

Linear guideways

CG series

3.2 CG series

3.2.1 Properties of the CG series linear guideway

Standard series in O arrangement. The HIWIN linear guideways of the CG series with O-arrangement of the ball tracks guarantee high torque capacity, especially in the M_x direction. The modified track geometry ensures high load ratings. The new flexible end seal automatically adapts to the rail contour and ensures strong, durable dust protection. To protect against mechanical damage to the end seal, the blocks of the CG series are already equipped with a scraper in front of the end seal in the standard version.

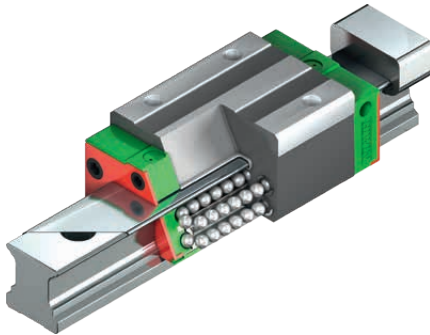
A cover strip is available as an option – dirt ingress and wear of the sealing lip are thus permanently reduced to a minimum. Thanks to the mounting aid, the cover strip can be installed in just a few steps.

For optimum lubricant distribution, the block has an additional channel that introduces the lubricant into the centre of the load-bearing zone. This ensures long relubrication intervals and offers a clear advantage, especially in short-stroke applications.

3.2.2 Layout of CG series

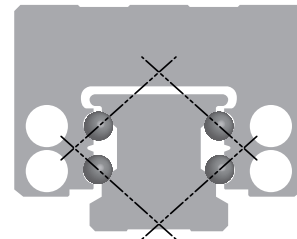
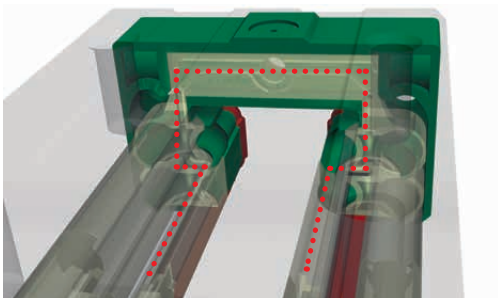
Backlash-free, four-row recirculating ball bearing guide with optimum dust protection even in the standard version.

Easy installation, better protection against dirt ingress and wear of the end seals with cover strip.



Optimised lubrication concept for long relubrication intervals and short-stroke applications.

O-arrangement with changed track geometry for high torque load and load ratings.



Advantages:

- Backlash-free
- Exchangeable
- High accuracy
- High torque capacity, special roll torque M_x
- Optionally with cover strip

3.2.3 Order codes of CG series

For CG linear guideways, there is a distinction made between assembled and non-assembled models. The dimensions of both models are the same. The main difference is that, in the unassembled models, blocks and profile rails can be freely interchanged. Block and profile rail can be ordered separately and mounted by the customer. Their accuracy reaches class P.

Order code for linear guideway (assembled)

CG	W	25	C	C	2	R	1600	ZO	H	2	SW	EC	CSS	CTS
----	---	----	---	---	---	---	------	----	---	---	----	----	-----	-----

Series: CG
Type: W: Flange block
H: High square block
L: Low square block
Size: 15, 20, 25, 30, 35, 45
Load class: C: Heavy load
H: Super heavy load
Block fastening: A: From above
C: From above or below
Number of blocks per profile rail
Profile rail mounting: R: From above
T: From below
Coating: None: No coating
CTS, CZS, CCB
Cover strip: None: Without cover strip
CSS: Cover strip with clamp (steel clamp)
CSB: Cover strip with clamp (front clamping screw)
None: Standard
EC: Long-term lubrication unit ⁴⁾
Dust protection ²⁾: None: Standard (SS)
ZZX, SW, ZWX
Rails per axis ¹⁾
Accuracy class: C, H, P, SP, UP
Preload identifier: ZO, ZA, ZB
Profile rail length [mm]

Order number of block (not assembled)

CG	W	25	C	C	ZO	H	SW	CS
----	---	----	---	---	----	---	----	----

Series: CG
Type: W: Flange block
H: High square block
L: Low square block
Size: 15, 20, 25, 30, 35, 45
Load class: C: Heavy load
H: Super heavy load
Cover strip ³⁾: None: Without cover strip
CS: With cover strip
Dust protection ²⁾: None: Standard (SS)
ZZX, SW, ZWX
Accuracy class: C, H, P
Preload identifier: ZO, ZA, ZB
Block fastening: A: From above
C: From above or below

Order number of profile rail (not assembled)

CG	R	25	R	1200	H	CSS	CTS
----	---	----	---	------	---	-----	-----

CG series
Profile rail
Size: 15, 20, 25, 30, 35, 45
Profile rail mounting: R: From above
T: From below
Coating: None: No coating
CTS, CZS, CCB
Cover strip: None: Without cover strip
CSS: Cover strip with clamp (steel clamp)
CSB: Cover strip with clamp (front clamping screw)
Accuracy class: C, H, P
Profile rail length [mm]

Note:

¹⁾ The number 2 is also a quantity indication, i.e. one piece of the article described above consists of one pair of rails.

No number is given for single profile rails. In the case of multi-part rails, the joint is offset as standard.

²⁾ An overview of the individual sealing systems can be found on Page 22

³⁾ The standard dust protection (SS) can be used for profile rails with and without cover strip.

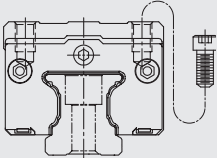
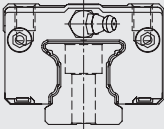
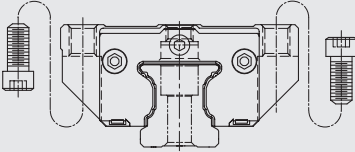
⁴⁾ Only available for sizes 15, 20 and 25.

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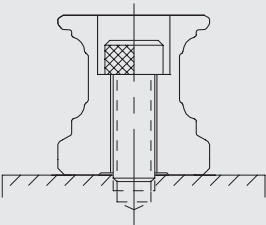
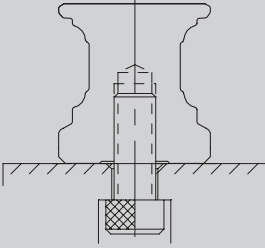
CG series

3.2.4 Block types

HIWIN offers block and flange blocks for its linear guideways. Due to the low installation height and the larger mounting surface, flange blocks are better suited for large loads.

Table 3.19 Block types				
Type	Series/size	Layout	Height [mm]	Typical applications
High square type	CGH-CA CGH-HA		28 – 70	○ Woodworking ○ Machining centres ○ NC lathes ○ Grinding machines ○ Precision milling machines ○ High performance cutting machines ○ Automation technology ○ Transport technology ○ Measuring technology ○ Machines and devices with high required positioning accuracy
Low square type	CGL-CA CGL-HA		25 – 60	
Flange type	CGW-CA CGW-HA		24 – 60	

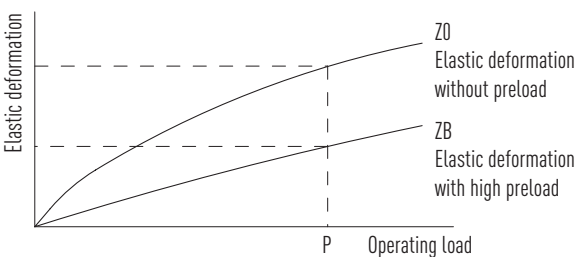
3.2.5 Profile rail types

Table 3.20 Profile rail types	
Fastening from above	Fastening from below
	
CGR_R	CGR_T

3.2.6 Preload

Definition

Each linear guideway can be preloaded via the ball size. The curve shows that the rigidity doubles at high preload. The CG series of linear guideways offers three standard preloads for different applications and conditions.



Preload identifier

Table 3.21 Preload identifier

Identifier	Preload		Application	Example applications
Z0	Slight preload	$0 - 0.02 C_{dyn}$	Constant load direction, little vibration, less accuracy required	- Transport technology - Automatic packaging machines - X-Y axis in industrial machines - Welding machines
ZA	Medium preload	$0.05 - 0.07 C_{dyn}$	High accuracy required	- Machining centres - Z axes in industrial machines - Eroding machines - NC lathes - Precision X-Y table - Measuring technology
ZB	High preload	Over $0.1 C_{dyn}$	High rigidity required, vibration and jolting	- Machining centres - Grinding machines - NC lathes - Horizontal and vertical milling machines - Z-axis of machine tools - High performance cutting machines

3.2.7 Load ratings and torques

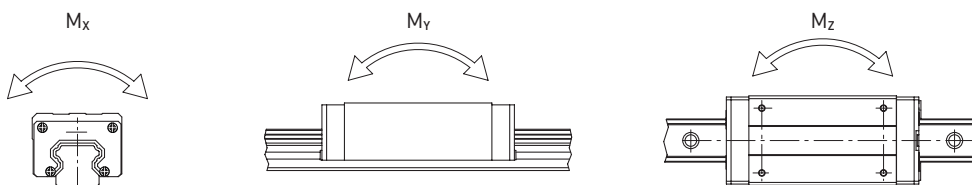


Table 3.22 Load ratings and torques for CG series

Series/Size	Dynamic load rating C_{dyn} [N] ¹⁾	Static load rating C_0 [N]	Static moment [Nm]		
			M_{0x}	M_{0y}	M_{0z}
CG_15C	14,700	19,520	190	140	140
CG_20C	23,700	30,510	370	280	280
CG_20H	28,600	39,900	480	480	480
CG_25C	34,960	43,940	600	490	490
CG_25H	40,500	54,080	740	730	730
CG_30C	46,000	55,190	950	700	700
CG_30H	58,590	78,180	1,350	1,230	1,230
CG_35C	61,170	79,300	1,730	1,090	1,090
CG_35H	77,900	112,340	2,460	2,020	2,020
CG_45C	98,430	112,660	3,560	2,350	2,350
CG_45H	125,580	159,600	5,050	4,450	4,450

¹⁾ Dynamic load rating for 50,000 m travel path

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3.2.8 Rigidity

The rigidity depends on the preload. With the formula F 3.4, the deformation can be calculated depending on the rigidity.

F 3.4

$$\delta = \frac{P}{k}$$

δ Deformation [µm]
P Operating load [N]
k Rigidity value [N/µm]

Table 3.23 Radial rigidity of CG series				
Load type	Series/ Size	Rigidity depending on the preload		
		Z0	ZA	ZB
Heavy load	CG_15C	240	290	330
	CG_20C	270	420	480
	CG_25C	340	440	570
	CG_30C	440	550	760
	CG_35C	470	610	800
	CG_45C	550	720	820
Super heavy load	CG_20H	360	470	530
	CG_25H	410	540	620
	CG_30H	490	640	730
	CG_35H	570	730	840
	CG_45H	740	960	1,100

Unit: N/µm

3.2.9 Dimensions of the CG blocks

3.2.9.1 CGH

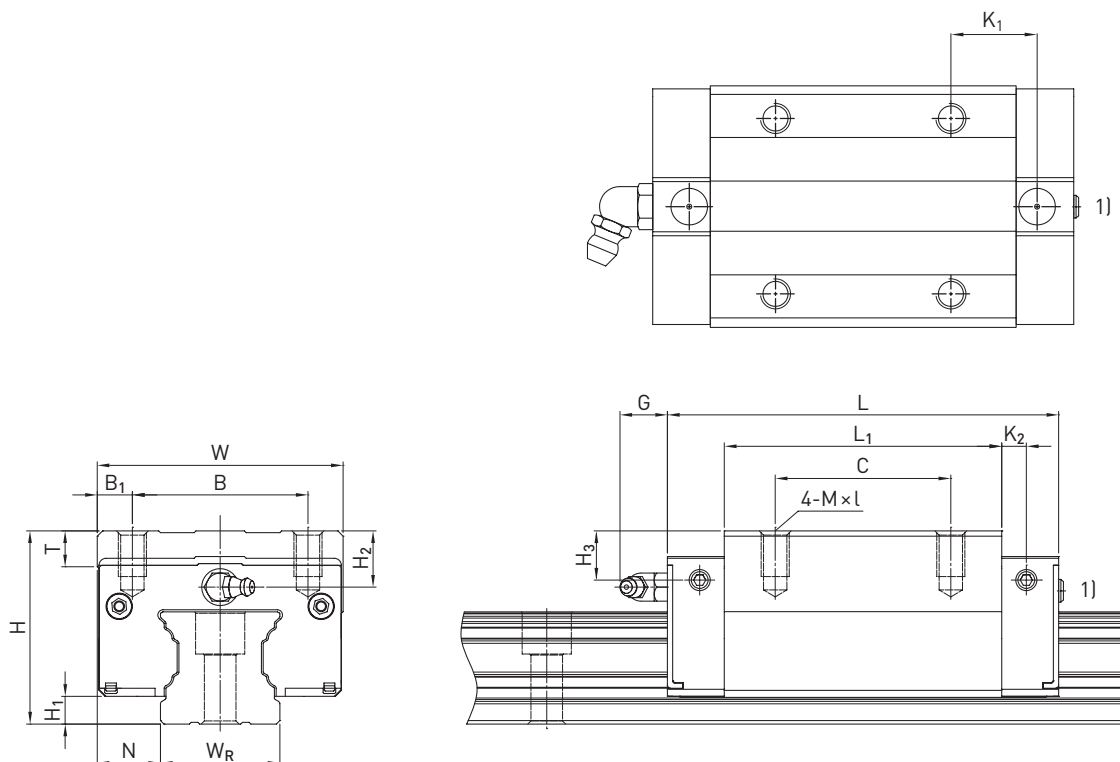


Table 3.24 Dimensions of the block

Series/size	Installation dimensions [mm]			Dimensions of the block [mm]														Load ratings [N]		Weight [kg]
	H	H ₁	N	W	B	B ₁	C	L ₁	L	K ₁	K ₂	G	M × l	T	H ₂	H ₃	C _{dyn}	C ₀		
CGH15CA	28	4.1	9.5	34	26	4.0	26	39.6	58.2	10.8	4.25	6.0	M4 × 6	6.0	7.8	7.8	14,700	19,520	0.15	
CGH20CA	30	4.6	12.0	44	32	6.0	36	52.5	74.9	12.45	5.50	6.0	M5 × 6	8.0	3.7	3.5	23,700	30,510	0.25	
CGH20HA							50	68.5	90.9	13.45							28,600	39,900	0.33	
CGH25CA	40	6.1	12.5	48	35	6.5	35	61.0	84.0	17.4	5.00	12.0	M6 × 8	8.0	10.0	9.5	34,960	43,940	0.46	
CGH25HA							50	78.4	101.4	18.6							40,500	54,080	0.59	
CGH30CA	45	7.0	16.0	60	40	10.0	40	69.0	97.4	19.75	8.70	12.0	M8 × 10	9.5	9.7	10.0	46,000	55,190	0.71	
CGH30HA							60	91.5	119.9	21							58,590	78,180	0.94	
CGH35CA	55	7.6	18.0	70	50	10.0	50	79.0	111.4	22.6	7.00	12.0	M8 × 13	10.2	16.0	14.0	61,170	79,300	1.24	
CGH35HA							72	103.4	135.8	23.8							77,900	112,340	1.62	
CGH45CA	70	9.7	20.5	86	60	13.0	60	97.2	137.6	23	8.70	12.9	M10 × 17	16.0	18.5	18.2	98,430	112,660	2.38	
CGH45HA							80	133.6	174.0	31.2							125,580	159,600	3.01	

For dimensions of the rail, see Page 58, for standard as well as optional lubrication adapter, see Page 150.

¹⁾ Flat head screw protrudes 1 mm in all sizes.

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3.2.9.2 CGL

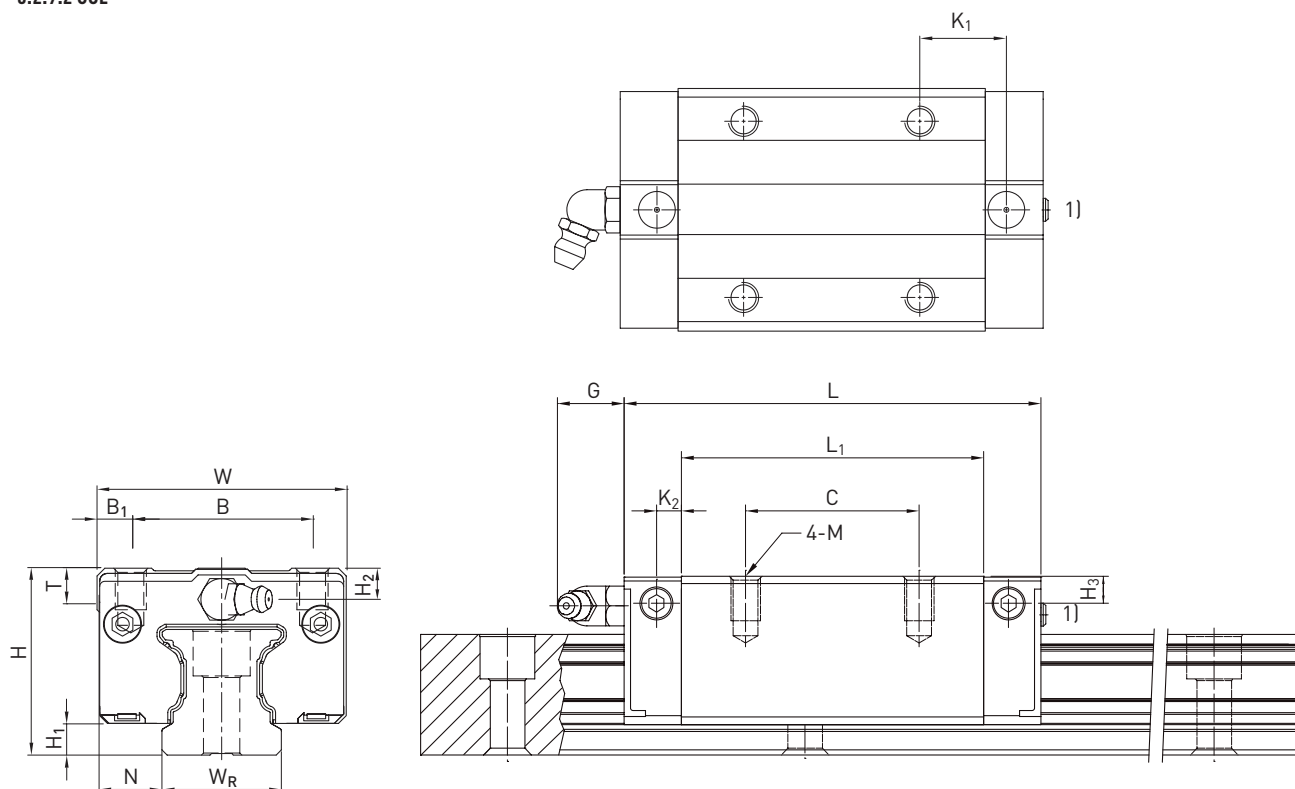


Table 3.25 Dimensions of the block

Series/size	Installation dimensions [mm]			Dimensions of the block [mm]														Load ratings [N]		Weight [kg]
	H	H ₁	N	W	B	B ₁	C	L ₁	L	K ₁	K ₂	G	M × l	T	H ₂	H ₃	C _{dyn}	C ₀		
CGL15CA	24	4.1	9.5	34	26	4.0	26	39.6	58.2	10.8	4.25	6.0	M4 × 6	6.0	3.8	3.8	14,700	19,520	0.11	
CGL25CA	36	6.1	12.5	48	35	6.5	35	61.0	84.0	17.4	5.00	12.0	M6 × 8	8.0	6.0	5.5	34,960	43,940	0.37	
CGL25HA							50	78.4	101.4	18.6										
CGL30CA	42	7.0	16.0	60	40	10.0	40	69.0	97.4	19.75	8.70	12.0	M8 × 10	9.5	6.7	7.0	46,000	55,190	0.61	
CGL30HA							60	91.5	119.9	21.0										
CGL35CA	48	7.6	18.0	70	50	10.0	50	79.0	111.4	22.6	7.00	12.0	M8 × 13	10.2	9.0	7.0	61,170	79,300	0.93	
CGL35HA							72	103.4	135.8	23.8										
CGL45CA	60	9.7	20.5	86	60	13.0	60	97.2	137.6	23.0	8.70	12.9	M10 × 17	16.0	8.5	8.1	98,430	112,660	1.72	
CGL45HA							80	133.6	174.0	31.2										

For dimensions of the rail, see Page 58, for standard as well as optional lubrication adapter, see Page 150.

¹⁾ Flat head screw protrudes 1 mm in all sizes.

3.2.9.3 CGW

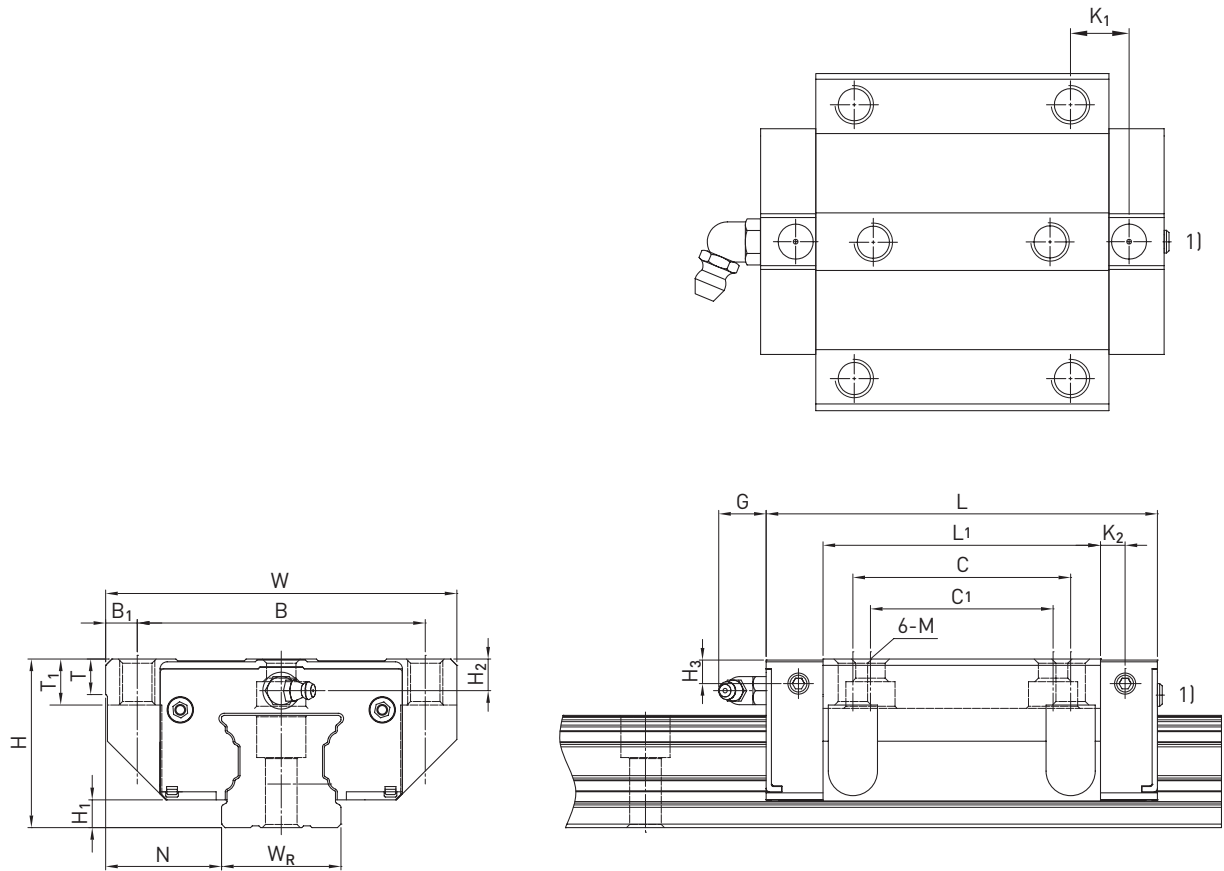


Table 3.26 Dimensions of the block

Series/size	Installation dimensions [mm]			Dimensions of the block [mm]															Load ratings [N]		Weight [kg]
	H	H ₁	N	W	B	B ₁	C	C ₁	L ₁	L	K ₁	K ₂	G	M	T	T ₁	H ₂	H ₃	C _{dyn}	C ₀	
CGW15CC	24	4.1	16.0	47	38	4.5	30	26	39.6	58.2	8.8	4.25	6.0	M5	6.0	6.5	3.8	3.8	14,700	19,520	0.14
CGW20CC	30	4.6	21.5	63	53	5.0	40	35	52.5	74.9	10.45	5.50	6.0	M6	6.5	7.7	3.7	3.5	23,700	30,510	0.36
CGW20HC									68.5	90.9	18.45								28,600	39,900	0.47
CGW25CC	36	6.1	23.5	70	57	6.5	45	40	61.0	84.0	12.4	5.00	12.0	M8	7.0	9.3	6.0	5.5	34,960	43,940	0.53
CGW25HC									78.4	101.4	21.1								40,500	54,080	0.68
CGW30CC	42	7.0	31.0	90	72	9.0	52	44	69.0	97.4	13.75	8.70	12.0	M10	10.5	12.0	6.7	7.0	46,000	55,190	0.90
CGW30HC									91.5	119.9	25.0								58,590	78,180	1.19
CGW35CC	48	7.6	33.0	100	82	9.0	62	52	79.0	111.4	16.6	7.00	12.0	M10	10.1	13.1	9.0	7.0	61,170	79,300	1.37
CGW35HC									103.4	135.8	28.8								77,900	112,340	1.79
CGW45CC	60	9.7	37.5	120	100	10.0	80	60	97.2	137.6	13.0	8.70	12.9	M12	15.1	15.0	8.5	8.1	98,430	112,660	2.45
CGW45HC									133.6	174.0	31.2								125,580	159,600	3.00

For dimensions of the rail, see Page 58, for standard as well as optional lubrication adapter, see Page 150.

¹⁾ Flat head screw protrudes 1 mm in all sizes.

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3.2.10 Dimensions of the CG rail

3.2.10.1 Dimensions CGR_R

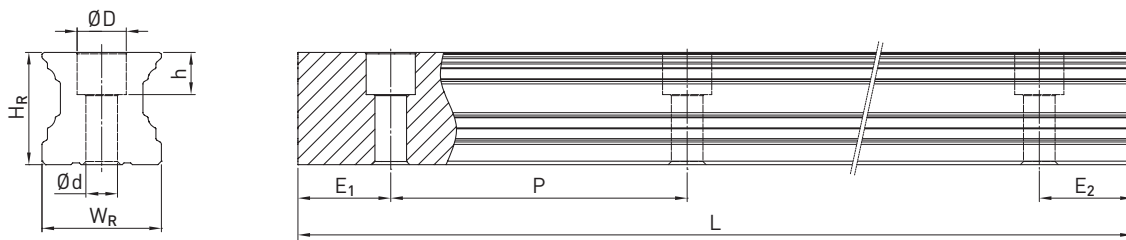


Table 3.27 Dimensions of profile rail CGR_R

Series/ size	Assembly screw for rail [mm]	Dimensions of the rail [mm]						Max. length [mm]	Max. length $E_1 = E_2$ [mm]	Min. length [mm]	$E_{1/2}$ min [mm] ¹⁾	$E_{1/2}$ min [mm] ²⁾	$E_{1/2}$ max [mm]	Weight [kg/m]
		W_R	H_R	D	h	d	P							
CGR15R	M4 × 20	15	16.20	7.5	5.9	4.5	60	4,000	3,900	72	6	14	54	1.58
CGR20R	M5 × 25	20	20.55	9.5	8.5	6.0	60	4,000	3,900	74	7	16	53	2.48
CGR25R	M6 × 30	23	24.25	11.0	9.0	7.0	60	4,000	3,900	76	8	17	52	3.38
CGR30R	M8 × 35	28	28.35	14.0	12.4	9.0	80	4,000	3,920	98	9	18	71	5.10
CGR35R	M8 × 40	34	31.85	14.0	12.0	9.0	80	4,000	3,920	98	9	24	71	7.14
CGR45R	M12 × 50	45	39.85	20.0	17.0	14.0	105	4,000	3,885	129	12	27	93	11.51

¹⁾ $E_{1/2}$ min without cover strip and with cover strip (clamp: steel clamp)

²⁾ $E_{1/2}$ min with cover strip (clamp: front clamping screw)

3.2.10.2 Dimensions CGR_T

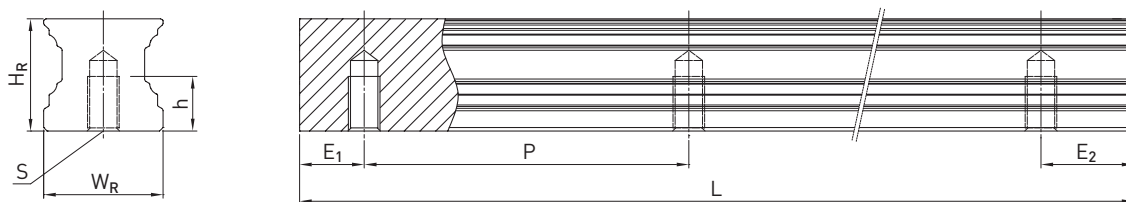


Table 3.28 Dimensions of profile rail CGR_T

Series/size	Dimensions of the rail [mm]					Max. length [mm]	Max. length $E_1 = E_2$ [mm]	Min. length [mm]	$E_{1/2}$ min [mm] ¹⁾	$E_{1/2}$ min [mm] ²⁾	$E_{1/2}$ max [mm]	Weight [kg/m]
	W_R	H_R	S	h	P							
CGR15T	15	16.20	M5	8	60	4,000	3,900	72	6	14	54	1.58
CGR20T	20	20.55	M6	10	60	4,000	3,900	74	7	15	53	2.48
CGR25T	23	24.25	M6	12	60	4,000	3,900	76	8	15	52	3.38
CGR30T	28	28.35	M8	15	80	4,000	3,920	98	9	16	71	5.10
CGR35T	34	31.85	M8	17	80	4,000	3,920	98	9	22	71	7.14
CGR45T	45	39.85	M12	24	105	4,000	3,885	129	12	24	93	11.51

¹⁾ $E_{1/2}$ min without cover strip and with cover strip (clamp: steel clamp)

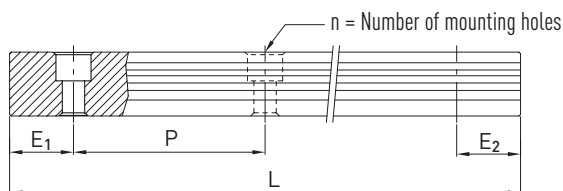
²⁾ $E_{1/2}$ min with cover strip (clamp: front clamping screw)

Note:

1. The tolerance for E is +0.5 to -1 mm for standard, for joint connections 0 to -0.3 mm.
2. If no information is provided on the $E_{1/2}$ dimensions, the maximum number of mounting holes is determined taking into account $E_{1/2}$ min.
3. The rails are shortened to the desired length. If no information on the $E_{1/2}$ dimensions is provided, then the rails are manufactured symmetrically.

3.2.10.3 Calculation of the length of profile rails

HIWIN offers profile rails in customised lengths. To make sure the end of the profile rail does not become unstable, the value E should not exceed half the distance between the mounting holes (P). At the same time, the value $E_{1/2}$ should be between $E_{1/2}$ min and $E_{1/2}$ max so that the mounting hole does not break out.



F 3.5

$$L = (n - 1) \times P + E_1 + E_2$$

L Total length of the profile rail [mm]
n Number of mounting holes
P Distance between two mounting holes [mm]
 $E_{1/2}$ Distance from the centre of the last mounting hole to the end of the profile rail [mm].

3.2.10.4 Cover caps for mounting holes of profile rails

The cover caps are used to keep the mounting holes free of chips and dirt. The standard plastic cover caps accompany each profile rail. Optional cover caps have to be ordered separately.



Table 3.29 Cover caps for mounting holes of profile rails

Rail	Screw	Article number			Ø D [mm]	Height H [mm]
		Plastic (200 units)	Brass ¹⁾	Steel ¹⁾		
CGR15R	M4	5-002218	5-001344	—	7.5	1.2
CGR20R	M5	5-002220	5-001350	5-001352	9.5	2.5
CGR25R	M6	5-002221	5-001355	5-001357	11.0	2.8
CGR30R	M8	5-002222	5-001360	5-001362	14.0	3.5
CGR35R	M8	5-002222	5-001360	5-001362	14.0	3.5
CGR45R	M12	5-002223	5-001324	5-001327	20.0	4.0

¹⁾ Not recommended for coated rails.

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3.2.10.5 Cover strip clamp

The optional cover strip is supplied with a steel clamp to secure the strip. Alternatively, the clamp can also be secured with a clamping screw on the front side. The stroke is shortened when the clamping screw is used on the front side, see assembly instructions



Fig. 3.1 Clamp: Steel



Fig. 3.2 Clamp: Front-side clamping screw

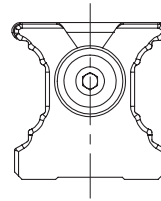
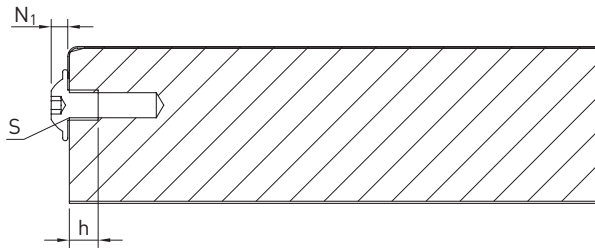


Table 3.30 Dimensions of profile rail with front-side clamping screw

Series/Size	S [mm]	h [mm]	N ₁ [mm]
CG_15	M3	5	1.65
CG_20	M4	5	2.20
CG_25	M4	5	2.20
CG_30	M4	5	2.20
CG_35	M6	9	3.30
CG_45	M6	9	3.30

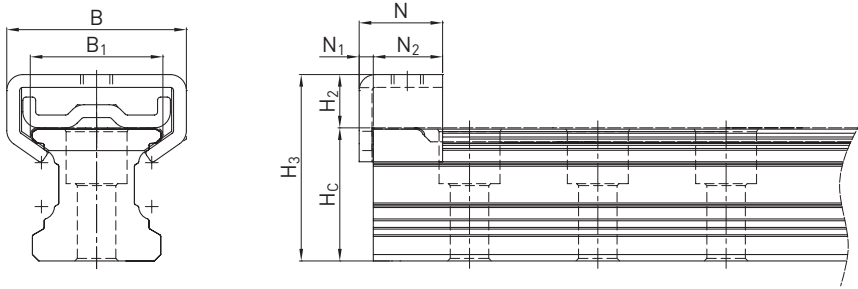


Table 3.32 Dimensions of profile rail with steel clamp

Series/Size	H ₃ [mm]	H _c [mm]	H ₂ [mm]	N [mm]	N ₁ [mm]	N ₂ [mm]	B [mm]	B ₁ [mm]
CG_15	20.09	16.70	3.9	15	2.2	12.8	21.0	15.8
CG_20	29.05	20.75	8.3	13	2.2	10.8	28.0	20.7
CG_25	34.42	24.45	10.0	15	2.2	12.8	30.6	23.9
CG_30	37.80	28.55	9.3	12	2.2	9.8	34.0	28.9
CG_35	43.20	30.40	13.0	18	2.2	15.8	35.4	34.8
CG_45	52.66	39.85	13.7	18	2.2	15.8	53.6	45.6

3.2.11 Sealing systems

Different sealing systems are available for HIWIN blocks. You can find an overview on Page 22. The following table shows the total length of the blocks with different sealing systems. Appropriate sealing systems are available for these sizes.

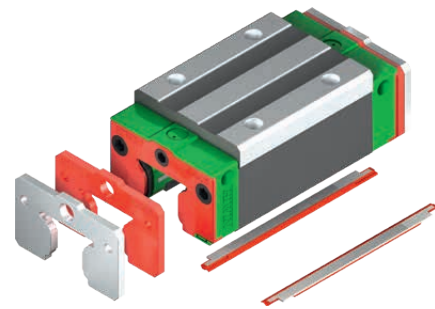


Table 3.31 Total length of block with different sealing systems

Series/size	Total length L (including screws)			
	SS	ZZX	SW	ZWX
CG15C	58.2	61.2	63.2	66.2
CG20C	74.9	77.9	79.9	82.9
CG20H	90.9	93.9	95.9	98.9
CG25C	84.0	90.0	89.0	95.0
CG25H	101.4	107.4	106.4	112.4
CG30C	97.4	103.4	102.8	108.8
CG30H	119.9	125.9	125.3	131.3
CG35C	111.4	117.4	116.8	122.8
CG35H	135.8	141.8	141.2	147.2
CG45C	137.6	143.6	143.0	149.0
CG45H	174.0	180.0	179.4	185.4

Unit: mm

Linear guideways

CG series

3.2.12 Long-term lubrication unit

Further information on the lubrication unit can be found in the general information in section "Long-term lubrication unit" on Page 15. The following drawing shows the dimension (L) for a single-sided lubrication unit. The dimension for a double-sided lubrication unit results from the dimension L + T. The EC lubrication unit is available with the sealing systems named in the table.

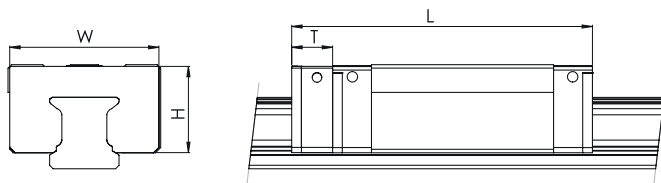


Table 3.33 Dimensions of the block with lubrication unit EC

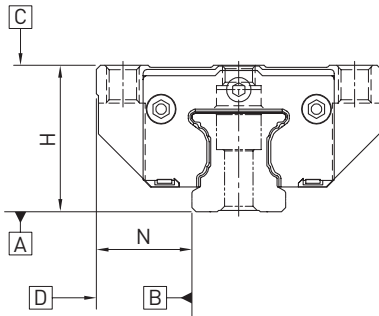
Model	Dimensions of the block [mm]				Max. running performance ²⁾ [km] EC single-sided	Max. running performance ²⁾ [km] EC double-sided
	W	H	T	L _{ss/sw} ¹⁾		
CG_15C	33.4	19.35	10.8	69.0	10,000	20,000
CG_20C	43.0	24.85	11.8	86.7	10,000	20,000
CG_20H	43.0	24.85	11.8	102.7	10,000	20,000
CG_25C	47.0	28.90	12.5	96.5	10,000	20,000
CG_25H	47.0	28.90	12.5	113.9	10,000	20,000

¹⁾ Total length with selected dust protection. SS = Standard dust protection

²⁾ Further details can be found in the assembly instructions in the "Lubrication" chapter

3.2.13 Tolerances depending on the accuracy class

The CG series are available in five accuracy classes according to the parallelism between block and rail, height accuracy H and width accuracy N. The selection of the accuracy class is determined by the requirements of the machine.



3.2.12.1 Parallelism

Parallelism of locating surfaces D and B of the block and rail and of top block surface C to mounting surface A of the rail. Ideal installation of the linear guideway and the measurement in the centre of the block are prerequisites.

Table 3.34 Tolerance of parallelism between block and profile rail

Rail length [mm]	Accuracy class				
	C	H	P	SP	UP
– 100	12	7	3	2	2
100 – 200	14	9	4	2	2
200 – 300	15	10	5	3	2
300 – 500	17	12	6	3	2
500 – 700	20	13	7	4	2
700 – 900	22	15	8	5	3
900 – 1100	24	16	9	6	3
1100 – 1500	26	18	11	7	4
1500 – 1900	28	20	13	8	4
1900 – 2500	31	22	15	10	5
2500 – 3100	33	25	18	11	6
3100 – 3600	36	27	20	14	7
3600 – 4000	37	28	21	15	7

Unit: μm

Linear guideways

CG series

3.2.13.1 Accuracy – height and width

Height tolerance of H

Permissible absolute dimension deviation of height H, measured between the centre of bolting surface C and rail underside A, with any position of the block on the rail.

Height variance of H

Permissible deviation of height H between several blocks on one rail, measured at the same position of the rail.

Width tolerance of N

Permissible absolute dimension deviation of width N, measured between the centre of bolting surfaces D and B, with any position of the block on the rail.

Width variance of N

Permissible deviation of width N between several blocks on one rail, measured at the same position of the rail.

Table 3.35 Tolerances of width and height

Series/size	Accuracy class	Height tolerance of H (T_H)	Width tolerance of N	Height variance of H	Width variance of N
CG_15, 20	C (Normal)	± 0.1	± 0.1	0.02	0.02
	H (high)	± 0.03	± 0.03	0.01	0.01
	P (precision)	$0/-0.03^{1)}$ $\pm 0.015^{2)}$	$0/-0.03^{1)}$ $\pm 0.015^{2)}$	0.006	0.006
	SP (super precision)	$0/-0.015$	$0/-0.015$	0.004	0.004
	UP (ultra precision)	$0/-0.008$	$0/-0.008$	0.003	0.003
CG_25, 30, 35	C (Normal)	± 0.1	± 0.1	0.02	0.03
	H (high)	± 0.04	± 0.04	0.015	0.015
	P (precision)	$0/-0.04^{1)}$ $\pm 0.02^{2)}$	$0/-0.04^{1)}$ $\pm 0.02^{2)}$	0.007	0.007
	SP (super precision)	$0/-0.02$	$0/-0.02$	0.005	0.005
	UP (ultra precision)	$0/-0.01$	$0/-0.01$	0.003	0.003
CG_45	C (Normal)	± 0.1	± 0.1	0.03	0.03
	H (high)	± 0.05	± 0.05	0.015	0.02
	P (precision)	$0/-0.05^{1)}$ $\pm 0.025^{2)}$	$0/-0.05^{1)}$ $\pm 0.025^{2)}$	0.007	0.01
	SP (super precision)	$0/-0.03$	$0/-0.03$	0.005	0.007
	UP (ultra precision)	$0/-0.02$	$0/-0.02$	0.003	0.005

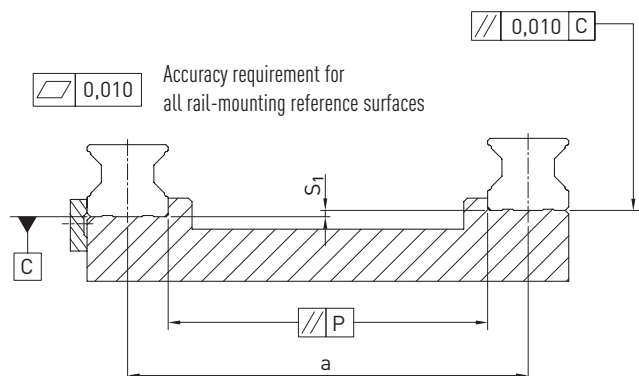
Unit: mm

¹⁾ Assembled linear guideway

²⁾ Unassembled linear guideway

3.2.13.2 Permissible tolerances of the mounting surface

Once the requirements for the accuracy of the mounting surfaces are met, the high accuracy, rigidity and service life of the CG series linear guideways are achieved.



Tolerance of parallelism of reference surface (P)

Table 3.36 Maximum tolerance for parallelism (P)

Series/Size	Preload class		
	Z0	ZA	ZB
CG_15	9	5	4
CG_20	11	7	5
CG_25	12	8	6
CG_30	14	9	7
CG_35	15	11	8
CG_45	19	12	10

Unit: μm

Tolerance of height of reference surface (S_1)

F 3.6 $S_1 = a \times K - T_H$

S_1 Maximum height tolerance [mm]
 a Distance between rails [mm]
 K Coefficient of height tolerance
 T_H Tolerance of height according to Table 3.35

Table 3.37 Coefficient of height tolerance (K)

Series/Size	Preload class		
	Z0	ZA	ZB
CG_15 – CG_45	2.8×10^{-4}	1.7×10^{-4}	1.2×10^{-4}

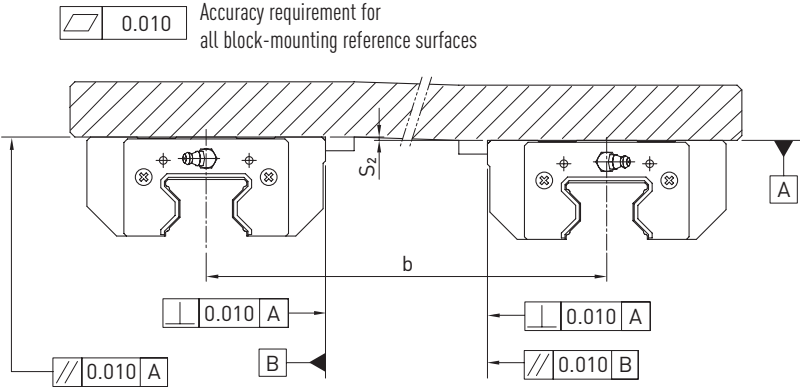
Note: If $S_1 < 0$, select another tolerance class!

Linear guideways

CG series

Height tolerance for mounting surface on block

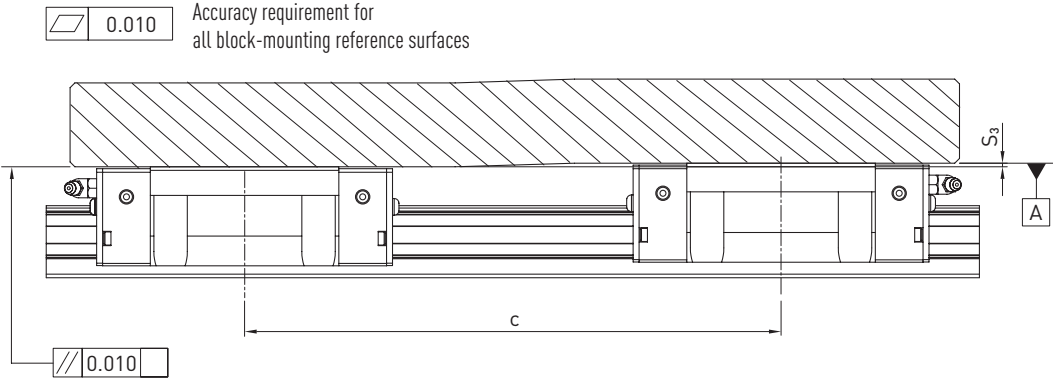
- The height tolerance of the reference surface when two or more blocks are used in parallel (S_2)



F 3.7 $S_2 = b \times K$

S_2 Maximum height tolerance [mm]
 b Distance between blocks [mm]
 K Coefficient of height tolerance

- The height tolerance of the reference surface when two or more blocks are used in parallel (S_3)



F 3.8 $S_3 = c \times K$

S_3 Maximum height tolerance [mm]
 c Distance between blocks [mm]
 K Coefficient of height tolerance

Table 3.38 Coefficient of height tolerance (K)		
Series/Size	Load type	
	CG_C	CG_H
CG_15 – CG_45	4.2×10^{-5}	3.0×10^{-5}

3.2.14 Shoulder heights and edge roundings

Inaccurate shoulder heights and edge roundings of mounting surfaces impair accuracy and may conflict with the block or rail profile. The following shoulder heights and edge profiles must be observed to avoid assembly problems.

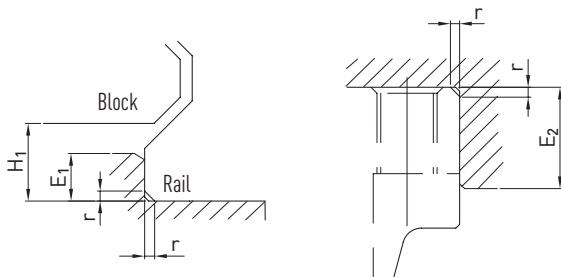


Table 3.39 Shoulder heights and edge roundings

Series/Size	Max. radius of edges r	Shoulder height of the reference edge of rail E_1	Shoulder height of the reference edge of block E_2	Clearance height under block H_1
CG_15	0.5	3.0	4.0	4.3
CG_20	0.5	3.5	5.0	4.6
CG_25	1.0	5.0	5.0	6.1
CG_30	1.0	5.0	5.0	7.0
CG_35	1.0	6.0	6.0	7.6
CG_45	1.0	8.0	8.0	9.5

Unit: mm