

Miniature carriage units – corrosion-resistant

with cylindrical roller flat cages



Miniature carriage units

Miniature carriage units with cylindrical roller flat cages are corrosion-resistant, ready-to-fit cage guidance systems for limited stroke lengths. They have a high load carrying capacity, high rigidity and high accuracy whilst requiring very little space.

Due to their compact design, they can often be used to replace guidance systems which require significantly more space.

The units are produced in numerous carriage and guideway lengths, giving cost-effective designs.

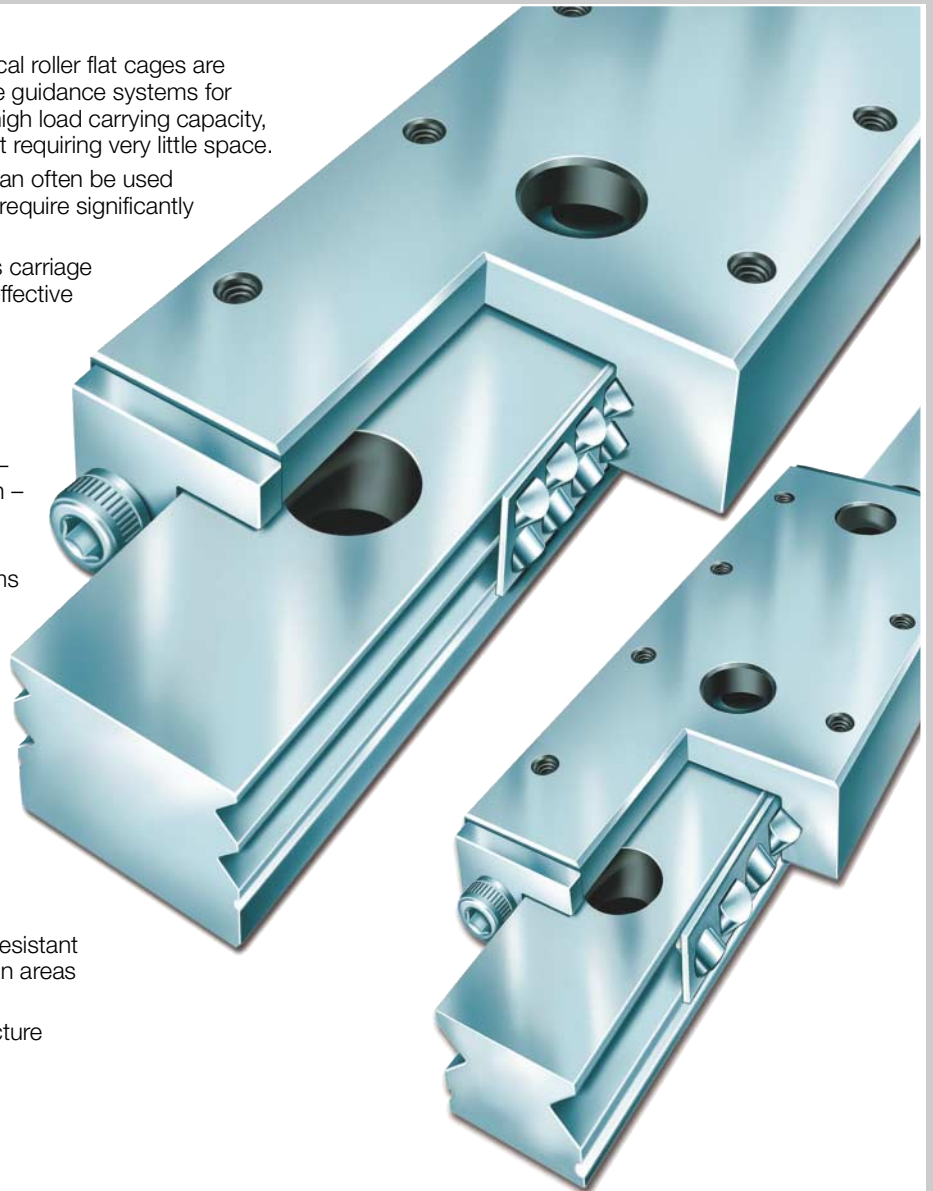
Miniature carriage units

- are linear locating bearings with at least one carriage
- support loads from all directions – apart from the direction of motion – and moments about all axes
- have higher rigidity than linear recirculating ball guidance systems
- are very smooth-running
- have high running accuracy.

Applications






Miniature carriage units:

- are particularly suitable for
 - short stroke lengths
 - low-friction motion
 - oscillating motion
 - high loads where high rigidity is also required
- are used, due to their corrosion-resistant design, in the following application areas
 - medical equipment
 - electronic component manufacture
 - robotics
 - laboratory equipment
 - in “clean room” conditions.



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Features

Miniature carriage units

- of these series are complete units comprising:
 - a carriage and a guideway
 - flat cages with one or two rows of cylindrical rollers, depending on the size
 - end pieces
 - plastic closing plugs
- have rolling element arrangements which transmit forces at a contact angle of 45°
 - RMWE 12 VA and RMWE 15 VA have four rows and RMWE 7 VA and RMWE 9A VA have two rows of cylindrical rollers in line contact with the raceways
 - RMWE 12 VA and RMWE 15 VA have cylindrical rollers in an O arrangement as standard
- have cylindrical rollers in an O or X arrangement
 - an O arrangement is more rigid and better suited to supporting tilting moments than an X arrangement. An X arrangement can be achieved by changing over the cages
 - RMWE 7 VA and RMWE 9A VA have cylindrical rollers in a crossed roller arrangement
- can be lubricated with oil or grease via the guideway
- are available in various lengths and stroke lengths.

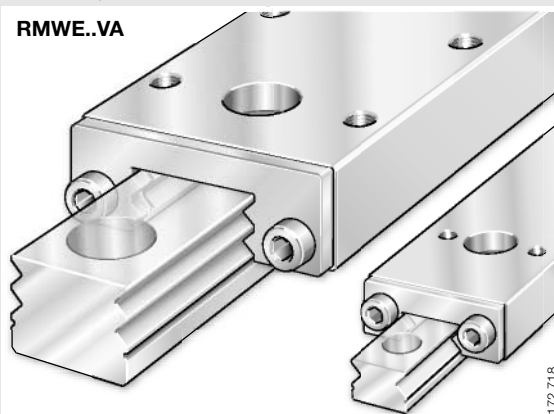
End pieces

- are corrosion-resistant
- restrict the travel of the cage
- protect the rolling elements against contamination.

Miniature carriage units – corrosion-resistant



RMWE..VA

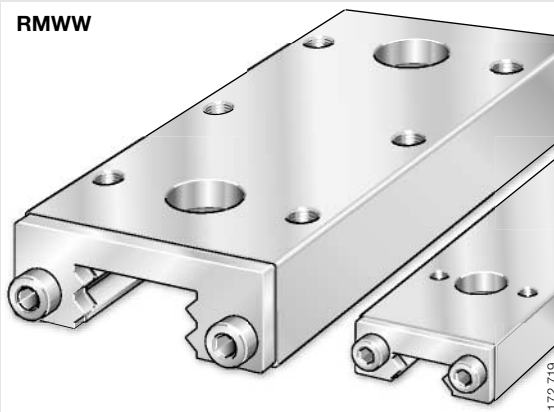


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- basic design comprising:
 - carriage and guideway
 - cylindrical roller flat cages
 - end pieces
 - closing plugs
- suitable for temperatures up to +120 °C

Carriage – corrosion-resistant

RMWW

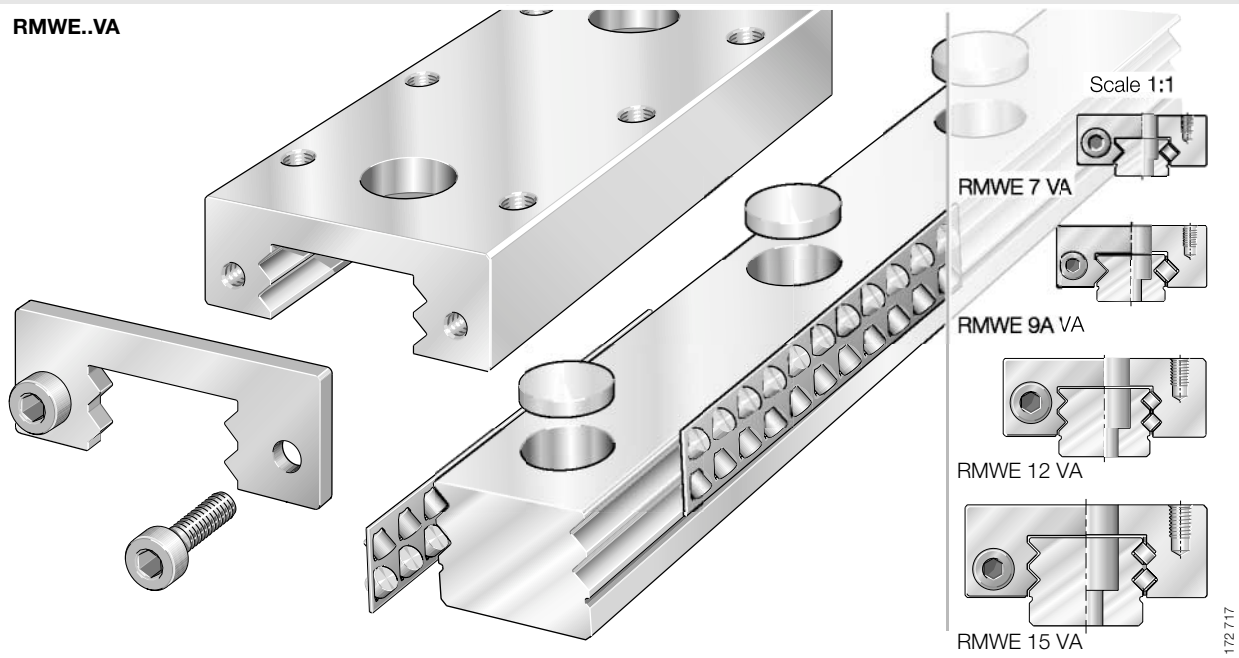


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- hardened and ground saddle plate made from corrosion-resistant steel
- RMWW 12 and RMWW 15 have four rolling element raceways, RMWW 7 and RMWW 9 have two raceways
- through holes for fixing the guideway through the carriage, threaded holes for fixing the carriage
- holes in the end faces for the end pieces

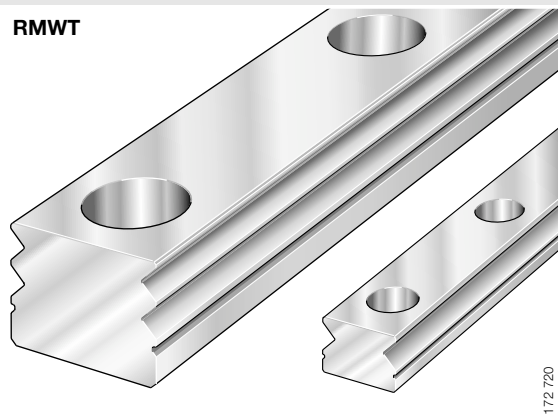
Miniature carriage units – corrosion-resistant

RMWE..VA



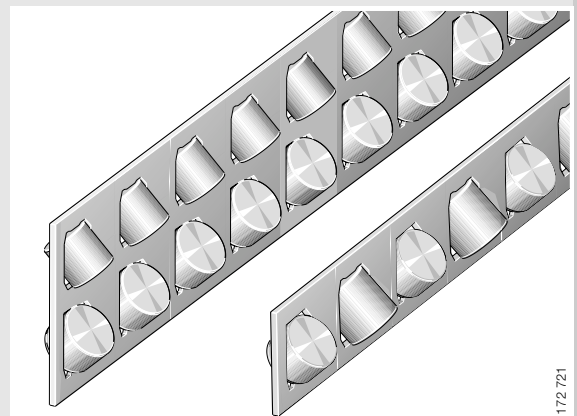
Guideways – corrosion-resistant

RMWT



- through hardened, corrosion-resistant steel with a minimum hardness of 620 HV
- precision ground raceways for rolling elements
- counterbored through holes for the fixing screws

Cylindrical roller flat cages – corrosion-resistant



- cage strip made from corrosion-resistant steel
- cylindrical rollers to DIN 5 402-1

Miniature carriage units – corrosion-resistant

with cylindrical roller flat cages



Design and safety guidelines

Load carrying capacity and life

The size of the guidance unit is determined by the load carrying capacity of the individual elements. The load carrying capacity is described in terms of the basic dynamic load rating C and basic static load rating C_0 (*dimension tables*).



For applications with temperatures in excess of $+120\text{ °C}$, factors must be used to reflect reductions in the basic load ratings. Please consult the INA engineering service.

Basic rating life

The basic rating life is determined using the following formulae:

$$L = k_{KHV} \cdot \left(\frac{C}{P}\right)^p$$

$$L_h = \frac{8,33 \cdot 10^5}{H \cdot n_{osc}} \cdot k_{KHV} \cdot \left(\frac{C}{P}\right)^p$$

L m
Basic rating life in 100 000 m

k_{KHV} –
Short stroke factor in accordance with DIN 636-3 (Figure 1)

C N
Basic dynamic load rating (*dimension tables*)

P N
Equivalent dynamic load

p –
Life exponent = 10/3

L_h h
Basic rating life in operating hours

H mm
Distance between ends of stroke

n_{osc} min⁻¹
Number of return strokes per minute.

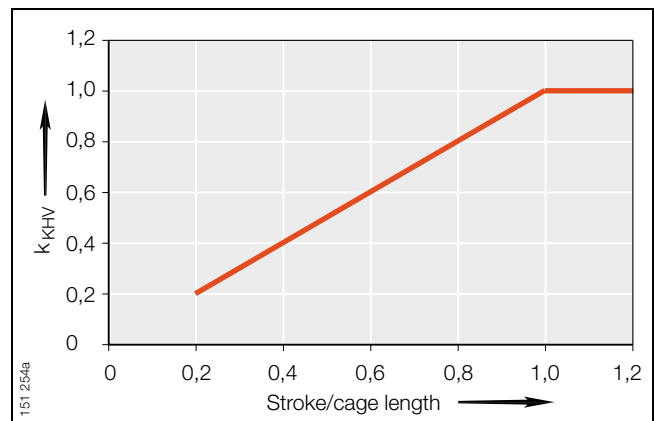


Figure 1 · Short stroke factor k_{KHV} –
in accordance with DIN 636-3

Static load safety factor

The static load safety factor S_0 indicates the security with regard to permissible permanent deformation in the bearing without affecting the guidance accuracy and smooth running of the bearing.

It can be determined using the following formula:

$$S_0 = \frac{C_0}{P_0}$$

$$S_0 = \frac{M_0}{M}$$



If high demands are placed on accuracy and smoothness of running, the static load safety factor should not be less than $S_0 = 3$.

For high loads, the load carrying capacity of the fixing screws must be checked!

The equivalent static bearing load is determined by the maximum load F_{\max} .

$$P_0 = F_{\max}$$

$$M_0 = M_{\max}$$

S_0 –
Static load safety factor

C_0 N
Basic static load rating (*dimension tables*)

P_0 N
Maximum equivalent static load

M_0 Nm
Basic static moment rating in load direction
(M_{0x} , M_{0y} , M_{0z} from *dimension tables*)

M Nm
Equivalent static moment in load direction.

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Preload

Miniature carriage units RMWE..VA are preloaded (Table 1). Increasing the preload has the effect of increasing:

- the rigidity
- the moment load carrying capacity
- the guidance accuracy.

! However, preload also influences the displacement resistance and the operating life of cage guidance systems!

Table 1 · Preload class

Class	Preload	Suitable applications
V1	0,005 · C to 0,02 · C	Low to moderate loads; moderate to high rigidity; moment loads

Location of guideways and carriages

The defined locating face on the carriage should be used in the design (Figure 2)

- the locating face is on the opposing side to the marked face.

If high rigidity and high load carrying capacity are required, the guidance elements should be abutted on both sides against locating faces of the adjacent construction (Figure 3).

! For high loads, the load carrying capacity of the fixing screws must be checked!

If fixing is to be carried out in accordance with DIN 645-2, smaller screws should be used in conjunction with appropriate support washers.

In order to avoid location defects, the holes in the adjacent construction must be carefully deburred.

! The counterbores of the guideway fixing holes have sharp edges! Risk of injury!

The carriage must not be removed from the guideway! Incorrect fitting or dismantling can damage the cage!

If corrosion-resistant fixing screws are used, their lower tensile strength and lower tightening torques must be taken into consideration!

After the guideways have been fitted, the counterbores must be closed off using plastic closing plugs in order to protect against contamination (special design, page 11) (Figure 4)

- for higher temperatures, brass closing plugs can be used – special accessories (page 11).

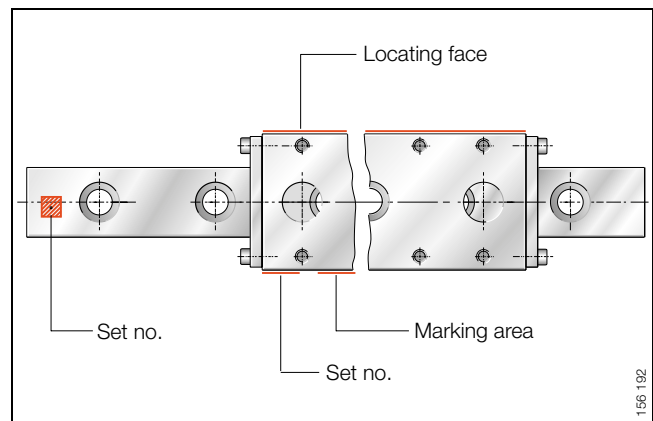


Figure 2 · Locating face and marked face

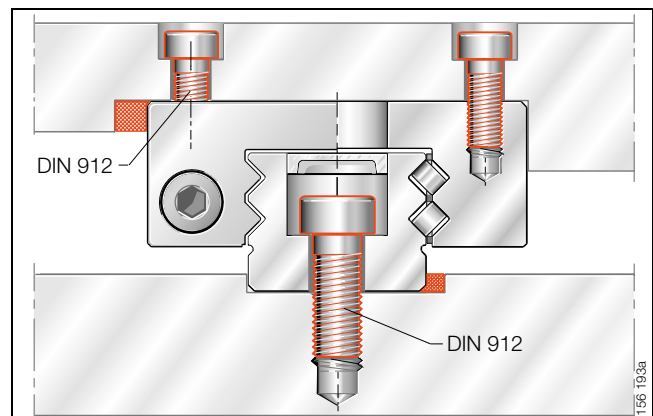


Figure 3 · Location of guideways and carriages

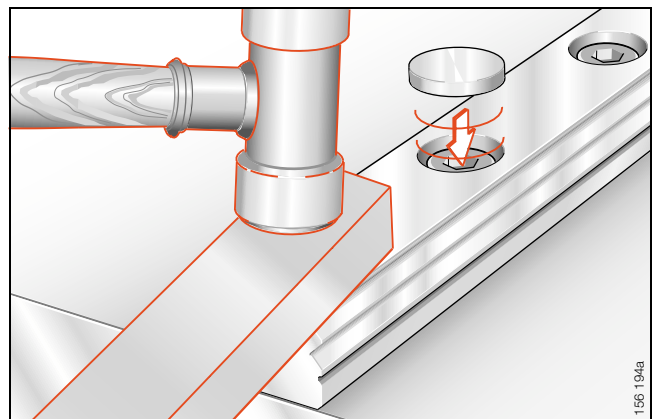


Figure 4 · Fitting the closing plugs

Hole patterns

The hole pattern of the carriages and guideways conforms to DIN 645-2. The counterbores in the guideways for series RMWE 12 VA and RMWE 15 VA allow the use of larger fixing screws. Larger screws should always be used if high lateral loads or moment loads are present!

The guideways have a symmetrical hole pattern. In this case, $C_5 = C_6$ (Figure 5).

For guideways with a symmetrical hole pattern:

$$C_5 = C_6 = \frac{1}{2} (L - n \cdot C_4 - V_s)$$

C_5, C_6 mm
Distance between start or end of guideway and nearest hole

L mm
Length of guideway

n -
Maximum number of pitches between holes

C_4 mm
Hole spacing (*Dimension table*)

V_s mm
Waste (cutting loss approx. 1,3 mm).

Rolling elements in O and X arrangements

Sizes RMWE 12 VA and RMWE 15 VA have cylindrical rollers in an O arrangement as standard (Figure 6). An X arrangement can be achieved by changing over the cages (Figure 6).

Delivered condition/initial operation/lubrication

Miniature carriage units are supplied greased.

The raceways must be:

- greased or oiled, depending on the lubrication process, before initial operation
- protected against solid and liquid contaminants.



Compatibility with the lubricant must be checked!

If the operating temperature is to be in excess of +120 °C, please consult the INA engineering service in relation to the lubricating grease!

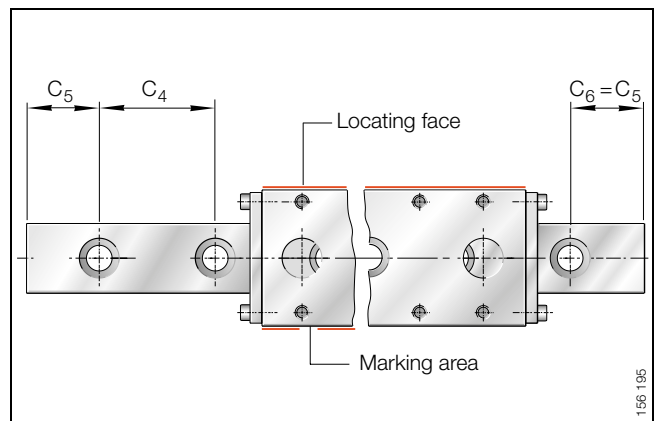


Figure 5 · Symmetrical hole pattern

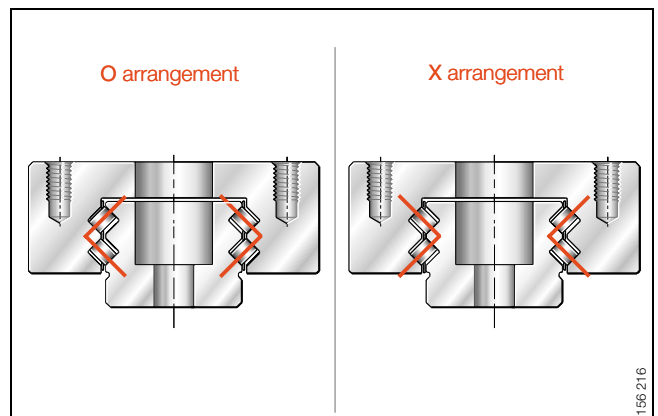


Figure 6 · Rolling elements in O and X arrangements

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Design of bearing arrangements

The design of a bearing arrangement with miniature guidance systems is essentially determined by requirements for:

- accuracy
- rigidity
- load carrying capacity.

This has a direct influence on the adjacent construction and predominantly relates to:

- geometrical and positional accuracy of mounting surfaces
- the location of the guidance elements
- the sealing of the bearing arrangement.

! Ensure that the adjacent construction has adequate strength – VDI guideline 2 230!

End pieces should not be used to limit the stroke!
This can damage the guidance system!

Geometrical and positional accuracy of mounting surfaces

The higher the requirements for accuracy and smooth running, the more attention must be paid to geometrical and positional accuracy.

Observe the tolerances for the support and locating surfaces in accordance with Figure 7, Figure 8 and Table 3

- surfaces should be ground or precision milled.
A mean roughness value of $\leq R_a 1,6$ should be achieved.

! If these tolerances are not met,
– this will impair overall guidance system accuracy
– the preload will be affected
– the guidance system life will be reduced!

The permissible values for ΔH (Figure 7) are given by the formula below. If the variation is greater than this, please consult the INA engineering service.

$$\Delta H = a \cdot b$$

ΔH μm
Maximum permissible deviation from the theoretically precise position

a –
Factor dependent on bearing size (Table 2).
This factor is valid for a guidance system set free from clearance!

b mm
Centre distance between guidance elements.

Table 2 · Factor dependent on bearing size

Miniature carriage unit Designation	Factor a
RMWE 7 VA, RMWE 9A VA, RMWE 12 VA	0,04
RMWE 15 VA	0,08

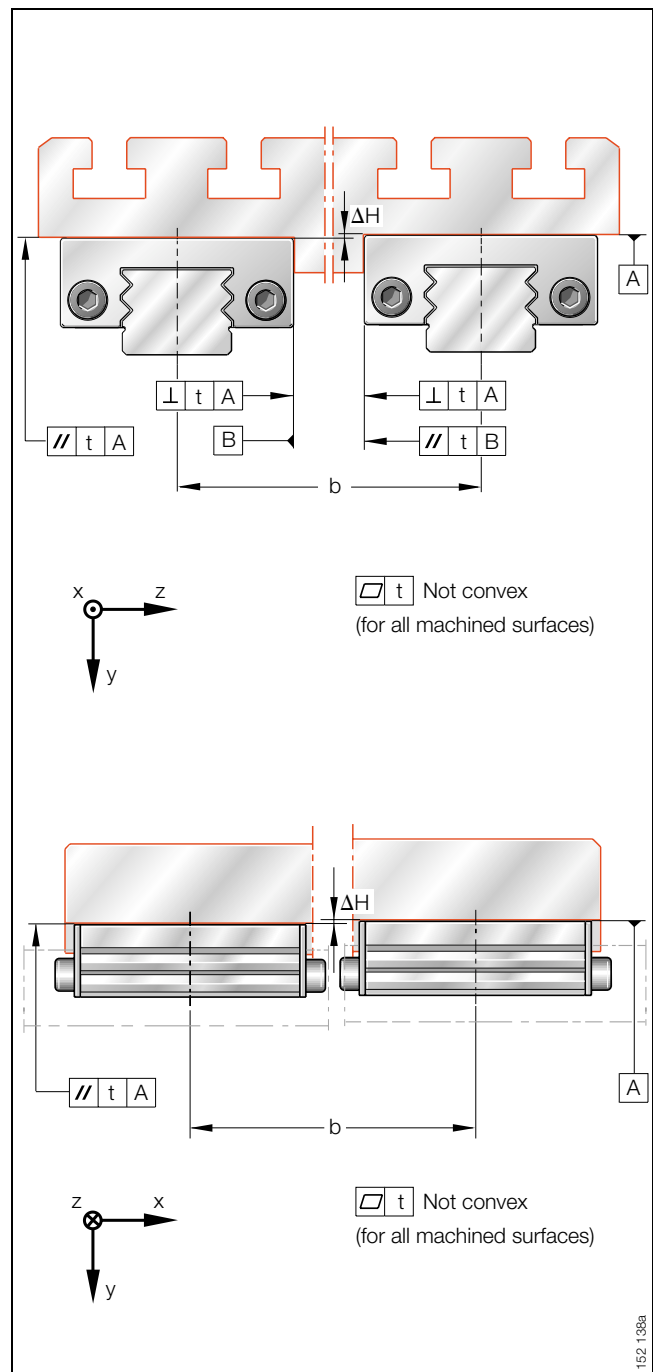


Figure 7 · Tolerances for mounting surfaces

Parallelism of mounted guideways

For guideways arranged parallel to each other, the parallelism value t given in Figure 8 and Table 3 should be adhered to

- If the maximum values are used, this may increase the displacement resistance
- For larger tolerances, please consult the INA engineering service.
- For calculation of ΔH , see page 8.

Table 3 · Values for t

Miniature carriage unit Designation	Guideway Designation	Parallelism t μm
RMWE 7 VA	RMWT 7	3
RMWE 9A VA	RMWT 9	3
RMWE 12 VA	RMWT 12	4
RMWE 15 VA	RMWT 15	5

Locating heights and corner radii

Locating heights and corner radii should be in accordance with Figure 9 and Table 4.

Table 4 · Locating heights and corner radii


Miniature carriage unit Designation	Locating heights and corner radii			
	h_1	h_2 max.	r_1 max.	r_2 max.
RMWE 7 VA	2,5	1	0,4	0,1 ¹⁾
RMWE 9A VA	3	1,5	0,4	0,1 ¹⁾
RMWE 12 VA	4	2,5	0,4	0,4
RMWE 15 VA	5	3	0,4	0,4

¹⁾ Preferably with undercut.

Sealing

In order to prevent damage to the guidance systems, the raceways must be kept clean at all times. If the end pieces used as standard are not adequate for this purpose, additional seals must be provided in the adjacent construction.

Corrosion-resistant design

 Miniature carriage units RMWE..VA are corrosion-resistant due to the steels used in manufacture.

If very high levels of corrosion resistance are required, the suitability of the unit for the specific application must be investigated!

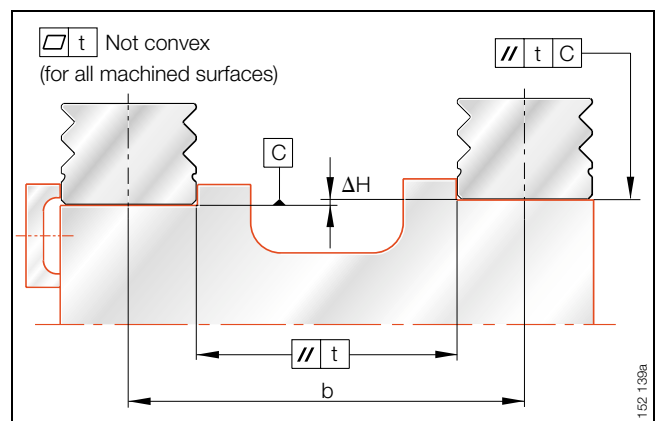


Figure 8 · Parallelism of mounted guideways

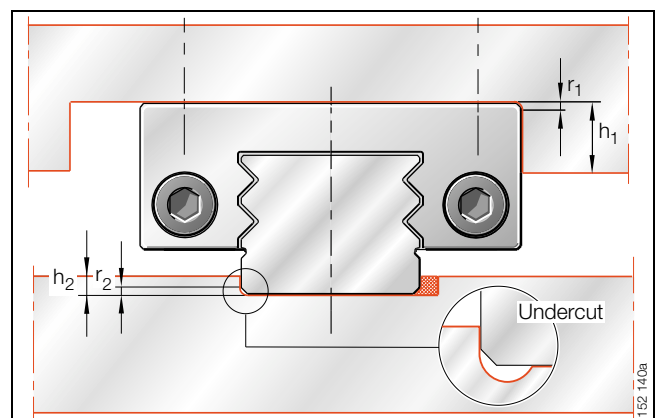


Figure 9 · Locating heights and corner radii

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Accuracy

Accuracy classes available: see Figure 10 and Table 5.

Table 5 · Accuracy classes

Miniature carriage unit Designation	Accuracy class	
RMWE..VA	G1 ¹⁾	G2

¹⁾ Available only by agreement.
The standard version G2 should be used in preference.

Parallelism of raceways to locating surfaces

Parallelism tolerances of guideways: see Figure 10.

Tolerances of reference dimensions for locating surfaces

The tolerances are arithmetic mean values (Figure 11 and Table 6). They relate to the centre point of the screw mounting or locating surfaces of the carriage. The dimensions H and A₁ should always remain within the tolerance irrespective of the position of the carriage on the guideway.

Table 6 · Accuracy class and tolerances

Tolerance		Accuracy class	
		G1 μm	G2 μm
for height	H	±10	±10
Height difference ¹⁾	ΔH	5	10
for distance	A ₁	±10	±20
Distance difference ¹⁾	ΔA ₁	7	15

¹⁾ Dimensional difference between several carriages on one guideway, measured at the same point on the guideway.

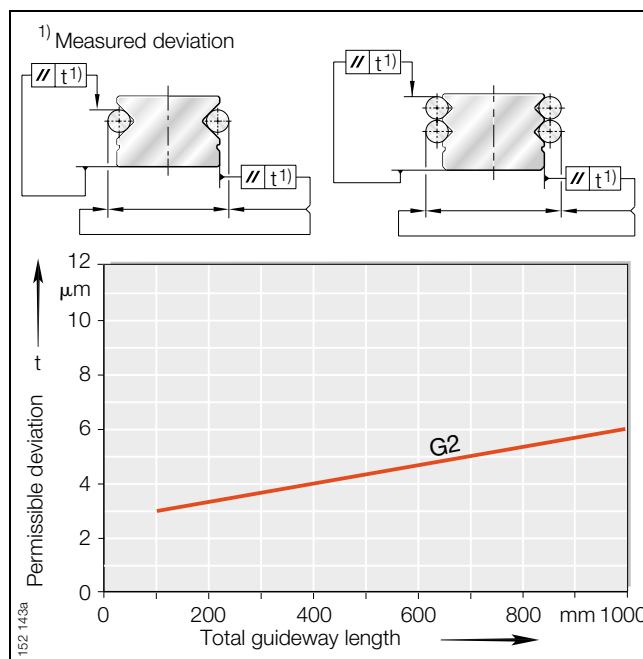


Figure 10 · Parallelism tolerances of guideways

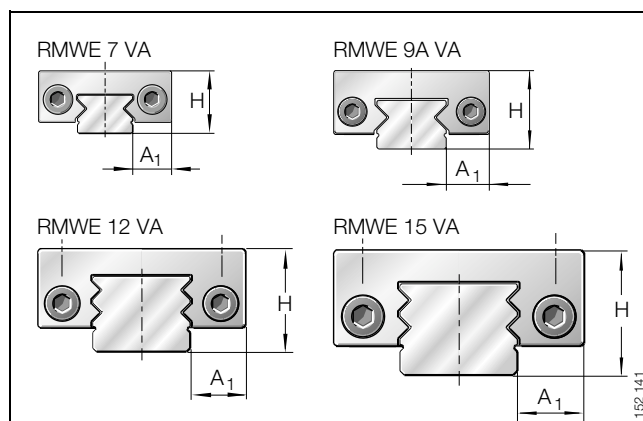


Figure 11 · Reference dimensions for accuracy

Length tolerances for guideways

Tolerances: see Figure 12 and Table 7.

Table 7 · Length tolerances

Miniature carriage unit	Tolerances Guideways/carriages
Designation	$L \leq 360$ mm
RMWE..VA	from +0,6 mm to -1,1 mm



Special designs

Available by agreement:

- plastic closing plugs
– suffix KA
- brass closing plugs
– suffix KAM.

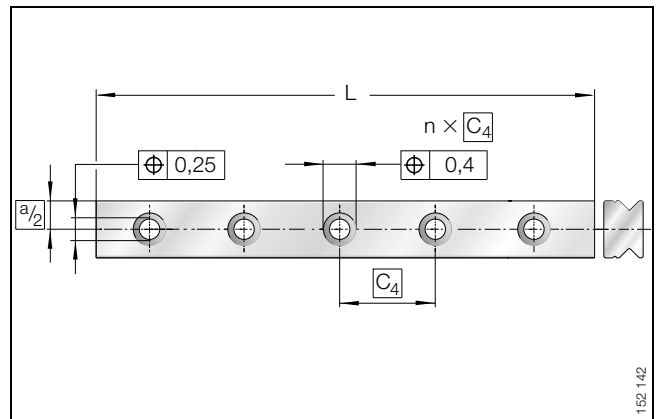


Figure 12 · Length tolerances



Ordering example and ordering designation

Corrosion-resistant miniature carriage unit with cylindrical roller flat cage and one carriage

RMWE..VA	
Size code	15
Guideway length C_1	159 mm
Stroke h	54 mm
Cage length L_k	130,4 mm
Safety range z	$4 \leq z \leq 10$

Guideway length L

$$L = C_1 + h + z$$

$$L = 159 \text{ mm} + 54 \text{ mm} + 10 \text{ mm} = 223 \text{ mm}$$

Next guideway length = 239 mm
(in accordance with table on page 22).

Ordering designation:

1 off RMWE 15 VA/159×239/54 (Figure 13).

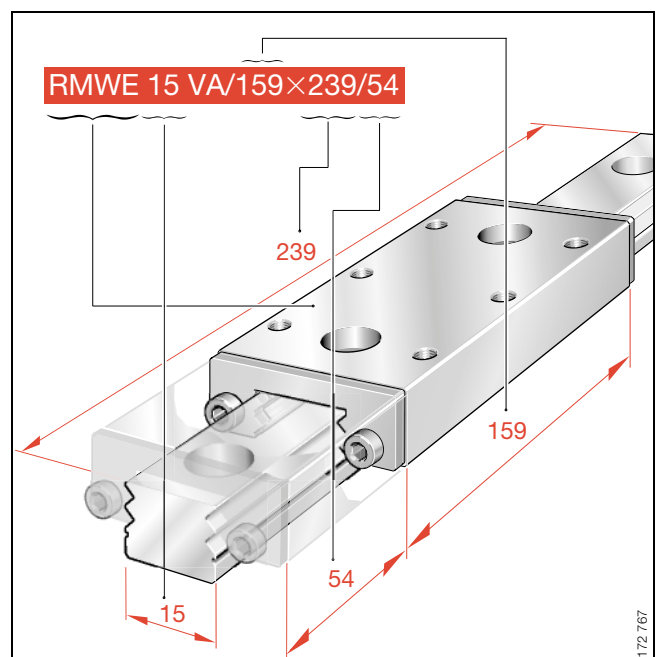
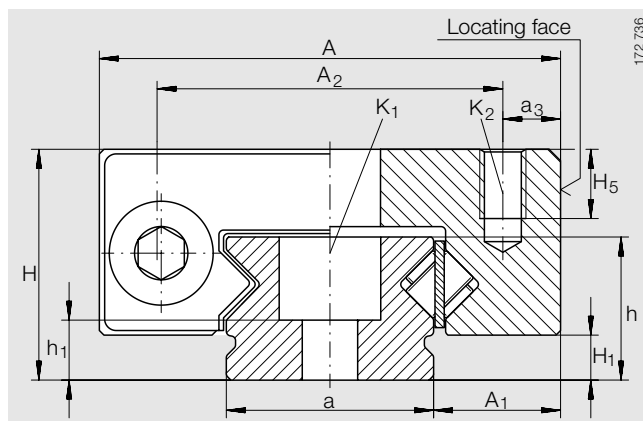


Figure 13 · Ordering example, ordering designation

Miniature carriage units – corrosion-resistant

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Series RMWE 7 VA¹⁾



RMWE 7 VA

Dimension table · Dimensions in mm

Unit Designation	Dimensions				Mounting dimensions			
	L _{max} ²⁾	C _{1 max} ³⁾	H	A	A ₁	A ₂	a _{-0,005 -0,05}	a ₃
RMWE 7 VA	250	200	8	17	5	12	7	2,5

- 1)  Corrosion-resistant steels may nevertheless undergo various forms of localised corrosion and corrosion involving loss of surface material! If very high levels of corrosion resistance are required, the suitability of the unit for the specific application must be investigated!
- 2) Maximum manufactured length of guideway. Special lengths are available by agreement.
- 3) Maximum manufactured length of carriage.

Example for RMWE 7 VA:

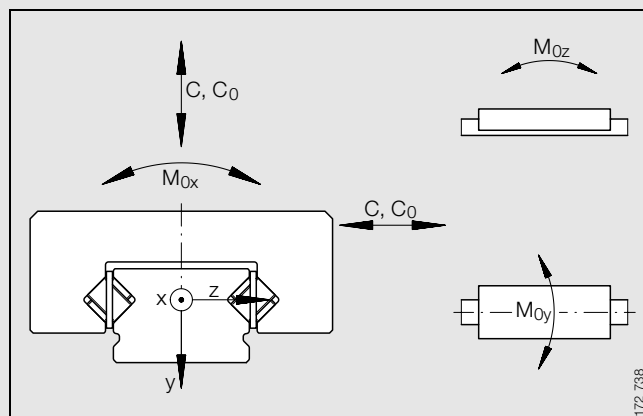
- C₁ Carriage length = 23 mm
- Stroke required = 16 mm
- h Stroke length = 18 mm
- L_k Length of cage = 12,9 mm
- z Safety range = 10 mm (4 ≤ z ≤ 10)
- L Length of guideway (see formula and table *Guideway*, page 13).

$$L = C_1 + h + z$$

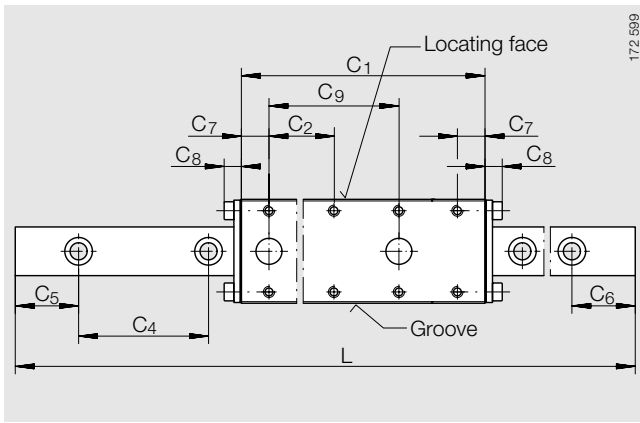
L = 23 mm + 18 mm + 10 mm = 51 mm (next standard length from table *Guideway*: L = 89 mm).

Ordering data:

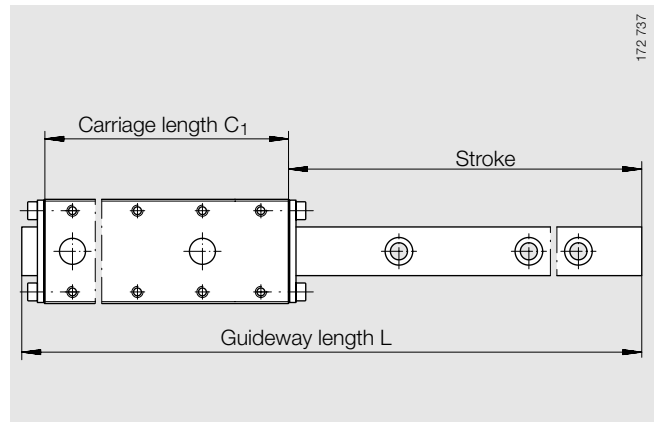
RMWE 7 VA/23×89/18



Load directions
(table *Main dimensions*, *basic load ratings*, *moments*)



RMWE 7 VA · top view



Main dimension and stroke length
(table *Main dimensions, basic load ratings, moments*)

										K ₁ , K ₂		
C ₇	C ₂	C ₄	C ₅ /C ₆	C ₈	C ₉	H ₁	H ₅	h	h ₁	For screw DIN 912-12.9	Tightening torque max. Nm	Screw corrosion- resistant ¹⁾ max. Nm
3,5	8	15	7	3	16	1,3	2,5	4,9	1,7	M2	0,6	0,2

Main dimensions, basic load ratings, moments

Unit Designation ¹⁾	Stroke length h mm	Dimensions		Basic load ratings		Moment ratings		
		C ₁ mm	L _k ⁴⁾ mm	dyn. C N	stat. C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
RMWE 7 VA	18	23	12,9	950	1250	4	3	3
	6		18,9	1300	1870	6	7	7
	30	47	30,9	1940	3100	10	18	18
	18		36,9	2230	3750	12	25	25
	6	42,9	2500	4350	14	34	34	
	38	63	42,9	2500	4350	14	34	34
	26		48,9	2800	5000	16	44	44
	14		54,9	3050	5600	18	55	55
	2		60,9	3300	6200	20	67	67
	78	95	54,9	3050	5600	18	55	55
	66		60,9	3300	6200	20	67	67
	54		66,9	3550	6900	22	81	81
	42		72,9	3800	7500	24	95	95
	30		78,9	4050	8100	26	111	111
	18		84,9	4300	8700	28	128	128
	6		90,9	4550	9400	30	147	147

⁴⁾ Length of cage. Special lengths are available by agreement.

Carriage

Carriage	
Designation	Mass ≈g
RMWW 7	12
	12
	25
	25
	25
	33
	33
	33
	33
	51
	51
	51
	51
	51
	51

Guideway

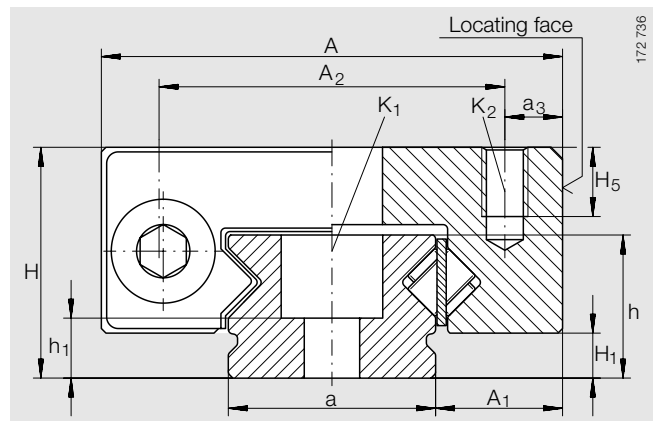
Guideway		
Designation	L ⁵⁾ mm	Mass ≈g
RMWT 7	44	9
	89	19
	104	23
	119	26
	134	30
	164	35
	209	44

⁵⁾ Special lengths are available by agreement.

Miniature carriage units – corrosion-resistant

with cylindrical roller flat cages

Series RMWE 9A VA¹⁾



RMWE 9A VA

Dimension table · Dimensions in mm

Unit Designation	Dimensions				Mounting dimensions			
	$L_{\max}^{2)}$	$C_1 \max^{3)}$	H	A	A_1	A_2	$a - 0,005$ $-0,05$	a_3
RMWE 9A VA	360	300	10	20	5,5	15	9	2,5

1) Corrosion-resistant steels may nevertheless undergo various forms of localised corrosion and corrosion involving loss of surface material! If very high levels of corrosion resistance are required, the suitability of the unit for the specific application must be investigated!

2) Maximum manufactured length of guideway. Special lengths are available by agreement.

3) Maximum manufactured length of carriage.

Example for RMWE 9A VA:

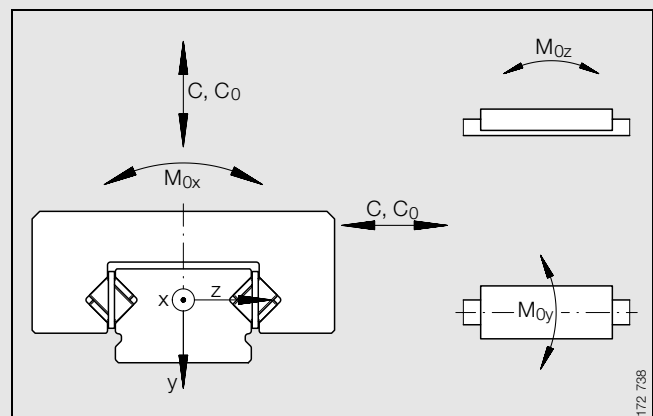
- C_1 Carriage length = 79 mm
- Stroke required = 12 mm
- h Stroke length = 14 mm
- L_k Length of cage = 70,9 mm
- z Safety range = 10 mm ($4 \leq z \leq 10$)
- L Length of guideway (see formula and table *Guideway*, page 15).

$$L = C_1 + h + z$$

$L = 79 \text{ mm} + 14 \text{ mm} + 10 \text{ mm} = 103 \text{ mm}$ (next standard length from table *Guideway*: $L = 99 \text{ mm}$).

Ordering data:

RMWE 9A VA/79×99/14

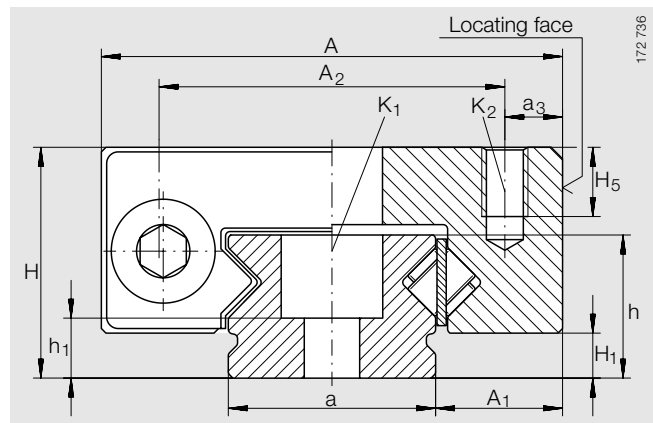


Load directions
(table *Main dimensions*, *basic load ratings*, *moments*)

Miniature carriage units – corrosion-resistant

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Series RMWE 9 VA¹⁾



RMWE 9 VA

Dimension table · Dimensions in mm

Unit Designation	Dimensions				Mounting dimensions			
	$L_{\max}^{2)}$	$C_1 \max^{3)}$	H	A	A_1	A_2	$a \begin{smallmatrix} -0,005 \\ -0,05 \end{smallmatrix}$	a_3
RMWE 9 VA⁴⁾	360	300	10	20	5,5	15	9	2,5

- 1)  Corrosion-resistant steels may nevertheless undergo various forms of localised corrosion and corrosion involving loss of surface material! If very high levels of corrosion resistance are required, the suitability of the unit for the specific application must be investigated!
- 2) Maximum manufactured length of guideway. Special lengths are available by agreement.
- 3) Maximum manufactured length of carriage.
- 4) Not to be used for new designs.

Example for RMWE 9 VA:

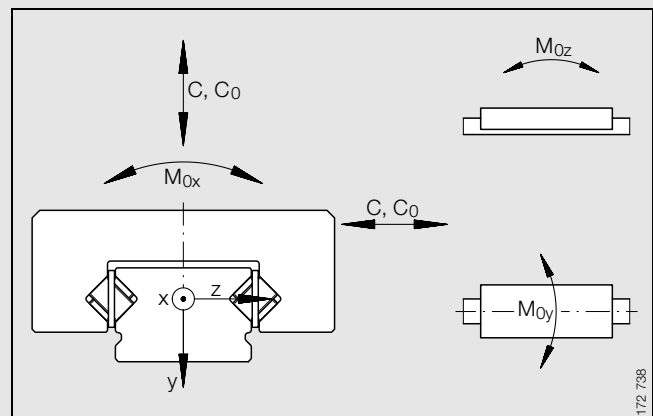
- C_1 Carriage length = 103 mm
- Stroke required = 60 mm
- h Stroke length = 62 mm
- L_k Length of cage = 70,9 mm
- z Safety range = 10 mm ($4 \leq z \leq 10$)
- L Length of guideway (see formula and table *Guideway*, page 17).

$$L = C_1 + h + z$$

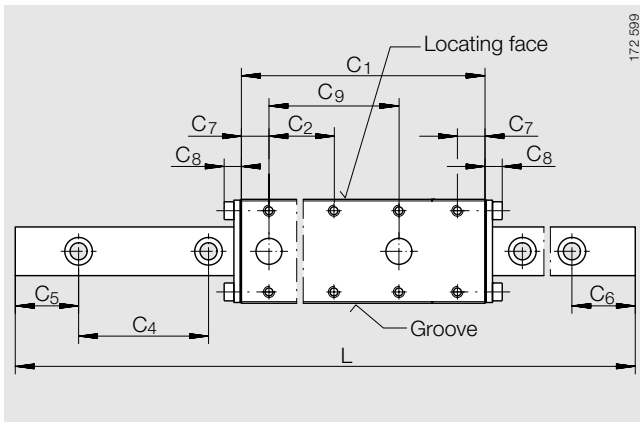
$L = 103 \text{ mm} + 62 \text{ mm} + 10 \text{ mm} = 175 \text{ mm}$ (next standard length from table *Guideway*: $L = 199 \text{ mm}$).

Ordering data:

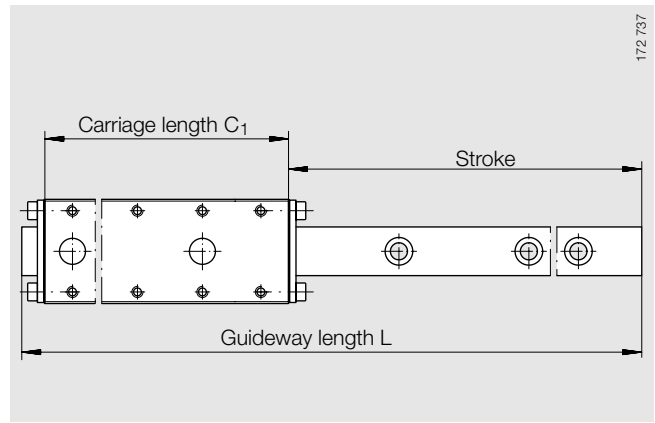
RMWE 9 VA/103×199/62



Load directions
(table *Main dimensions, basic load ratings, moments*)



RMWE 9 VA · top view



Main dimension and stroke length
(table *Main dimensions, basic load ratings, moments*)

										K ₁ , K ₂		
C ₇	C ₂	C ₄	C ₅ /C ₆	C ₈	C ₉	H ₁	H ₅	h	h ₁	For screw DIN 912-12.9	Tightening torque max. Nm	Screw corrosion- resistant ¹⁾ max. Nm
6	13	20	9,5	3,5	26	1,7	2,5	6,2	2,6	M2	0,6	0,2

Main dimensions, basic load ratings, moments

Unit Designation ¹⁾	Stroke length h mm	Dimensions		Basic load ratings		Moment ratings		
		C ₁ mm	L _k ⁵⁾ mm	dyn. C N	stat. C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
RMWE 9 VA	18	25	14,9	1740	2340	9	8	8
	4		21,9	2380	3500	13	16	16
	28	51	35,9	3550	5900	22	40	40
	14		42,9	4100	7000	27	56	56
	52	77	49,9	4600	8200	31	75	75
	38		56,9	5100	9400	36	96	96
	24		63,9	5600	10500	40	120	120
	10		70,9	6100	11700	45	146	146
	76	103	63,9	5600	10500	40	120	120
	62		70,9	6100	11700	45	146	146
	48		77,9	6500	12900	49	176	176
	34		84,9	7000	14100	54	208	208
	20		91,9	7500	15200	58	242	242
	6		98,9	7900	16400	63	279	279
	114	129	70,9	6100	11700	45	146	146
	100		77,9	6500	12900	49	176	176
	86		84,9	7000	14100	54	208	208
	72		91,9	7500	15200	58	242	242
	58		98,9	7900	16400	63	279	279
	44		105,9	8300	17600	67	319	319
30	112,9		8800	18700	72	361	361	
16	119,9		9200	19900	76	406	406	
2	126,9		9600	21100	81	454	454	

⁵⁾ Length of cage. Special lengths are available by agreement.

Carriage

Carriage	
Designation	Mass ≈g
RMWW 9	19
	19
	40
	40
	61
	61
	61
	61
	61
	61
	61
	61
	61
	61
	61
	61

Guideway

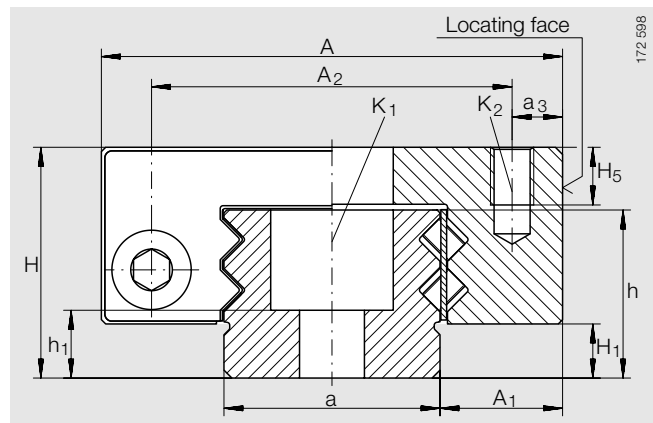
Guideway		
Designation	L ⁶⁾ mm	Mass ≈g
RMWT 9	59	21
	99	36
	159	58
	199	72
	219	80
	299	108

⁶⁾ Special lengths are available by agreement.

Miniature carriage units – corrosion-resistant

with cylindrical roller flat cages

Series RMWE 12 VA¹⁾



RMWE 12 VA

Dimension table · Dimensions in mm

Unit Designation	Dimensions				Mounting dimensions									
	$L_{max}^{2)}$	$C_{1 max}^{3)}$	H	A	A_1	A_2	$a_{-0,005}^{-0,05}$	a_3	C_7	C_2	C_4	C_5/C_6	C_8	C_9
RMWE 12 VA⁴⁾	360	200	13	27	7,5	20	12	3,5	7	15	25	12	5	30

- 1) Corrosion-resistant steels may nevertheless undergo various forms of localised corrosion and corrosion involving loss of surface material! If very high levels of corrosion resistance are required, the suitability of the unit for the specific application must be investigated!
- 2) Maximum manufactured length of guideway. Special lengths are available by agreement.
- 3) Maximum manufactured length of carriage.
- 4) Cylindrical rollers in O arrangement as standard. X arrangement available by agreement.
- 5) For interchangeability with standard elements, support washers and correspondingly smaller screws should be used.

Example for RMWE 12 VA:

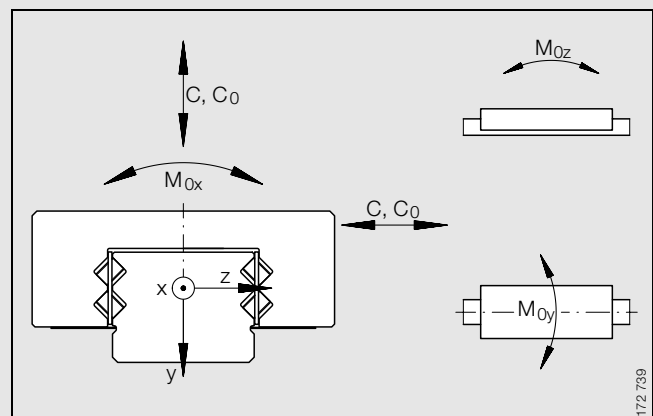
- C_1 Carriage length = 89 mm
- Stroke required = 20 mm
- h Stroke length = 24 mm
- L_k Length of cage = 75,9 mm
- z Safety range = 10 mm ($4 \leq z \leq 10$)
- L Length of guideway (see formula and table *Guideway*, page 19).

$$L = C_1 + h + z$$

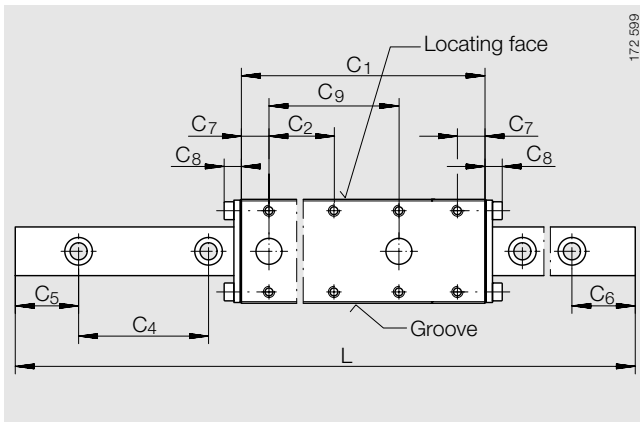
$L = 89 \text{ mm} + 24 \text{ mm} + 10 \text{ mm} = 123 \text{ mm}$ (next standard length from table *Guideway*: $L = 124 \text{ mm}$).

Ordering data:

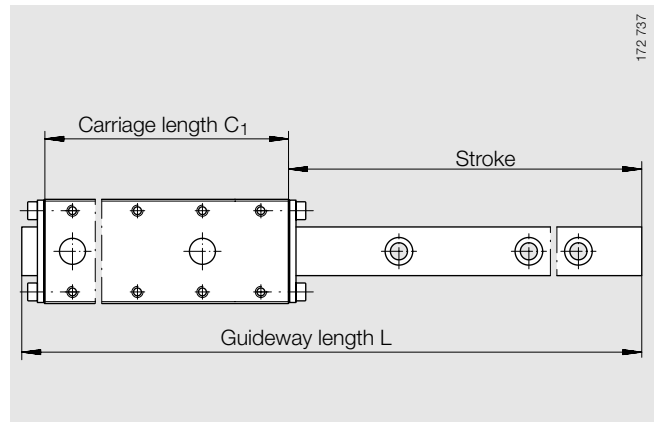
RMWE 12 VA/89×124/24



Load directions
(table *Main dimensions, basic load ratings, moments*)



RMWE 12 VA · top view



Main dimension and stroke length
(table *Main dimensions, basic load ratings, moments*)

				K ₁ ⁵⁾			K ₂		
H ₁	H ₅	h	h ₁	For screw DIN 912-12.9	Tightening torque max. Nm	Screw corrosion-resistant ¹⁾ max. Nm	For screw DIN 912-12.9	Tightening torque max. Nm	Screw corrosion-resistant ¹⁾ max. Nm
2,6	3,5	9	2,8	M4	5	1,7	M3	2,2	1

Main dimensions, basic load ratings, moments

Unit	Stroke length h mm	Dimensions		Basic load ratings		Moment ratings			
		C ₁ mm	L _k ⁶⁾ mm	dyn. C N	stat. C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm	
RMWE 12 VA	18	29	18,9	2230	3750	21	9	9	
	12		21,9	2500	4350	25	12	12	
	42	59	36,9	3800	7500	47	40	40	
	36		39,9	4050	8100	51	47	47	
	30		42,9	4300	8700	56	55	55	
	24		45,9	4550	9400	60	64	64	
	18		48,9	4800	10000	64	73	73	
	12		51,9	5000	10600	69	83	83	
	6		54,9	5200	11200	73	93	93	
	72		89	51,9	5000	10600	69	83	83
	66			54,9	5200	11200	73	93	93
	60			57,9	5500	11900	77	104	104
	54	60,9		5700	12500	82	116	116	
	48	63,9		5900	13100	86	128	128	
	42	66,9		6100	13700	90	141	141	
	36	69,9		6300	14400	94	154	154	
	30	72,9		6600	15000	99	168	168	
	24	75,9		6800	15600	103	183	183	
	18	78,9		7000	16200	107	198	198	
	12	81,9	7200	16900	112	214	214		
	6	84,9	7400	17500	116	231	231		
	102	119	66,9	6100	13700	90	141	141	
	96		69,9	6300	14400	94	154	154	
	90		72,9	6600	15000	99	168	168	
84	75,9		6800	15600	103	183	183		
78	78,9		7000	16200	107	198	198		
72	81,9		7200	16900	112	214	214		
66	84,9		7400	17500	116	231	231		
60	87,9		7600	18100	120	248	248		
54	90,9		7800	18700	125	266	266		

Carriage

Carriage	
Designation	Mass ≈g
RMWW 12	35
	35
	74
	74
	74
	74
	74
	74
	74
	74
	113
	113
	113
	113
	113

Guideway

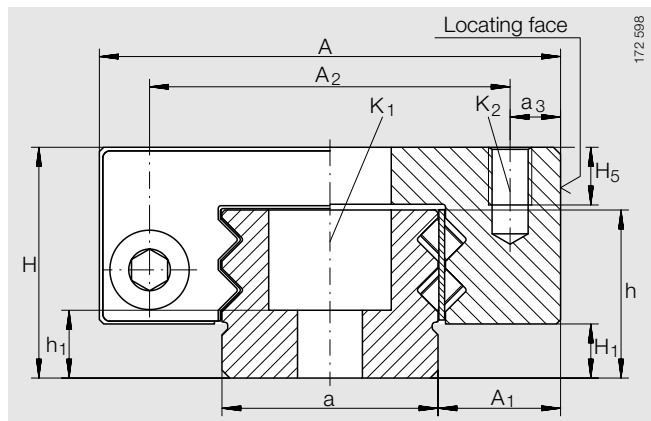
Guideway		
Designation	L ⁷⁾ mm	Mass ≈g
RMWT 12	49	30
	99	64
	124	82
	149	98
	174	114
	224	148
	324	215

⁶⁾ Length of cage. Special lengths are available by agreement.
⁷⁾ Special lengths are available by agreement.

Miniature carriage units – corrosion-resistant

with cylindrical roller flat cages

Series RMWE 12 VA¹⁾




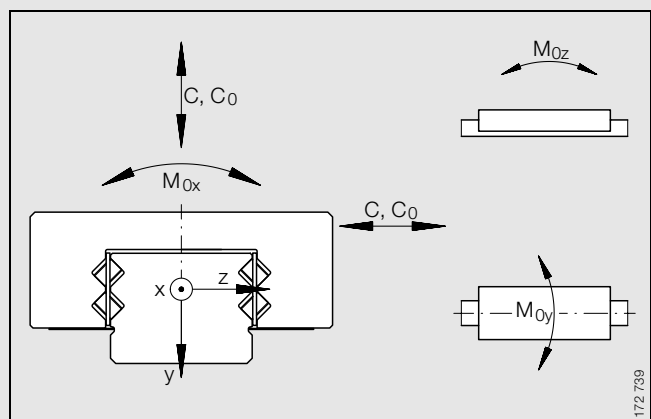
RMWE 12 VA

Dimension table (continued) · Dimensions in mm

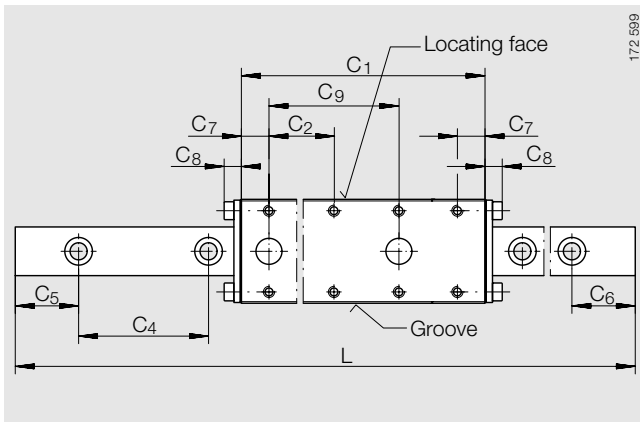
Unit Designation	Dimensions				Mounting dimensions									
	$L_{\max}^{2)}$	$C_{1 \max}^{3)}$	H	A	A_1	A_2	$a_{-0,005}^{-0,05}$	a_3	C_7	C_2	C_4	C_5/C_6	C_8	C_9
RMWE 12 VA⁴⁾	360	200	13	27	7,5	20	12	3,5	7	15	25	12	5	30

Example for selection of unit: see page 18.

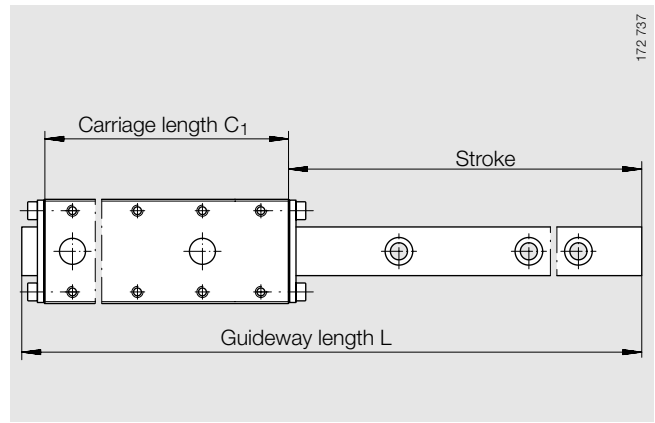
- 1)  Corrosion-resistant steels may nevertheless undergo various forms of localised corrosion and corrosion involving loss of surface material! If very high levels of corrosion resistance are required, the suitability of the unit for the specific application must be investigated!
- 2) Maximum manufactured length of guideway. Special lengths are available by agreement.
- 3) Maximum manufactured length of carriage.
- 4) Cylindrical rollers in O arrangement as standard. X arrangement available by agreement.
- 5) For interchangeability with standard elements, support washers and correspondingly smaller screws should be used.



Load directions
(table Main dimensions, basic load ratings, moments)



RMWE 12 VA · top view



Main dimension and stroke length
(table *Main dimensions, basic load ratings, moments*)

				K ₁ ⁵⁾			K ₂		
H ₁	H ₅	h	h ₁	For screw DIN 912-12.9	Tightening torque max. Nm	Screw corrosion-resistant ¹⁾ max. Nm	For screw DIN 912-12.9	Tightening torque max. Nm	Screw corrosion-resistant ¹⁾ max. Nm
2,6	3,5	9	2,8	M4	5	1,7	M3	2,2	1

Main dimensions, basic load ratings, moments

Unit	Stroke length h	Dimensions		Basic load ratings		Moment ratings		
		C ₁	L _k ⁶⁾	dyn. C N	stat. C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
RMWE 12 VA	48	119	93,9	8000	19400	129	284	284
	42		96,9	8200	20000	133	303	303
	36		99,9	8400	20600	138	322	322
	30		102,9	8600	21200	142	342	342
	24		105,9	8800	21900	146	363	363
	18		108,9	9000	22500	151	385	385
	12		111,9	9200	23100	155	407	407
	6		114,9	9400	23700	159	429	429
	132	149	81,9	7200	16900	112	214	214
	126		84,9	7400	17500	116	231	231
	120		87,9	7600	18100	120	248	248
	114		90,9	7800	18700	125	266	266
	108		93,9	8000	19400	129	284	284
	102		96,9	8200	20000	133	303	303
	96		99,9	8400	20600	138	322	322
	90		102,9	8600	21200	142	342	342
	84		105,9	8800	21900	146	363	363
	78		108,9	9000	22500	151	385	385
	72		111,9	9200	23100	155	407	407
	66		114,9	9400	23700	159	429	429
	60		117,9	9600	24400	164	452	452
	54		120,9	9800	25000	168	476	476
	48		123,9	9900	25500	172	500	500
	42		126,9	10100	26000	177	525	525
	36	129,9	10300	27000	181	551	551	
	30	132,9	10500	27500	185	577	577	
	24	135,9	10700	28000	189	604	604	
	18	138,9	10900	28500	194	632	632	
12	141,9	11100	29500	198	660	660		
6	144,9	11200	30000	202	689	689		

Carriage

Carriage	
Designation	Mass
	≈g
RMWW 12	152
	152
	152
	152
	152
	152
	152
	152
	190
	190
	190
	190
	190
	190
	190

Guideway

Guideway		
Designation	L ⁷⁾	Mass
	mm	≈g
RMWT 12	49	30
	99	64
	124	82
	149	98
	174	114
	224	148
	324	215

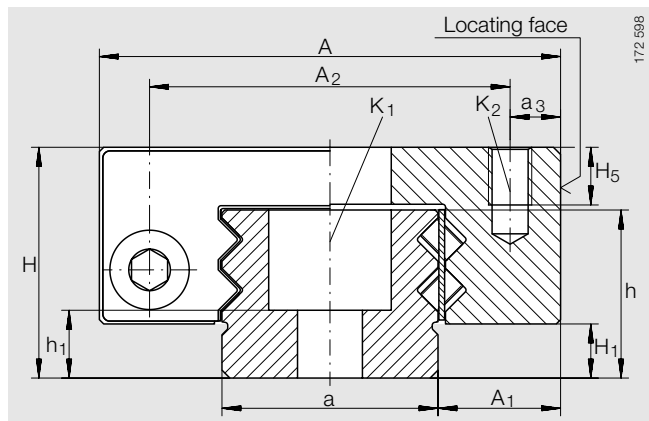
⁶⁾ Length of cage.
Special lengths are available by agreement.

⁷⁾ Special lengths are available by agreement.

Miniature carriage units – corrosion-resistant

with cylindrical roller flat cages

Series RMWE 15 VA¹⁾



RMWE 15 VA

Dimension table · Dimensions in mm

Unit Designation	Dimensions				Mounting dimensions									
	$L_{\max}^{2)}$	$C_1 \max^{3)}$	H	A	A_1	A_2	$a_{-0,005}^{-0,05}$	a_3	C_7	C_2	C_4	C_5/C_6	C_8	C_9
RMWE 15 VA⁴⁾	360	300	16	32	8,5	25	15	3,5	9,5	20	40	19,5	5	40

- 1) Corrosion-resistant steels may nevertheless undergo various forms of localised corrosion and corrosion involving loss of surface material! If very high levels of corrosion resistance are required, the suitability of the unit for the specific application must be investigated!
- 2) Maximum manufactured length of guideway. Special lengths are available by agreement.
- 3) Maximum manufactured length of carriage.
- 4) Cylindrical rollers in O arrangement as standard. X arrangement available by agreement.
- 5) For interchangeability with standard elements, support washers and correspondingly smaller screws should be used.

Example for RMWE 15 VA:

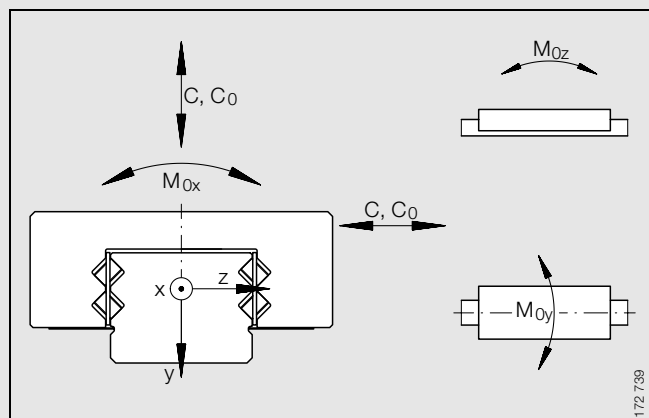
- C_1 Carriage length = 119 mm
- Stroke required = 20 mm
- h Stroke length = 24 mm
- L_k Length of cage = 105,9 mm
- z Safety range = 10 mm ($4 \leq z \leq 10$)
- L Length of guideway (see formula and table *Guideway*, page 23).

$$L = C_1 + h + z$$

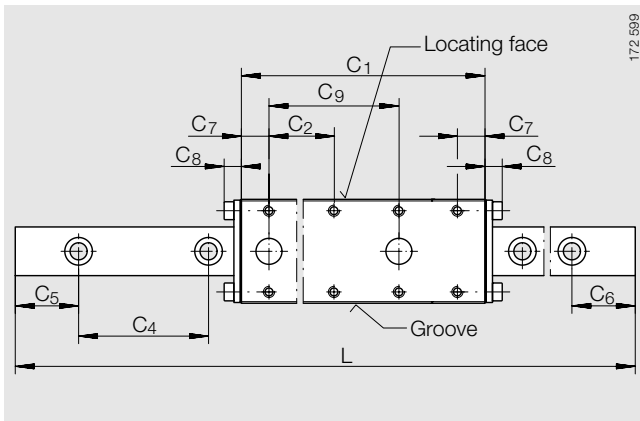
$L = 119 \text{ mm} + 24 \text{ mm} + 10 \text{ mm} = 153 \text{ mm}$ (next standard length from table *Guideway*: $L = 159 \text{ mm}$).

Ordering data:

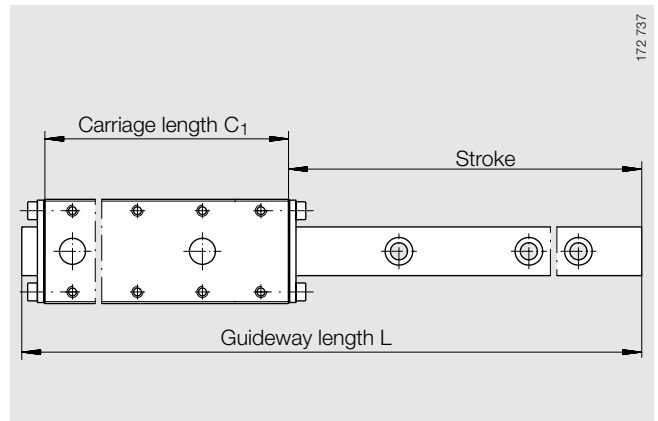
RMWE 15 VA/119×159/24



Load directions
(table *Main dimensions*, *basic load ratings*, *moments*)



RMWE 15 VA · top view



Main dimension and stroke length
(table *Main dimensions, basic load ratings, moments*)

				K ₁ ⁵⁾			K ₂		
H ₁	H ₅	h	h ₁	For screw DIN 912-12.9	Tightening torque max. Nm	Screw corrosion-resistant ¹⁾ max. Nm	For screw DIN 912-12.9	Tightening torque max. Nm	Screw corrosion-resistant ¹⁾ max. Nm
3,5	4	11,7	4,7	M4	5	1,7	M3	2,2	1

Main dimensions, basic load ratings, moments

Unit Designation ¹⁾	Stroke length h mm	Dimensions		Basic load ratings		Moment ratings		
		C ₁ mm	L _k ⁶⁾ mm	dyn. C N	stat. C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
RMWE 15 VA	24	39	25,4	4600	8200	69	37	37
	18		28,9	5100	9400	79	48	48
	10		32,4	5600	10500	89	60	60
	14		35,9	6100	11700	99	73	73
	62	79	46,4	7500	15200	128	121	121
	56		49,9	7900	16400	138	139	139
	48		53,4	8300	17600	148	159	159
	42		56,9	8800	18700	158	180	180
	34		60,4	9200	19900	168	203	203
	28		63,9	9600	21100	178	227	227
	20		67,4	10000	22300	188	252	252
	14		70,9	10400	23400	198	279	279
	6		74,4	10800	24600	208	306	306
	100		119	67,4	10000	22300	188	252
	94	70,9		10400	23400	198	279	279
	86	74,4		10800	24600	208	306	306
	80	77,9		11200	26000	218	336	336
	72	81,4		11600	27000	228	366	366
	66	84,9		12000	28000	239	398	398
	58	88,4		12400	29500	247	431	431
52	91,9	12800		30500	257	465	465	
44	95,4	13200		31500	267	501	501	
38	98,9	13500		33000	277	538	538	
30	102,4	13900	34000	287	577	577		
24	105,9	14300	35000	297	616	616		
16	109,4	14600	36500	307	657	657		
10	112,9	15000	37500	317	700	700		
2	116,4	15400	38500	327	743	743		

Carriage

Carriage	
Designation	Mass ≈g
RMWW 15	19
	19
	19
	19
	40
	40
	40
	40
	40
	40
	40
	40
	40
	40
	40
	40
	40
	40

Guideway

Guideway		
Designation	L ⁷⁾ mm	Mass ≈g
RMWE 15	79	92
	119	138
	159	185
	199	234
	239	280
	359	422

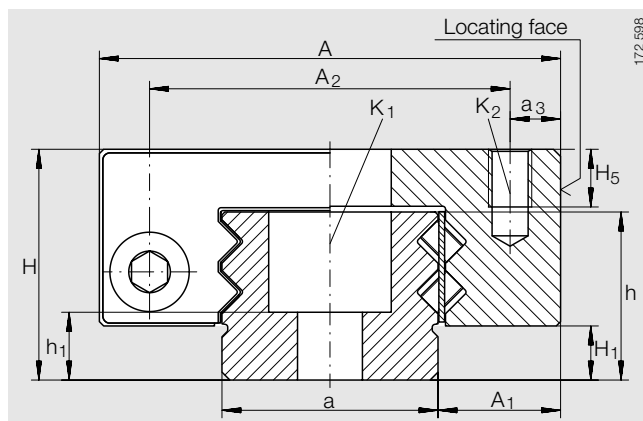
⁷⁾ Special lengths are available by agreement.

⁶⁾ Length of cage. Special lengths are available by agreement.

Miniature carriage units – corrosion-resistant

with cylindrical roller flat cages

Series RMWE 15 VA¹⁾




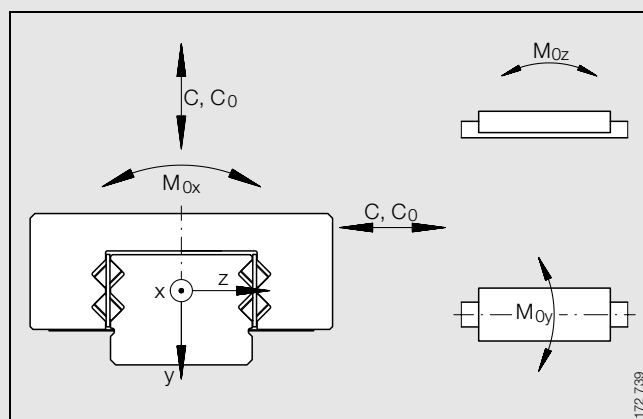
RMWE 15 VA

Dimension table (continued) · Dimensions in mm

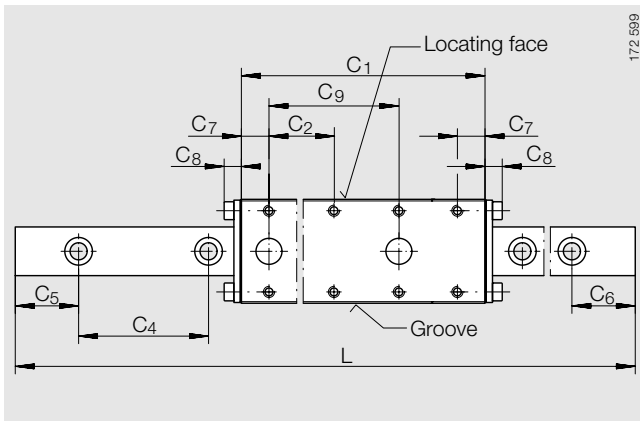
Unit Designation	Dimensions				Mounting dimensions									
	$L_{\max}^{2)}$	$C_1 \max^{3)}$	H	A	A_1	A_2	$a_{-0,005}^{-0,05}$	a_3	C_7	C_2	C_4	C_5/C_6	C_8	C_9
RMWE 15 VA⁴⁾	360	300	16	32	8,5	25	15	3,5	9,5	20	40	19,5	5	40

Example for selection of unit: see page 22.

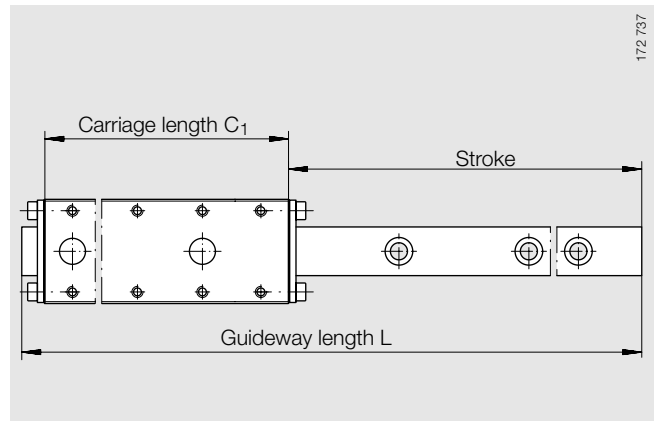
- 1)  Corrosion-resistant steels may nevertheless undergo various forms of localised corrosion and corrosion involving loss of surface material! If very high levels of corrosion resistance are required, the suitability of the unit for the specific application must be investigated!
- 2) Maximum manufactured length of guideway. Special lengths are available by agreement.
- 3) Maximum manufactured length of carriage.
- 4) Cylindrical rollers in O arrangement as standard. X arrangement available by agreement.
- 5) For interchangeability with standard elements, support washers and correspondingly smaller screws should be used.



Load directions
(table Main dimensions, basic load ratings, moments)



RMWE 15 VA · top view



Main dimension and stroke length
(table *Main dimensions, basic load ratings, moments*)

				K ₁ ⁵⁾			K ₂		
H ₁	H ₅	h	h ₁	For screw DIN 912-12.9	Tightening torque max. Nm	Screw corrosion- resistant ¹⁾ max. Nm	For screw DIN 912-12.9	Tightening torque max. Nm	Screw corrosion- resistant ¹⁾ max. Nm
3,5	4	11,7	4,7	M4	5	1,7	M3	2,2	1

Main dimensions, basic load ratings, moments

Unit	Stroke length	Dimensions		Basic load ratings		Moment ratings		
		C ₁	L _k ⁶⁾	dyn. C	stat. C ₀	M _{0x}	M _{0y}	M _{0z}
Designation ¹⁾	h	mm	mm	N	N	Nm	Nm	Nm
RMWE 15 VA	146	159	84,9	12000	28000	238	398	398
	138		88,4	12400	29500	247	431	431
	132		91,9	12800	30500	257	465	465
	124		95,4	13200	31500	267	501	501
	118		98,9	13500	33000	277	538	538
	110		102,4	13900	34000	287	577	577
	104		105,9	14300	35000	297	616	616
	96		109,4	14600	36500	307	657	657
	90		112,9	15000	37500	317	700	700
	82		116,4	15400	38500	327	743	743
	76		119,9	15700	40000	337	788	788
	68		123,4	16100	41000	347	835	835
	62		126,9	16500	42000	357	882	822
	54		130,4	16800	43500	367	931	931
	48		133,9	17200	44500	376	982	982
	40		137,4	17500	45500	386	1030	1030
	34		140,9	17900	47000	396	1080	1080
	26		144,4	18200	48000	406	1140	1140
20	147,9	18600	49000	416	1190	1190		
12	151,4	18900	50500	426	1250	1250		
6	154,9	19200	51500	436	1310	1310		

⁶⁾ Length of cage. Special lengths are available by agreement.

Carriage

Carriage	
Designation	Mass
	≈g
RMWW 15	83
	83
	83
	83
	83
	83
	83
	83
	83
	83
	83
	83
	83
	83
	83
	83
	83
	83

Guideway

Guideway		
Designation	L ⁷⁾	Mass
	mm	≈g
RMWE 15	79	92
	119	138
	159	185
	199	234
	239	280
	359	422

⁷⁾ Special lengths are available by agreement.

Companies in Europe ■

Agents in Europe ●

Resident Engineers ▲

Austria ■

INA AUSTRIA GmbH.
Marktstraße 5
Postfach 35
2331 Vösendorf
Tel. +43/1/6 99 25 41-0
Fax+43/1/69925 41 55

Belgium ■

INA Roulements S.A.
Graignette Business Park
Avenue du Commerce, 38
1420 Braine-l'Alleud
Tel. +32/2/3 89 13 89
Fax+32/2/3 89 13 99

Bulgaria ■

INA Lageri OOD
Kompl. Krasno Selo BL 194/W,
App. 54
P.K. 97
1618 Sofia
Tel. +359/2/55 13 87
+359/2/9 55 91 56
Fax+359/2/9 55 92 69
E-Mail
ina_bg@mail.techno-link.com

Croatia ■

INA Valjkasti Ležajevi d.o.o.
Samoborska Cesta 145
10090 Zagreb-Susedgrad
Tel. +385/1/34 96-912
+385/1/34 96-913
Fax+385/1/34 96-122
Telex 21 134 RH-TJ-ZG
E-Mail inavl-hr@zg.tel.hr

Czech Republic ■

INA Ložiska s r.o.
Průběžná 74 a
100 00 Praha 10 – Strašnice
Tel. +420/2/67 29 81 11
Fax+420/2/67 29 81 10
E-Mail inaloziska@inaloziska.cz

Denmark ■

INA Danmark A/S
Meterbuen 32
2740 Skovlunde
Tel. +45/44 84 13 00
Fax+45/44 84 22 23
E-Mail inadk@inadk.dk

Finland ■

INA Laakeri Oy
Vappulantie 474
08200 Lohja
Tel. +358/19/3 63 61
Fax+358/19/38 60 37
E-Mail ina@ina-laakeri.fi

France ■

INA Roulements S.A.
93, route de Bitche
BP 186
67506 Haguenau Cedex
Tel. +33/3 88 63 40 40
Fax+33/3 88 63 40 41
Telex 870 936

Germany ■

INA Wälzlager Schaeffler oHG
91072 Herzogenaurach
Postal address:
Industriestrasse 1–3
91074 Herzogenaurach
Tel. +49/91 32/82-0
Fax+49/91 32/82-49 50
E-Mail info@ina.com
Telex 6 25 212-0 in d

Germany ■

INA Motorenelemente
Schaeffler oHG
Industriestrasse 1
96114 Hirschaid
Tel. +49/95 43/68-0
Fax+49/95 43/68-3 60

Germany ■

INA Lineartechnik oHG
Postfach 15 45
66406 Homburg (Saar)
Postal address:
Berliner Straße 134
66424 Homburg (Saar)
Tel. +49/68 41/7 01-100
Fax+49/68 41/7 01-6 25
Telex 44 605 sw h d

Germany ■

Helmut Elges GmbH
Postfach 1162
33791 Steinhagen
Postal address:
Gottlieb-Daimler-Straße 2–4
33803 Steinhagen
Tel. +49/52 04/999-0
Fax+49/52 04/999-100

Germany ■

REGE
Motorenteile GmbH & Co. KG
Industriestraße 4
Industriegebiet Eisenach/Kindel
99819 Hörselberg
Tel. +49/3 69 20/12-0
Fax+49/3 69 20/12-4 07

Great Britain ■

INA Bearing Company Ltd
Forge Lane, Minworth
Sutton Coldfield
West Midlands B76 1AP
Tel. +44/121/3 51 38 33
Fax+44/121/3 51 76 86
E-Mail ina.bearing@ina.co.uk

Greece ●

Arion AG
Ion-Aris Phostirooulos & Co AG
Krokaion 18 u. Polykratous
104 42 Athen
P.O. Box 1173
10110 Athen
Tel. +30/1/5 13 39-10/-11
Fax+30/1/5 13 21 10

Greece ●

Konst. G. Vasiliadis & Co.
Ball & Roller Bearings
Kolonou Str. 55–59
Athen T.K. 104 36
Tel. +30/1/5 24 68 38
+30/1/5 24 63 22
Fax+30/1/5 24 88 69
Telex 2163 49

Greece ●

E. Sczikis - L. Marangos S.A.
Serron Str. 8
104 41 Athen
Tel. +30/1/5 22 53 10
+30/1/5 23 65 14 (4 lines)
Fax+30/1/5 22 34 12
Telex 22 51 16 roul gr

Hungary ■

INA Gördülöcsapágy Kft.
1146 Budapest
XIV. Hermina út17.
Postfach 229
1390 Budapest
Tel. +36/1/3 43 51 52
+36/1/4 61 70 19
Fax+36/1/3 43 53 50

Ireland ●

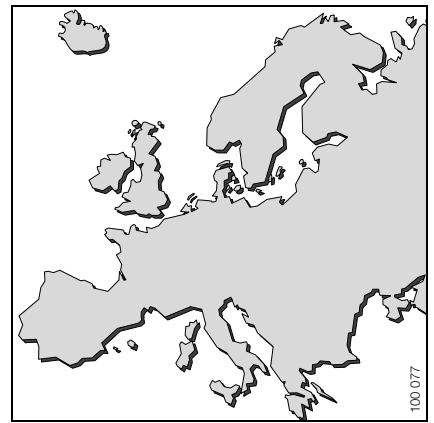
The Reliance Bearing & Gear
Co.Ltd.
PO Box 72
10/12 Andersons Quay
Cork
Tel. +353/21/27 73 66
Fax+353/21/27 67 04
E-Mail info@reliancebearings.ie

Israel ●

Frank Agencies
4 Pinkas Str.
62661 Tel Aviv
P.O. Box 22307
61222 Tel Aviv
Tel. +972/3/5 44 19 41
Fax+972/3/5 44 14 38
E-Mail frank_ag@frank.co.il

Israel ●

Power Transmission Ltd.
P.O. Box 2009
61019 Tel Aviv
12 Barzilay Street
66188 Tel Aviv
Tel. +972/3/5 60 34 45
Fax+972/3/5 60 18 54



Italy ■

INA rullini S.p.A.
Strada Statale 229 - km. 17
28015 Momo (Novara)
Tel.+39/03 21/92 92 11
Fax+39/03 21/92 93 00

Macedonia ●

SANEX A.D.
Belasica b.b.
91000 Skopje
Tel.+389/91/1167 30
Fax+389/91/1162 14

Netherlands ■

INA Nederland B.V.
Gildeweg 31
3771 NB Barneveld
Postbus 50
3770 AB Barneveld
Tel.+31/342/40 30 00
Fax+31/342/40 32 80
E-Mail info@ina.nl

Norway ■

INA Norge AS
Postboks
6404 Etterstad
Niils Hansens Vei 2
0604 Oslo 6
Tel.+47/2/2 64 85 30
Fax+47/2/2 64 54 11
E-Mail ina@ina.no

Poland ■

INA Lozyska Spolka z o.o.
ul. Stepinska 22/30
00-739 Warszawa
Tel.+48/22/8 41 73 35
+48/22/8 51 36 85
Fax+48/22/8 51 36 84
Telex 813527 omig pl

Portugal ■

INA Rolamentos Lda.
Av. Fontes Pereira de Melo, 470
4149-012 Porto
Tel.+351/2/6104 20-8/-9
Fax+351/2/610 42 20
Telex 22 329 rolina p

Romania ●

CH Industrial Group S.R.L.
Str. Ziduri Mosi, nr. 25
Bucuresti, sector 4
Tel.+40/1/2 52 98 61
Fax+40/1/2 52 98 60

Russia ▲

INA Moskau
ul. Bolschaja Moltschanovka
Nr. 23/38, Building 2
121019 Moskau
Tel.+7/095/2 32 15 38
+7/095/2 32 15 39
Fax+7/095/2 32 15 40
E-Mail inarussia@col.ru

Slovakian Republic ■

INA ložiska spol. s r.o.
ul. Dr. G. Schaefflera
024 01 Kysucké Nové Mesto
Tel.+421/826/42 05-911/-917
Fax+421/826/42 05-918

Slovenia ▲

INA kotalni lezaji Maribor
Glavni trg, 17/b
2000 Maribor
Tel.+386/2/2 28 20 70
Fax+386/2/2 52 65 43
E-Mail info@ina-lezaji.si

Spain ■

INA Rodamientos, s.a.
Poligono Pont Reixat
08960 Sant Just Desvern
Barcelona
Tel.+34/93/4 80 34 10
Fax+34/93/3 72 92 50
E-Mail marketing@es.ina.com

Sweden ■

INA Sverige AB
Box 41
195 86 Arlandastad
Charles' gata 10
195 61 Arlandastad
Tel.+46/8/59 51 09 00
Fax+46/8/59 51 09 60
E-Mail info@ina.se

Switzerland ■

Hydrel AG
Postfach 180
8590 Romanshorn
Tel.+41/71/4 66 66 66
Fax+41/71/4 66 63 33

Turkey ■

INA Rulmanlari
Ticaret Ltd. Sirketi
Aydin Sokak
Dagli Apt. 4/10
1 Levent
80600 Istanbul
Tel.+90/212/2 79 27 41
Fax+90/212/2 81 66 45
Telex 27 628 inlt tr

Yugoslavia ●

Simex Trade D.O.O.
ul. Milesevska 35/2
1100 Beograd
Tel.+381/11/45 65 23
Fax+381/11/45 65 23



INA-Schaeffler KG

Geschäftsbereich Lineartechnik
66406 Homburg (Saar)

Internet www.ina.com

E-Mail info.linear@de.ina.com

In Deutschland:

Telefon 0180/5 00 38 72

Telefax 0180/5 00 38 73

Aus anderen Ländern:

Telefon +49/68 41/7 01-0

Telefax +49/68 41/7 01-625



HYDREL AG Maschinenfabrik

8590 Romanshorn · Switzerland

Telefon +41/71/466 66 66

Telefax +41/71/466 66 90

Internet www.hydel.ch

E-Mail hydres@dial.eunet.ch