool is also available. Usage of the fixture tool ensures an easy, safe and accurately centered mounting of the cover strip on the top surface of the rail.



1 – Stopper
2 – Cover strip
3 – Fixture
4 – Rail

Specification of the cover strip
In the following table the width and the thickness of the cover strip for all size of the rail are presented. Length of a single stopper is also presented.



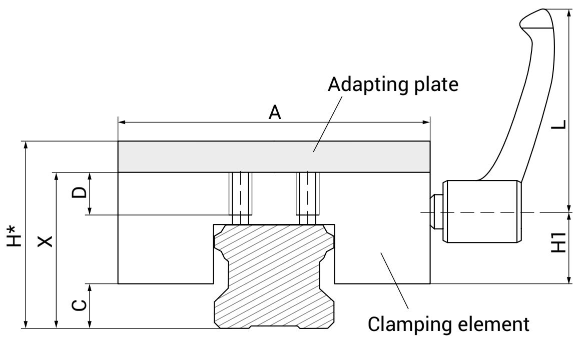
Rail size	Width W [mm]	Thickness t [mm]	Length of the stopper l [mm]
15 type	10	0,3	12,5
20 type	11	0,3	12,5
25 type	13	0,3	12,5
30 type	16	0,3	12,5
35 type	18	0,3	14,2
45 type	27	0,3	17,5
55 type	29	0,3	17,5

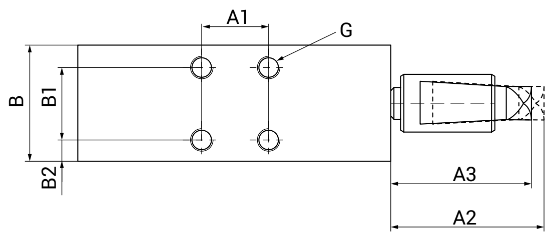
CLAMPING ELEMENT

By rotating the freely adjustable clamping lever, the contact sections are pressed synchronously against the free surfaces of section rail guide. The floating contact sections guarantee symmetrical application of force.

– Simple and safe construction
– Floating supported contact sections
– Exact positioning
– Holding force up to 2 kN
– Up to 50000 static clamping cycles
– Operating temperature between -10°C and 70°C
– Manually operated clamping element
– Not suitable for dynamic braking cycles

ℹ Adapting plate is required in some applications for height compensation of the clamping element and guide block.





Rail size	Dimensions [mm]													Fastening torque [Nm]	Holding force ** [N]
	A	A1	A2	A3	B	B1	B2	C	X	D	G	L	H1		
15 type	47	17	33,5	30,5	25	17	4,0	4,5	22	5	M4	44	12,5	5	1200
20 type	60	15	41,5	38,5	24	15	4,5	8,0	28	6	M5	63	13,0	7	1200
25 type	70	20	41,5	38,5	30	20	5,0	9,0	33	8	M6	63	15,0	7	1200
30 type	90	22	50,5	46,5	39	22	8,5	12,0	42	8	M6	78	21,5	12	2000
35 type	100	24	50,5	46,5	39	24	7,5	12,0	44	10	M8	78	21,5	12	2000
45 type	120	26	50,5	46,5	44	26	9,0	12,0	54	14	M10	78	26,5	15	2000
55 type	140	30	61,5	56,5	49	30	9,5	17,0	66	16	M14	95	31,0	17	2000

* H = assembly height of the linear guide (H)
** Tested with lighty oiled lubricating layer (ISO VG 68)

How to order

Z | BGCH25BN

Brake — Z

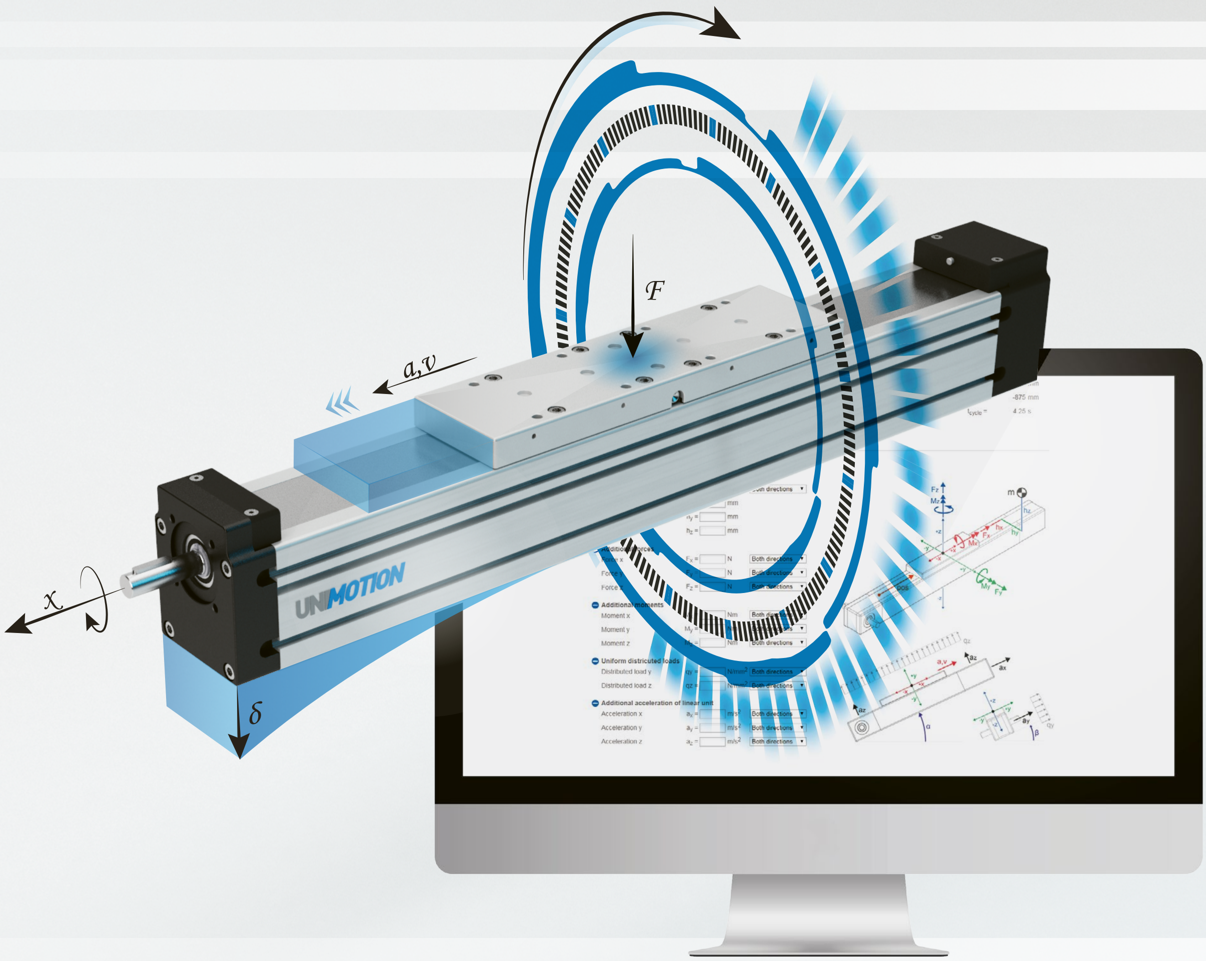
Block type — BGCH25BN

ℹ Adapting plate is included.

Subject to change without notice.

NOTES

NOTES



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