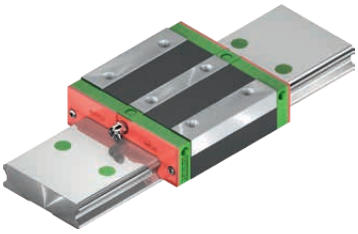
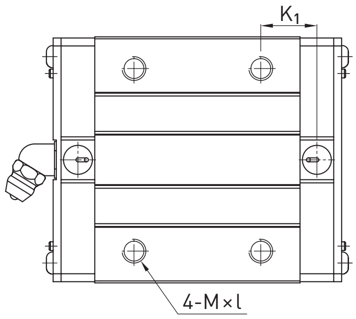


Linear guideway of WE and QW series

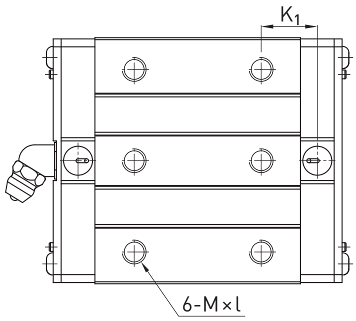
- Wide type
- For maximum torque loads
- Block with SynchMotion™ technology (QW series)

3.4.8 Dimensions of the WE/QW blocks

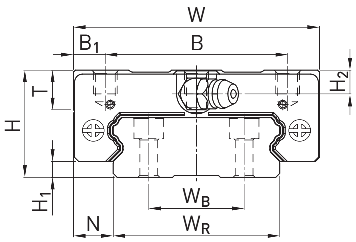
3.4.8.1 WEH/QWH



WE_17
WE/QW_21



WE/QW_27
WE/QW_35
WE_50



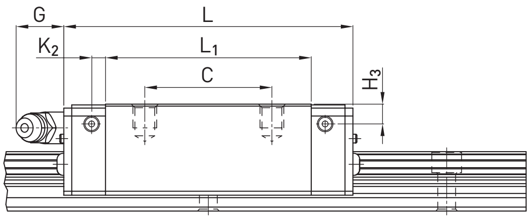


Table 3.62 **Dimensions of the block**

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	
WEH17CA	17	2.5	8.5	50	29	10.5	15	35.0	50.6	—	3.10	4.9	M4 × 5	6.0	4.0	3.0	5,230	9,640	0.12
WEH21CA	21	3.0	8.5	54	31	11.5	19	41.7	59.0	14.68	3.65	12.0	M5 × 6	8.0	4.5	4.2	7,210	13,700	0.20
QWH21CA	21	3.0	8.5	54	31	11.5	19	41.7	59.0	14.68	3.65	12.0	M5 × 6	8.0	4.5	4.2	9,000	12,100	0.20
WEH27CA	27	4.0	10.0	62	46	8.0	32	51.8	72.8	14.15	3.50	12.0	M6 × 6	10.0	6.0	5.0	12,400	21,600	0.35
QWH27CA	27	4.0	10.0	62	46	8.0	32	56.6	73.2	15.45	3.15	12.0	M6 × 6	10.0	6.0	5.0	16,000	22,200	0.35
WEH35CA	35	4.0	15.5	100	76	12.0	50	77.6	102.6	18.35	5.25	12.0	M8 × 8	13.0	8.0	6.5	29,800	49,400	1.10
QWH35CA	35	4.0	15.5	100	76	12.0	50	83.0	107.0	21.50	5.50	12.0	M8 × 8	13.0	8.0	6.5	36,800	49,200	1.10
WEH50CA	50	7.5	20.0	130	100	15.0	65	112.0	140.0	28.05	6.00	12.9	M10 × 15	19.5	12.0	10.5	61,520	97,000	3.16

For dimensions of the rail, see Page 86, for standard as well as optional lubrication adapter, see Page 148.

3.4.8.2 WEW/QWW

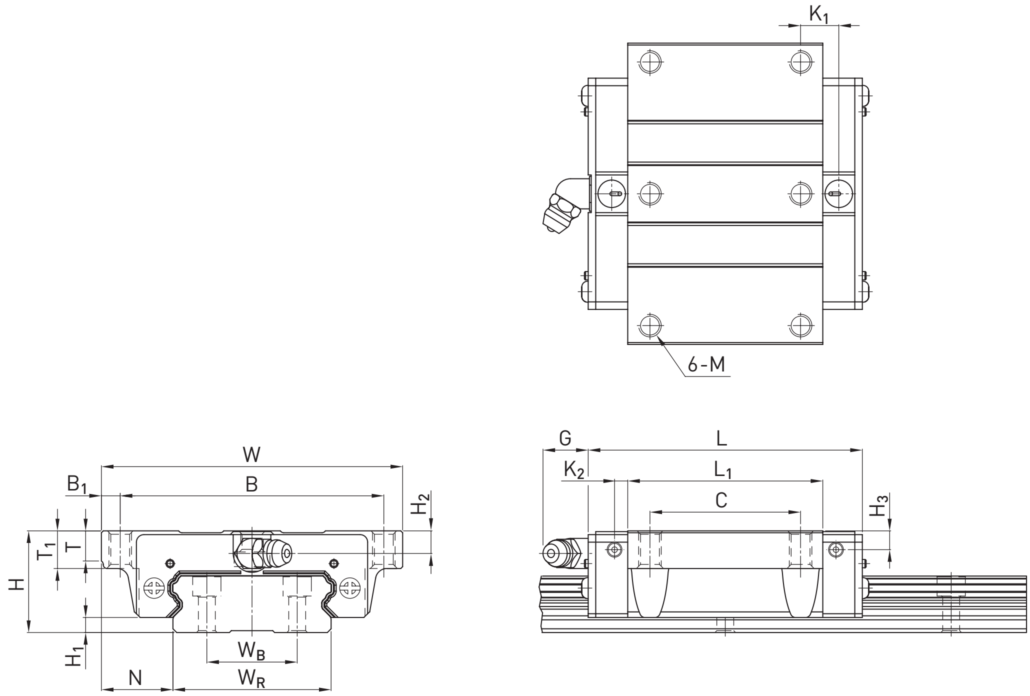


Table 3.63 **Dimensions of the block**

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	T	T_1	H_2	H_3	C_{dyn}	C_0	
WEW17CC	17	2.5	13.5	60	53	3.5	26	35.0	50.6	–	3.10	4.9	M4	5.3	6	4.0	3.0	5,230	9,640	0.13
WEW21CC	21	3.0	15.5	68	60	4.0	29	41.7	59.0	9.68	3.65	12.0	M5	7.3	8	4.5	4.2	7,210	13,700	0.23
QWW21CC	21	3.0	15.5	68	60	4.0	29	41.7	59.0	9.68	3.65	12.0	M5	7.3	8	4.5	4.2	9,000	12,100	0.23
WEW27CC	27	4.0	19.0	80	70	5.0	40	51.8	72.8	10.15	3.50	12.0	M6	8.0	10	6.0	5.0	12,400	21,600	0.43
QWW27CC	27	4.0	19.0	80	70	5.0	40	56.6	73.2	15.45	3.15	12.0	M6	8.0	10	6.0	5.0	16,000	22,200	0.43
WEW35CC	35	4.0	25.5	120	107	6.5	60	77.6	102.6	13.35	5.25	12.0	M8	11.2	14	8.0	6.5	29,800	49,400	1.26
QWW35CC	35	4.0	25.5	120	107	6.5	60	83.0	107.0	21.50	5.50	12.0	M8	11.2	14	8.0	6.5	36,800	49,200	1.26
WEW50CC	50	7.5	36.0	162	144	9.0	80	112.0	140.0	20.55	6.00	12.9	M10	14.0	18	12.0	10.5	61,520	97,000	3.71

For dimensions of the rail, see Page 86, for standard as well as optional lubrication adapter, see Page 148.

3.4.9 Dimensions of WE profile rails

3.4.9.1 Dimensions WER_R

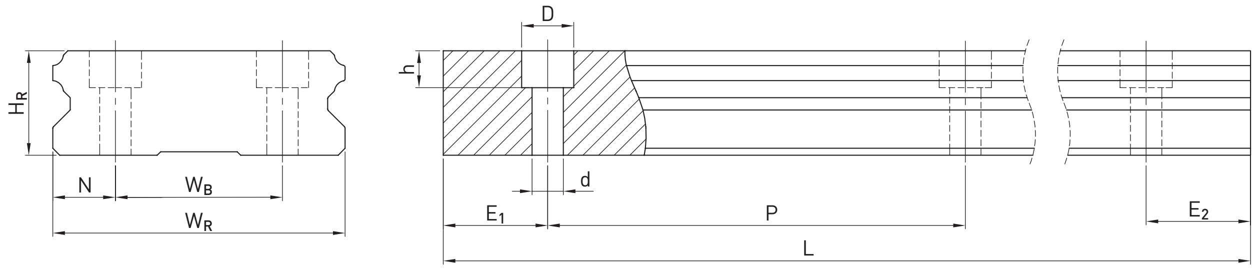


Table 3.64 **Dimensions of profile rail WER_R**

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]	$E_{1/2}$ max [mm]	Weight [kg/m]
		W_R	W_B	H_R	D	h	d	P						
WER17R	M4 × 12	33	18	9.3	7.5	5.3	4.5	40	4,000	3,960	52	6	34	2.2
WER21R	M4 × 16	37	22	11.0	7.5	5.3	4.5	50	4,000	3,950	62	6	44	3.0
WER27R	M4 × 20	42	24	15.0	7.5	5.3	4.5	60	4,000	3,900	72	6	54	4.7
WER35R	M6 × 25	69	40	19.0	11.0	9.0	7.0	80	4,000	3,920	96	8	72	9.7
WER50R	M8 × 30	90	60	24.0	14.0	12.0	9.0	80	4,000	3,920	98	9	71	14.6

3.4.9.2 Dimensions WER_T

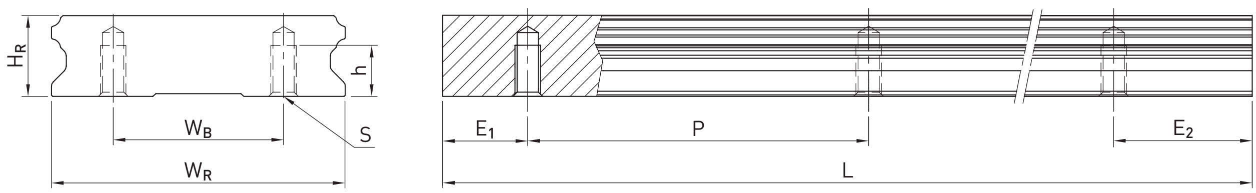


Table 3.65 **Dimensions of profile rail WER_T**

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]	$E_{1/2}$ max [mm]	Weight [kg/m]
	W_R	W_B	H_R	S	h	P						
WER21T	37	22	11	M4	7.0	50	4,000	3,950	62	6	44	3.0
WER27T	42	24	15	M5	7.5	60	4,000	3,900	72	6	54	4.7
WER35T	69	40	19	M6	12.0	80	4,000	3,920	96	8	72	9.7

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.

2.2 Selection principles

Determine the selection conditions

- Machine base
- Maximum installation space
- Desired accuracy
- Required rigidity
- Load type
- Travel path
- Travel speed, acceleration
- Frequency of use
- Service life
- Environmental conditions

Select the series

- HG and CG series – grinding, milling, drilling machines, lathes, machining centres, woodworking
- EG series – automation technology, high-speed transport, semiconductor assembly, precision measuring equipment
- WE series – single axes with high torque loads M_X
- MG series – miniature technology, semiconductor assembly, medical technology
- RG series – machining centres, injection moulding machines, machines and systems with high rigidity

Select the accuracy class

- Classes: C, H, P, SP, UP, depending on the required accuracy

Determine the size and number of blocks

- Depending on empirical values
- Depending on type of load
- If a ballscrew is used, the nominal size of the linear guideways and the ballscrew should be similar, e.g. 32 mm ballscrew and 35 mm profile rail.

Calculate the maximum block load

- Calculate the maximum block load using the example calculations (see section 2.5). Make sure that the static support stability factor of the selected linear guideway is higher than the corresponding value in the static support stability factor table.

Determine the preload

- The preload depends on the stiffness requirements and the accuracy of the mounting surface.

Determine the rigidity

- Calculate the deformation (δ) using the stiffness table in the respective chapter; the stiffness increases with higher preload and with larger guideway dimensions.

Calculation of service life

- Determine the required service life taking into account the travel speed and frequency; use the example calculations as a guide (see section 2.4).

Select the type of lubrication

- Grease lubrication via lubricating nipple
- Oil lubrication via connection line

Selection finished

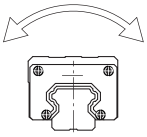
2.3 Load ratings

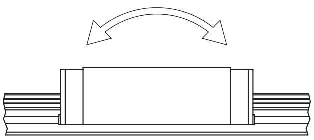
2.3.1 Static load rating C_0

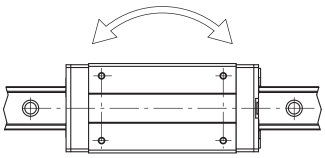
If a linear guideway system is subjected to excessive loads or impacts during movement or at a standstill, localised permanent deformation occurs between the track and balls. As soon as this permanent deformation exceeds a certain level, it affects smooth operation of the guideway. According to its basic definition, the static load rating corresponds to a static load that causes permanent deformation of 0.0001 × ball diameter at the contact point that is loaded the most. The values are given in the tables for each linear guideway system. Using these tables, the designer can select a suitable linear guideway system. The maximum static load to which a linear guideway system is subjected must not exceed the static load rating.

2.3.2 Permissible static moment M_0

The permissible static moment is the moment which, in a defined direction and size, corresponds to the maximum possible load on the moving parts by the basic static load rating. The permissible static moment is defined for linear motion systems for three directions: M_X, M_Y and M_Z.







2.3.3 Static support stability

For profile rail systems at rest and slow motion, the static support stability must be taken into account, which depends on the environmental and operating conditions. Increased support stability is particularly important for guideways that are subjected to impact loads, see Table 2.1. The static support stability can be calculated according to F 2.1.

F 2.1

$$f_{SL} = \frac{C_0}{P} \; ; \quad f_{SM} = \frac{M_0}{M}$$

f_{SL} Static support stability
f_{SM} Static support stability for torque load
C_0 Static load rating [N]
M_0 Permissible static moment [Nm]
P Static equivalent load [N]
M Static equivalent moment [Nm]

Note: The linear guideway's load-bearing capacity is often restricted – not by its load-bearing strength, but by the screw connection. We therefore recommend checking the screw connection's maximum permissible load-bearing capacity in accordance with VDI 2230.

Table 2.1 **Static support stability**

Load	f_{SL}; f_{SM} [min.]
Normal load	1.25 – 3.00
With jolting and vibration	3.00 – 5.00

2.3.4 Dynamic load rating C_{dyn}

The dynamic load rating is the load, defined in terms of direction and size, at which a linear guideway achieves a nominal service life of a 50 km [1] (HG, QH, EG, QE, CG, WE, QW, MG) or 100 km [1] (RG, QR) travel path. The dynamic load rating is specified for each guideway in the dimension tables. It can be used to calculate the service life of a particular guideway.

[1] The dynamic load rating of linear guideways is specified for a service life of a 50 or 100 km travel path, depending on the manufacturer. The following factors can be used to convert the basic dynamic load rating: C_{dyn} 50 km = 1.26 × C_{dyn} 100 km (HG, QH, EG, QE, CG, WE, QW, MG series)
C_{dyn} 50 km = 1.23 × C_{dyn} 100 km (RG, QR series)

2.4 Service life calculation

2.4.1 Definition of service life

The constant and repeated loading of tracks and balls of a linear guideway causes fatigue on the track surface. In the end, so-called pitting formation occurs.
The service life of a linear guideway is defined as the total travel distance covered until pitting occurs on the surface of the track or balls.

2.4.2 Nominal service life (L)

The service life can be very different even if linear guideways are manufactured in the same way and used under the same movement conditions. Therefore, the nominal service life is taken as a reference value for estimating the service life of a linear guideway.
The nominal service life corresponds to the total travel path achieved without failure by 90% of a group of identical linear guideways used under the same conditions.

2.4.2.1 Calculation of the nominal service life

The actual load influences the nominal service life of a linear guideway. Using the selected dynamic load rating and the equivalent dynamic load, the nominal service life can be calculated using the formulas F 2.2 and F 2.3.

Formulas for calculation of the nominal service life

HG, QH, EG, QE, CG, WE, QW, MG series:

F 2.2

$$L = \left(\frac{C_{dyn}}{P}\right)^{3} \times 50\,\text{km}$$

L	Nominal service life [km]
C_{dyn}	Dynamic load rating [N]
P	Dynamic equivalent load [N]

RG, QR series:

F 2.3

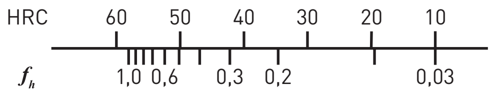
$$L = \left(\frac{C_{dyn}}{P}\right)^{10/3} \times 100\,\text{km}$$

2.4.2.2 Factors of nominal service life

The type of load, the hardness of the track and the temperature of the guideway have a considerable influence on the nominal service life. The relationship between these factors are shown by formulas F 2.4 and F 2.5.

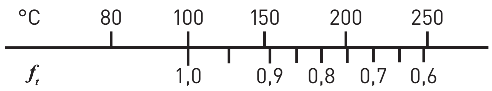
Hardness factor (f_h)

The tracks of the linear guideways have a hardness of 58 HRC. A hardness factor of 1.0 therefore applies. If the hardness differs, the hardness factor according to the adjacent figure must be taken into account. If the specified hardness is not achieved, the permissible load is reduced. In this case, the dynamic load rating and the static load rating must be multiplied by the hardness factor.



Temperature factor (f_t)

The application range of the standard profile rails is between –10 and 80 °C ambient temperature. For ambient temperatures up to 150 °C, the use of linear guideways with steel deflection system is required (marked with the suffix "SE" in the order code). Short-term ambient temperatures of up to 180 °C are possible. However, we recommend consulting our technical support for this. If the temperature of a linear guideway exceeds 100 °C, the permissible load and the service life are reduced. That is why the dynamic load rating and the static load rating must be multiplied by the temperature factor.



Load factor (f_w)

To take into account external influences on the service life of the profile rails which are not directly included in the calculation (e.g. vibrations, jolting and high speed), the dynamic equivalent load is multiplied by the load factor according to Table 2.2. For short-stroke applications (stroke < 2 × block lengths), the calculated load factor must be doubled.

Table 2.2 **Load factor**

Type of load	Travel speed	f_w
No jolting and vibration	At 15 m/min	1.0 – 1.2
Normal load	15 m/min – 60 m/min	1.2 – 1.5
Minor jolting	60 m/min – 120 m/min	1.5 – 2.0
With jolting and vibration	Greater than 120 m/min	2.0 – 3.5

Formulas for calculation of the nominal service life (considering all factors)

HG, QH, EG, QE, CG, WE, QW, MG series:

F 2.4

$$L = \left(\frac{f_h \times f_t \times C_{dyn}}{f_w \times P}\right)^3 \times 50\,\text{km}$$

RG, QR series:

F 2.5

$$L = \left(\frac{f_h \times f_t \times C_{dyn}}{f_w \times P}\right)^{10/3} \times 100\,\text{km}$$

L	Nominal service life [km]
f_h	Hardness factor
C_{dyn}	Dynamic load rating [N]
f_t	Temperature factor
P	Dynamic equivalent load [N]
f_w	Load factor

2.4.3 Service life (L_h)

The service life in hours is calculated from the nominal service life with the aid of the travel speed and movement frequency.

Formulas for calculation of the service life (L_h)

HG, QH, EG, QE, CG, WE, QW, MG series:

F 2.6

$$L_h = \frac{L}{v \times 60} = \frac{\left(\frac{C_{dyn}}{P}\right)^3 \times 50.000}{v \times 60}$$

RG, QR series:

F 2.7

$$L_h = \frac{L}{v \times 60} = \frac{\left(\frac{C_{dyn}}{P}\right)^{10/3} \times 100.000}{v \times 60}$$

L_h	Service life [h]
L	Nominal service life [m]
v	Velocity [m/min]
C_{dyn}/P	Load rating/Load ratio

Linear guideways

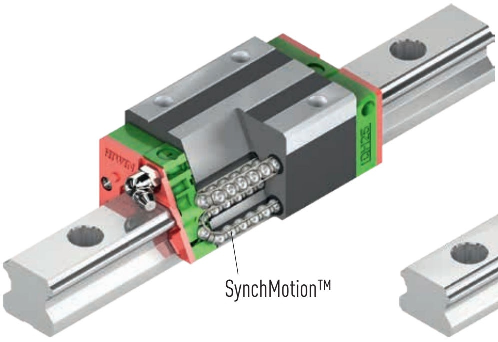
General information

2.10 SynchMotion™ technology

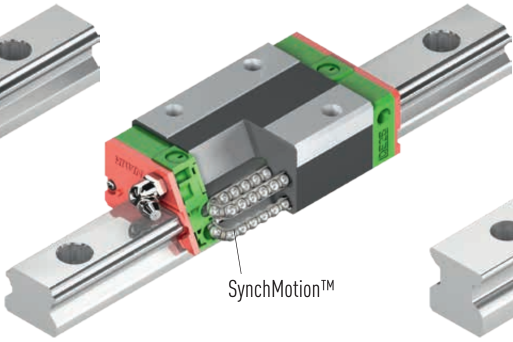
The innovative SynchMotion™ technology reduces contact between the rolling elements and the block. Similar to the ball cage of a standard ball bearing, the rolling elements are kept at a defined distance from each other by SynchMotion™ technology. Counter-rotating friction, as occurs in conventional linear guideways, is thus prevented and synchronisation fluctuations are significantly reduced. Even at high speeds, no uncontrolled ball movements occur. SynchMotion™ technology also improves lubricant transport within the block and lubricant storage.

Advantages:

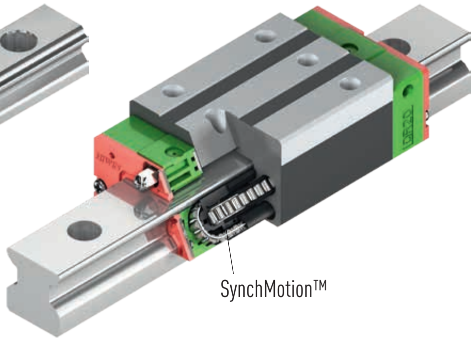
- Improved synchronous performance
- Optimised for high travel speeds
- Improved lubrication properties
- Reduced running noise
- Higher dynamic load rating



QH series



QE series



QR series

Table 2.8 **Availability of SynchMotion™ technology for HIWIN linear guideways**

Series	Sizes									
	15	20	21	25	27	30	35	45	55	65
QH	●	●	–	●	–	●	●	●	–	–
QE	●	●	–	●	–	●	●	–	–	–
QW	–	–	●	–	●	–	●	–	–	–
QR	–	–	–	●	–	●	●	●	–	–

Dimensionally identical and compatible with the HG, EG, WE and RG blocks, the blocks with SynchMotion™ technology are mounted on the standard rail and are therefore very easy to exchange.

2.12 HIWIN coating for linear guideways

2.12.1 HIWIN coating HICOAT CZS

2.12.1.1 Features and properties

HICOAT CZS is a very thin zinc coating that provides very good corrosion protection, even in radii and chamfers. Smaller bare spots remain protected against corrosion by the cathodic protection effect. This results in a significantly longer service life compared to uncoated parts. CZS coating available for the HG, EG, CG and WE series. Note: Not for series RG, MG, PG, QH, QE, QR and QW.

Specific features:

- Very good corrosion protection
- Cr(VI)-free
- One-piece and multi-piece rails available from stock
- End preservation with zinc spray (see below)
- Possible interaction between coating, ambient medium and lubricant should be checked on a case-by-case basis

Technical data:

- Salt spray test according to DIN EN ISO 9227 (with unloaded rail): 300 hours
- Salt spray test according to DIN EN ISO 9227 (with loaded rail): 99 hours
- Maximum rail length (one-piece): 4.0 meters

2.12.1.2 Order code for CZS coatings

C Z S

Coating (C)

Composition:
Z: Zinc

Colour:
S: Silver

2.12.1.3 Corrosion test

CZS-coated profile rails were tested in comparison with an uncoated profile rail.

New rail in CZS coating

Rail with CZS coating – after 6 months of outdoor storage

Rail (unloaded) with CZS coating – after 99 hours of salt spray test (according to DIN EN ISO 9227)

Uncoated rail – after 4 hours of salt spray test

2.12.1.4 Rail end

The rail ends are preserved with zinc spray. In order to achieve reliable corrosion protection at the uncoated rail ends as well, a high-quality zinc spray (zinc content 99%) is used. The rail ends of single-piece rails and the outer ends of multi-piece rails are preserved with zinc spray approx. 2 mm beyond the cut edge as shown in Fig. 2.1. Rail ends at joints are supplied with a greased, uncoated cut edge (see Fig. 2.2).
Note: The mounting holes and the process-related contact points on the underside of the rail may have lower coating thicknesses or isolated bare spots. The inner side of the block is generally not coated.

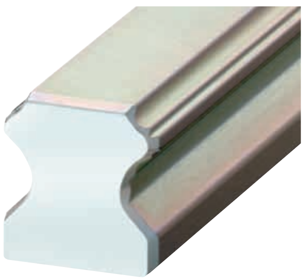


Fig. 2.1 **Rail end preserved with zinc spray**

Fig. 2.2 **Joint uncoated**

3.4 WE/QW series

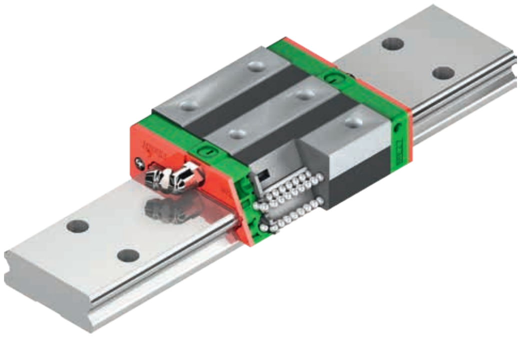
3.4.1 Properties of the WE and QW series linear guideway

Wide type, for maximum torque loads. The HIWIN linear guideways of the WE series are based on proven HIWIN technology. Due to their large rail width and low overall height, they enable a compact design and high torque capacity.

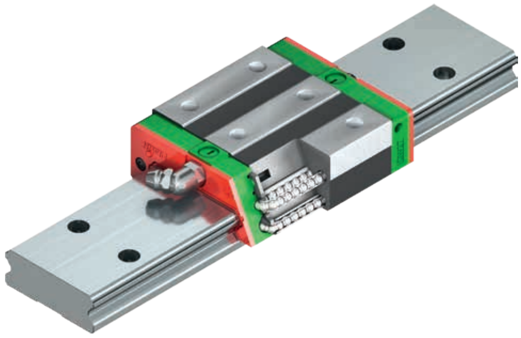
The models of the QW series with SynchMotion™ technology offer all the advantages of the standard WE series. Controlled movement of the balls at a defined distance also results in improved synchronous performance, higher reliable travel speeds, extended lubrication intervals and less running noise. Since the installation dimensions of the QW blocks are identical to those of the WE blocks, they are also mounted on the WER standard rail and can thus be easily interchanged. For further information, see Page 24.

3.4.2 Layout of WE/QW series

- Four-row linear guideway
- 45° contact angle
- The ball retainers prevent the balls from falling out when the block is removed
- Low installation height
- Wide linear guideway for high torque capacity
- Large mounting surface on block
- SynchMotion™ technology (QW series)



Layout of WE series



Layout of QW series

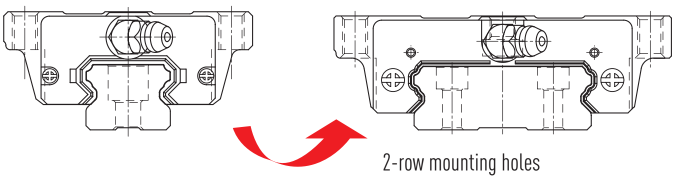
Advantages:

- Compact and cost-effective design due to high torque capacity
- High efficiency due to low friction losses

Additional advantages of QW series:

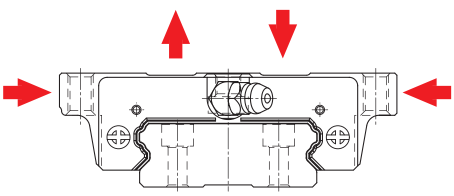
- Improved synchronous performance
- Optimised for higher travel speeds
- Extended relubrication intervals
- Reduced running noise
- Higher dynamic load rating

50 % wider than standard series



2-row mounting holes

- The large-area mounting surface of the block supports the transmission of higher torques
- The 45° arrangement of the ball tracks allows for high loads from all directions



3.4.3 Order codes of WE/QW series

For WE/QW 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)

WE	W	27	C	C	2	R	1600	ZA	H	2	KK	CTS

Series:
WE
QW

Type:
W: Flange block
H: Square block

Size:
WE: 17, 21, 27, 35, 50
QW: 21, 27, 35

Load class:
C: Heavy load

Block fastening:
A: From above
C: From above or below

Number of blocks per profile rail

Coating:
None: No coating
CTS, CZS, CCB

Dust protection [2]:
None: Standard (SS)
ZZ, DD, KK

Rails per axis [1]

Accuracy class:
C, H, P, SP, UP

Preload identifier:
Z0, ZA, ZB

Profile rail length [mm]

Profile rail mounting:
R: From above
T: From below

Order number of block (not assembled)

WE	W	27	C	C	ZA	H	ZZ

Series:
WE
QW

Type:
W: Flange block
H: Square block

Size:
WE: 17, 21, 27, 35, 50
QW: 21, 27, 35

Load class:
C: Heavy load

Dust protection [2]:
None: Standard (SS)
ZZ, DD, KK

Accuracy class:
C, H, P

Preload identifier:
Z0, ZA, ZB

Block fastening:
A: From above
C: From above or below

Order number of profile rail (not assembled)

WE	R	27	R	1200	H	CTS

WE series

Profile rail

Size:
17, 21, 27, 35, 50

Coating:
None: No coating
CTS, CZS, CCB

Accuracy class:
C, H, P

Profile rail length [mm]

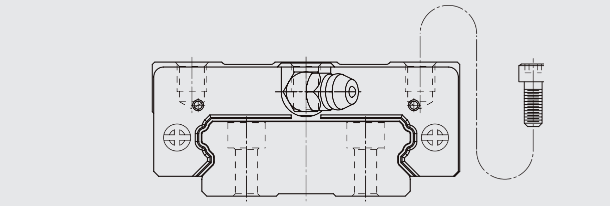
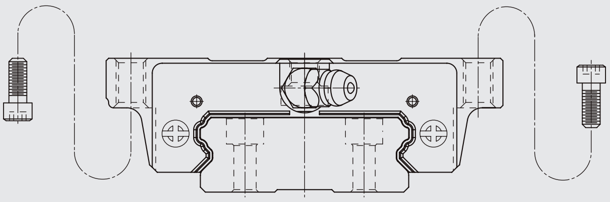
Profile rail mounting:
R: From above
T: From below

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

3.4.4 Block types

HIWIN offers block and flange block versions. Due to the larger mounting surface, flange blocks are better suited for large loads.

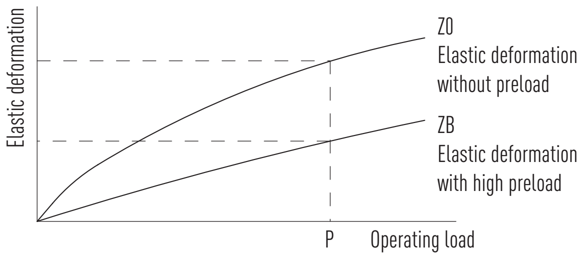
Table 3.58 **Block types**

Type	Series/size	Layout	Height [mm]	Typical applications
Square type	WEH-CA QWH-CA		17 – 50	o Automation o Handling industry o Measuring and testing technology o Semiconductor industry o Injection moulding machines o Linear axes
Flange type	WEW-CC QWW-CC			

3.4.5 Preload

Definition

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



Preload identifier

Table 3.59 **Preload identifier**

Identifier	Preload		Application	Example applications
Z0	Slight preload	0 – 0.02 C_{dyn}	Constant load direction, little vibration, less accuracy required	o Transport technology o Automatic packaging machines o X-Y axis in industrial machines o Welding machines
ZA	Medium preload	0.03 – 0.05 C_{dyn}	High accuracy required	o Machining centres o Z axes in industrial machines o Eroding machines o NC lathes o Precision X-Y table o Measuring technology
ZB	High preload	0.06 – 0.08 C_{dyn}	High rigidity required, vibration and jolting	o Machining centres o Grinding machines o NC lathes o Horizontal and vertical milling machines o Z-axis of machine tools o High performance cutting machines

3.4.6 Load ratings and torques

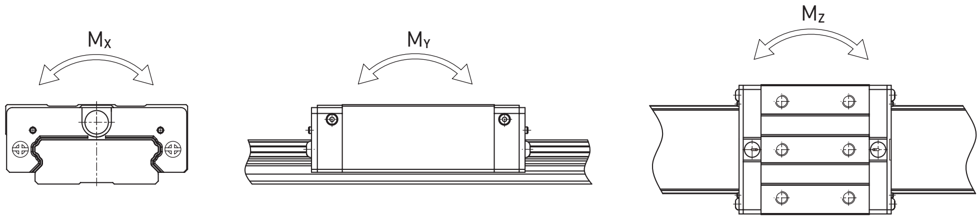


Table 3.60 **Load ratings and torques for WE/QW series**

Series/Size	Dynamic load rating C_{dyn} [N] [1]	Static load rating C_0 [N]	Static moment [Nm]		
			M_{0X}	M_{0Y}	M_{0Z}
WE_17C	5,230	9,640	150	62	62
WE_21C	7,210	13,700	230	100	100
QW_21C	9,000	12,100	210	90	90
WE_27C	12,400	21,600	420	170	170
QW_27C	16,000	22,200	420	200	200
WE_35C	29,800	49,400	1,480	670	670
QW_35C	36,800	49,200	1,510	650	650
WE_50C	61,520	97,000	4,030	1,960	1,960

[1] Dynamic load rating for 50,000 m travel path

3.4.7 Rigidity

The rigidity depends on the preload. With the formula F 3.12, the deformation can be calculated depending on the rigidity.

F 3.12

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

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

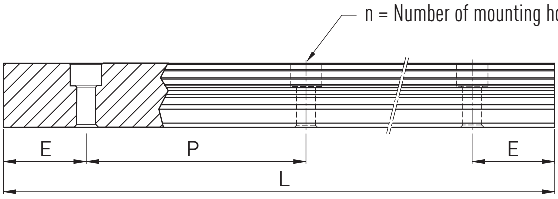
Table 3.61 **Radial rigidity of WE/QW series**

Load type	Series/ Size	Rigidity depending on the preload		
		Z0	**ZA**	**ZB**
Heavy load	**WE_17C**	128	166	189
	WE_21C	154	199	228
	QW_21C	140	176	200
	WE_27C	187	242	276
	QW_27C	183	229	260
	WE_35C	281	364	416
	QW_35C	277	348	395
	WE_50C	428	554	633

Unit: N/μm

3.4.9.3 Calculation of the length of profile rails

HIWIN offers profile rains 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 3.13

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

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].

3.4.9.4 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.

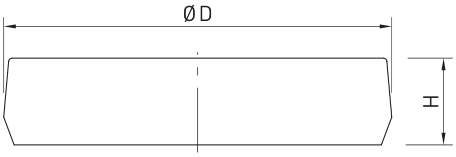


Table 3.66 **Cover caps for mounting holes of profile rails**

Rail	Screw	Article number			Ø D [mm]	Height H [mm]
		Plastic (200 units)	Brass [1)]	Steel [1)]		
WER17R	M4	5-002218	5-001344	–	7.5	1.2
WER21R	M4	5-002218	5-001344	–	7.5	1.2
WER27R	M4	5-002218	5-001344	–	7.5	1.2
WER35R	M6	5-002221	5-001355	5-001357	11.0	2.8
WER50R	M8	5-002222	5-001360	5-001362	14.0	3.5

[1)] Not recommended for coated rails.

3.4.10 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.

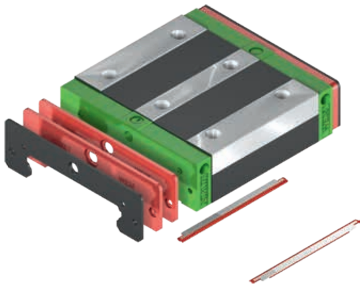


Table 3.67 **Total length of block with different sealing systems**

Series/size	Total length L (including screws)			
	SS	**DD**	**ZZ**	**KK**
WE_17C	50.6	53.8	52.6	55.8
WE/QW_21C	59.0	63.0	61.0	65.0
WE/QW_27C	72.8	76.8	74.8	78.8
WE/QW_35C	102.6	106.6	105.6	109.6
WE_50C	140.0	145.0	142.0	147.0

Unit: mm

3.4.10.1 Designation of the seal sets

The seal sets are always shipped complete with the installation materials and include the supplemental parts for the standard seal.

WE | 21 | SS

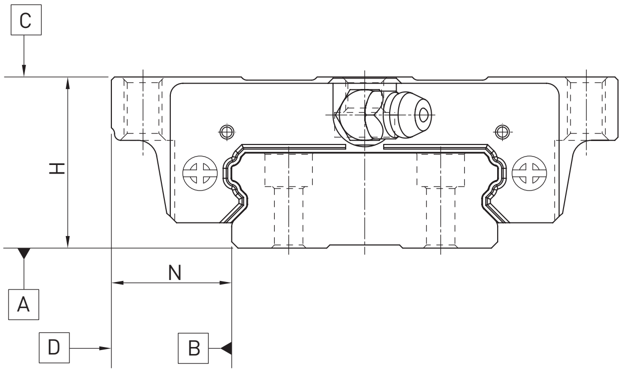
Series:
WE
QW

Size:
WE: 17, 21, 27, 35, 50
QW: 21, 27, 35

Dust cover ID:
SS: Standard seal
ZZ: End seal with scraper
DD: Double end seal
KK: Double end seal with scraper

3.4.11 Tolerances depending on the accuracy class

The WE and QW 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.



3.4.11.1 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 3.68 **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

3.4.11.2 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 3.69 **Tolerances of width and height**

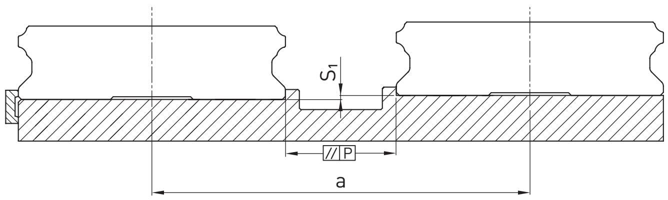
Series/size	Accuracy class	Height tolerance of H	Width tolerance of N	Height variance of H	Width variance of N
WE_17, 21 QW_21	C (Normal)	± 0.1	± 0.1	0.02	0.02
	H (high)	± 0.03	± 0.03	0.01	0.01
	P (precision)	0/– 0.03 [1] ± 0.015 [2]	0/– 0.03 [1] ± 0.015 [2]	0.006	0.006
	SP (super precision)	0/– 0.015	0/– 0.015	0.004	0.004
	UP (ultra precision)	0/– 0.008	0/– 0.008	0.003	0.003
WE_27, 35 QW_27, 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] ± 0.02 [2]	0/– 0.04 [1] ± 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
WE_50	C (Normal)	± 0.1	± 0.1	0.03	0.03
	H (high)	± 0.05	± 0.05	0.02	0.02
	P (precision)	0/– 0.05 [1] ± 0.025 [2]	0/– 0.05 [1] ± 0.025 [2]	0.01	0.01
	SP (super precision)	0/– 0.03	0/– 0.03	0.01	0.01
	UP (ultra precision)	0/– 0.02	0/– 0.02	0.01	0.01

Unit: mm

[1] Assembled linear guideway
[2] Unassembled linear guideway

3.4.11.3 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 WE and QW series linear guideways are achieved.



Tolerance of parallelism of reference surface (P):

Table 3.70 **Maximum tolerance for parallelism (P)**

Series/Size	Preload class		
	Z0	ZA	ZB
WE_17	20	15	9
WE/QW_21	25	18	9
WE/QW_27	25	20	13
WE/QW_35	30	22	20
WE_50	40	30	27

Unit: µm

Tolerance of height of reference surface (S_1):

F 3.14

$$S_1 = a \times K$$

S_1 Maximum height tolerance [mm]
a Distance between rails [mm]
K Coefficient of height tolerance

Table 3.71 **Coefficient of height tolerance (K)**

Series/Size	Preload class		
	Z0	ZA	ZB
WE_17	1.3×10^{-4}	0.4×10^{-4}	–
WE/QW_21	2.6×10^{-4}	1.7×10^{-4}	0.9×10^{-4}
WE/QW_27	2.6×10^{-4}	1.7×10^{-4}	0.9×10^{-4}
WE/QW_35	2.6×10^{-4}	1.7×10^{-4}	1.4×10^{-4}
WE_50	3.4×10^{-4}	2.2×10^{-4}	1.8×10^{-4}

3.4.12 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.

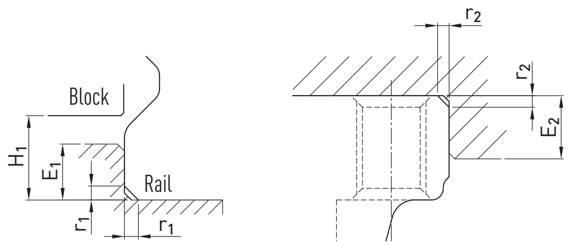


Table 3.72 **Shoulder heights and edge roundings**

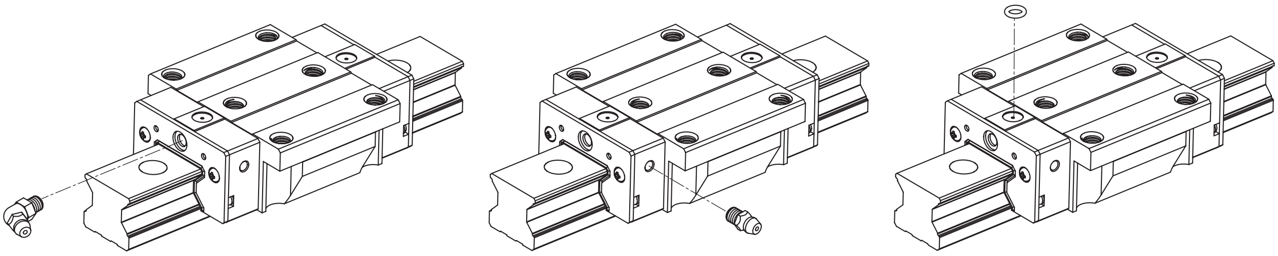
Series/Size	Max. radius of edges r_1	Max. radius of edges r_2	Shoulder height of the reference edge of rail E_1	Shoulder height of the reference edge of block E_2	Clearance height under block H_1
WE_17	0.4	0.4	2.0	4.0	2.5
WE/QW_21	0.4	0.4	2.5	5.0	3.0
WE/QW_27	0.5	0.5	3.0	7.0	4.0
WE/QW_35	0.5	0.5	3.5	10.0	4.0
WE_50	0.8	0.8	6.0	10.0	7.5

Unit: mm

4. Accessories

4.1 Lubrication adapter

A lubricating nipple is fitted as standard on the end face of one end of the block **(1)**. The opposite side is closed with a plug screw. Alternatively, lubrication can also be supplied via the four holes **(2)** provided in the side of the deflector or from above **(3)**. Lubricating nipples, lubrication adapters or push-in fittings can be used for lubrication.



(1) Front side lubrication **(2)** Side lubrication **(3)** Lubrication from above

Table 4.1 **Overview of block type/thread size**

Block type	Thread size side/front
HG_15	M4
HG_20, HG_25, HG_30, HG_35	M6 × 0.75
HG_45, HG_55, HG_65	1/8 PT
QH_15	M4
QH_20, QH_25, QH_30, QH_35	M6 × 0.75
QH_45	1/8 PT
EG_15	M4
EG_20, EG_25, EG_30, EG_35	M6 × 0.75
QE_15	M4
QE_20, QE_25, QE_30, QE_35	M6 × 0.75
CG_15, CG_20	M3
CG_25, CG_30, CG_35, CG_45	M6 × 0.75
WE_17	M3
WE_21, WE_27, WE_35, QW_21, QW_27	M6 × 0.75 / M4
WE_35, QW_35	M6 × 0.75
WE_50	1/8 PT
MG_15	M3
RG_15, RG_20, CRG_15, CRG_20	M4
RG_25, RG_30, RG_35, CRG_25, CRG_30, CRG_35	M6 × 0.75
RG_45, RG_55, RG_65, CRG_45, CRG_55, CRG_65	1/8 PT
QR_25, QR_30, QR_35	M6 × 0.75
QR_45	1/8 PT