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*Compact Rail*



# New Compact Rail

It simplifies the project, improves the performance and reduces the application cost: **8 main advantages**.



1

## Self-aligning system

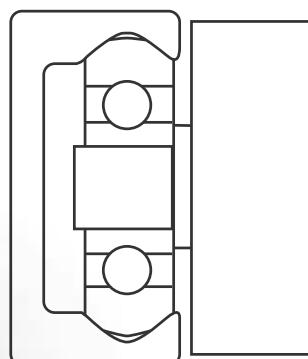
- Select the most suitable structure for your project
- Avoid machining the mounting surface
- Reduce the assembly time

Up to 3.9 mm with T+U or K+U rails  
Up to 3.5 mm with TG rails



Compact Rail

## Configurations of



Rails with different geometries

+



Single row ball bearings

Up to  $\pm 2^\circ$  with K+U rails

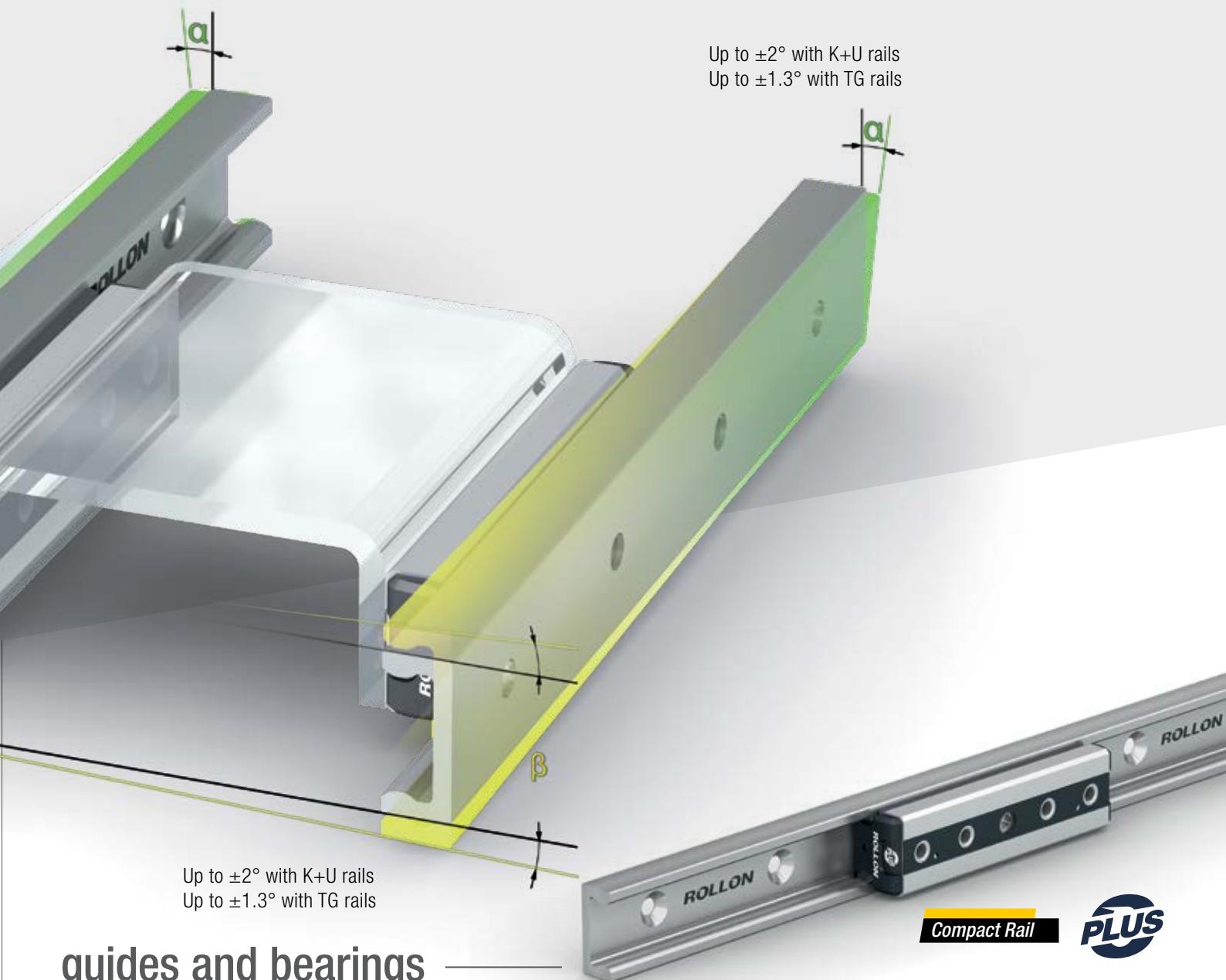


Up to  $\pm 2^\circ$  with K+U rails



Up to 3.9 mm with T+U or K+U rails





## guides and bearings

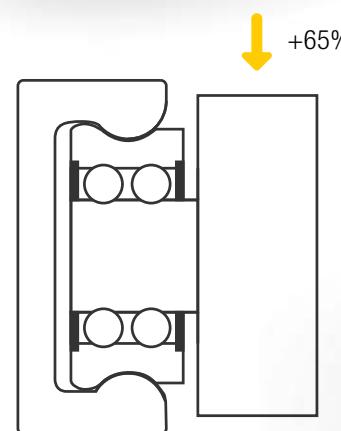
Compact Rail



Rail with convex raceways  
and higher rigidity



Double row ball  
bearings



\* Example referred to size 43.

Up to ±1.3° with RP+RA or RU+RA sliders



Up to ±1.3° with RP+RA or RU+RA sliders



Up to 3.5 mm with RP+RV or RU+RV sliders



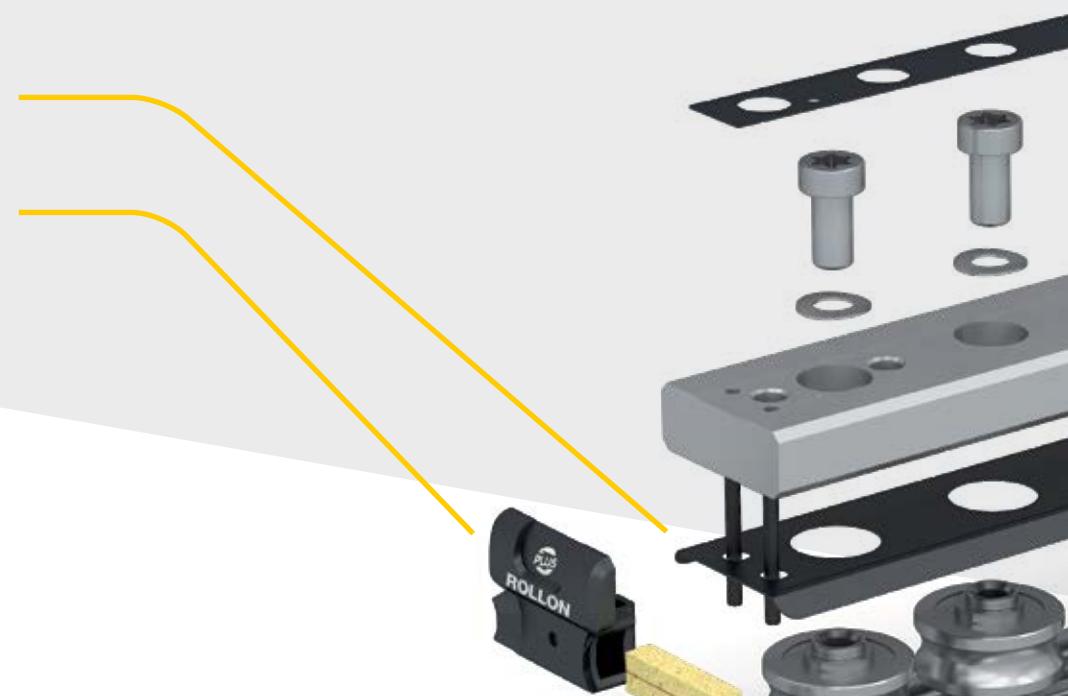


2

## Optimal reliability in dirty environments

Lateral sealing for a greater protection against contaminants

New self-centering wiper for an optimal cleansing of the raceways



3

## Resistant to corrosion

Different surface treatments make Compact Rail reliable even in the harsher environments

- **Indoor applications:** zinc-plating ISO 2081. Also available with electro-painted black finishing
- **Corrosive environments (humidity):** ZincNickel-plating ISO 19598.
- **Corrosive environments (acidic or basic):** nichel-plating



4

## Long lifetime

Induction hardened raceways with 1.2 mm effective depth and hardness between 58 and 62 HRC



5

## High dynamics

Speed up to 9 m/s  
Acceleration up to 20 m/s<sup>2</sup>

# New Compact Rail slider

Improved performance and a new look designed to fit every project perfectly.



6

## Low maintenance

Integrated lubrication system with slow release felt and front-access for greasing



7

## Uniquely quiet

Ground raceways for a smooth and silent movement



8

## Strength and sturdiness

Thanks to steel slider body



**ROLLON®**  
BY TIMKEN



*Compact Rail*



## Product explanation



### ➤ The newly designed Rollon guide with double row ball bearings for higher load capacities.



Fig. 1

Featuring double row ball bearings, new rigid rails with convex raceways and new robust steel sliders with longitudinal protection and floating wipers, Compact Rail Plus has been designed for the most demanding applications in terms of load capacities, dynamics and work environment. All while maintaining the self-aligning capabilities that make this product family unique.

The rails are made of cold drawn carbon steel, zinc-plated for sizes 28 and 43 and hardened with Rollon-Nox patented process for size 18 (nitriding and black oxidation). Other treatments for higher corrosion resistance are available as an option. For sizes 28 and 43, raceways are induction hardened and ground. The sliders are available in four versions: guiding slider; floating slider; extra-floating slider and rotating slider. Combining two rails with different sliders makes it possible to create self-aligning systems that can compensate misalignment errors on two planes: radial up to  $\pm 1.3^\circ$  and axial up to 3.5 mm.

#### The most important characteristics:

- High radial and axial load capacity
- High rigidity
- Robust steel slider with longitudinal protection and floating wipers
- Self-aligning in two planes
- Induction hardened and ground raceways (size 28 and 43)
- Nitriding and black oxidation and polished raceways (size 18)
- Protected for dirty environments
- High operating speeds
- Wide temperature range
- Two ways to adjust the slider in the guide rail
- Different anticorrosion treatments available for rails and slider bodies

#### Preferred areas of application:

- Cutting machines
- Medical technology
- Packaging machines
- Photographic lighting equipment
- Construction and machine technology (doors, protective covers)
- Robots and manipulators
- Automation
- Handling

### Rail with convex raceways

Rails are made of cold-drawn carbon steel and feature a c-shaped cross-section with interior convex raceways. The rail shape allows protection from accidental bumps and other damages that might occur during usage.

For sizes 28 and 43, the raceways are induction hardened and fine ground and the rail is zinc-plated. Other treatments are available for higher corrosion resistance, these include: Rollon Aloy, Rollon E-coating and nickel plating. For size 18, the rail is treated with Rollon-Nox nitriding and oxidation process that provides a fine black color to the entire rail. Other anticorrosion treatments are not available.



Fig. 2



Fig. 3

### R-slider

Robust zinc plated steel slider with sealed double row ball bearing rollers, self-centering heads with wipers, longitudinal seals to protect the internal components and a top sealing strip to prevent accidental tampering of the fixed rollers. The slider body is accurately finished with matte longitudinal edge chamfer and a shining ground flat surface. It is available for all sizes, configurable with up to six rollers depending on the load requirement. Four versions are available to allow different floating capacities and create self-aligning systems: RV guiding slider, RP floating slider, RU extra-floating slider and RA rotating slider.



Fig. 4

### RD-slider

Constructed as the R-slider with mounting holes parallel to the direction of preferred loading. It is available for sizes 28 and 43, with three or five rollers, depending on load case and load direction set with the corresponding configuration.



Fig. 5

### Self-alignment system: V+P/U

The combination of two rails, one featuring a RV guiding slider and one featuring a RP floating slider or RU extra-floating slider, creates a system that allows to compensate large axial misalignment errors.



Fig. 6

### Self-alignment system: A+P/U

The combination of two rails, one featuring a RA rotating slider and one featuring a RP floating slider or RU extra-floating slider, creates a system that allows to compensate misalignment errors on two planes: axial and radial.

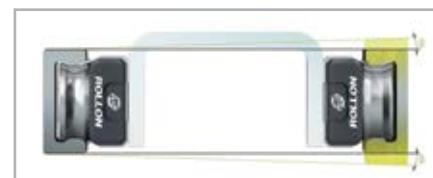


Fig. 7

### Rollers

The precision rollers have double row ball bearings to provide high load capacities in both radial and axial direction. All rollers are equipped with splash-proof plastic seal (2RS). They are available in three versions: guiding rollers with two contact points on the raceway; floating rollers with one contact point and two lateral shoulders to limit the axial floating; extra-floating rollers with completely flat outer ring for total excursion. All rollers can also be ordered individually, and for size 28 and 43 it is available the stainless steel version.



Fig. 8

### Wipers

The slider heads are equipped with special slow release felt pads and are free to rotate with respect to the slider body, so that the felts are always in contact with the raceways to ensure a perfect lubrication. The felts can be grased through a dedicated oil refilling access on the front of the head, simply by means of a syringe oiler.



Fig. 9

### Alignment fixture

The alignment fixture is used during installation of joined rails in order to precisely align the rails with each other.



Fig. 10

## Technical data

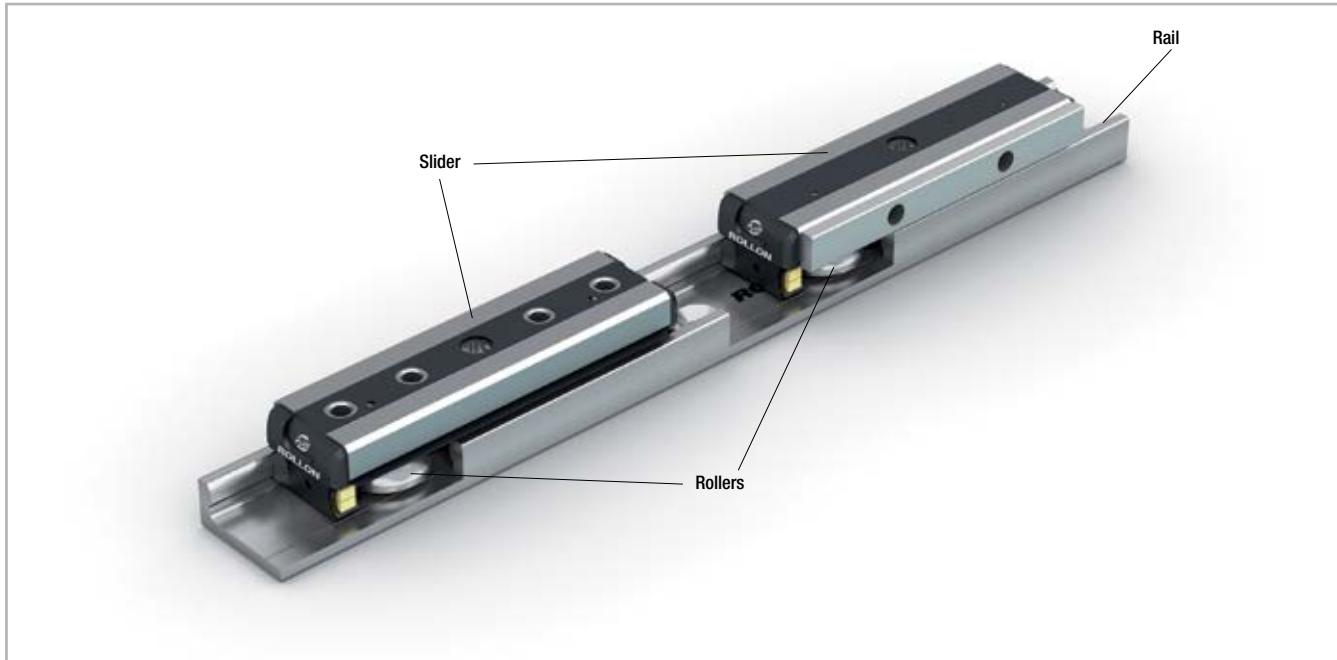


Fig. 11

### Performance characteristics:

- Available rail sizes: 18, 28, 43
- Max. operating speed: 7 m/s (276 in/s) (depending on application)
- Max. acceleration: 15m/s<sup>2</sup> (590.55 in/s<sup>2</sup>) (depending on application)
- Max. radial load capacity: 10,800 N (per slider)
- Temperature range: -20 °C to +120 °C (-4 °F to +248 °F) briefly up to max. +150 °C (+302 °F)
- Available rail lengths from 160 mm to 3,600 mm (6.3 in to 142 in) in 80-mm increments (3.15 in), longer single rails up to max. 4,080 mm (160.6 in) on request for sizes 28 and 43.
- Rollers material: steel 100Cr6 (also available stainless steel AISI 440)
- Roller pins lubricated for life
- Roller seal/shield: 2RS (splash-proof)
- In sizes 28 and 43 rails and slider bodies are standard zinc-plated according to ISO 2081, raceways are induction hardened and ground.
- In size 18 rails are hardened with Rollon-Nox treatment of deep nitriding and black oxidation and slider bodies are standard zinc-plated according to ISO 2081.
- Rail material of rails size 28-43: cold-drawn carbon steel CF53
- Rail material of rails size 18: cold-drawn carbon steel 20MnCr5

### Notes:

- The sliders are equipped with rollers that are in alternating contact with both sides of the raceway. Markings on the body around the roller pins indicate correct arrangement of the rollers to the external load
- With a simple adjustment of the eccentric rollers, the desired clearance or preload on the rail and slider can be set (see pg. CR-35)
- Rails in joined design are available for longer transverse distances (see pg. CR-43).
- Screws of property class 10.9 must be used
- When mounting the rails, it is crucial to ensure that the mounting holes in the structure are properly chamfered (see pg. CR-34 tab. 59)
- The general illustrations show R-sliders as an example
- For rollers size 28 and 43 it is available the stainless steel version (see pg. CR-18).

## ➤ Configurations and behavior of the slider under yawing moment $M_z$

### Individual slider under $M_z$ moment load

When an overhanging load in an application with a single slider per rail causes an  $M_z$  moment in one direction, a 4 to 6 roller Compact Rail slider is available. These sliders are available in both configuration A and B in regards to the roller arrangement to counter the acting  $M_z$  moment load. The moment capacity of these sliders in the  $M_z$ -direction varies significantly through spacing  $L_1$  and  $L_2$  in accordance with the direction of rotation of  $M_z$ .

Especially in the use of two parallel rails, it is extremely important to pay attention to the correct combination of the slider configuration A and B, in order to use the maximum load capacities of the slider.

The diagrams below illustrate this concept of the A and B configuration for sliders with 4 and 6 rollers. The maximum allowable  $M_z$ -moment is identical in both directions for all 3 and 5 roller sliders.

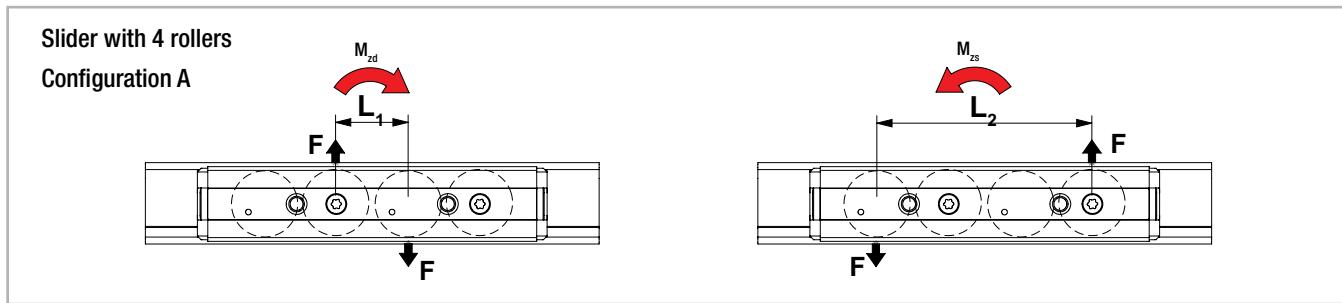


Fig. 12

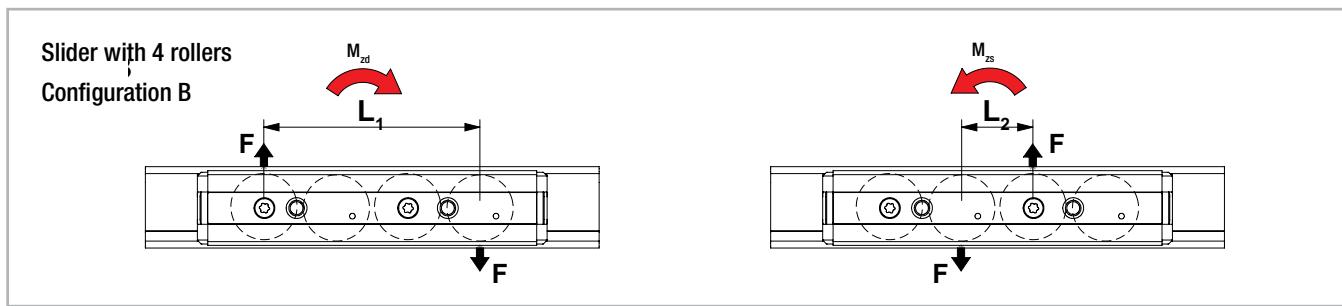


Fig. 13

### Two sliders under $M_z$ moment load

When an overhanging load acts on an application with two sliders per rail and causes an  $M_z$ -moment in one direction, different support reactions occur on the two sliders. For this reason, an optimal arrangement of slider configurations must be achieved to reach the maximum load capacities. In practice, when using R-sliders with 3 or 5 rollers, the two sliders must be installed rotated by 180° so that the slider is always loaded on the side with the highest number of rollers.

For an even number of rollers this has no effect. The RD-sliders with installation option from above or below cannot be installed due to the position of the rollers in reference to the installation side, therefore they are available in the configurations A and B (see fig. 15).

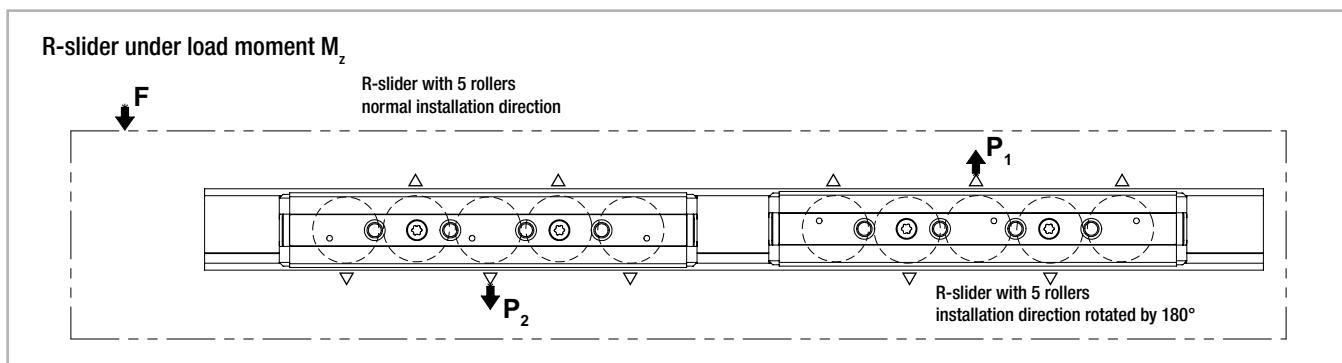
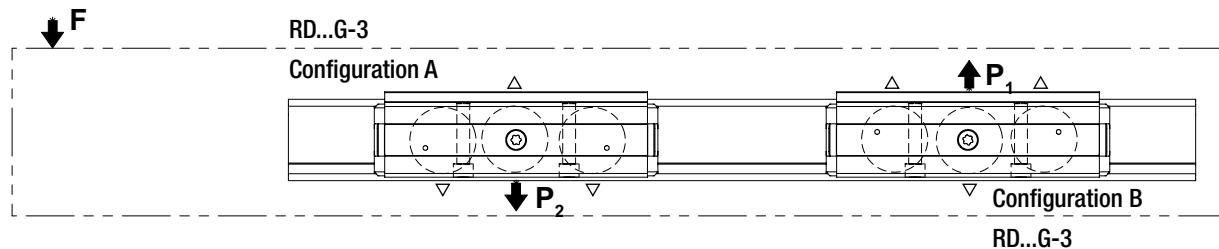


Fig. 14

### RD-slider under load moment $M_z$



Configuration not possible for sliders RDA.

Fig. 15

### Slider configurations for various load cases

#### Arrangement DS

This is the recommended arrangement for use of two sliders under  $M_z$ -moment when using one rail. Also see previous page: Two sliders under  $M_z$  moment load.

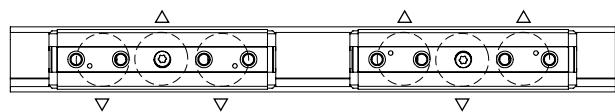


Fig. 16

#### Arrangement DD

When using a pair of guide rails with two sliders each under  $M_z$  moment load, the second system should be designed in arrangement DD. This results in the following combination: one guide rail with two sliders in arrangement DS and the other guide rail with 2 sliders in arrangement DD. This allows even load and moment distribution between the two parallel rails.

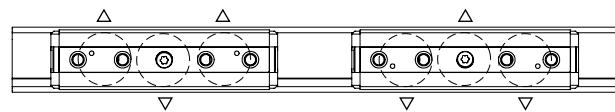


Fig. 17

#### Arrangement DA

Standard arrangement if no other information is given. This arrangement is recommended if the load point is located within the two outside points of the sliders.

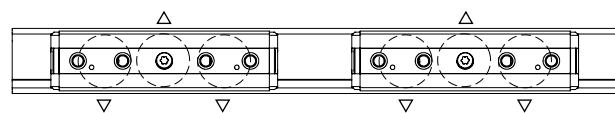


Fig. 18

## Load capacities

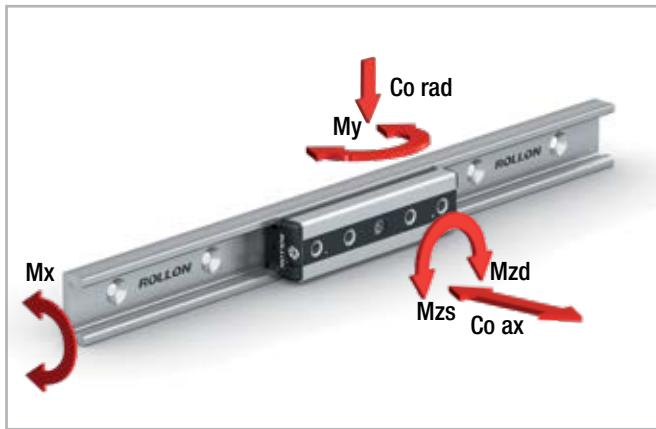


Fig. 19

The load capacities in the following table apply for one slider.

The functional characteristic is related to the nominal floating capacity, for more information see pg. CR-22, CR-23.

Type	Number of rollers	Load capacities and moments						Weight [kg]	
		C [N]	Co <sub>rad</sub> [N]	Co <sub>ax</sub> [N]	M <sub>x</sub> [Nm]	M <sub>y</sub> [Nm]	M <sub>z</sub> [Nm]		
							M <sub>zd</sub>	M <sub>zs</sub>	
RVG18-3	3	3300	1600	690	3	8.3	14.4	14.4	0.055
RVG18-4A	4	3300	1600	920	6	13.8	16	48	0.073
RVG18-4B	4	3300	1600	920	6	13.8	48	16	0.073
RVG18-5	5	4455	2160	1150	6	18.4	48	48	0.087
RVG18-6A	6	4455	2160	1380	9	23	48	80	0.105
RVG18-6B	6	4455	2160	1380	9	23	80	48	0.105
RAG18-3	3	3300	1600	460	0	8.3	14.4	14.4	0.055
RAG18-4A	4	3300	1600	460	0	13.8	16	48	0.073
RAG18-4B	4	3300	1600	460	0	13.8	48	16	0.073
RAG18-5	5	4455	2160	690	0	18.4	48	48	0.087
RAG18-6A	6	4455	2160	690	0	23	48	80	0.105
RAG18-6B	6	4455	2160	690	0	23	80	48	0.105
RPG18-3	3	3300	1600	0	0	0	14.4	14.4	0.055
RPG18-4A	4	3300	1600	0	0	0	16	48	0.073
RPG18-4B	4	3300	1600	0	0	0	48	16	0.073
RPG18-5	5	4455	2160	0	0	0	48	48	0.087
RPG18-6A	6	4455	2160	0	0	0	48	80	0.105
RPG18-6B	6	4455	2160	0	0	0	80	48	0.105
RUG18-3	3	2300	1120	0	0	0	10.1	10.1	0.052
RUG18-4A	4	2300	1120	0	0	0	11.2	33.6	0.070
RUG18-4B	4	2330	1120	0	0	0	33.6	11.2	0.070
RUG18-5	5	3105	1512	0	0	0	33.6	33.6	0.084
RUG18-6A	6	3105	1512	0	0	0	33.6	56	0.1
RUG18-6B	6	3105	1512	0	0	0	56	33.6	0.1

Tab. 1

Type	Number of rollers	Load capacities and moments							Weight [kg]	
		C [N]	C <sub>rad</sub> [N]	C <sub>ax</sub> [N]	M <sub>x</sub> [Nm]	M <sub>y</sub> [Nm]	M <sub>z</sub> [Nm]			
		M <sub>zd</sub>	M <sub>zs</sub>							
RV28G-3	3	6000	3200	1380	9.2	25.3	44	44	0.24	
RV28G-4A	4	6000	3200	1840	18.4	34.5	40	120	0.29	
RV28G-4B	4	6000	3200	1840	18.4	34.5	120	40	0.29	
RV28G-5	5	8100	4320	2300	18.4	46	120	120	0.36	
RV28G-6A	6	8100	4320	2760	27.6	57.5	120	200	0.4	
RV28G-6B	6	8100	4320	2760	27.6	57.5	200	120	0.4	
RA28G-3	3	6000	3200	920	0	25.3	44	44	0.24	
RA28G-4A	4	6000	3200	920	0	34.5	40	120	0.29	
RA28G-4B	4	6000	3200	920	0	34.5	120	40	0.29	
RA28G-5	5	8100	4320	1380	0	46	120	120	0.36	
RA28G-6A	6	8100	4320	1380	0	57.5	120	200	0.4	
RA28G-6B	6	8100	4320	1380	0	57.5	200	120	0.4	
RP28G-3	3	6000	3200	0	0	0	44	44	0.24	
RP28G-4A	4	6000	3200	0	0	0	40	120	0.29	
RP28G-4B	4	6000	3200	0	0	0	120	40	0.29	
RP28G-5	5	8100	4320	0	0	0	120	120	0.36	
RP28G-6A	6	8100	4320	0	0	0	120	200	0.4	
RP28G-6B	6	8100	4320	0	0	0	200	120	0.4	
RU28G-3	3	4200	2240	0	0	0	30.8	30.8	0.24	
RU28G-4A	4	4200	2240	0	0	0	28	84	0.27	
RU28G-4B	4	4200	2240	0	0	0	84	28	0.27	
RU28G-5	5	5670	3024	0	0	0	84	84	0.33	
RU28G-6A	6	5670	3024	0	0	0	84	140	0.39	
RU28G-6B	6	5670	3024	0	0	0	140	84	0.39	
RDV28G-3A	3	6000	3200	1380	9.2	25.3	44	44	0.28	
RDV28G-3B	3	6000	3200	1380	9.2	25.3	44	44	0.28	
RDV28G-5A	5	8100	4320	2300	18.4	46	120	120	0.41	
RDV28G-5B	5	8100	4320	2300	18.4	46	120	120	0.41	
RDA28G-3A	3	6000	3200	920	0	25.3	44	44	0.39	
RDA28G-3B	3	6000	3200	920	0	25.3	44	44	0.39	
RDA28G-5A	5	8100	4320	1380	0	46	120	120	0.41	
RDA28G-5B	5	8100	4320	1380	0	46	120	120	0.41	
RDP28G-3A	3	6000	3200	0	0	0	44	44	0.39	
RDP28G-3B	3	6000	3200	0	0	0	44	44	0.39	
RDP28G-5A	5	8100	4320	0	0	0	120	120	0.41	
RDP28G-5B	5	8100	4320	0	0	0	120	120	0.41	
RDU28G-3A	3	4200	2240	0	0	0	30.8	30.8	0.25	
RDU28G-3B	3	4200	2240	0	0	0	30.8	30.8	0.25	
RDU28G-5A	5	5670	3024	0	0	0	84	84	0.38	
RDU28G-5B	5	5670	3024	0	0	0	84	84	0.38	

Type	Number of rollers	Load capacities and moments							Weight [kg]	
		C [N]	C <sub>0,rad</sub> [N]	C <sub>0,ax</sub> [N]	M <sub>x</sub> [Nm]	M <sub>y</sub> [Nm]	M <sub>z</sub> [Nm]			
							M <sub>zd</sub>	M <sub>zs</sub>		
RV43G-3	3	15200	8000	3570	36.9	97.6	164	164	0.77	
RV43G-4A	4	15200	8000	4760	73.8	135.7	152	456	0.99	
RV43G-4B	4	15200	8000	4760	73.8	135.7	456	152	0.99	
RV43G-5	5	20520	10800	5950	73.8	195.2	452.4	452.4	1.19	
RV43G-6A	6	20520	10800	7140	110.7	224.3	452.4	754	1.42	
RV43G-6B	6	20520	10800	7140	110.7	224.3	754	452.4	1.42	
RA43G-3	3	15200	8000	2380	0	97.6	164	164	0.77	
RA43G-4A	4	15200	8000	2380	0	135.7	152	456	0.99	
RA43G-4B	4	15200	8000	2380	0	135.7	456	152	0.99	
RA43G-5	5	20520	10800	3570	0	195.2	452.4	452.4	1.19	
RA43G-6A	6	20520	10800	3570	0	224.3	452.4	754	1.42	
RA43G-6B	6	20520	10800	3570	0	224.3	754	452.4	1.42	
RP43G-3	3	15200	8000	0	0	0	164	164	0.77	
RP43G-4A	4	15200	8000	0	0	0	152	456	0.99	
RP43G-4B	4	15200	8000	0	0	0	456	152	0.99	
RP43G-5	5	20520	10800	0	0	0	452.4	452.4	1.19	
RP43G-6A	6	20520	10800	0	0	0	452.4	754	1.42	
RP43G-6B	6	20520	10800	0	0	0	754	452.4	1.42	
RU43G-3	3	11400	5600	0	0	0	114.8	114.8	0.75	
RU43G-4A	4	11400	5600	0	0	0	106.4	319.2	0.96	
RU43G-4B	4	11400	5600	0	0	0	319.2	106.4	0.96	
RU43G-5	5	15390	7560	0	0	0	316.7	316.7	1.16	
RU43G-6A	6	15390	7560	0	0	0	316.7	527.8	1.38	
RU43G-6B	6	15390	7560	0	0	0	527.8	316.7	1.38	
RDV43G-3A	3	15200	8000	3570	36.9	97.6	164	164	0.85	
RDV43G-3B	3	15200	8000	3570	36.9	97.6	164	164	0.85	
RDV43G-5A	5	20520	10800	5950	74.8	95.2	452.4	452.4	1.3	
RDV43G-5B	5	20520	10800	5950	74.8	95.2	452.4	452.4	1.3	
RDA43G-3A	3	15200	8000	2380	0	97.6	164	164	0.85	
RDA43G-3B	3	15200	8000	2380	0	97.6	164	164	0.85	
RDA43G-5A	5	20520	10800	3570	0	95.2	452.4	452.4	1.3	
RDA43G-5B	5	20520	10800	3570	0	95.2	452.4	452.4	1.3	
RDP43G-3A	3	15200	8000	0	0	0	164	164	0.85	
RDP43G-3B	3	15200	8000	0	0	0	164	164	0.85	
RDP43G-5A	5	20520	10800	0	0	0	452.4	452.4	1.3	
RDP43G-5B	5	20520	10800	0	0	0	452.4	452.4	1.3	
RDU43G-3A	3	11400	5600	0	0	0	114.8	114.8	0.83	
RDU43G-3B	3	11400	5600	0	0	0	114.8	114.8	0.83	
RDU43G-5A	5	15390	7560	0	0	0	316.7	316.7	1.27	
RDU43G-5B	5	15390	7560	0	0	0	316.7	316.7	1.27	

Tab. 3

## Product dimensions



### > TG / TMG -rail

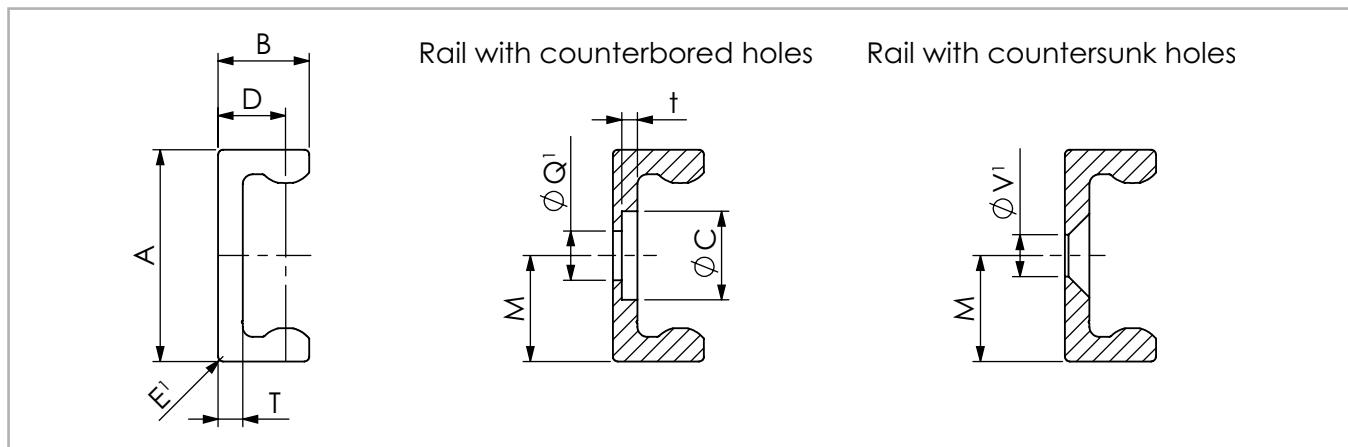


Fig. 20

Q: Fixing holes for Torx® screws with low head (custom design) included in scope of supply

V: Fixing holes for countersunk head screws according to DIN 7991

Type	Size	A [mm]	B [mm]	M [mm]	E <sup>1</sup> [mm]	T [mm]	C [mm]	D [mm]	Weight [Kg/m]	t [mm]	Q <sup>1</sup> [mm]	V <sup>1</sup> [mm]
<b>TMGC</b> <b>TMGV</b>	18	18	9.5	9	1	2.9	9	7.1	0.68	1.9	M4	M4
<b>TGC</b>	28	28	11.3	14	1	3	11	8.2	1.25	2	M5	M5
<b>TGV</b>	43	43	18.5	21.5	1	5	18	13.7	2.9	3.2	M8	M8

Tab. 4

### > Rail length

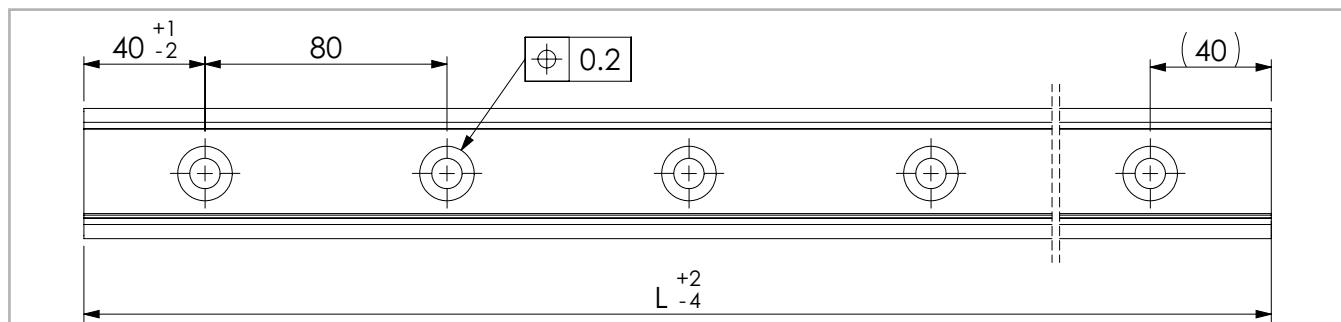


Fig. 21

Type	Size	Min length [mm]	Max length [mm]	Available standard lengths L [mm]
<b>TMGC</b> <b>TMGV</b>	18	240	2960	160 - 240 - 320 - 400 - 480 - 560 - 640 - 720 - 800 - 880 - 960 - 1040 - 1120 - 1200 - 1280 - 1360 - 1440 - 1520 - 1600 - 1680 - 1760 - 1840
<b>TGC</b>	28	160	3200	- 1920 - 2000 - 2080 - 2160 - 2240 - 2320 - 2400 - 2480 - 2560 - 2640
<b>TGV</b>	43	160	3200	- 2720 - 2800 - 2880 - 2960 - 3040 - 3120 - 3200 - 3360 - 3440 - 3520 - 3600

Longer single rails up to max. 4080 mm on request for sizes 28 and 43  
Longer rail systems see pg. CR-43 Joined rails

Tab. 5

## R-version slider

R-series

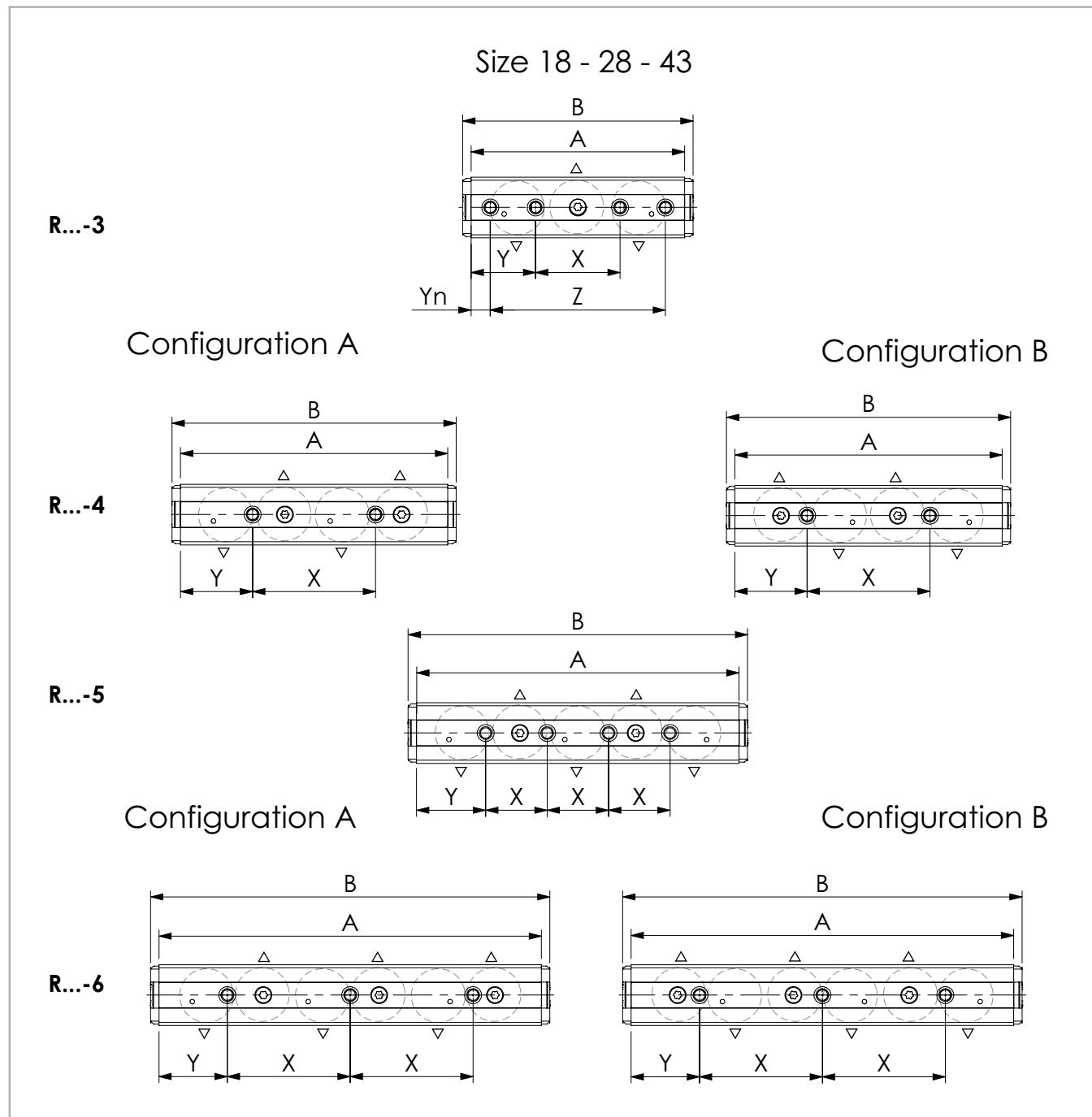


Fig. 22

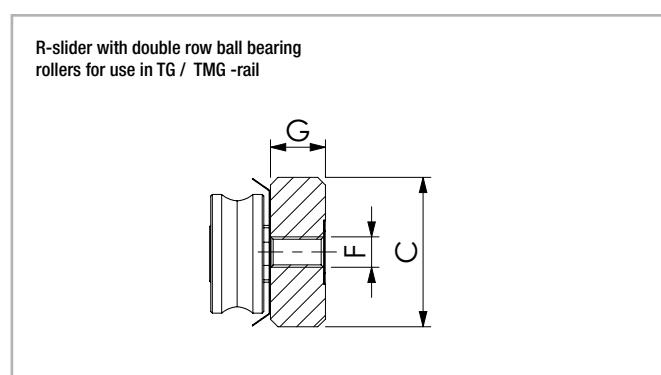


Fig. 23

Type	Size	No. of rollers	A [mm]	B [mm]	C [mm]	G [mm]	F [mm]	X [mm]	Y [mm]	Yn [mm]	Z [mm]	No. of holes
RVG... RAG... RPG... RUG...	18	3	70	78	16	4.8	M5	20	25	9	52	4
		4	92	100				40	26	-	-	2
		5	112	120				20	26	-	-	4
		6	132	140				40	26	-	-	3
RV...G RA...G	28	3	97	108	24.9	9.7	M5	35	31	9.5	78	4
		4	117	128				50	33.5	-	-	2
		5	142	153				25	33.5	-	-	4
		6	167	178				50	33.5	-	-	3
RP...G RU...G	43	3	139	150	39.5	14.5	M8	55	42	12.5	114	4
		4	174	185				80	47	-	-	2
		5	210	221				40	45	-	-	4
		6	249	260				80	44.5	-	-	3

For information about the roller sliders configuration, see pg. CR-22 and CR-23.  
For information about the roller type, see pg. CR-18, tab. 10.

Tab. 6

## RD-version slider

RD-series

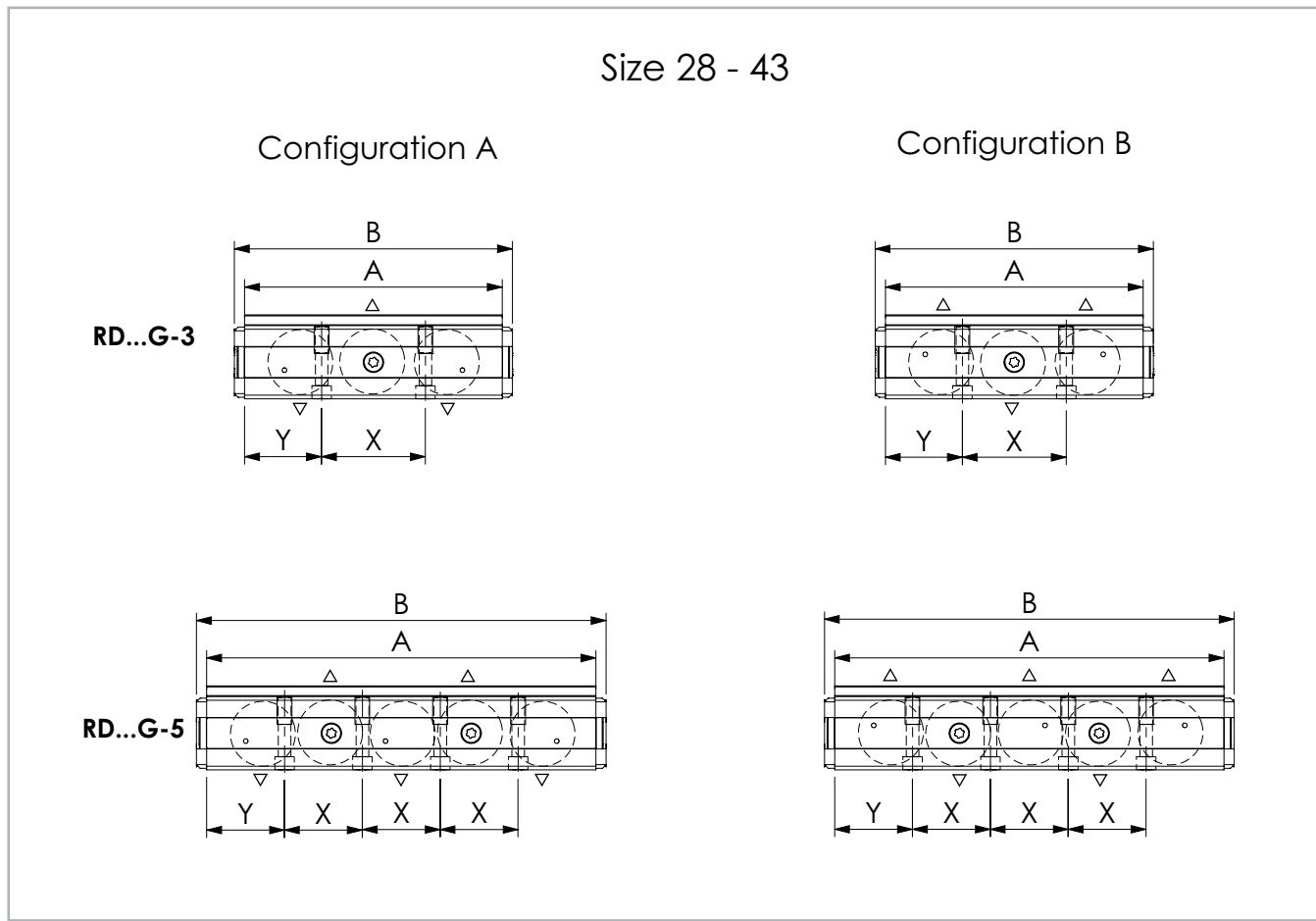


Fig. 24

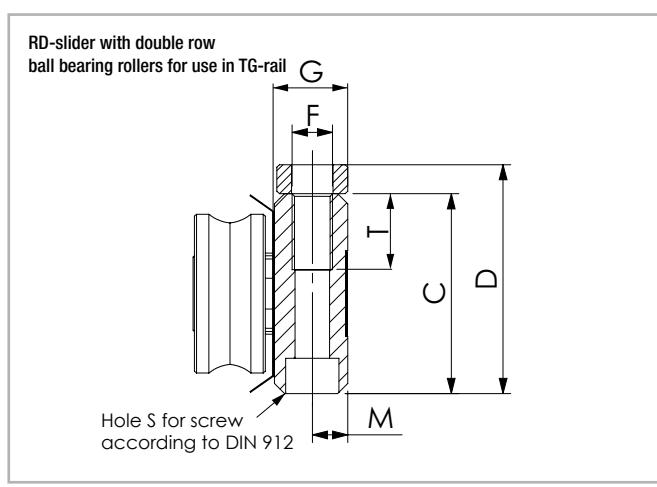


Fig. 25

Type	Size	No. of rollers	A [mm]	B [mm]	C [mm]	D [mm]	T [mm]	M [mm]	S	G [mm]	F	X [mm]	Y [mm]	No. of holes
RDV...G RDA...G RDP...G RDU...G	28	3	97	108	24.9	30.45	15	4.7	M5	9.7	M6	36	30.5	2
		5	142	153								27	30.5	4
	43	3	139	150	39.5	45.25	15	7	M6	14.5	M8	56	41.5	2
		5	210	221								42	42	4

For information about the roller sliders configuration, see pg. CR-22 and CR-23.

For information about the roller type, see pg. CR-18, tab. 10.

Tab. 7

## > TG / TMG -rail with sliders

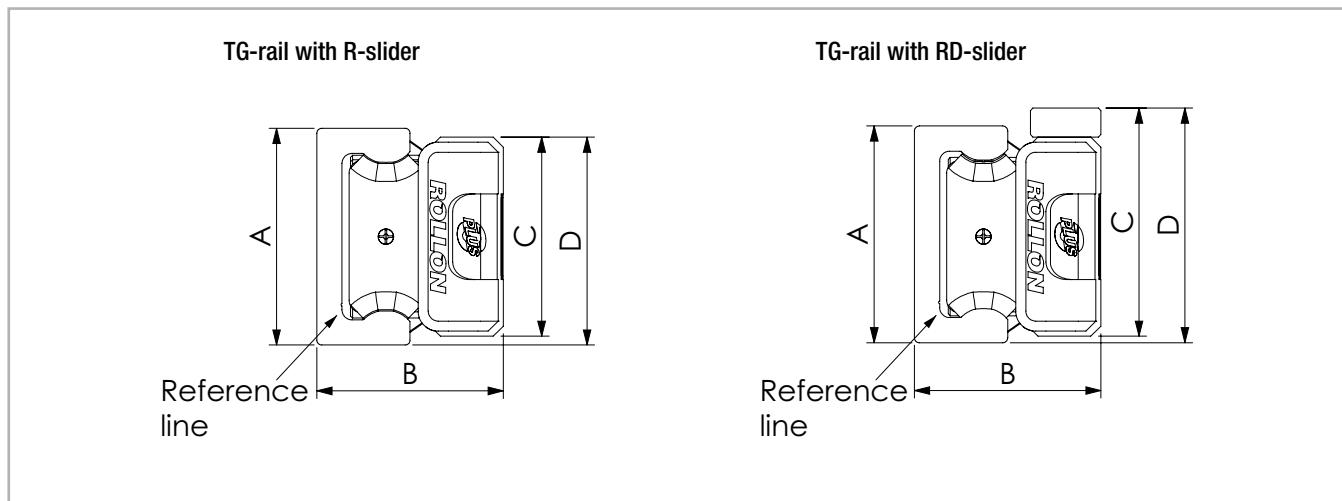


Fig. 26

Configuration	Size	A [mm]		B [mm]		C [mm]		D [mm]	
TMG... / R...G	18	18	+0.2 -0.10	16.5	$\pm 0.15$	16	0 -0.2	17	+0.2 -0.4
TG... / R...G	28	28	+0.2 -0.10	24	$\pm 0.15$	24.9	0 -0.2	26.45	+0.2 -0.4
	43	43	+0.3 -0.10	37	$\pm 0.15$	39.5	0 -0.2	41.25	+0.2 -0.4
TG... / RD...G	28	28	+0.2 -0.10	24	$\pm 0.15$	24.9	0 -0.2	32	+0.2 -0.4
	43	43	+0.3 -0.10	37	$\pm 0.15$	39.5	0 -0.2	47	+0.2 -0.4

Tab. 8

## ➤ Offset of fixing holes

Principle representation of offset

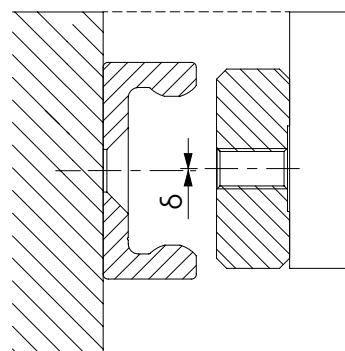


Fig. 27

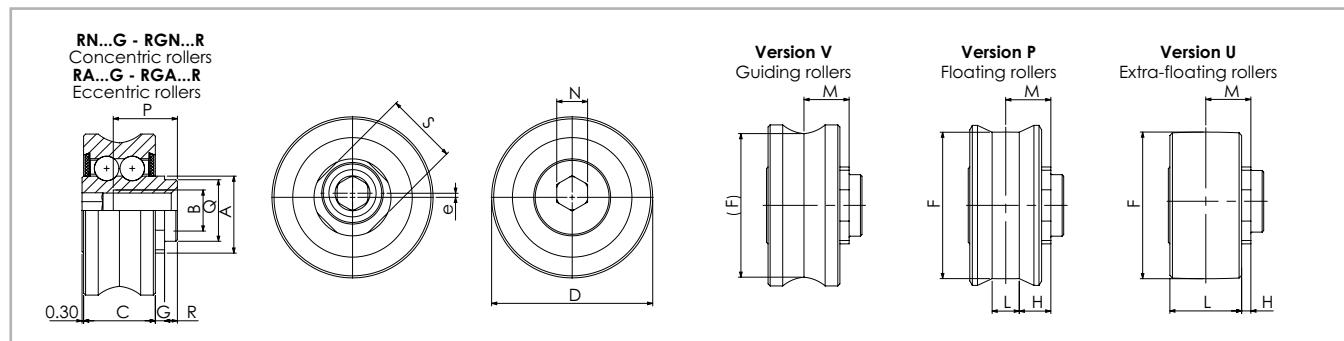
Configuration	Size	$\delta$ nominal [mm]	$\delta$ maximum [mm]	$\delta$ minimum [mm]
TMG... / R...G	18	0	-0.25	+0.25
	28			
TG... / R...G	43	0	-0.25	+0.25
	28			
TG... / RD...G	43			

Tab. 9

## Accessories



### Rollers



Seals: 2RS splash proof seal.

Note: the rollers are lubricated for life.

Fig. 28

Type		e [mm]	D [mm]	C [mm]	M [mm]	G [mm]	A [mm]	B [mm]	P [mm]	F [mm]	L [mm]	H [mm]	R [mm]	Q [mm]	S	N	C [N]	Co <sub>rad</sub> [N]	Co <sub>ax</sub> [N]	Weight [kg]
Steel	Inox																			
RNVG18	-		13.2														1650	800	230	0.01
RNPG18	-		-	13.2						11.96	2.5	3.35					1650	800	0	
RNUG18	-		11.95		7	4.6	1.1	6.8	M4	5.4	11.95	6	1.6				1150	560	0	
RAVG18	-		13.2								-	-	-				1650	800	230	
RAPG18	-	0.4	13.2								11.96	2.5	3.35				1650	800	0	
RAUG18	-		11.95								11.95	6	1.6				1150	560	0	
RGNV28R	RGNVX28R		20.75								-	-	-				3000	1600	460	0.02
RGNP28R	RGNPX28R	-	20.75								18.81	4	4.1				3000	1600	0	
RGNU28R	RGNUX28R		18.81		9	6.1	1.6	10.8	M5	8	18.81	8	2.1	1.5	8	10	2300	1120	0	
RGAV28R	RGAVX28R		20.75								-	-	-				3000	1600	460	
RGAP28R	RGAPX28R	0.6	20.75								18.81	4	4.1				3000	1600	0	
RGAU28R	RGAU28R		18.81								18.81	8	2.1				2300	1120	0	
RGNV43R	RGNVX43R		31.4								-	-	-				7600	4000	1190	0.05
RGNP43R	RGNPX43R	-	31.2								28.59	5.3	6.15				7600	4000	0	
RGNU43R	RGNUX43R		28.59		14	8.8	1.8	15	M8	12.5	28.59	13	2.3	2.5	11	14	5700	2800	0	
RGAV43R	RGAVX43R		31.4								-	-	-				7600	4000	1190	
RGAP43R	RGAPX43R	0.8	31.2								28.59	5.3	6.15				7600	4000	0	
RGAU43R	RGAU43R		28.59								28.59	13	2.3				5700	2800	0	

Rollers size 18 are without protruding pin.

Tab. 10

## Wipers

Pair of wipers WR for R- / RD- slider

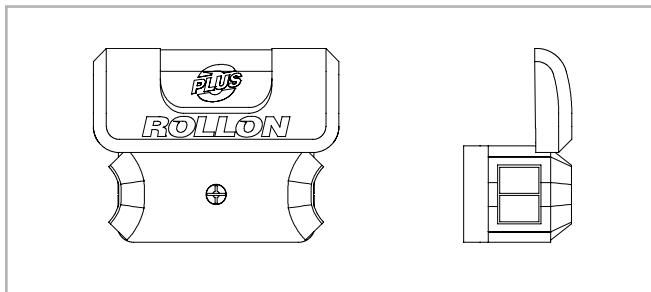


Fig. 29

Rail size	Pair of wipers
18	ZK-WR18G
28	ZK-WR28G
43	ZK-WR43G

Tab. 11

## Alignment fixtures

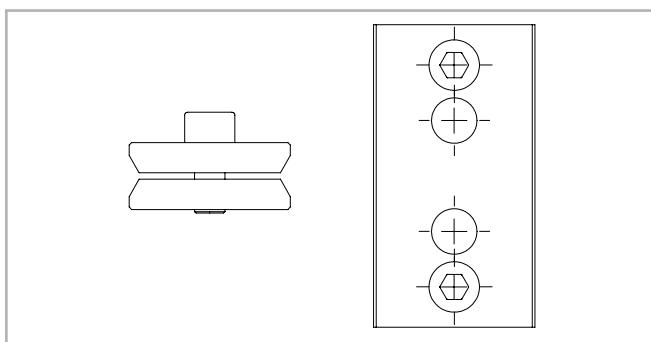


Fig. 30

Rail size	Alignment fixture
18	ATMG18
28	ATG28
43	ATG43

Tab. 12

## Fixing screws

When a rail with counterbored holes is delivered, the Torx® screws are provided in the right quantity.

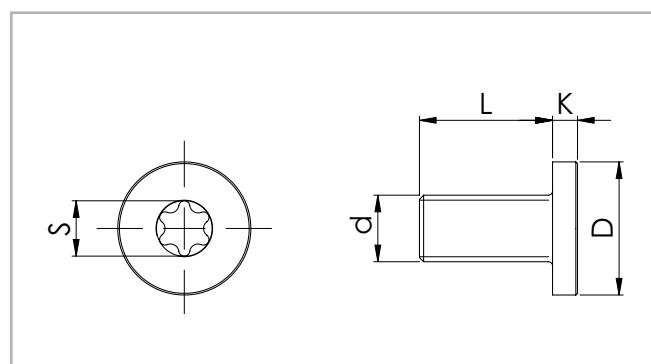


Fig. 31

Rail size	d	D [mm]	L [mm]	K [mm]	S	Tightening torque [Nm]
18	M4 x 0.7	8	8	2	T20	3
28	M5 x 0.8	10	10	2	T25	9
43	M8 x 1.25	16	16	3	T40	22

Tab. 13

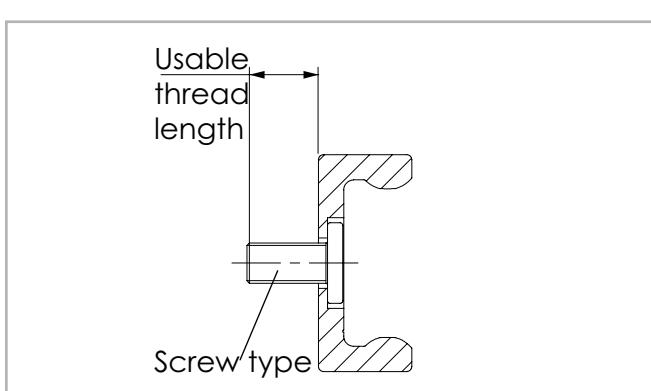


Fig. 32

Rail size	Screw type	Usable thread length [mm]
18	M4 x 8	7.2
28	M5 x 10	9
43	M8 x 16	14.6

Tab. 14

## Technical Instructions



### Linear accuracy

Linear accuracy is defined as the maximum deviation of the slider in the rail based on the side and support surface during straight line movement.

The linear accuracy, depicted in the graphs below, applies to rails that are carefully installed with all the provided screws on a level and rigid foundation.

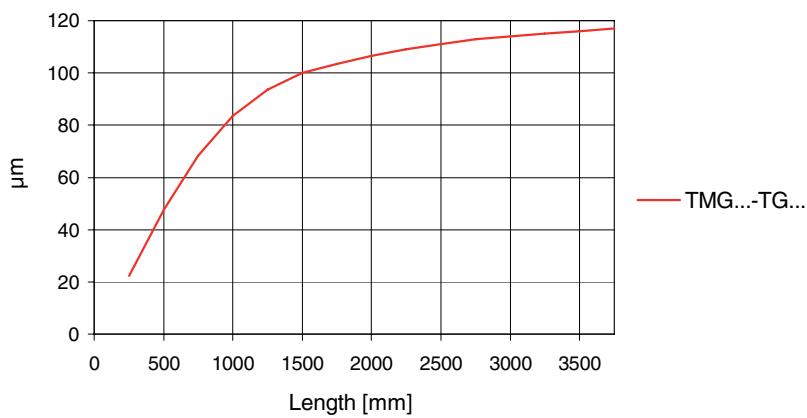
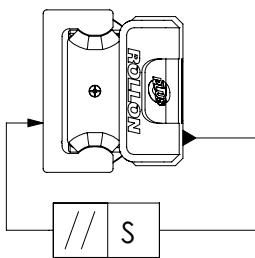
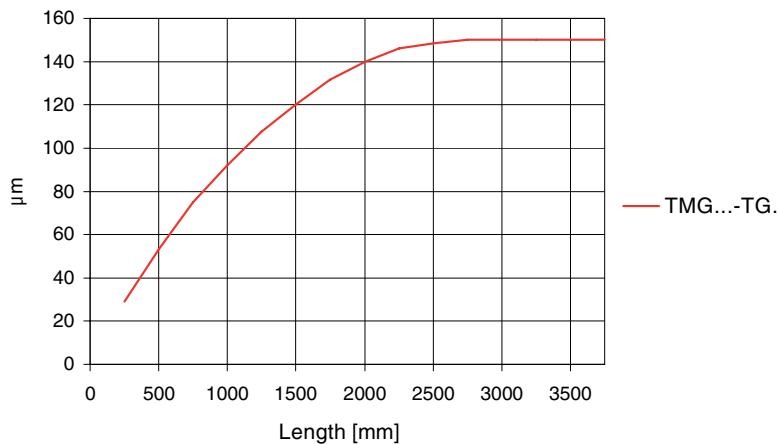
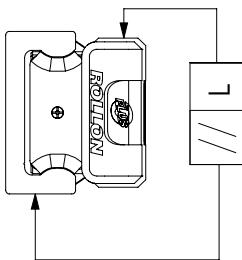
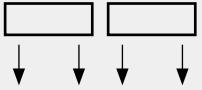
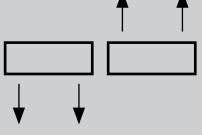


Fig. 33

## Deviation of accuracy with two 3 roller sliders in one rail

Type	
$\Delta L$ [mm] Slider with equal arrangement	0.2
	
$\Delta L$ [mm] Slider with opposite arrangement	1.0
	
$\Delta S$ [mm]	0.05

Tab. 15

## ➤ Points of contact between rollers and raceways

### Guiding rollers (Version V)

The guiding rollers have two contact points with the raceways. This creates a well constrained movement of rollers on the raceway, in both radial and axial direction.

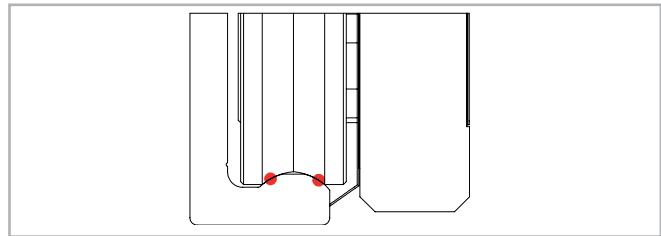


Fig. 34

### Floating rollers (Version P)

The floating rollers engage only the peak of the raceway. They are constrained radially but allowed to float in the axial direction between the two shoulders. The rollers can also rotate a little.

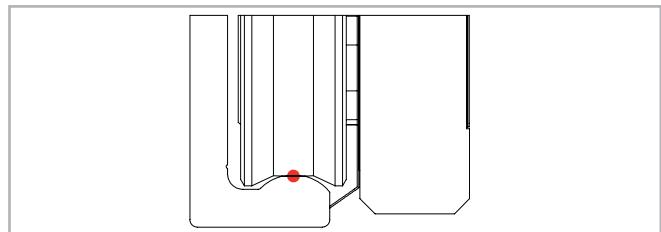


Fig. 35

### Extra-floating rollers (Version U)

The extra-floating rollers engage only the peak of the raceway. They are constrained radially but allowed to float in the axial direction without limitation. The completely flat surface of the rollers allows an axial travel wider than the floating rollers, and they can also rotate a little.

(Note: being free from lateral shoulders, extra-floating rollers could run out of the rail or against the bottom rail when exceeding the nominal floating capacity)

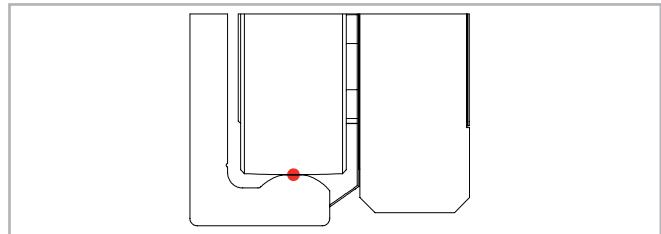


Fig. 36

## ➤ Sliders composition

### Guiding sliders (RV -slider)

Guiding sliders are built only with guiding rollers. For this reason, they are completely constrained and can support loads and moments in all directions, especially the radial ones.

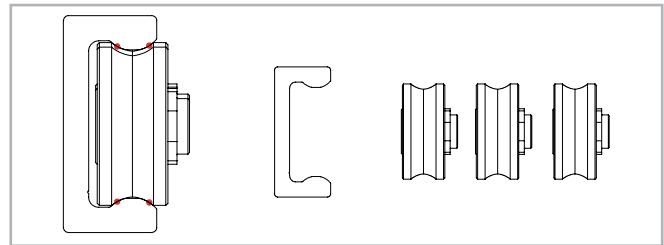


Fig. 37

### Floating sliders (RP -slider)

Floating sliders are built only with floating rollers. They are able to slightly travel axially and to rotate a bit without affecting the preload or the smooth running quality.

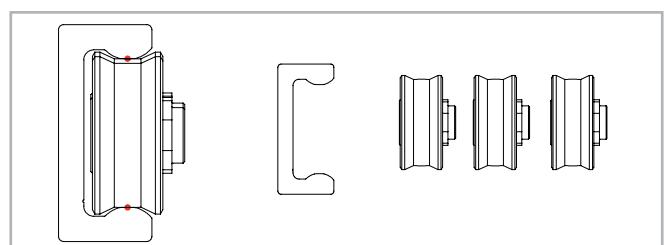


Fig. 38

### Extra-floating sliders (RU -slider)

Extra-floating sliders are built only with extra-floating rollers. They are able to fully travel axially and to rotate a bit without affecting the preload or the smooth running quality. (Note: being free from lateral shoulders, extra-floating sliders could run out of the rail or against the bottom rail when exceeding the nominal floating capacity).

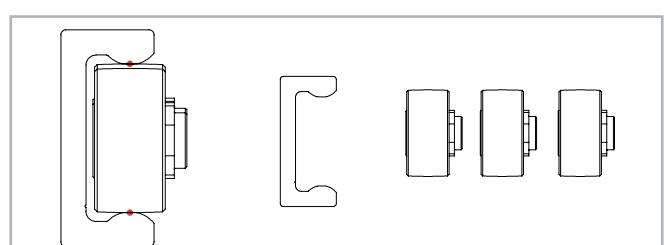


Fig. 39

### Rotating sliders (RA -slider)

Rotating sliders are built mixing guiding and floating rollers. They are able to carry full radial load and retain the ability to guide the payload as it travels, while also rotating a bit without affecting the preload or the smooth running quality. Rotating sliders are used to absorb angular errors in the mounting surfaces.

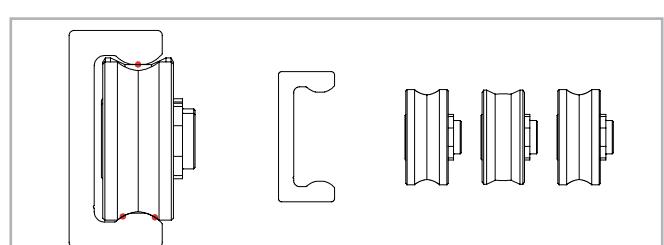


Fig. 40

## > V+P/U-system tolerance compensation

### Axial deviations in parallelism

This problem occurs fundamentally by insufficient precision in the axial parallelism of the mounting surfaces, which results in an excessive load on the slider and thus causes drastically reduced service life.

The combination of two rails, one featuring a RV-slider and one featuring a RP-slider or RU-slider, creates a system that allows to compensate large axial misalignment errors. The limit is set by the axial misalignment permitted by the RP- or RU-slider.

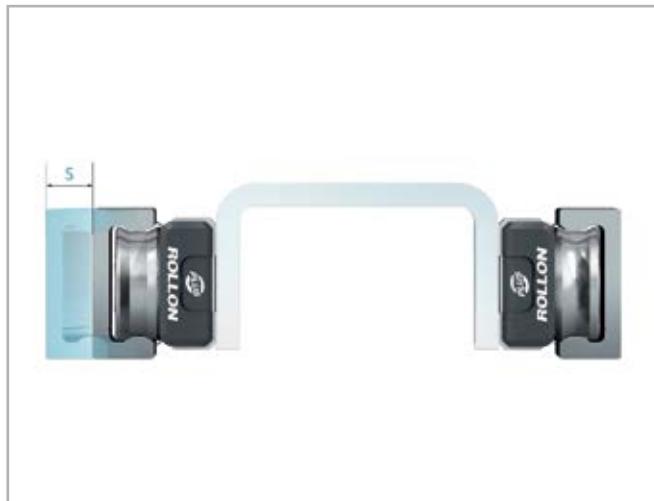


Fig. 41

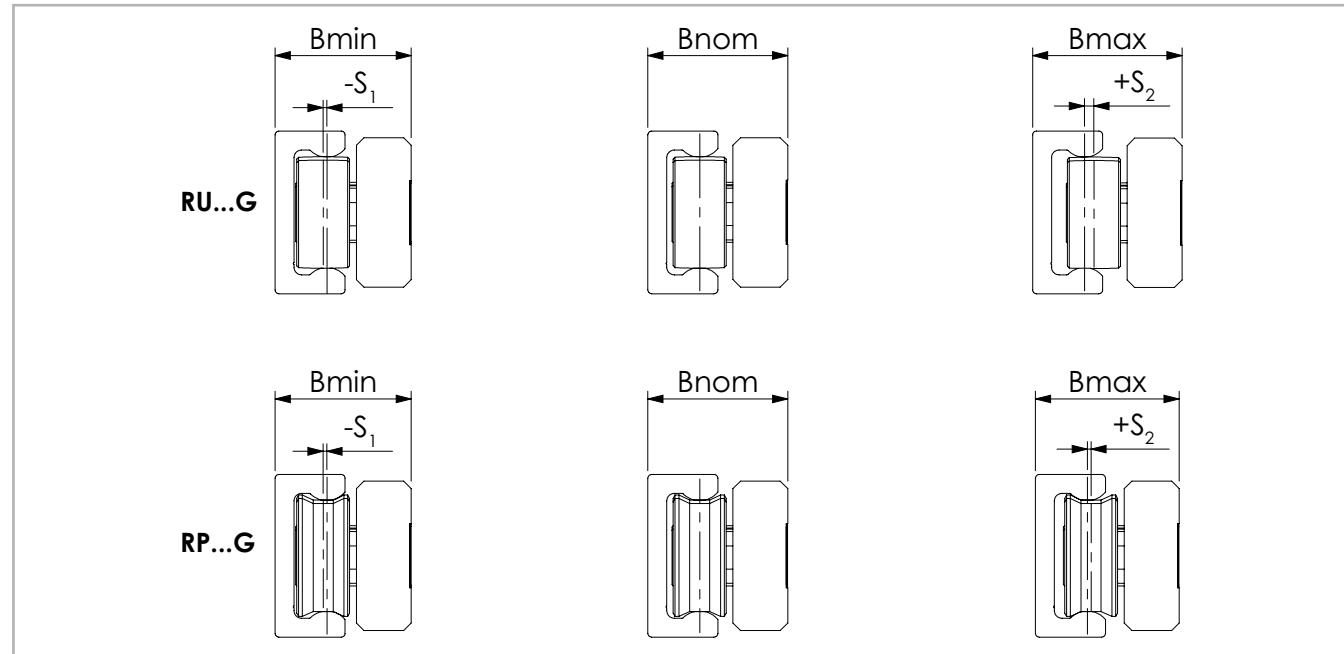


Fig. 42

### Maximum offset

RP-sliders feature floating rollers that are able to slightly travel axially between the two shoulders, while RU-sliders feature extra-floating rollers that are able to fully travel axially without constraints. The maximum axial offset that can be compensated is made up of the combined values  $S_1$  and  $S_2$  listed in table 16. Considered from a nominal value  $B_{\text{nom}}$  as the starting point,  $S_1$  indicates the maximum offset into the rail, while  $S_2$  represents the maximum offset towards the outside of the rail.

Slider type	$S_1$ [mm]	$S_2$ [mm]	$B_{\text{min}}$ [mm]	$B_{\text{nom}}$ [mm]	$B_{\text{max}}$ [mm]
<b>RPG18</b>	0.4	0.4	16.1	16.5	16.9
<b>RP28G</b> <b>RDP28G</b>	0.4	0.4	23.6	24	24.4
<b>RP43G</b> <b>RDP43G</b>	1	1	36	37	38
<b>RUG18</b>	0.4	1	16.1	16.5	17.5
<b>RU28G</b> <b>RDU28G</b>	0.4	2	23.6	24	26
<b>RU43G</b> <b>RDU43G</b>	1	2.5	36	37	39.5

Tab. 16

The application example in the adjacent drawing (see fig. 44) shows that the V+P/U-system implements a problem-free function of the slider even with an angled offset in the mounting surfaces.

If the length of the guide rails is known, the maximum allowable angle deviation of the screwed surfaces can be determined using this formula (the floating slider moves here from the innermost position  $S_1$  to outermost position  $S_2$ ):

$$\alpha = \arctan \frac{S^*}{L}$$

$S^*$  = Sum of  $S_1$  and  $S_2$   
 $L$  = Length of rail

Fig. 43

The following table (tab. 17) contains guidelines for this maximum angle deviation  $\alpha$ , achievable with the longest guide rail from one piece.

Size	Rail length [mm]	Offset S [mm]	Angle $\alpha$ [°]
RPG18	2960	0.8	0.015
RP28G	3200	0.8	0.014
RP43G	3600	2	0.031
RUG18	2000	1.4	0.040
RU28G	3200	2.4	0.043
RU43G	3600	3.5	0.055

Tab. 17

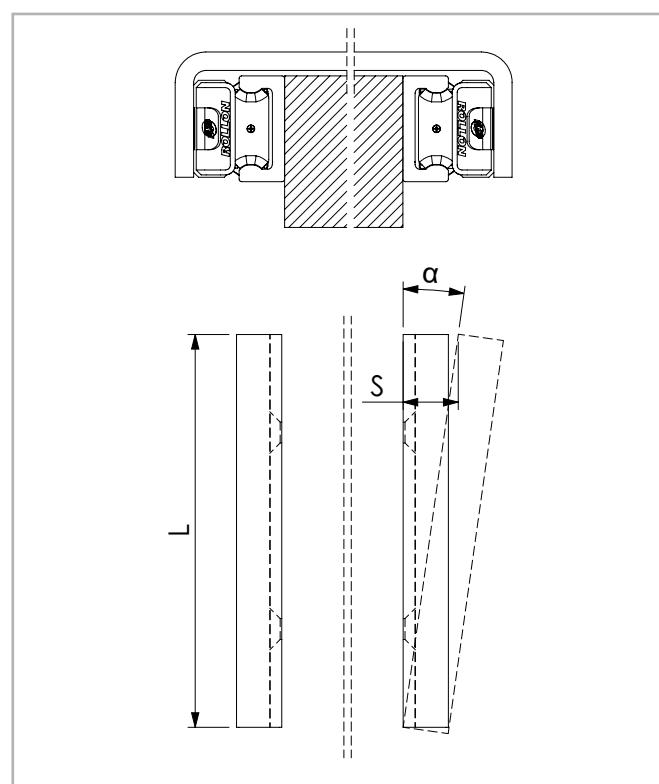


Fig. 44

The V+P/U-system can be designed in different arrangements (see fig. 45). A TG-rail with RV-slider accepts the vertical components of load A TG-rail with RP-slider or RU-slider slider attached underneath the component to be guided prevents the vertical panel from swinging and is used as moment support. In addition, a vertical offset in the structure, as well as possible existing unevenness of the support surface, is compensated.



Fig. 45

## > A+P/U-system tolerance compensation

### Deviations in parallelism in two planes

The A+P/U-system, like the V+P/U, can compensate for axial deviations in parallelism. The RP- or RU-slider allows to correct the longitudinal parallelism error and, additionally, the RA-slider can rotate in the rail, to compensate for other deviations in parallelism, e.g. height offset.

RA-sliders are built mixing guiding and floating rollers. They carry the full radial load and retain the ability to guide the payload as it travels, while being able to rotate in the rail without affecting the preload or the smooth running quality. The combination of two rails, one featuring a RA-slider and one featuring a RP- or RU-slider, can be used to absorb both axial and angular errors in the mounting surfaces.

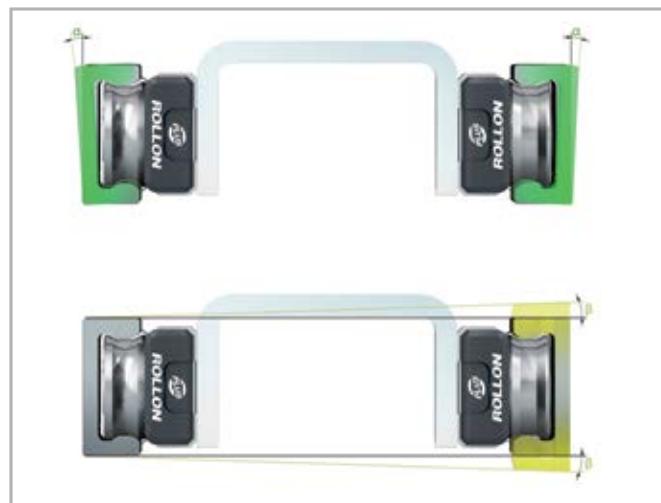


Fig. 46

The maximum allowable rotation angle of the RA-sliders are shown in the following table 18 and figure 47.  $\alpha_1$  is the maximum rotation angle counterclockwise,  $\alpha_2$  is clockwise.

Slider type	$\alpha_1$ [°]	$\alpha_2$ [°]
RAG18	1	1
RA28G RDA28G	0.85	0.85
RA43G RDA43G	1.3	1.3

Tab. 18

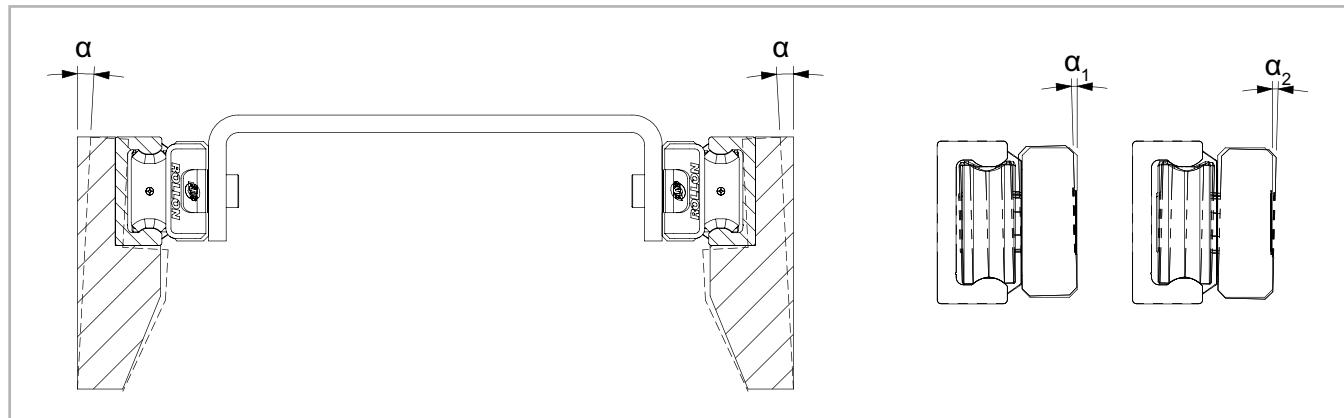


Fig. 47

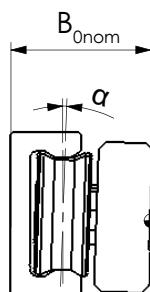


Fig. 48

#### Maximum offset

It must be noted that the RP- or RU-slider in one rail will turn during the movement and rotation of the RA-slider in the other to allow an axial offset. During the combined effect of these movements, you must not exceed the maximum values (see tab. 19).  $B_{0nom}$  is a recommended nominal starting value for the position of a RP- or RU-slider when part of a tolerance compensation system.

Slider type	$B_{0nom}$ [mm]	Angle $\alpha$ [°]
<b>RPG18</b>	16.5	1°
<b>RP28G RDP28G</b>	24	1.7°
<b>RP43G RDP43G</b>	37	2.6°
<b>RUG18</b>	16.5	1°
<b>RU28G RDU28G</b>	24	1.7°
<b>RU43G RDU43G</b>	37	2.6°

Tab. 19

If a RA-slider is used in combination with a RP- or RU-slider with guaranteed problem-free running and without extreme slider load, a pronounced height difference between the two rails can also be compensated. The following illustration shows the maximum height offset  $b$  of the mounting surfaces in relation to the distance  $a$  of the rails (see fig. 49).

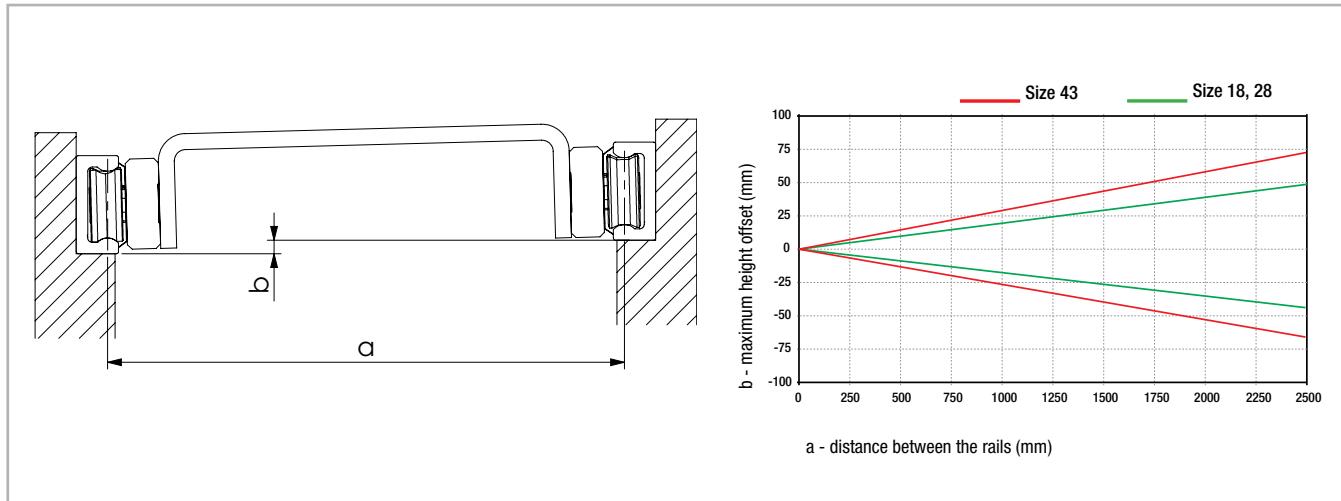


Fig. 49

Even the A+P/U-system can be used in different arrangements. If the same example as with the V+P/U-system is observed (see pg. CR-25, fig. 45), this solution, in addition to the prevention of vibrations and moments, also enables the compensation of larger deviations in parallelism in the vertical direction, without negative consequences to the guide. This is particularly important for longer strokes as it is more difficult to obtain a correct vertical parallelism.



Fig. 50

## > Preload

### Preload classes

The factory installed systems, consisting of rails and sliders, are available in two preload classes:

Standard preload K1 means a rail-slider combination with minimum preload which means the rollers are adjusted free of clearance for optimal running properties.

Usually preload K2 is used for rail-slider systems for increasing the rigidity. When using a system with K2 preload a reduction of the loading capacities and service life must be taken into consideration (see tab. 20).

Preload class	Reduction y
K1	-
K2	0.1

Tab. 20

This coefficient y is used in the calculation formula for checking the static load and lifetime (see pg. CR-95, fig. 172 and pg. CR 99, fig. 189).

The interference is the difference between the contact lines of the rollers and the raceways of the rail.

Preload class	Interference* [mm]	Rail size
K1	0.01	all
K2	0.03	18
	0.04	28
	0.06	43

\* Measured on the largest interior dimension between the raceways

Tab. 21

## Drive force

### Frictional resistance

The drive force required for moving the slider is determined by the combined resistance of the rollers, wipers and seals.

The ground raceways and rollers have a minimal coefficient of friction, which remains almost the same in both the static and dynamic state. The wiper and longitudinal seals are designed for an optimum protection of the system, without a significant negative influence on the quality of motion. The overall friction of the Compact Rail also depends on external factors such as lubrication, preload and additional forces. Table 22 below contains the coefficients of friction for each slider type.



Fig. 51

Size	$\mu$ Roller friction	$\mu_w$ Wiper friction	$\mu_s$ Friction of longitudinal seals
18	0.003	$\frac{\ln(m \cdot 1000)^*}{0.98 \cdot m \cdot 1000}$	0.0015
28	0.003	$\frac{\ln(m \cdot 1000)^*}{0.06 \cdot m \cdot 1000}$	$\frac{\ln(m \cdot 1000)^*}{0.15 \cdot m \cdot 1000}$
43	0.005		

\* Kilograms must be used for load m

Tab. 22

The values given in Table 22 apply to external loads, which, with sliders with three rollers, are at least 10 % of the maximum load rating. For calculating the driving force for lower loads, please contact Rollon technical support.

### Calculation of drive force

The minimum required drive force for the slider is determined with the coefficients of friction (see tab. 22) and the following formula (see fig. 52):

$$F = (\mu + \mu_w + \mu_s) \cdot m \cdot g$$

m = mass (kg)  
g = 9.81 m/s<sup>2</sup>

Fig. 52

### Example calculation:

If a R...43G slider is used with a radial load of 100 kg, the result is  $\mu = 0.005$ ; from the formula the following is calculated:

$$\mu_s = \frac{\ln(100000)}{0.15 \cdot 100000} = 0.00076$$

$$\mu_w = \frac{\ln(100000)}{0.06 \cdot 100000} = 0.0019$$

Fig. 53

This is the minimum drive force for this example:

$$F = (0.005 + 0.0019 + 0.00076) \cdot 100 \cdot 9.81 = 7.51 \text{ N}$$

Fig. 54

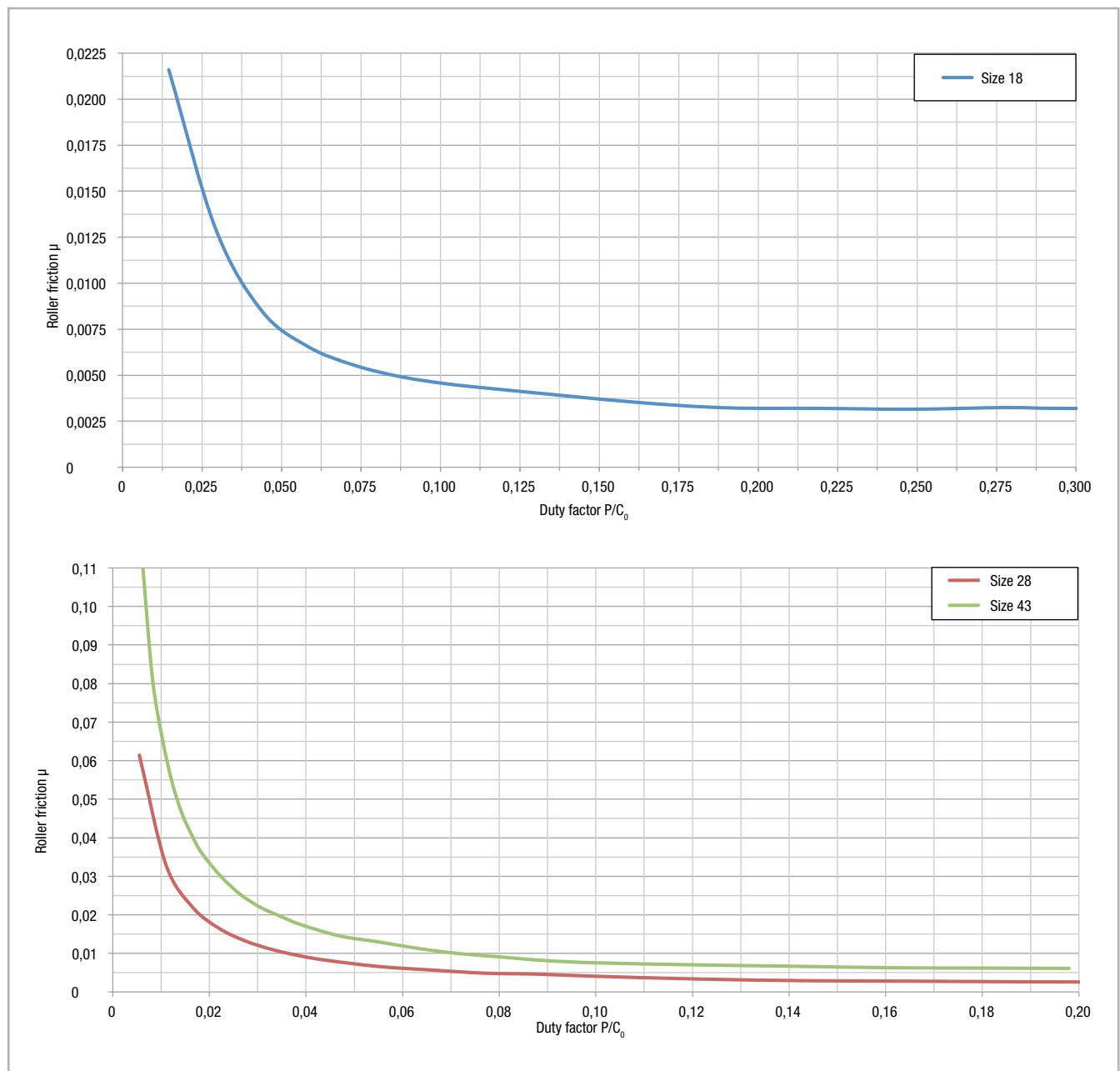


Fig. 55

## ➤ Lubrication

### Roller pin lubrication

The bearings inside the rollers are lubricated for life. To reach the calculated service life (see pg. CR-107), a film of lubricant should always be

present between the raceway and roller, this also serves to protect against corrosion of the ground raceways.

### Lubrication of the raceways

Proper lubrication during normal conditions:

- reduces friction
- reduces wear
- reduces the load of the contact surfaces through elastic deformations
- reduces running noise

## ➤ Slider lubrication

The sliders are equipped with wiper heads that include lubricated felts which slowly release oil on the raceways for a long time. The felts inside the wiper heads can be refilled with lubrication by means of an oiling syringe with needle of OD 1.85mm (max) through the lubrication hole of the wiper located on the front side.



Fig. 56

The durability of the lubrication delivered by the wiper heads depends on the conditions of use. In the normal clean indoor applications, it is suggested to refill the oil every 0.5 million of cycles, 1000 km or 1 year of use whichever comes first. In different conditions, it could be necessary to refill more often, depending on the level of environment criticality. In case of severe dust and dirt conditions, it is suggested to change the entire wiper head with a new one.

When refilling the oil or the substituting the wiper heads, it is recommended to clean the raceways of the guide.

Lubricant	Thickening agent	Temperature range [°C]	Kinematic viscosity 40°C [mm²/s]
Mineral oil	Lithium soap	-20... to +120	approx 110

Tab. 23

## > Corrosion protection

All rails and slider bodies have a standard corrosion protection system by means of electrolytic-zinc plating according to ISO 2081, except for size 18 rails where the standard treatment is Rollon-Nox hardening. If increased corrosion protection is required, application-specific surface treatments are available upon request for rails and slider bodies sizes 28

and 43, e.g. approved nickel plated for use in the food industry. In this case, the chosen treatment must be specified in the order for both rails and sliders using the appropriate code shown in the table below. For more information contact Rollon technical support.

Treatment	Characteristics
<b>Rollon-Nox</b>	Patented high depth nitride hardening and black oxidation treatment that provides good durability under high loads or frequencies and good corrosion resistance. It is standard for rails size 18 and it's not available for other sizes.
<b>Zinc Plating ISO 2081</b>	Standard treatment for rails sizes 28-43 and all slider bodies, it is ideal for indoor applications. When applied to the rail, it is removed from the raceways by the subsequent grinding process. Zinc-plated sliders are supplied with steel rollers. Not available for size 18.
<b>ZincNickel ISO19598 (Z)</b>	Ideal for outdoor applications. Sliders ordered with ZincNickel treatment are supplied with stainless steel rollers to further increase the corrosion resistance. Not available for size 18.
<b>Rollon E-coating (K)</b>	As zinc-plated version with additional electro painting that provides a fine black finishing to the entire rail. When applied to the rail, the slider can partially remove the coating from the raceways on the running contact point after a period of use. Sliders ordered with Rollon E-Coating are supplied with stainless steel rollers to further increase the corrosion resistance.
<b>Nickel Plating (N)</b>	Provides high resistance to chemical corrosion and is ideal for applications in medical or food related environments. When applied to the rail, raceways are coated too. Sliders ordered with Nickel Plating treatment are supplied with stainless steel rollers to further increase the corrosion resistance. Not available for size 18.

Tab. 24

## > Speed and acceleration

The Compact Rail product family is suitable for high operating speeds and accelerations.

Size	Speed [m/s]	Acceleration [m/s <sup>2</sup> ]
<b>18</b>	3	10
<b>28</b>	5	15
<b>43</b>	7	15

Tab. 25

## > Operating temperatures

The temperature range for continuous operation is: -20 °C / +120 °C with occasional peaks up to +150 °C.

## Installation instructions



### Fixing holes

#### V-holes with 90° bevels

The selection of rails with 90° countersunk holes is based on the precise alignment of the threaded holes for installation. Here the complex alignment of the rail to an external reference is omitted, since the rail aligns during installation by the self-centering of the countersunk screws on the existing hole pattern.

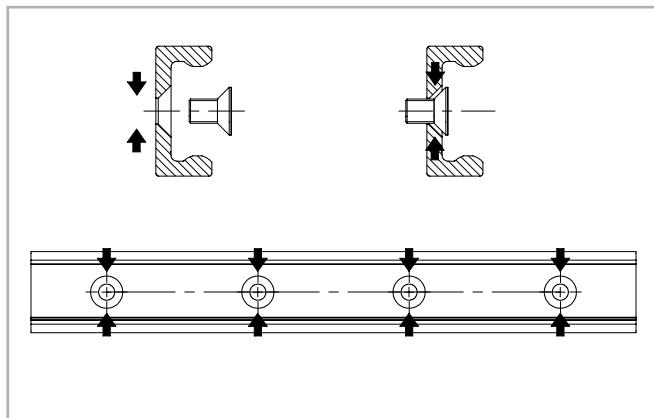


Fig. 57

#### C-holes with cylindrical counterbore

When a rail with counterbored holes is delivered, the Torx® screws are provided in the right quantity. The cylindrical screw has, as shown, some play in the countersunk fixing hole, so that an optimum alignment of the rail can be achieved during installation (see fig. 58).

The area T is the diameter of the possible offset, in which the screw center point can move during the precise alignment.

Rail type	Area T [mm]
TMGC18	Ø 1.0
TGC28	Ø 1.0
TGC43	Ø 2.0

Tab. 26

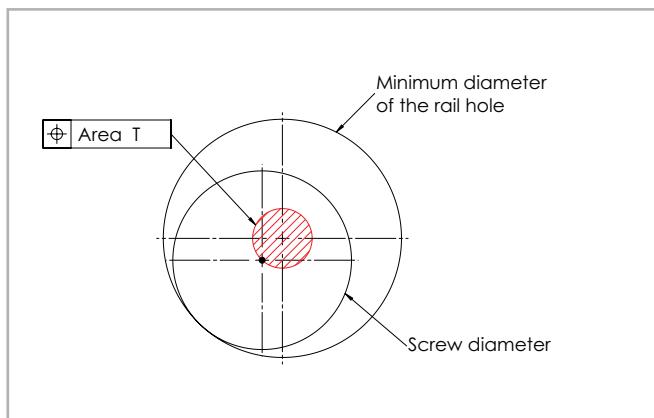


Fig. 58

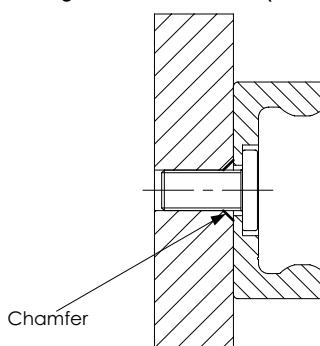
#### Chamfers

Chamfers must be realized for both C-holes and V-holes rails. The minimum chamfers on the fixing threads are listed on the table below.

Size	Chamfer C-holes [mm]	Chamfer V-holes [mm]
18	0.5 x 45°	0.5 x 45°
28	0.6 x 45°	1 x 45°
43	1 x 45°	1 x 45°

Tab. 27

#### Example for fixing with Torx® screws (custom design)



#### Example for fixing with countersunk screws

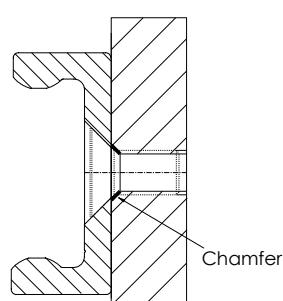


Fig. 59

## Adjusting the sliders

If requested in the order, rails and sliders are delivered as a system with factory adjustment. If rails and sliders are supplied separately or if the slider is to be mounted in another rail, the bearings will need to be adjusted. For sections 28 and 43, the preload can be calibrated using one of the following procedures. For section 18, the only suitable approach is to use the hexagonal spanner.

### Common preliminary operations:

- (1) Check that the raceways are clean and remove the wipers, to increase sensitivity for proper preload.
- (2) Place the slider in the rail. It may be necessary to align the bearings to be adjusted with those fixed, to facilitate insertion. Excessive offset may make insertion difficult. Use a flat or hexagonal spanner.
- (3) Use a medium threadlocking adhesive in the screws.
- (4) Lightly tighten the upper bearing screw without over-tightening. Vice versa if the screw has already been previously tightened, loosen the bearing fixing screws slightly. The bearing must be able to rotate but should not be completely free. Only adjust the eccentric bearings (without the center marked).

### With flat spanner

- (5) Position the slider at one end of the rail to simplify insertion of the flat spanner.
- (6) Insert the flat spanner supplied to the side, between the rail and the slider. Take care to insert it from the end of the slider, sliding it under the side seal until it reaches the bearing (Fig. 60). Use the flat spanner to engage the hexagon of the eccentric bearing.
- (7) Turn the flat adjustment spanner clockwise so that the eccentric bearing contacts the raceway opposite the factory-set fixed bearings, thus reducing the slider clearance to zero. Avoid applying a high preload, which would cause high wear and reduce service life.
- (8) While holding the rolling pin in the correct position with the flat adjustment spanner, tighten the fixing screw to ensure that the pin is first locked in position.
- (9) Run the slider and check the preload over the entire length of the rail. The movement must be smooth. If any oscillation/clearance or excessive force is observed, repeat the adjustment operation. Preload is optimized when the slider runs smoothly and without play.
- (10) For sliders with more than 3 bearings, repeat this procedure for each one to be adjusted. Ensure that all bearings have uniform contact with the raceways.
- (11) While maintaining the angular position of the pin with the flat spanner, tighten the adjusted bearing fixing screw with a torque spanner. The prescribed tightening torque is shown in table 28.
- (12) Reinstall the wipers.

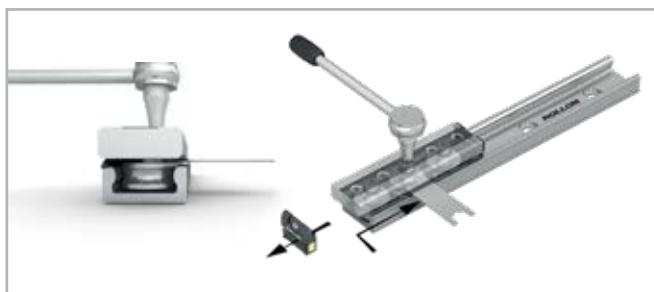


Fig. 60

Slider type	Tightening torque [Nm]
R...18G	3
R...28G	9
R...43G	22

Tab. 28

### With hexagonal spanner

- (5) Lock the rail on a stable support so that your hands are free.
- (6) Insert the hexagonal spanner into the pin, passing it through a hole in the track. Turn the hexagonal key slightly so that the eccentric bearing contacts the raceway opposite the factory-set fixed bearings, thus reducing the slider clearance to zero. When turning, support the upper screw by turning in the same direction with the second hexagonal spanner to prevent loosening or changes in preload settings.
- (7) While firmly holding the hexagonal spanner inserted in the off-center pin with one hand, use the other hexagonal spanner to turn and tighten the upper sealing screw of the bearing. Do not lock or unlock the off-center bearing by rotating the pin. Always turn the top screw to lock or loosen the bearing.
- (8) Slide the slider and check the preload over the entire length of the rail. The movement must be smooth. If any oscillation/clearance or excessive force is observed, repeat the adjustment operation. Preload is optimized when the slider runs smoothly and without play.
- (9) Preload values can be checked by slowly inserting the slider at the end of the rail. The insertion force is proportional to the preload. Normally a good setting corresponds to the following min/max forces shown in table 29.
- (10) For sliders with more than 3 bearings, repeat this procedure for each one to be adjusted. Ensure that all bearings have uniform contact with the raceways.
- (11) Tighten the rolling pin/screw definitively precisely using a torque spanner to ensure the correct tightening torque, in accordance with the values in table 28, while holding the hexagonal spanner to the pin, to avoid variations in the preload parameters. Always turn the top screw to lock or loosen the bearing.
- (12) Reinstall the wipers.



Fig. 61

Slider type	Inserting force	
	$F_{min}$ [N]	$F_{max}$ [N]
R...G18	0,5	2
R...28G	1	5
R...43G	2	10

Tab. 29

## Use of radial ball bearing rollers

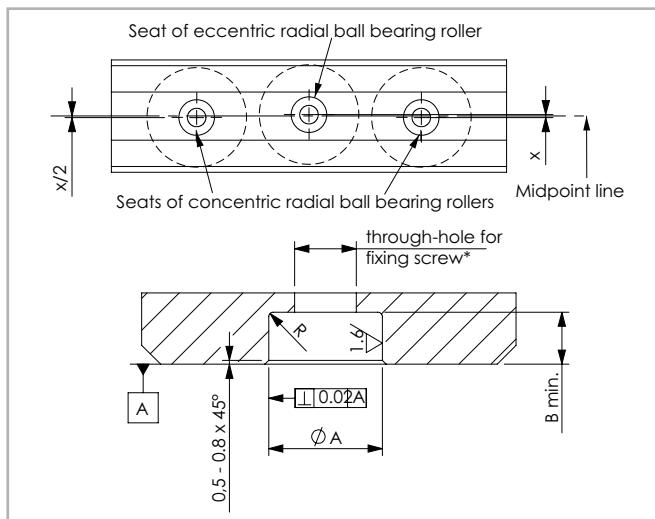


Fig. 62

If purchasing "Radial ball bearing rollers" to install on your own structure (see p. CR-18) we advise:

- Using a maximum of 2 concentric radial ball bearing rollers
- Offset the seats of the concentric radial ball bearing rollers with respect to those of the eccentric radial ball bearing rollers according to the table 30.

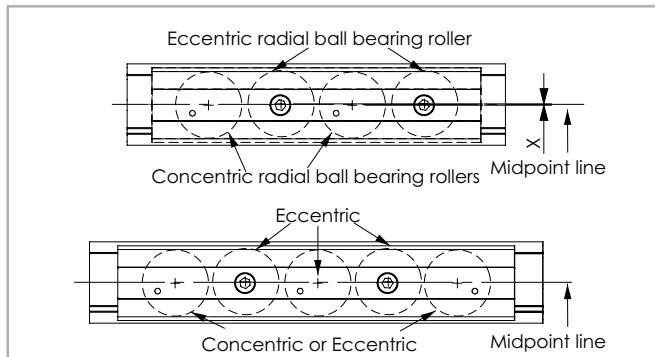


Fig. 63

Slider size	X [mm]	Ø A [mm]	B min. [mm]	Radius R [mm]
18	0.30	-	-	-
28	0.44	8 + 0.05/+0.02	2	0.5
43	0.90	11 + 0.05/+0.02	3	0.5

Tab. 30

## > Installing the single rail

The rails can be installed in two positions relative to the external force. For axial loading of the slider (fig. 64 pos. 2), the load capacity is reduced because of the decline in contact area caused by the change in position. Therefore, the rails should be installed in such a way that the load on the rollers acts in the radial direction (fig. 64, pos. 1). The number of fixing holes in the rail in combination with screws of property class 10.9 is dimensioned in accordance with the load capacity values. For critical applications with vibrations or higher demand for rigidity, a support of the rail (fig. 64, pos. 3) is advantageous.

This reduces deformation of the sides and the load on the screws. The installation of a rail with counterbored holes requires an external reference for alignment. This reference can also be used simultaneously as rail support if required. All information in this section on alignment of the rails, refers to rails with counterbored holes. Rails with countersunk holes self-align using the specified fixing hole pattern (see pg. CR-34, fig. 57).

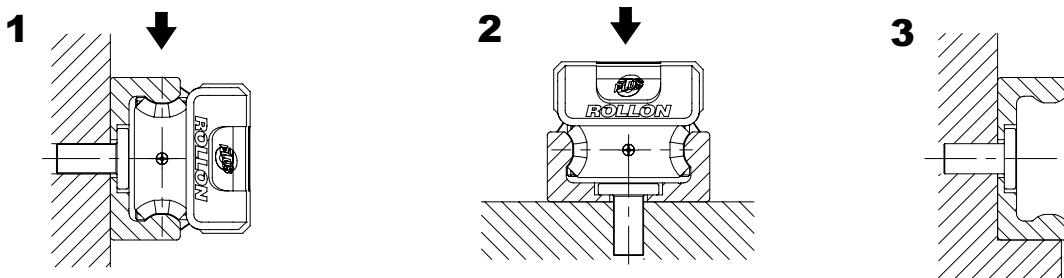


Fig. 64

## Rail installation with reference surface as support

- (1) Remove unevenness, burrs and dirt from the support surface.
- (2) Press the rail against the support surface and insert all screws without tightening them.
- (3) Start tightening the fixing screws to the specified torque on one end of the rail while continuing to hold pressure on the rail against the support surface.

Screw type	Torx® tightening torque [Nm]	Countersunk tightening torque [Nm]
M4 (TMG...18)	3	3
M5 (TG...28)	9	6
M8 (TG...43)	22	25

Tab. 31

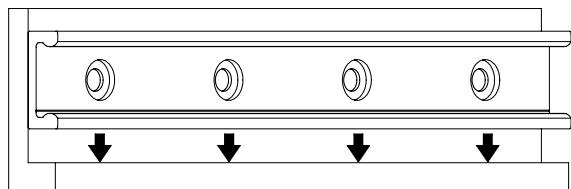


Fig. 65

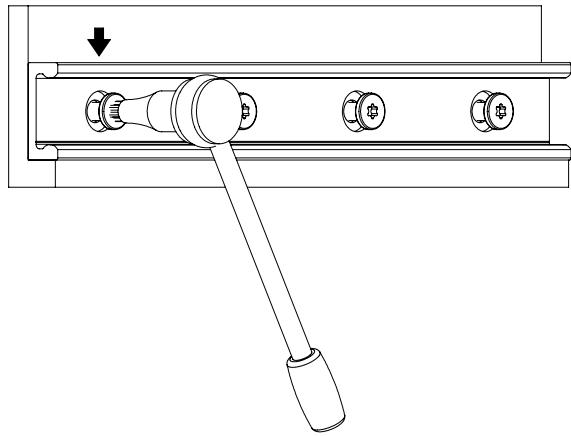


Fig. 66

### Rail installation without support

(1) Carefully lay the guide rail with installed slider on the mounting surface and slightly tighten the fixing screws so that the guide rail lightly touches the mounting surface.

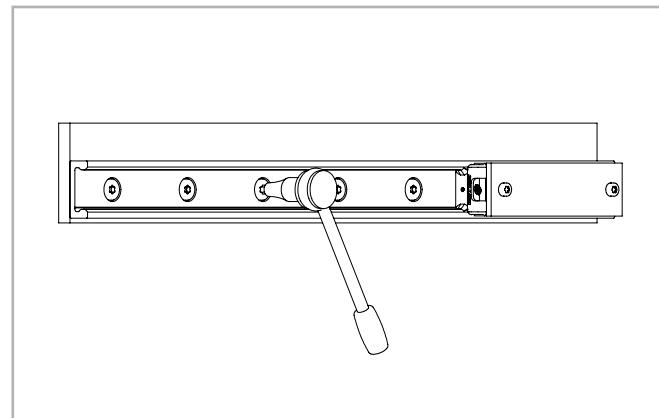


Fig. 67

(2) Install a dial indicator so that the offset of the rail to a reference line can be measured. Now position the slider in the center of the rail and set the dial indicator to zero. Move the slider back and forth between each two hole spacings and carefully align the rail. Fasten the three center screws of this area now with the specified tightening torque, see fig. 68.  
 (3) Now position the slider on one end of the rail and carefully align the rail to zero on the dial indicator.

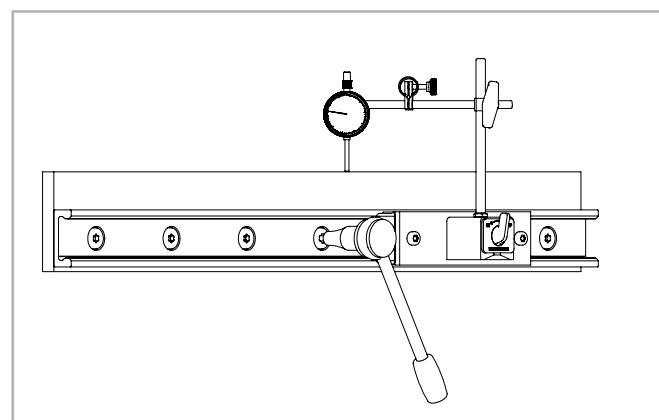


Fig. 68

(4) Begin to tighten the screws as specified while moving the slider together with the dial indicator. Make sure that it does not show any significant deflection. Repeat this procedure from the other end of the rail.

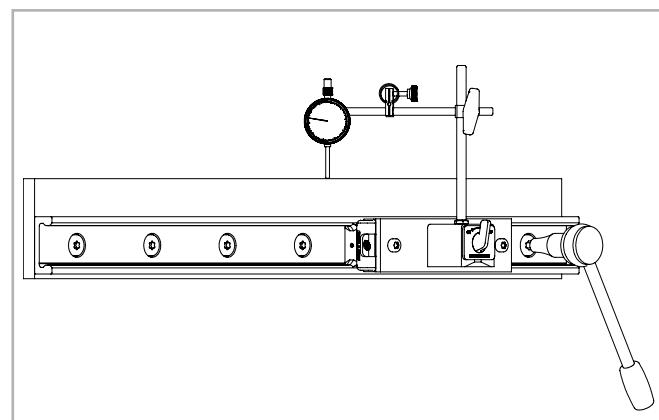


Fig. 69

## Parallel installation of two rails

When two rails with guiding sliders RV, a V+P system or a V+U system are installed the height difference of the two rails must not exceed a certain value (obtainable from the table below) in order to ensure proper guiding. These maximum values result from the maximum allowable twisting angle of the rollers in the raceways (see tab. 32). These values account for a load capacity reduction of 30% on the rail and must absolutely be maintained in every case.

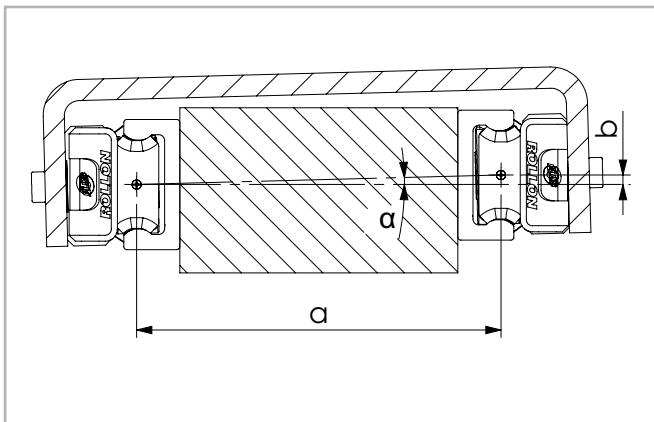


Fig. 70

Size	$\alpha$
18	1 mrad (0.057°)
28	2.5 mrad (0.143°)
43	3 mrad (0.171°)

Tab. 32

When using two rails, the maximum parallelism deviation must not be exceeded (see tab. 33). Otherwise stresses can occur, which can result in a reduction in load capacity and service life.

Rail size	K1	K2
18	0.03	0.02
28	0.04	0.03
43	0.05	0.04

Tab. 33

Note: For parallelism problems, it is recommended to use a V+P/U or A+P/U system, since these combinations compensate for inaccuracies (see pg. CR-24, or CR-26 ).

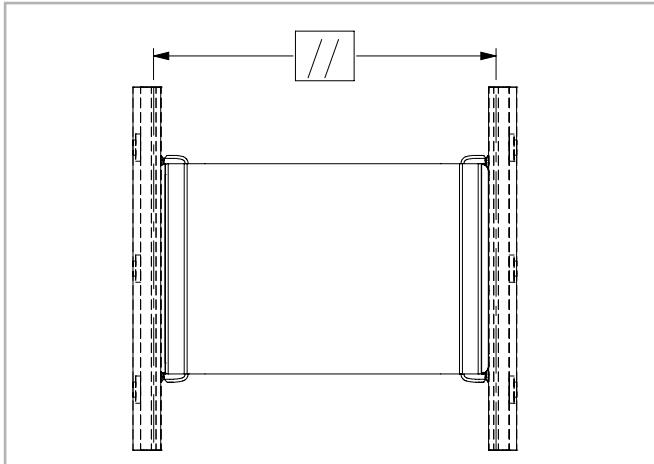


Fig. 71

### Parallel installation of two rails

- (1) Clean chips and dirt from the prepared mounting surfaces and fasten the first rail as described in the section on installation of a single rail.
- (2) Fasten the second rail on the ends and the center. Tighten the screws in Position A and measure the distance between the raceways of the two rails.

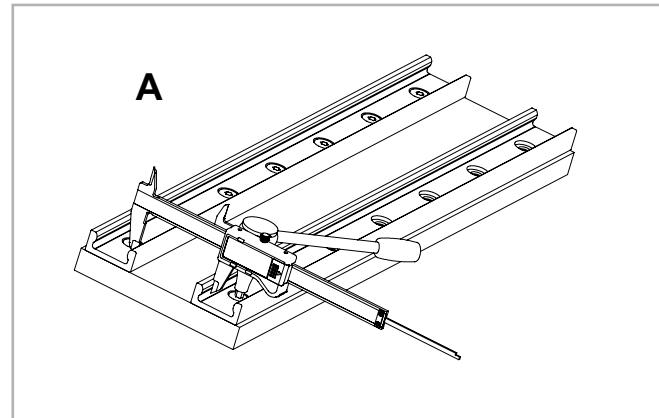


Fig. 72

- (3) Fasten the rail in Position B so that the distance between the raceways does not exceed the measured values in Position A while maintaining the tolerances (see pg. CR-30, tab. 22) for parallel rail installation.

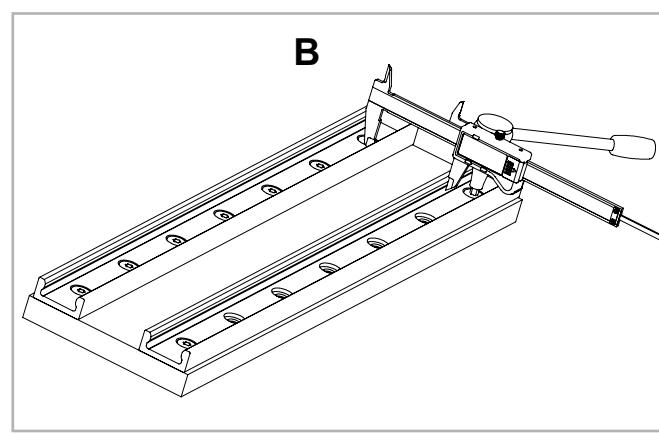


Fig. 73

- (4) Fasten the screw in Position C so that the distance of the raceways is as close to an average between the two values from A and B as possible.

- (5) Fasten all other screws and check the specified tightening torque of all fixing screws (see pg. CR-38, tab. 31).

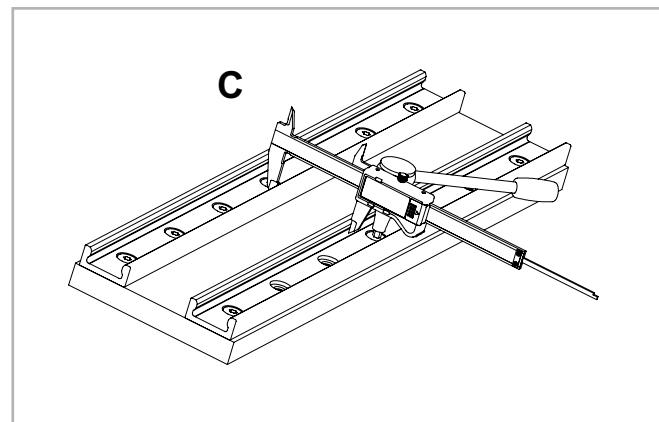


Fig. 74

## ➤ Installation of the self-aligning systems

When using a two-track parallel linear guide we recommend the use of a misalignment compensation system: the combination of a V+P/U sliders to compensate for deviations in parallelism or A+P/U sliders to compensate for deviations in parallelism in two planes.

### Installation steps

(1) For a compensating system, the rail with the guiding slider RV is always installed first. This is then used as a reference for the compensating bearing rail.

Then proceed as described in the section on installation of a single rail (see pg. CR-37).

(2) Install the other bearing rail and only tighten the fixing screws slightly.

(3) Insert the sliders in the rails and install the element to be moved, without tightening its screws.

(4) Insert the element in the center of the rails and tighten it, use screws class 10.9.

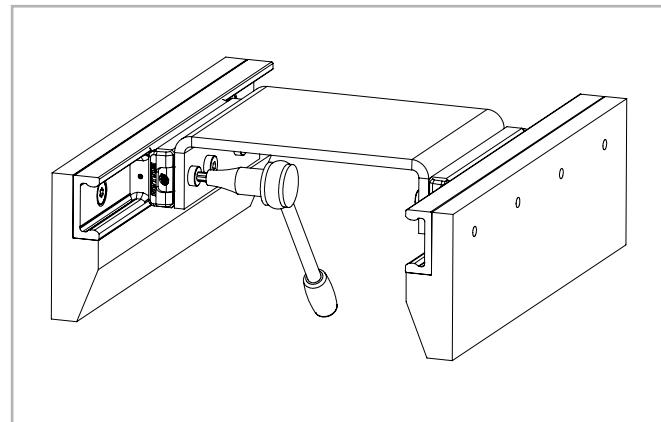


Fig. 75

(5) Tighten the center rail fixing screws to the specified torque (see pg.CR-38, tab. 31).

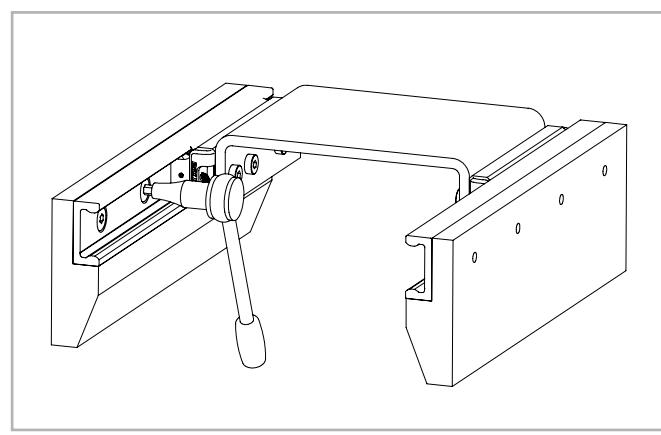


Fig. 76

(6) Move the element to one end of the rail and start tightening the rest of the screws in the direction away from the slider.

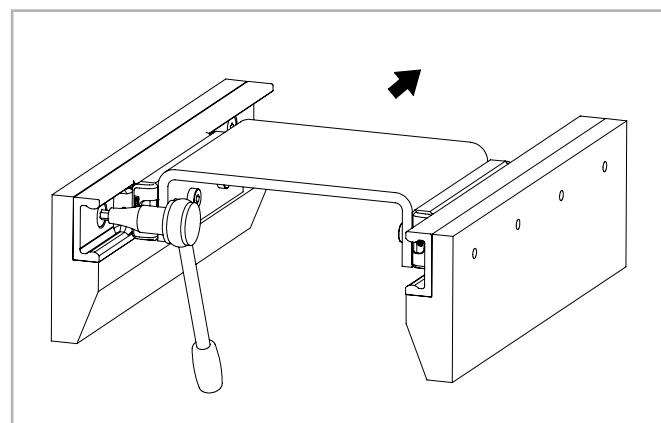


Fig. 77

## Joined Rails

If long guide rails are required, two or more rails can be joined to the desired length. When putting guide rails together, be sure that the register marks shown in fig. 78 are positioned correctly.

For applications with parallel joined guide rails we suggest them to be fabricated asymmetric.

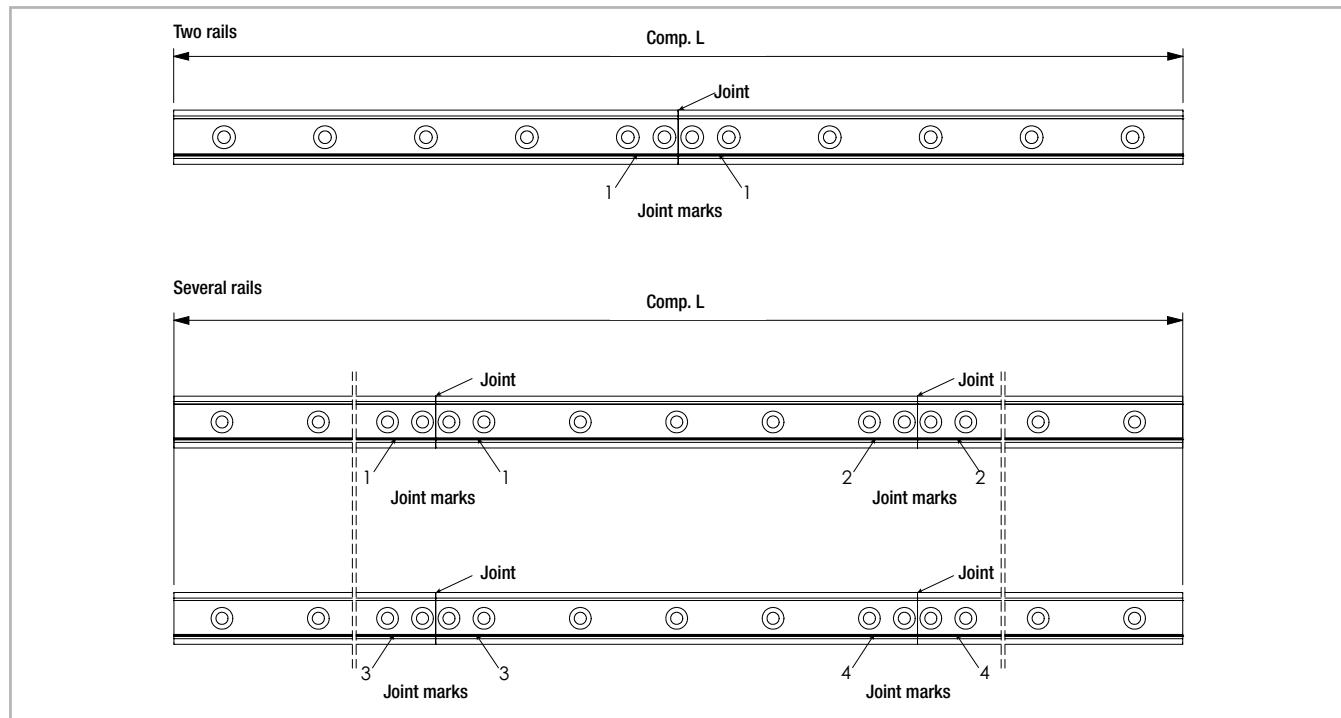


Fig. 78

### General information

The maximum available rail length in one piece is indicated in table 5 on page CR-11. Longer lengths are achieved by joining two or more rails (joined rails).

Rollon then machines the rail ends at a right angle to the impact surfaces and marks them. Additional fixing screws are included with the delivery, which ensure a problem-free transition of the slider over the joints, if the following installation procedures are followed. Two additional threaded holes (see fig. 79) are required in the load-bearing structure. The included end fixing screws correspond to the installation screws for the rails for cylindrical counterbores (see pg. CR-34).

The alignment fixture for aligning the rail joint can be ordered using the designation given in the table (see pg. CR-19, tab. 11).

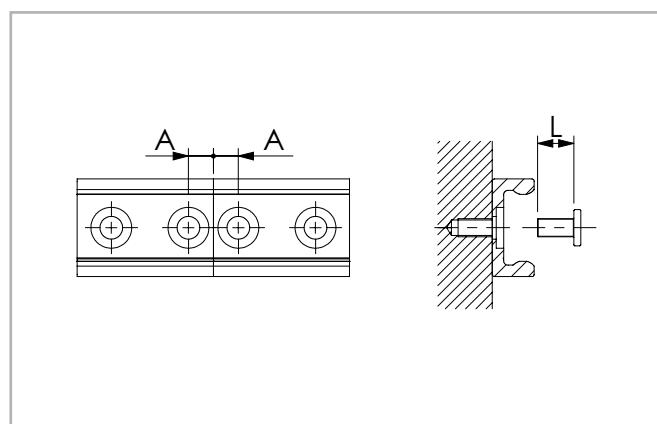


Fig. 79

Rail type	A [mm]	Threaded hole (load-bearing structure)	Screw type	L [mm]	Alignment fixture
TMGC18 - TMGV18	7	M4		8	ATMG18
TGC28 - TGV28	8	M5	see pg. CR-19	10	ATG28
TGC43 - TGV43	11	M8		16	ATG43

Tab. 34

## ➤ Installation of joined rails

After the fixing holes for the rails are made in the load-bearing structure, the joined rails can be installed according to the following procedure:

- (1) Fix the individual rails on the mounting surface by tightening all screws except for each last one on the rail joint.

(2) Install the end fixing screws without tightening them (see fig. 80).

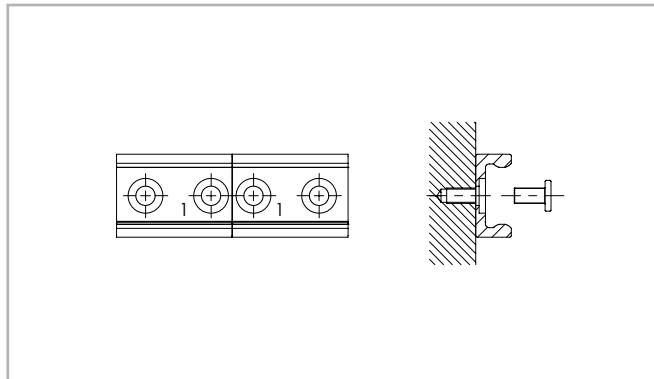


Fig. 80

(3) Place the alignment fixture on the rail joint and tighten both set screws uniformly, until the raceways are aligned (see fig. 81).

(4) After the previous step (3) it must be checked if both rail backs lie evenly on the mounting surface. If a gap has formed there, this must be shimmed.

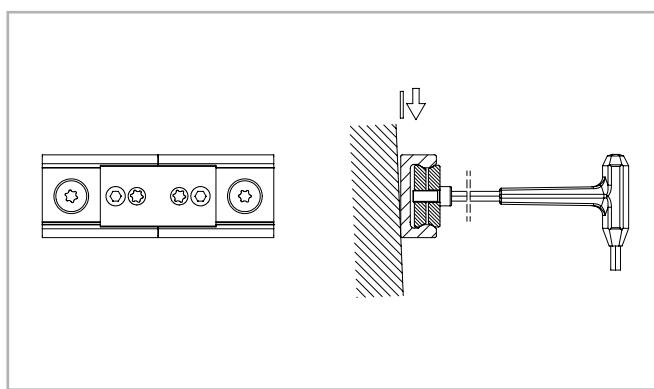


Fig. 81

(5) The bottom of the rails should be supported in the area of the transition. Here a possible existing gap must be looked for, which must be closed for correct support of the rail ends by shims.

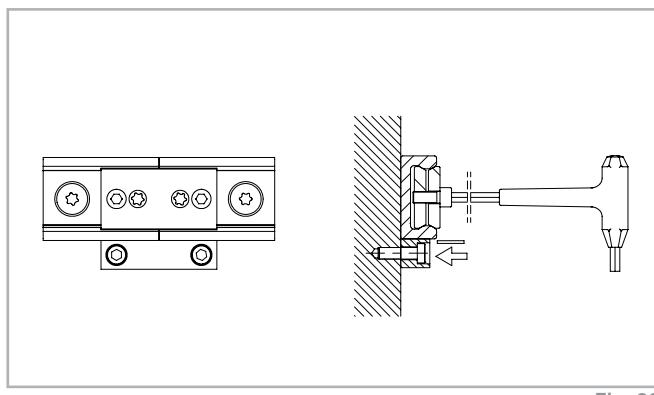


Fig. 82

(6) Insert the key through the holes in the alignment fixture and tighten the screws on the rail ends.

(7) For rails with 90° countersunk holes, tighten the remaining screws starting from the rail joint in the direction of the rail center. For rails with cylindrical counter-sunk holes, first adjust the rail to an external reference, then proceed as described above.

(8) Remove the alignment fixture from the rail.

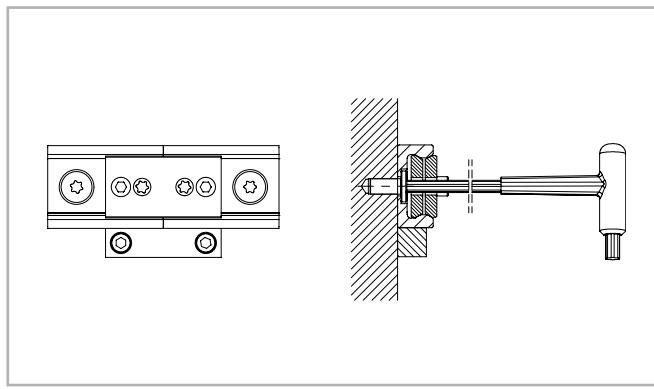


Fig. 83

## Ordering key



Note on ordering: rails length codes are always 5 digits, sliders length codes are always 3 digits. Use zeroes as a prefix when lengths are shorter.

### Rail / slider system

TGV	-03600	/2/	RV	43G	-4	A	-N	
Surface protection (if different from Standard) see pg. CR-33, tab. 24								
Configuration depending on type of slider see pg. CR-12 and CR-14								
Number of rollers see pg. CR-8, tab. 1								
Size see from pg. CR-11								
Slider type see pg. CR-12								
Number of sliders in one rail								
Rail length in mm see pg. CR-11, tab. 5								
Rail type see pg. CR-11, tab. 4								

Ordering example: TGV-03600/2/RV43G-4A-N

### Rail

TGV	-43	-03600	-N					
Surface protection (if different from Standard ISO 2081) see pg. CR-33, tab. 24								
Rail length in mm see pg. CR-11, tab. 5								
Size see pg. CR-11								

Ordering examples: TGV-43-03600-N (single rail); TGV-43-05680-N (joined rails)

Rail composition: 1x880+2x2400 (only for joint processed rails)

Hole pattern: 40-10x80-40//40-29x80-40//40-29x80-40 (please always specify the hole pattern separately)

### Slider

RV	43G	-4	A	-N				
Surface protection (if different from Standard) see pg. CR-33, tab. 24								
Configuration depending on type of slider see pgs. CR-12 and CR-14								
Number of rollers see pg. CR-8								

Size see pg. CR-11

Slider type see pg. CR-12

Ordering example: RV43G-4A-N

### Wipers

ZK-WR	43G							
Size								

Wiper type see pg. CR-19

Ordering example: ZK-WR43G

Note on ordering: every kit contains a pair of wipers. Two wipers per slider are always required.



**ROLLON®**  
BY TIMKEN

*Compact Rail*



## Product explanation



### ➤ Self-aligning linear guides with bearings and C-profile featuring newly designed robust steel slider



Fig. 84

Compact Rail is the product family of guide rails consisting of roller sliders with radial bearings which slide on the internal, induction hardened and ground raceways of a C-profile made from cold-drawn roller bearing carbon steel.

Compact Rail consists of three product series: the fixed bearing rail, the compensating bearing rail and the floating bearing rail. They can be combined to create self-aligning systems to compensate misalignment errors on two planes: axially up to 3.9 mm and radially up to 2°. All products are available in zinc plating, with other treatments for higher corrosion resistance as an option. There are five different sizes of guide rails and many different versions and lengths of the slide bearings, depending on the size and load requirement.

#### The most important characteristics:

- Compact size
- Corrosion resistant surface
- Not sensitive to dirt due to internal raceways and large rollers
- Hardened and ground raceways
- Self-aligning in two planes
- Quieter than recirculating ball systems
- High operating speeds
- Wide temperature range
- Easy adjustment of slider in the guide rail
- Different anticorrosion treatments available for rails and slider bodies

#### Preferred areas of application:

- Cutting machines
- Medical equipment
- Packaging machines
- Photographic lighting equipment
- Construction and machine technology (doors, protective covers)
- Robots and manipulators
- Automation
- Handling
- Special vehicles

### Fixed bearing rails (T-rails)

Fixed bearing rails are used as the main load bearing of radial and axial forces.



Fig. 85

### Floating bearing rails (U-rails)

The floating bearing rails are used for load bearing of radial forces and, in combination with the fixed bearing T-rail or compensation K-rail, as a support bearing for occurring moment loads.



Fig. 86

### Compensation bearing rails (K-rails)

The compensation bearing rails are used for the load bearing of radial and axial forces. Tolerance compensation in two planes can be implemented in combination with the U-rail.



Fig. 87

### Self-aligning system: T+U

The combination of fixed bearing rail and floating bearing rail allows for deviations in parallelism.



Fig. 88

### Self-aligning system: K+U

The combination of compensation rail and floating bearing rail allows for deviations in parallelism and height offset.

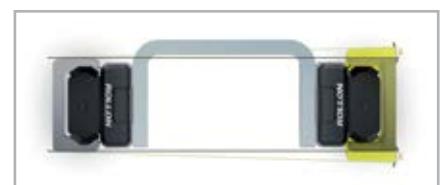


Fig. 89

### NSW/NSA-slider

Robust zinc plated steel slider with roller bearings, self-centering heads with wipers, longitudinal seals to protect the internal components and a top sealing strip to prevent accidental tampering of the fixed rollers. The slider body is accurately finished with matte longitudinal edge chamfer and a shining ground flat surface. It is available for all sizes, configurable with up to six rollers depending on the load requirement.



Fig. 90

### CS-slider

Constructed with zinc-plated steel body and sturdy wipers (optional) made of thermoplastic elastomer. Available for all sizes. Depending on the load requirement, slider is configurable with up to six rollers.



Fig. 91

### NSD/NSDA-slider

Constructed as the NSW/NSA-slider with mounting holes parallel to the direction of preferred loading. It is available for sizes 28 and 43, with three or five rollers, depending on load case and load direction set with the corresponding configuration.



Fig. 92

### Rollers

Also available individually in all sizes. Available as eccentric or concentric rollers. Optionally available with splash-proof plastic seal (2RS) or with steel cover disc (2Z; 2ZR for size 63).



Fig. 93

### Wipers

The slider heads are equipped with special slow release felt pads and are free to rotate with respect to the slider body, so that the felts are always in contact with the raceways to ensure a perfect lubrication. The felts can be grased through a dedicated oil refilling access on the front of the head, simply by means of a syringe oiler.



Fig. 94

### Alignment fixture

The alignment fixture AT / AK is used during installation of joined rails in order to precisely align the rails with each other.



Fig. 95

## Technical data

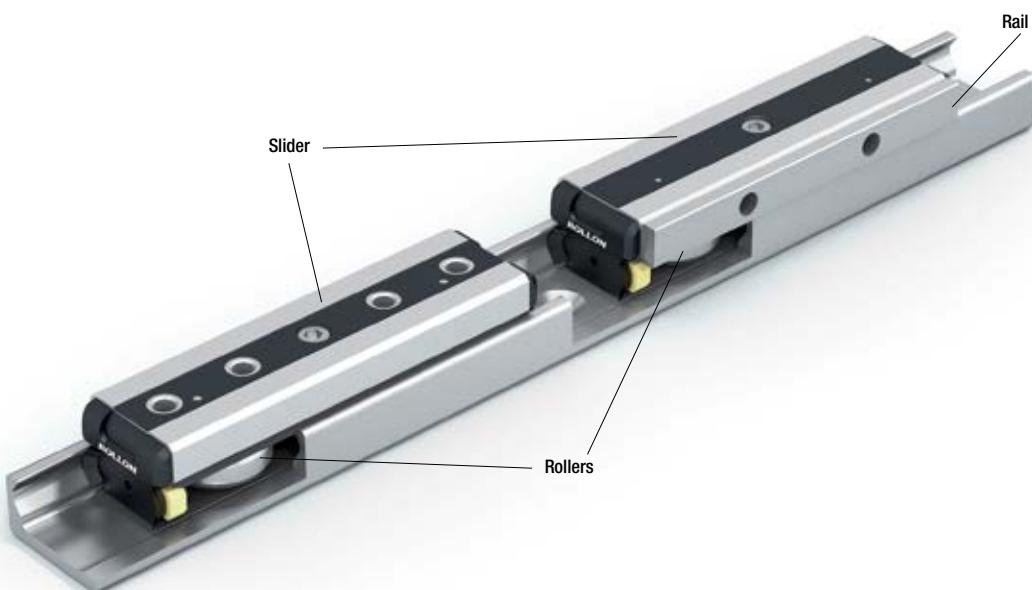


Fig. 96

### Performance characteristics:

- Available sizes for T-rail, U-rail: 18, 28, 35, 43, 63
- Available sizes for K-rail: 43, 63
- Max. operating speed: 9 m/s (354 in/s) (depending on application)
- Max. acceleration: 20 m/s<sup>2</sup> (787 in/s<sup>2</sup>) (depending on application)
- Max. radial load capacity: 15,000 N (per slider)
- Temperature range: -20 °C to +120 °C (-4 °F to +248 °F) briefly up to max. +150 °C (+302 °F)
- Available rail lengths from 160 mm to 3,600 mm (6.3 in to 142 in) in 80-mm increments (3.15 in), longer single rails up to max. 4,080 mm (160.6 in) on request
- Roller pins lubricated for life
- Roller seal/shield: standard 2Z (steel cover disk), 2RS (splash-proof)
- Rollers material: steel 100Cr6 (also available stainless steel AISI 440)
- Rail raceways are induction hardened and ground
- Rails and slider bodies are standard zinc-plated according to ISO 2081
- Rail material of T- and U-rails in sizes 18: cold-drawn roller bearing carbon steel C43 F
- Rail material of K-rails, as well as T- and U-rails in size 28 to 63: Cf53

### Notes:

- The sliders are equipped with rollers that are in alternating contact with both sides of the raceway. Markings on the body around the roller pins indicate correct arrangement of the rollers to the external load
- With a simple adjustment of the eccentric rollers, the desired clearance or preload on the rail and slider can be set.
- Rails in joined design are available for longer transverse distances (see pg. CR-98)
- The K rails are not suitable for vertical installation
- Screws of property class 10.9 must be used
- Differences in screw sizes must be observed
- When mounting the rails, it is crucial to ensure that the mounting holes in the structure are properly chamfered. (see pg. CR-91, tab. 74)
- The general illustrations show NSW-sliders as an example
- Rollers are available also in stainless steel version (see pg. CR-74).

## ➤ Configurations and behavior of the slider under yawing moment $M_z$

### Individual slider under $M_z$ moment load

When an overhanging load in an application with a single slider per rail causes an  $M_z$  moment in one direction, a 4 to 6 roller Compact Rail slider is available. These sliders are available in both configuration A and B in regards to the roller arrangement to counter the acting  $M_z$  moment load. The moment capacity of these sliders in the  $M_z$ -direction varies significantly through spacing  $L_1$  and  $L_2$  in accordance with the direction of rotation of  $M_z$ . Especially in the use of two parallel rails, for example with a T+U-system,

it is extremely important to pay attention to the correct combination of the slider configuration A and B, in order to use the maximum load capacities of the slider.

The diagrams below illustrate this concept of the A and B configuration for sliders with 4 and 6 rollers. The maximum allowable  $M_z$ -moment is identical in both directions for all 3 and 5 roller sliders.

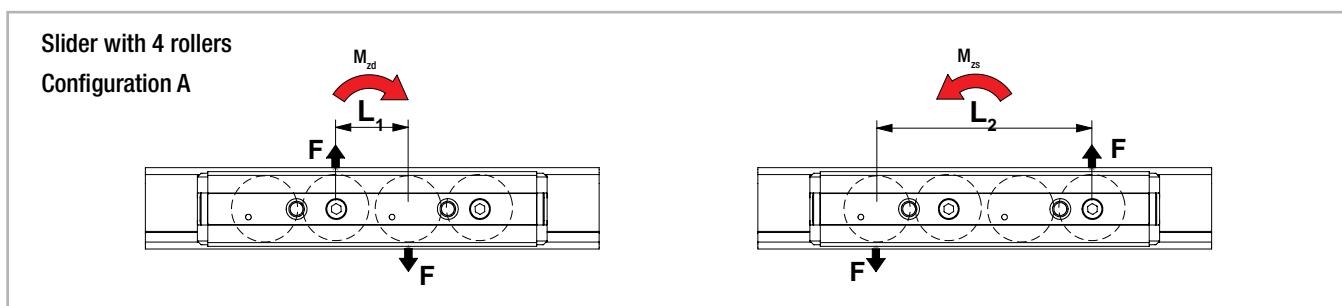


Fig. 97

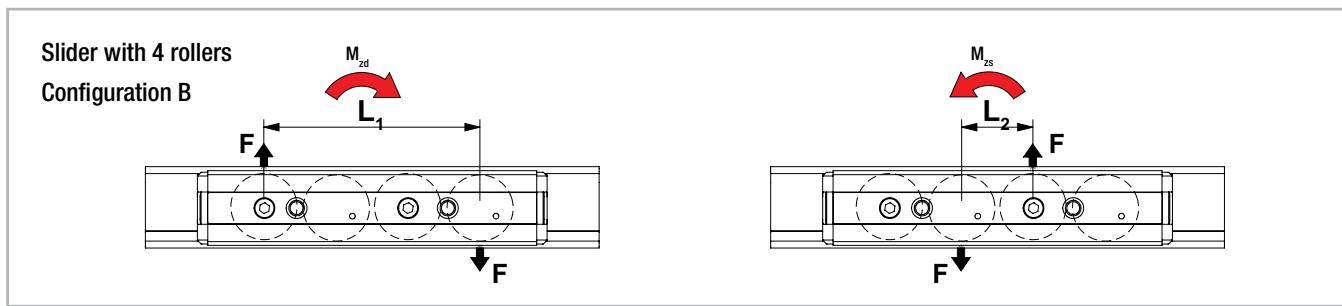


Fig. 98

### Two sliders under $M_z$ moment load

When an overhanging load acts on an application with two sliders per rail and causes an  $M_z$ -moment in one direction, different support reactions occur on the two sliders. For this reason, an optimal arrangement of slider configurations must be achieved to reach the maximum load capacities. In practice, when using NSW-sliders with 3 or 5 rollers, the two sliders must be installed rotated by 180° so that the slider is always loaded on the side with the highest number of rollers (with

NSA sliders this is not possible due to different rail geometries). For an even number of rollers this has no effect. The NSD-sliders with installation option from above or below cannot be installed due to the position of the rollers in reference to the installation side, therefore they are available in the configurations A and B (see fig. 100).

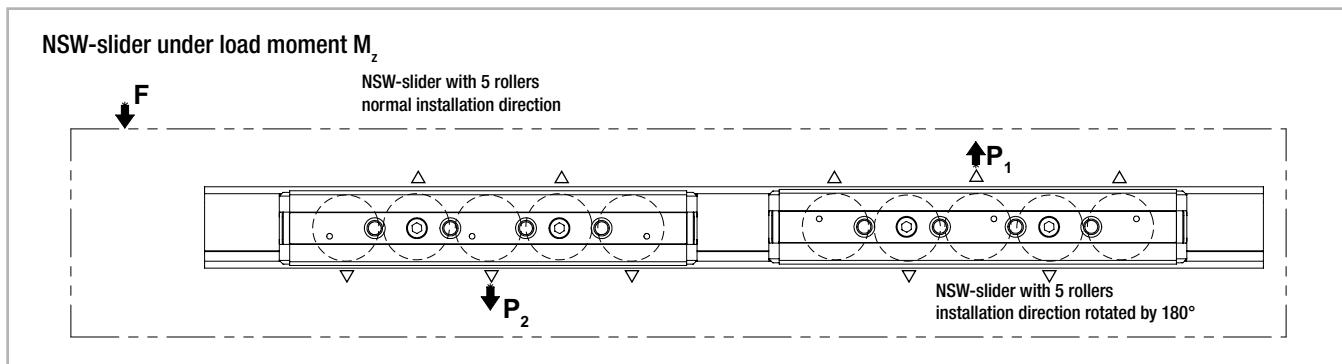


Fig. 99

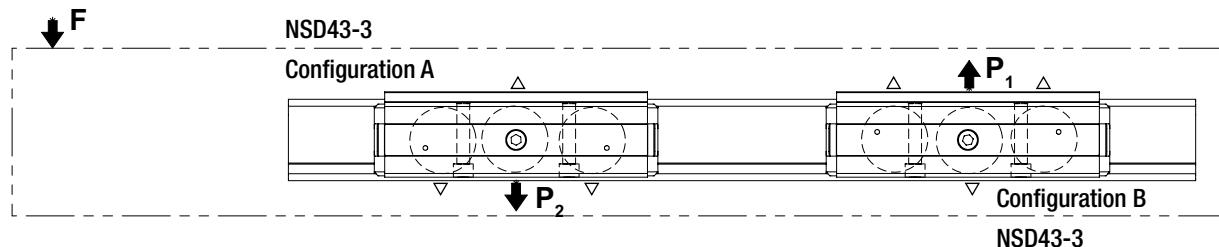
NSD-slider under load moment  $M_z$ 

Fig. 100

## Slider configurations for various load cases

## Arrangement DS

This is the recommended arrangement for use of two sliders under  $M_z$ -moment when using one rail. Also see previous page: Two sliders under  $M_z$  moment load.

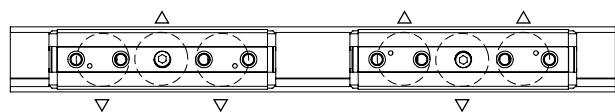


Fig. 101

## Arrangement DD

When using a pair of guide rails with two sliders each under  $M_z$  moment load, the second system should be designed in arrangement DD. This results in the following combination: one guide rail with two sliders in arrangement DS and the other guide rail with 2 sliders in arrangement DD. This allows even load and moment distribution between the two parallel rails.

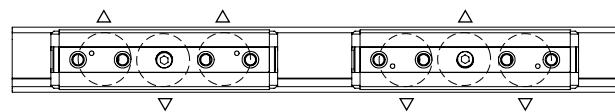


Fig. 102

## Arrangement DA

Standard arrangement if no other information is given. This arrangement is recommended if the load point is located within the two outside points of the sliders.

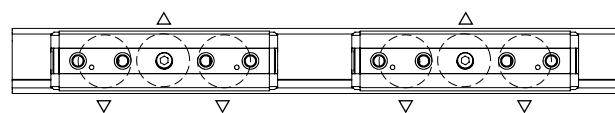


Fig. 103

## Load capacities

### Slider

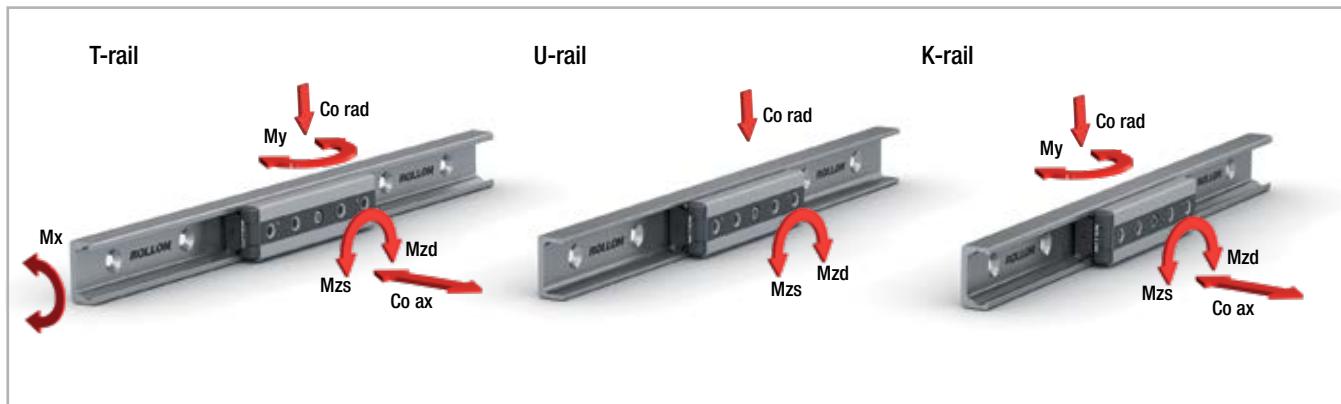


Fig. 104

The load capacities in the following tables each apply for one slider.

When using the slider in U-rails (floating bearing rails) the values are

$C_{0ax} = 0$ ,  $M_x = 0$  and  $M_y = 0$ . When using the sliders in K-rails (compensation rails) the value is:  $M_x = 0$ .

### Load capacities NSW / NSA / NSD / NSDA

Type	No. of rollers	Load capacities and moments							Weight [kg]	
		C [N]	$C_{0rad}$ [N]	$C_{0ax}$ [N]	$M_x$ [Nm]	$M_y$ [Nm]	M <sub>z</sub> [Nm]			
							M <sub>zd</sub>	M <sub>zs</sub>		
NSW18-3 -...	3	1530	820	260	1.5	4.7	8.2	8.2	0.076	
NSW18-4A -...	4	1530	820	300	2.8	7	8.2	24.7	0.096	
NSW18-4B -...	4	1530	820	300	2.8	7	24.7	8.2	0.096	
NSW18-5 -...	5	1830	975	360	2.8	9.4	24.7	24.7	0.11	
NSW18-6A -...	6	1830	975	440	3.3	11.8	24.7	41.1	0.138	
NSW18-6B -...	6	1830	975	440	3.3	11.8	41.1	24.7	0.138	
NSW28-3 -...	3	4260	2170	640	6.2	16	27.2	27.2	0.23	
NSW28-4A -...	4	4260	2170	750	11.5	21.7	27.2	81.7	0.29	
NSW28-4B -...	4	4260	2170	750	11.5	21.7	81.7	27.2	0.29	
NSW28-5 -...	5	5065	2580	900	11.5	29	81.7	81.7	0.35	
NSW28-6A -...	6	5065	2580	1070	13.7	36.2	81.7	136.1	0.42	
NSW28-6B -...	6	5065	2580	1070	13.7	36.2	136.1	81.7	0.42	
NSW28L-3-...	3	4260	2170	640	6.2	29	54.4	54.4	0.32	
NSW28L-4A-...	4	4260	2170	750	11.5	29	54.4	108.5	0.34	
NSW28L-4B-...	4	4260	2170	750	11.5	29	108.5	54.4	0.34	
NSW28L-4C-...	4	4260	2170	750	11.5	29	81.7	81.7	0.34	
NSW28L-5A-...	5	5065	2580	900	11.5	29	81.7	81.7	0.36	
NSW28L-5B-...	5	6816	3472	640	6.2	29	54.4	54.4	0.36	
NSD28-3A -...	3	4260	2170	640	6.2	16	27.2	27.2	0.23	
NSD28-3B -...	3	4260	2170	640	6.2	16	27.2	27.2	0.23	
NSD28-5A -...	5	5065	2580	900	11.5	29	81.7	81.7	0.35	
NSD28-5B -...	5	5065	2580	900	11.5	29	81.7	81.7	0.35	

Tab. 35

Type	No. of rollers	Load capacities and moments							Weight [kg]	
		C [N]	C <sub>0rad</sub> [N]	C <sub>0ax</sub> [N]	M <sub>x</sub> [Nm]	M <sub>y</sub> [Nm]	M <sub>z</sub> [Nm]			
		M <sub>zd</sub>	M <sub>zs</sub>							
NSW35-3 -...	3	8040	3510	1060	12.9	33.7	61.5	61.5	0.44	
NSW35-4A -...	4	8040	3510	1220	23.9	43.3	52.7	158.1	0.53	
NSW35-4B -...	4	8040	3510	1220	23.9	43.3	158.1	52.7	0.53	
NSW35-5 -...	5	9565	4180	1460	23.9	57.7	158.1	158.1	0.64	
NSW35-6A -...	6	9565	4180	1780	28.5	72.2	158.1	263.4	0.76	
NSW35-6B -...	6	9565	4180	1780	28.5	72.2	263.4	158.1	0.76	
NSD35-3A -...	3	8040	3510	1060	12.9	33.7	61.5	61.5	0.44	
NSD35-3B -...	3	8040	3510	1060	12.9	33.7	61.5	61.5	0.44	
NSD35-5A -...	5	9565	4180	1460	23.9	57.7	158.1	158.1	0.64	
NSD35-5B -...	5	9565	4180	1460	23.9	57.7	158.1	158.1	0.64	
NSW43-3 -...	3	12280	5500	1570	23.6	60	104.5	104.5	0.8	
NSW43-4A -...	4	12280	5500	1855	43.6	81.5	104.5	313.5	1.02	
NSW43-4B -...	4	12280	5500	1855	43.6	81.5	313.5	104.5	1.02	
NSW43-5 -...	5	14675	6540	2215	43.6	108.6	313.5	313.5	1.24	
NSW43-6A -...	6	14675	6540	2645	52	135.8	313.5	522.5	1.47	
NSW43-6B -...	6	14675	6540	2645	52	135.8	522.5	313.5	1.47	
NSW43L-3-...	3	12280	5500	1570	23.6	108.6	209	209	1.10	
NSW43L-4A-...	4	12280	5500	1855	43.6	108.6	209	418	1.17	
NSW43L-4B-...	4	12280	5500	1855	43.6	108.6	418	209	1.17	
NSW43L-4C-...	4	12280	5500	1855	43.6	108.6	313.5	313.5	1.17	
NSW43L-5A-...	5	14675	6540	2215	43.6	108.6	313.5	313.5	1.25	
NSW43L-5B-...	5	19650	8800	1570	23.6	108.6	209	209	1.25	
NSA43-3 -...	3	12280	5100	1320	0	50.4	96.9	96.9	0.8	
NSA43-4A -...	4	12280	5100	1320	0	54.3	96.9	290.7	1.02	
NSA43-4B -...	4	12280	5100	1320	0	54.3	290.7	96.9	1.02	
NSA43-5 -...	5	14675	6065	1570	0	108.7	290.7	290.7	1.24	
NSA43-6A -...	6	14675	6065	1570	0	108.7	290.7	484.5	1.47	
NSA43-6B -...	6	14675	6065	1570	0	108.7	484.5	290.7	1.47	
NSA43L-3-...	3	12280	5100	1320	0	97.7	188.7	188.7	1.10	
NSA43L-4A-...	4	12280	5100	1320	0	97.7	188.7	377.3	1.17	
NSA43L-4B-...	4	12280	5100	1320	0	97.7	377.3	188.7	1.17	
NSA43L-4C-...	4	12280	5100	1320	0	97.7	283	283	1.17	
NSA43L-5A-...	5	14675	6065	1570	0	97.7	283	283	1.25	
NSA43L-5B-...	5	19650	8160	1820	0	97.7	188.7	188.7	1.25	
NSD43-3A -...	3	12280	5500	1570	23.6	60	104.5	104.5	0.8	
NSD43-3B -...	3	12280	5500	1570	23.6	60	104.5	104.5	0.8	
NSD43-5A -...	5	14675	6540	2215	43.6	108.6	313.5	313.5	1.24	
NSD43-5B -...	5	14675	6540	2215	43.6	108.6	313.5	313.5	1.24	
NSDA43-3A -...	3	12280	5100	1320	0	50.4	96.9	96.9	0.8	
NSDA43-3B -...	3	12280	5100	1320	0	50.4	96.9	96.9	0.8	
NSDA43-5A -...	5	14675	6065	1570	0	108.7	290.7	290.7	1.24	
NSDA43-5B -...	5	14675	6065	1570	0	108.7	290.7	290.7	1.24	

Type	Number of rollers	Load capacities and moments							Weight [kg]	
		C [N]	C <sub>0,rad</sub> [N]	C <sub>0,ax</sub> [N]	M <sub>x</sub> [Nm]	M <sub>y</sub> [Nm]	M <sub>z</sub> [Nm]			
							M <sub>zd</sub>	M <sub>zs</sub>		
NSW63-3-2ZR	3	30750	12500	6000	125	271	367	367	2.44	
NSW63-4A-2ZR	4	30750	12500	7200	250	413	367	1100	3.17	
NSW63-4B-2ZR	4	30750	12500	7200	250	413	1100	367	3.17	
NSW63-5-2ZR	5	36600	15000	8500	250	511	1100	1100	3.89	
NSW63-6A-2ZR	6	36600	15000	10000	350	689	1100	1830	4.60	
NSW63-6B-2ZR	6	36600	15000	10000	350	689	1830	1100	4.60	
NSA63-3-2ZR	3	30750	11550	5045	0	235	335	335	2.44	
NSA63-4A-2ZR	4	30750	11550	5045	0	294	335	935	3.17	
NSA63-4B-2ZR	4	30750	11550	5045	0	294	935	335	3.17	
NSA63-5-2ZR	5	36600	13745	6000	0	589	935	935	3.89	
NSA63-6A-2ZR	6	36600	13745	6000	0	589	935	1560	4.60	
NSA63-6B-2ZR	6	36600	13745	6000	0	589	1560	935	4.60	

Tab. 37

## Load capacities CS / CSK

Type	Number of rollers	Load capacities and moments							Weight [kg]
		C [N]	C <sub>grad</sub> [N]	C <sub>0ax</sub> [N]	M <sub>x</sub> [Nm]	M <sub>y</sub> [Nm]	M <sub>z</sub> [Nm]		
							M <sub>zd</sub>	M <sub>zs</sub>	
CS18-060-...	3	1530	820	260	1.5	4.7	8.2	8.2	0.04
CS18-080-...-A	4	1530	820	300	2.8	7	8.2	24.7	0.05
CS18-080-...-B	4	1530	820	300	2.8	7	24.7	8.2	0.05
CS18-100-...	5	1830	975	360	2.8	9.4	24.7	24.7	0.06
CS18-120-...-A	6	1830	975	440	3.3	11.8	24.7	41.1	0.07
CS18-120-...-B	6	1830	975	440	3.3	11.8	41.1	24.7	0.07
CS28-080-...	3	4260	2170	640	6.2	16	27.2	27.2	0.155
CS28-100-...-A	4	4260	2170	750	11.5	21.7	27.2	81.7	0.195
CS28-100-...-B	4	4260	2170	750	11.5	21.7	81.7	27.2	0.195
CS28-125-...	5	5065	2580	900	11.5	29	81.7	81.7	0.24
CS28-150-...-A	6	5065	2580	1070	13.7	36.2	81.7	136.1	0.29
CS28-150-...-B	6	5065	2580	1070	13.7	36.2	136.1	81.7	0.29
CS35-100-...	3	8040	3510	1060	12.9	33.7	61.5	61.5	0.27
CS35-120-...-A	4	8040	3510	1220	23.9	43.3	52.7	158.1	0.33
CS35-120-...-B	4	8040	3510	1220	23.9	43.3	158.1	52.7	0.33
CS35-150-...	5	9565	4180	1460	23.9	57.7	158.1	158.1	0.41
CS35-180-...-A	6	9565	4180	1780	28.5	72.2	158.1	263.4	0.49
CS35-180-...-B	6	9565	4180	1780	28.5	72.2	263.4	158.1	0.49
CS43-120-...	3	12280	5500	1570	23.6	60	104.5	104.5	0.53
CS43-150-...-A	4	12280	5500	1855	43.6	81.5	104.5	313.5	0.68
CS43-150-...-B	4	12280	5500	1855	43.6	81.5	313.5	104.5	0.68
CS43-190-...	5	14675	6540	2215	43.6	108.6	313.5	313.5	0.84
CS43-230-...-A	6	14675	6540	2645	52	135.8	313.5	522.5	1.01
CS43-230-...-B	6	14675	6540	2645	52	135.8	522.5	313.5	1.01
CSK43-120-...	3	12280	5100	1320	0	50.4	96.9	96.9	0.53
CSK43-150-A	4	12280	5100	1320	0	54.3	96.9	290.7	0.68
CSK43-150-B	4	12280	5100	1320	0	54.3	290.7	96.9	0.68
CSK43-190-...	5	14675	6065	1570	0	108.7	290.7	290.7	0.84
CSK43-230-A	6	14675	6065	1570	0	108.7	290.7	484.5	1.01
CSK43-230-B	6	14675	6065	1570	0	108.7	484.5	290.7	1.01
CS63-180-2ZR	3	30750	12500	6000	125	271	367	367	1.66
CS63-235-2ZR-A	4	30750	12500	7200	250	413	367	1100	2.17
CS63-235-2ZR-B	4	30750	12500	7200	250	413	1100	367	2.17
CS63-290-2ZR	5	36600	15000	8500	250	511	1100	1100	2.67
CS63-345-2ZR-A	6	36600	15000	10000	350	689	1100	1830	3.17
CS63-345-2ZR-B	6	36600	15000	10000	350	689	1830	1100	3.17
CSK63-180-2ZR	3	30750	11550	5045	0	235	335	335	1.66
CSK63-235-2ZR-A	4	30750	11550	5045	0	294	335	935	2.17
CSK63-235-2ZR-B	4	30750	11550	5045	0	294	935	335	2.17
CSK63-290-2ZR	5	36600	13745	6000	0	589	935	935	2.67
CSK63-345-2ZR-A	6	36600	13745	6000	0	589	935	1560	3.17
CSK63-345-2ZR-B	6	36600	13745	6000	0	589	1560	935	3.17

## Product dimensions



### ➤ Rail T, U, K

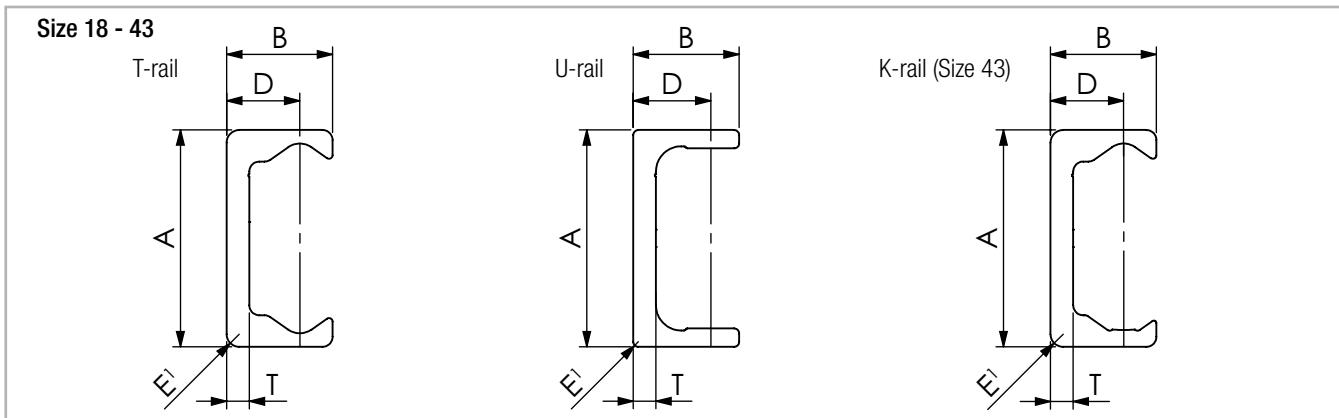


Fig. 105

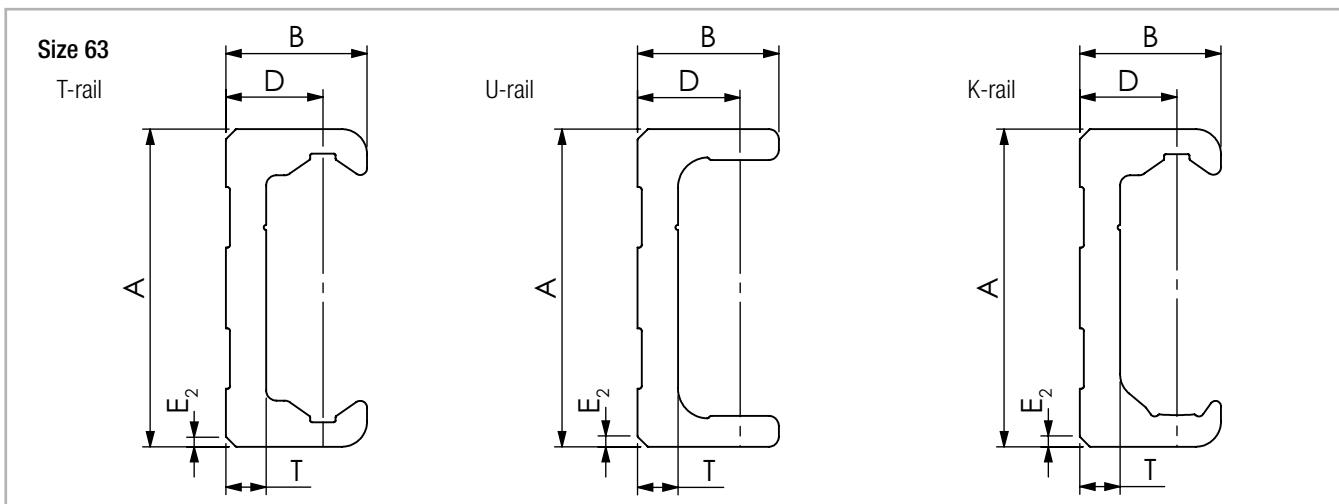
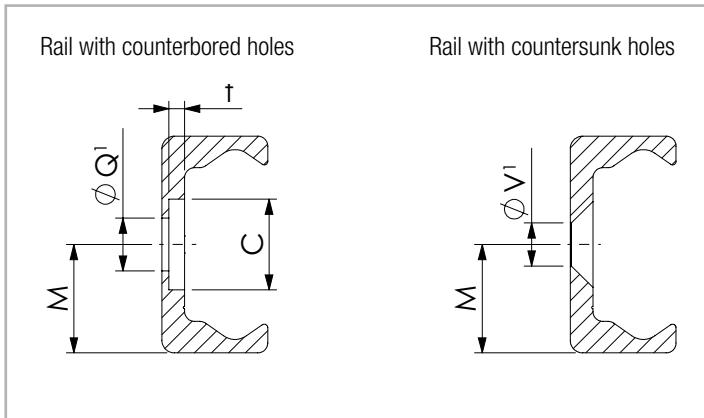


Fig. 106

### Holes



Q<sup>1</sup> Fixing holes for Torx® screws with low head (custom design)  
included in scope of supply

V<sup>1</sup> Fixing holes for countersunk head screws according to DIN 7991

Fig. 107

Type	Size	A [mm]	B [mm]	D [mm]	M [mm]	E <sub>1</sub> [mm]	T [mm]	C [mm]	Weight [kg/m]	E <sub>2</sub> [°]	t [mm]	Q <sup>1</sup> [mm]	V <sup>1</sup> [mm]
TLC TLV	18	18	8.25	5.75	9	1.5	2.8	9.5	0.55	-	2	M4	M4
	28	28	12.25	8.5	14	1	3	11	1.0	-	2	M5	M5
	35	35	16	12	17.5	2	3.5	14.5	1.65	-	2.7	M6	M6
	43	43	21	14.5	21.5	2.5	4.5	18	2.6	-	3.1	M8	M8
	63	63	28	19.25	31.5	-	8	15	6.0	2x45	5.2	M8	M10
ULC ULV	18	18	8.25	5.75	9	1	2.6	9.5	0.55	-	1.9	M4	M4
	28	28	12	8.5	14	1	3	11	1.0	-	2	M5	M5
	35	35	16	12	17.5	1	3.5	14.5	1.65	-	2.7	M6	M6
	43	43	21	14.5	21.5	1	4.5	18	2.6	-	3.1	M8	M8
	63	63	28	19.25	31.5	-	8	15	6.0	2x45	5.2	M8	M10
KLC KLV	43	43	21	14.5	21.5	2.5	4.5	18	2.6	-	3.1	M8	M8
	63	63	28	19.25	31.5	-	8	15	6.0	2x45	5.2	M8	M10

Tab. 39

## > Rail length

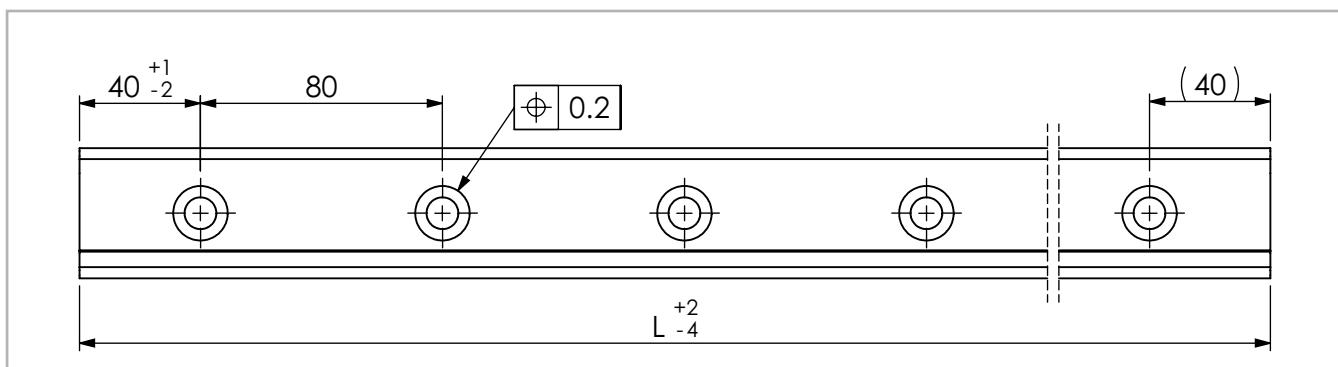


Fig. 108

Type	Size	Min length [mm]	Max length [mm]	Available standard lengths L [mm]
TLC TLV ULC ULV	18	160	2000	160 - 240 - 320 - 400 - 480 - 560 - 640 - 720 - 800 - 880
	28	240	3200	- 960 - 1040 - 1120 - 1200 - 1280 - 1360 - 1440
	35	320	3600	- 1520 - 1600 - 1680 - 1760 - 1840 - 1920 - 2000 - 2080
	43	400	3600	- 2160 - 2240 - 2320 - 2400 - 2480 - 2560 - 2640
	63	560	3600	- 2720 - 2800 - 2880 - 2960 - 3040 - 3120 - 3200 - 3280
KLC KLV	43	400	3600	- 3360 - 3440 - 3520 - 3600
	63	560	3600	

Longer single rails up to max. 4,080 mm on request  
Longer rail systems see pg. CR-98 Joined rails

Tab. 40

## NSW/NSA-version slider

NSW/NSA-series 18-28-35-43

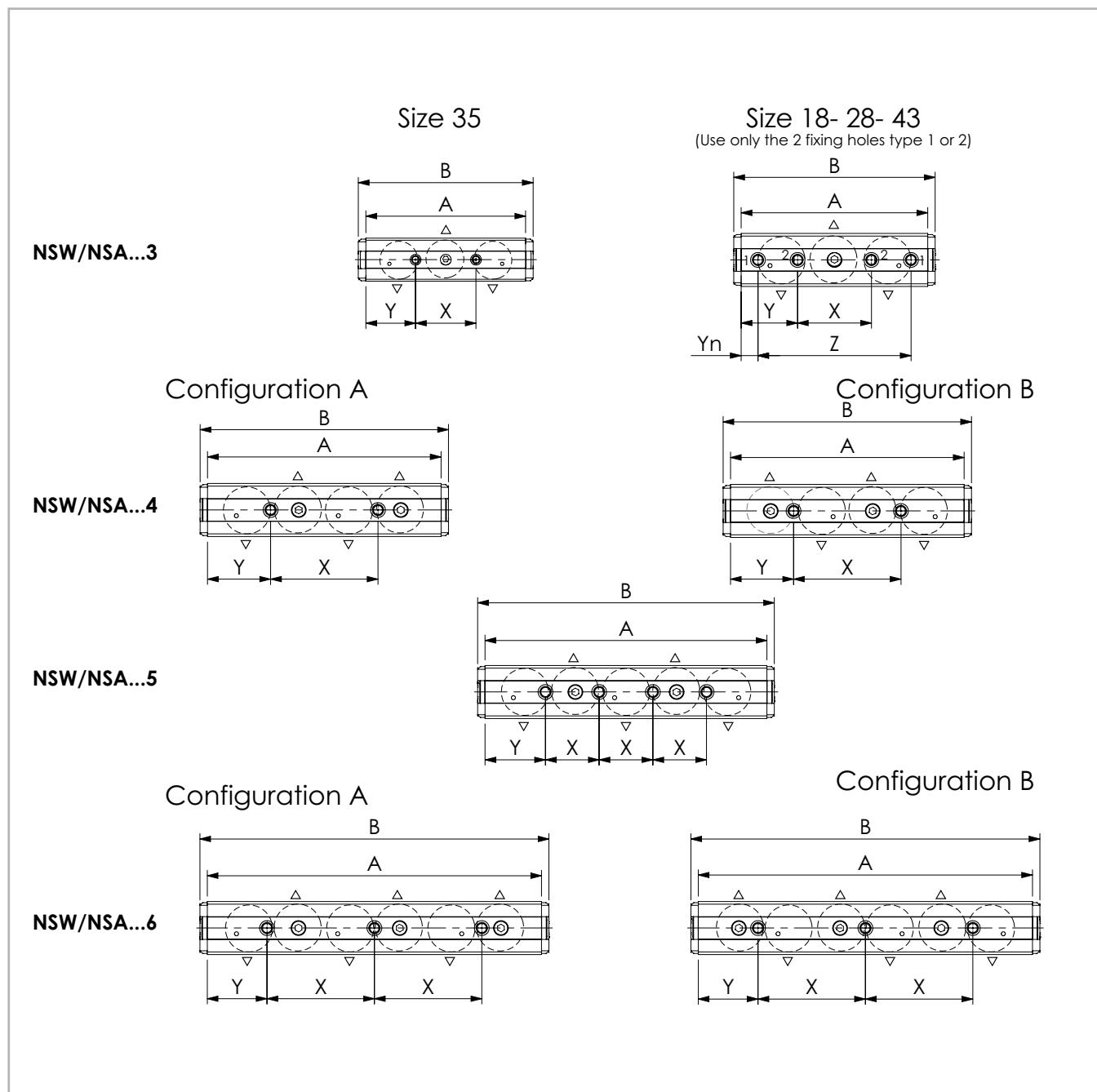


Fig. 109

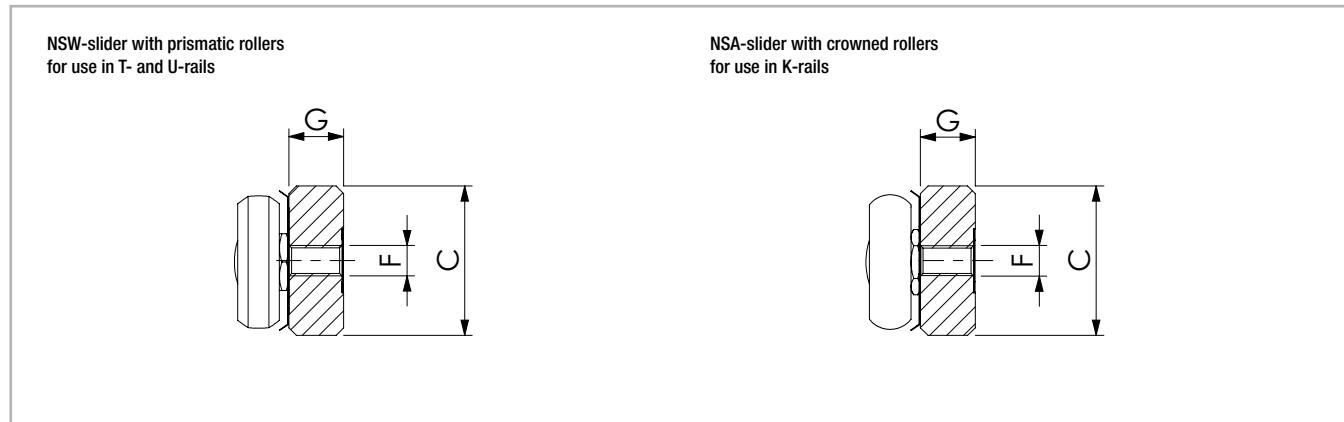


Fig. 110

Type	Size	No. of Rollers	A [mm]	B [mm]	C [mm]	G [mm]	F [mm]	X [mm]	Y [mm]	Z [mm]	Yn [mm]	No. of holes	Roller type used*
NSW	18	3	70	78	16	7.2	M5	20	25	52	9	4	CPA18-CPN18
		4	92	100				40	26	-	-	2	CPA18
		5	112	120				20	26			4	CPA18
		6	132	140				40	26	-	-	3	CPA18
	28	3	97	108	24.9	9.7	M5	35	31	78	9.5	4	CPA28-CPN28
		4	117	128				50	33.5	-	-	2	CPA28
		5	142	153				25	33.5			4	CPA28
		6	167	178				50	33.5	-	-	3	CPA28
	35	3	119	130	32	11.9	M6	45	37	-	-	2	CPA35-CPN35
		4	139	150				60	39.5			2	CPA35
		5	169	180				30	39.5	-	-	4	CPA35
		6	199	210				60	39.5			3	CPA35
	43	3	139	150	39.5	14.5	M8	55	42	114	12.5	4	CPA43-CPN43
		4	174	185				80	47	-	-	2	CPA43
		5	210	221				40	45			4	CPA43
		6	249	260				80	44.5	-	-	3	CPA43
NSA	43	3	139	150	39.5	14.5	M8	55	42	114	12.5	4	CRPA43-CRPN43
		4	174	185				80	47	-	-	2	CRPA43
		5	210	221				40	45			4	CRPA43
		6	249	260				80	44.5	-	-	3	CRPA43

\* Information about the roller type, see pg. CR-74, tab. 51

Tab. 41

NSW/NSA-series 63

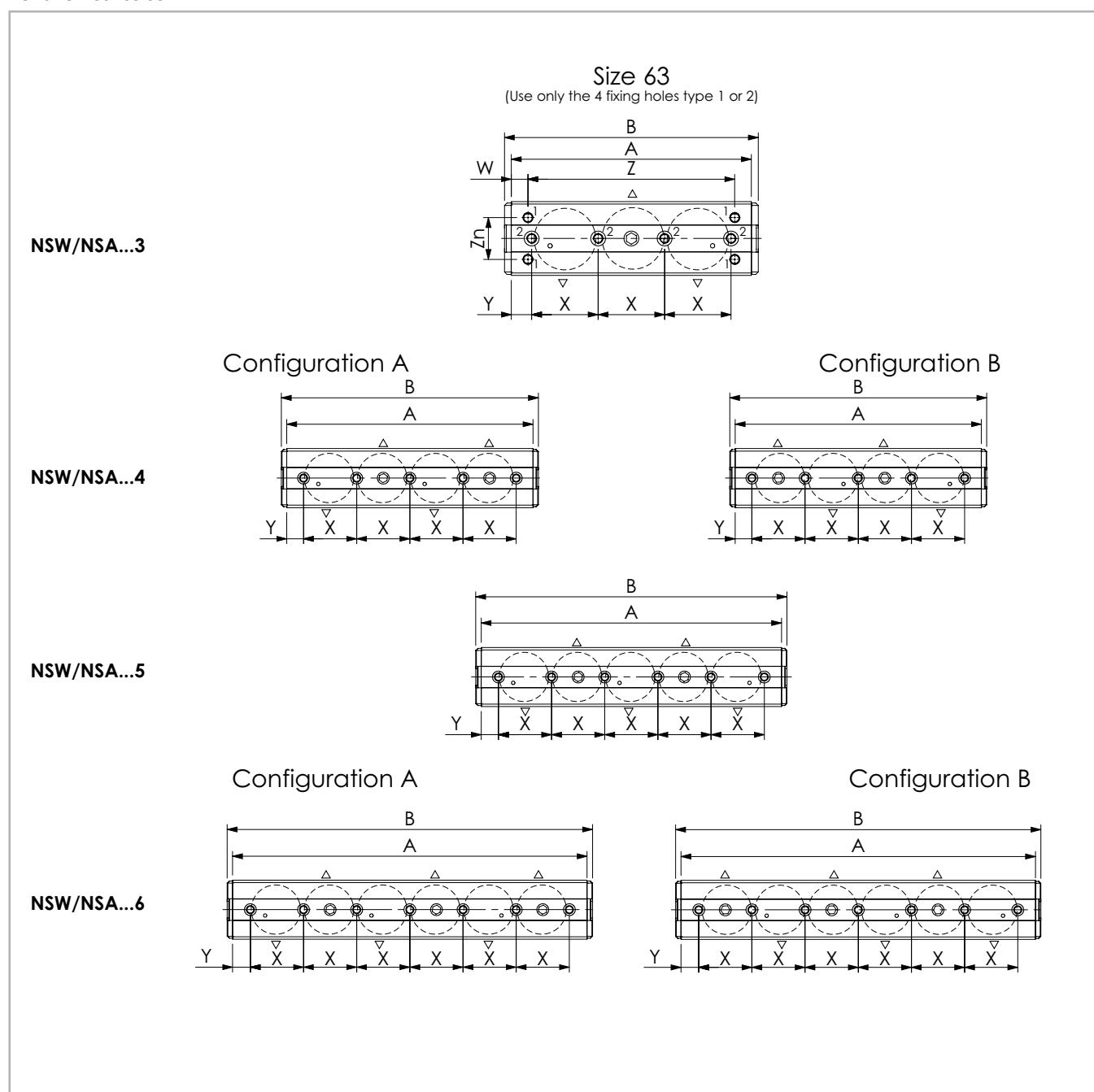


Fig. 111

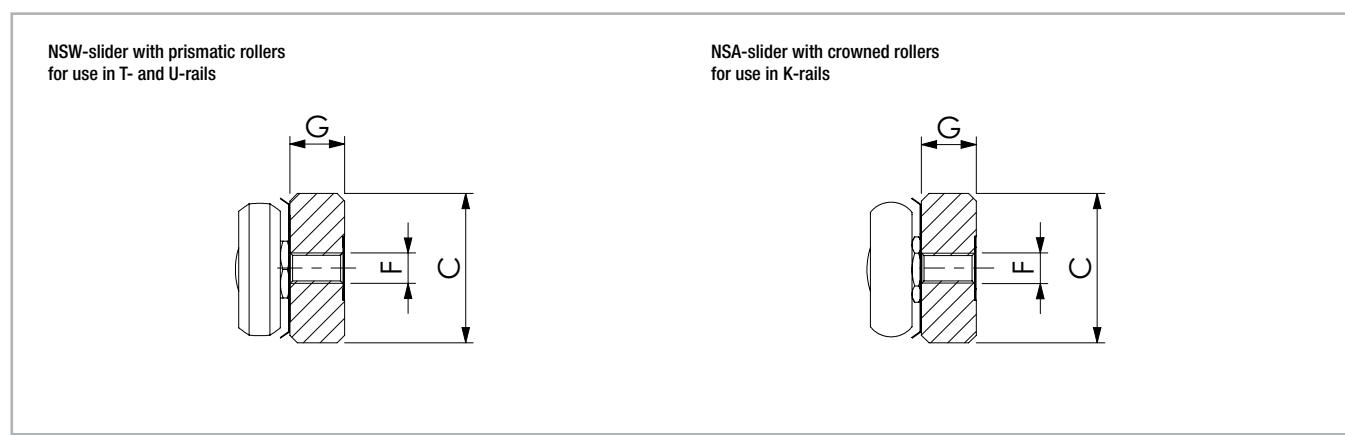


Fig. 112

Type	Size	No. of Rollers	A [mm]	B [mm]	C [mm]	G [mm]	F [mm]	X [mm]	Y [mm]	Z [mm]	Zn [mm]	W [mm]	No. of holes	Roller type used*
NSW	63	3	195	206	60	20.2	M8	54	16.5	168	34	13.5	4+4	CPA63
		4	250	261				54	17				5	CPA63
		5	305	316				54	17.5	-	-	-	6	CPA63
		6	360	371				54	18				7	CPA63
NSA	63	3	195	206	60	20.2	M8	54	16.5	168	34	13.5	4+4	CRPA63
		4	250	261				54	17				5	CRPA63
		5	305	316				54	17.5	-	-	-	6	CRPA63
		6	360	371				54	18				7	CRPA63

\* Information about the roller type, see pg. CR-74, tab. 51

Tab. 42

## NSW...L/NSA...L-version slider

NSW...L/NSA...L-series version with long body

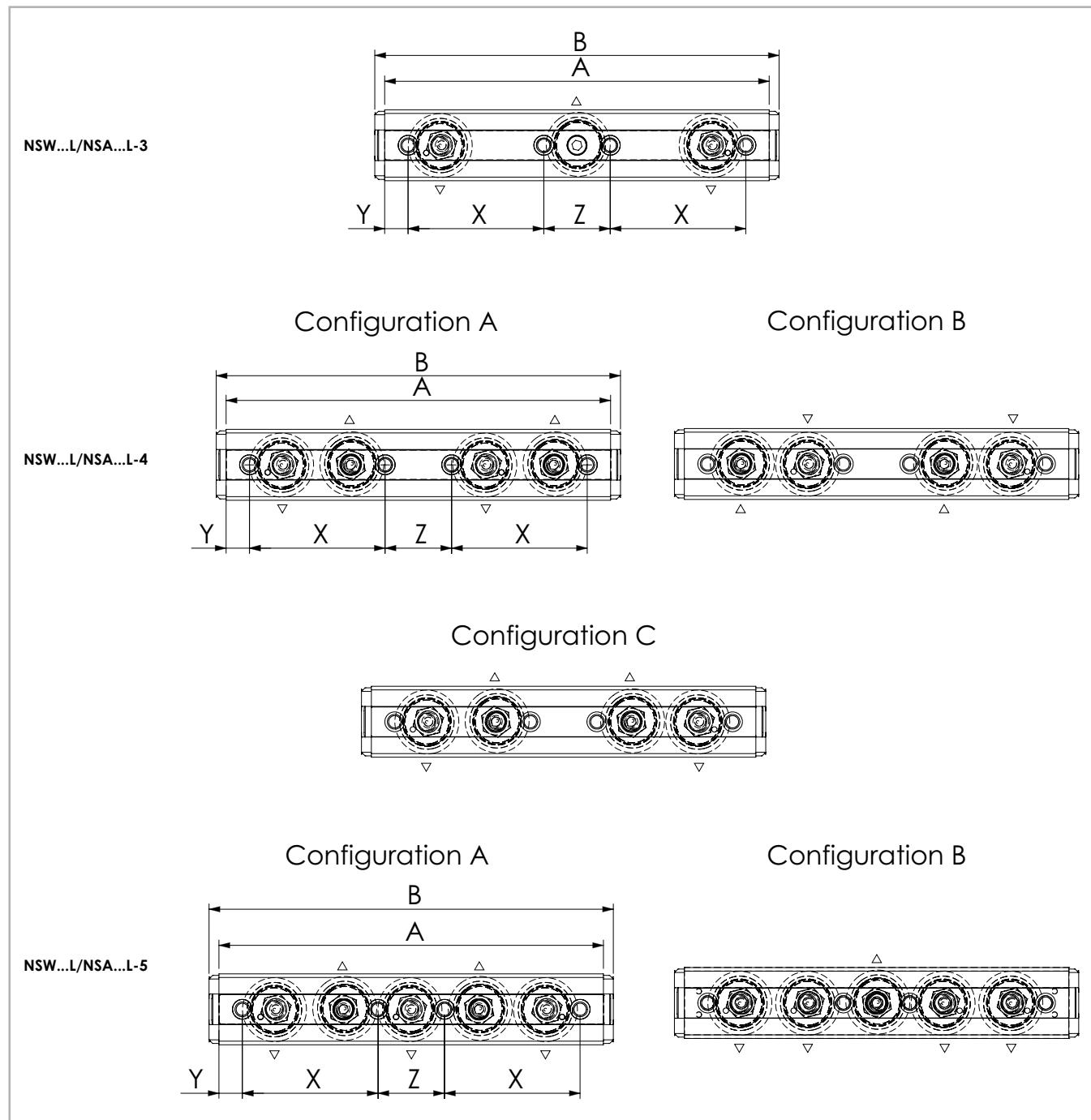


Fig. 113

Type	Size	No. of Rollers	A [mm]	B [mm]	C [mm]	G [mm]	F [mm]	X [mm]	Y [mm]	Z [mm]	No. of holes	Roller type used*
<b>NSW28L</b>	28	3 4 5	149	160	24.9	9.7	M5	52	9.5	26	4	CPA28
<b>NSW43L</b>	43	3 4 5	214	225	39.5	14.5	M8	75.5	13	37	4	CPA43
<b>NSA43L</b>												CRA43

Tab. 43

## NSD/NSDA-version slider

NSD/NSDA-series

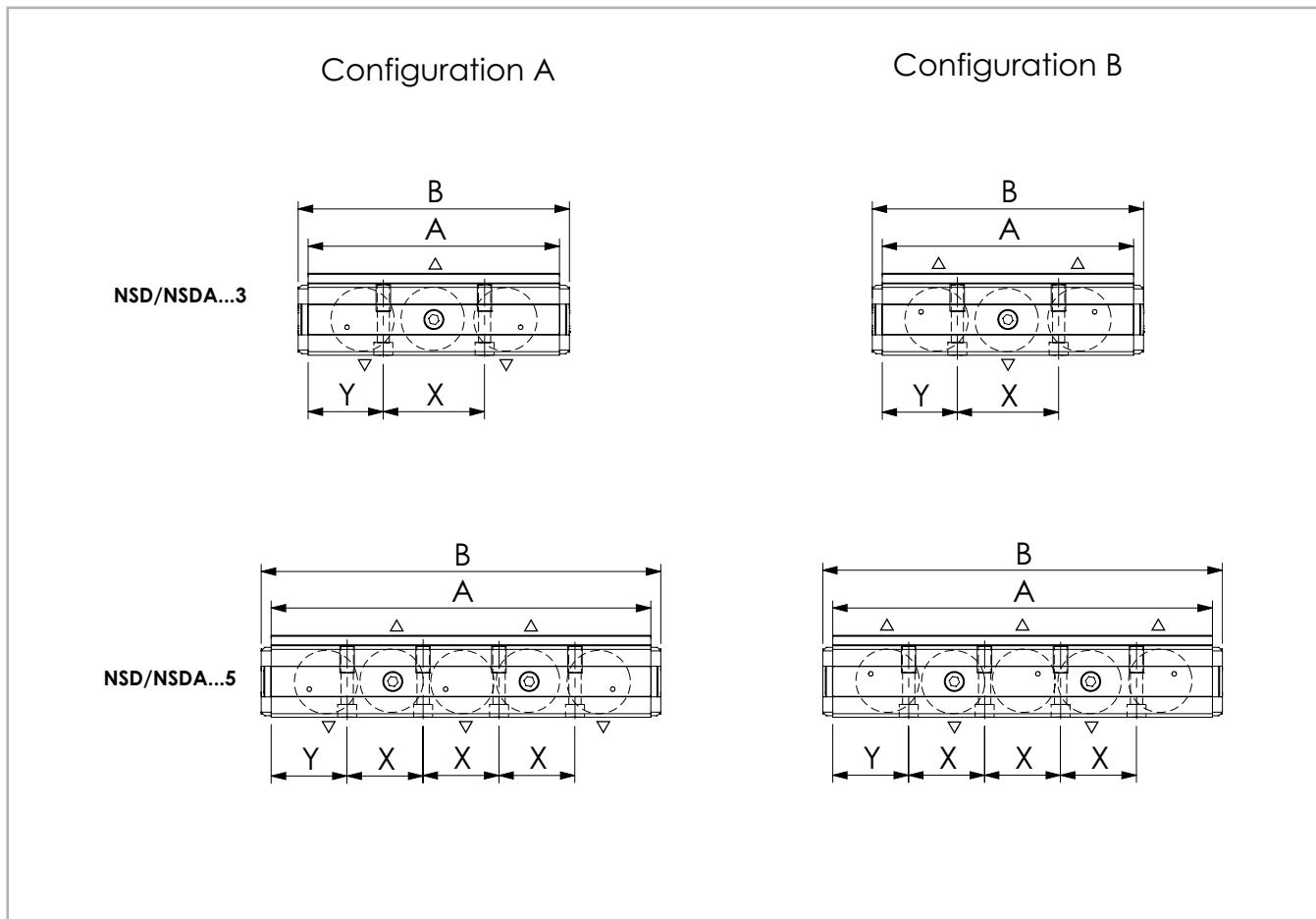


Fig. 114

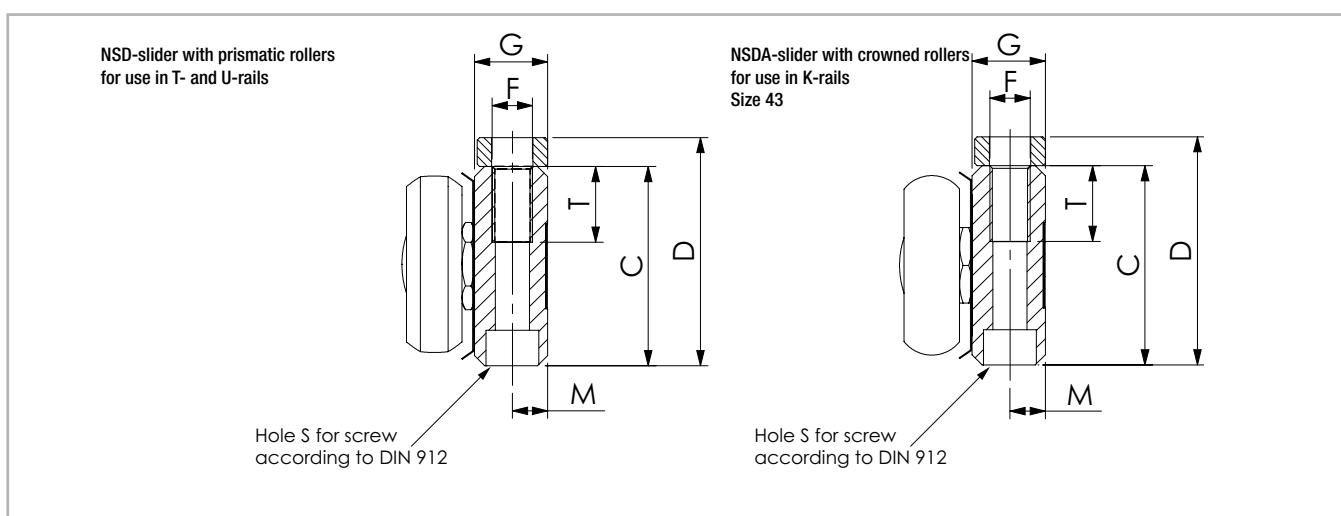


Fig. 115

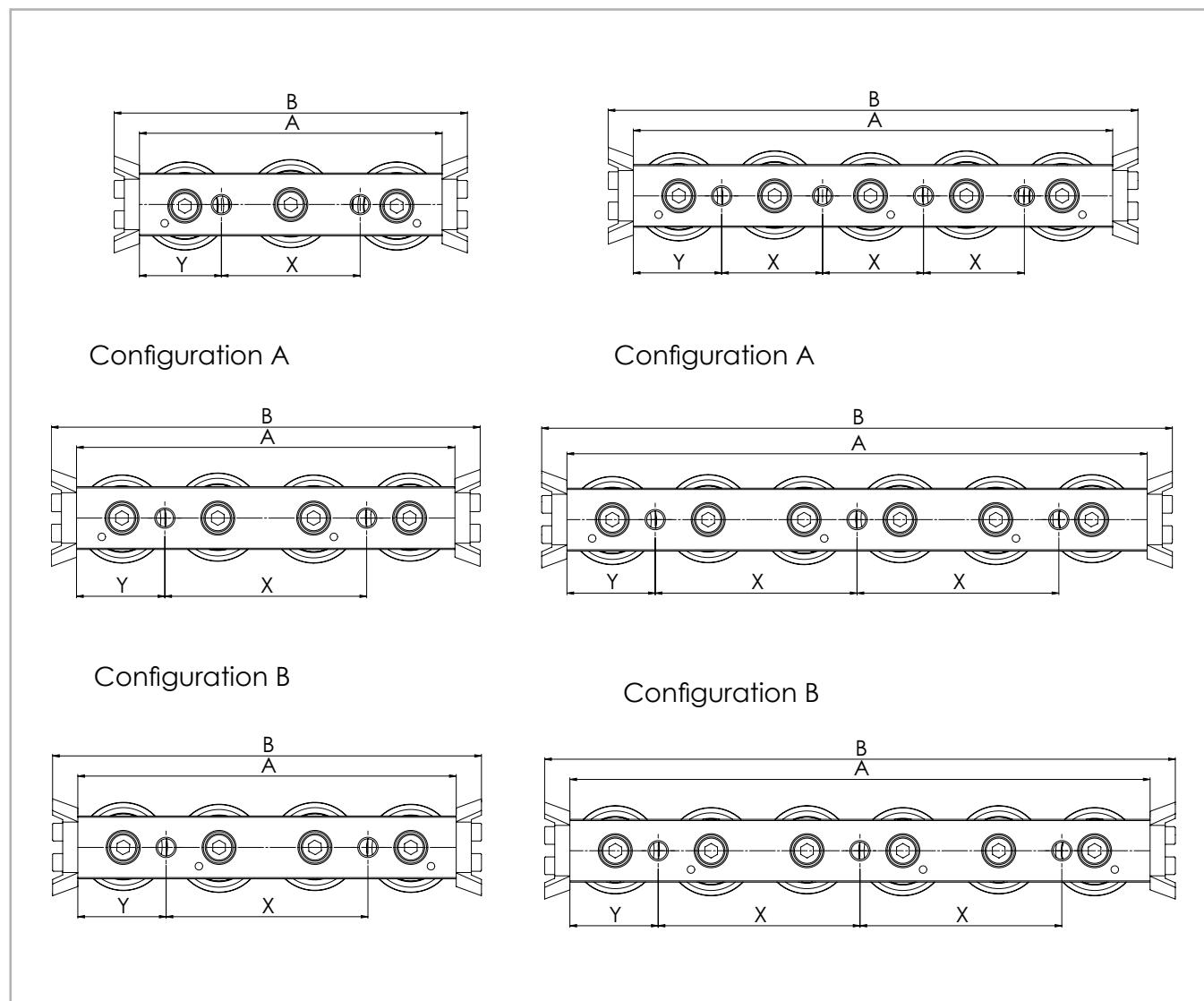
Type	Size	No. of rollers	A [mm]	B [mm]	C [mm]	D [mm]	G [mm]	M [mm]	S	T [mm]	F [mm]	X [mm]	Y [mm]	No. of holes	Roller type used*
NSD	28	3	97	108	24.9	30.45	9.7	4.7	M5	15	M6	36	30.5	2	CPA28
		5	142	153								27	30.5	4	CPA28
	35	3	119	130	32	36.35	12.4	6	M6	15	M8	45	37	2	CPA35
		5	169	180								30	39.5	4	CPA35
	43	3	139	150	39.5	45.25	14.5	7	M6	15	M8	56	41.5	2	CPA43
		5	210	221								42	42	4	CPA43
NSDA	43	3	139	150	39.5	45.25	14.5	7	M6	15	M8	56	41.5	2	CRPA43
		5	210	221								42	42	4	CRPA43

\* Information about the roller type, see pg. CR-74, tab. 51

Tab. 44

## CS-version slider

CS-series



Representation of slider with wiper

Fig. 116

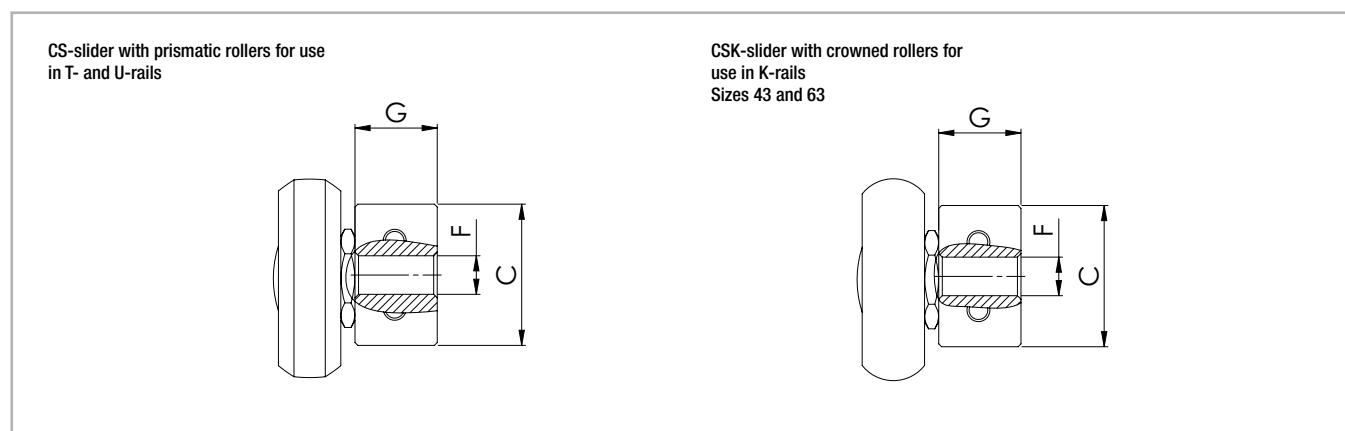


Fig. 117

Type	Size	Number of Rollers	A [mm]	B [mm]	C [mm]	G [mm]	F [mm]	X [mm]	Y [mm]	No. of holes	Roller type used*
CS	18	3	60	76	9.5	5.7	M5	20	20	2	CPA18-CPN18
		4	80	96	9.5	5.7	M5	40	20	2	CPA18
		5	100	116	9.5	5.7	M5	20	20	4	CPA18
		6	120	136	9.5	5.7	M5	40	20	3	CPA18
	28	3	80	100	14.9	9.7	M5	35	22.5	2	CPA28-CPN28
		4	100	120	14.9	9.7	M5	50	25	2	CPA28
		5	125	145	14.9	9.7	M5	25	25	4	CPA28
		6	150	170	14.9	9.7	M5	50	25	3	CPA28
	35	3	100	120	19.9	11.9	M6	45	27.5	2	CPA35-CPN35
		4	120	140	19.9	11.9	M6	60	30	2	CPA35
		5	150	170	19.9	11.9	M6	30	30	4	CPA35
		6	180	200	19.9	11.9	M6	60	30	3	CPA35
	43	3	120	140	24.9	14.5	M8	55	32.5	2	CPA43-CPN43
		4	150	170	24.9	14.5	M8	80	35	2	CPA43
		5	190	210	24.9	14.5	M8	40	35	4	CPA43
		6	230	250	24.9	14.5	M8	80	35	3	CPA43
	63	3	180	200	39.5	19.5	M8	54	9	4	CPA63
		4	235	255	39.5	19.5	M8	54	9.5	5	CPA63
		5	290	310	39.5	19.5	M8	54	10	6	CPA63
		6	345	365	39.5	19.5	M8	54	10.5	7	CPA63
CSK	43	3	120	140	24.9	14.5	M8	55	32.5	2	CRPA43-CRPN43
		4	150	170	24.9	14.5	M8	80	35	2	CRPA43
		5	190	210	24.9	14.5	M8	40	35	4	CRPA43
		6	230	250	24.9	14.5	M8	80	35	3	CRPA43
	63	3	180	200	39.5	19.5	M8	54	9	4	CRPA63
		4	235	255	39.5	19.5	M8	54	9.5	5	CRPA63
		5	290	310	39.5	19.5	M8	54	10	6	CRPA63
		6	345	365	39.5	19.5	M8	54	10.5	7	CRPA63

\* Information about the roller type, see pg. CR-74, tab. 51

Tab. 45

## ➤ T-rail with NSW / NSD / CS slider

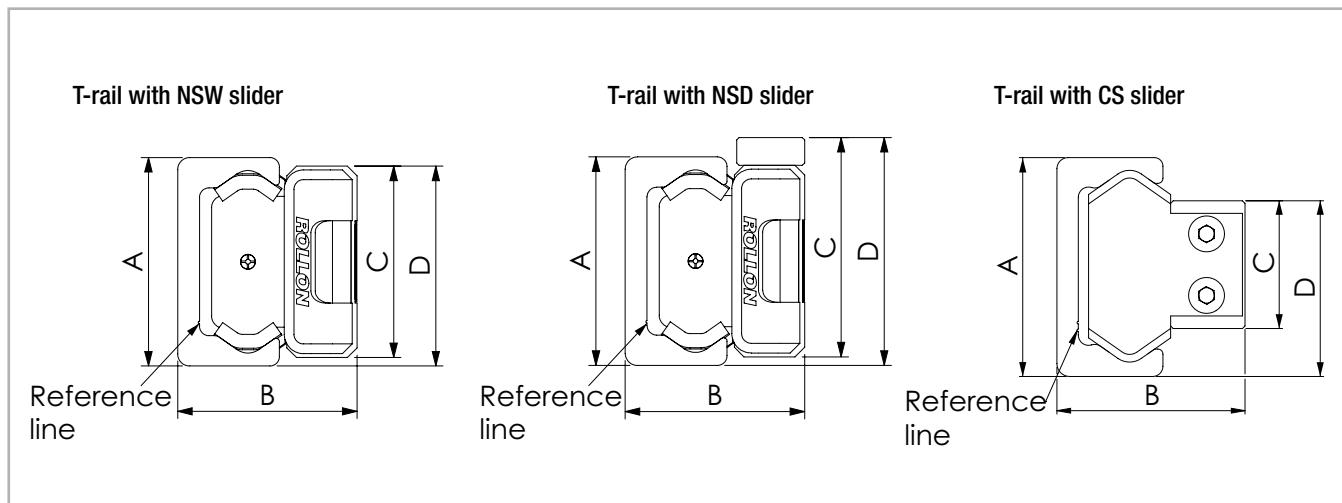


Fig. 118

Configuration	Size	A [mm]		B [mm]		C [mm]		D [mm]	
TL... / NSW	18	18	+0.2 -0.10	16.5	±0.15	16	0 -0.2	17	+0.1 -0.3
	28	28	+0.2 -0.10	23.9	±0.15	24.9	0 -0.2	26.45	+0.1 -0.3
	35	35	+0.35 -0.10	30.2	±0.15	32	0 -0.2	33.5	+0.2 -0.4
	43	43	+0.3 -0.10	37	±0.15	39.5	0 -0.2	41.25	+0.2 -0.4
	63	63	+0.3 -0.10	50.5	±0.15	60	0 -0.2	61.5	+0.2 -0.4
TL... / NSD	28	28	+0.2 -0.10	23.9	±0.15	24.9	0 -0.2	32	+0.1 -0.3
	35	35	+0.35 -0.10	30.2	±0.15	32	0 -0.2	37.85	+0.2 -0.4
	43	43	+0.3 -0.10	37	±0.15	39.5	0 -0.2	47	+0.2 -0.4
TL... / CS	18	18	+0.25 -0.10	15	+0.15 -0.15	9.5	0 -0.05	14	+0.05 -0.25
	28	28	+0.25 -0.10	23.9	+0.15 -0.15	14.9	0 -0.10	21.7	+0.05 -0.35
	35	35	+0.35 -0.10	30.2	+0.10 -0.30	19.9	+0.05 -0.15	27.85	+0.10 -0.30
	43	43	+0.35 -0.10	37	+0.15 -0.15	24.9	0 -0.15	34.3	+0.10 -0.30
	63	63	+0.35 -0.10	49.8	+0.15 -0.15	39.5	+0.15 0	51.6	+0.15 -0.30

Tab. 46

## > U-rail with NSW / NSD / CS slider

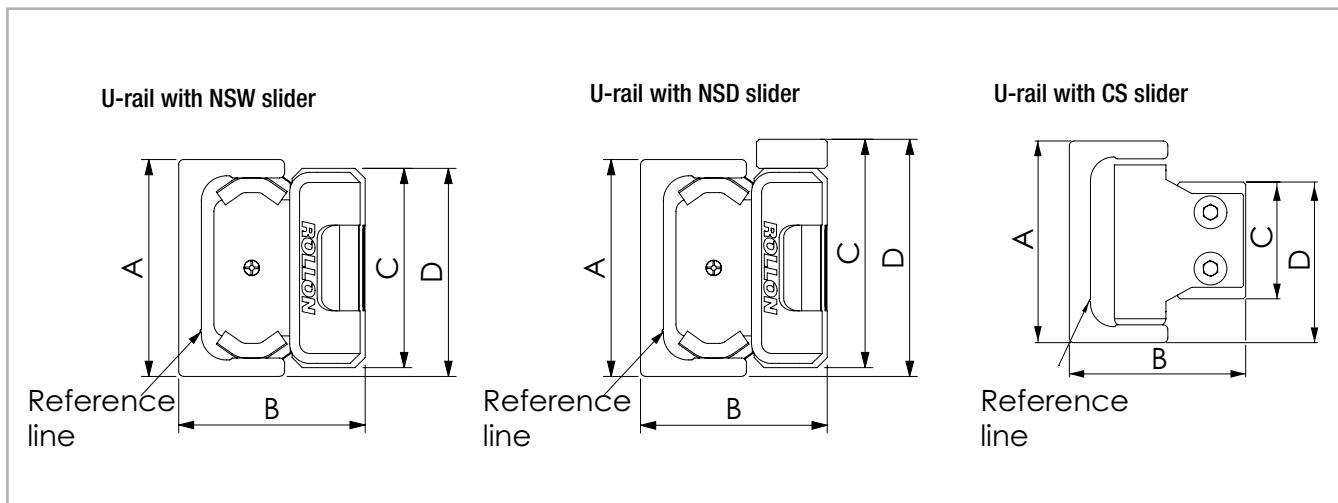
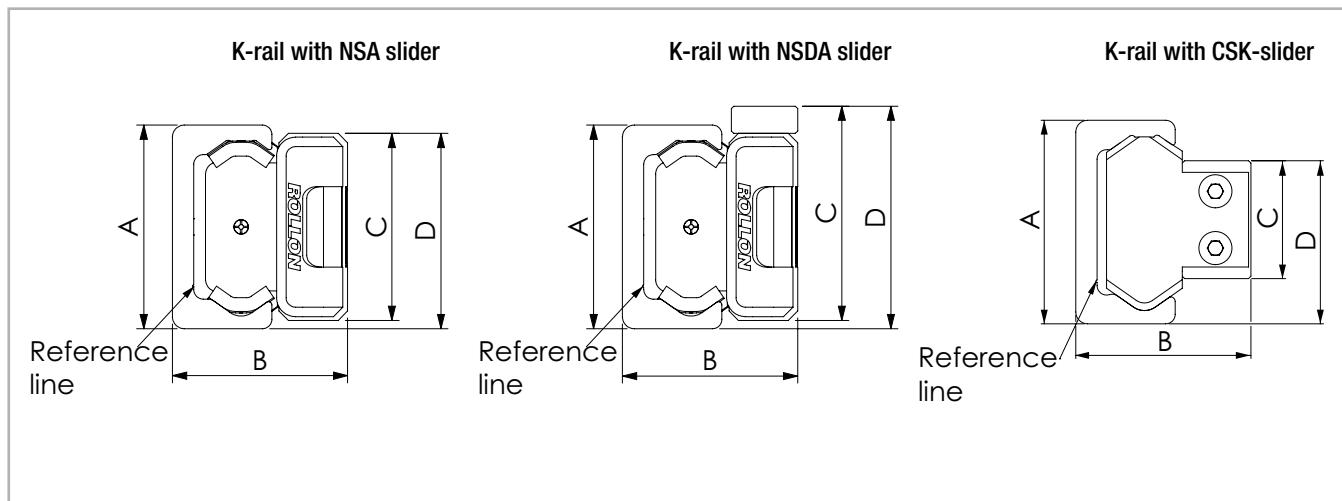


Fig. 119

Configuration	Size	A [mm]		B <sub>nom*</sub> [mm]	C [mm]		D [mm]	
UL... / NSW	18	18	+0.25 -0.10	16.5	16	0 -0.2	17	+0.1 -0.3
	28	28	+0.25 -0.10	23.9	24.9	0 -0.2	26.45	+0.1 -0.3
	35	35	+0.35 -0.10	30.2	32	0 -0.2	33.5	+0.2 -0.4
	43	43	+0.35 -0.10	37	39.5	0 -0.2	41.25	+0.2 -0.4
	63	63	+0.35 -0.10	50.5	60	0 -0.2	61.5	+0.2 -0.4
UL... / NSD	28	28	+0.25 -0.10	23.9	24.9	0 -0.2	32	+0.1 -0.3
	35	35	+0.35 -0.10	30.2	32	0 -0.2	37.85	+0.2 -0.4
	43	43	+0.35 -0.10	37	39.5	0 -0.2	47	+0.2 -0.4
UL... / CS	18	18	+0.25 -0.10	15	9.5	0 -0.05	14	+0.05 -0.25
	28	28	+0.25 -0.10	23.9	14.9	0 -0.10	21.7	+0.05 -0.35
	35	35	+0.35 -0.10	30.2	19.9	+0.05 -0.15	27.85	+0.10 -0.30
	43	43	+0.35 -0.10	37	24.9	0 -0.15	34.3	+0.15 -0.30
	63	63	+0.35 -0.10	49.8	39.5	+0.15 0	51.6	+0.15 -0.30

Tab. 47

## ➤ K-rail with NSA / NSDA / CSK slider



The K-rail enables the slider to rotate around its longitudinal axis (see pg. CR-82)

Fig. 120

Configuration	Size	A [mm]		B [mm]		C [mm]		D [mm]	
KL... / NSA	43	43	+0.35 -0.1	37	±0.15	39.5	0 -0.2	41.25	+0.2 -0.4
	63	63	+0.35 -0.1	50.5	±0.15	60	0 -0.2	61.5	+0.2 -0.4
KL... / NSDA	43	43	+0.35 -0.1	37	±0.15	39.5	0 -0.2	41.25	+0.2 -0.4
KL... / CSK	43	43	+0.35 -0.10	37	+0.15 -0.15	24.9	0 -0.15	34.3	+0.10 -0.30
	63	63	+0.35 -0.10	49.8	+0.15 -0.15	39.5	+0.15 0	51.6	+0.15 -0.30

Tab. 48

## Offset of fixing holes

Principle representation of offset

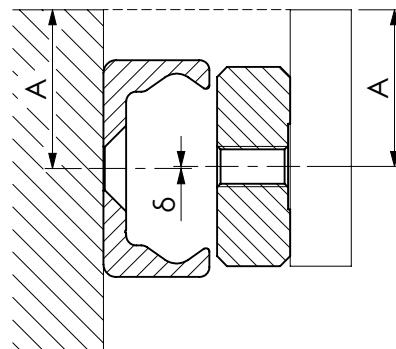


Fig. 121

Configura-tion	Size	$\delta$ nominal [mm]	$\delta$ maximum [mm]	$\delta$ minimum [mm]	Configura-tion	Size	$\delta$ nominal [mm]	$\delta$ maximum [mm]	$\delta$ minimum [mm]
TLC / NSW	18		+0.5	-0.5	TLC / CS	18	0.35	+0.75	-0.2
	28		+0.5	-0.5		28	0.25	+0.6	-0.35
	35		+0.6	-0.6		35	0.35	+0.7	-0.35
	43		+0.6	-0.6		43	0.35	+0.8	-0.35
	63		+0.65	-0.65		63	0.35	+0.6	-0.35
KLC / NSA	43		+0.6	-0.6	KLC / CSK	43	0.35	+0.8	-0.35
	63		+0.65	-0.65		63	0.35	+0.6	-0.35
ULC / NSW	18		+0.5	-0.5	ULC / CS	18	0.3	+0.7	-0.2
	28		+0.5	-0.5		28	0.3	+0.6	-0.3
	35		+0.6	-0.6		35	0.35	+0.7	-0.35
	43		+0.6	-0.6		43	0.4	+0.75	-0.35
	63		+0.65	-0.65		63	0.35	+0.6	-0.25
TLV / NSW	18		+0.35	-0.35	TLV / CS	18	0.35	+0.6	-0.15
	28		+0.35	-0.35		28	0.25	+0.45	-0.3
	35		+0.45	-0.45		35	0.35	+0.55	-0.3
	43		+0.45	-0.45		43	0.35	+0.65	-0.3
	63		+0.5	-0.5		63	0.35	+0.45	-0.35
KLV / NSA	43		+0.45	-0.45	KLV / CSK	43	0.35	+0.65	-0.3
	63		+0.5	-0.5		63	0.35	+0.45	-0.35
ULV / NSW	18		+0.35	-0.35	ULV / CS	18	0.3	+0.55	-0.15
	28		+0.35	-0.35		28	0.3	+0.45	-0.25
	35		+0.45	-0.45		35	0.35	+0.55	-0.3
	43		+0.45	-0.45		43	0.4	+0.6	-0.3
	63		+0.5	-0.5		63	0.35	+0.45	-0.25

Tab. 49

Tab. 50

## Accessories



### Rollers

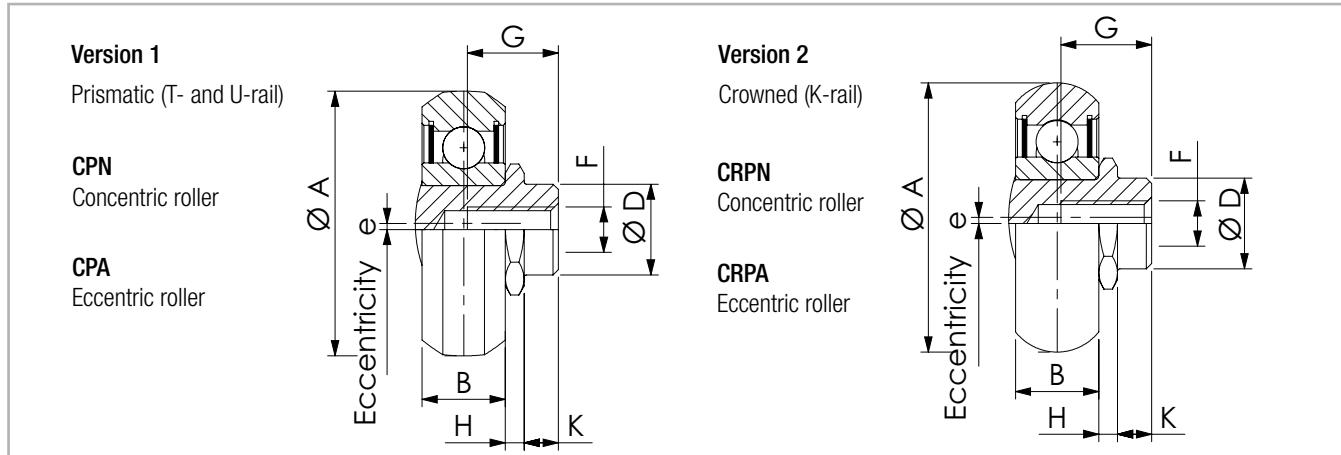


Fig. 122

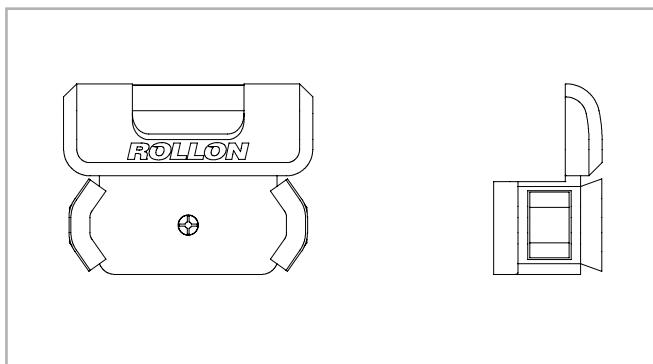
Note: The rollers are lubricated for life

Type		A [mm]	B [mm]	D [mm]	e [mm]	H [mm]	K [mm]	G [mm]	F	C [N]	C <sub>Grad</sub> [N]	Weight [kg]
Steel	Inox											
CPN18-2RS	CXPNX18-2RS	14	4	6	-	1.55	1.8	5.5	M4	765	410	0.004
CPN18-2Z	-	14	4	6	-	1.55	1.8	5.5	M4	765	410	0.004
CPA18-2RS	CXPAX18-2RS	14	4	6	0.4	1.55	1.8	5.5	M4	765	410	0.004
CPA18-2Z	-	14	4	6	0.4	1.55	1.8	5.5	M4	765	410	0.004
CPN28-2RS	CXPNX28-2RS	23.2	7	10	-	2.2	3.8	7	M5	2130	1085	0.019
CPN28-2Z	-	23.2	7	10	-	2.2	3.8	7	M5	2130	1085	0.019
CPA28-2RS	CXPAX28-2RS	23.2	7	10	0.6	2.2	3.8	7	M5	2130	1085	0.019
CPA28-2Z	-	23.2	7	10	0.6	2.2	3.8	7	M5	2130	1085	0.019
CPN35-2RS	CXPNX35-2RS	28.2	7.5	12	-	2.55	4.2	9	M5	4020	1755	0.032
CPN35-2Z	-	28.2	7.5	12	-	2.55	4.2	9	M5	4020	1755	0.032
CPA35-2RS	CXPAX35-2RS	28.2	7.5	12	0.7	2.55	4.2	9	M5	4020	1755	0.032
CPA35-2Z	-	28.2	7.5	12	0.7	2.55	4.2	9	M5	4020	1755	0.032
CPN43-2RS	CXPNX43-2RS	35	11	12	-	2.5	4.5	12	M6	6140	2750	0.06
CPN43-2Z	-	35	11	12	-	2.5	4.5	12	M6	6140	2750	0.06
CPA43-2RS	CXPAX43-2RS	35	11	12	0.8	2.5	4.5	12	M6	6140	2750	0.06
CPA43-2Z	-	35	11	12	0.8	2.5	4.5	12	M6	6140	2750	0.06
CPN63-2ZR	CXPNX63-2RS	50	17.5	18	-	2.3	6	16	M8	15375	6250	0.19
CPA63-2ZR	CXPAX63-2RS	50	17.5	18	1.2	2.3	6	16	M10	15375	6250	0.19
CRPN43-2Z	CRXPNX43-2RS	35.6	11	12	-	2.5	4.5	12	M6	6140	2550	0.06
CRPA43-2Z	CRXPAX43-2RS	35.6	11	12	0.8	2.5	4.5	12	M6	6140	2550	0.06
CRPN63-2ZR	CRXPNX63-2RS	49.7	17.5	18	-	2.3	6	16	M8	15375	5775	0.19
CRPA63-2ZR	CRXPAX63-2RS	49.7	17.5	18	1.2	2.3	6	16	M10	15375	5775	0.19

Tab. 51

## > Wipers

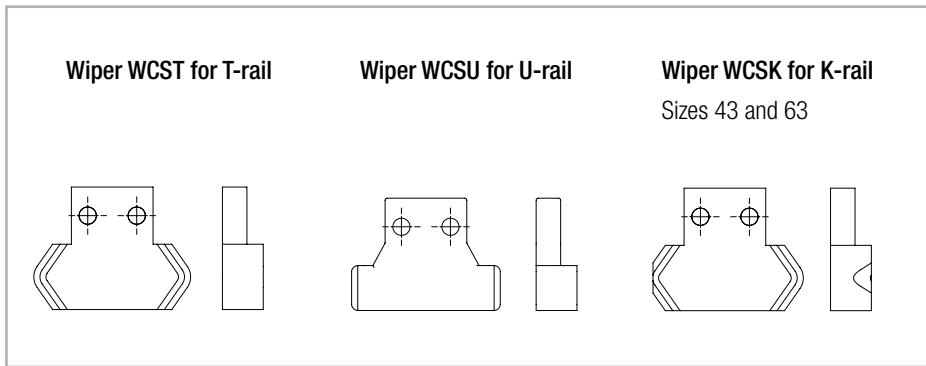
### Wipers for NSW / NSA / NSD / NSDA



Rail size	Rail type	Pair of wipers
18	T, U	ZK-WCN18
28	T, U	ZK-WCN28
35	T, U	ZK-WCN35
43	T, U	ZK-WCN43
	K	ZK-WCNK43
63	T, U	ZK-WCN63
	K	ZK-WCNK63

Tab. 52

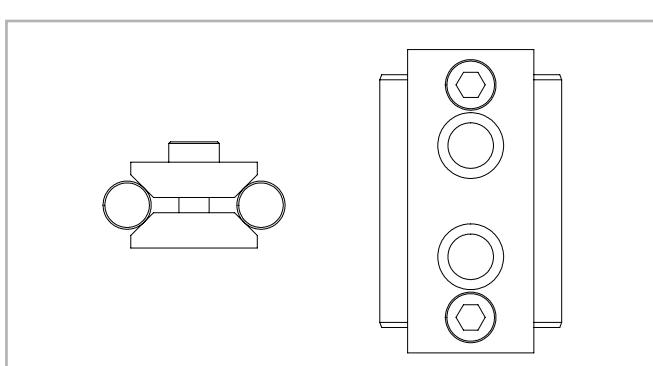
### Wipers for CS / CSK



Rail size	Pair of wipers
18	ZK-WCS...18
28	ZK-WCS...28
35	ZK-WCS...35
43	ZK-WCS...43
63	ZK-WCS...63

Tab. 53

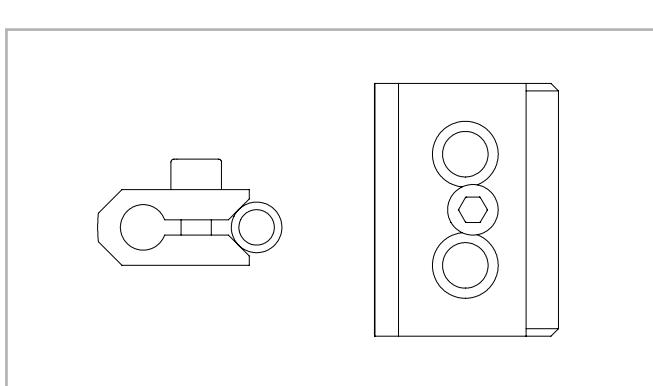
## > Alignment fixture AT (for T- and U-rail)



Rail size	Alignment fixture
18	AT 18
28	AT 28
35	AT 35
43	AT 43
63	AT 63

Tab. 54

## > Alignment fixture AK (for K-rail)



Rail size	Alignment fixture
43	AK 43
63	AK 63

Tab. 55

## Fixing screws

When a rail with counterbored holes is delivered, the Torx® screws are provided in the right quantity.

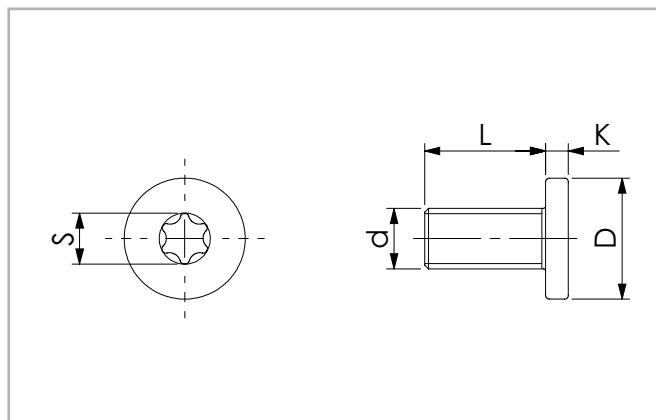


Fig. 127

Rail size	d	D [mm]	L [mm]	K [mm]	S	Tightening torque [Nm]
18	M4 x 0.7	8	8	2	T20	3
28	M5 x 0.8	10	10	2	T25	9
35	M6 x 1	13	13	2,7	T30	12
43	M8 x 1.25	16	16	3	T40	22
63	M8 x 1.25	13	20	5	T40	35

Tab. 56

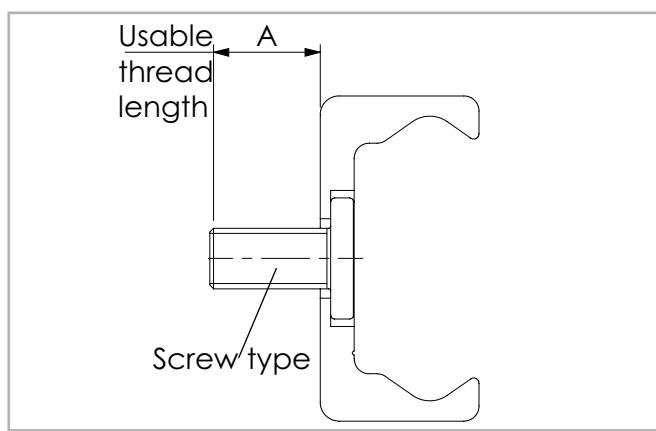


Fig. 128

Rail size	Screw type	Usable thread length A [mm]
18	M4 x 8	7.2
28	M5 x 10	9
35	M6 x 13	12.2
43	M8 x 16	14.6
63	M8 x 20	17.2

Tab. 57

## Manual clamp elements

Compact Rail guides can be secured with manual clamping elements.

Areas of application are:

- Table cross beams and sliding beds
- Width adjustment, stops
- Positioning of optical equipment and measuring tables

The HK series is a manually activated clamping element. By using the freely adjustable clamping lever (except for HK 18, which uses hexagon socket bolt M6 DIN 913 with 3 mm drive) press the contact profile synchronously on the free surfaces of the rail. The floating mounted contact profiles guarantee symmetrical introduction of force on the guide rail.

HK 18

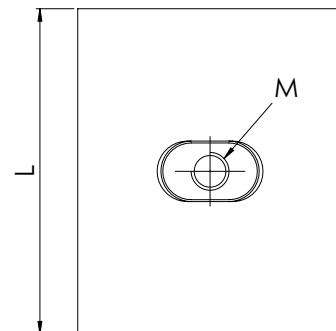
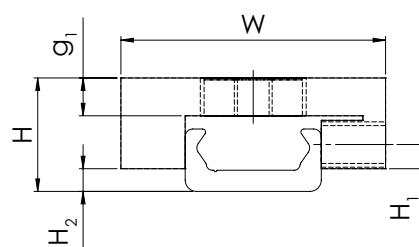


Fig. 129

HK 28-63 (except for size 35)

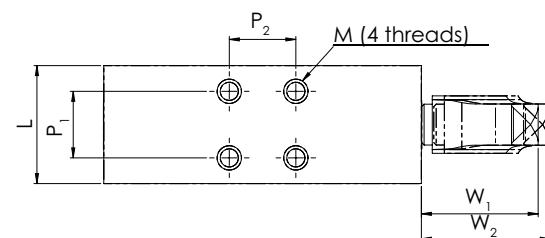
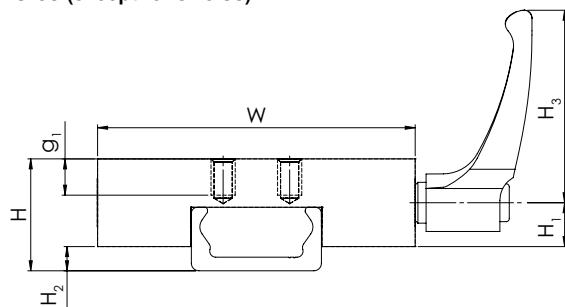


Fig. 130

Type	Size	Holding force [N]	Tightening torque [Nm]	Dimensions [mm]										M	
				H	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W	W <sub>1</sub>	W <sub>2</sub>	L	P <sub>1</sub>	P <sub>2</sub>		
HK1808A	18	150	0.5	15	3.2	3	-	35	-	-	43	0	0	6	M5
HK2808A	28	1200	7	24	17	5	64	68	38.5	41.5	24	15	15	6	M5
HK4308A	43	2000	15	37	28.5	8	78	105	46.5	50.5	39	22	22	12	M8
HK6308A	63	2000	15	50.5	35	9.5	80	138	54.5	59.5	44	26	26	12	M8

Tab. 58

## Technical instructions



### Linear accuracy

Linear accuracy is defined as the maximum deviation of the slider in the rail based on the side and support surface during straight line movement.

The linear accuracy, depicted in the graphs below, applies to rails that are carefully installed with all the provided screws on a level and rigid foundation.

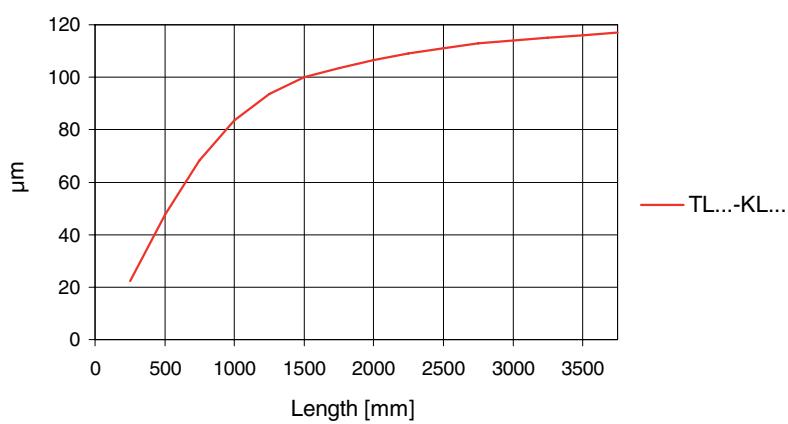
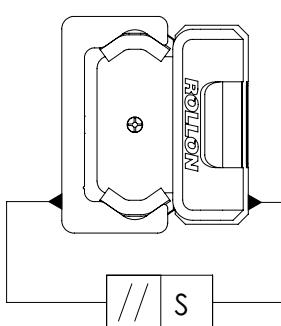
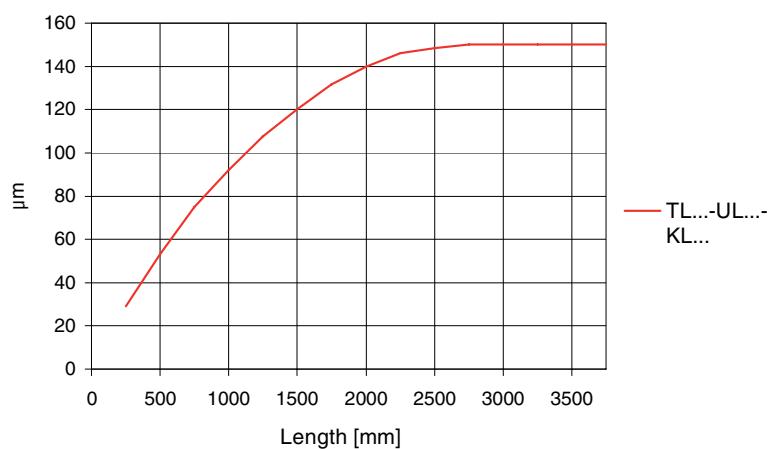
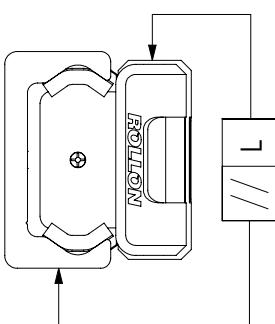
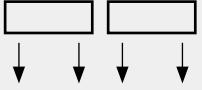
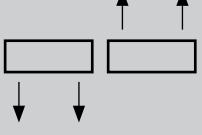


Fig. 131

## Deviation of accuracy with two 3 roller sliders in one rail

Type	TL..., UL..., KL...
$\Delta L$ [mm] Slider with equal arrangement	0.2
	
$\Delta L$ [mm] Slider with opposite arrangement	1.0
	
$\Delta S$ [mm]	0.05

Tab. 59

## &gt; Supported sides

If a higher system rigidity is required, a support of the rail sides is recommended, which can also be used as the reference surface (see fig. 132). The minimum required support depth can be taken from the adjacent table (see tab. 60).

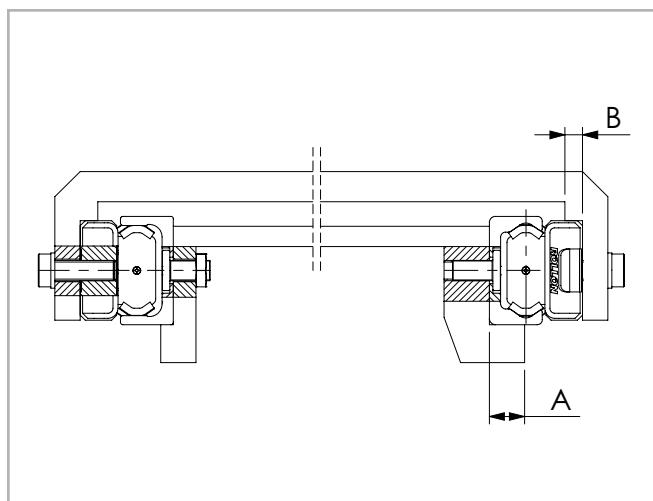


Fig. 132

Rail size	A [mm]	B [mm]
18	5	4
28	8	4
35	11	5
43	14	5
63	18	5

Tab. 60

## ➤ T+U-system tolerance compensation

### Axial deviations in parallelism

This problem occurs fundamentally by insufficient precision in the axial parallelism of the mounting surfaces, which results in an excessive load on the slider and thus causes drastically reduced service life.

The use of fixed bearing and compensating bearing rail (T+U-system) solves the unique problem of aligning two track, parallel guide systems. By using a T+U-system, the T-rail takes over the motion of the track while the U-rail serves as a support bearing and takes only radial forces and  $M_z$  moments.

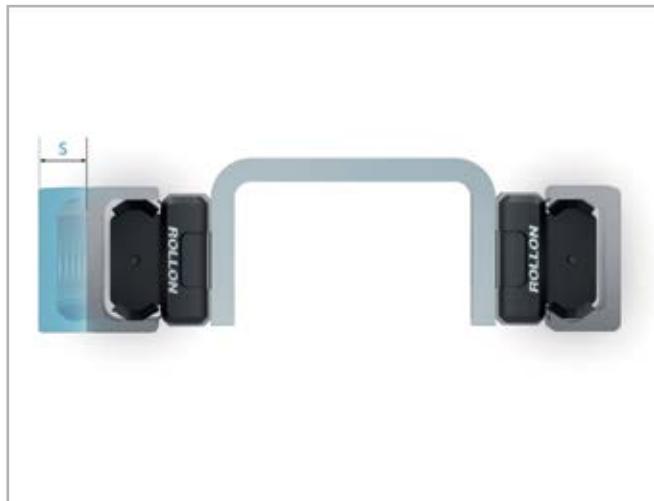


Fig. 133

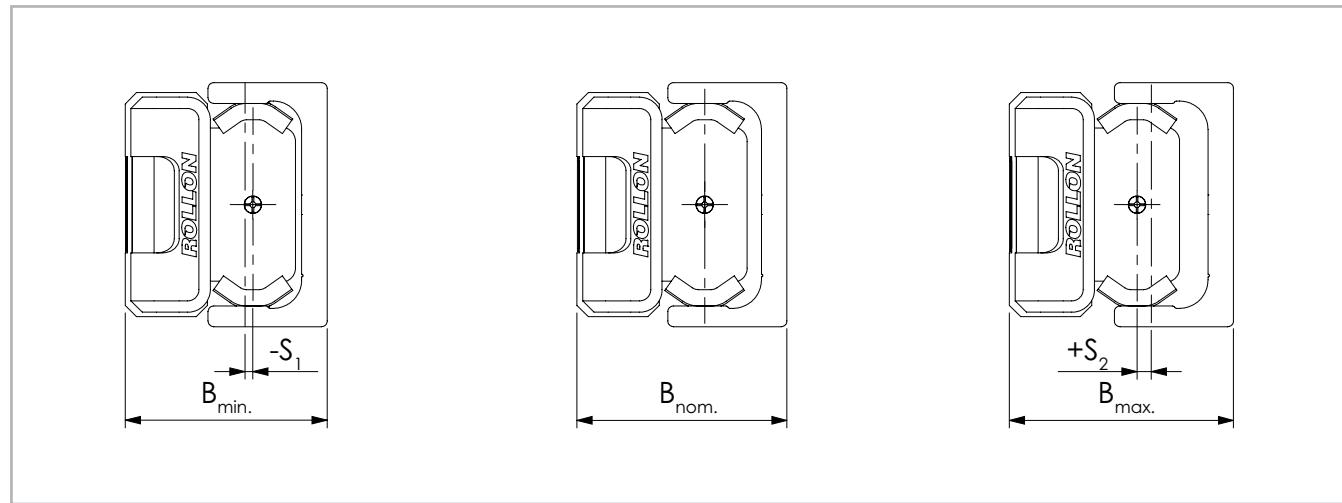


Fig. 134

### T+U-system maximum offset

U-rails have flat parallel raceways that allow free lateral movement of the sliders. The maximum axial offset that can be compensated for in each slider of the U-rail is made up of the combined values  $S_1$  and  $S_2$  listed in table 61. Considered from a nominal value  $B_{\text{nom}}$  as the starting point,  $S_1$  indicates the maximum offset into the rail, while  $S_2$  represents the maximum offset towards the outside of the rail.

Slider type	$S_1$ [mm]	$S_2$ [mm]	$B_{\text{min}}$ [mm]	$B_{\text{nom}}$ [mm]	$B_{\text{max}}$ [mm]
<b>NSW18</b>	0.3	1.1	16.2	16.5	17.6
<b>NSW28</b> <b>NSD28</b>	0.6	1.3	23.3	23.9	25.2
<b>NSW35</b> <b>NSD35</b>	1.3	2.7	28.9	30.2	32.9
<b>NSW43</b> <b>NSD43</b>	1.4	2.5	35.6	37	39.5
<b>NSW63</b>	0.4	3.5	50.1	50.5	54
<b>CS18</b>	0.3	1.1	14.7	15	16.1
<b>CS28</b>	0.6	1.3	23.3	23.9	25.2
<b>CS35</b>	1.3	2.7	28.9	30.2	32.9
<b>CS43</b>	1.4	2.5	35.6	37	39.5
<b>CS63</b>	0.4	3.5	49.4	49.8	53.3

Tab. 61

The application example in the adjacent drawing (see fig. 136) shows that the T+U-system implements a problem-free function of the slider even with an angled offset in the mounting surfaces.

If the length of the guide rails is known, the maximum allowable angle deviation of the screwed surfaces can be determined using this formula (the slider in the U-rail moves here from the innermost position  $S_1$  to outermost position  $S_2$ ):

$$\alpha = \arctan \frac{S^*}{L}$$

$S^*$  = Sum of  $S_1$  and  $S_2$   
 $L$  = Length of rail

Fig. 135

The following table (tab. 62) contains guidelines for this maximum angle deviation  $\alpha$ , achievable with the longest guide rail from one piece.

Size	Rail length [mm]	Offset S [mm]	Angle $\alpha$ [°]
18	2000	1.4	0.040
28	3200	1.9	0.034
35	3600	4	0.063
43	3600	3.9	0.062
63	3600	3.9	0.062

Tab. 62

The T+U-system can be designed in different arrangements (see fig. 137). A T-rail accepts the vertical components of load A U-rail attached underneath the component to be guided prevents the vertical panel from swinging and is used as moment support. In addition, a vertical offset in the structure, as well as possible existing unevenness of the support surface, is compensated.

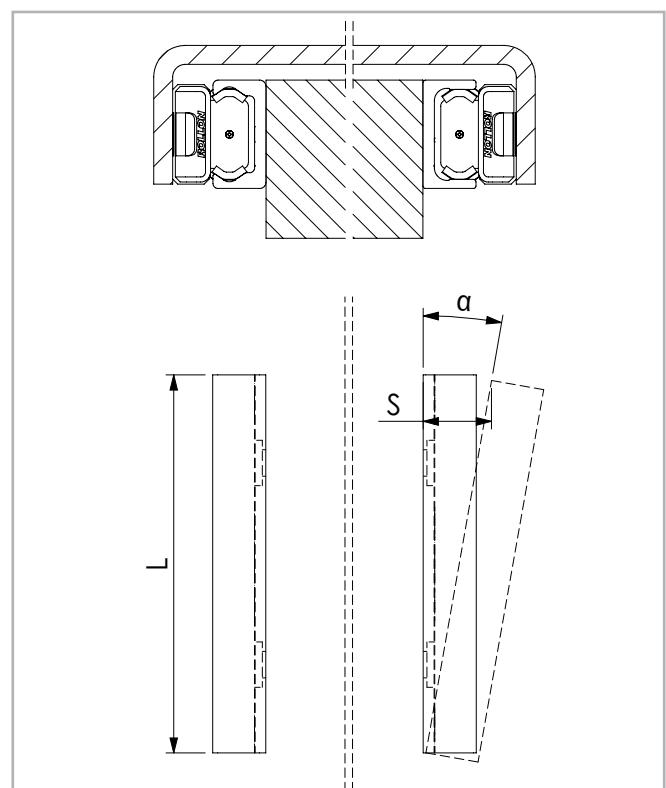


Fig. 136



Fig. 137

## ➤ K+U-system tolerance compensation

### Deviations in parallelism in two planes

The K+U-system, like the T+U-system, can compensate for axial deviations in parallelism. Additionally, the K+U system has the option of rotating the slider in the rail, which will compensate for other deviations in parallelism, e.g. height offset.

The unique raceway contour of the K-rail allows the slider a certain rotation around its longitudinal axis, with the same linear precision as with a T-rail. With the use of a K+U-system, the K-rail accounts for the main loads and the motion of the track. The U-rail is used as a support bearing and takes only radial forces and  $M_z$  moments. The K-rail must always be installed so that the radial load of the slider is always supported by at least 2 load bearing roller sliders, which lie on the V-shaped raceway (reference line) of the rail.

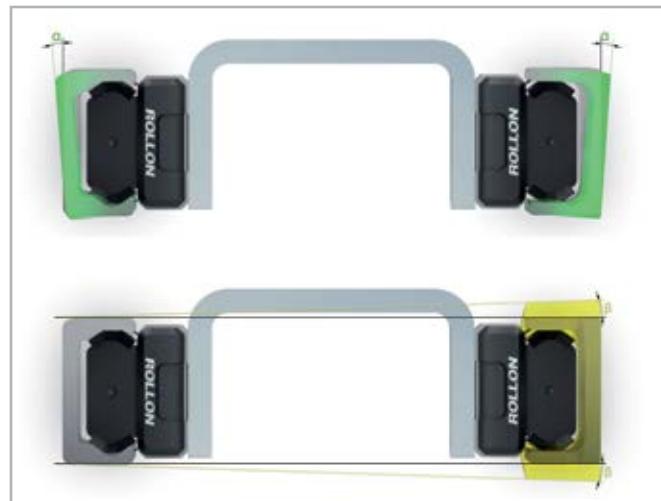


Fig. 138

K-rails and sliders are available in both sizes 43 and 63. The custom NSA-slider may only be used in K-rails and cannot be exchanged with other Rollon sliders. The maximum allowable rotation angle of the NSA- and NSW-sliders are shown in the following table 63 and figure 139.  $\alpha_1$  is the maximum rotation angle counterclockwise,  $\alpha_2$  is clockwise.

Slider type	$\alpha_1$ [°]	$\alpha_2$ [°]
NSA43 and NSW43 / CSK43 and CSW43	2	2
NSA63 and NSW63 / CSK63 and CSW63	1	1

Values referred to NSW and CSW slider in U rail

Tab. 63

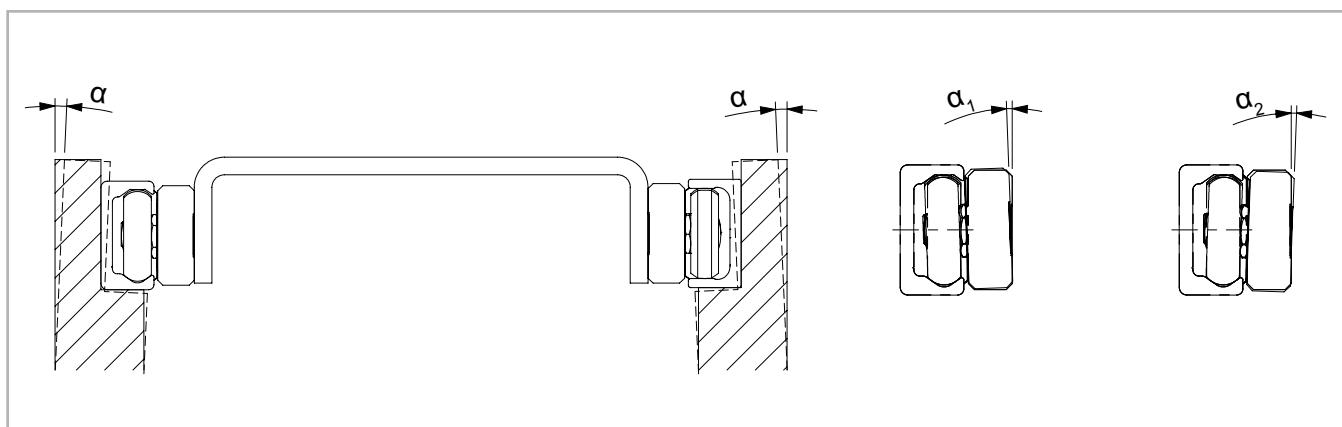


Fig. 139

### K+U-system maximum offset

It must be noted that the slider in the U-rail will turn during the movement and rotation of the slider in the K-rail to allow an axial offset. During the combined effect of these movements, you must not exceed the maximum values (see tab. 64). If a maximum rotated NSW or CSW- slider is observed ( $2^\circ$  for size 43 and  $1^\circ$  for size 63), the maximum and minimum position of the slider in the U rail results from the values  $B_{0\max}$  and  $B_{0\min}$ , which are already considered by the additional rotation caused axial offset.  $B_{0\text{nom}}$  is a recommended nominal starting value for the position of a NSW or CSW-slider in the U-rail of a K+U-system.

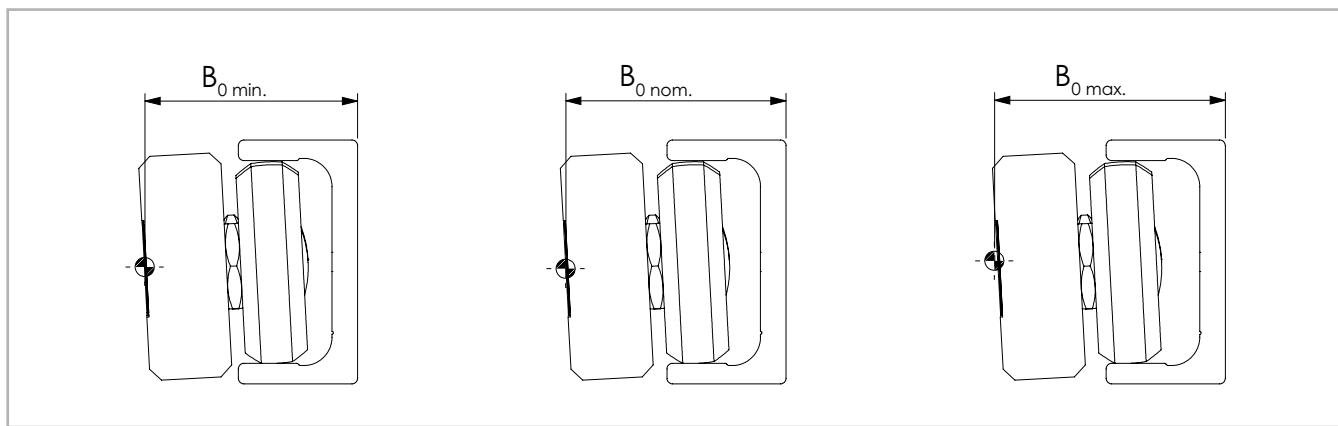


Fig. 140

Slider type	$B_{0\min}$ [mm]	$B_{0\text{nom}}$ [mm]	$B_{0\max}$ [mm]
NSW43	37.6	38.85	40.1
NSD43	37.9	39.15	40.4
NSW63	49.85	51.80	53.75
CS43	37.6	38.85	40.1
CS63	49.85	51.80	53.75

Tab. 64

If a K-rail is used in combination with a U-rail, with guaranteed problem-free running and without extreme slider load, a pronounced height difference between the two rails can also be compensated for. The following illustration shows the maximum height offset  $b$  of the mounting surfaces in relation to the distance  $a$  of the rails (see fig. 141).

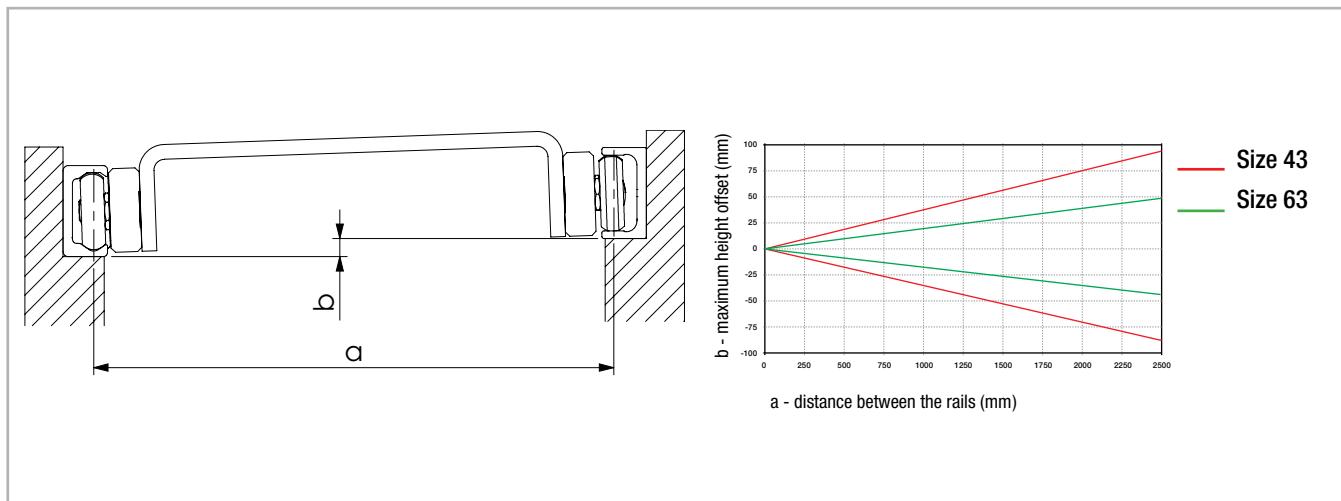


Fig. 141

Even the K+U-system can be used in different arrangements. If the same example as with the T+U-system is observed (see pg. CR-81, fig. 137), this solution, in addition to the prevention of vibrations and moments, also enables the compensation of larger deviations in parallelism in the vertical direction, without negative consequences to the guide. This is particularly important for longer strokes as it is more difficult to obtain a correct vertical parallelism.



Fig. 142

## > Preload

### Preload classes

The factory installed systems, consisting of rails and sliders, are available in two preload classes:

Standard preload K1 means a rail-slider combination with minimum preload which means the rollers are adjusted free of clearance for optimal running properties.

Usually preload K2 is used for rail-slider systems for increasing the rigidity. When using a system with K2 preload a reduction of the loading capacities and service life must be taken into consideration (see tab. 65).

Preload class	Reduction y
K1	-
K2	0.1

Tab. 65

This coefficient y is used in the calculation formula for checking the static load and lifetime (see pg. CR-103, fig. 179 and pg. CR 107, fig. 196).

The interference is the difference between the contact lines of the rollers and the raceways of the rail.

Preload class	Interference* [mm]	Rail type
K1	0.01	all
K2	0.03	T, U...18
	0.04	T, U...28
	0.05	T, U...35
	0.06	T, U, K...43, T, U, K...63

\* Measured on the largest interior dimension between the raceways

Tab. 66

### External preload

The unique design of the Compact Rail product family enables applying a partial external preload on selected locations along the entire guide.

An external preload can be applied by pressure along the side surfaces of the guide rail according to the drawing below (see fig. 143). This local preload results in higher rigidity only at the locations where it is necessary (e.g. on reversing points with high dynamic auxiliary forces).

This partial preload increases the service life of the linear guide by

avoiding a continually increased preload over the entire length of the guide. Also the required drive force of the linear carriage in the non-pre-loaded areas is reduced.

The amount of the externally applied preload is determined using two dial indicators by measuring the deformation of the rail sides. These are deformed by thrust blocks with pressure screws. The external preload must be applied when the slider is not directly located in the pressure zone.

Size	A [mm]
18	40
28	55
35	75
43	80
63	120

Tab. 67

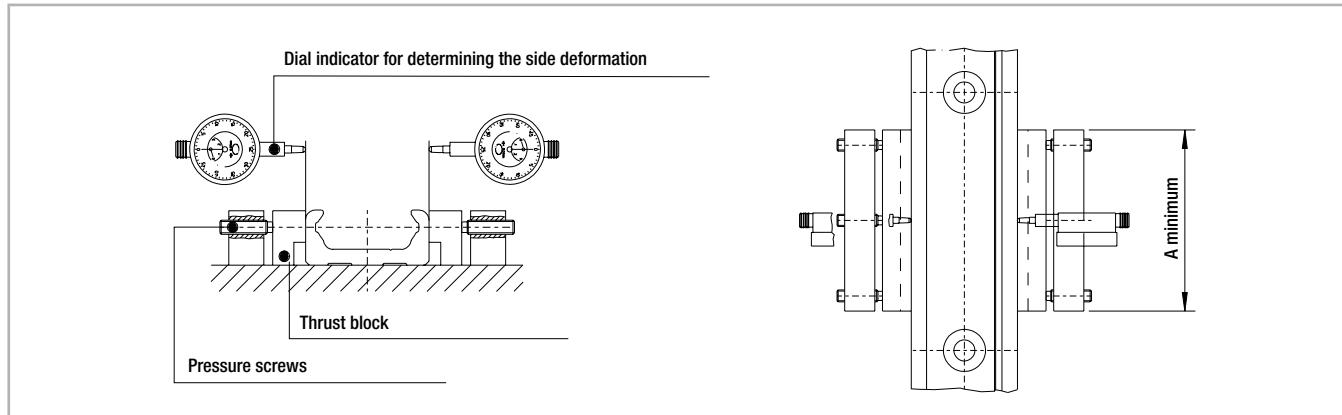


Fig. 143

The graph below indicates the value of the equivalent load as a function of the total deformation of both rail sides. The data relates to sliders with three rollers (see fig. 144).

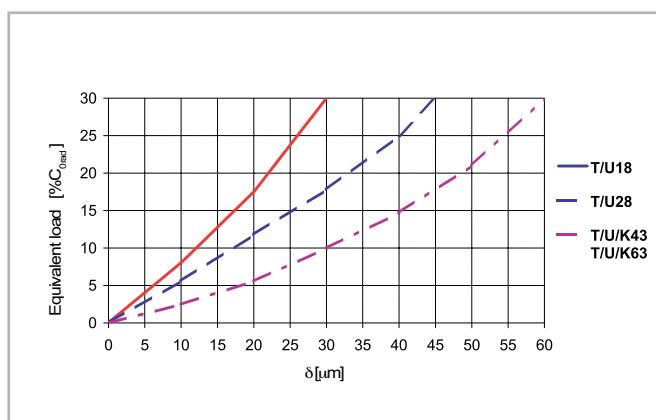


Fig. 144

## Drive force

### Frictional resistance

The drive force required for moving the slider is determined by the combined resistance of the rollers, wipers and seals.

The ground raceways and rollers have a minimal coefficient of friction, which remains almost the same in both the static and dynamic state. The wiper and longitudinal seals are designed for an optimum protection of the system, without a significant negative influence on the quality of motion. The overall friction of the Compact Rail also depends on external factors such as lubrication, preload and additional forces. Table 68 below contains the coefficients of friction for each slider type.



Fig. 145

Size	$\mu$ Roller friction	$\mu_w$ Wiper friction	$\mu_s$ Friction of longitudinal seals
18	0.003	$\frac{\ln(m \cdot 1000)^*}{0.98 \cdot m \cdot 1000}$	0.0015
28	0.003		
35	0.005		
43	0.005	$\frac{\ln(m \cdot 1000)^*}{0.06 \cdot m \cdot 1000}$	$\frac{\ln(m \cdot 1000)^*}{0.15 \cdot m \cdot 1000}$
63	0.006		

\* Kilograms must be used for load m

Tab. 68

The values given in table 68 apply to external loads, which, with sliders with three rollers, are at least 10 % of the maximum load rating. For calculating the driving force for lower loads, please contact ROLLON technical support.

### Calculation of drive force

The minimum required drive force for the slider is determined with the coefficients of friction (see tab. 68) and the following formula (see fig. 146):

$$F = (\mu + \mu_w + \mu_s) \cdot m \cdot g$$

$m$  = mass (kg)  
 $g$  = 9.81 m/s<sup>2</sup>

Fig. 146

### Example calculation:

If a NSW43 slider is used with a radial load of 100 kg, the result is  $\mu = 0.005$ ; from the formula the following is calculated:

$$\mu_s = \frac{\ln(100000)}{0.15 \cdot 100000} = 0.00076$$

$$\mu_w = \frac{\ln(100000)}{0.06 \cdot 100000} = 0.0019$$

Fig. 147

This is the minimum drive force for this example:

$$F = (0.005 + 0.0019 + 0.00076) \cdot 100 \cdot 9.81 = 7.51 \text{ N}$$

Fig. 148

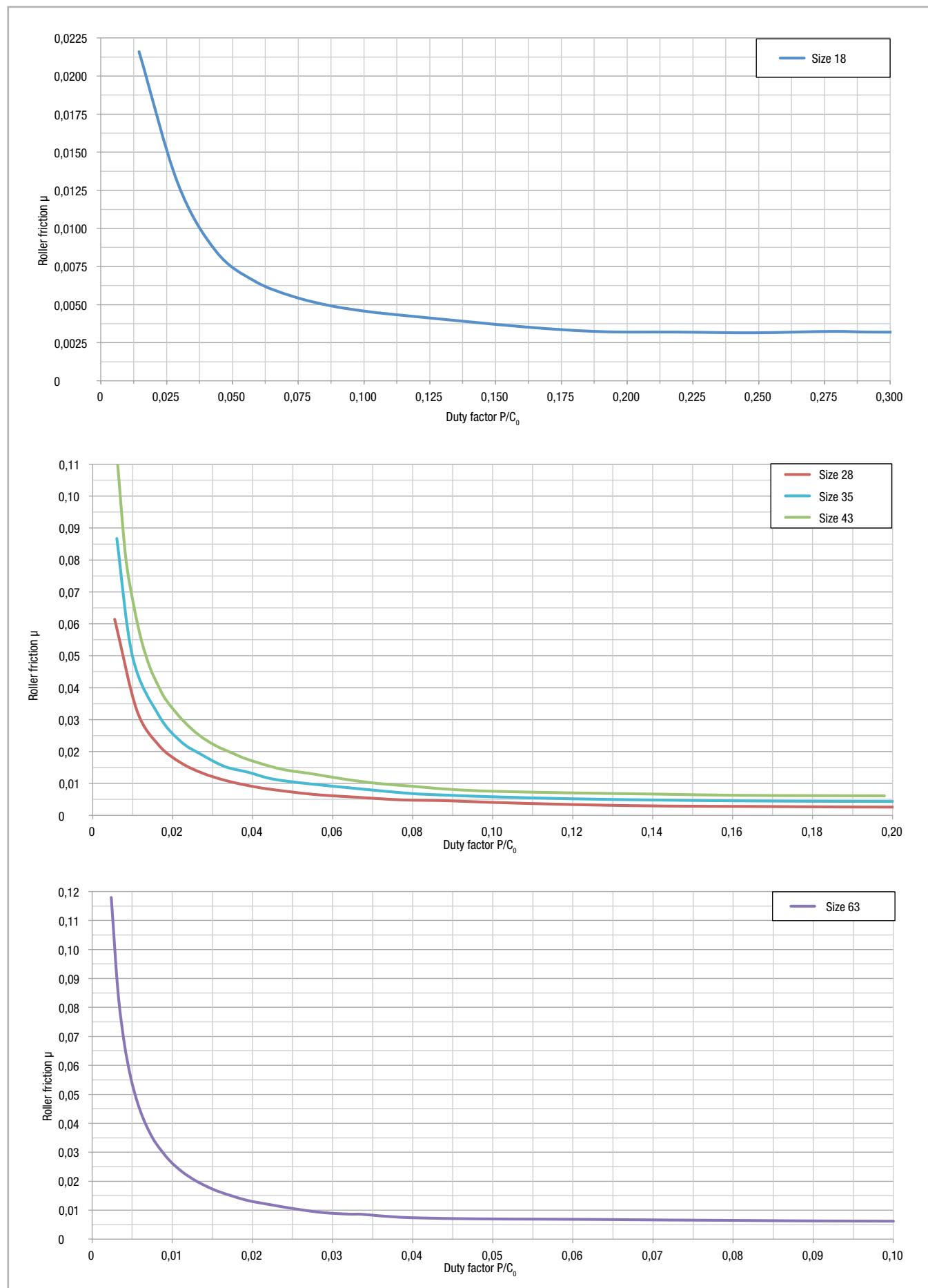


Fig. 149

## ➤ Lubrication

### Roller pin lubrication

The bearings inside the rollers are lubricated for life. To reach the calculated service life (see pg. CR-107), a film of lubricant should always be

present between the raceway and roller, this also serves to protect against corrosion of the ground raceways.

### Lubrication of the raceways

Proper lubrication during normal conditions:

- reduces friction
- reduces wear
- reduces the load of the contact surfaces through elastic deformations
- reduces running noise

## ➤ NSW-slider lubrication

The NSW sliders are equipped with wiper heads that include lubricated felts which slowly release oil on the raceways for a long time. The wiper heads can be recharged from the front through a dedicated access hole by means of an oiling syringe.



Fig. 150

Lubricant	Thickening agent	Temperature range [°C]	Kinematic viscosity 40°C [mm²/s]
Mineral oil	Lithium soap	-20... to +120	approx 110

Tab. 69

The durability of the lubrication delivered by the wiper heads depends on the conditions of use. In the normal clean indoor applications, it is suggested to refill the oil every 0.5 million of cycles, 1000 km or 1 year of use, based on the value reached first. In different conditions, it could be necessary to refill more often, depending on the level of environment criticality. In case of severe dust and dirt conditions, it is suggested to change the entire wiper head with a new one.

When refilling the oil or the substituting the wiper heads, it is recommended to clean the raceways of the guide.

## CSW-slider lubrication

### Lubrication when using C-sliders

The CSW series sliders can be provided with wipers made of thermoplastic elastomer to remove contaminants on the raceways. Since the sliders do not have a self-lubrication kit, manual lubrication of the raceways is

required. A guideline is to lubricate the raceways every 100 km or every 6 months. We recommend a roller bearing lubricant with a lithium base of average consistency (see tab. 70).

Lubricant	Thickening agent	Temperature range [°C]	Kinematic viscosity 40°C [mm²/s]
Roller bearing lubricant	Lithium soap	-20 to +170	approx 160

Tab. 70

Different lubricants are available on request for special applications:

- FDA-approved lubricant for use in the food industry
- specific lubricant for clean rooms

■ specific lubricant for the marine technology sector

■ specific lubricant for high and low temperatures

For specific information, contact Rollon technical support.

## Corrosion protection

All rails and slider bodies have a standard corrosion protection system by means of electrolytic-zinc plating according to ISO 2081. If increased corrosion protection is required, application-specific surface treatments are available upon request for rails and slider bodies e.g. approved nickel

plated for use in the food industry. In this case, the chosen treatment must be specified in the order for both rails and sliders using the appropriate code shown in the table below. For more information contact Rollon technical support.

Treatment	Characteristics
Zinc Plating ISO 2081	Standard treatment for all sizes of rails and slider bodies, it is ideal for indoor applications. When applied to the rail, it is removed from the raceways by the subsequent grinding process. Zinc-plated sliders are supplied with steel rollers.
ZincNickel ISO19598 (Z)	Ideal for outdoor applications. Sliders ordered with ZincNickel treatment are supplied with stainless steel rollers to further increase the corrosion resistance.
Rollon E-coating (K)	As zinc-plated version with additional electro painting that provides a fine black finishing to the entire rail. When applied to the rail, the slider can partially remove the coating from the raceways on the running contact point after a period of use. Sliders ordered with Rollon E-Coating are supplied with stainless steel rollers to further increase the corrosion resistance.
Nickel Plating (N)	Provides high resistance to chemical corrosion and is ideal for applications in medical or food related environments. When applied to the rail, raceways are coated too. Sliders ordered with Nickel Plating treatment are supplied with stainless steel rollers to further increase the corrosion resistance.

Tab. 71

## Speed and acceleration

The Compact Rail product family is suitable for high operating speeds and accelerations.

Size	Speed [m/s]	Acceleration [m/s²]
18	3	10
28	5	15
35	6	15
43	7	15
63	9	20

Tab. 72

# Installation instructions



## > Fixing holes

### V-holes with 90° bevels

The selection of rails with 90° countersunk holes is based on the precise alignment of the threaded holes for installation. Here the complex alignment of the rail to an external reference is omitted, since the rail aligns during installation by the self-centering of the countersunk screws on the existing hole pattern.

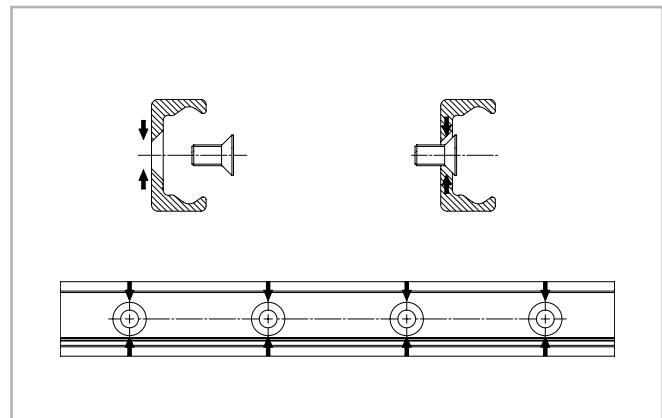


Fig. 151

### C-holes with cylindrical counterbore

When a rail with counterbored holes is delivered, the Torx® screws are provided in the right quantity. The cylindrical screw has, as shown, some play in the countersunk fixing hole, so that an optimum alignment of the rail can be achieved during installation (see fig. 152).

The area T is the diameter of the possible offset, in which the screw center point can move during the precise alignment.

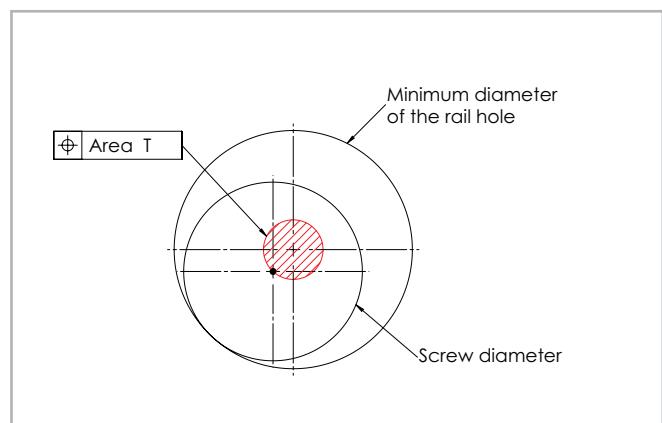


Fig. 152

Rail type	Area T [mm]
TLC18 - ULC18	Ø 1.0
TLC28 - ULC28	Ø 1.0
TLC35 - ULC35	Ø 1.5
TLC43 - ULC43 - KLC43	Ø 2.0
TLC63 - ULC63 - KLC63	Ø 0.5

Tab. 73

### Chamfers

Chamfers must be realized for both C-holes and V-holes rails. The minimum chamfers on the fixing threads are listed on the table below.

Size	Chamfer C-holes [mm]	Chamfer V-holes [mm]
18	0.5 x 45°	0.5 x 45°
28	0.6 x 45°	1 x 45°
35	0.5 x 45°	1 x 45°
43	1 x 45°	1 x 45°
63	0.5 x 45°	1 x 45°

Tab. 74

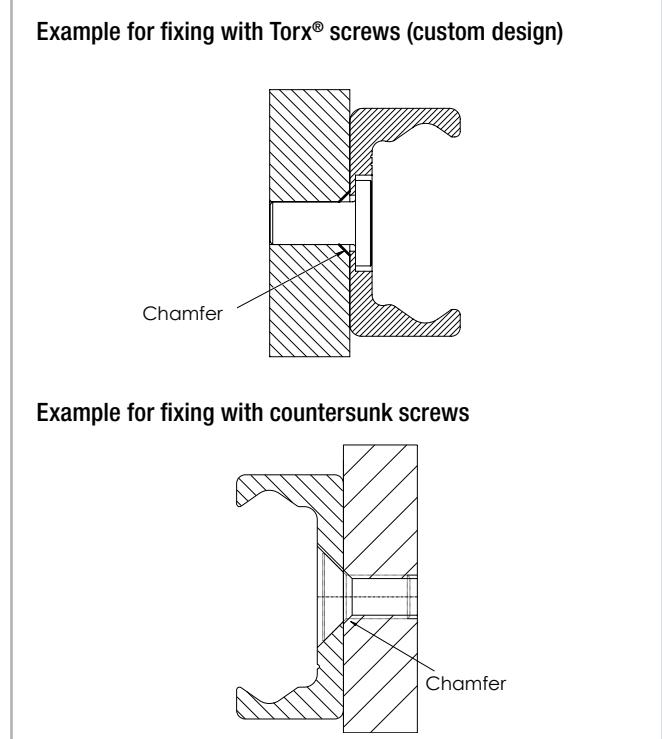


Fig. 153

## Adjusting the sliders

If requested in the order, rails and sliders are delivered as a system with factory adjustment. If rails and sliders are supplied separately or if the slider is to be mounted in another rail, the bearings will need to be adjusted.

- (1) Check that the rails are clean and remove the wipers to increase sensitivity for proper preload.
- (2) Place the slider in the rail. It may be necessary to align the bearings to be adjusted with those fixed, to facilitate insertion. Excessive offset may make insertion difficult. Use the flat spanner.
- (3) Use a medium threadlocking adhesive in the screws.
- (4) Lightly tighten the upper bearing screw without over-tightening. Vice versa if the screw has already been previously tightened, loosen the bearing fixing screws slightly. The bearing must be able to rotate but should not be completely free. Only adjust the eccentric bearings (without the center marked).
- (5) For NSW/NSA/NSD/NSDA series, place the slider at one end of the rail to simplify insertion of the flat key. For the CSW/CDW series, adjustment can take place at any point on the rail, if desired.
- (6) Insert the flat spanner supplied between the rail and the slider. For NSW/NSA/NSD/NSDA series take care to insert it from the end of the slider, sliding it under the side seal until it reaches the bearing to be adjusted. (Fig. 154). Engage the hexagon of the eccentric bearing

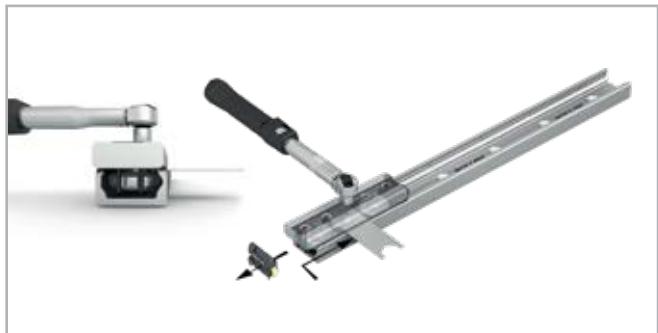


Fig. 154

with the flat spanner.

- (7) Turn the flat adjustment spanner clockwise so that the eccentric bearings contacts the raceway opposite the factory-set fixed bearings, thus reducing the slider clearance to zero. Avoid applying a high preload, which would cause high wear and reduce service life.
- (8) While holding the eccentric bearing in the correct position with the flat adjusting spanner, tighten the fixing screw to ensure a stable pin position.
- (9) Run the slider and check the preload over the entire length of the rail. The movement must be smooth. If any oscillation/clearance or excessive force is observed, repeat the adjustment operation. Preload is optimized when the slider runs smoothly and without play.
- (10) For sliders with more than 3 eccentric bearings, repeat this procedure for each one to be adjusted. Ensure that all bearings have uniform contact with the raceways.
- (11) While maintaining the angular position of the pin with the flat spanner, tighten all the bearing retaining screws with a torque spanner to the specified tightening torque shown in Table 75.
- (12) Reinstall the wipers.
- (13) For CSW/CDW series, lubricate the raceways.

Slider size	Tightening torque [Nm]
18	3
28	7
35	7
43	12
63	35

Tab. 75

## Use of radial ball bearing rollers

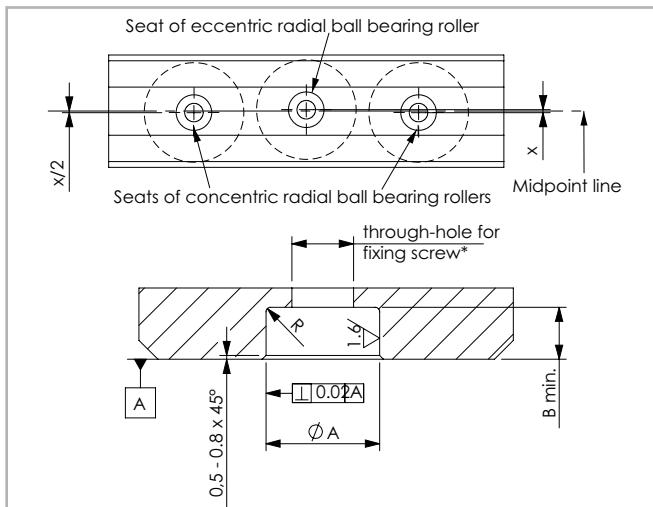


Fig. 155

Slider size	X [mm]	Ø A [mm]	B min. [mm]	Radius R [mm]
18	0,30	6 + 0,025/+0,01	2,1	0,5
28	0,64	10 + 0,03/+0,01	4,0	0,5
35	0,90	12 + 0,05/+0,02	4,5	0,5
43	0,72	12 + 0,05/+0,02	5,5	1
63	0,55	18 + 0,02/-0,02	7	1

Tab. 76

If purchasing "Radial ball bearing rollers" to install on your own structure (see p. CR-74) we advise:

- Using a maximum of 2 concentric radial ball bearing rollers
- Offset the seats of the concentric radial ball bearing rollers with respect to those of the eccentric radial ball bearing rollers according to the table (tab. 76).

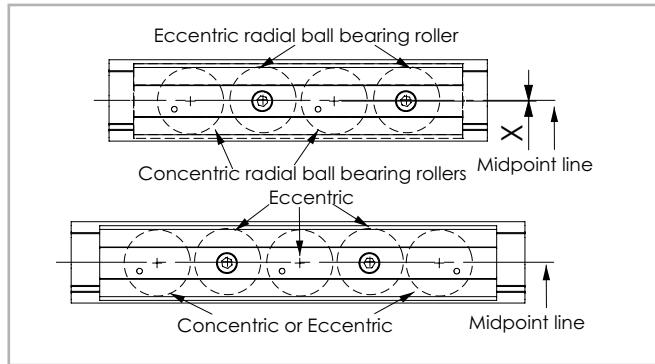


Fig. 156

## > Installing the single rail

The T- and K-rails can be installed in two positions relative to the external force. For axial loading of the slider (fig. 157. pos. 2), the load capacity is reduced because of the decline in contact area caused by the change in position. Therefore, the rails should be installed in such a way that the load on the rollers acts in the radial direction (fig. 157, pos. 1). The number of fixing holes in the rail in combination with screws of property class 10.9 is dimensioned in accordance with the load capacity values. For critical applications with vibrations or higher demand for rigidity, a support of the rail (fig. 157, pos. 3) is advantageous.

This reduces deformation of the sides and the load on the screws. The installation of a rail with countersunk holes requires an external reference for alignment. This reference can also be used simultaneously as rail support if required. All information in this section on alignment of the rails, refers to rails with counterbored holes. Rails with countersunk holes self-align using the specified fixing hole pattern (see pg. CR-91, fig. 151).

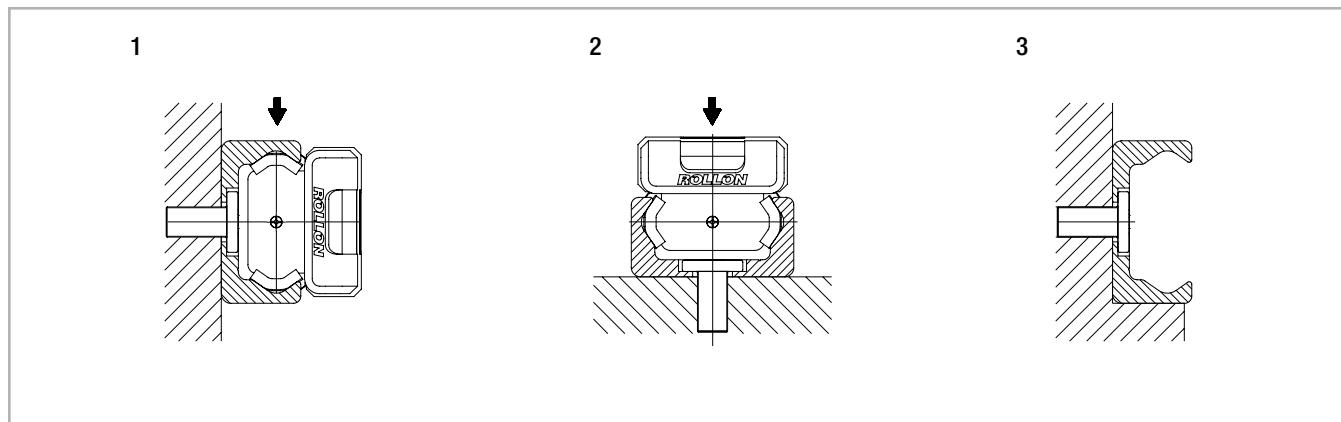


Fig. 157

### Rail installation with reference surface as support

- (1) Remove unevenness, burrs and dirt from the support surface.
- (2) Press the rail against the support surface and insert all screws without tightening them.
- (3) Start tightening the fixing screws to the specified torque on one end of the rail while continuing to hold pressure on the rail against the support surface.

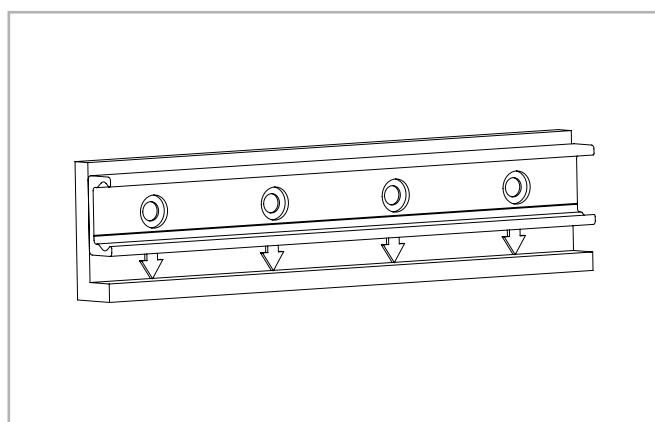


Fig. 158

Screw type	Torx® tightening torque [Nm]	Countersunk tightening torque [Nm]
M4 (T..., U... 18)	3	3
M5 (T..., U... 28)	9	6
M6 (T..., U... 35)	12	10
M8 (T..., U..., K... 43)	22	25
M8 (T..., U..., K... 63)	35	30

Tab. 77

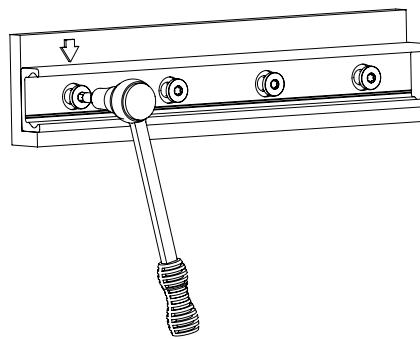


Fig. 159

#### Rail installation without support

(1) Carefully lay the guide rail with installed slider on the mounting surface and slightly tighten the fixing screws so that the guide rail lightly touches the mounting surface.

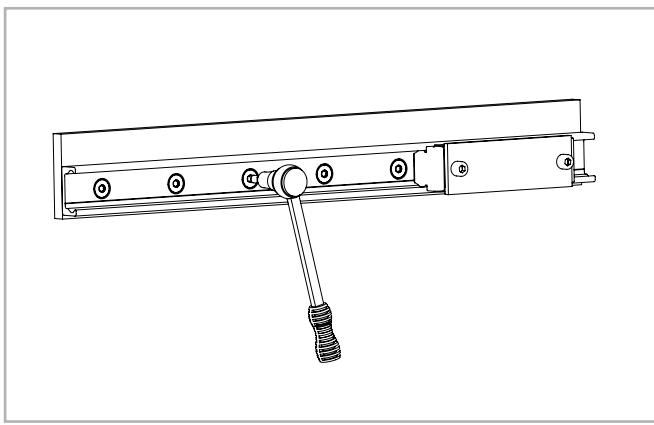


Fig. 160

(2) Install a dial indicator so that the offset of the rail to a reference line can be measured. Now position the slider in the center of the rail and set the dial indicator to zero. Move the slider back and forth between each two hole spacings and carefully align the rail. Fasten the three center screws of this area now with the the specified tightening torque, see pg. fig. 161.  
 (3) Now position the slider on one end of the rail and carefully align the rail to zero on the dial indicator.

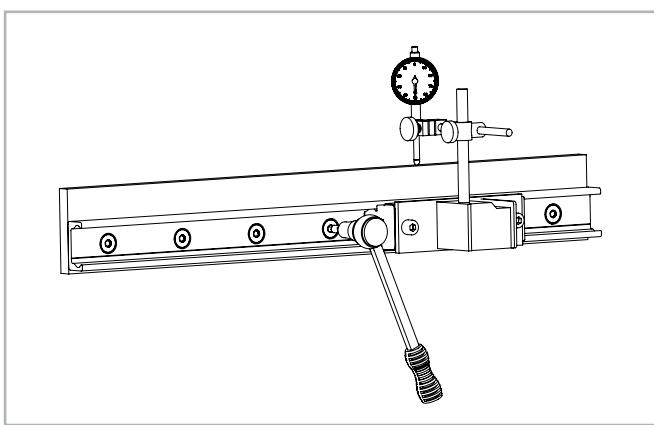


Fig. 161

(4) Begin to tighten the screws as specified while moving the slider together with the dial indicator. Make sure that it does not show any significant deflection. Repeat this procedure from the other end of the rail.

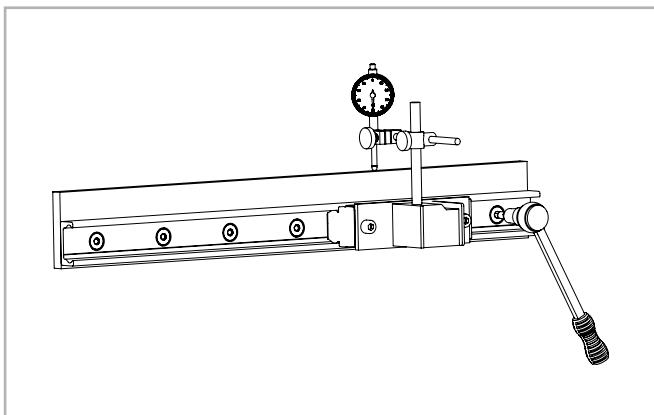


Fig. 162

## Parallel installation of two rails

If two T-rails or a T+U-system are installed, the height difference of the two rails must not exceed a certain value (obtainable from the table below) in order to ensure proper guiding. These maximum values result from the maximum allowable twisting angle of the rollers in the raceways (see tab. 78). These values account for a load capacity reduction of 30% on the T-rail and must absolutely be maintained in every case.

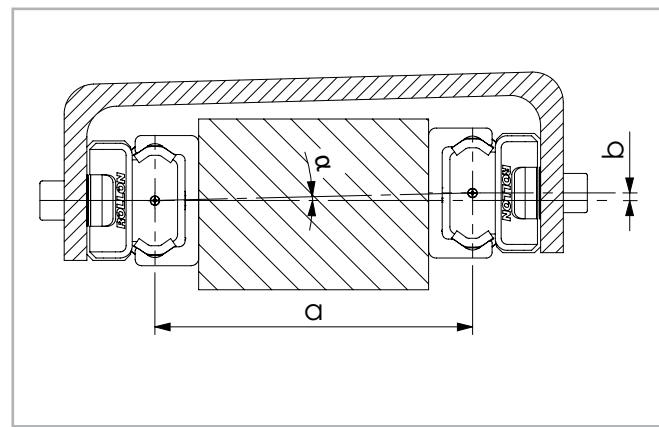


Fig. 163

Size	$\alpha$
18	1 mrad (0.057°)
28	2.5 mrad (0.143°)
35	2.6 mrad (0.149°)
43	3 mrad (0.171°)
63	5 mrad (0.286°)

Tab. 78

Example:

NSW43: if  $a = 500$  mm;  $b = a \cdot \tan \alpha = 1.5$  mm

When using two T-rails, the maximum parallelism deviation must not be exceeded (see tab. 79). Otherwise stresses can occur, which can result in a reduction in load capacity and service life.

Rail size	K1	K2
18	0.03	0.02
28	0.04	0.03
35	0.04	0.03
43	0.05	0.04
63	0.06	0.05

Tab. 79

Note: For parallelism problems, it is recommended to use a T+U or K+U system, since these combinations compensate for inaccuracies (see pg. CR-80 and following).

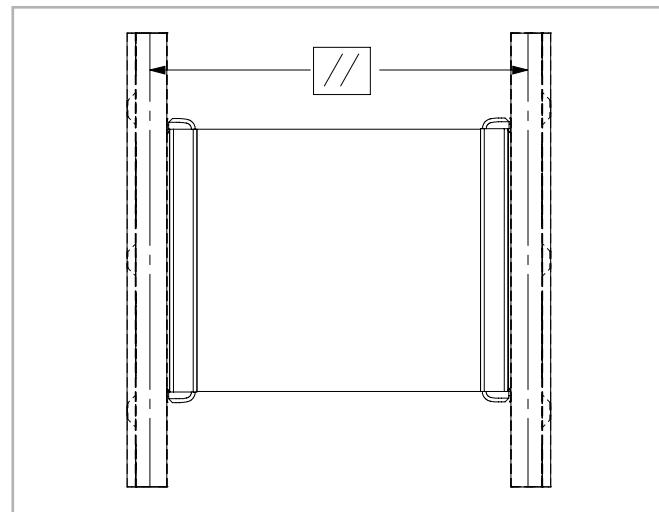


Fig. 164

### Parallel installation of two T-rails

- (1) Clean chips and dirt from the prepared mounting surfaces and fasten the first rail as described in the section on installation of a single rail.
- (2) Fasten the second rail on the ends and the center. Tighten the screws in Position A and measure the distance between the raceways of the two rails.

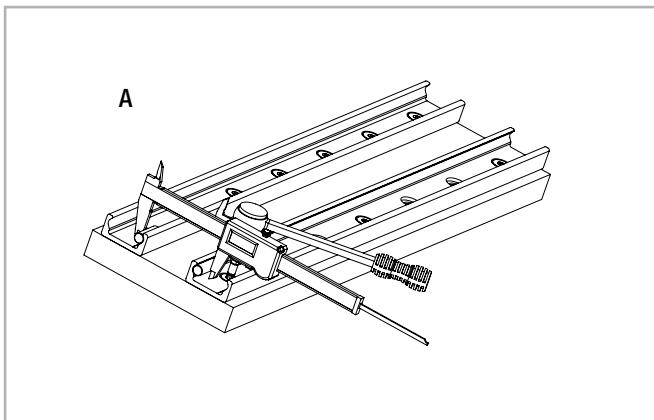


Fig. 165

- (3) Fasten the rail in Position B so that the distance between the raceways does not exceed the measured values in Position A while maintaining the tolerances (see pg. CR-95, tab. 79) for parallel rail installation.

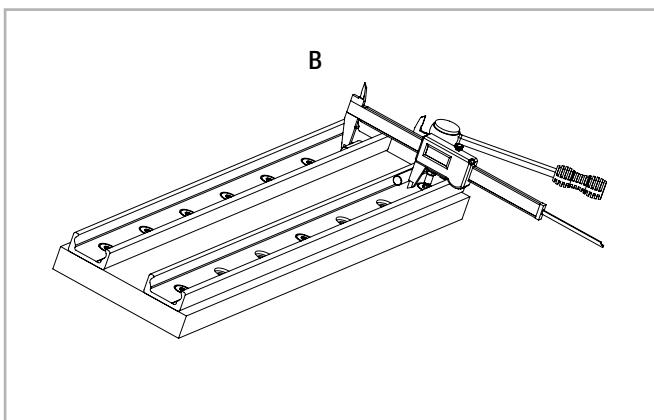


Fig. 166

- (4) Fasten the screw in Position C so that the distance of the raceways is as close to an average between the two values from A and B as possible.

- (5) Fasten all other screws and check the specified tightening torque of all fixing screws (see pg. CR-94, tab. 77).

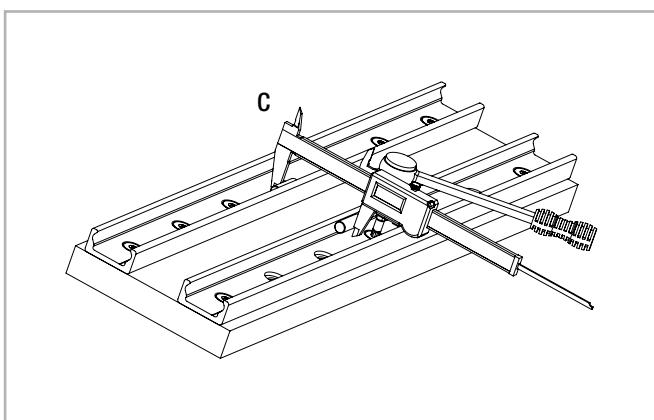


Fig. 167

## > Installation of the T+U- or the K+U-system

When using a two-track parallel linear guide we recommend the use of a fixed bearing / compensating bearing system: The combination of T+U-rails for compensation of deviations in parallelism or the K+U-system to compensate for deviations in parallelism in two planes.

### Installation steps

(1) For a fixed bearing / compensating bearing system the fixed bearing rail is always installed first. This is then used as a reference for the compensating bearing rail.

Then proceed as described in the section on installation of a single rail (see pg. CR-95).

(2) Install the compensating bearing rail and only tighten the fixing screws slightly.

(3) Insert the sliders in the rails and install the element to be moved, without tightening its screws.

(4) Insert the element in the center of the rails and tighten it, use screws class 10.9.

(5) Tighten the center rail fixing screws to the specified torque (see pg. CR-94, tab. 77).

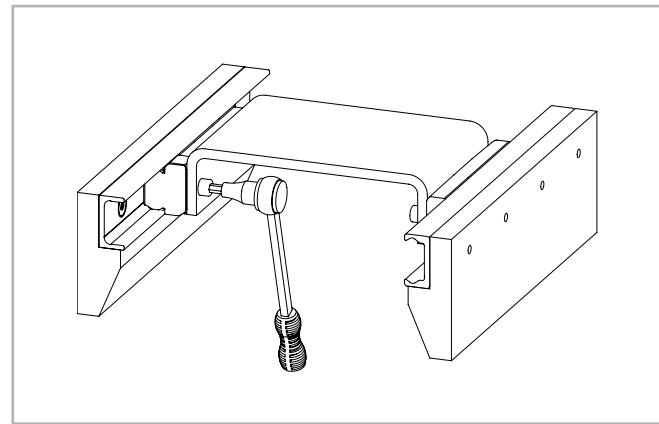


Fig. 168

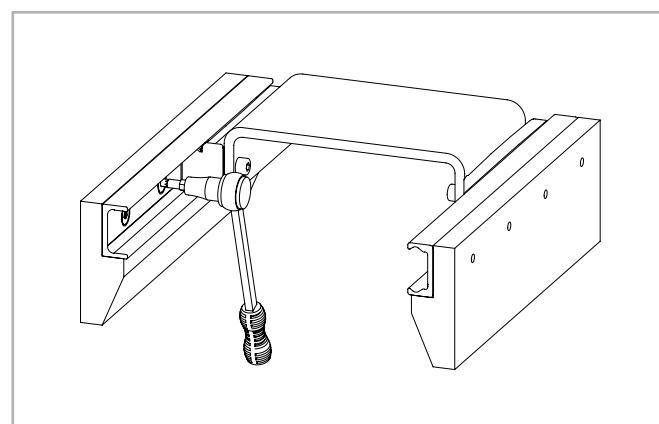


Fig. 169

(6) Move the element to one end of the rail and start tightening the rest of the screws in the direction away from the slider.

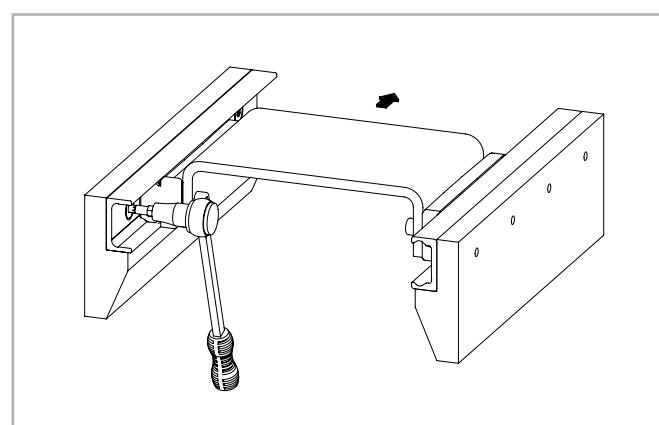


Fig. 170

## Joined Rails

If long guide rails are required, two or more rails can be joined to the desired length. When putting guide rails together, be sure that the register marks shown in fig. 171 are positioned correctly.

For applications with parallel joined guide rails we suggest them to be fabricated asymmetric.

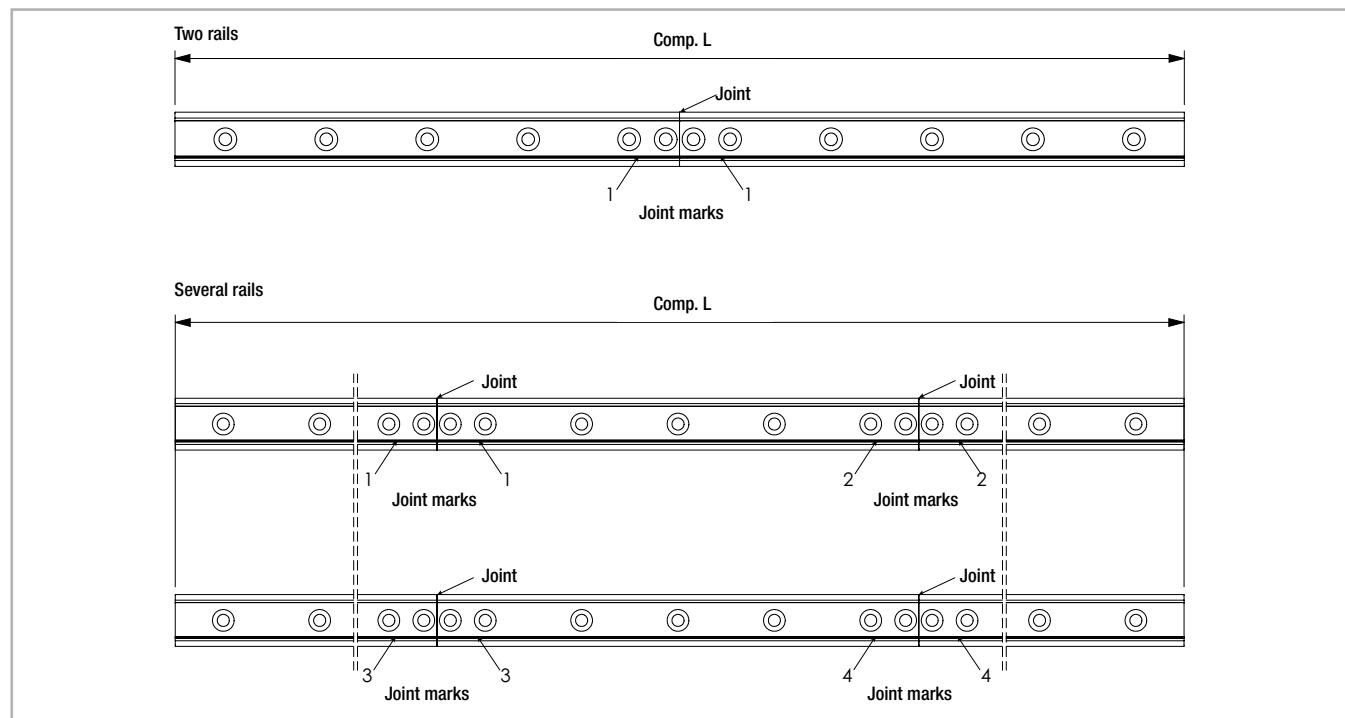


Fig. 171

### General information

The maximum available rail length in one piece is indicated in table 40 on page CR-59. Longer lengths are achieved by joining two or more rails (joined rails).

Rollon then machines the rail ends at a right angle to the impact surfaces and marks them. Additional fixing screws are included with the delivery, which ensure a problem-free transition of the slider over the joints, if the following installation procedures are followed. Two additional threaded holes (see fig. 172) are required in the load-bearing structure. The included end fixing screws correspond to the installation screws for the rails for cylindrical counterbores (see pg. CR-91).

The alignment fixture for aligning the rail joint can be ordered using the designation given in the table (see pg. CR-75, tab. 54 and 55).

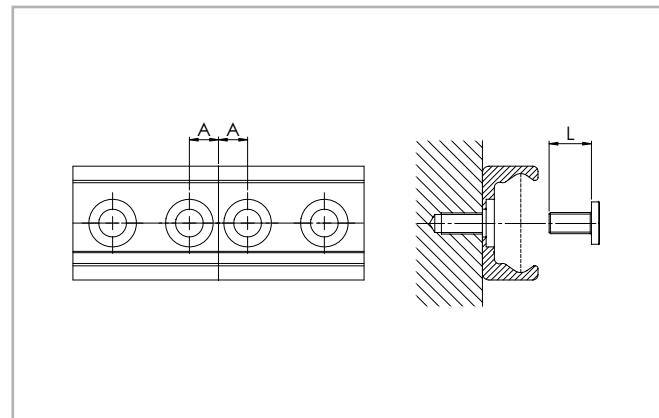


Fig. 172

Rail type	A [mm]	Threaded hole (load-bearing structure)	Screw type	L [mm]	Alignment fixture
T..., U...18	7	M4	see pg. CR-91	8	AT18
T..., U...28	8	M5		10	AT28
T..., U...35	10	M6		13	AT35
T..., U...43	11	M8		16	AT43
T..., U...63	8	M8		20	AT63
K...43	11	M8		16	AK43
K...63	8	M8		20	AK63

Tab. 80

## ➤ Installation of joined rails

After the fixing holes for the rails are made in the load-bearing structure, the joined rails can be installed according to the following procedure:

- (1) Fix the individual rails on the mounting surface by tightening all screws except for each last one on the rail joint.

(2) Install the end fixing screws without tightening them (see fig. 173).

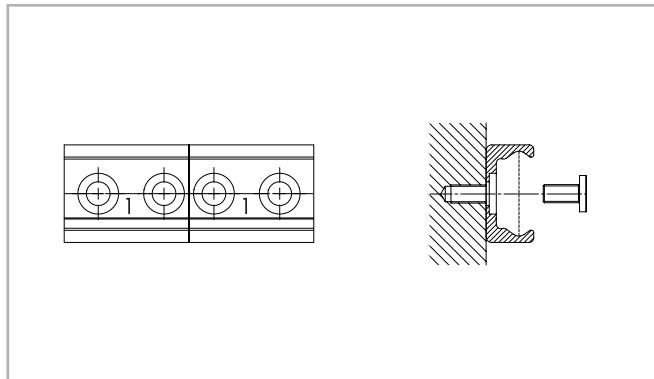


Fig. 173

(3) Place the alignment fixture on the rail joint and tighten both set screws uniformly, until the raceways are aligned (see fig. 174).

(4) After the previous step (3) it must be checked if both rail backs lie evenly on the mounting surface. If a gap has formed there, this must be shimmed.

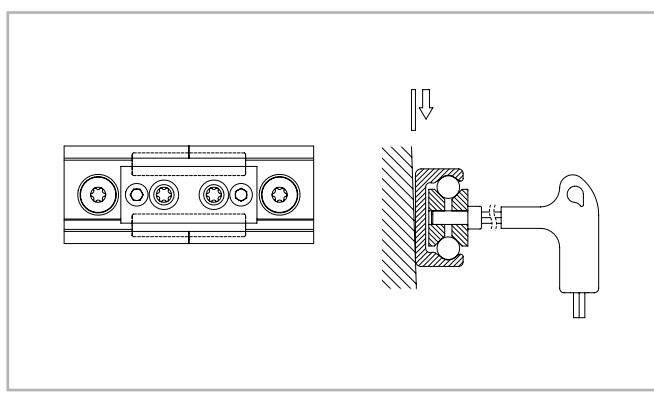


Fig. 174

(5) The bottom of the rails should be supported in the area of the transition. Here a possible existing gap must be looked for, which must be closed for correct support of the rail ends by shims.

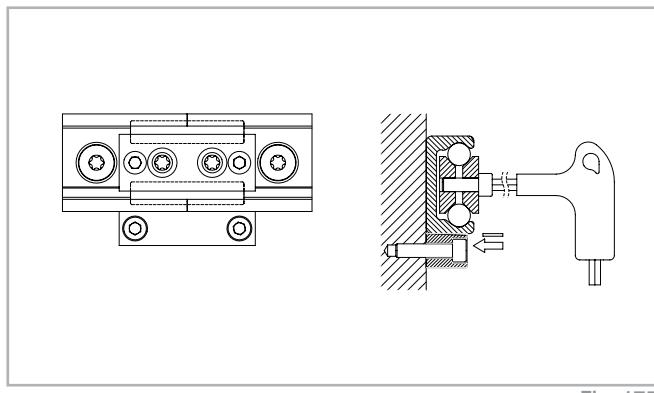


Fig. 175

(6) Insert the key through the holes in the alignment fixture and tighten the screws on the rail ends.

(7) For rails with 90° countersunk holes, tighten the remaining screws starting from the rail joint in the direction of the rail center. For rails with cylindrical counter-sunk holes, first adjust the rail to an external reference, then proceed as described above.

(8) Remove the alignment fixture from the rail.

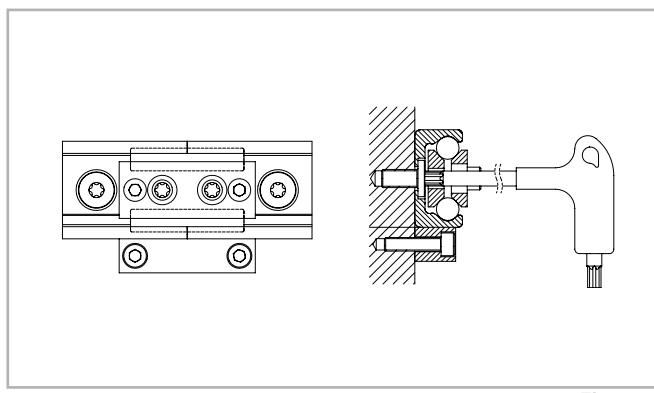


Fig. 176

## Ordering key



### Rail / slider system

TL	4560	/2/	NSW	28	-4	B	-2Z	-N
								Expanded surface protection if deviation from Standard ISO 2081 <i>see pg. CR-90, tab.71</i>
								Roller seal <i>see pg. CR-74</i>
								Configuration depending on type of slider <i>see pg. CR-60 and CR-69</i>
								Number of rollers / slider length <i>see pg. CR-60 and CR-69</i>
					Size			<i>see pg. CR-60 and CR-69</i>
				Slider type				<i>see pg. CR-60 and CR-69</i>
								Number of sliders in one rail
								Rail length in mm <i>see pg. CR-59, tab. 40</i>
								Rail type <i>see pg. CR-59, tab. 39</i>

Ordering example: TLC-04560/2/NSW28-4B-2Z-N, TLC-04560/2/CS28-100-2RS-B-N

Rail composition: 1x3280+1x1280 (only for joint processed rails)

Hole pattern: 40-40x80-40//40-15x80-40 (please always specify the hole pattern separately)

Notes on ordering: The rail length codes are always 5 digits, the slider length codes are always 3 digits; use zeroes as a prefix when lengths are shorter

### Rail

TLV	-43	-5680	-N	Expanded surface protection if deviation from Standard ISO 2081	<i>see pg. CR-90, tab.71</i>
				Rail length in mm	<i>see pg. CR-59, tab. 40</i>
				Size	<i>see pg. CR-59, tab. 39</i>
				Rail type	<i>see pg. CR-59, tab. 39</i>

Ordering example: TLV-43-05680-N

Rail composition: 1x880+2x2400 (only for joint processed rails)

Hole pattern: 40-10x80-40//40-29x80-40//40-29x80-40 (please always specify the hole pattern separately)

Notes on ordering: The rail length codes are always 5 digits; use zeroes as a prefix when lengths are shorter

## > Slider

NSW	28	-4	B	-2RS	-N	
Expanded surface protection if deviation from Standard ISO 2081 <i>see pg. CR-90, tab.71</i>						
Roller seal <i>see pg. CR-74</i>						
Configuration depending on type of slider <i>see pg. CR-60 and CR-69</i>						
Number of rollers / slider length <i>see pg. CR-60 and CR-69</i>						
Size <i>see pg. CR-60 and CR-69</i>						
Slider type <i>see pg. CR-60 and CR-69</i>						

Ordering example: NSW28-4B-2RS-N

Notes on ordering: The slider length codes are always 3 digits; use zeroes as a prefix when lengths are shorter

## > Wipers

ZK-WNS	28	
Size	<i>see pg. CR-60 and CR-69</i>	
Wiper type	<i>see pg. CR-75, fig. 123, fig.124</i>	

Ordering example: ZK-WNS28, CS28-100-2RS-B-N

Note on ordering: every kit contains a pair of wipers. Two wipers per slider are always required.

## Calculation formulas



### Static load

The radial load capacity rating,  $C_{0\text{rad}}$ , the axial load capacity rating  $C_{0\text{ax}}$ , and moments  $M_x, M_y, M_z$  indicate the maximum permissible values of the load (see from pg. CR-8 to CR-10 and CR-54, CR-57), higher loads will have a detrimental effect on the running quality. A safety factor,  $S_0$ , is used to check the static load, which takes into account the basic parameters of the application and is defined more in detail in the following table:

#### Safety factor $S_0$

No shock nor vibration, smooth and low-frequency reverse, high assembly accuracy, no elastic deformations	1 - 1.5
Normal installation conditions	1.5 - 2
Shock and vibration, high-frequency reverse, significant elastic deformation	2 - 3.5

Fig. 177

The ratio of the actual load to maximum permissible load may be as large as the reciprocal of the accepted safety factor,  $S_0$ , at the most.

$$\frac{P_{0\text{rad}}}{C_{0\text{rad}}} \leq \frac{1}{S_0} \quad \frac{P_{0\text{ax}}}{C_{0\text{ax}}} \leq \frac{1}{S_0} \quad \frac{M_1}{M_x} \leq \frac{1}{S_0} \quad \frac{M_2}{M_y} \leq \frac{1}{S_0} \quad \frac{M_3}{M_z} \leq \frac{1}{S_0}$$

Fig. 178

The above formulas are valid for a single load case.

If two or more forces are acting simultaneously, please check the following formula:

$$\frac{P_{0\text{rad}}}{C_{0\text{rad}}} + \frac{P_{0\text{ax}}}{C_{0\text{ax}}} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} + y \leq \frac{1}{S_0}$$

$P_{0\text{rad}}$

$C_{0\text{rad}}$

$P_{0\text{ax}}$

$C_{0\text{ax}}$

$M_1, M_2, M_3$

$M_x, M_y, M_z$

= effective radial load (N)

= permissible radial load (N)

= effective axial load (N)

= permissible axial load (N)

= external moments (Nm)

= maximum permissible moments  
in the different loading directions (Nm)

$y$   
= reduction due to preload (see pg. CR-29, Tab. 20  
or pg. CR-85, Tab. 65)

Fig. 179

The safety factor  $S_0$  can lie on the lower given limit if the occurring forces can be determined with sufficient precision. If shock and vibration are

present, the higher value should be selected. For dynamic applications higher safety is required. Please contact Rollon technical support.

## Slider load

Examples of formulas for determining the forces on the most heavily loaded slider

For an explanation of the parameters in the formulas see pg. CR-106, fig. 194

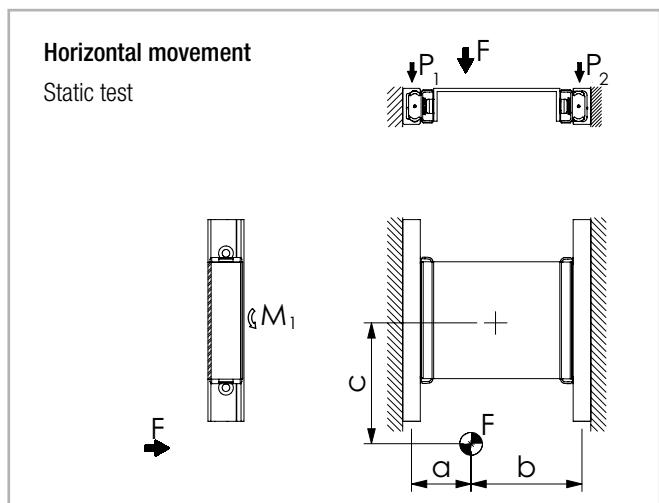


Fig. 180

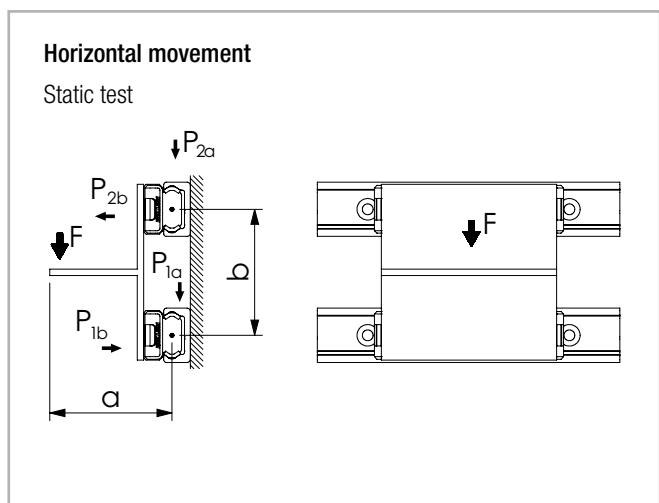


Fig. 181

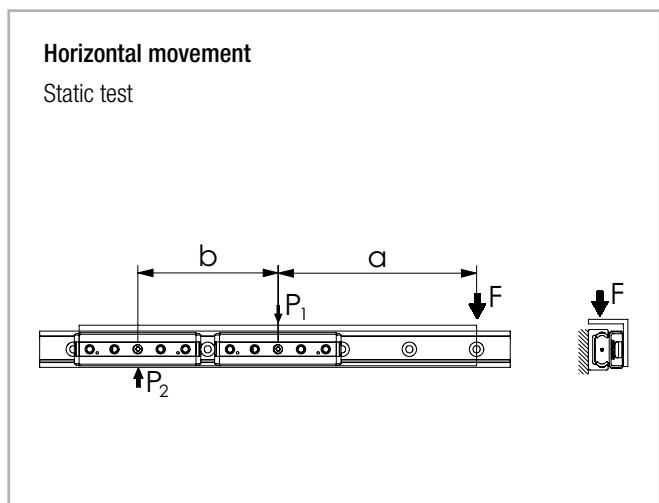


Fig. 182

**Slider load:**

$$P_1 = F \cdot \frac{b}{a+b}$$

$$P_2 = F - P_1$$

in addition each slider is loaded by a moment:

$$M_1 = \frac{F}{2} \cdot c$$

Fig. 183

**Slider load:**

$$P_{1a} \approx P_{2a} = \frac{F}{2}$$

$$P_{2b} \approx P_{1b} = F \cdot \frac{a}{b}$$

Fig. 184

**Slider load:**

$$P_2 = F \cdot \frac{a}{b}$$

$$P_1 = P_2 + F$$

Fig. 185

Note: Applies only if the distance between centers of the sliders  $b > 2x$  slider length

**Horizontal movement**

Static test

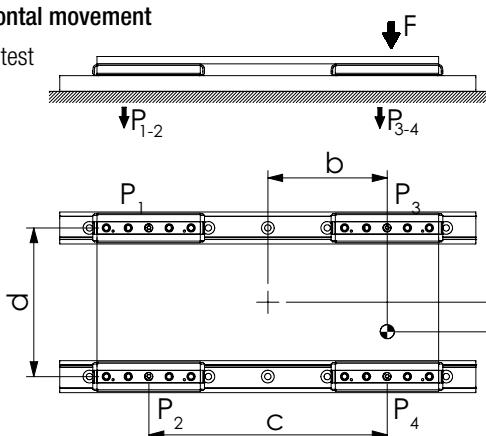


Fig. 186

**Slider load:**

$$P_1 = \frac{F}{4} - \left(\frac{F}{2} \cdot \frac{b}{c}\right) - \left(\frac{F}{2} \cdot \frac{a}{d}\right)$$

$$P_2 = \frac{F}{4} - \left(\frac{F}{2} \cdot \frac{b}{c}\right) + \left(\frac{F}{2} \cdot \frac{a}{d}\right)$$

$$P_3 = \frac{F}{4} + \left(\frac{F}{2} \cdot \frac{b}{c}\right) - \left(\frac{F}{2} \cdot \frac{a}{d}\right)$$

$$P_4 = \frac{F}{4} + \left(\frac{F}{2} \cdot \frac{b}{c}\right) + \left(\frac{F}{2} \cdot \frac{a}{d}\right)$$

Fig. 189

Note: It is defined that slider no. 4 is always located closest to the point where the force is applied.

**Vertical movement**

Static test

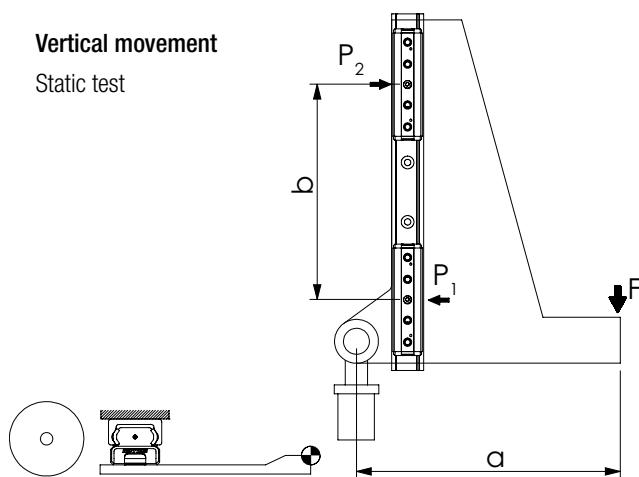


Fig. 187

**Slider load:**

$$P_1 \approx P_2 = F \cdot \frac{a}{b}$$

Fig. 190

Note: Applies only if the distance between centers of the sliders  $b > 2 \times$  slider length

**Horizontal movement**

Static test

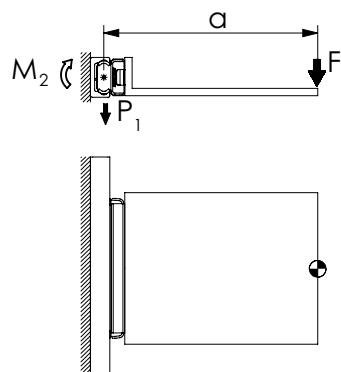


Fig. 188

**Slider load:**

$$P_1 = F$$

$$M_2 = F \cdot a$$

Fig. 191

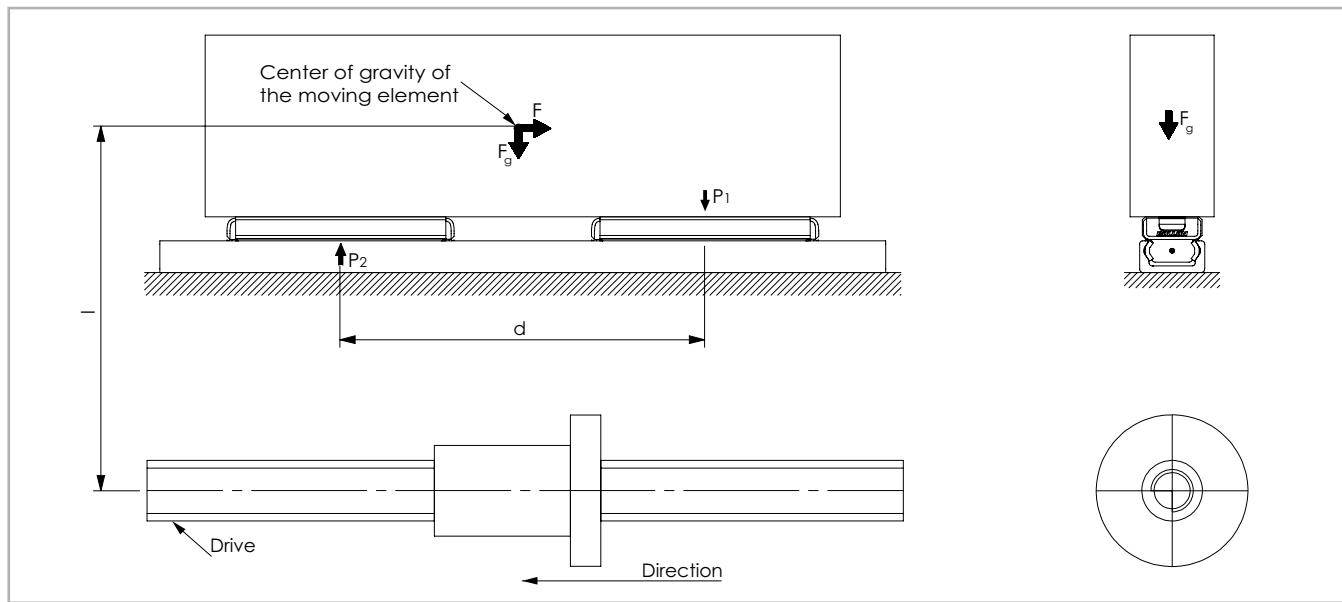


Fig. 192

### Horizontal movement

Test with a moving element of the weight-force  $F_g$  at the instant the direction of movement changes

Inertial force

$$F = m \cdot a$$

Slider load at time of reverse

$$P_1 = \frac{F \cdot I}{d} + \frac{F_g}{2}$$

$$P_2 = \frac{F_g}{2} - \frac{F \cdot I}{d}$$

Fig. 193

### Explanation of the calculation formula

$F$  = effective force (N)

$F_g$  = weight-force (N)

$P_1, P_2, P_3, P_4$  = effective load on the slider (N)

$M_1, M_2$  = effective moment (Nm)

$m$  = mass (kg)

$a$  = acceleration ( $m/s^2$ )

Fig. 194

## Service life

The dynamic load capacity  $C$  is a conventional variable used for calculating the service life. This load corresponds to a nominal service life of 100 km. For values of the individual slider see from pg. CR-8 to CR-10 and CR-54, CR-57. The following formula (see fig. 195) links the calculated theoretical service life to the dynamic load capacity and the equivalent load:

$$L_{km} = 100 \cdot \left( \frac{C}{P} \cdot \frac{f_c}{f_i} \cdot f_h \right)^3$$

$L_{km}$  = theoretical service life (km)  
 $C$  = dynamic load capacity (N)  
 $P$  = effective equivalent load (N)  
 $f_c$  = contact factor  
 $f_i$  = application coefficient  
 $f_h$  = stroke factor

Fig. 195

The equivalent load  $P$  corresponds in its effects to the sum of the forces and moments working simultaneously on a slider. If these different load components are known,  $P$  results as follows:

$$P = P_r + \left( \frac{P_a}{C_{0ax}} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} + y \right) \cdot C_{0rad}$$

$y$  = reduction due to preload  
 (see pg. CR-29, Tab. 20 or pg. CR-85, Tab. 65)

Fig. 196

Here the external loads are assumed as constant in time. Brief loads, which do not exceed the maximum load capacities, do not have any relevant effect on the service life and can therefore be neglected.

The contact factor  $f_c$  refers to applications in which several sliders pass the same rail section. If two or more sliders move over the same point of a rail, the contact factor according to table 81 to be taken into account in the formula for calculation of the service life.

Number of sliders	1	2	3	4
$f_c$	1	0.8	0.7	0.63

Tab. 81

The application coefficient  $f_i$  takes into account the operational conditions in the service life calculation. It has a similar significance to the safety factor  $S_0$  in the static load test. It is calculated as described in the following table:

$f_i$	
Neither shocks nor vibrations, smooth and low-frequency direction change; clean operating conditions; low speeds (<1 m/s)	1 - 1.5
Slight vibrations, average speeds (1 - 2.5 m/s) and average frequency of direction change	1.5 - 2
Shocks and vibrations, high speeds (> 2.5 m/s) and high-frequency direction change; extreme dirt contamination	2 - 3.5

Tab. 82

The stroke factor  $f_h$  takes into account the higher load of the raceways and rollers during short strokes on the same total length of run. The corresponding values are taken from the following graph (for strokes longer than 1 m,  $f_h = 1$ ):

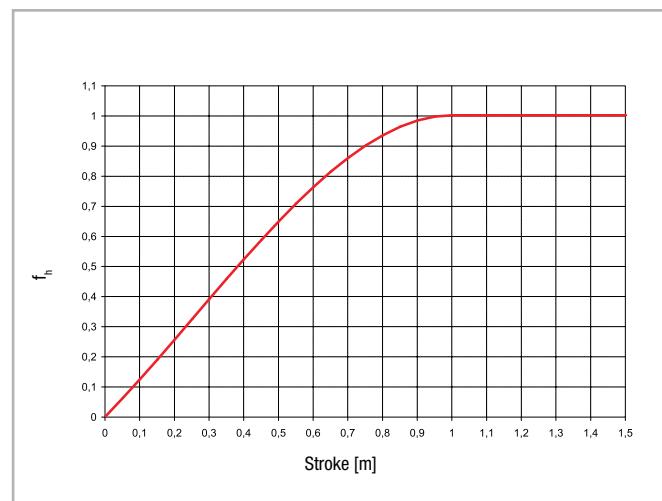


Fig. 197



**ROLLON®**  
BY TIMKEN

*Curviline*





## Product explanation



### Curviline are curvilinear rails for constant and variable radii



Fig. 1

Curviline is the name of the curvilinear rail product family that is used for all non-linear special movements. Rails with constant or variable radii may be specified according to customer requirements, resulting in a highly flexible, economical solution. Curviline is available in two rail widths.

The use of standard radii is recommended. All non-standard rail layouts and radii are possible as custom products, however extra lead time may result.

#### Preferred areas of application of the Curviline product family:

- Packaging machines
- Railway car interior doors
- Special extensions
- Shipbuilding (interior doors)
- Food industry

#### The most important characteristics:

- Straight and curved sections in one continuous rail is possible
- Sliders with four rollers arranged in pairs maintain the preload over the entire rail length
- Custom production according to customer requirements
- Also available in stainless steel

### Constant radii

The layout of CKR guide rails corresponds to a partial section of a complete circle.



Fig. 2

### Variable radii

CVR curvilinear rail is a combination of variable radii and straight sections.



Fig. 3

### Straight rail

The linear rail Curviline is also available in its straight version.



Fig. 4

### Slider

The carriage maintains the desired preload over the entire rail layout.

Pivoting roller mounts coupled with concentric and eccentric rollers allows for a smooth operation over complex rail layouts.



Fig. 5

## Technical data

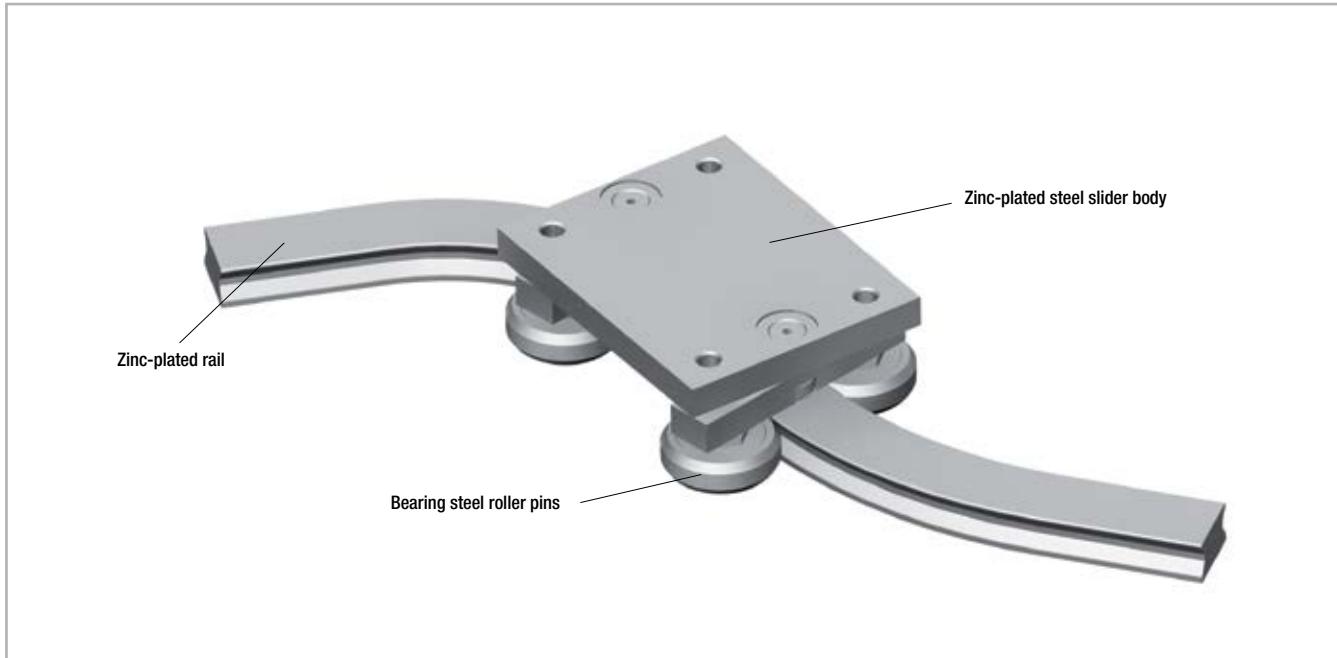


Fig. 6

CL

### Performance characteristics:

- Available rail widths: CKR01/CVR01: 16.5 mm (0.65 in) and CKR05/CVR05: 23 mm (0.91 in)
- Max. slider operating speed on the rail: 1.5 m/s (59 in/s) (depending on application)
- Max. acceleration: 2 m/s<sup>2</sup> (78 in/s<sup>2</sup>) (depending on application)
- Max. effective length of the rail: 3,240 mm (127.56 in)
- Max. traverse: CCT08: 3,170 mm (124.8 in) and CCT11: 3,140 mm (123.62 in)
- Minimum radius for stainless steel version and non-hardened version 120 mm
- Minimum radius for version with tempered raceways: 300 mm for section 01, 400 mm for size 05  
For non-standard radii, please contact Rollon technical support.
- Radius tolerance +/- 0.5 mm (0.02 in), angle tolerance +/- 1°
- Temperature range: -20 °C to +80 °C (-4 °F to +176 °F)
- Rail and runner electrolytic zinc-plated and passivated (Rollon Aloy); increased anticorrosive protection on request (see pg. CL-12 Anticorrosive protection)
- Rail material: C43, AISI316L for the stainless steel version
- Slider body material: Fe360, AISI316L for the stainless steel version
- Radial ball bearing roller material: 100Cr6, AISI440 for the stainless steel version
- Rollers are lubricated for life

### Remarks:

- With a simple adjustment of the eccentric roller (denoted with a marking on the bottom of the roller), the slider preload can be set to desired preload, including clearance.
- The recommended hole pitch is 80 mm (3.15 in) on the extended length
- Please indicate the precise rail layout and the desired hole pattern in a drawing
- Indicate if the design is a right or left version when ordering
- Joints are possible in straight sections. For more information, please contact Rollon technical support.
- Resulting moment loads must be absorbed through the use of two sliders. For more information, please contact Rollon technical support.

## Product dimensions



### ➤ Rails with constant/variable radii with tempered raceways

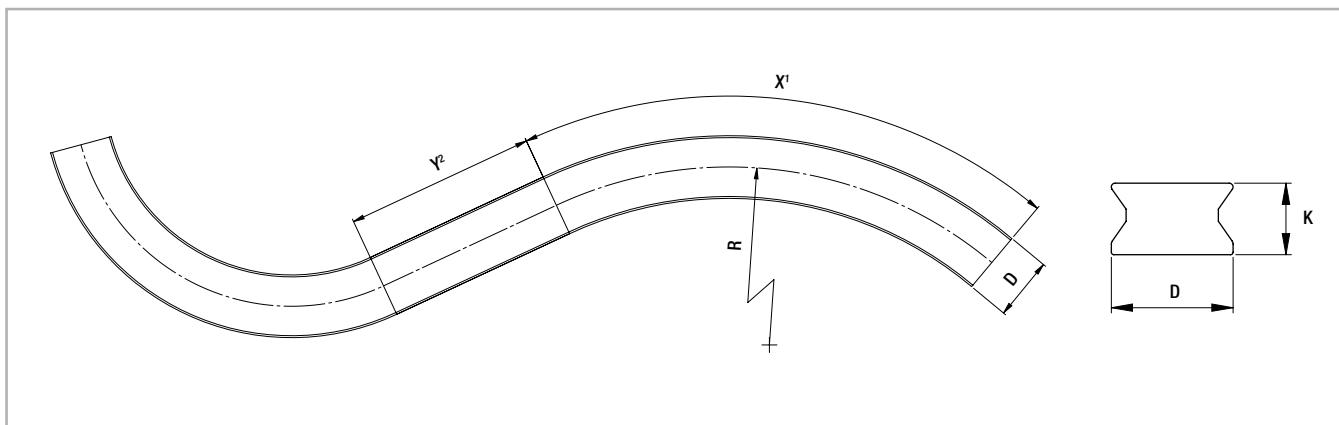


Fig. 7

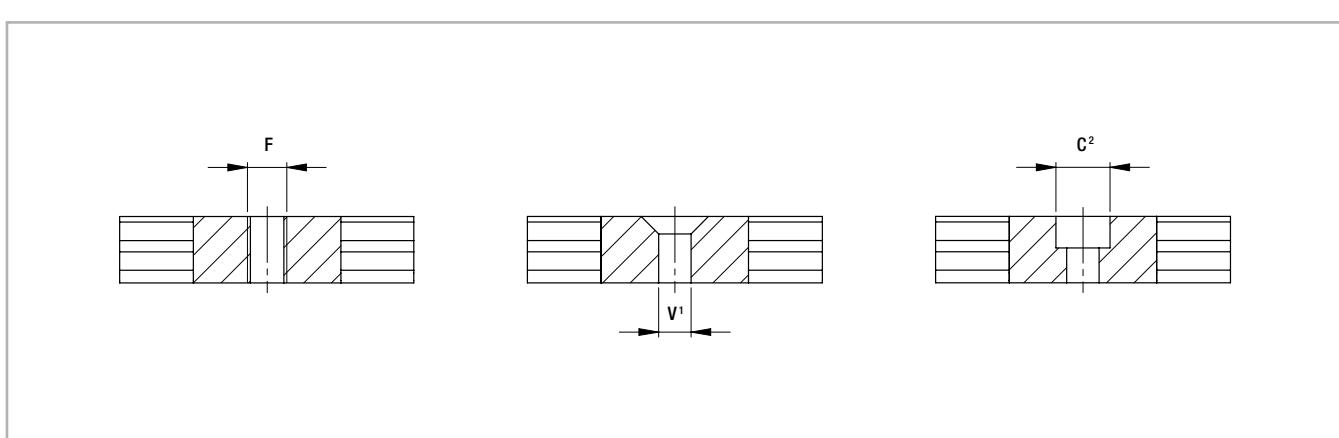


Fig. 8

<sup>1</sup> Fixing holes (Y) for countersunk head screws according to DIN 7991

<sup>2</sup> Fixing holes (C) for socket cap screws according to DIN 912

Type	D [mm]	K [mm]	F	C <sup>2</sup>	Y <sup>1</sup>	X	Standard radii [mm]	Y [mm]	Weight [kg/m]
<b>CKRH01</b> <b>CVRH01</b>	16.5	10	up to M6	up to M5	up to M5	dependent on radius	300* - 400 - 500 - 600 - 700 - 800 - 900 - 1000	min. 70	1.2
<b>CKRH05</b> <b>CVRH05</b>	23	13.5	up to M8	up to M6	up to M6				2.2

\* Only for size 01

Tab. 1

Please indicate the precise rail layout and the desired hole pattern in a drawing. We recommend 80 mm (3.15 in) on the extended length as a gage for the hole pattern.

Non-standard radii are possible as special products. For more information on rail layouts, radii and hole patterns, please contact Rollon Technical Support.

## > Slider

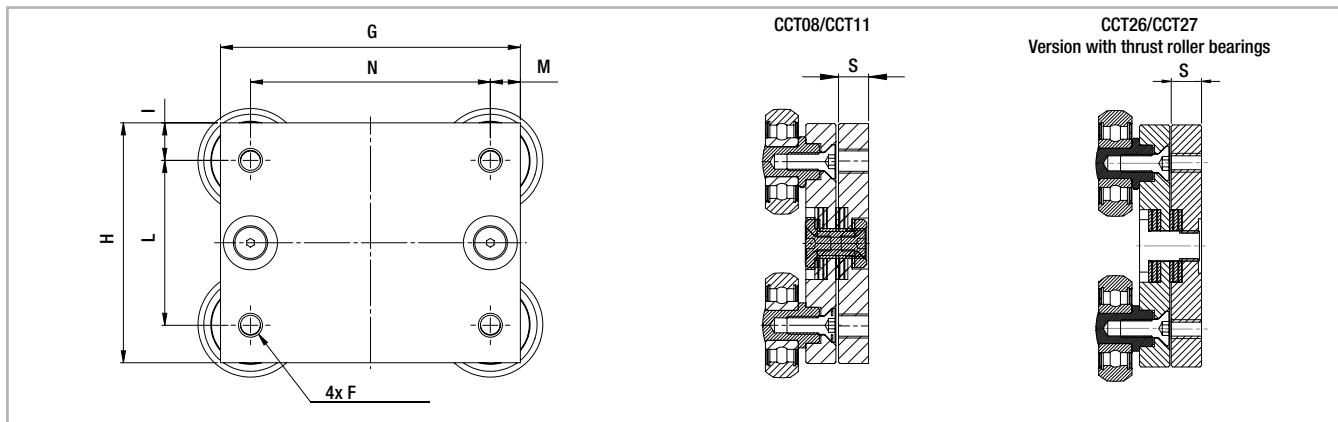
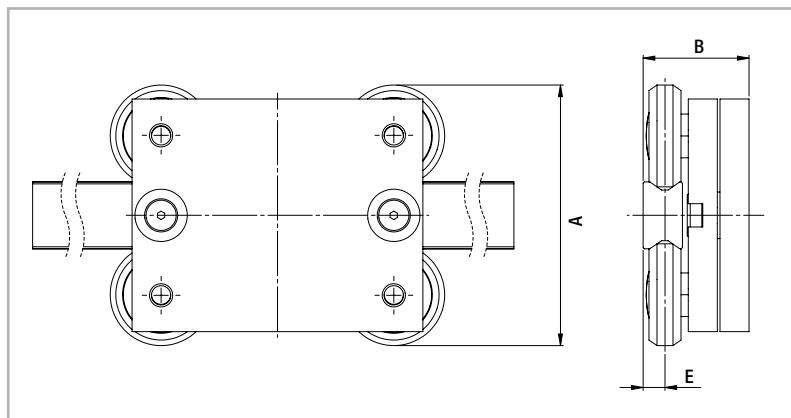


Fig. 9

Type	G [mm]	H [mm]	I [mm]	L [mm]	M [mm]	N [mm]	S [mm]	F	Weight [kg]
CCT08/CCT26	70	50	10	30	10	50	10	M5	0.45
CCT11/CCT27	100	80	12.5	55	10	80	10	M8	1.1

Tab. 2

## > Mounted sliders and rails



Configuration	A [mm]	B [mm]	E [mm]
CKRH01-CCT08 CVRH01-CCT08	60	32.3	5.7
CKRH01-CCT26 CVRH01-CCT26	60	32	5.7
CKRH05-CCT11 CVRH05-CCT11	89.5	36.4	7.5
CKRH05-CCT27 CVRH05-CCT27	89.5	36	7.5

Tab. 3

## > Load capacities

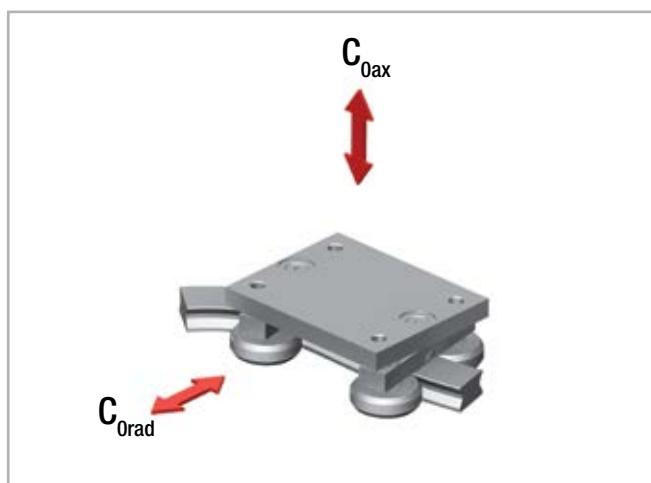


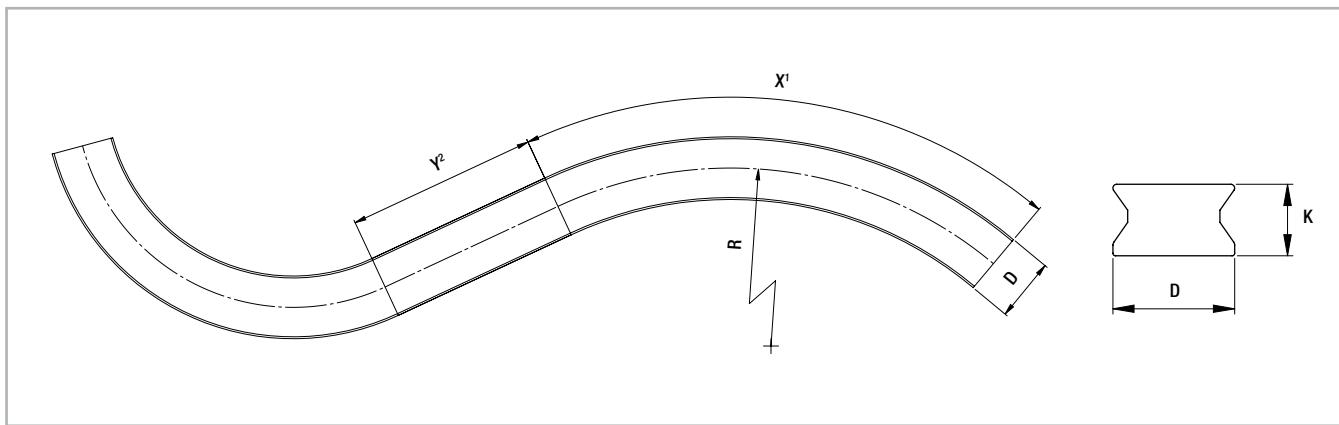
Fig. 11

Slider type	Load capacities	
	C <sub>0ax</sub> [N]	C <sub>0rad</sub> [N]
CKRH01-CCT08/CCT26 CVRH01-CCT08/CCT26	592	980
CKRH05-CCT11/CCT27 CVRH05-CCT11/CCT27	1459	2475

Resulting moment loads must be absorbed through the use of two sliders

Tab. 4

## ➤ Rails with constant/variable radii in carbon steel

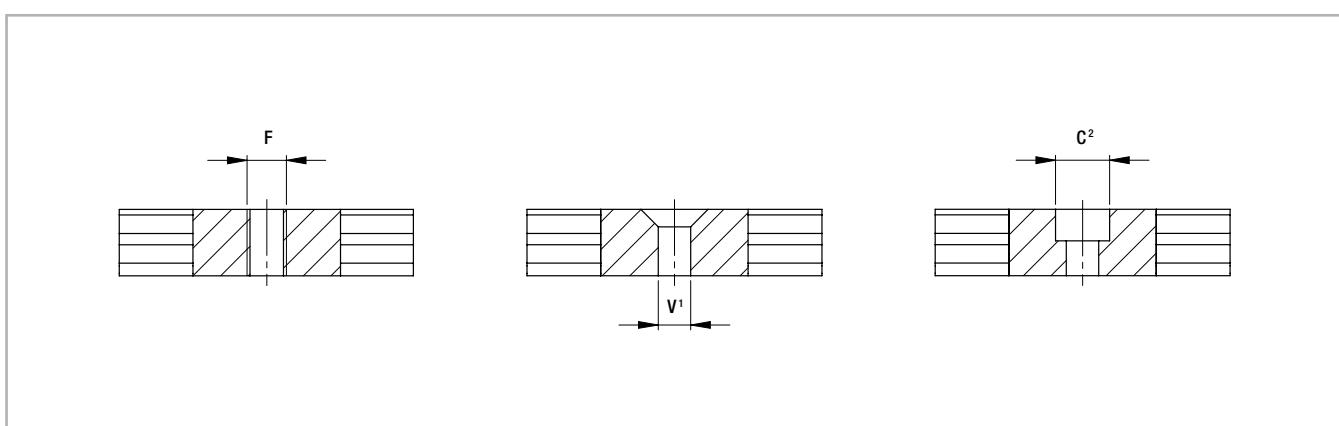


<sup>1</sup> The max. angle (X) is dependent on the radius

<sup>2</sup> For curved linear rails with variable radius, there must always be a straight section (Y) between two successive curved sections.

Refer to tab.18 on pag. CL-15 to define the minimum length required for the straight section (Y).

Fig. 12



<sup>1</sup> Fixing holes (V) for countersunk head screws according to DIN 7991

<sup>2</sup> Fixing holes (C) for socket cap screws according to DIN 912

Fig. 13

Type	D [mm]	K [mm]	F	C <sup>2</sup>	V <sup>1</sup>	X	Standard radii [mm]	Y [mm]	Weight [kg/m]
<b>CKR01</b> <b>CVR01</b>	16.5	10	up to M6	up to M5	up to M5	dependent on radius	150 - 200 - 250 - 300 - 400 - 500 - 600 - 700 - 800 - 900 - 1000	min. 70	1.2
<b>CKR05</b> <b>CVR05</b>	23	13.5	up to M8	up to M6	up to M6				2.2

Tab. 5

Please indicate the precise rail layout and the desired hole pattern in a drawing. We recommend 80 mm (3.15 in) on the extended length as a gage for the hole pattern.

Non-standard radii are possible as special products. For more information on rail layouts, radii and hole patterns, please contact Rollon Technical Support.

## > Slider

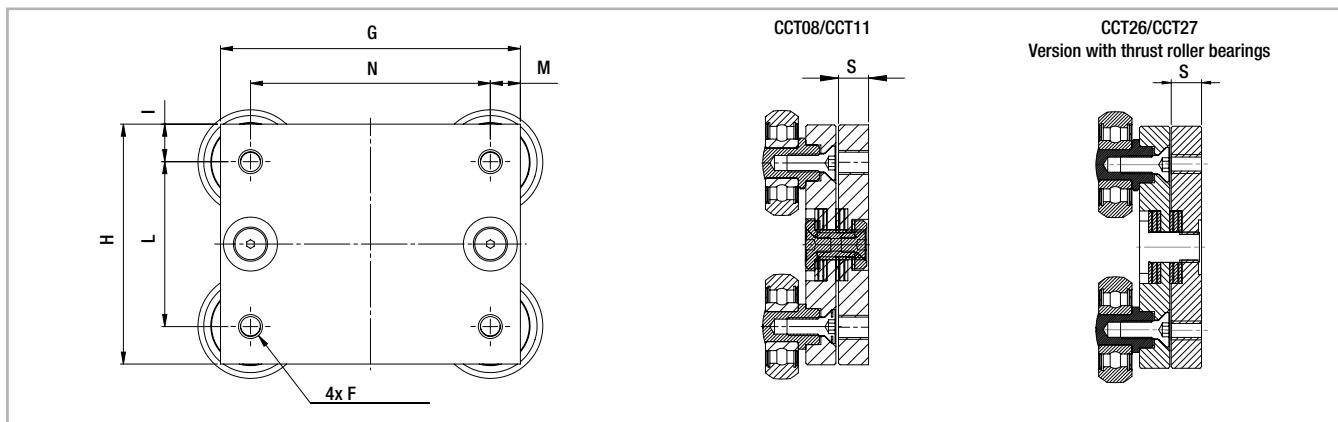
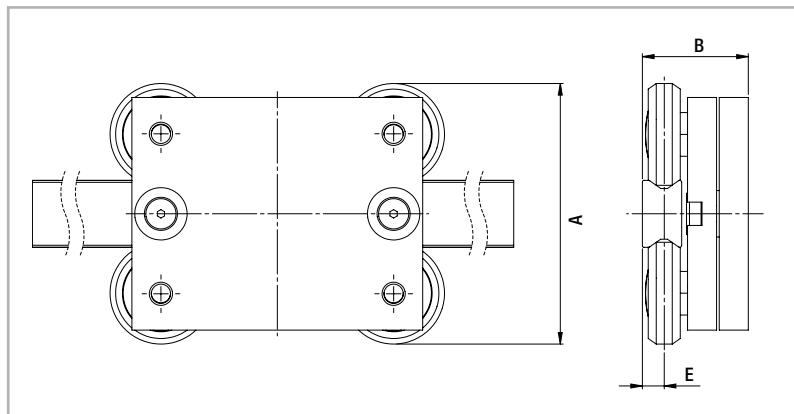


Fig. 14

Type	G [mm]	H [mm]	I [mm]	L [mm]	M [mm]	N [mm]	S [mm]	F	Weight [kg]
CCT08/CCT26	70	50	10	30	10	50	10	M5	0.45
CCT11/CCT27	100	80	12.5	55	10	80	10	M8	1.1

Tab. 6

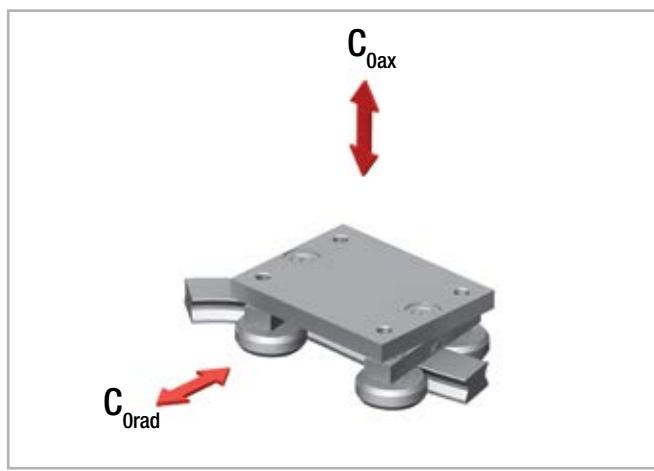
## > Mounted sliders and rails



Configuration	A [mm]	B [mm]	E [mm]
CKR01-CCT08	60	32.3	5.7
CVR01-CCT08			
CKR01-CCT26	60	32	5.7
CVR01-CCT26			
CKR05-CCT11	89.5	36.4	7.5
CVR05-CCT11			
CKR05-CCT27	89.5	36	7.5
CVR05-CCT27			

Tab. 7

## > Load capacities



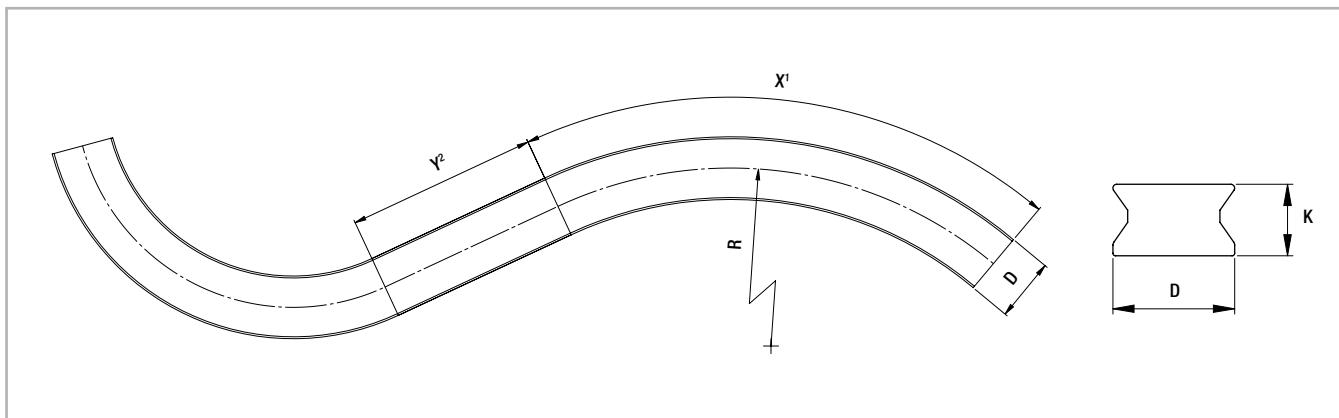
Slider type	Load capacities	
	$C_{0ax}$ [N]	$C_{0rad}$ [N]
CKR01-CCT08/CCT26 CVR01-CCT08/CCT26	400	570
CKR05-CCT11/CCT27 CVR05-CCT11/CCT27	1130	1615

Resulting moment loads must be absorbed through the use of two sliders

Tab. 8

Fig. 16

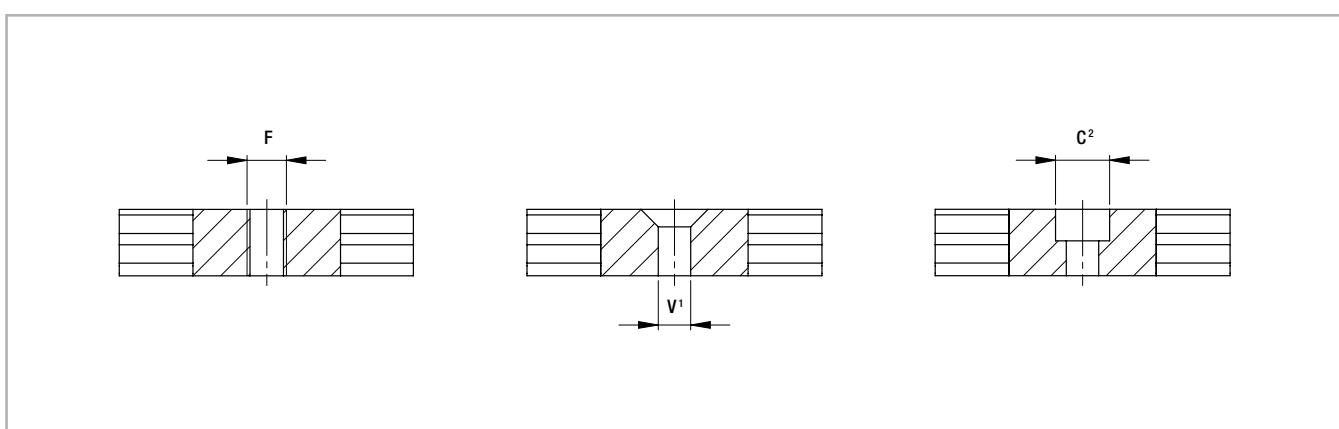
## ► Rails with constant/variable radii in stainless steel



<sup>1</sup> The max. angle (X) is dependent on the radius

<sup>2</sup> For curved linear rails with variable radius, there must always be a straight section (Y) between two successive curved sections.  
Refer to tab.18 on pag. CL-15 to define the minimum length required for the straight section (Y).

Fig. 17



<sup>1</sup> Fixing holes (V) for countersunk head screws according to DIN 7991

<sup>2</sup> Fixing holes (C) for socket cap screws according to DIN 912

Fig. 18

Type	D [mm]	K [mm]	F	C <sup>2</sup>	V <sup>1</sup>	X	Standard radii [mm]	Y [mm]	Weight [kg/m]
CKRX01 CVRX01	16.5	10	up to M6	up to M5	up to M5	dependent on radius	150 - 200 - 250 - 300 - 400 - 500 - 600 - 700 - 800 - 900 - 1000	min. 70	1.2
CKRX05 CVRX05	23	13.5	up to M8	up to M6	up to M6				2.2

Tab. 9

Please indicate the precise rail layout and the desired hole pattern in a drawing. We recommend 80 mm (3.15 in) on the extended length as a gage for the hole pattern.

Non-standard radii are possible as special products. For more information on rail layouts, radii and hole patterns, please contact Rollon Technical Support.

## > Slider in stainless steel

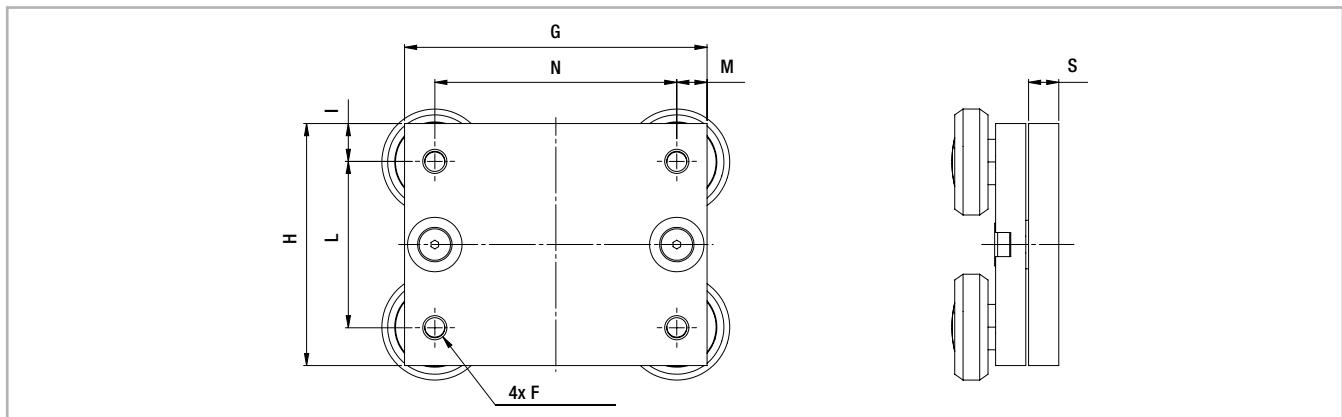
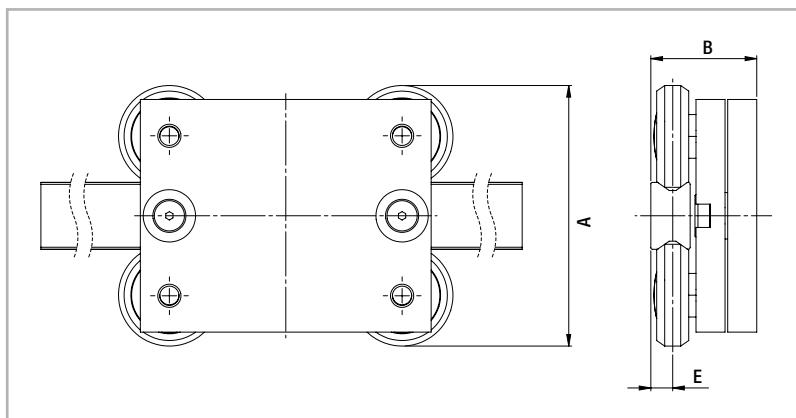


Fig. 19

Type	G [mm]	H [mm]	I [mm]	L [mm]	M [mm]	N [mm]	S [mm]	F	Weight [kg]
CCTX08	70	50	10	30	10	50	10	M5	0.45
CCTX11	100	80	12.5	55	10	80	10	M8	1.1

Tab. 10

## > Rail-slider package in stainless steel

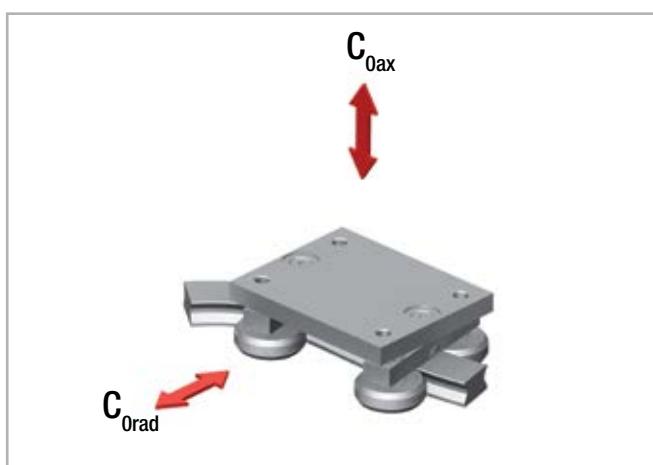


Configuration	A [mm]	B [mm]	E [mm]
CKRX01-CCTX08 CVRX01-CCTX08	60	32.3	5.7
CKRX05-CCTX11 CVRX05-CCTX11	89.5	36.4	7.5

Tab. 11

Fig. 20

## > Load capacities



Slider type	Load capacities	
	C_0ax [N]	C_0rad [N]
CKRX01-CCTX08 CVRX01-CCTX08	400	570
CKRX05-CCTX11 CVRX05-CCTX11	1130	1615

Resulting moment loads must be absorbed through the use of two sliders

Tab. 12

Fig. 21

## Technical instructions



### Slider with joint

In applications involving the simultaneous use of two sliders connected to the same mobile element and along a curved guide with variable radius, or combined straight and curved sections in the same guide, a joint between the sliders and the mobile element is necessary to avoid jamming of the sliders in the areas of changing curvature. Alternatively, Rollon can supply, for each type of slider in the catalog, a special version with an oscillating plate that enables the joint, guaranteeing optimal movement and eliminating the need to build the joint on the moving structure.



Fig. 22

#### Slider dimensions - CCT32/CCT36

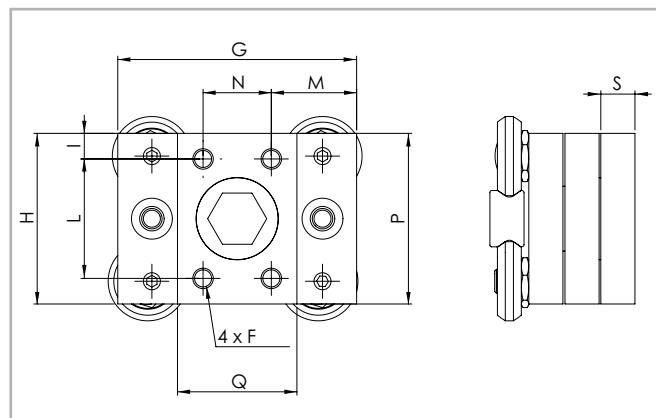


Fig. 23

#### Slider dimensions - CCT33/CCT37

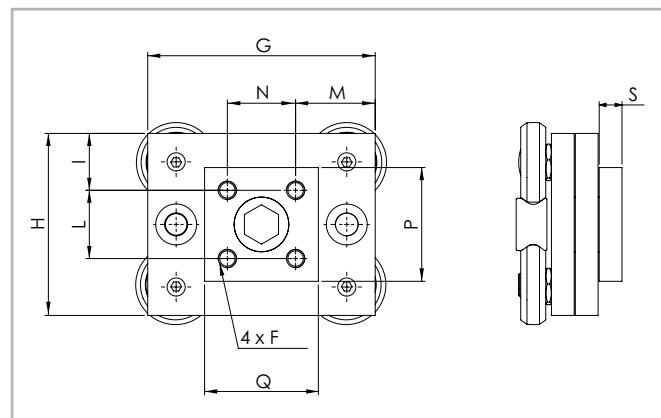


Fig. 24

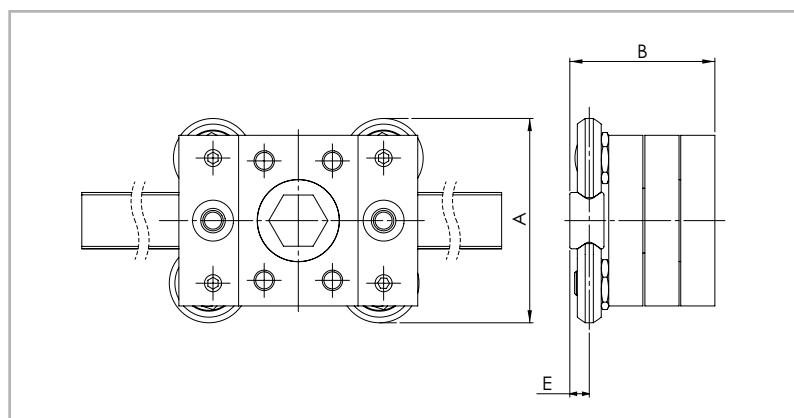
Type	Rail size [mm]	G [mm]	H [mm]	I [mm]	L [mm]	M [mm]	N [mm]	S [mm]	F	P [mm]	Q [mm]
CCT32 <sup>1</sup> /CCT36 <sup>2</sup>	01	70	50	7.5	30	25	20	10	M6	50	35
CCT33 <sup>1</sup> /CCT37 <sup>2</sup>	05	100	80	25	30	35	30	10	M8	50	50

Tab. 13

1) Slider with thrust roller bearings (CCT32/CCT33). Not available in stainless steel.

2) Slider with thrust washers on the steering arms and axial roller bearings on the central joint (CCT36/CCT37). Not available in stainless steel.

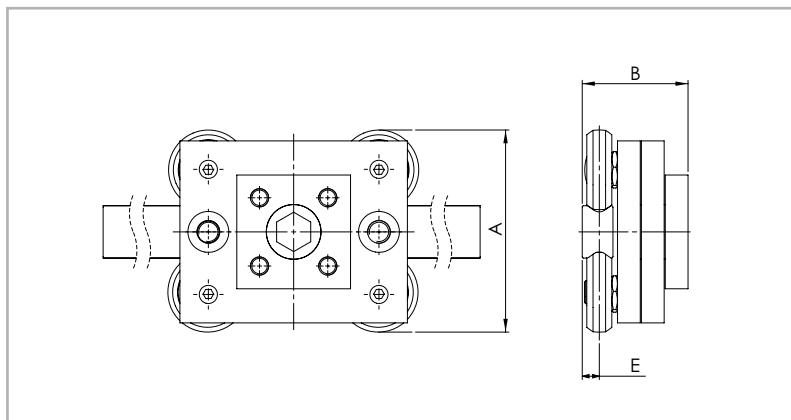
#### Mounted sliders and rails



Configuration	A [mm]	B [mm]	E [mm]
CCT32/CCT36	60	42.5	5.7

Tab. 14

## Mounted sliders and rails



Configuration	A [mm]	B [mm]	E [mm]
CCT33/CCT37	89.5	46.5	7.5

Tab. 15

Fig. 26

## &gt; Load capacities

Slider type	Rails		Tempered raceways		Carbon steel		Stainless steel	
	Load capacities		Load capacities		Load capacities		Load capacities	
	$C_{0ax}$ [N]	$C_{0rad}$ [N]	$C_{0ax}$ [N]	$C_{0rad}$ [N]	$C_{0ax}$ [N]	$C_{0rad}$ [N]	$C_{0ax}$ [N]	$C_{0rad}$ [N]
CCT32/CCT36	592	980	400	570	400	570		
CCT33/CCT37	1459	2475	1130	1615	1130	1615		

Resulting moment loads must be absorbed through the use of two sliders

Tab. 16

CL

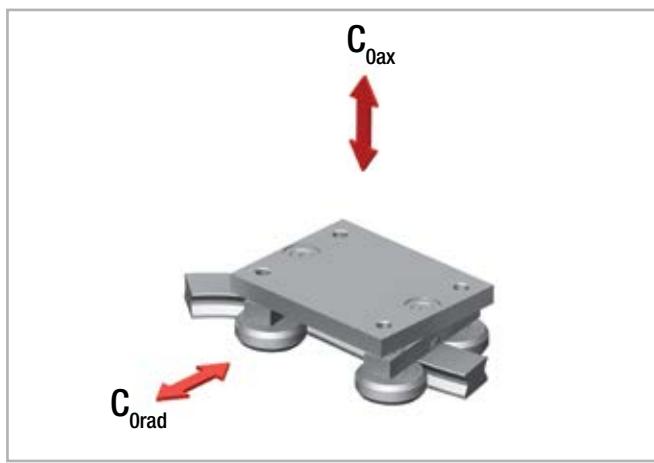


Fig. 27

## &gt; Anticorrosive protection

The Curviline product family comes standard with electrolytic zinc plating with passivation for anticorrosion protection. If increased anticorrosive protection is required, application-specific surface treatments are available on request, e.g. as nickel-plated design with FDA approval for use in the food industry. Rails of Curviline series are available also in stainless

steel (rails CKRX, CVRX), with the sliders in stainless steel CCTX08 and CCTX11 (page CL-10/11). All other sliders have a standard surface treatment of zinc plating with passivation and, on request, can be supplied with increased anticorrosive protection (zinc-nickel or nickel plating) with rollers in stainless steel (AISI 440).

## Lubrication

### Roller lubrication

All rollers of the Curviline product family are lubricated for life.

### Lubrication of the raceways

Rails must be lubricated before operation. Recommended lubrication intervals are heavily dependent upon the ambient conditions, speed and temperature. Under normal conditions, lubrication is recommended after 100 km operational performance or after an operating period of six months. In critical application cases the interval should be shorter. Please clean the raceways carefully before lubrication.

We recommend a roller bearing lubricant with a lithium base of average consistency.

Proper lubrication during normal conditions:

- reduces friction
- reduces wear
- reduces the load of the contact surfaces through elastic deformations
- reduces running noise

Different lubricants are available by request for special applications:

- FDA-approved lubricant for use in the food industry
- specific lubricant for clean rooms
- specific lubricant for the marine technology sector
- specific lubricant for high and low temperatures

For specific information, contact Rollon technical support.

## Setting the preload

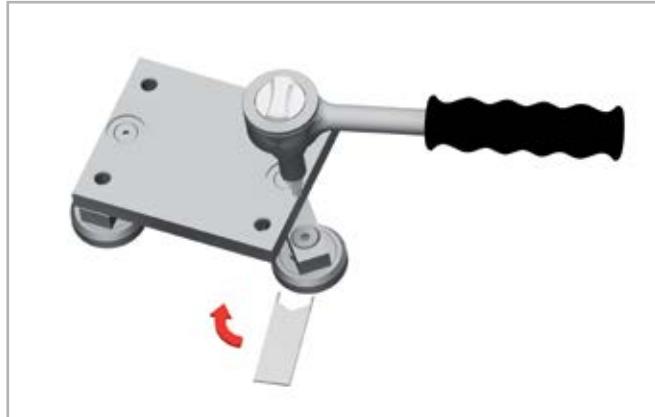


Fig. 28

If the curvilinear rails are delivered as a system, the sliders are already set with no clearance. In this case the fixing screws are secured with Loctite® at the factory.

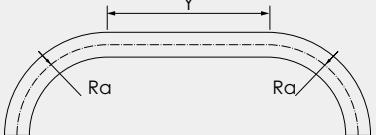
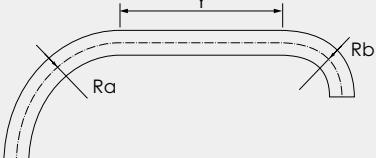
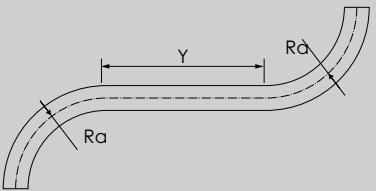
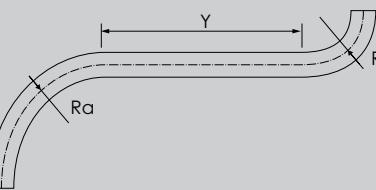
If delivered separately, or if the sliders should be installed in another track, the eccentric roller pins must be readjusted. Important: The fixing screws must be additionally glued against loosening. The following points must also be observed:

- Wipe the raceways of any dirt and debris.
- Slightly loosen the fixing screws of the roller mounting. The eccentric roller pins are marked on the bottom.
- Position the slider(s) at the ends of the rail.
- The special flat key provided is inserted from the side onto the hexagonal of the roller to be set (see fig. 28).

Type	Tightening torque [Nm]
CCT08	7
CCT11	12

Tab. 17

- By turning the flat key clockwise the roller is pressed against the raceway and thus reduces the clearance. Observe that with increasing preload, the friction is also increased and thus the service life reduced.
- Hold the roller pin with the adjustment key in the desired position and carefully tighten the fixing screw. The exact tightening torque will be checked later.
- Move the slider on the rail and check the preload over the entire length of the rail. It should move easily and the slider should not have play at any location of the rail.
- Now tighten the fixing screws with the specified tightening torque (see tab. 17), while the flat key holds the angle adjustment of the pin. A special thread in the roller pin secures the set position.

Configurations	GCT01	GCT05
	Se Ra < 133 mm, Y ≥ 80 mm	Se Ra < 195 mm, Y ≥ 80 mm
	Se Ra > 133 mm, Y ≥ 70 mm	Se Ra > 195 mm, Y ≥ 70 mm
	Se Ra > 133 mm e Rb < 133 mm Y ≥ 100 mm (*)	Se Ra > 195 mm e Rb < 195 mm Y ≥ 100 mm (*)
	Se Ra > 133 mm e Rb > 133 mm Y ≥ 70 mm (*)	Se Ra > 195 mm e Rb > 195 mm Y ≥ 70 mm (*)
	Se Ra < 133 mm e Rb < 133 mm Y ≥ 80 mm (*)	Se Ra < 195 mm e Rb < 195 mm Y ≥ 80 mm (*)
	Se Ra < 133 mm, Y ≥ 80 mm	Se Ra < 195 mm, Y ≥ 80 mm
	Se Ra > 133 mm, Y ≥ 60 mm	Se Ra > 195 mm, Y ≥ 60 mm
	Se Ra > 133 mm e Rb < 133 mm Y ≥ 100 mm (*)	Se Ra > 195 mm e Rb < 195 mm Y ≥ 100 mm (*)
	Se Ra > 133 mm e Rb > 133 mm Y ≥ 60 mm (*)	Se Ra > 195 mm e Rb > 195 mm Y ≥ 60 mm (*)
	Se Ra < 133 mm e Rb < 133 mm Y ≥ 80 mm (*)	Se Ra < 195 mm e Rb < 195 mm Y ≥ 80 mm (*)

(\*) the above rules are independent of the sequence of the Ra and Rb radii on the circuit

Tab. 18

## Ordering key



### Constant radius rail / slider system

CKR01	85°	600	890	/2/	CCT08	NIC	R	
							Right or left version	
							Expanded surface protection	
							if deviation from Standard	
							<i>see pg. CL-12 Anticorrosion protection</i>	
						Slider type	<i>see pg. CL-7, tab. 3 ; CL-9, tab.7 ; CL-11, tab.11</i>	
						Number of sliders		
						Rails extended length		
						Radius	<i>see pg. CL-6, tab. 1 ; CL-8, tab. 5 ; CL-10, tab. 9</i>	
						Angle		
						Rail type	<i>see pg. CL-6, tab. 1 ; CL-8, tab. 5 ; CL-10, tab. 9</i>	

Ordering example: CKR01-085°-0600-0890/2/CCT08-NIC-R

Note: Information for right and left side installation and for expanded surface protection is only necessary if required

Notes on ordering: Rail lengths and radii always are indicated with four digits, angles always with three digits and a zero as prefix

Exact specifications (angle, radius, hole pattern, etc.) must be represented in a drawing

### Variable radius rail / slider system

CVR01	39°	200	//23°	400	297	/2/	CCT08	NIC	R	
								Right or left version		
								Expanded surface protection if deviation from Standard		
								<i>see pg. CL-8 Anticorrosion protection</i>		
							Slider type	<i>see pg. CL-7, tab. 3 ; CL-9, tab.7 ; CL-11, tab.11</i>		
							Number of sliders			
							Rails extended length			
							Radius	<i>see pg. CL-6, tab. 1 ; CL-8, tab. 5 ; CL-10, tab. 9</i>		
							Angle			
							Radius	<i>see pg. CL-6, tab. 1 ; CL-8, tab. 5 ; CL-10, tab. 9</i>		
							Angle			
							Rail type	<i>see pg. CL-6, tab. 1 ; CL-8, tab. 5 ; CL-10, tab. 9</i>		

Ordering example: CVR01-039°-0200//023°-0400-0297/2/CCT08-NIC-R

Note: Data for angles and respective radii are in sequential order

Note: Information for right and left side installation and for expanded surface protection is only necessary if required

Notes on ordering: Rail lengths and radii always are indicated with four digits, angles always with three digits and a zero as prefix

Exact specifications ( layout, angle, radius, hole pattern, etc.) must be represented in a drawing

## Constant radius rails

CKR01	120°	600	1152	NIC	R	
Right or left version						
Expanded surface protection if deviation from Standard						
<i>see pg. CL-12 Anticorrosion protection</i>						
Rails extended length						
Radius <i>see pg. CL-6, tab. 1 ; CL-8, tab. 5 ; CL-10, tab. 9</i>						
Angle						
Rail type <i>see pg. CL-6, tab. 1 ; CL-8, tab. 5 ; CL-10, tab. 9</i>						

Ordering example: CKR01-120°-0600-1152-NIC-R

Note: Information for right and left side installation and for expanded surface protection is only necessary if required

Notes on ordering: Rail lengths and radii always are indicated with four digits, angles always with three digits and a zero as prefix

Exact specifications (angle, radius, hole pattern, etc.) must be represented in a drawing

## Variable radius rails

CVR01	39°	200	//23°	400	297	NIC	R	
Right or left version								
Expanded surface protection if deviation from Standard								
<i>see pg. CL-12 Anticorrosion protection</i>								
Rails extended length								
Radius <i>see pg. CL-6, tab. 1 ; CL-8, tab. 5 ; CL-10, tab. 9</i>								
Angle								
Radius <i>see pg. CL-6, tab. 1 ; CL-8, tab. 5 ; CL-10, tab. 9</i>								
Angle								
Rail type <i>see pg. CL-6, tab. 1 ; CL-8, tab. 5 ; CL-10, tab. 9</i>								

Ordering example: CVR01-039°-0200//023°-0400-0297-NIC-R

Note: Data for various angles and respective radii are in sequential order

Note: Information for right and left side installation and for expanded surface protection is only necessary if required

Notes on ordering: Rail lengths and radii always are indicated with four digits, angles always with three digits and a zero as prefix

Exact specifications ( layout, angle, radius, hole pattern, etc.) must be represented in a drawing

## Slider

CCT08	NIC	
Expanded surface protection if deviation from Standard		<i>see pg. CL-12 Anticorrosion protection</i>
Slider type <i>see pg. CL-7, tab. 3 ; CL-9, tab. 7 ; CL-11, tab. 11</i>		

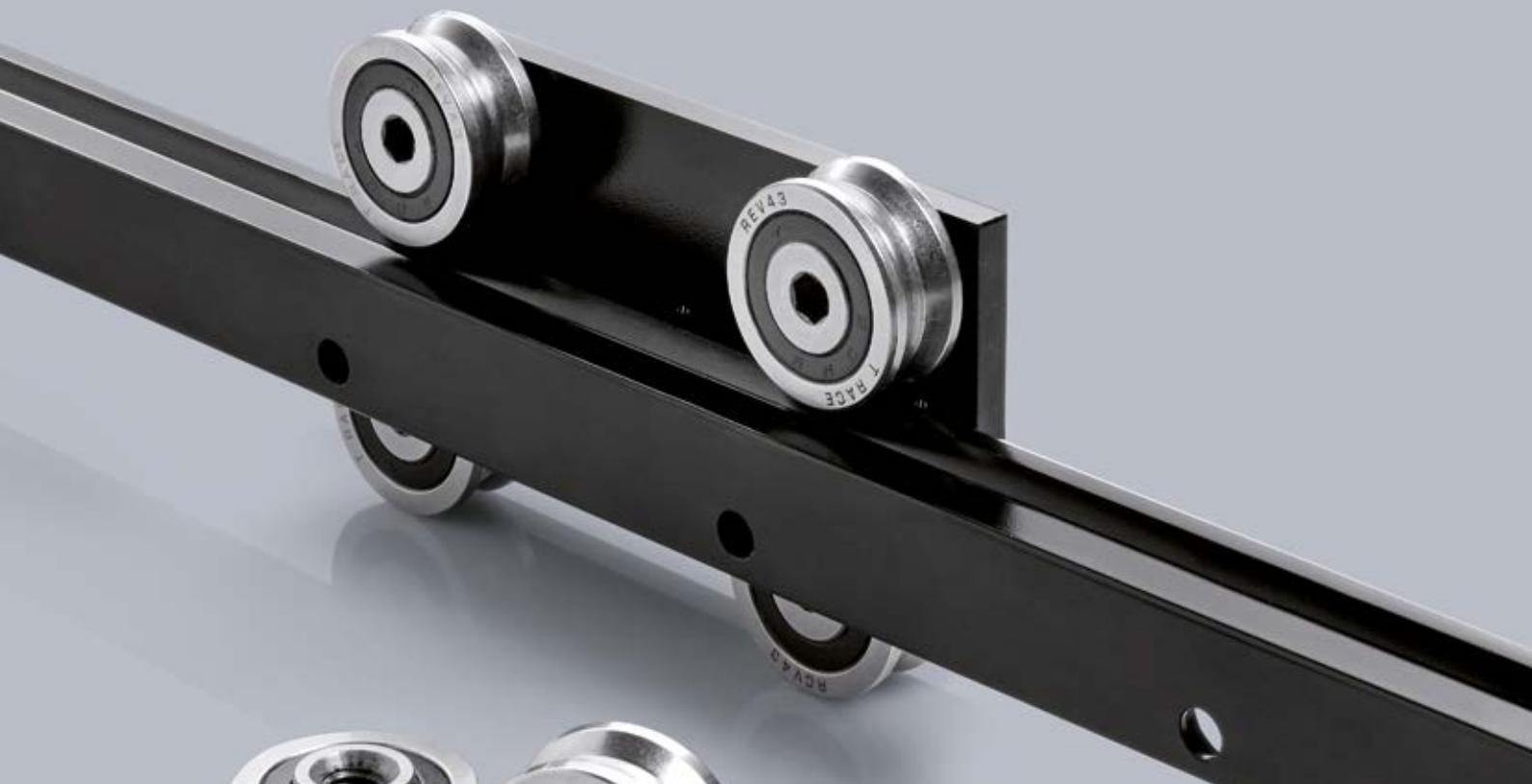
Ordering example: CCT08-NIC

Note: Information for expanded surface protection are only necessary when needed



**ROLLON®**  
BY TIMKEN

*0-Rail*



## Product explanation



### ➤ O-Rail - unique assembly possibilities



Fig. 1

The roller linear system O-Rail offers the maximum flexibility configuration due to the original shape of the guide with 3 raceways arranged at 90 ° to each other where on each of those can slide rollers R..G43 series. Using a single guide, two, or more parallel guides, gives rise to a number of combinations capable of satisfying each specific need for linear motion and offering exceptional self-alignment capacity. O-Rail is constructed in high strength steel hardened with hardening treatments, for a further improvement of both performance and durability.

O-Rail is designed to be a strong and simple multitask linear system for larger handling and automation applications. It is an easy to assemble system, that offers smooth motion even on inaccurate surfaces.

### ➤ FXRG series

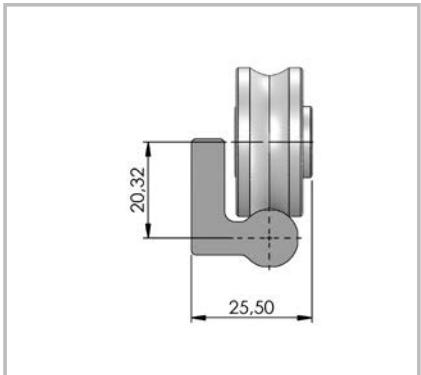


Fig. 2

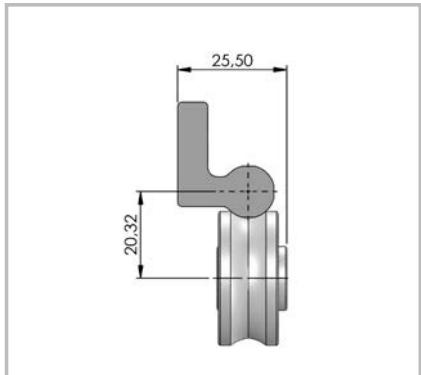


Fig. 3

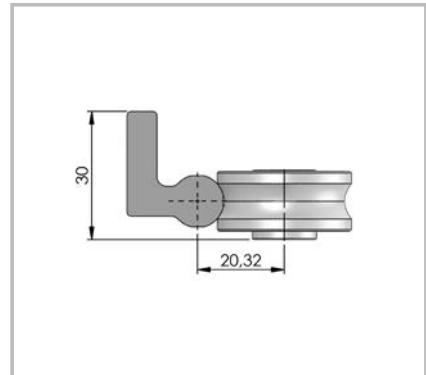


Fig. 4

## General characteristics



New geometrical design of the contact areas, based on Gothic arch raceways

- Superior sliding
- Very low friction
- Long lifetime
- Greater load capacity
- Very compact design

New rollers, double row bearings, with increased thickness of outer ring, gothic profile and finished raceways.

- Increased load capacity
- Increased lifetime
- Extremely low noise
- High speed
- Neoprene lateral seals for dust protection

Self-aligning system when using two parallel rails, compensating large assembly inaccuracies on both longitudinal and transversal plane.

- allow for installation on non precise structures - welded carpentry or aluminium frame structures
- Do not require machined fixing surfaces for installation.

Cost saving, as easy and fast assembly

Patented process Rollon-Nox, to further improve the rail material and thermochemical hardening treatment of deep nitriding and post-oxidation black for an effective corrosion protection.

- Very high hardness
- Resistance to heavy loads
- Very low wear
- Effective corrosion protection
- Smooth black finish

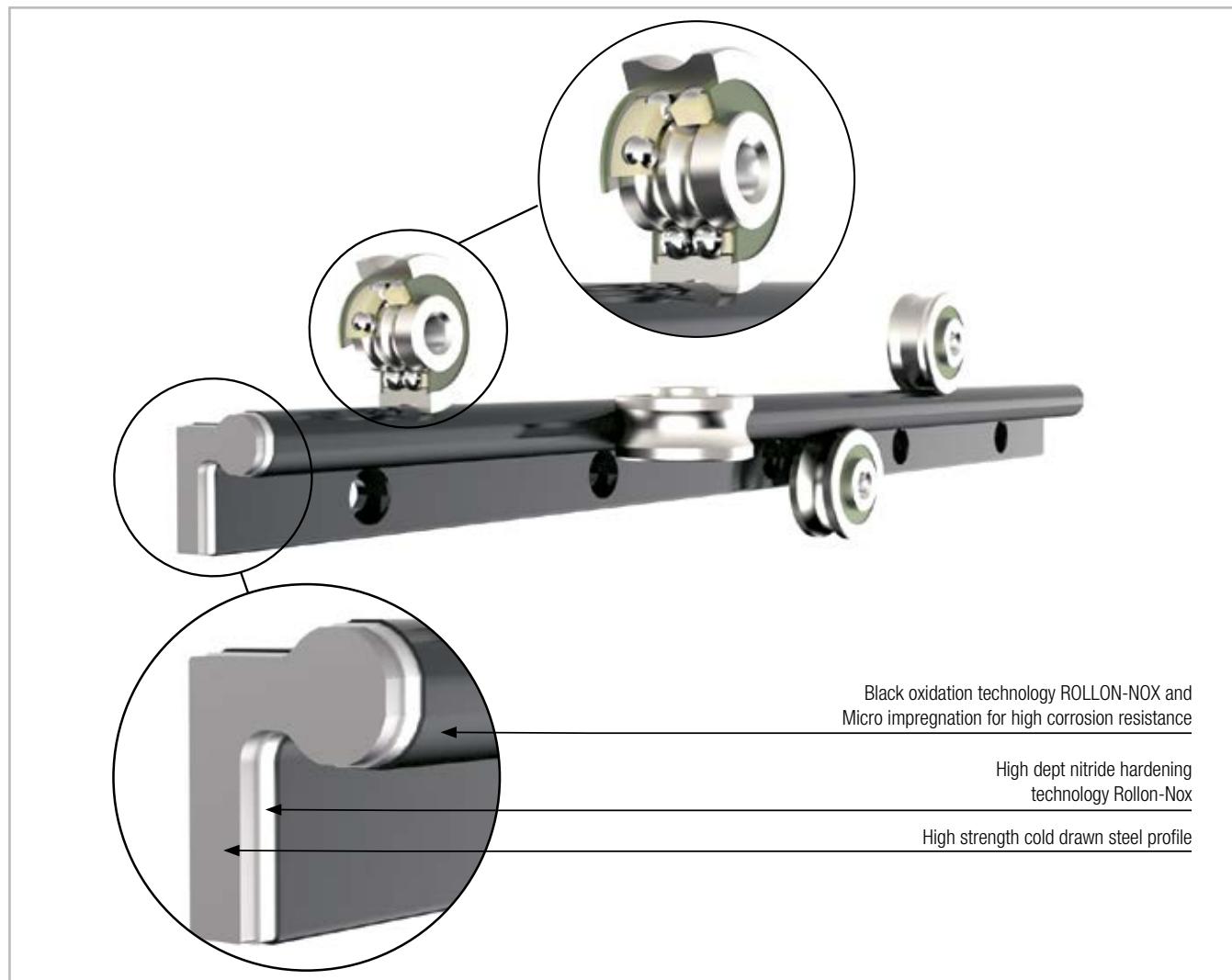


Fig. 5

## Configurations

The FXRG allows a wide range of configurations when using two or more rails in parallel. Depending on required load and moment capacities/direction more single rollers and standard sliders are used to obtain

unique Self-aligning systems. Contact ROLLON for eventual support in dimensioning customized systems .

FXRG with guiding slider with limited rotational capacity

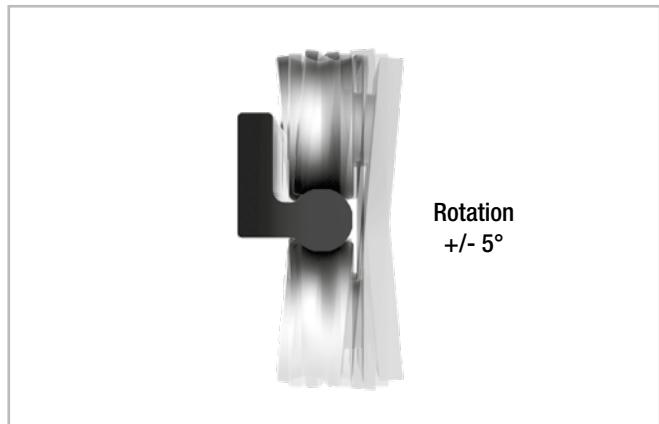


Fig. 6

Combination of two FXRG with resting load

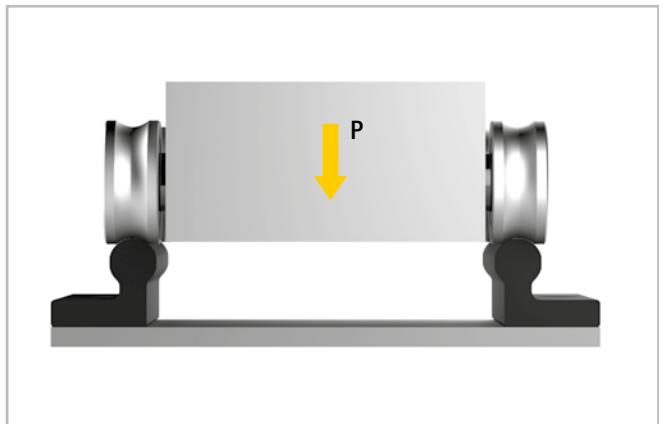


Fig. 7

Configuration with two parallel FXRG with self-aligning capacity

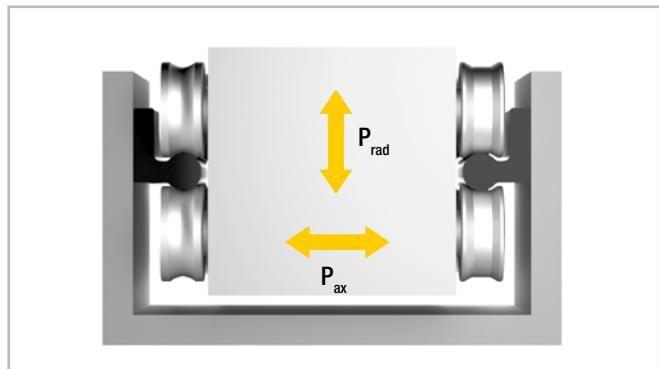


Fig. 8

Configuration with two FXRG to form a single rail with a slider allowing for high  $M_x$  moments

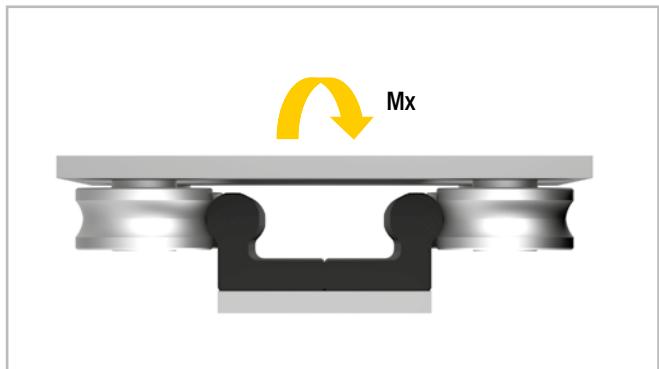
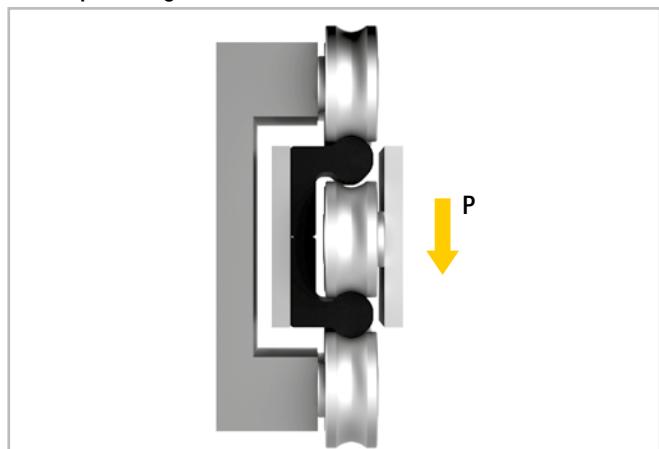


Fig. 9

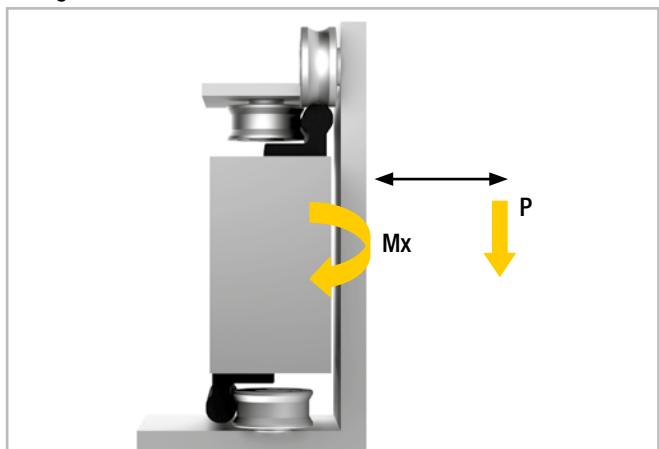
Telescopic configuration



Composed of two FXRG rails with rollers in between the rails fixed to mobile part and rollers on fixed structure running on outer raceways, providing a customized solutions for telescopic movements.

Fig. 10

Configuration of two FXRG



With high cantilever load capacity, meanwhile Self-aligning.

Fig. 11

## Dimensions and load capacity



### FXRG series

FXRG is a high precision cold drawn profile of high strength steel. After a high depth nitride hardening treatment the rails are oxidized, assuring high hardness and excellent corrosion resistance. The characteristic black color on the whole rail is the result of oxidation and subsequent process

of micro-impregnation with oils and substances for improved smoothness and long life. The fixing holes are for standard M6 cylindrical low head screws, DIN 7984, with 80mm pitch .

Position of guiding roller - Concentric RCVG43 on the three raceways

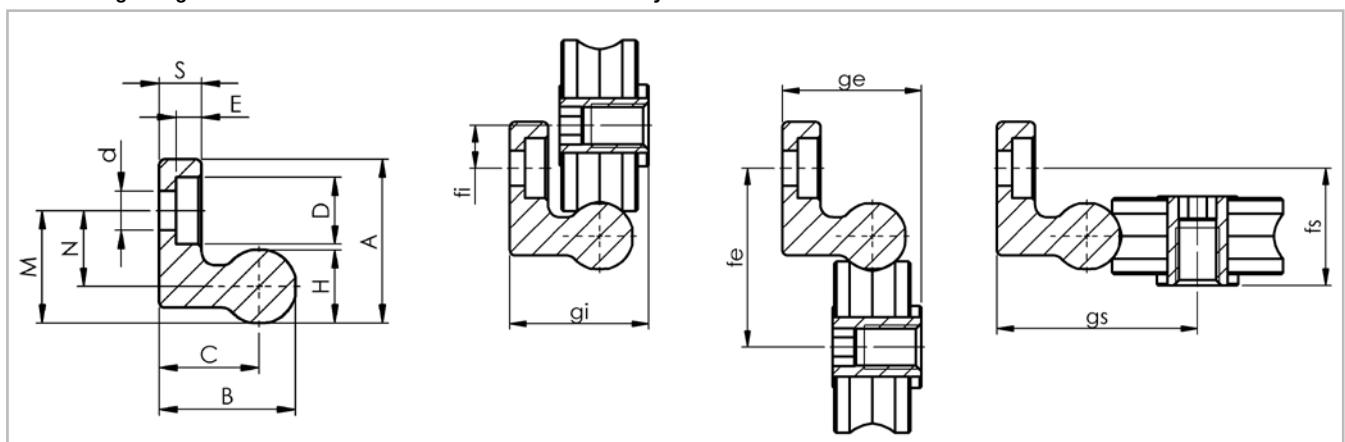


Fig. 12

Type	A [mm]	B [mm]	S [mm]	H [mm]	C [mm]	d [mm]	D [mm]	E [mm]	Screw type	M [mm]	N [mm]	Weight [Kg/m]
FXRG	27.02	22.52	7.00	12.04	16.50	6.50	11.00	4.20	M6 DIN 7984	18.52	12.50	2.48

Tab. 1

Axial movement of floating roller R.P43G with FXRG

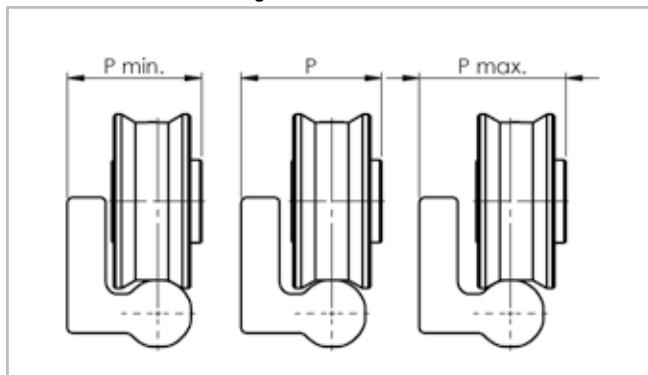


Fig. 13

Rotation of guiding roller R.V43G on FXRG

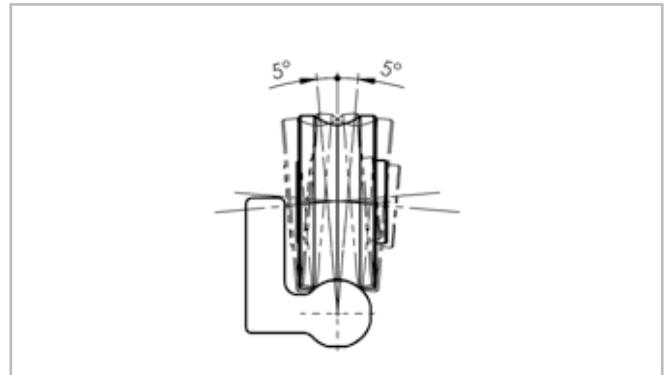


Fig. 14

Type	P [mm]	movement	P <sub>min</sub> [mm]	P <sub>max</sub> [mm]
FXRG	25.50	+/-1	24.50	26.50

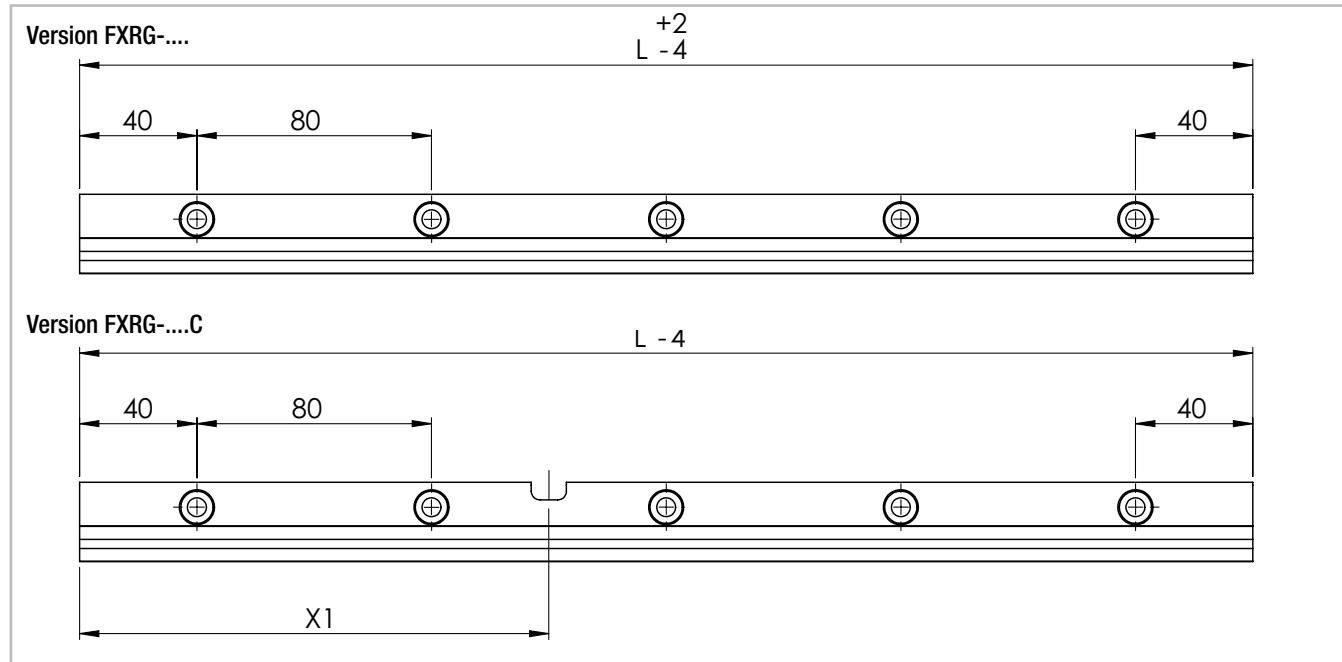
Tab. 2

fi [mm]	gi [mm]	fe [mm]	ge [mm]	fs [mm]	gs [mm]
7.82	25.50	32.82	25.50	21.50	36.82

Tab. 3

### 3 Dimensions and load capacity

#### Available lengths and types



Version FXRG-.... and Version FXRG-....C with additional slot - see page OR-9

Fig. 15

#### Dimensions

Rail codes	Length L [mm]
FXRG	400 - 480 - 560 - 640 - 720 - 800 - 880 - 960 - 1040 - 1120 - 1200 - 1280 - 1360 - 1440 - 1520 - 1600 - 1680 - 1760 - 1840 - 1920 - <b>2000</b> - 2080 - 2160 - 2240 - 2320 - 2400 - 2480 - 2560 - 2640 - 2720 - 2800 - 2880 - 2960 - 3040 - 3120 - - 3200 - 3280 - 3360 - 3440 - 3520 - 3600 - 3680 - 3760 - 3840 - 3920 - <b>4000</b>

Special lengths or pitches available upon request, please contact our Technical Department  
Highlighted rail lengths are available from stock

Tab. 4

Version	Characteristics
BASIC	Cold drawn profile with high depth nitride hardening "Rollon-Nox", oxidation with micro oil impregnation. Ends are cut to size after treatments and sprayed with protective black paint.

Tab. 5

## Accessories



### ▶ Rollers for FXRG

Guiding roller R.VG and floating roller R.PG without protruding pin

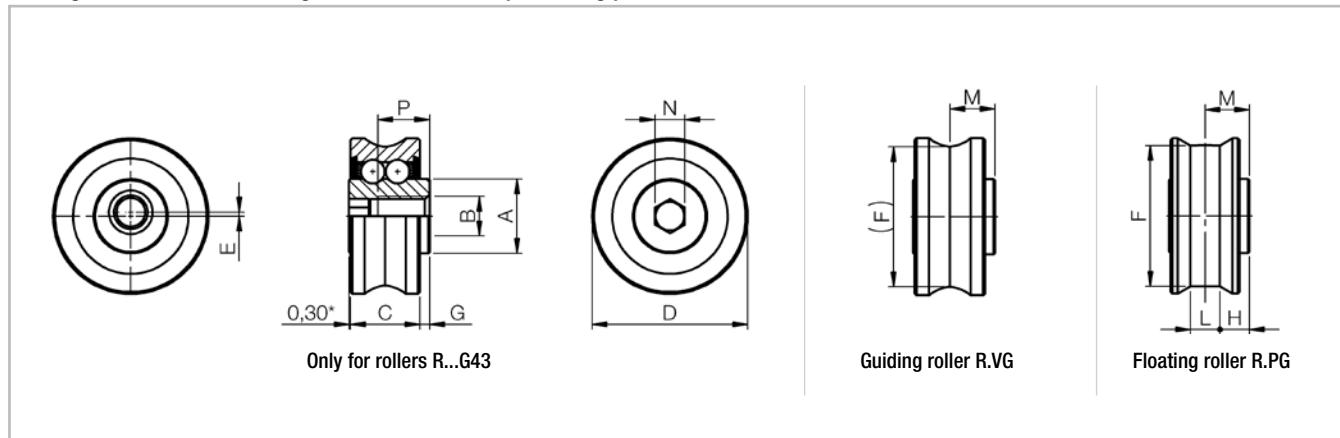


Fig. 16

Roller code		Type	Versions	E [mm]	D [mm]	C [mm]	M [mm]	G [mm]	N Key	A [mm]	B [mm]	P [mm]	F [mm]	L [mm]	H [mm]	Weight [g]	Dynamic coefficient C [N]		
Steel	Stainless steel																Co <sub>rad</sub> [N]	Co <sub>ax</sub> [N]	
RNVG43	RNVGX43	Concentric	guiding	-	31.4												7600	4000	1190
RNPG43	RNPGX43		floating	31.2		14	9	2	6	15	M8	10.5	28.59	5.3	6.35	60	7600	4000	0
RAVG43	RAVGX43	Eccentric	guiding	31.4									-	-	-		7600	4000	1190
RAPG43	RAPGX43		floating	0.8	31.2								28.59	5.3	6.35		7600	4000	0

Tab. 6

Guiding roller RG.V and floating roller RG.P with protruding pin

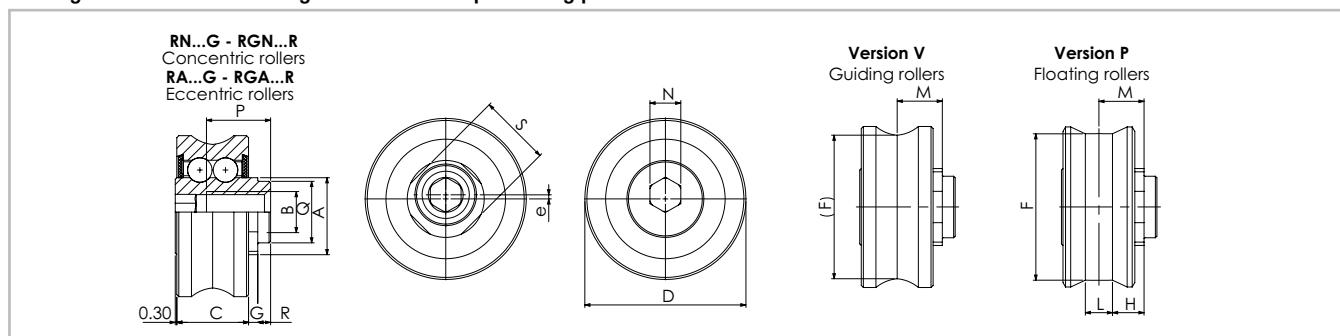


Fig. 17

Type		e [mm]	D [mm]	C [mm]	M [mm]	G [mm]	A [mm]	B [mm]	P [mm]	F [mm]	L [mm]	H [mm]	R [mm]	Q [mm]	S	N	C [N]	Co <sub>rad</sub> [N]	Co <sub>ax</sub> [N]	Weight [kg]
Steel	Inox																			
RGNV43R	RGNVX43R		31,4							-	-	-					7600	4000	1190	
RGNP43R	RGNPX43R		31,2	14	8,8	1,8	15	M8	12,5	28,59	5,3	6,15	2,5	11 h7	14	6	7600	4000	0	0,05
RGAV43R	RGAVX43R	0,8	31,4							-	-	-					7600	4000	1190	
RGAP43R	RGAPX43R		31,2							28,59	5,3	6,15					7600	4000	0	

Tab. 7

### Self-aligning combinations

When FXRG rails are used in parallel, the use of floating rollers R.PG43 and guiding rollers R.VG43 provides a Self-aligning system, capable of compensating greater inaccuracies of structure or assembly errors. The guiding rollers R.VG43 in contact with the FXRG's gothic raceways assure

precise guiding while compensating misalignment, as they are able to rotate slightly around the longitudinal axis of about  $+\/- 5^\circ$ . Combined with floating rollers R.PG43 on a parallel rail, such system can compensate an axial displacement of  $+\/- 1\text{ mm}$ , in addition to a max. rotation of  $+\/- 5^\circ$ .

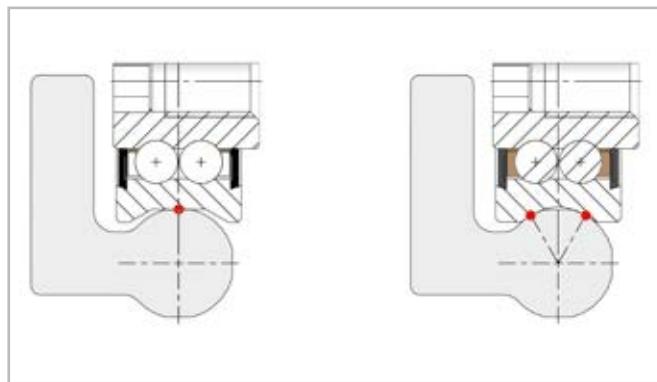


Fig. 18

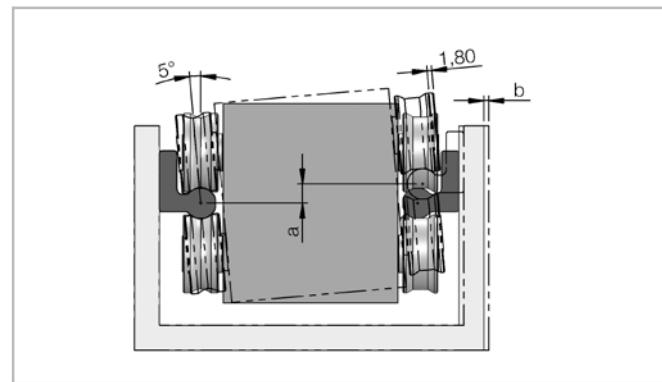


Fig. 19

## Technical instructions



### > Mounting configurations

The concentric rollers should be positioned in the direction of radial loading. Warning! A single slider configuration will rotate +/- 5° around the longitudinal axis of a single FXRG rail, not able to take any Mx moments.

#### Single rail with 3 rollers slider

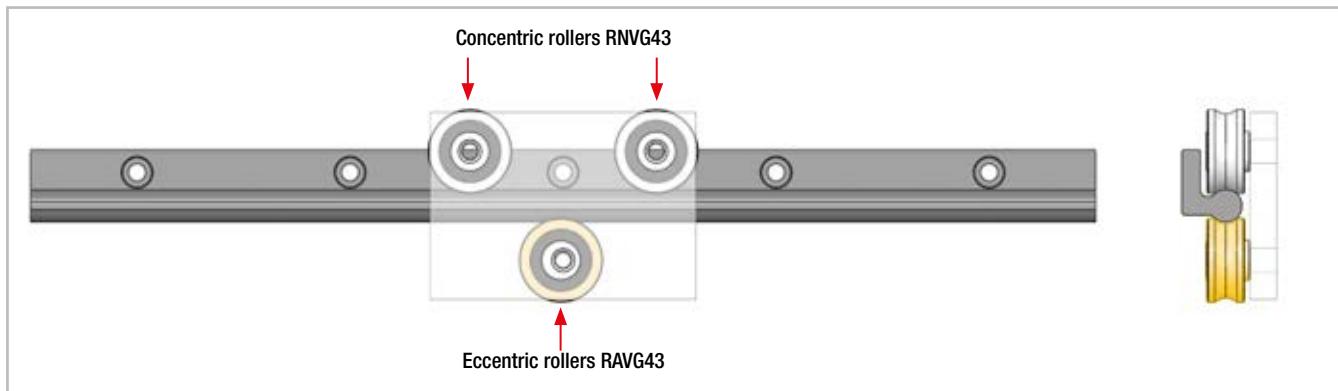


Fig. 20

It is recommended, when more than two rollers are on the same track with max. radial load, to use only two concentric rollers (as from example figure). The others should be eccentric. For cases with a wider distance between concentric rollers, please contact ROLLON's Technical department for dimensioning.

#### Single rail with 5 rollers slider

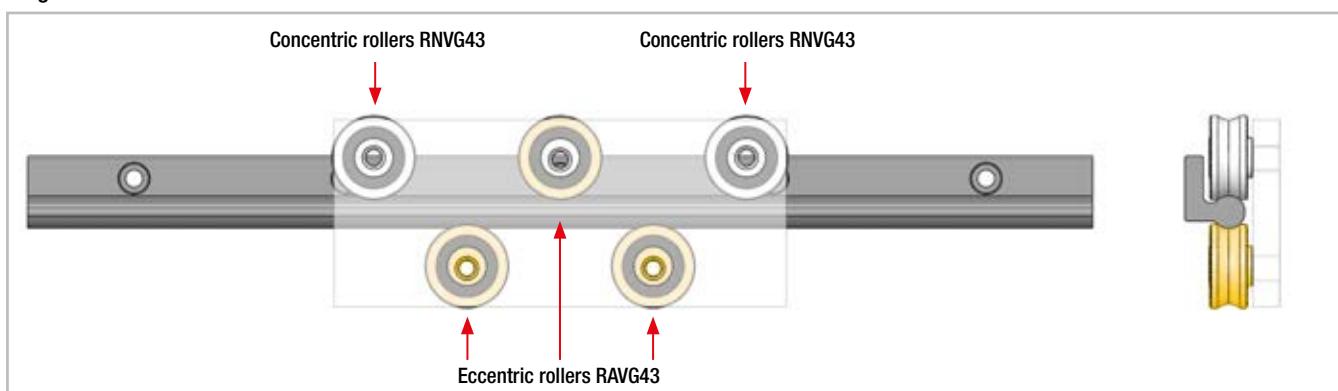
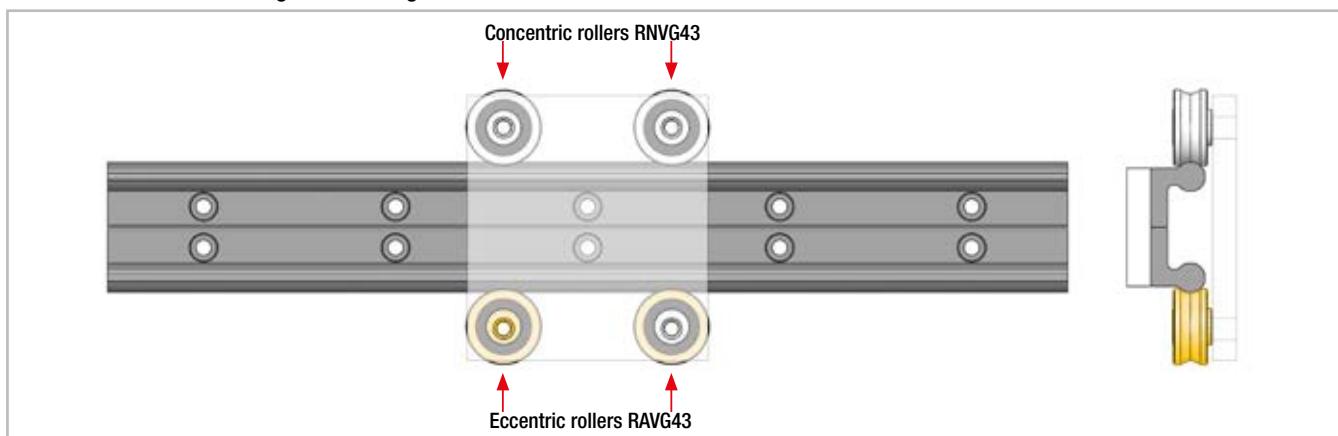


Fig. 21

#### Double rail with slider for high overturning moments

Fig. 22  
OR-9

The rollers need to be positioned on the rail in numbers and directions according to the prevailing load. It is always preferable to orient the rollers so that the prevailing load acts radially, due to higher radial load capacity.

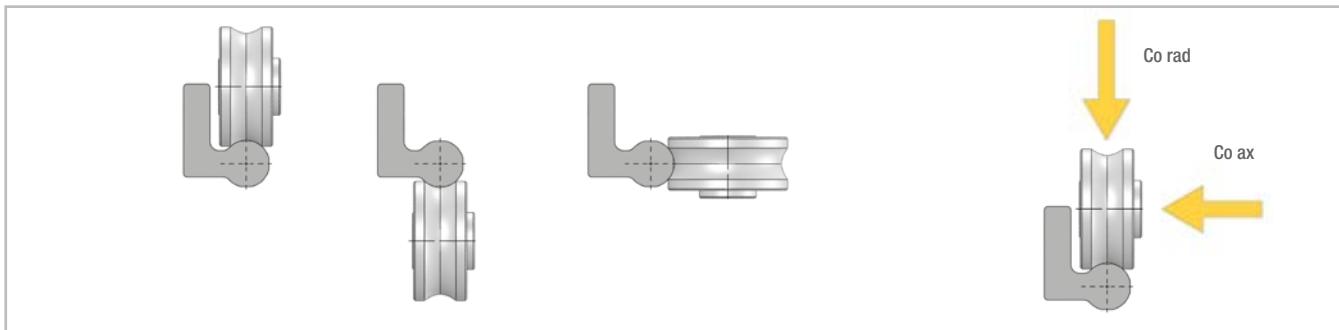
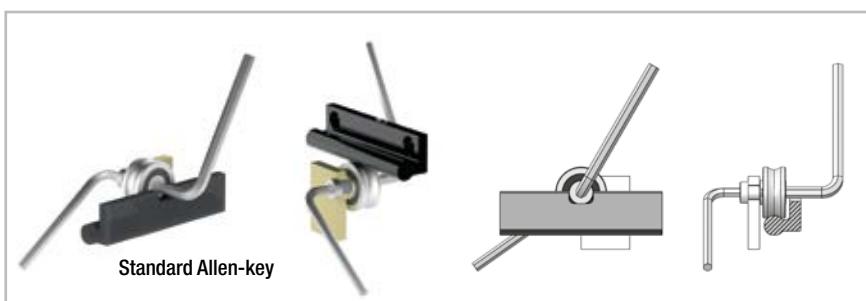
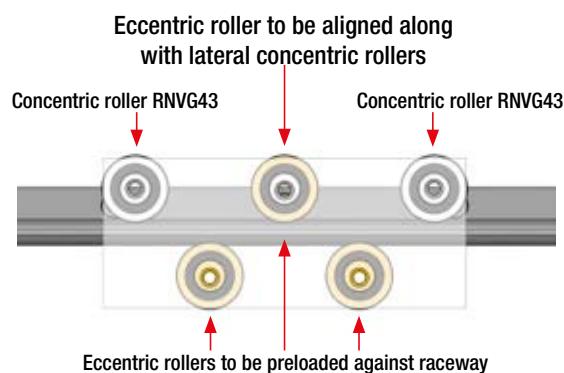


Fig. 23

The rollers must be fixed on a metal surface not yielding, perfectly flat and with its fixing screws, applying a locking torque of 22 Nm.

The tightening of the fixing-screw is to be performed, while holding the roller firm with an Allen-wrench, present on the opposite side of the fixing thread. In case eccentric rollers, it is advisable to use a cup-spring washer under the screw-head to obtain a firm movement, able to maintain the roller "firm" against the surface and facilitate minor

adjustment of eccentric roller, before the final locking. The preload adjustment can also be carried out by checking the force  $F_i$  of insertion of the movable part, in which the rollers are fixed into the rail. In general for a good  $F_i$  adjustment, the inserting friction must be between 2-10 N. To increase or decrease the  $F_i$  act on eccentric rollers, opposite to the load direction (see figure below).



In case required to have eccentric rollers on the internal rail side, it is necessary to include optional accesses, code FXRG-....C, to allow Allen-key to reach the roller. Otherwise the adjustment can take place outside of the rail.

Fig. 24

Possible configurations

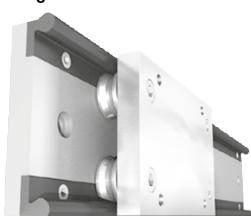


Fig. 25

## > Lubrication

### Roller pin lubrication

Recommended lubrication intervals are heavily dependent upon the ambient conditions. Under normal conditions, lubrication is recommended after 100 km operational performance or after an operating period of 6 months.

In critical application cases the interval should be shorter. Please clean the raceways carefully before lubrication. We recommend a roller bearing lubricant with a lithium base of average consistency.

### Lubrication of the raceways

To reach the calculated service life, a film of lubricant should always be present between the raceway and roller, this also serves to protect against corrosion of the ground raceways.

Proper lubrication during normal conditions:

- reduces friction
- reduces wear
- reduces the load of the contact surfaces through elastic deformations
- reduces running noise

## > Joined Rails

If long guide rails are required, two or more rails can be joined to the desired length. When putting guide rails together, be sure that the register marks shown in fig. 26 are positioned correctly.

These are fabricated asymmetric for parallel application of joined guide rails, unless otherwise specified.

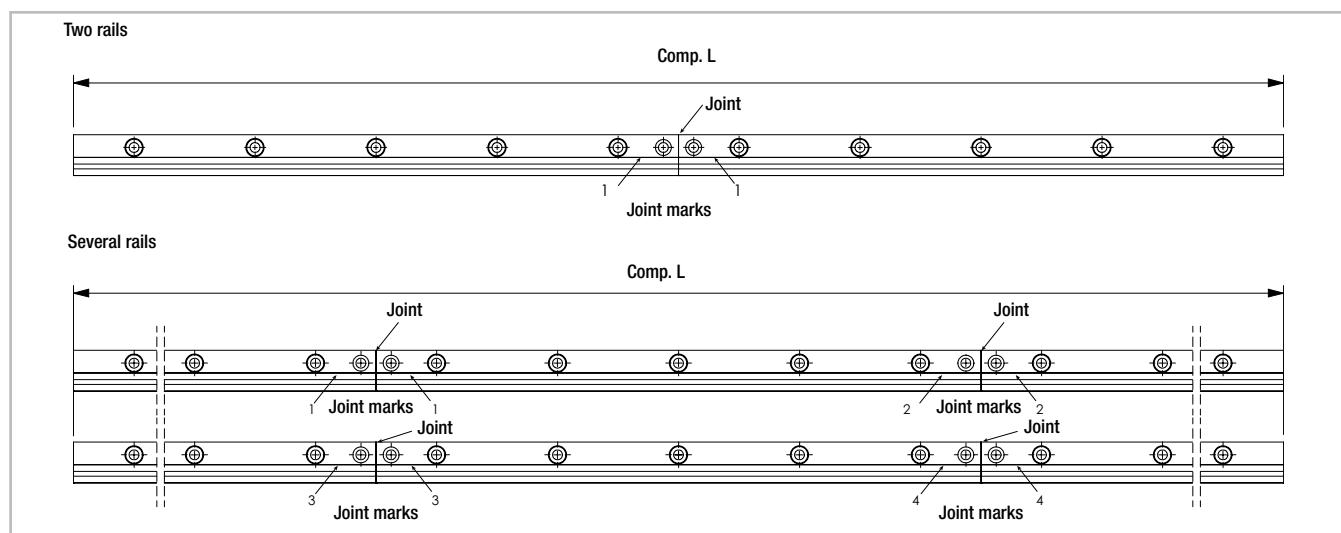


Fig. 26

### General information

The maximum available rail length in one piece is indicated in table 4 on page OR-6. Longer lengths are achieved by joining two or more rails (joined rails).

Rollon then machines the rail ends at a right angle to the impact surfaces and marks them. Two additional threaded holes (see fig. 27) are required in the load-bearing structure. To ensure a problem-free transition of the slider over the joints, please follow the installation procedures next page.

For information about the structure holes, the additional screws required and the alignment fixture for aligning the rail joint, please see table 7 below.

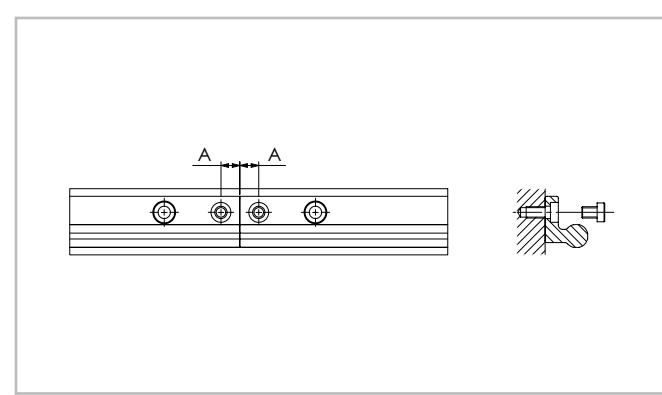


Fig. 27

Rail type	A [mm]	Threaded hole (load-bearing structure)	Screw type	Alignment fixture
FXRG	10	M6	M6 DIN 7984	ATFXR

Tab. 8

## ➤ Installation of joined rails

After the fixing holes for the rails are made in the load-bearing structure, the joined rails can be installed according to the following procedure:

- (1) Fix the individual rails on the mounting surface by tightening all screws except for each last one on the rail joint.
- (2) Install the end fixing screws without tightening them (see fig. 28).

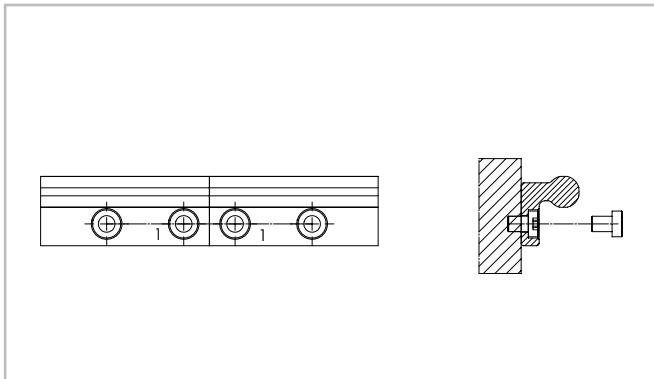


Fig. 28

- (3) Place the alignment fixture on the rail joint and tighten both set screws uniformly, until the raceways are aligned (see fig. 29).

- (4) After the previous step (3) it must be checked if both rail backs lie evenly on the mounting surface. If a gap has formed there, this must be shimmed.

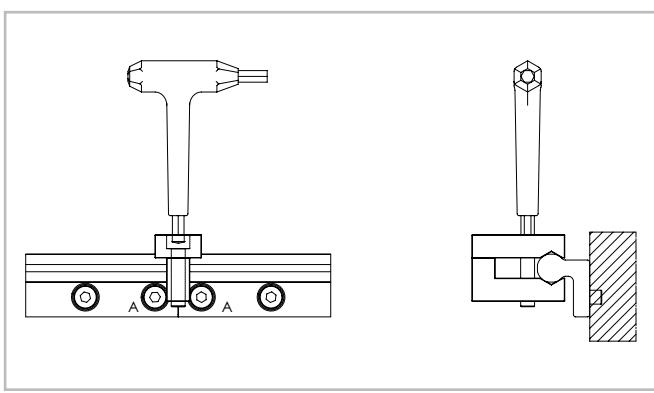


Fig. 29

- (5) The bottom of the rails should be supported in the area of the transition. Here a possible existing gap must be looked for, which must be closed if necessary for correct support of the rail ends by shims.

- (6) Insert the key through the holes in the alignment fixture and tighten the screws on the rail ends.

- (7) Remove the alignment fixture from the rail.

## Ordering key



### 0-Rail guide

FXRG

0960

Length *see pg. OR-6ff*Product type *see pg. OR-2ff*

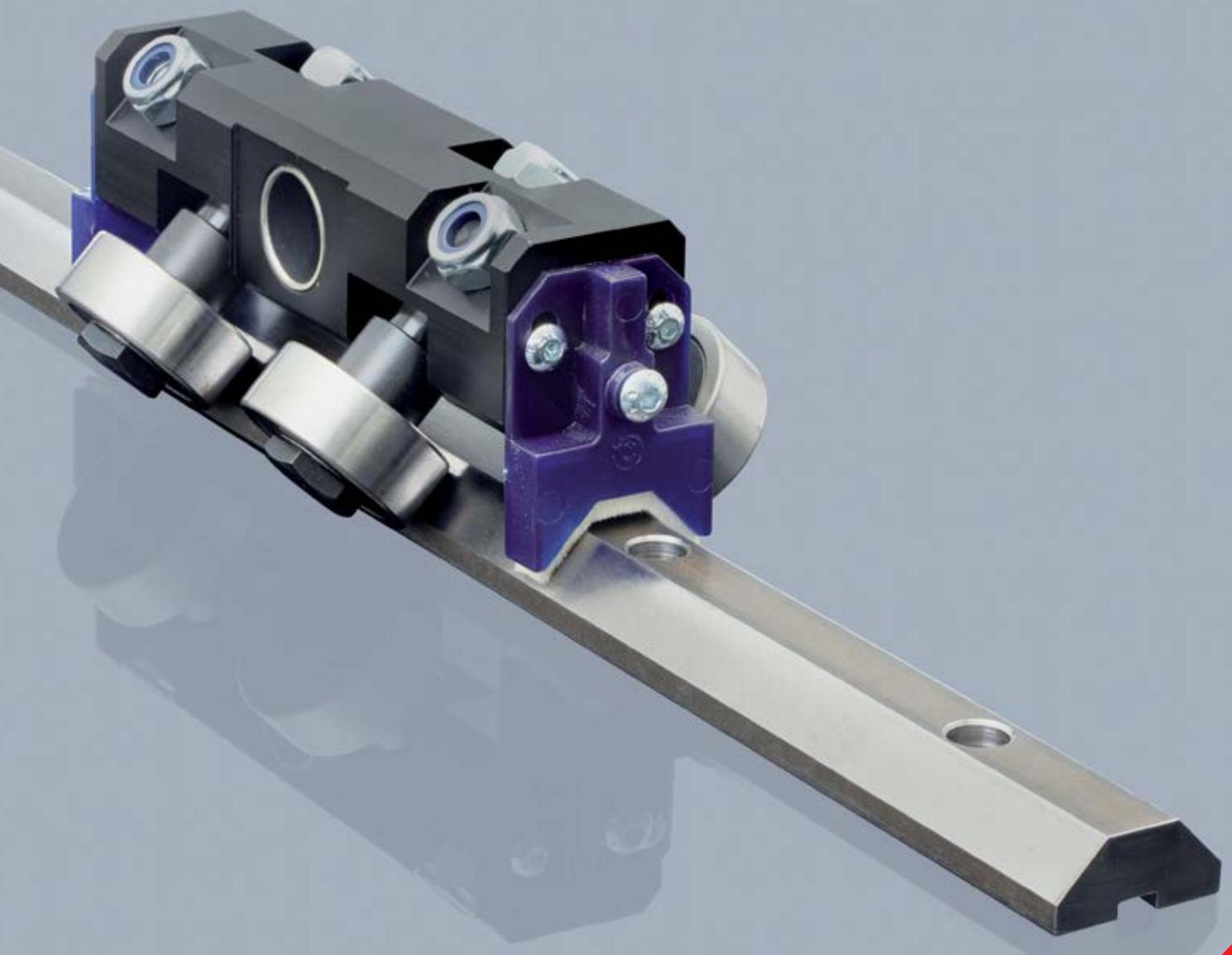
Ordering example: FXRG-3120

Notes on ordering: Rail lengths and stroke lengths are always stated with 4 digits. Please pad with zeroes to fill in for lengths with less than 4 digits, e.g. 515mm length is "0515"



**ROLLON®**  
BY TIMKEN

*Prismatic Rail*



## Product explanation



### Prismatic Rail: with cylindrical or V-shaped rollers



Fig. 1

The Prismatic Rail product family is composed of roller sliders sliding on V-shaped rails made of hardened steel. These linear guides also have high self-alignment properties.

V-shaped rails are induction hardened and polished, available in three sizes: 28, 35 and 55 mm. Rails can be machined with two straight cuts, one straight and one slanting cut or two slanting cuts. These options allow to create joinable versions, and thus obtaining longer strokes.

The aluminium slider can be configured with a variable number of rollers with steel pins, ranging from 3 to 6. Rollers are in turn available in two variants, cylindrical or V-shaped, with variable diameter from Ø30 a Ø62 depending on rail size.

#### The most important characteristics:

- Long life thanks to hardened raceways
- Optimal reliability in dirty environments
- Self-aligning system
- Simple mounting
- High dynamics

#### Preferred areas of application:

- Robot and handling systems
- Industrial automation
- Logistics
- Packaging machines

**Drilled guide rails with straight cut:**

Machining provided for guide rails with no joint.



Fig. 2

**Drilled guide rails with one straight and one slanting cut:**

Machining provided for the crop down sizes of guide rail ends with joints.



Fig. 3

**Drilled guide rails with 2 slanting cuts:**

Machining provided for the intermediate crop down sizes of guide rail ends with multiple joints.



Fig. 4

**Sliders with rollers Ø30 - Ø40:**

Floating and fixed sliders with rollers Ø30 (guide size 28) and Ø40 (guide size 35).



Fig. 5

**Sliders with rollers Ø52- Ø62:**

Floating and fixed sliders with rollers Ø52 and Ø62 (guide size 55).



Fig. 6

**Assembly pins:**

Steel pins.



Fig. 7

## Technical data



Fig. 8

### Performance characteristics:

- Sizes available: 28,35 and 55 mm.
- Rollers dimensions: Ø30 - Ø40 - Ø52 - Ø62.
- V-shaped rollers in hardened C45 steel available for sizes 28 and 35.
- Aluminum sliders, floating and fixed, with 3, 4 or 6 rollers.
- Max. speed: 7 m/s (depending on application).
- Max. acceleration: 20 m/s<sup>2</sup> (depending on application).
- Max. radial load capacity: 15000 (per slider).
- Max. axial load capacity: 15000 (per slider).
- Operating temperature: from -10°C to +80°C.
- Induction hardened and polished rails.
- Max. rail length: 4100 mm.
- Steel assembly pins.

### Notes:

- Longer stroke achievable with joinable versions.
- V-shaped rails available in drilled or non-drilled versions.
- Please follow the diagrams in every slider section to ensure correct assembly.
- For applications with high projecting loads, the sliders' rollers must be adjusted so that the load is supported by the maximum possible number of them.

## Product dimensions



### Steel V-shaped rails

Material: high-performance alloy steel: R > 900 MPa

Hardened and tempered: core hardness 240 HB.

Induction-hardened and polished. Track hardness > 58 HRC



Fig. 9

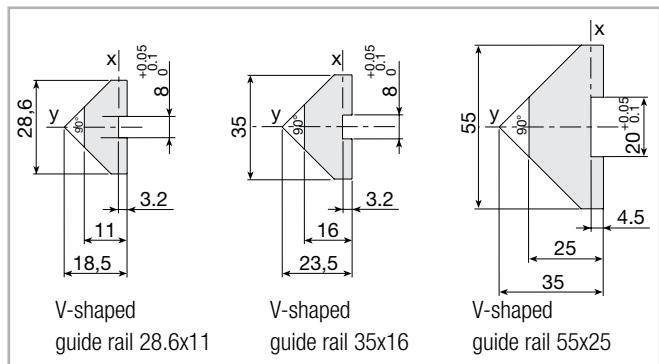


Fig. 10

Features	Moment of inertia $I_x$ [mm $^4$ ]	Moment of inertia $I_y$ [mm $^4$ ]	Weight [Kg/m]
28.6x11	2148	14490	2
35x16	7932	36405	3.5
55x25	41906	194636	7.8

Tab. 1

### Machining: drilled guide rails with straight cut

P\_ \_ - ....F V-shaped guide rails, length L, **drilled**



Fig. 11

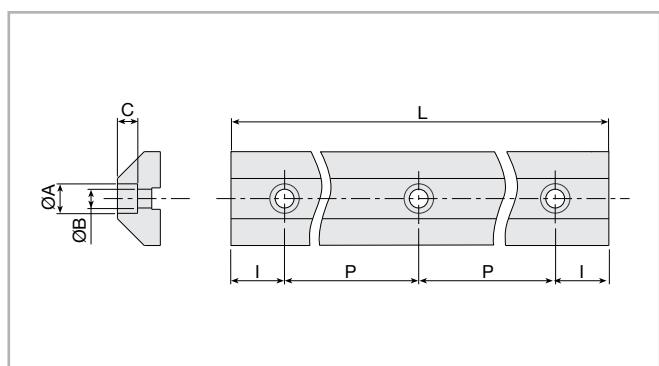


Fig. 12

Size	Treatment	L. max [mm]	P [mm]	I [mm]	A [mm]	B [mm]	C [mm]	Code
28.6x11	Induction-hardened	3980	150	40	11	7	5	P28...
35x16	Induction-hardened	4100	100	50	11	7	7.5	P35...
55x25	Induction-hardened	4100	150	25	18	11	11.5	P55...

Tab. 2

## > Machining: drilled guide rails with 1 straight and 1 slanting cut

P\_ \_ -.....FX V-shaped guide rails with 1 slanting cut, length L, **drilled**



Fig. 13

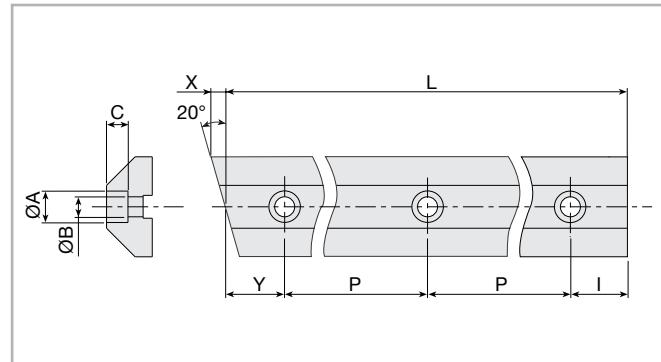


Fig. 14

Size	Treatment	L, max [mm]	P [mm]	Y [mm]	I [mm]	A [mm]	B [mm]	C [mm]	Code
28.6x11	Induction-hardened	3700	150	50	50	11	7	5	P28...
35x16	Induction-hardened	4000	100	50	50	11	7	7.5	P35...
55x25	Induction-hardened	3950	150	25	25	18	11	11.5	P55...

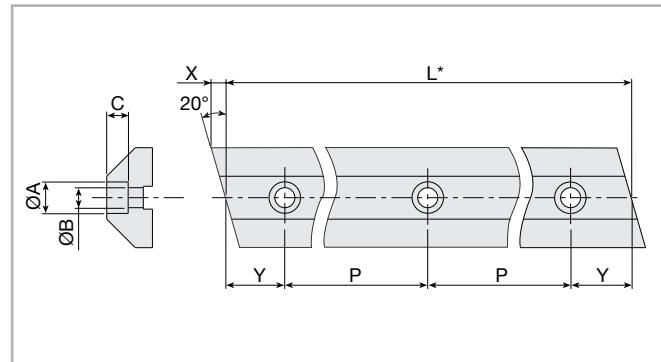
Tab. 3

## > Machining: drilled guide rails with 2 slanting cuts

P\_ \_ -.....FXX V-shaped guide rails with 2 slanting cuts, length L, **drilled**



Fig. 15



\*in order to maintain a constant hole pitch, arrange the guide rails so that the length "L" is equal to:  $n \cdot P + 2 \cdot Y$

Fig. 16

Size	Treatment	L. max [mm]	P [mm]	Y [mm]	A [mm]	B [mm]	C [mm]	Code
28.6x11	Induction-hardened	3700	150	50	11	7	5	P28...
35x16	Induction-hardened	3900	100	50	11	7	7.5	P35...
55x25	Induction-hardened	3950	150	25	18	11	11.5	P55...

Tab. 4

## > Tilting roller slides with 4 rollers Ø30 for V-shaped guide rails 28x11

Use the roller slide eccentric pin to adjust the backlash along the plane between the guide rails.



Important: remove the space washers to enable self-alignment of the roller slide

Fig. 17

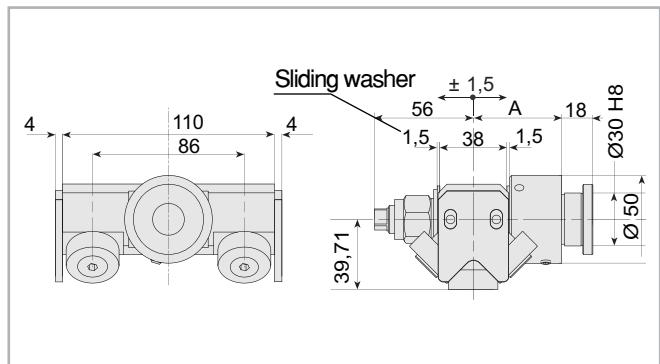


Fig. 18

	A [mm]	Load capacity C <sub>0rad</sub> [N]	Weight [Kg]	Code
Roller slide with concentric pin	75	3818	1.8	204.0052
Roller slide with eccentric pin ( $\pm 1$ mm)	75	3818	1.8	204.0053
Roller slide with concentric pin	50	3818	1.4	204.0054
Roller slide with eccentric pin ( $\pm 1$ mm)	50	3818	1.4	204.0055

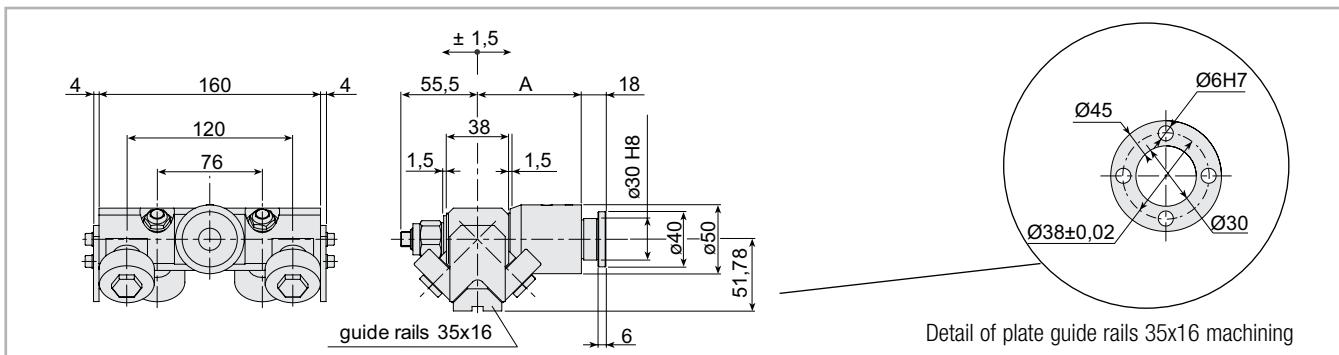
Tab. 5

Spare parts	A [mm]	Code
Complete body with rollers		204.0050
Concentric pin	75	236.0010
Eccentric pin ( $\pm 1$ mm)	75	236.0011
Concentric pin	50	236.0014
Eccentric pin ( $\pm 1$ mm)	50	236.0015

Tab. 6

## > Tilting roller slides with 4 rollers Ø40 for V-shaped guide rails 35x16

Use the roller slide eccentric pin to adjust the backlash along the plane between the guide rails.tino.



**Important:** remove the spacer washers to enable self-alignment of the roller slide

Fig. 19

	A [mm]	Load capacity $C_{0rad}$ [N]	Weight [Kg]	Code
Slide with eccentric pin ( $\pm 1$ mm)	75	7071	2.2	204.0016
Slide with eccentric pin ( $\pm 1$ mm)	50	7071	1.8	204.0033

Tab. 7

All pins are eccentric, but are made concentric by inserting the pin in the specific hole on the plate, in order to determine the required preload.

Spare parts	A [mm]	Code
Complete body with rollers		204.0013
Eccentric pin ( $\pm 1$ mm)	75	236.0011
Eccentric pin ( $\pm 1$ mm)	75	236.0015

Tab. 8

## > Type G roller slides (roller Ø52) and H type (roller Ø62) for V-shaped guide rails 55x25

Tilting 4-roller slides Suitable for assembly pins: Type 9

Use the roller slide eccentric pin to adjust the backlash along the plane between the guide rails.

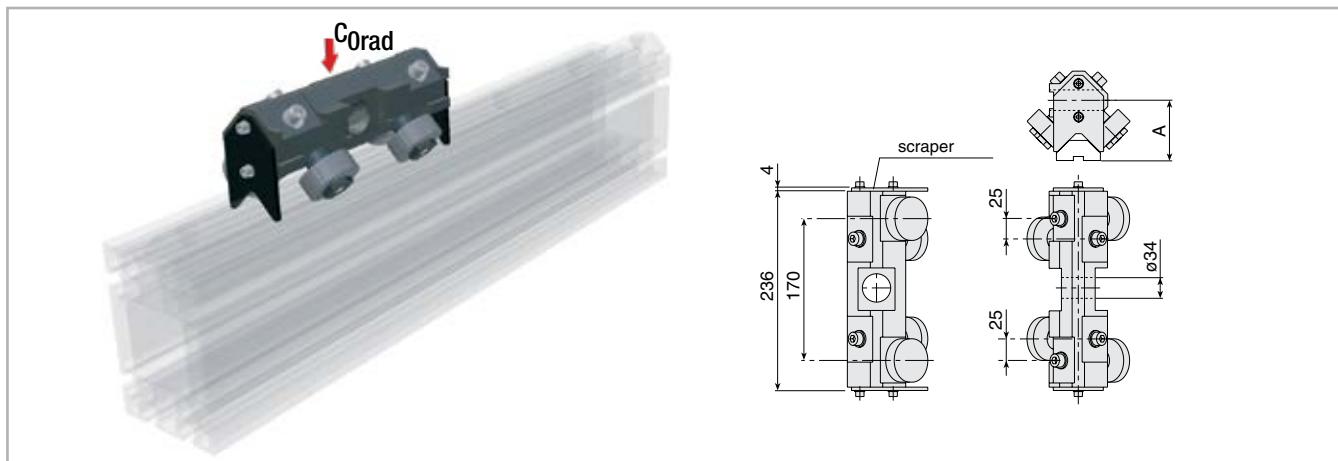


Fig. 20

Ø Rollers	A
Rollers Ø52	71.75
Rollers Ø62	78.85

Tab. 9

Technical characteristics	Ø52	Ø62
Load capacity [N]	12021	14991
N° roller	4	4
Weight [Kg]	3.2	3.8
Spare parts code	204.1520	204.1521

Tab. 10

## > I-type roller slides (roller Ø52) and L-type (roller Ø62) for V-shaped guide rails V 55x25

Tilting 6-roller slides Suitable for assembly pins: Type 9

Use the roller slide eccentric pin to adjust the backlash along the plane between the guide rails.

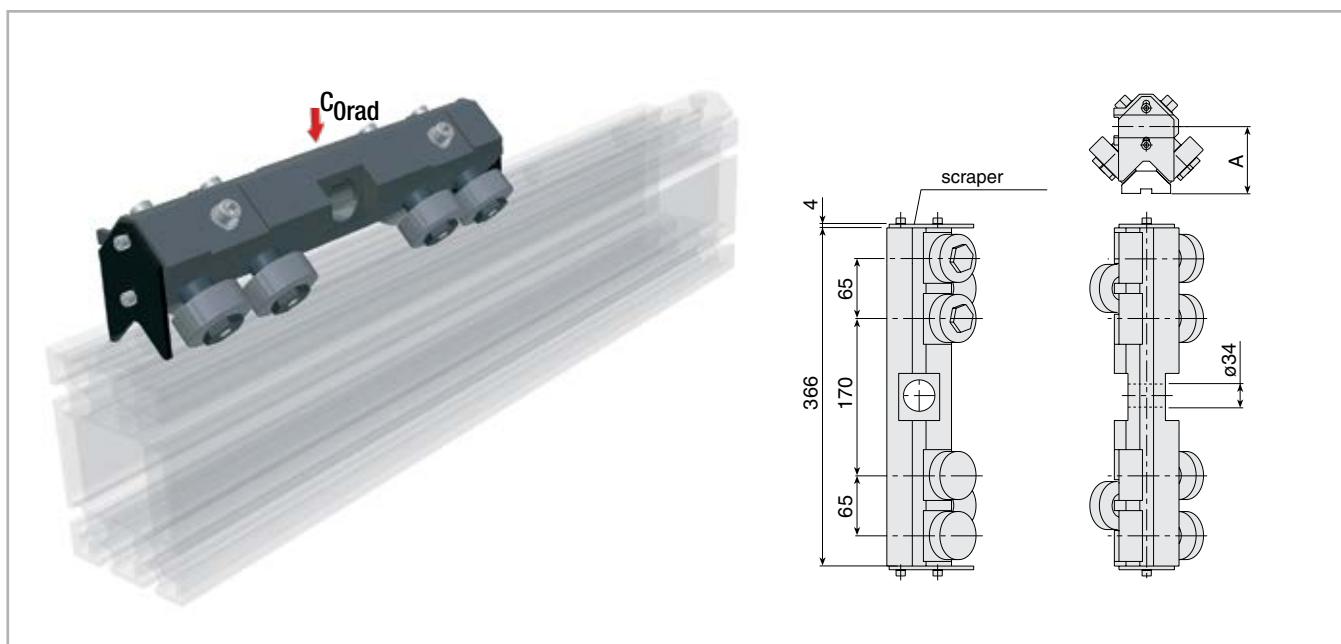


Fig. 21

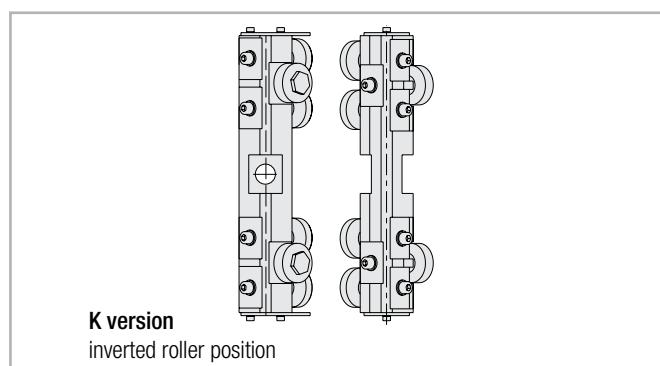


Fig. 22

Ø Roller	A
Roller Ø52	71.75
Roller Ø62	78.85

Tab. 11

Technical characteristics	Ø52	Ø62
Load capacity [N]	12021	14991
N° rollers	6	6
Weight [Kg]	4.9	5.9
Spare parts code	204.1522	204.1523

Tab. 12

# Accessories

## ➤ V-shaped rollers (Guide Rails 28.6 x 11) anti-oxidized version

Shaped rollers with radial bearings with 2RS sealing (medium version).

**\* IMPORTANT:** upon request, spacers can be supplied to increase the centre-distance between the guide rail and the roller supporting surface. In addition to the roller code, please indicate the required centre-distance (L), e.g. 205.0013.L



Fig. 23

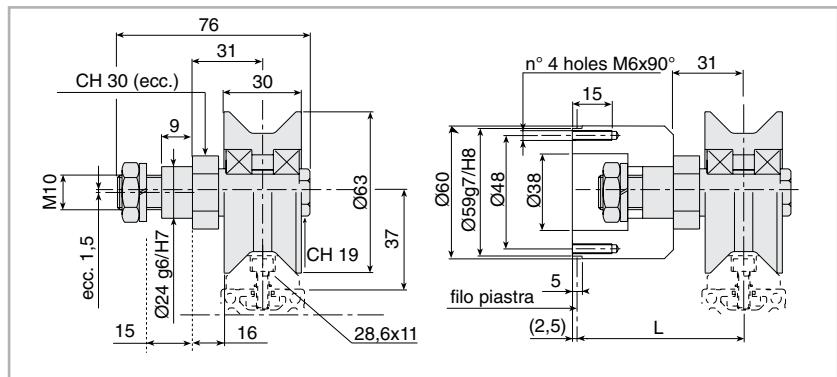


Fig. 24

Type	Bearing	C	CoW	PR [N]	PA [N]	Speed [m/s]	Weight [Kg]	Code
Conc.	radial bearing	9500	4540	1400	600	2.5	0.8	205.0013
Exc.	radial bearing	9500	4540	1400	600	2.5	0.8	205.0014

Tab. 13

## ➤ V-shaped rollers [rails 35 x 16]

Shaped rollers with two rows of angular contact ball bearings. With bilateral sliding sealing rings. Accuracy class P6.

They support loads along the axis of the pin provided  $P_a \text{ eff} < 0.4 P_r \text{ eff}$ .

**\* IMPORTANT:** upon request, spacers can be supplied to increase the centre-distance between the guide rail and the roller supporting surface. In addition to the roller code, please indicate the required centre-distance (L). e.g. 205.0011.L



Fig. 25

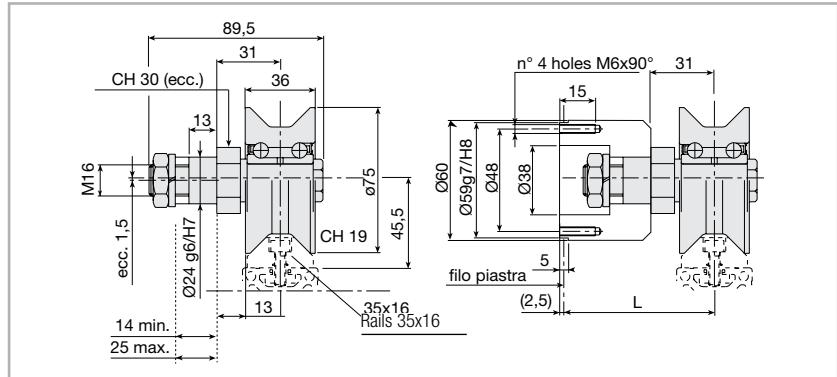


Fig. 26

Type	Bearing	C	COw	PR [N]	PA [N]	Speed [m/s]	Weight [Kg]	Code
Conc.	angular contact	21000	13900	4500	1800	2.5	1	205.0011
Exc.	angular contact	21000	13900	4500	1800	2.5	1	205.0012

Tab. 14

## > Spare roller with pin

Make sure that all the components are locked in place with the appropriate screws. The recommended tightening torque for pin locking screws and nuts is 50 Nm.



Fig. 27

### Max. load factors for induction-hardened guides

Roller	C <sub>w</sub> [N]	C <sub>0w</sub> [N]	F <sub>r</sub> amm. [N]	V max.
Ø30	5100	3100	1350	7 m/s
Ø40	10000	7000	2500	7 m/s
Ø52	16700	10700	4250	6 m/s
Ø62	21500	14500	5300	5 m/s

Tab. 15

Spare roller with pin	Weight [Kg]	Code
Ø30 Concentric	0.02	205.0465
Ø40 Concentric	0.22	205.0464
Ø40 Eccentric ( $\pm 0.75$ mm)	0.25	205.0463
Ø52 Concentric	0.4	205.0163
Ø62 Concentric	0.55	205.0165

Tab. 16

## Assembly Pins

Material: burnished steel ( $R_s=800 \text{ N/mm}^2$ ). Special variants upon request.  
AISI 303 stainless steel versions are available upon request. Types 0-7-

8-9 are complete with self-lubricating bushings to make roller slide self-adjustments easier.

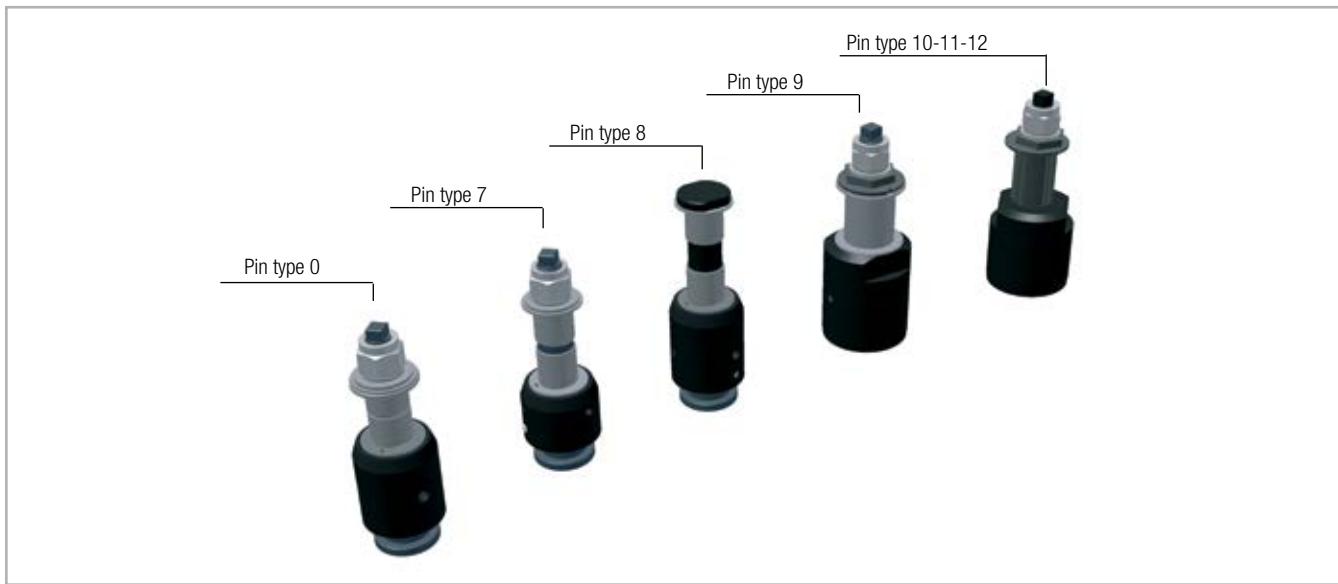


Fig. 28

## Type 0 assembly pins suitable for roller slide Ø30 and Ø40

\* Important: machine the pin clamping plate as shown in Fig. A

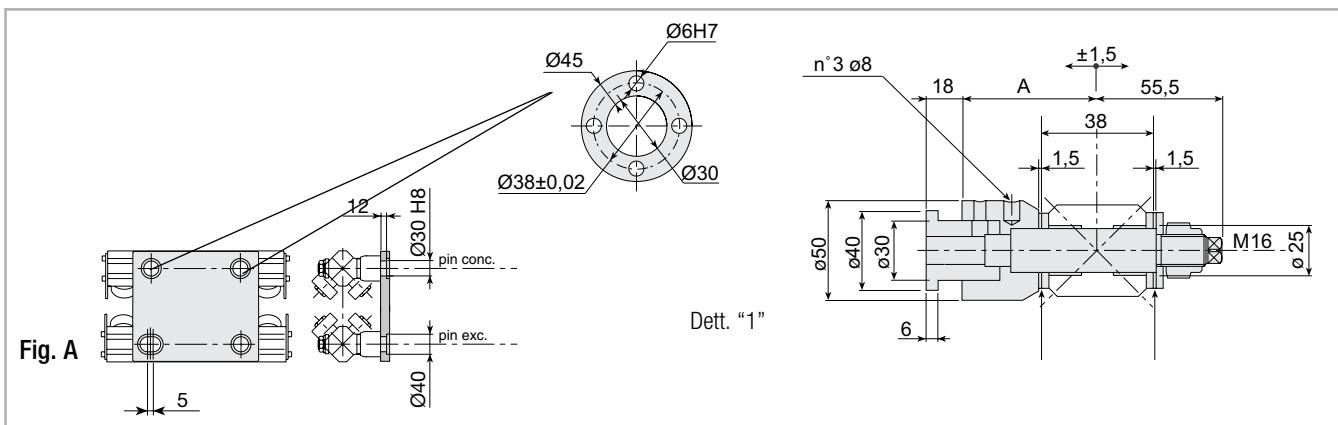


Fig. 29



Fig. 30

Important: remove the spacer washers to enable self-alignment of the roller slide

Technical characteristics	A [mm]	
Weight [Kg]		1.1 approx.
Eccentric code ( $\pm 0.75 \text{ mm}$ )	75	236.0011
Eccentric code ( $\pm 0.75 \text{ mm}$ )	50	236.0015

Tab. 17

## > Type 7 assembly pins suitable for roller slide E-F

\* Important: machine the pin clamping plate as shown in Fig. A

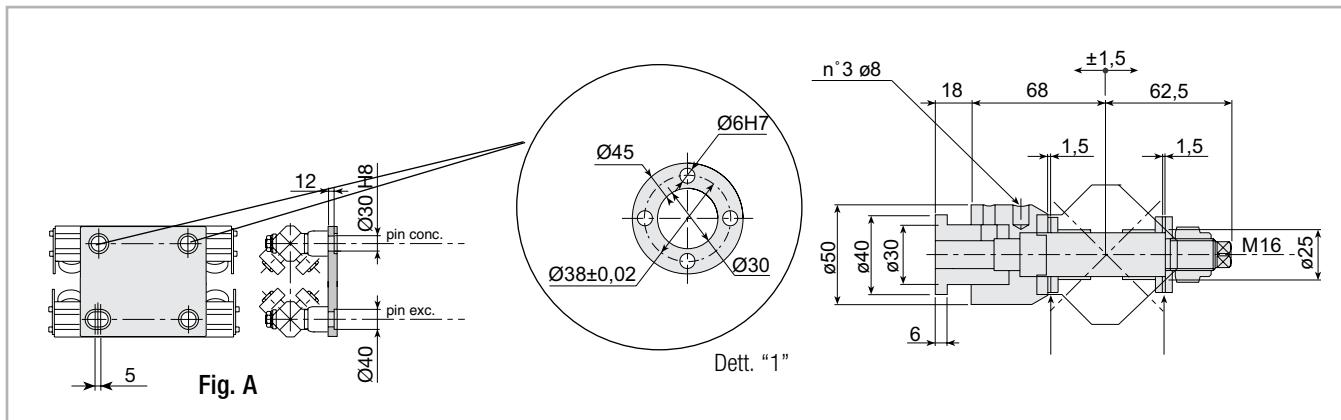


Fig. 31



Fig. 32

Important: remove the spacer washers to enable self-alignment of the roller slide

### Technical characteristics

Weight [Kg]

1.1 approx.

Eccentric code ( $\pm 1$  mm)

236.1689

Tab. 18

## > Assembly pins type 8 suitable for carriage E-F

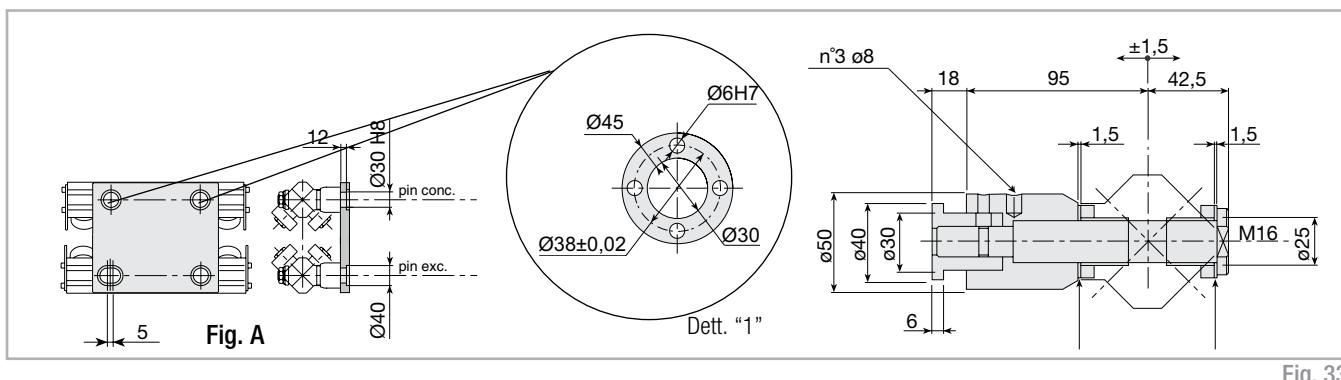


Fig. 33



Fig. 34

Important: remove the spacer washers to enable self-alignment of the roller slide

### Technical characteristics

Weight [Kg]

1.8 approx.

Eccentric code ( $\pm 1$  mm)

236.1691

Tab. 19

➤ Type 9 assembly pins suitable for tilting roller slides G-H / I-L



Fig. 35

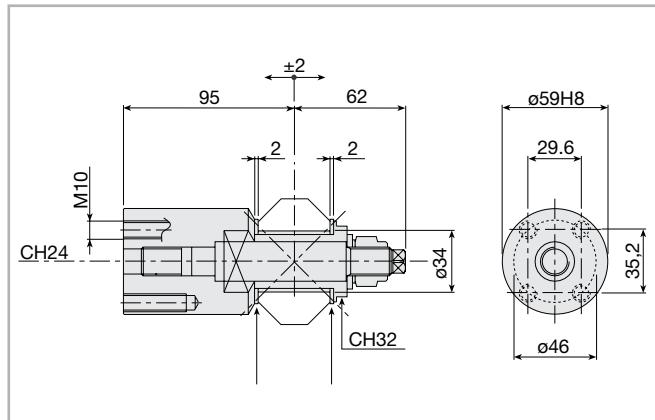


Fig. 36

**Important:** remove the spacer washers to enable self-alignment of the roller slide

Technical characteristics	
Weight [Kg]	2 approx.
Concentric code	236.2076
Eccentric code ( $\pm 1.5$ mm)	236.2079

Tab. 20

## > V-shaped guide rail assembly inserts

Material: C40 galvanized steel.



Fig. 37

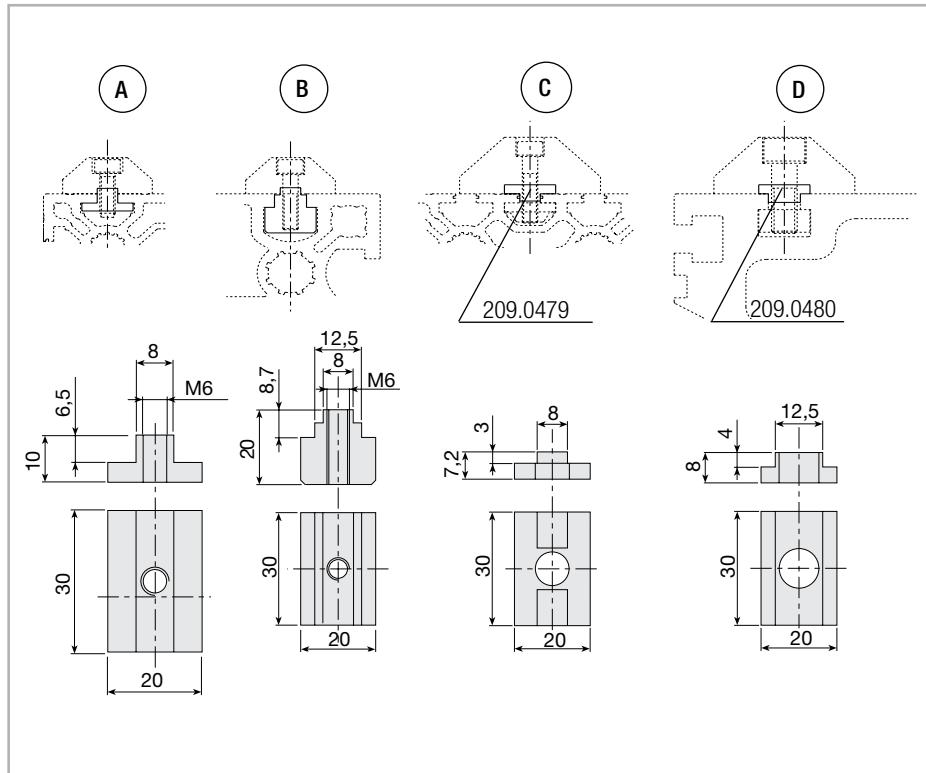


Fig. 38

Guide rails	Slot side	Screw	Code
A 35x16/28.6x11	8	M6x20	209.0298
B 35x16	12.5	M6x25	209.1855
C 55x25	8	M8x30	209.0479
D 55x25	12.5	M10x30	209.0480

Tab. 21

## Technical instructions



### ➤ Rollers and V-shaped guide rails 28.6x11 and 35x16

Material: Hardened and burnished C45 steel covering; burnished steel pins and bolts. Rollers with shaped plastic cover are available upon request. Rollers with longer centre-distance L can be supplied.

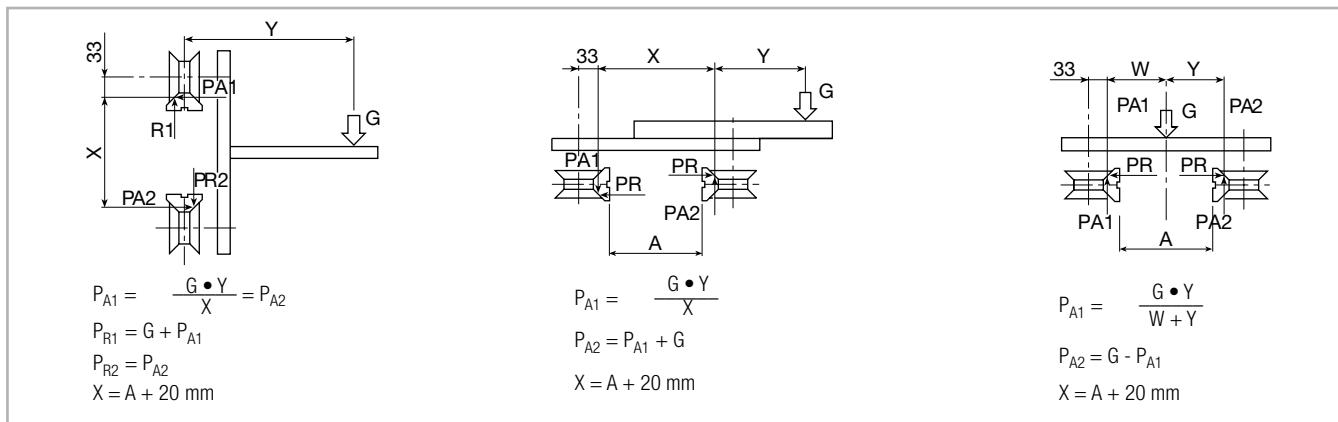
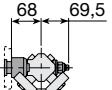
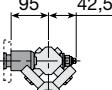
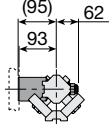
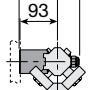
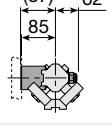
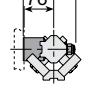


Fig. 39

## Ordering key



## &gt; Identification codes for roller slides and pins

PIN	Roller sl.	G (Ø 52)	H (Ø 62)	I (Ø 52)	L (Ø 62)
	7	conc	-	-	-
		exc.	-	-	-
	8	conc			
		exc.			
	9	conc	204.2092	204.2093	204.2094
		exc.	204.2102	204.2103	204.2104
	10	conc	-	-	-
		exc.	-	-	-
	11	conc	-	-	-
		exc.	-	-	-
	12	conc	-	-	-
		exc.	-	-	-

Tab. 22

## > Identification codes for Prismatic Rail guide

P	28	J	1100	F	XX	
	35				X = Single slanting cut	
	55				XX w= Double slanting cut	
					Drilled	
					Length	
					J = jointed rails (only when required)	
					Size	
					Linear guides series Prismatic Rail	

Ordering example: P55-2750FX, P55-2600FXX, P55-J5200FC01

Notes on ordering: the rail length codes are always 4 digits; use zeroes as a prefix when lengths are shorter.

In case of jointed rails it is necessary to send the segmentation order.

## > Assembly of standard carriages / K version carriages

**IMPORTANT:** for applications with high projecting loads, the rollers of the slides must be adjusted so that the load is supported by the maximum possible number of rollers. If this means arranging the rollers symmetrically with respect to the standard roller slide version, please add the letter K at the end of the code when filling in the order form. However, the roller assembly can also be inverted at a later date, by disassembling the pins and rollers and then reassembling them in the opposite way.

**Example:**

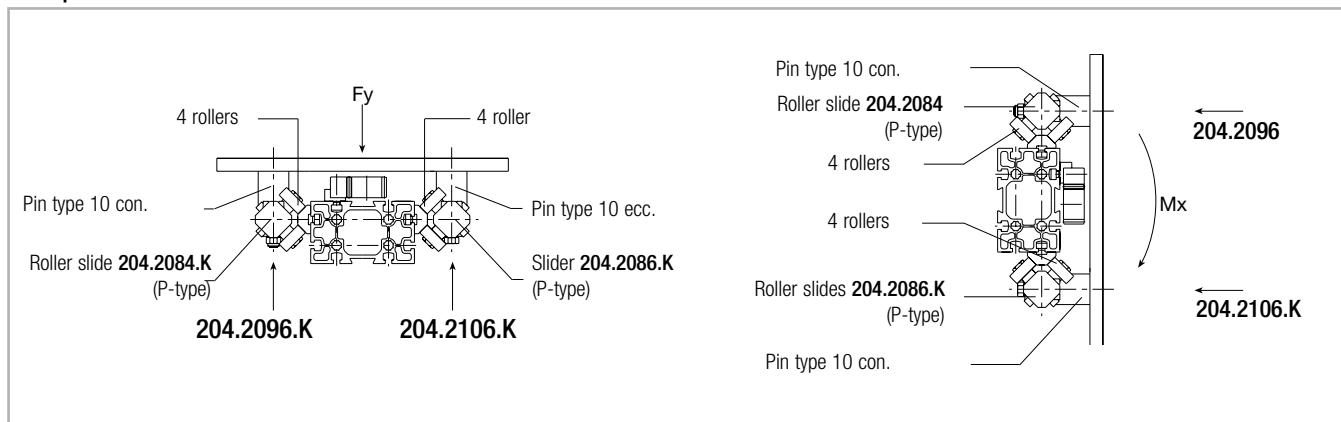


Fig. 40



**ROLLON®**  
BY TIMKEN

*Speedy Rail*



## Product explanation



### ➤ Self-supporting and self-aligning extruded aluminum linear guides



Fig. 1

**Speedy Rail®** beam is a heat-treated aluminium alloy profile with hollow cross-sections which makes it very strong under torsion and deflection stresses. Beams are then subject to a special patented treatment which provides a smooth, hard (700 HV) surface comparable to tempered steel. The fusion point of the non-stick surface layer (2100°C) permits an excellent resistance to welding splatters.

For these reasons the **Speedy Rail®** beams and components are widely used in the automotive industry to build transfer systems (lift & carry) for automated welding lines.

**Speedy Rail®** linear motion systems are lightweight, self-supporting, easy to assemble, inexpensive, modular, clean, quiet and ex stock. **Speedy Rail®** assemblies are very simple. Standard bolted dovetails and fishplate clamps are used for end to end joining. Rails are available in single beam up to max length 7.5 meters – 24.6 feet – and can be joined end-to-end with dovetails to build a transfer system of unlimited length. Rails have a dovetail groove on each side to accommodate any fixture. In this way it is not necessary to drill or to weld. The profiles Wide Body SR 180, Super Wide Body SR 250 are equipped with grooves and have a planarity precision so that guideways can be fixed without any mechanical machining.

#### The most important characteristics:

- Standard modular components
- All parts reusable
- Minimum space required
- Narrow profile
- Hard surface
- Resistance to welding splatters
- Quiet smooth operations
- Resistance to high corrosion
- Savings in assembly time
- Strong, lightweight
- Savings in reducing drive size
- Only hand tools required to assemble or modify

#### Preferred areas of application:

- Automotive assembly
- Woodworking and furniture
- Glass processing
- Painting lines
- Food industry
- Sheet working and laser cut machines
- Plastic extrusion, machine tools
- Appliances assembly and production
- Cardboard handling machines
- Packaging
- Tiles, shingles production
- Welding lines

## Technical data



### Dimensions

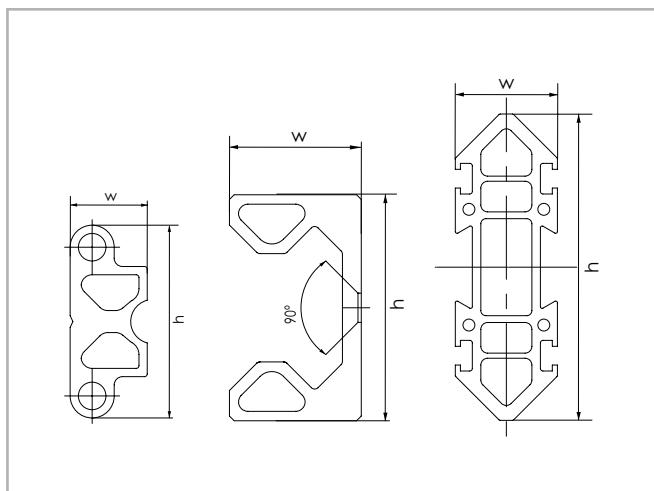


Fig. 2

Speedy Rail® guides are available in the following sizes:

Type	h [mm]	w [mm]
Speedy Rail 35	35	14
Speedy Rail C 48	48	28
Speedy Rail Mini	60	20
Speedy Rail Middle	90	30
Speedy Rail Standard	120	40
Speedy Rail Wide Body	180	60
Speedy Rail Super Wide Body	250	80

Tab. 1

### Rollers and roller assemblies:

The **Speedy Rail®** range includes a large selection of rollers both cylindrical and "V" shaped and roller assemblies with two or more rollers. Our rollers are covered by a sintered plastic compound, resistant to pollutants and virtually maintenance-free. Ball and/or needle bearings with high performance are mounted into the rollers and can be maintained either with standard greasing procedure or lifetime lubricated. All roller boxes are equipped with concentric and eccentric pins for a quick adjustment of the contact between rollers and rail.

- Standard
  - with 2 rollers, 1 concentric and 1 eccentric
- Blendo Beam®
  - with 4 or 8 rollers. It provides 3 mounting surfaces
- Compact
  - with 2 rollers. Suitable for low clearances and limited operation room
- Floating
  - with 4, 6 or even more rollers. Suitable for the withstanding minor misalignments on the rail mounted in pairs, one concentric and one eccentric
- "V" roller support
  - This kind of support are suggested for light applications and constricted operation areas

Supports are mounted on the frame when the rail is movable and on the trolleys when it is fixed. By the calculation of system needs, consider the max. radial load applicable to the rollers in accordance with the description of each roller.

## Speedy Rail 35



### ➤ "Speedy Rail 35" guide and specification

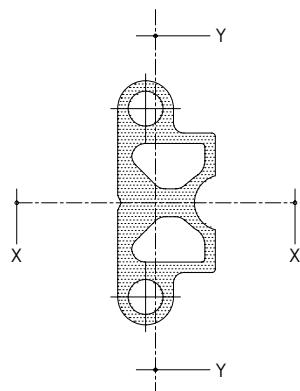


Fig. 3

Surface quadratic moments: X-X axis = 17.779 mm<sup>4</sup> / Y-Y AXIS = 3.665 mm<sup>4</sup>.

Area = 222 mm<sup>2</sup>

Max. angular distortion =  $\pm 20'$ /m.

Linear mass = 0.55 Kg/m.

Max. Linear distortion = 0.5 mm/m.

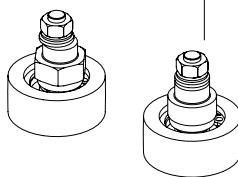
Standard lengths: 1000-1500-2000-2500-3000-3500-4000-4500 mm.

External surface: deep hard anodizing

> "Speedy Rail 35" assemblies and components

CONCENTRIC REACTION ROLLER

PAG. SR-7

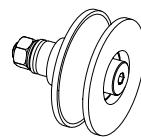


ECCENTRIC REACTION ROLLER

PAG. SR-7

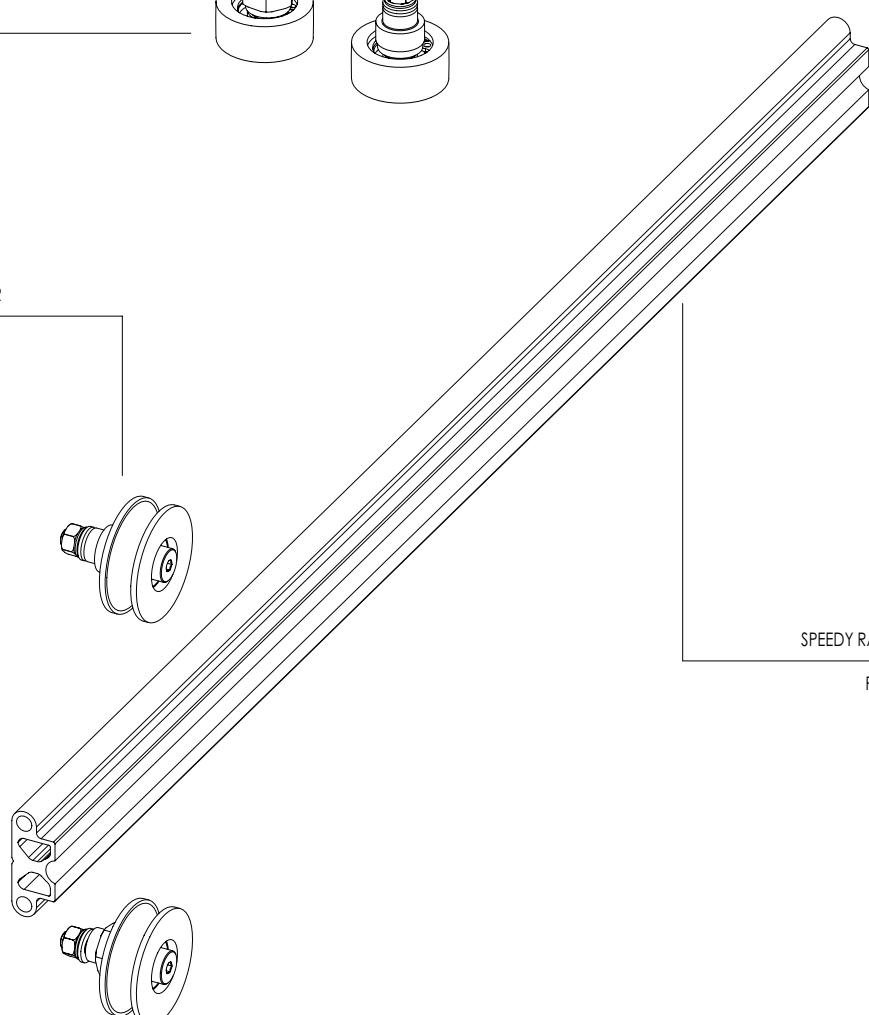
CONCENTRIC "V" SHAPED ROLLER

PAG. SR-6



SPEEDY RAIL GUIDE

PAG. SR-4



ECCENTRIC "V" SHAPED ROLLER

PAG. SR-6

S  
R

Fig. 4

SR-5

Speedy Rail guide with plain ends

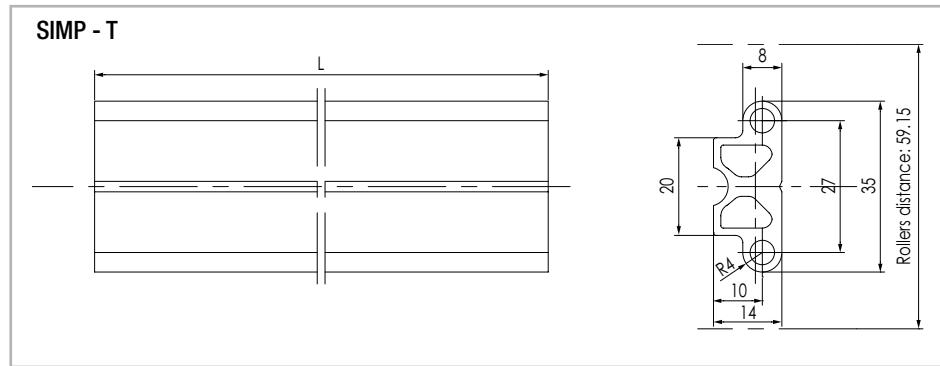


Fig. 5

Drilled Speedy Rail 35 guide - Order code 411.1405/length in mm.

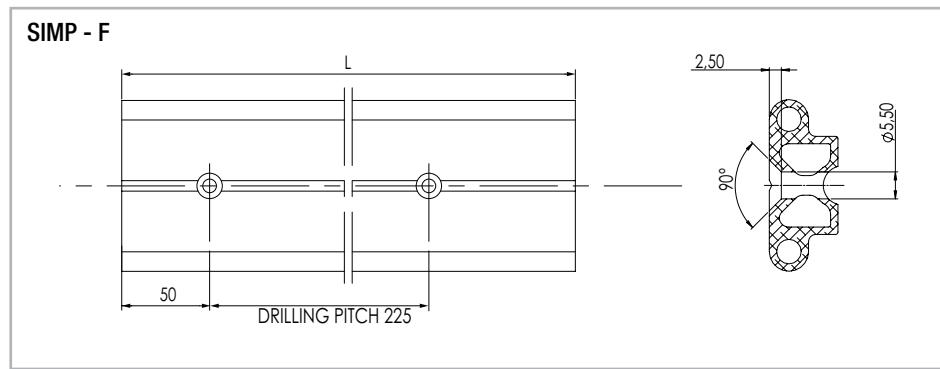


Fig. 6

Plastic compound eccentric roller,  
max load: radial 200 N, axial 100 N

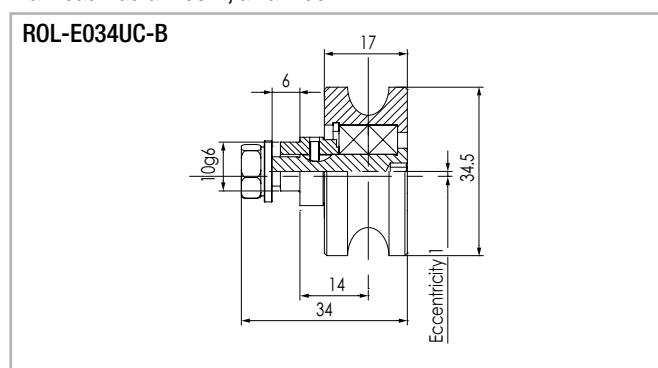


Fig. 7

Plastic compound concentric roller,  
max load: radial 200 N axial 100 N

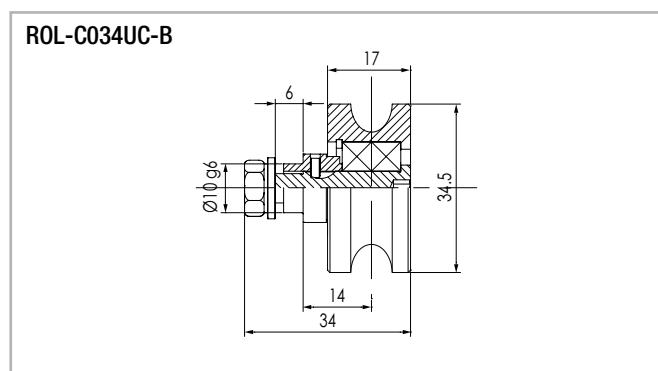


Fig. 8

Plastic compound concentric contrast roller,  
max radial load 200 N

ROL-C030CC-B

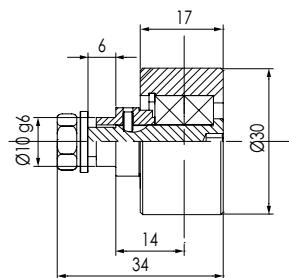


Fig. 9

Plastic compound eccentric contrast roller,  
max radial load 200 N

ROL-E030CC-B

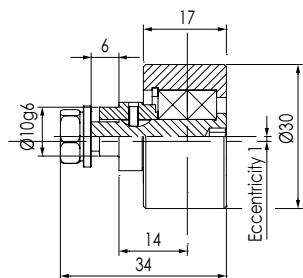


Fig. 10

## ➤ Sliding doors "Speedy Rail 35" application example

Overturning locking upper rollers  
Supporting lower rollers

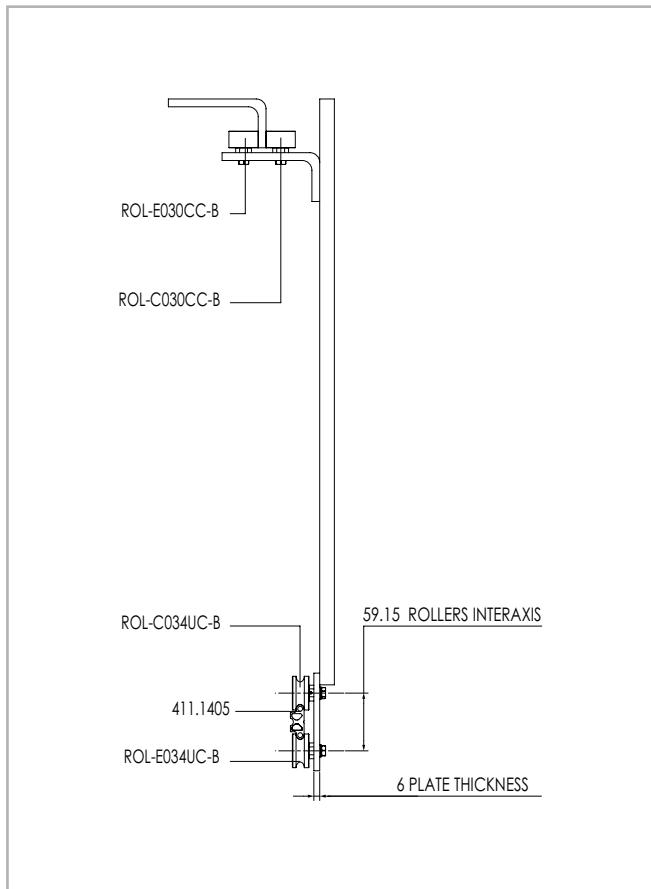


Fig. 11

## Speedy Rail C 48



### "Speedy Rail C 48" guide and specification

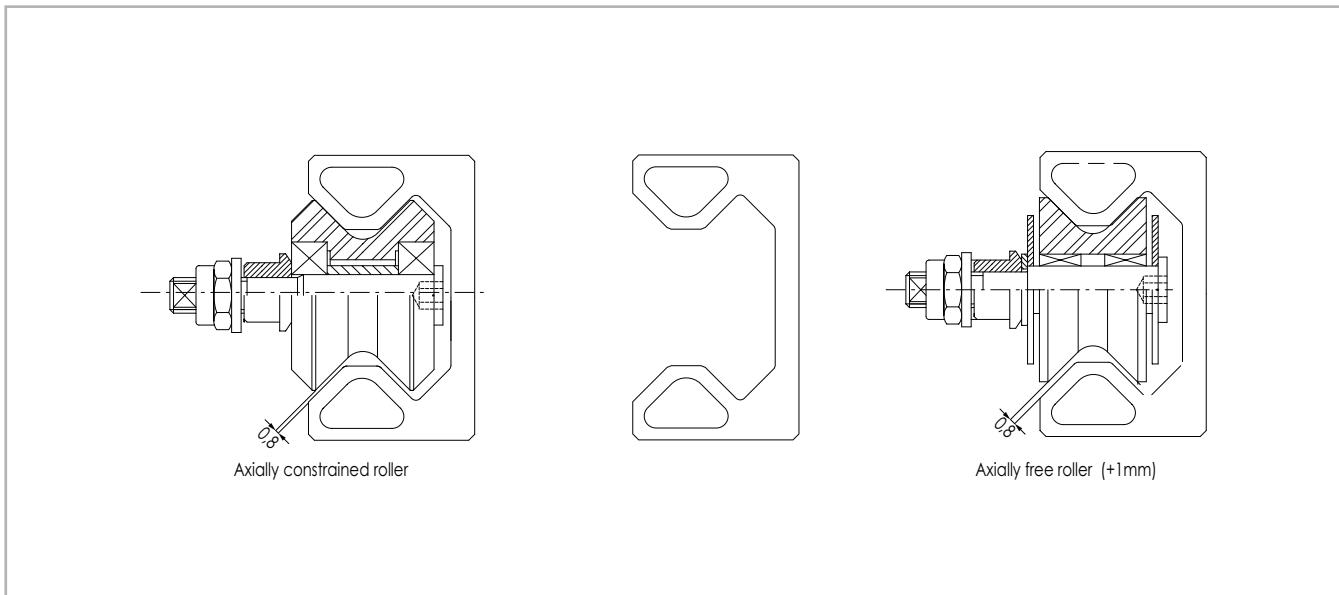


Fig. 12

#### "Speedy Rail C 48" guide

Material: aluminium alloy with hardened surface (700 Hv)

Surface quadratic moments: "I" XX AXIS= 152.026 mm<sup>4</sup> "I" YY AXIS= 36.823 mm<sup>4</sup>

Section modules: W (X) = 6334 mm<sup>3</sup> / W (Y) = 2045 mm<sup>3</sup>

Distance between the centre line of opposite rolling lanes: 28,86 mm

Linear mass = 1,42 kg/m.

Max. Angular distortion =  $\pm 20'$ /m max.

Max. linear distortion =  $\pm 0,4$  mm/m. Max.

Standard lengths: 500-1000-1500-2000-2500-3000-3500-4000-4500-5000-5500-6000-6500-7000-7500 mm.

Exterior treatment: deep hard anodizing

#### Rollers

Supported by ball or needle bearings. The external surface is finished with plastic compound

#### Speedy Rail C 48 guide without holes

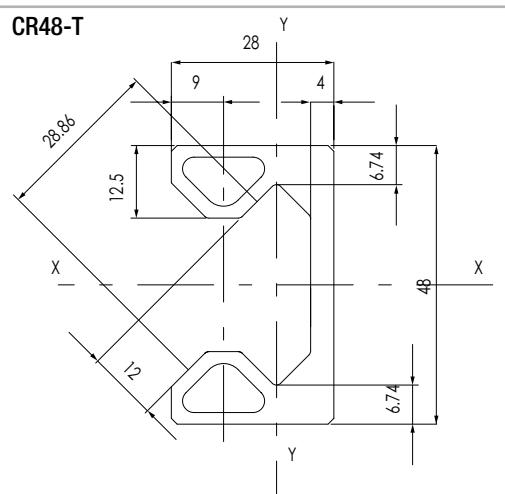


Fig. 13

#### Drilled Speedy Rail C 48 with holes for front fixing

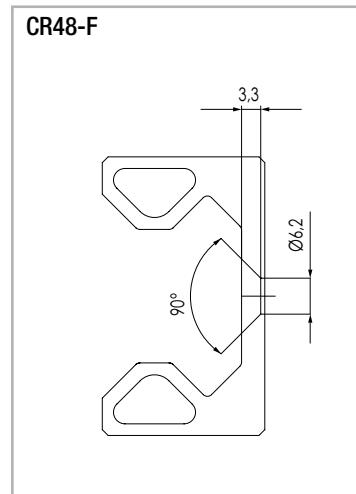


Fig. 14

#### Drilled Speedy Rail C 48 with holes for rear fixing

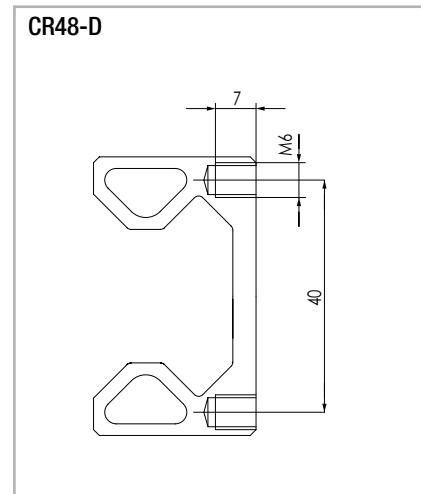


Fig. 15

> "Speedy Rail C 48" assemblies and components

4 ROLLERS ASSEMBLY

PAG. SR-11

SPEEDY RAIL C 48 PROFILE

PAG. SR-8

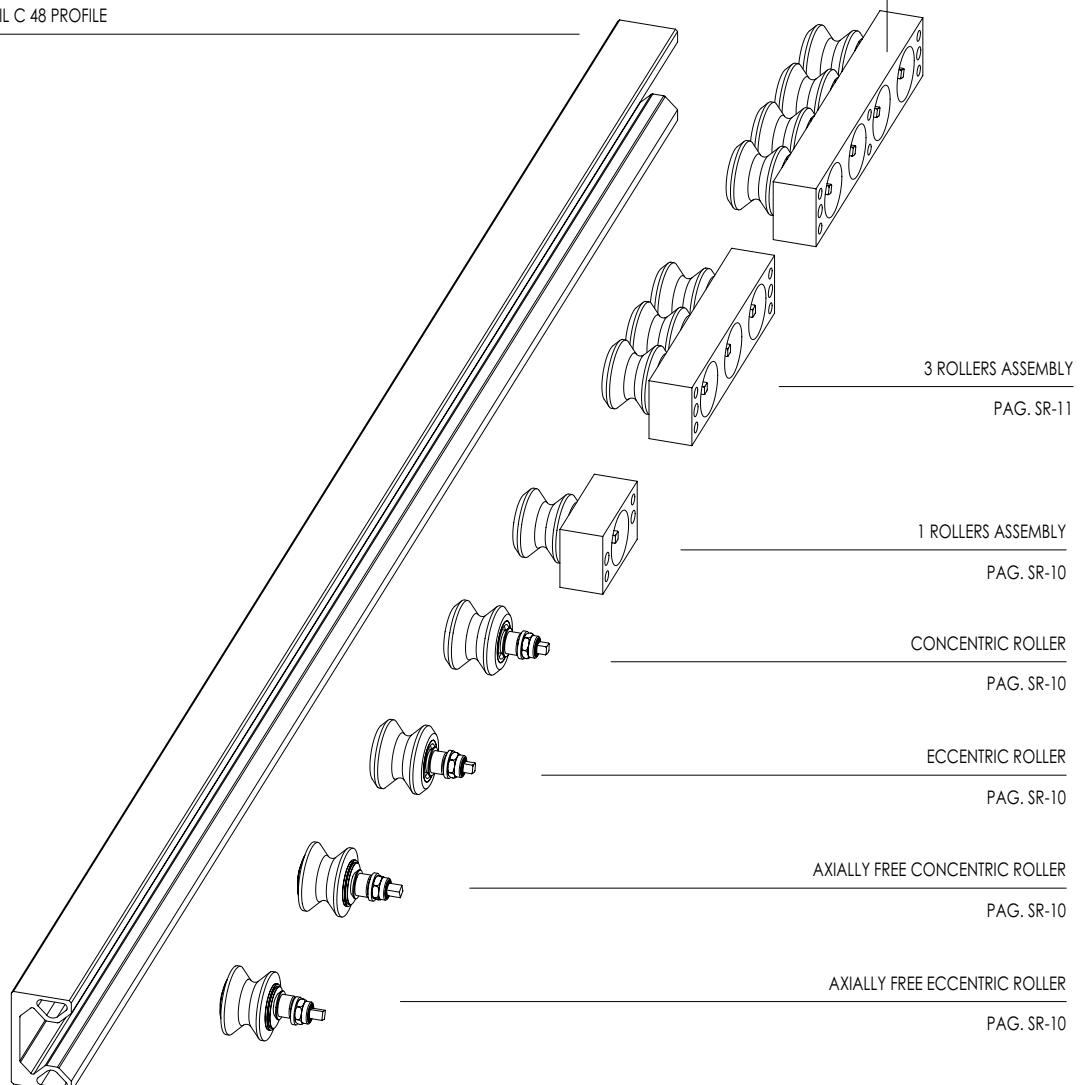


Fig. 16

S  
R

► Rollers and roller boxes for "Speedy Rail C 48" guide

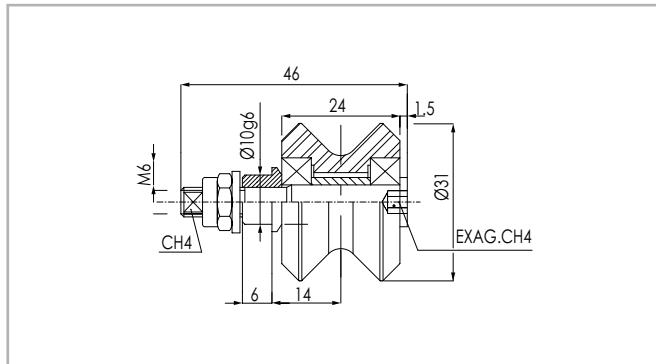


Fig. 17

ROL-C031WC-X - Axially constrained concentric roller  
 ROL-E031WC-B - Axially constrained eccentric roller (ecc. max. 1.4 mm)  
 Max radial load 270 N - max axial load 100 N

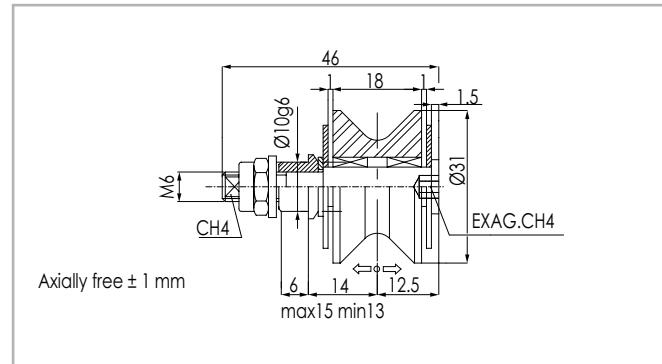


Fig. 18

ROL-C031VC-XA - Axially free concentric roller  
 ROL-E031VC-BA - Axially free eccentric roller (ecc. max. 1.4 mm)  
 Max radial load 270 N - it doesn't accept axial load

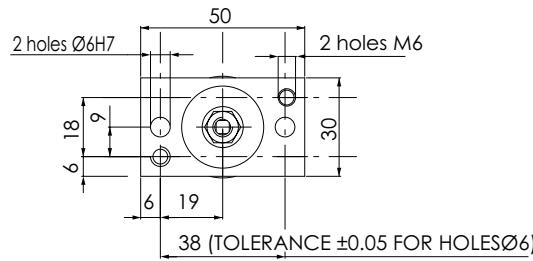


Fig. 19

55.1062 - Roller assembly with one conc. roller  
 55.1067 - Roller assembly with one ecc. roller  
 Max. Load per roller: radial 270 N / axial 100 N

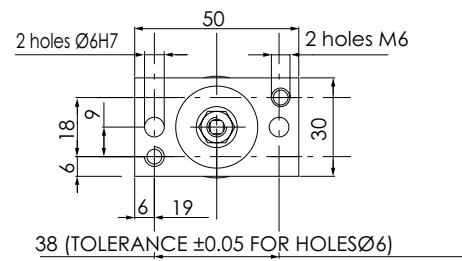


Fig. 20

55.1066 - Roller assembly with one conc. axial free roller  
 55.1065 - Roller assembly with one ecc. axial free roller  
 Max. Load per roller: radial 270 N  
 No axial loading

## > Roller boxes for "Speedy Rail C 48" guide

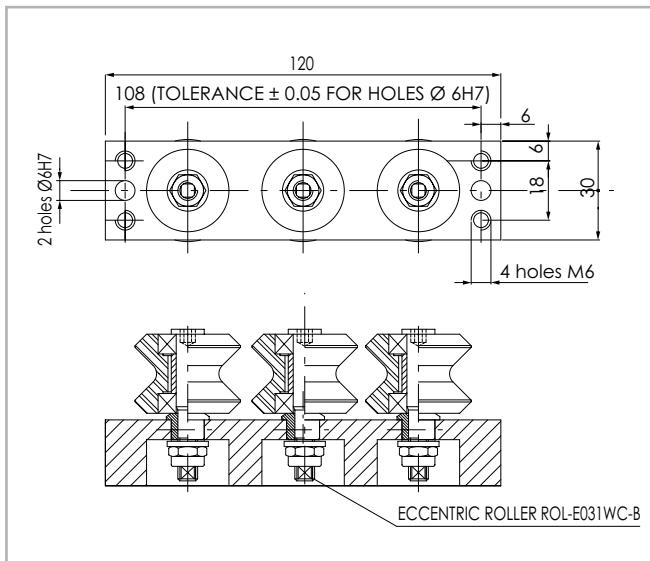


Fig. 21

55.1060 - Roller assembly with two concentric rollers and one eccentric roller  
Max. load per roller: radial 270 N / axial 100 N

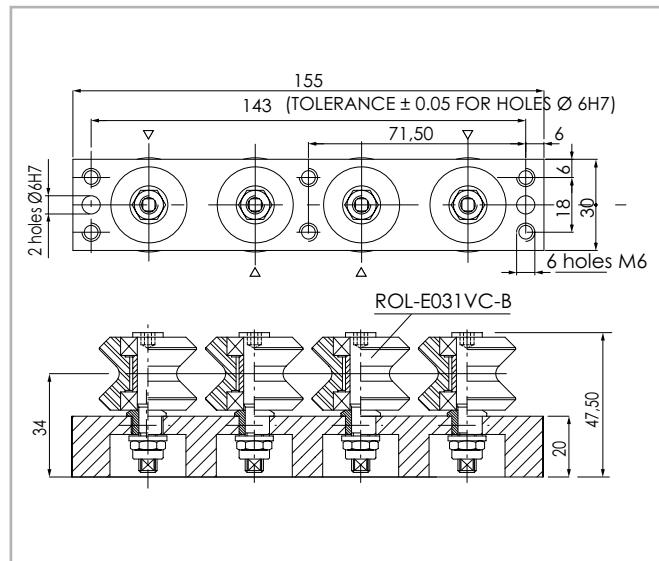


Fig. 22

55.1064 - Roller assembly with 4 rollers, 3 conc. and 1 ecc.  
Max. load per roller: radial 270 N / axial 100 N

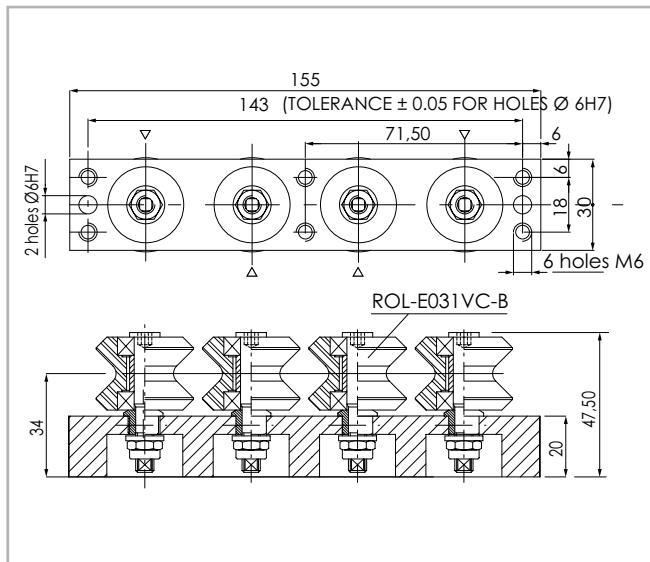


Fig. 23

55.1069 - Roller assembly with 4 rollers, 2 conc. and 2 ecc.  
Max. load per roller: radial 270 N / axial 100 N

On roller assemblies with 3-4 rollers it is possible to have different solutions (axial constrained, axial free, concentric and eccentric rollers).

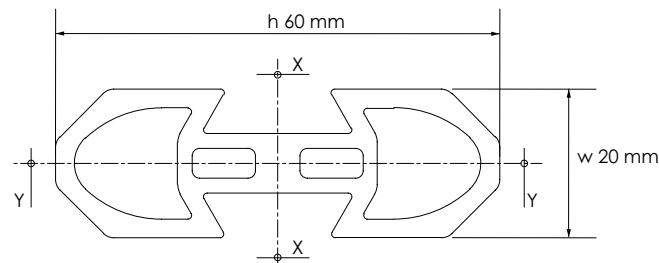
**Speedy Rail 60****"Speedy Rail Mini" guide and specification**

Fig. 24

Surface quadratic moments: X-X axis = 138.600 mm<sup>4</sup> / Y-Y axis = 18.000 mm<sup>4</sup>.

Max. manufacturing tolerances =  $\pm 0.15$  mm across opposite rolling surfaces.

Max. angular distortion =  $\pm 20'$ /m.

Linear mass = 1.27 Kg/m.

Max. linear distortion =  $\pm 0.4$  mm/m.

Standard lengths: 1000-1500-2000-2500-3000-3500-4000-4500-5000-5500-6000-6500-7000 mm.

Ext. surface: deep hard anodizing

➤ "Speedy Rail Mini" roller assemblies and components

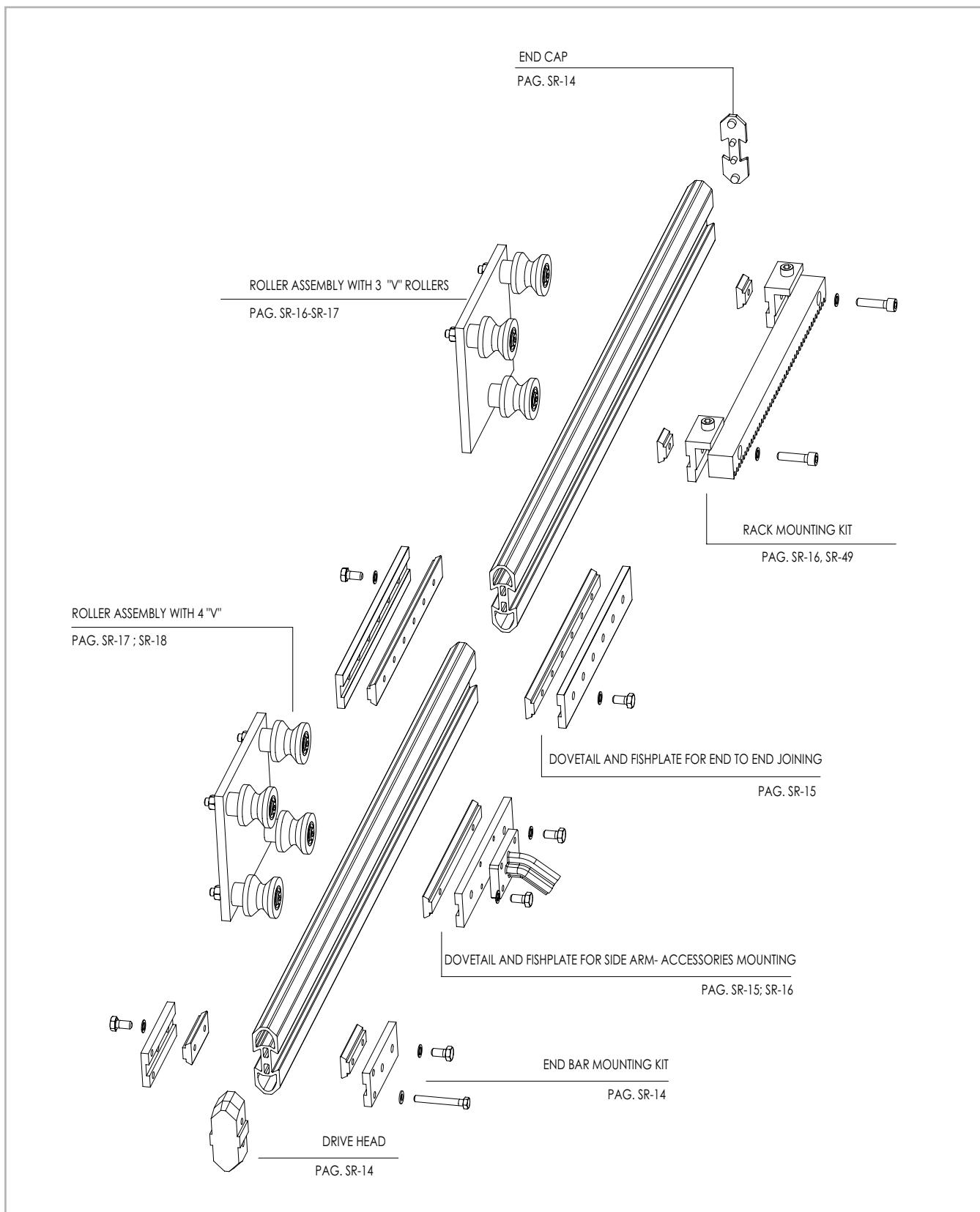


Fig. 25

## > "Speedy Rail Mini" guide and components

### Mini speedy rail with plain ends

SR060 - T

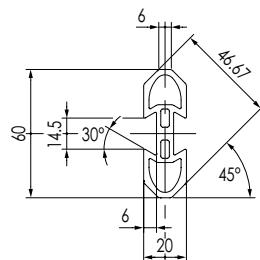
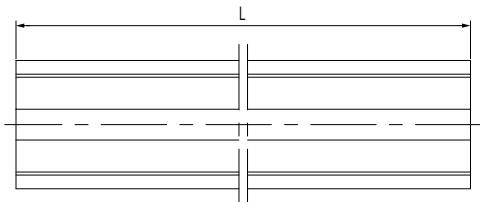


Fig. 26

### Mini speedy rail with drilled ends

SR060 - F

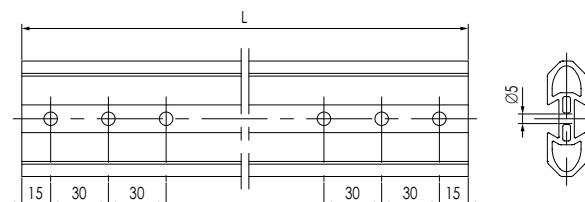


Fig. 27

### Fishplate for drive head

411.0767

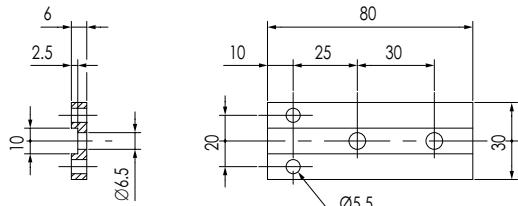


Fig. 28

### M6 allen round head screw

411.0775

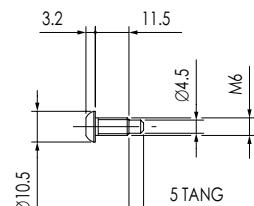


Fig. 29

### Drive head

411.0776

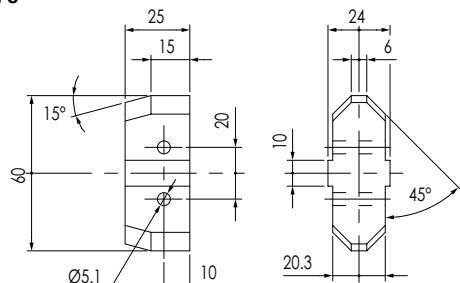


Fig. 30

### End cap

411.0739

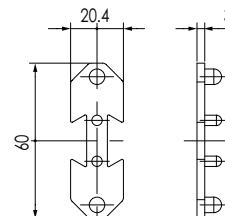


Fig. 31

## Bolt for drive head mount

411.0818

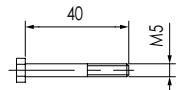


Fig. 32

## &gt; Dovetail clamps and fishplates

## Dovetail clamps

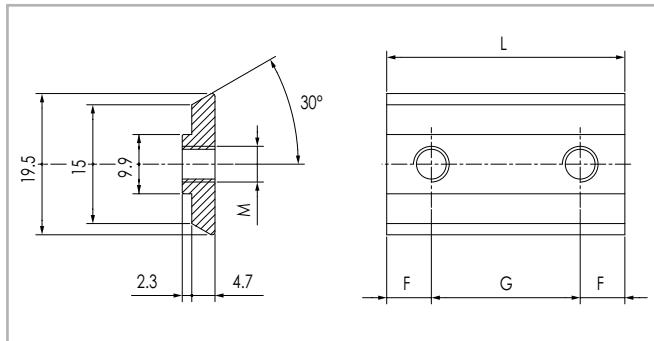
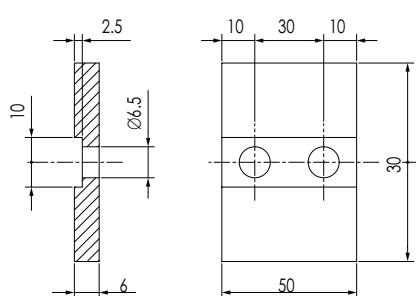


Fig. 33

## Fishplate

411.0463

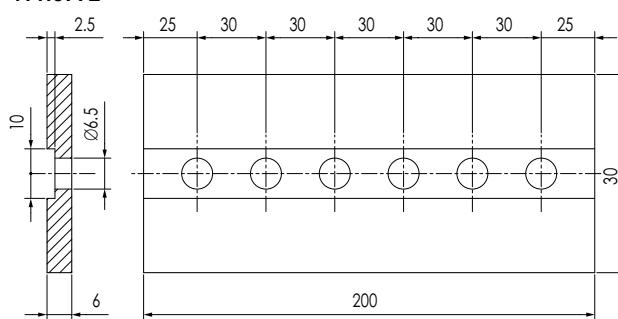


Material: hard anodized aluminium alloy

Fig. 34

## Fishplate for end to end joining

411.0772



Material: hard anodized aluminium alloy

Fig. 35

Code N°	N° Holes	F	G	L	M	Material
411.1732	1	10	/	20	M4	
411.2732	1	10	/	20	M5	
411.2733	9	8	60	496	M5	
411.0732	1	10	/	20	M6	
411.0768	2	15	30	60	M6	
411.0754	3	10	30	80	M6	
411.0769	6	25	30	200	M6	
411.0771	2	25	100	150	M6	
411.0462	2	10	30	50	M6	
411.3532	1	10	/	20	M8	

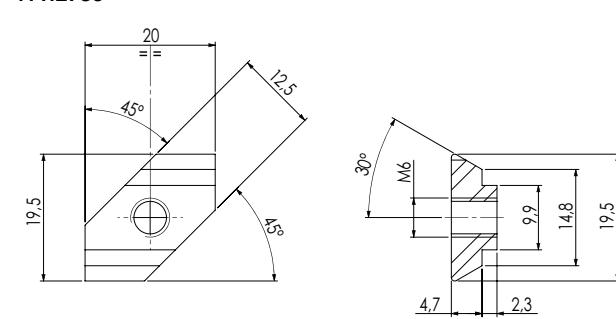
Burnished steel

Tab. 2

S R

## Dovetail quick front insertion

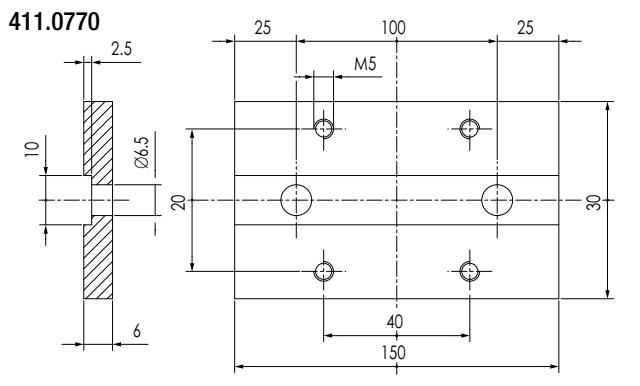
411.2736



Material: hard anodized aluminium alloy

Fig. 36

Fishplate for side-arm attachment



Material: hard anodized aluminium alloy

Fig. 37

Plate for m2 rack mounting

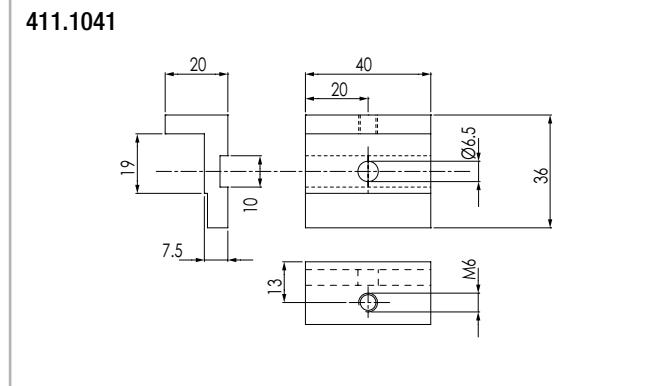
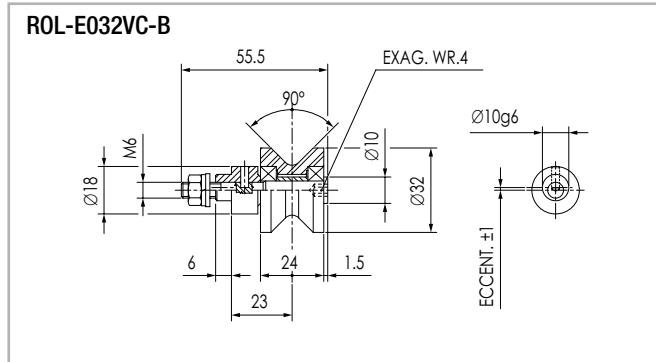


Fig. 38

➤ Roller assembly and "V" rollers "Light"

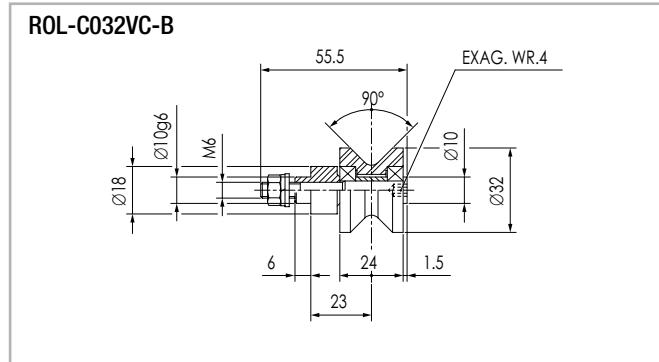
Plastic compound eccentric roller



Max. load: radial 270 N axial 100 N

Fig. 39

Plastic compound concentric roller

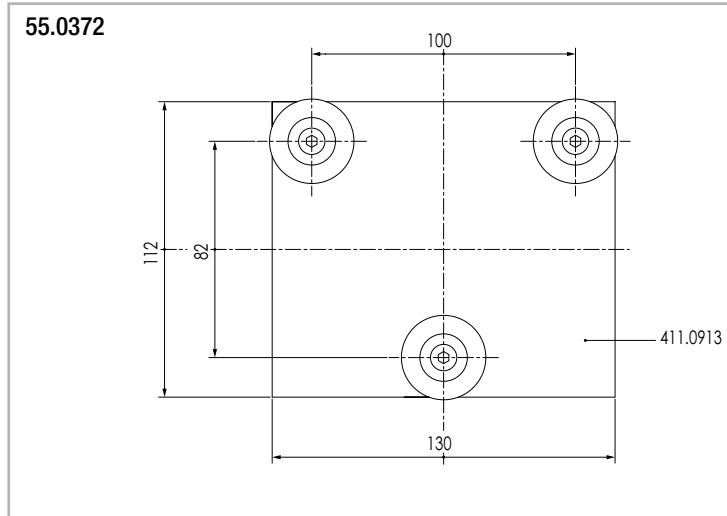


Max. load: radial 270 N axial 100 N

Fig. 40

For axially free roller see page SR-10 ( 55.1072 CONC. - 55.1073 ECC. )

Roller assembly with 3 rollers



411.0913

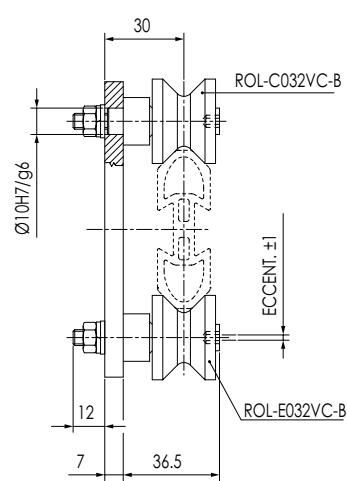


Fig. 41

## Roller assembly with 4 rollers

55.0375

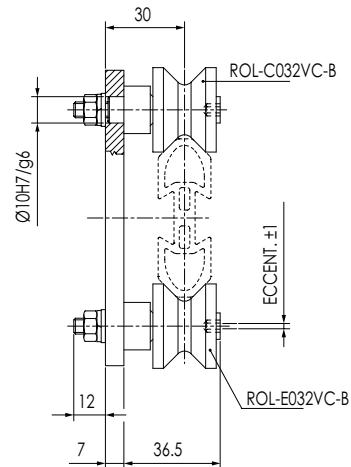
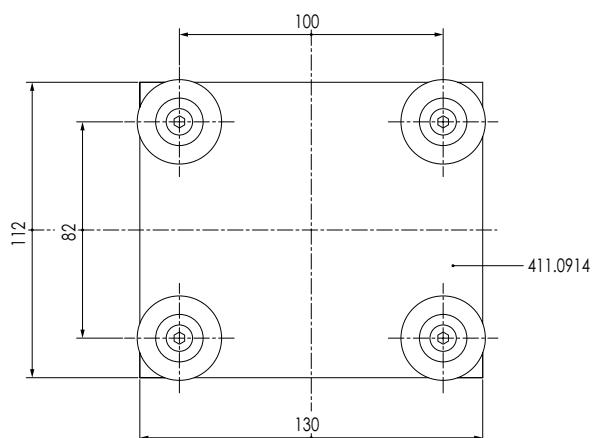
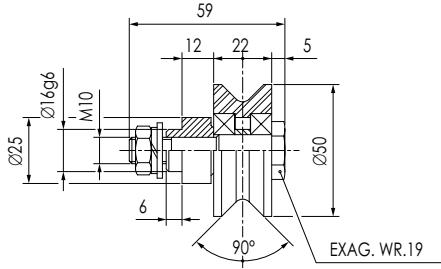


Fig. 42

## &gt; Roller assemblies and "V" rollers

## Plastic compound concentric roller

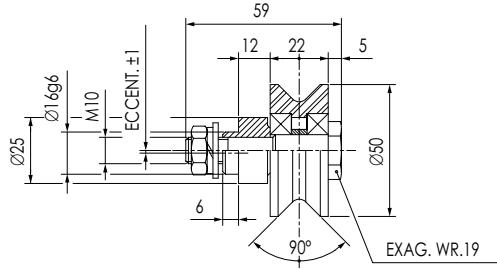
ROL-C050VC-B



Max. load: radial 400 N axial 100 N

## Plastic compound eccentric roller

ROL-E050VC-B



Max. load: radial 400 N axial 100 N

Fig. 44

## Roller assembly with 3 rollers

55.0605

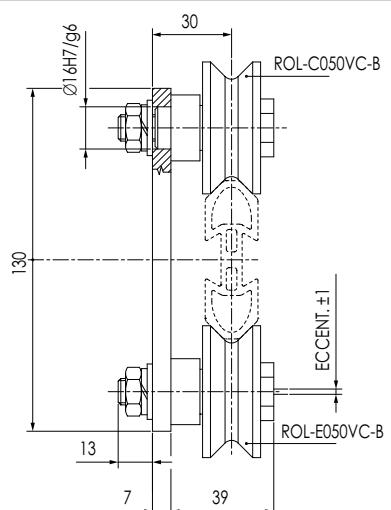
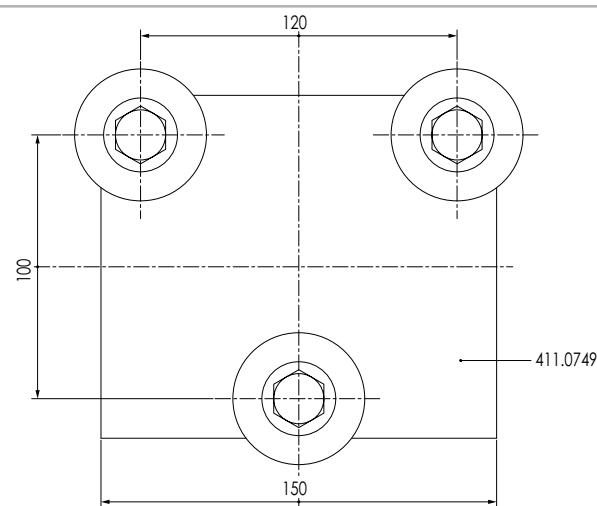


Fig. 45

## Roller assembly with 4 rollers

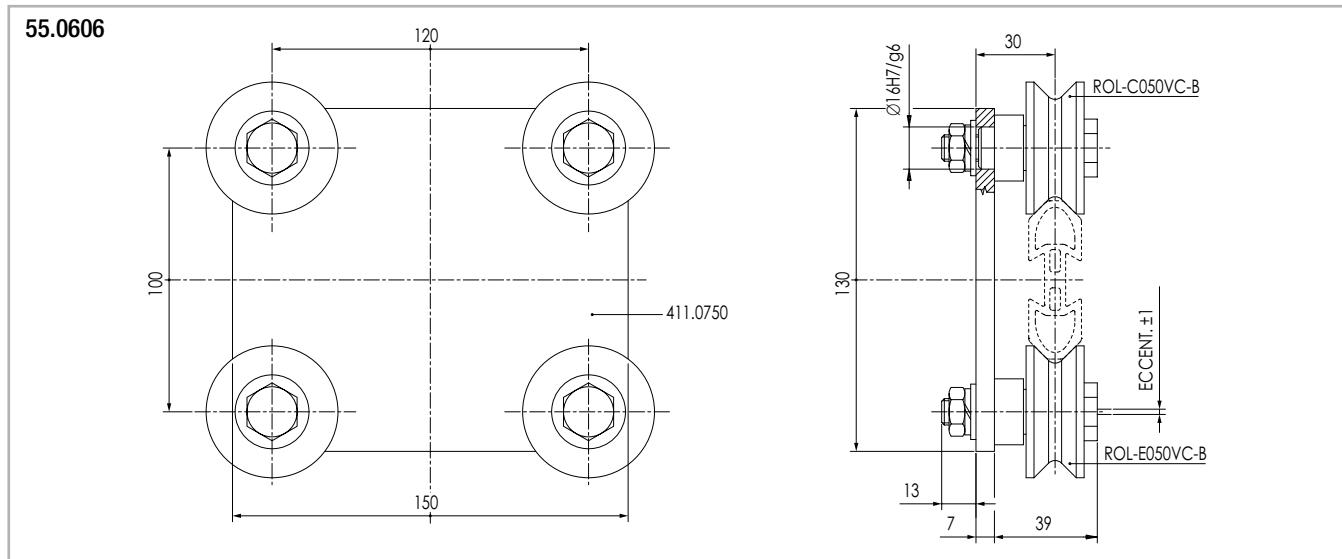


Fig. 46

## Speedy Rail 90



### ► "Middle Speedy Rail" guide and specifications

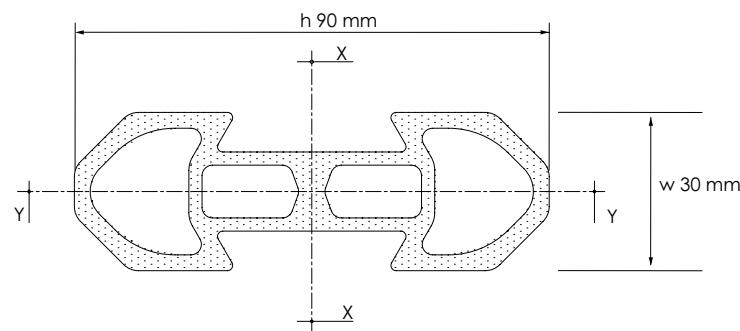


Fig. 47

Surface quadratic moments: X-X axis = 630.000 mm<sup>4</sup> / Y-Y axis = 76.500 mm<sup>4</sup>.

Max. manufacturing tolerances =  $\pm 0.20$  mm across opposite rolling surfaces.

Max. angular distortion =  $\pm 20'$ /m.

Linear mass = 2.6 Kg/m.

Max. linear distortion =  $\pm 0.4$  mm/m.

Standard lengths: 1000-1500-2000-2500-3000-3500-4000-4500-5000-5500-6000-6500-7000-7500 mm.

External surface: deep hard anodizing

> "Middle Speedy Rail" assemblies and components

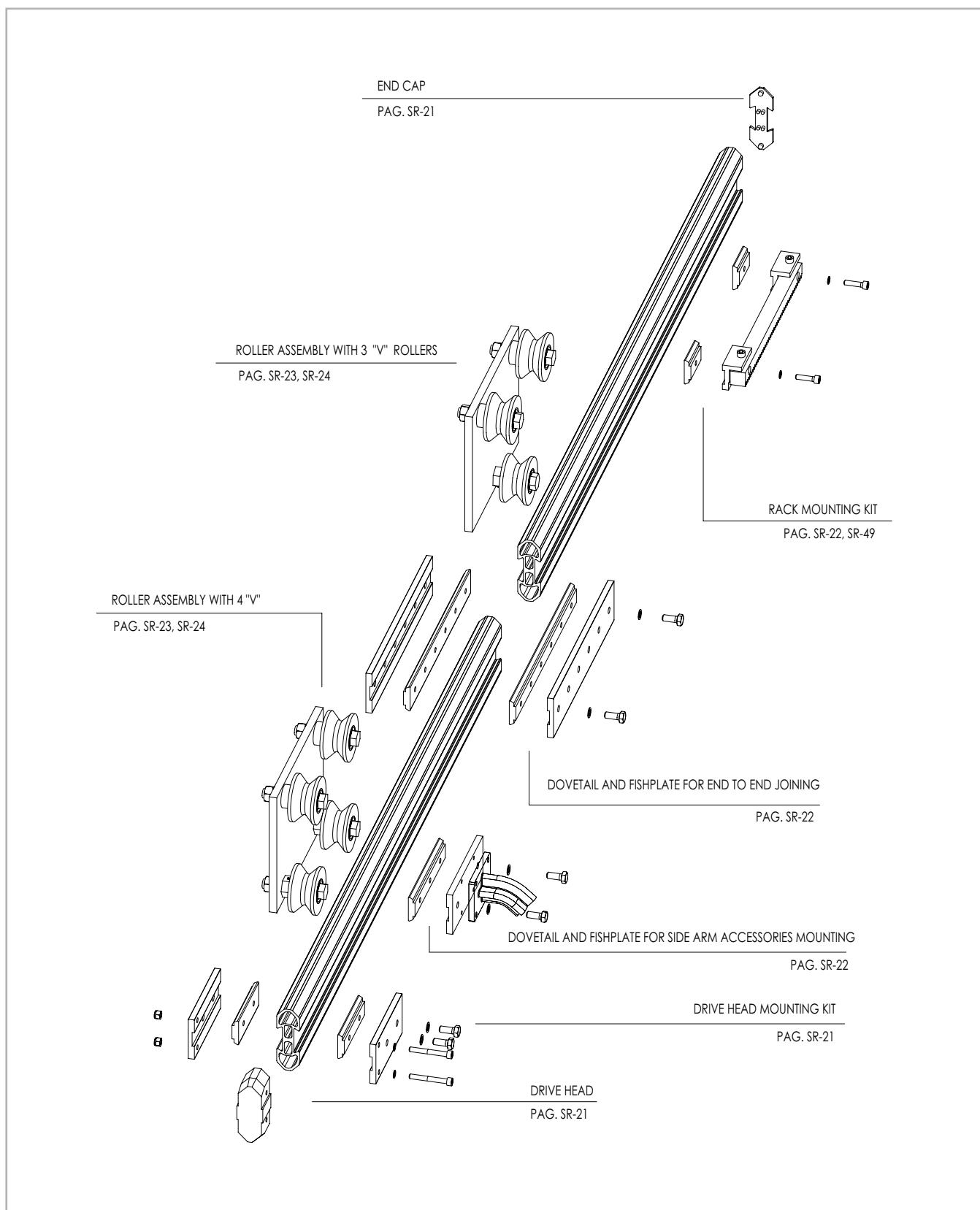


Fig. 48

## > "Middle Speedy Rail" guide and components

### Middle Speedy Rail with plain ends

SR090 -T

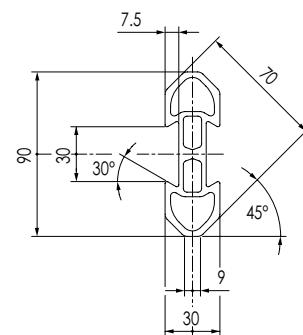
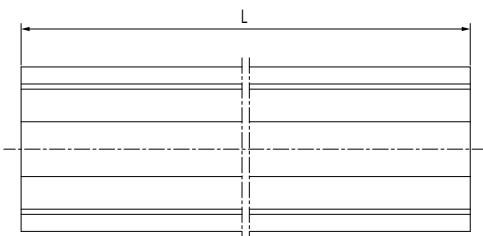


Fig. 49

### Middle Speedy Rail with drilled ends

SR090 - F

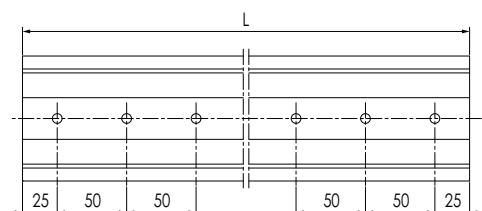


Fig. 50

### Fishplate for drive head

411.0866

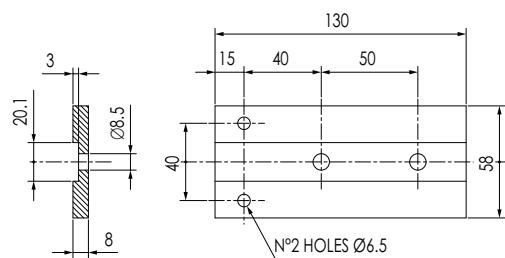


Fig. 51

### Drive head

411.0856

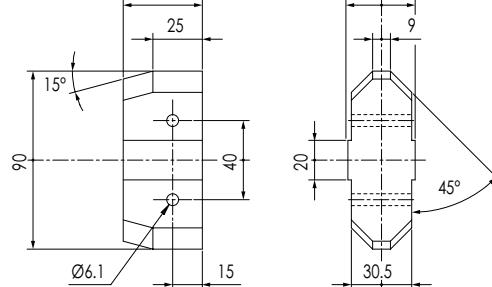


Fig. 52

S  
R

### End cap

411.0858

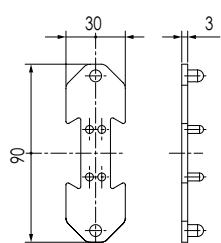


Fig. 53

### Bolt for drive head mount

411.0610

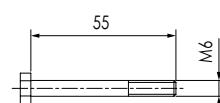


Fig. 54

## > Dovetail clamps and fishplates

### Dovetail Clamp

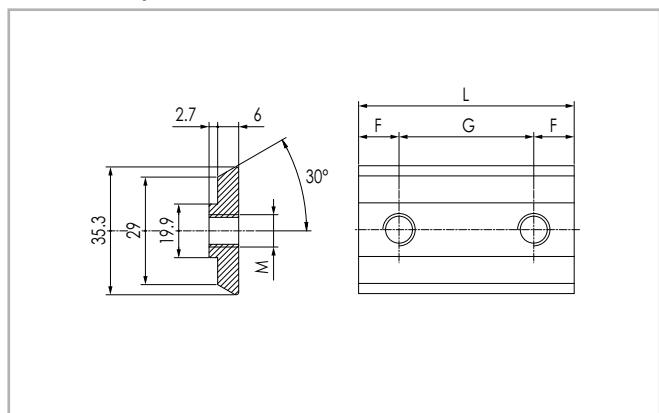


Fig. 55

### Dovetail-execution without step

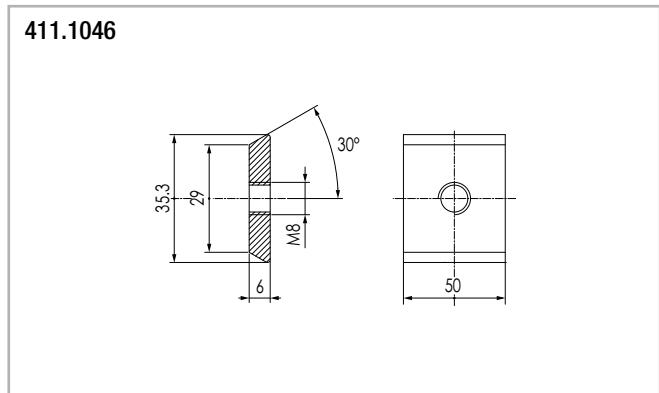
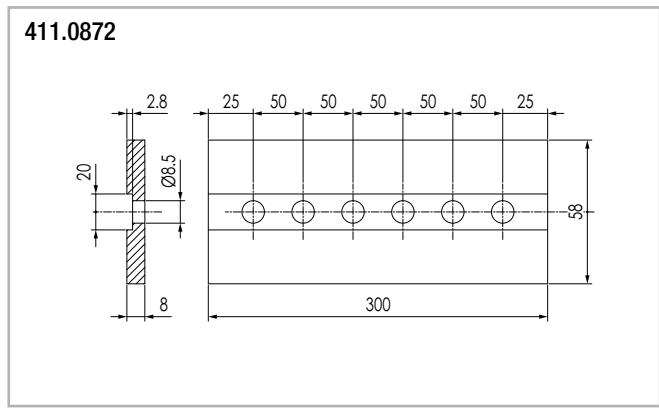


Fig. 56

### Fishplate for end to end joining



Material: hard anodized aluminium alloy

Fig. 58

### Steel plate for m2 rack mounting

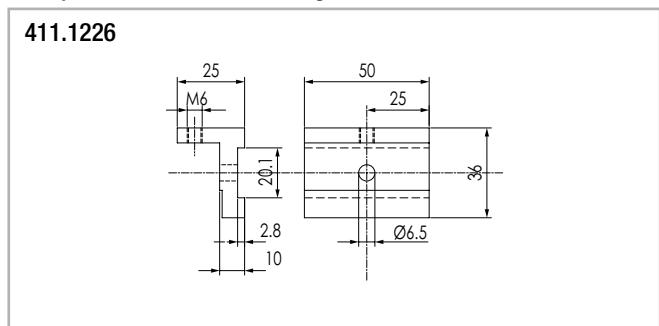


Fig. 60

Code N.	Nº Holes	F	G	L	M	Material
411.1025	1	25	/	50	M4	Burnished steel
411.1047	1	25	/	50	M6	
411.1045	1	25	/	50	M8	
411.1069	2	25	50	100	M8	
411.1088	3	25	50	150	M8	
411.1072	4	25	50	200	M8	
411.1070	6	25	50	300	M8	

Tab. 3

### Dovetail-quick front insertion version

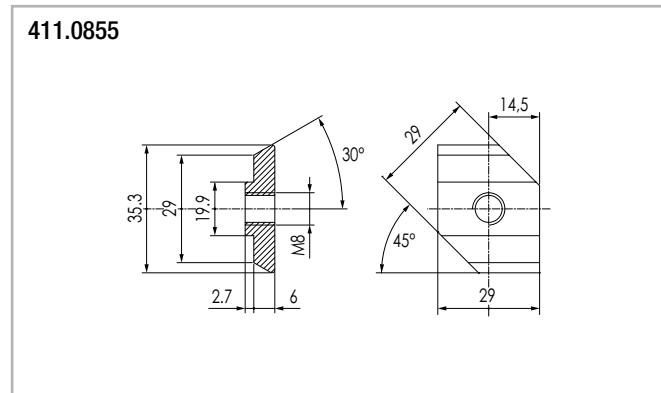
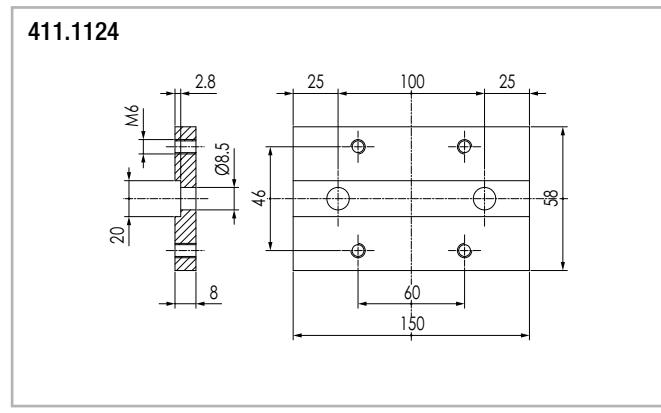


Fig. 57

### Fishplate for side-arm attachment



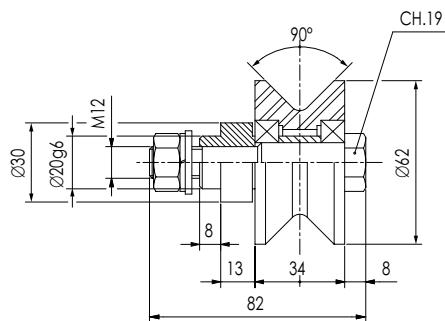
Material: hard anodized aluminium alloy

Fig. 59

## Plastic compound shell "V" rollers

### Concentric roller

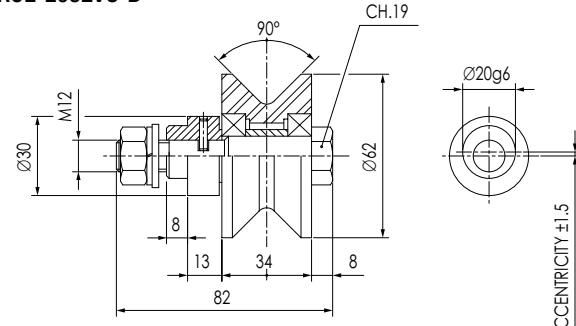
ROL-C062VC-B



Max. load: radial 450 N/axial 150 N - lifetime lubrication

### Eccentric roller

ROL-E062VC-B

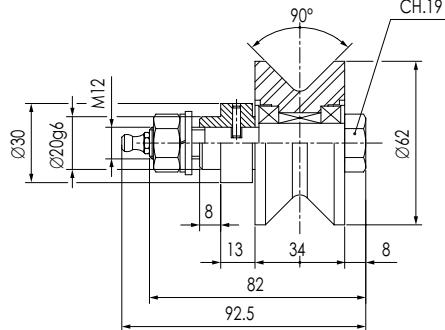


Max. load: radial 450 N/axial 150 N - lifetime lubrication

Fig. 62

### Concentric roller heavy duty

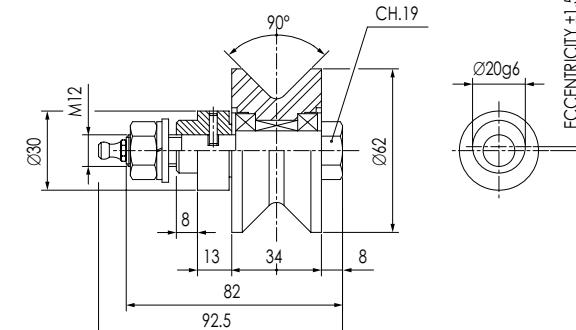
ROL-C062VC-BH



Max. Load: radial 700 N/axial 280 N - Optional lifetime lubrication

### Eccentric roller heavy duty

ROL-E062VC-BR

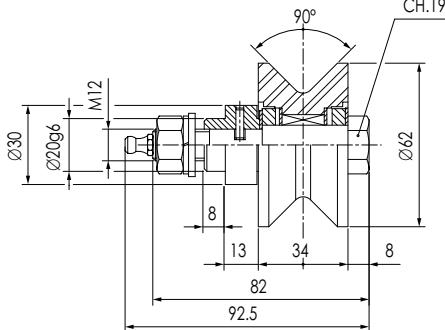


Max. Load: radial 700 N/axial 280 N - Optional lifetime lubrication

Fig. 64

### Concentric roller axially free $\pm 1.75$ mm

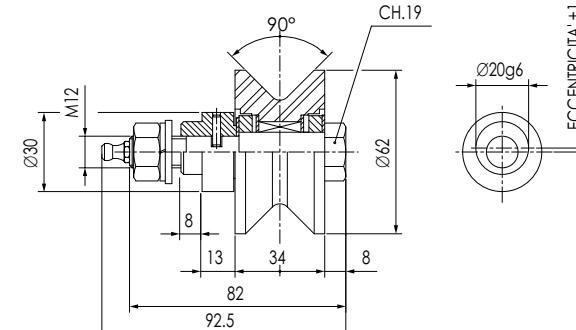
ROL-C062VC-BA



Max. radial load: 700 N - Optional lifetime lubrication

### Eccentric roller axially free $\pm 1.75$ mm

ROL-E062VC-BA



Max. radial load: 700 N - Optional lifetime lubrication

Fig. 66

## > Roller assembly with "V" shaped rollers

### Roller assembly with 4 rollers

55.0666

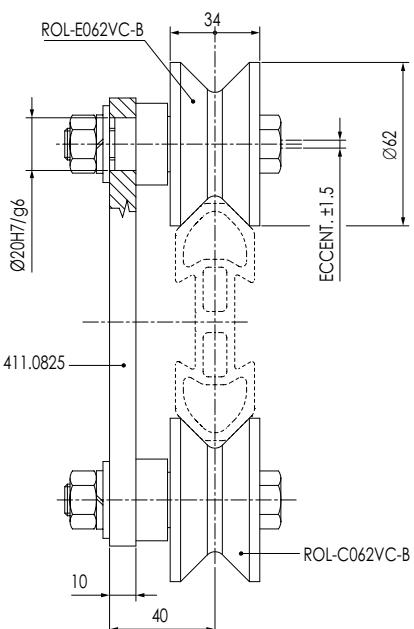
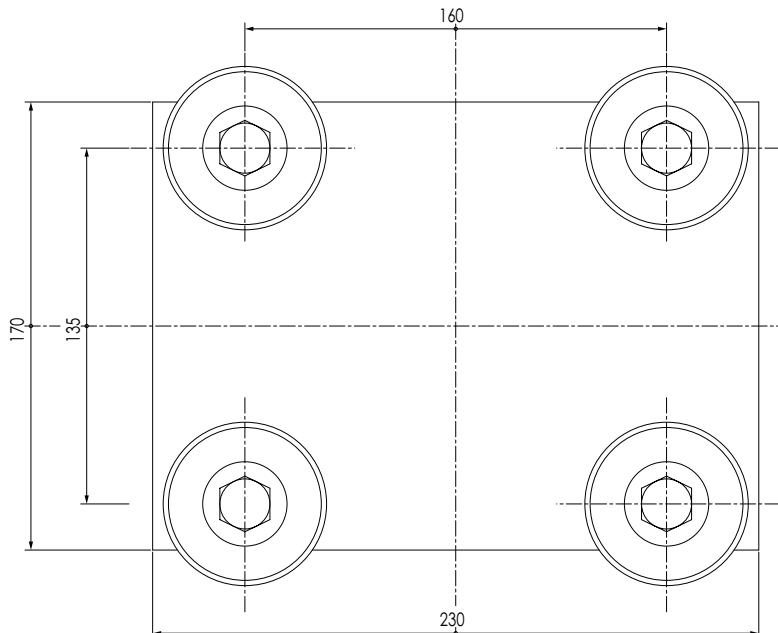


Fig. 67

### Roller assembly with 3 rollers

55.0665

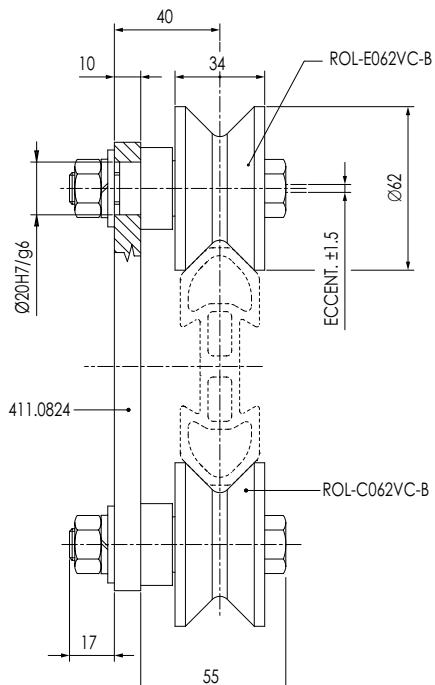
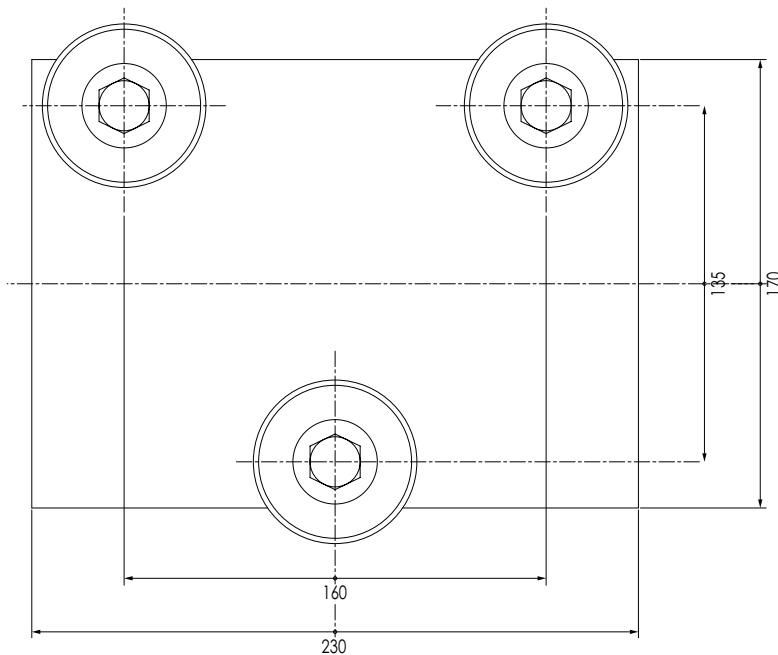


Fig. 68

The plates - cod. 411.0825 and 411.0824 - are made in aluminum alloy with hard anodization. The rollers cod. 55.0760 4 rollers ROL-C062VC-BH + ROL-E062VC-BR and 55.0759 3 rollers ROL-C062VC-BH + ROL-E062VC-BR and/or different combinations from the ones shown on this page can be mounted on the above plates. Please call our technical dept. Prior any configuration changes.

## Speedy Rail 120



### ► "Standard Speedy Rail" guide and specifications

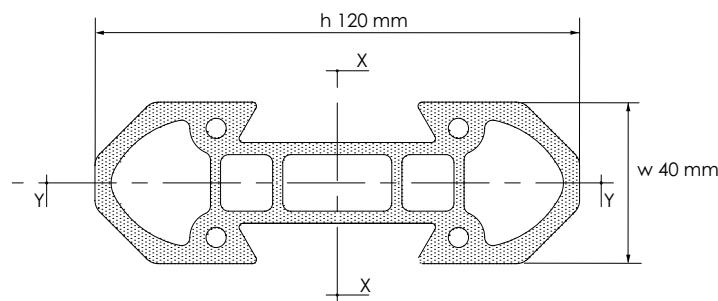


Fig. 69

Surface quadratic moments: X-X axis = 2.138.988 mm<sup>4</sup> / Y-Y axis = 259.785 mm<sup>4</sup>.

Max. manufacturing tolerances =  $\pm 0.20$  mm across opposite rolling surfaces.

Max. angular distortion =  $\pm 20'$ /m.

Linear mass = 4.4 Kg/m.

Max. linear distortion =  $\pm 0.5$  mm/m.

Standard lengths: 1000-1500-2000-2500-3000-3500-4000-4500-5000-5500-6000-6500-7000-7500 mm.

External surface: deep hard anodizing

> "Standard Speedy Rail" assemblies and components

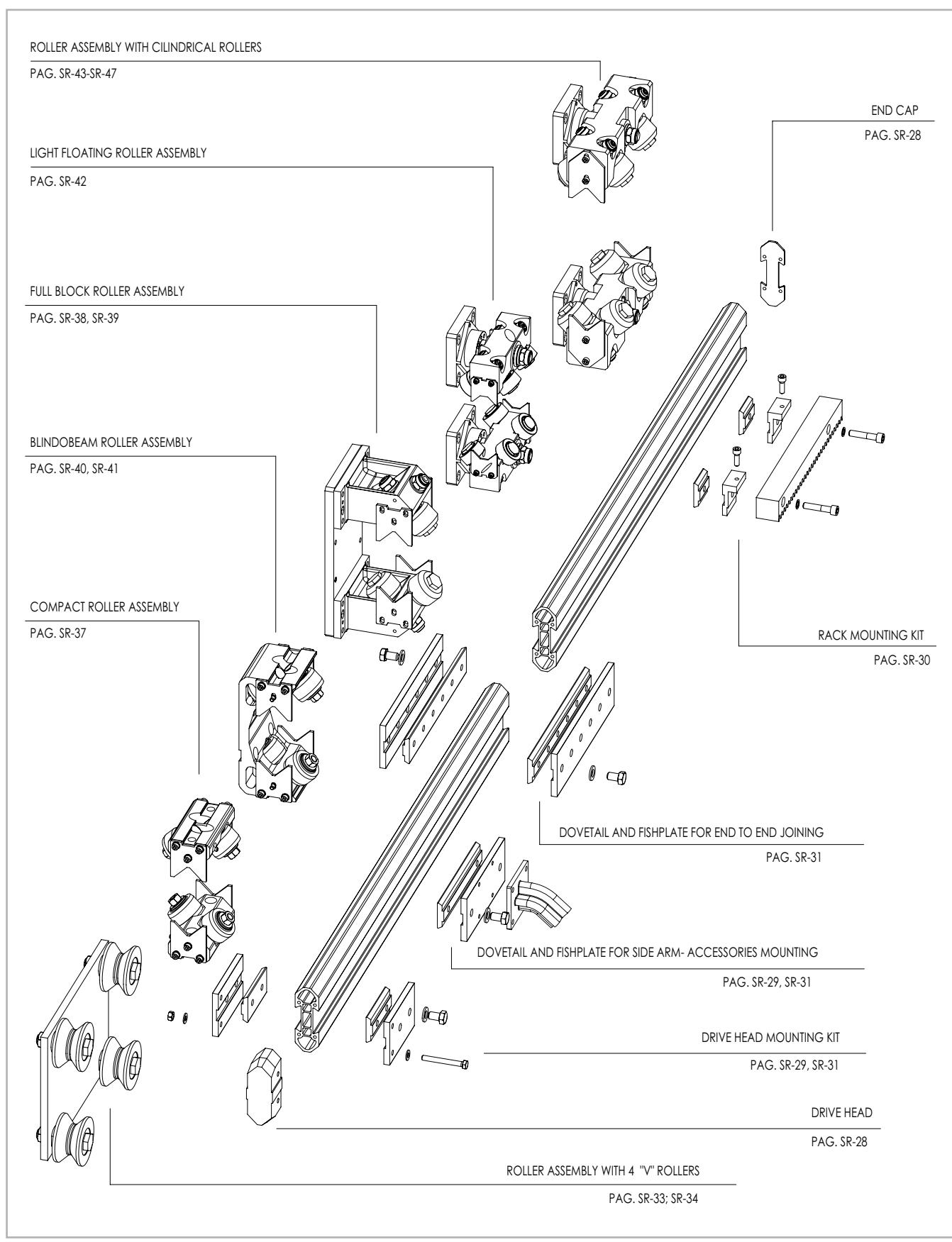


Fig. 70

## > "Standard Speedy Rail" guide and specifications

### Standard Speedy Rail with plain ends

SR120 -T

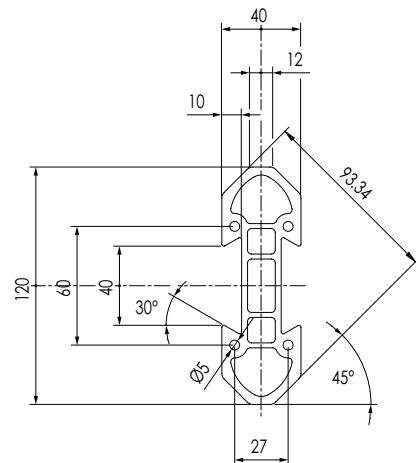
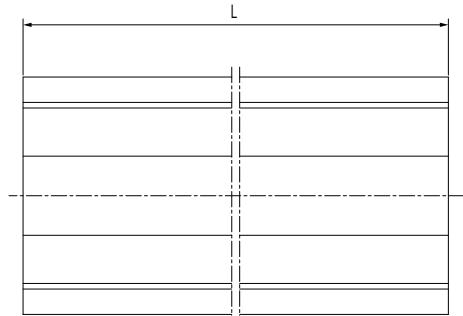


Fig. 71

### Standard Speedy Rail with drilled ends

SR120 - F

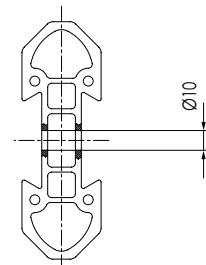
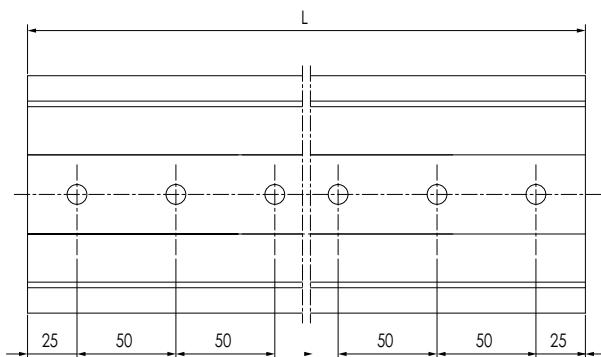


Fig. 72

**Note:** drillings on guide end are required as a safety measure with end-to-end joining in moving rails.

## Components for speedy rail SR120 guide

### Drive head

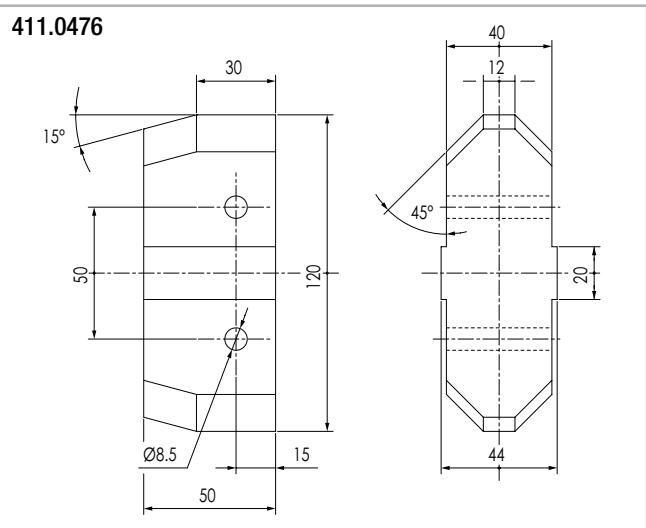


Fig. 73

### Aluminium alloy end cap

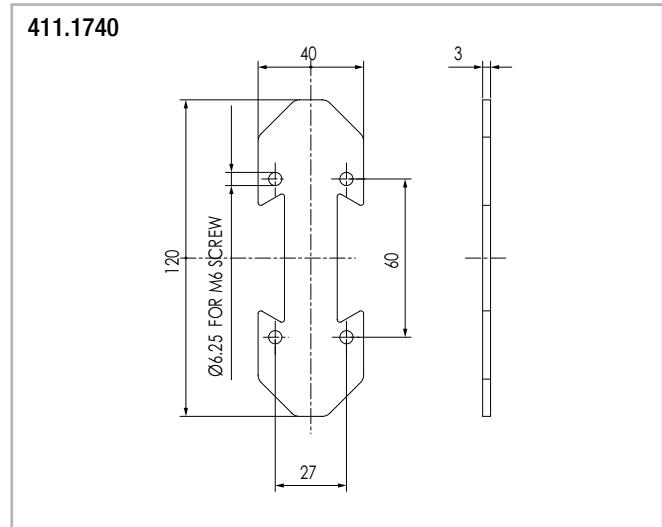


Fig. 75

### Bolt for drive head

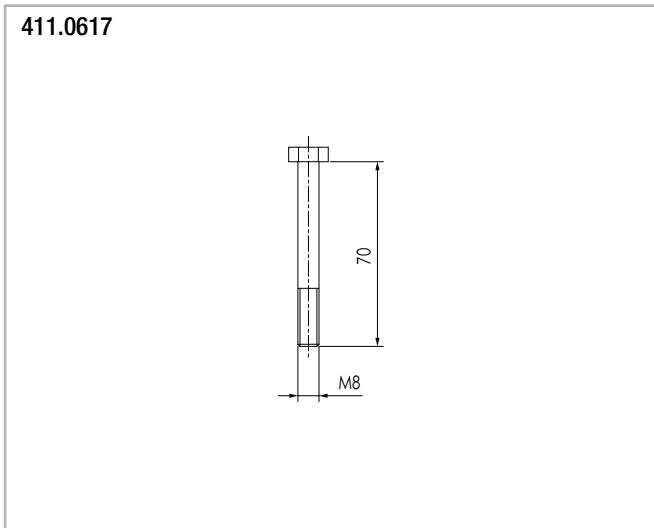


Fig. 74

## Standard dovetail clamps

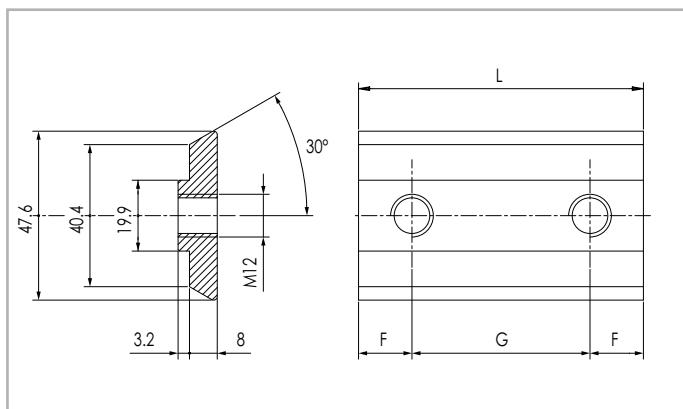


Fig. 76

Code N.	Nº Holes	F	G	L	Material
411.0745	1	25	/	50	Burnished steel
411.0503	2	15	40	70	
411.0469	2	25	50	100	
411.0588	3	25	50	150	
411.0472	2	25	150	200	
411.0470	6	25	50	300	

Tab. 4

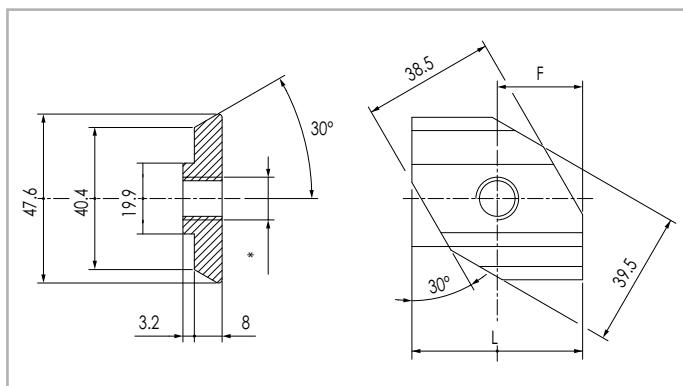


Fig. 77

**411.1178**  
\* M10 dovetail-quick front-insertion version

**411.0845**  
\* M12 dovetail-quick front-insertion version

## Dovetail clamps with M8 threaded holes

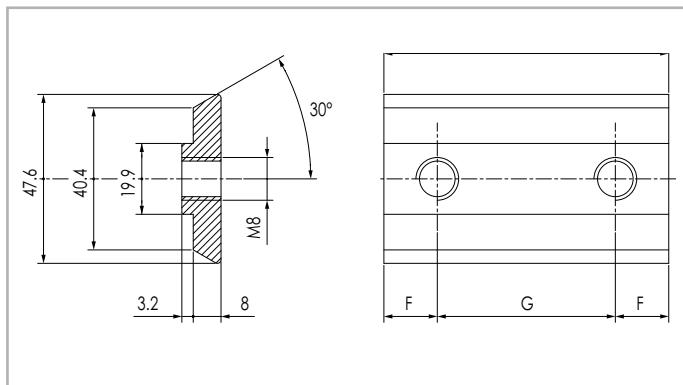


Fig. 78

Code N.	Nº Holes	F	G	L	Material
411.0675	2	15	20	50	Burnished steel
411.1111	1	25	/	50	
411.1112	2	25	50	100	
411.1113	3	25	50	150	
411.0970	6	25	50	300	

Tab. 5

## Dovetail clamps with M10 threaded holes

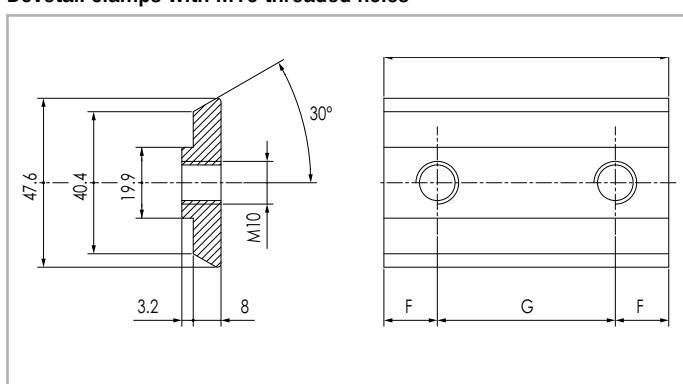


Fig. 79

Code N.	Nº Holes	F	G	L	Material
411.1117	1	25	/	50	Burnished steel
411.1119	2	25	50	100	
411.1120	3	25	50	150	

Tab. 6

## Steel dovetail without step

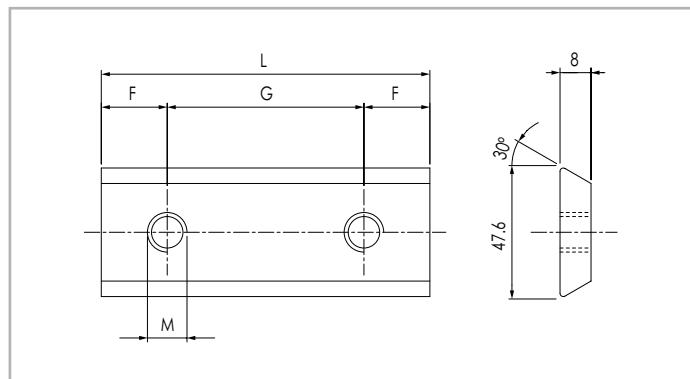


Fig. 80

Code N.	Nº Holes	F	G	L	M	Material
411.1675	2	15	20	50	M8	
411.1186	1	25	/	50	M10	Burnished
411.1185	1	25	/	50	M12	steel
411.0888	3	25	50	150	M12	

Tab. 7

## Steel dovetail quick front insertion without step

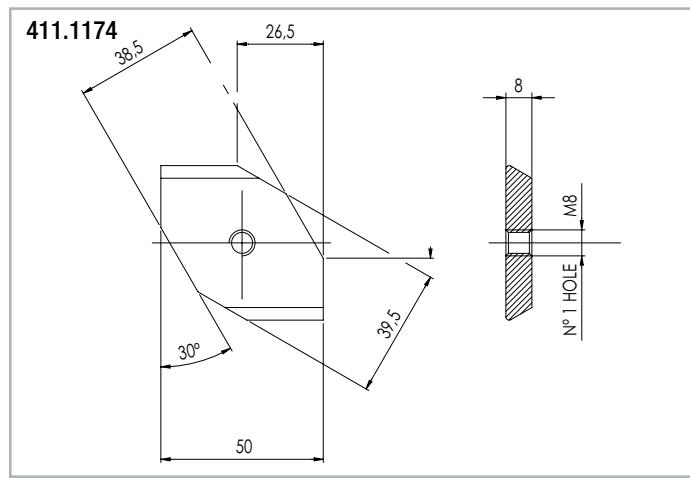


Fig. 81

## Racks components for rigid mounting

## Fishplate for mod.3-4 rack mounting on dovetail grooves

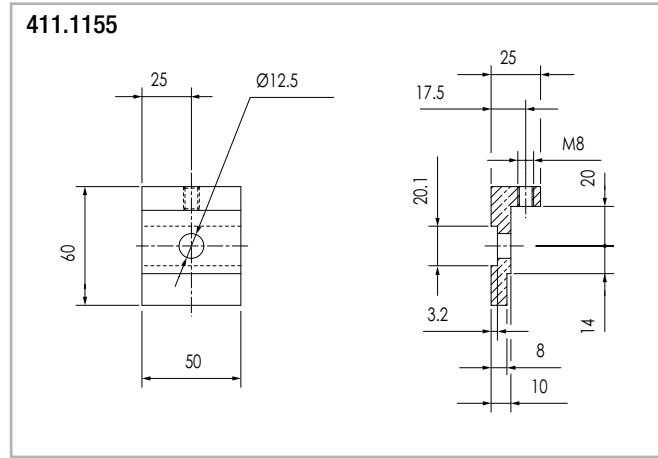


Fig. 82

For rack mounting plate mod.3 Use dovetail 411.1111

For rack mounting plate mod.4 Use dovetail 411.1117

For standard racks see page SR-49; For dovetail see page SR-29, SR-30; For insert see page SR-53

## ➤ Standard fixing fishplates

Side attachment fishplate suitable for: speedy rail standard, wide body, super wide body

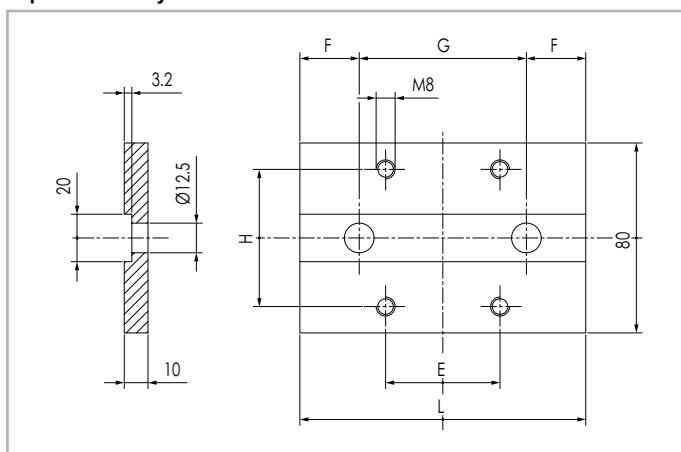


Fig. 83

Code N.	E	F	G	H	L	Material
411.0570	70	25	150	60	200	Hard anodized aluminium alloy

Tab. 8

Fishplates for end to end joining suitable for speedy rail standard, wide body, super wide body

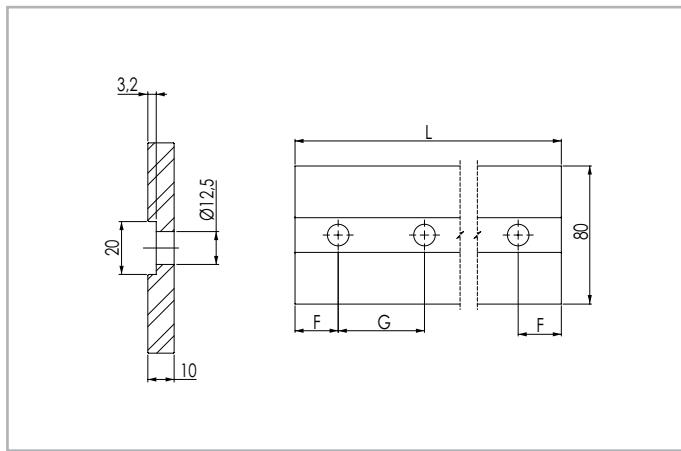


Fig. 84

Code N.	N° Holes	L	F	G	Material
411.0572	6	300	25	50	Hard anodized aluminium alloy
411.0690	6	300	25	50	Burnished steel
411.0573	6	300	25	50	Steel/countersuk holes

Tab. 9

Fishplate for drive head

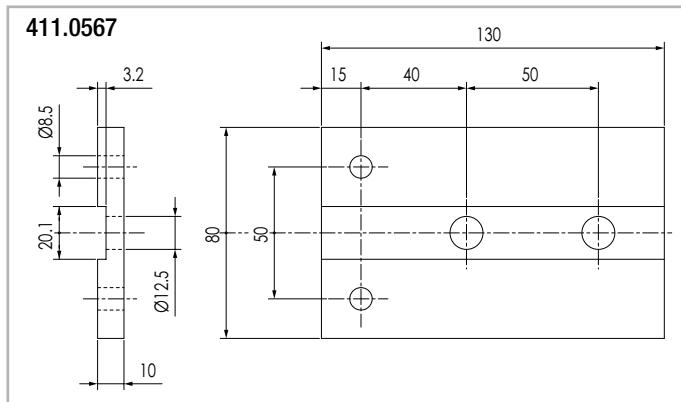


Fig. 85

M12 exag. head screw

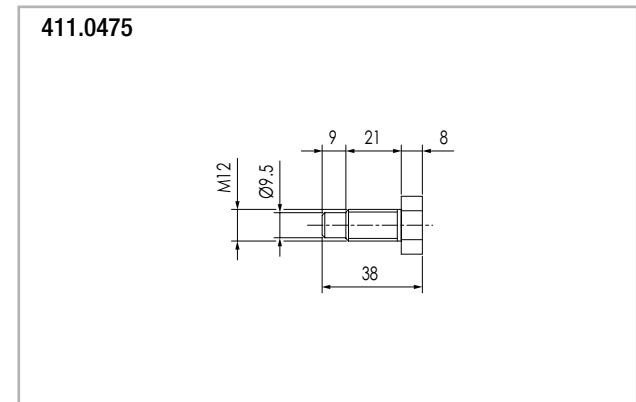
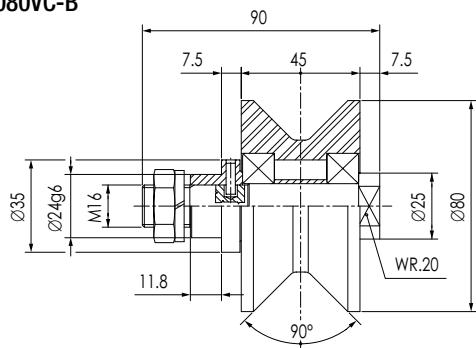


Fig. 86

## Plastic compound shell "V" rollers

### Concentric roller

ROL-C080VC-B

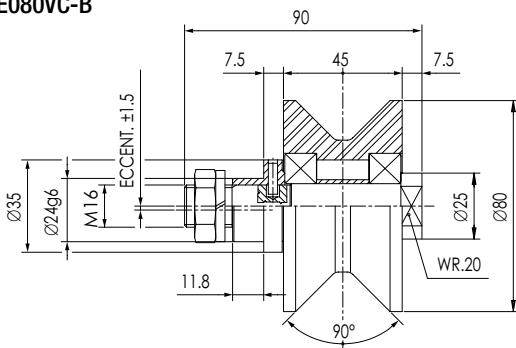


Radial load 700 N max. axial load 200 N max. - lifetime lubrication

Fig. 87

### Eccentric roller

ROL-E080VC-B

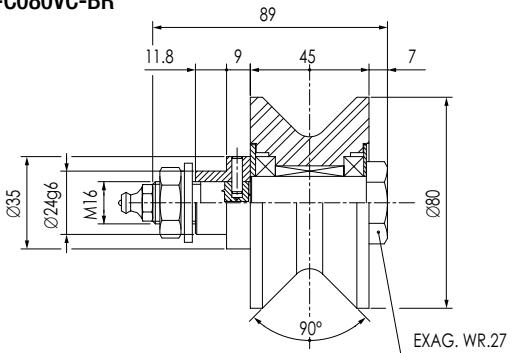


Radial load 700 N max. axial load 200 N max. - lifetime lubrication

Fig. 88

### High stiffness concentric roller

ROL-C080VC-BR

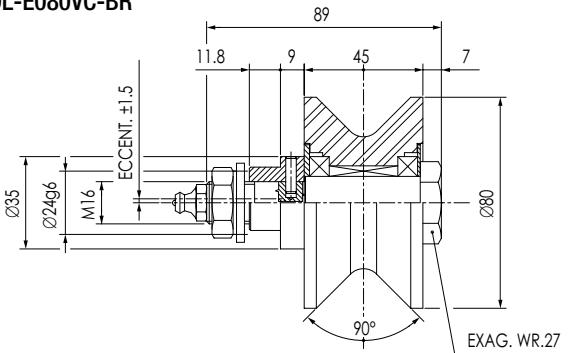


Radial load 1000 N max. axial load 400 N max. - Optional lifetime lubrication  
(end play 0.010/0.030 mm)

Fig. 89

### High stiffness eccentric roller

ROL-E080VC-BR

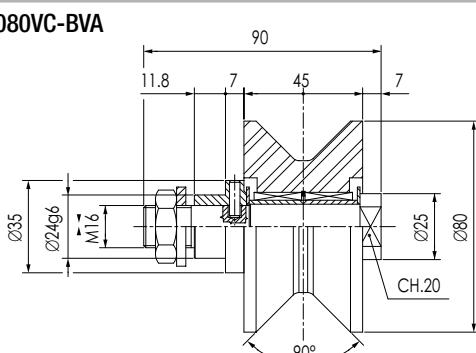


Radial load 1000 N max. axial load 400 N max. - Optional lifetime lubrication  
(end play 0.010/0.030 mm)

Fig. 90

### Concentric roller - axially free: ±1.9 mm

ROL-C080VC-BVA

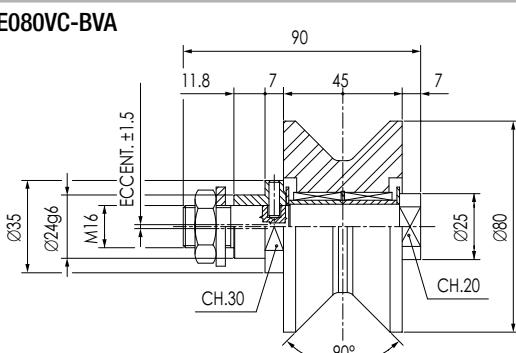


Radial load: 1000 N max. - lifetime lubrication

Fig. 91

### Eccentric roller - axially free: ±1.9 mm

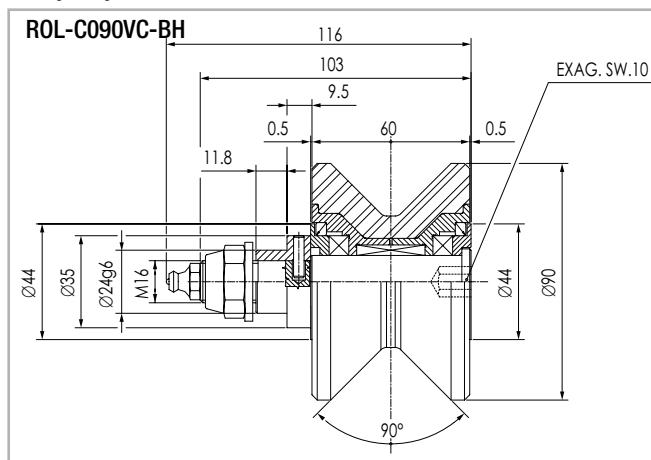
ROL-E080VC-BVA



Radial load: 1000 N max. - lifetime lubrication

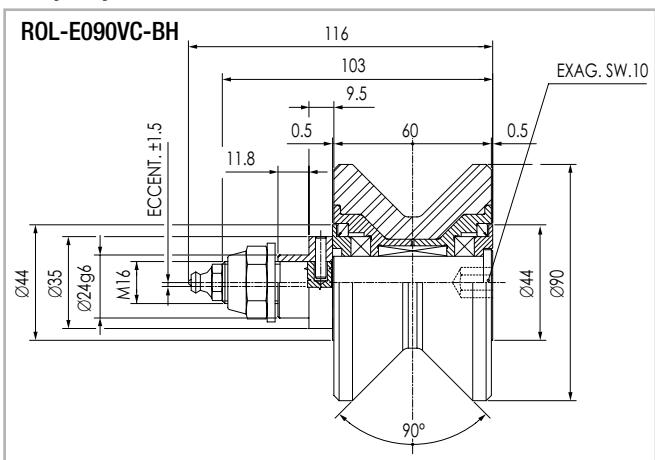
Fig. 92

## Heavy duty concentric 'V' roller



Max. load: radial 1150 N axial 650 N - Optional lifetime lubrication

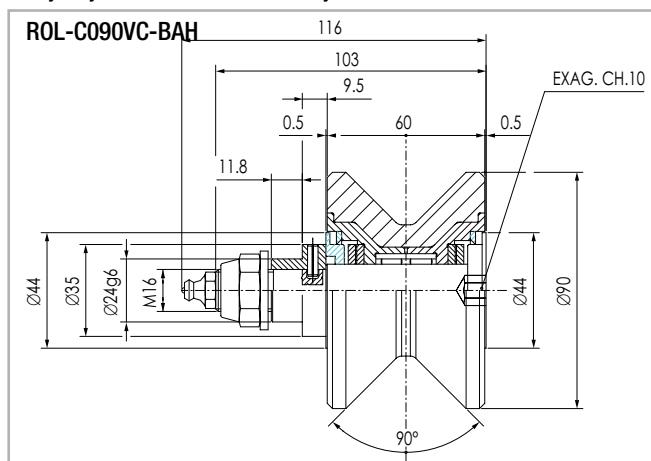
## Heavy duty eccentric 'V' roller



Max. load: radial 1150 N axial 650 N - Optional lifetime lubrication

Fig. 94

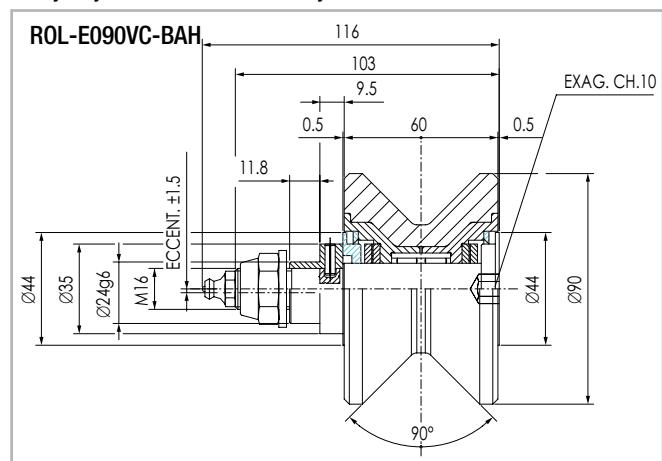
## Heavy duty concentric 'V' roller - axially free: ±1.5 mm



Radial load: 1150 N max. - Optional lifetime lubrication

Fig. 95

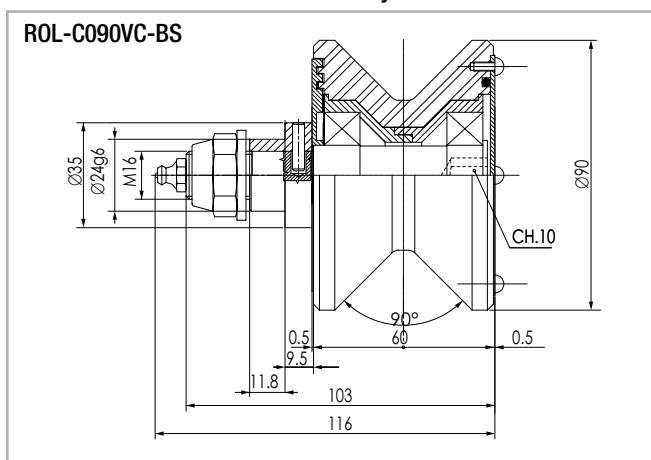
## Heavy duty eccentric 'V' roller - axially free: ±1.5 mm



Radial load: 1150 N max. - Optional lifetime lubrication

Fig. 96

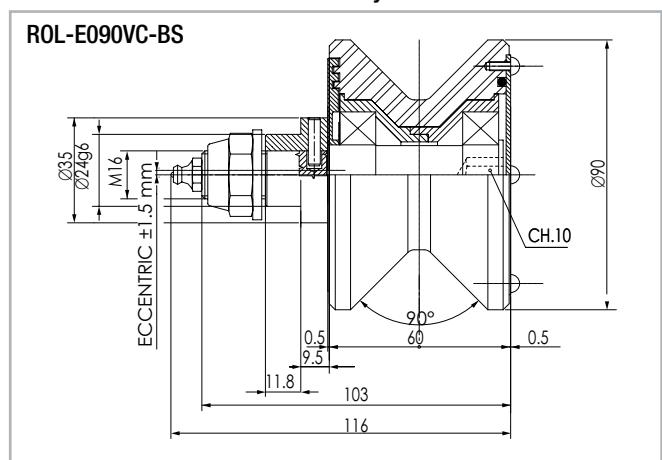
## Protected concentric 'V' roller for heavy duties



Max. load: radial 1150 N axial 650 N - Optional lifetime lubrication

Fig. 97

## Protected eccentric 'V' roller for heavy duties



Max. load: radial 1150 N axial 650 N - Optional lifetime lubrication

Fig. 98

## Wheelbase for all 'V' shaped rollers on Speedy Rail:

Wheelbase between roller centers for SR250 = 302,2 mm  
 Wheelbase between roller centers for SR180 = 232,2 mm  
 Wheelbase between roller centers for SR120 = 176,2 mm

## Roller assembly with "V" rollers

## Light weight roller assembly with 4 rollers

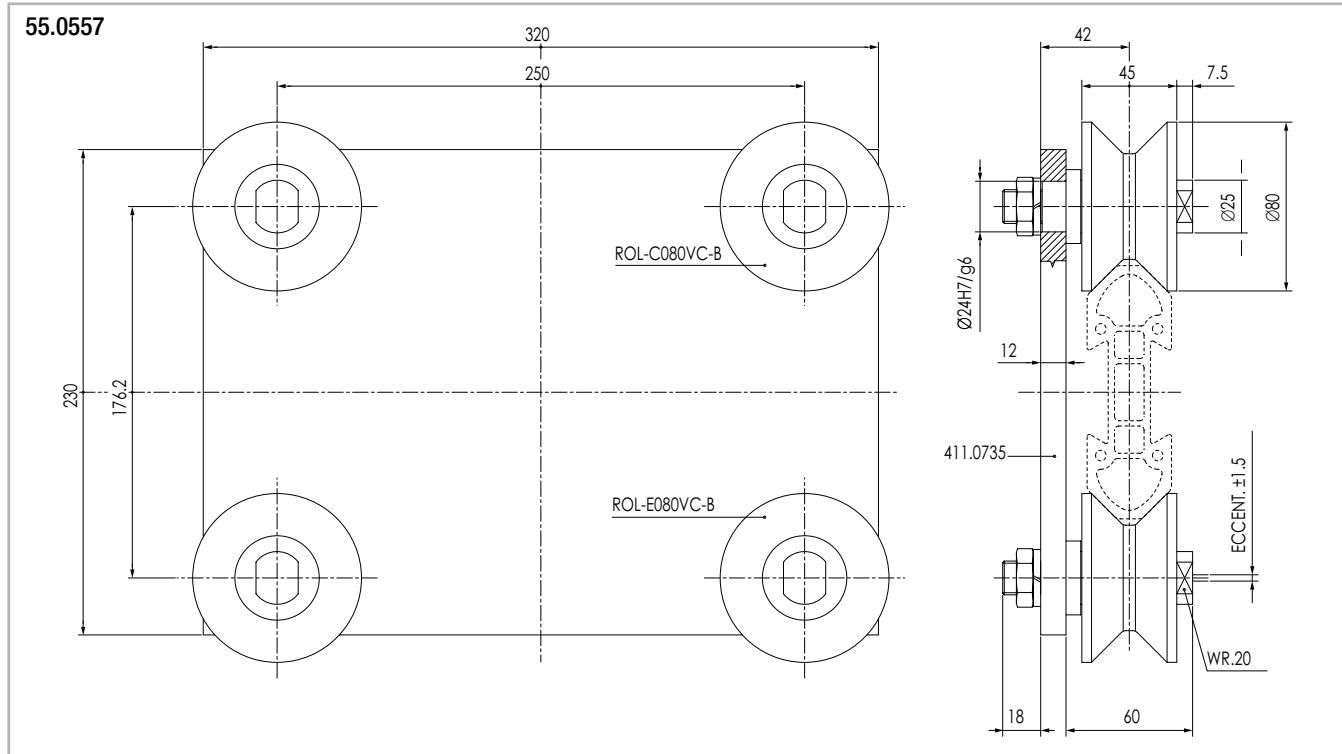


Fig. 99

## Roller assembly with 4 high stiffness rollers

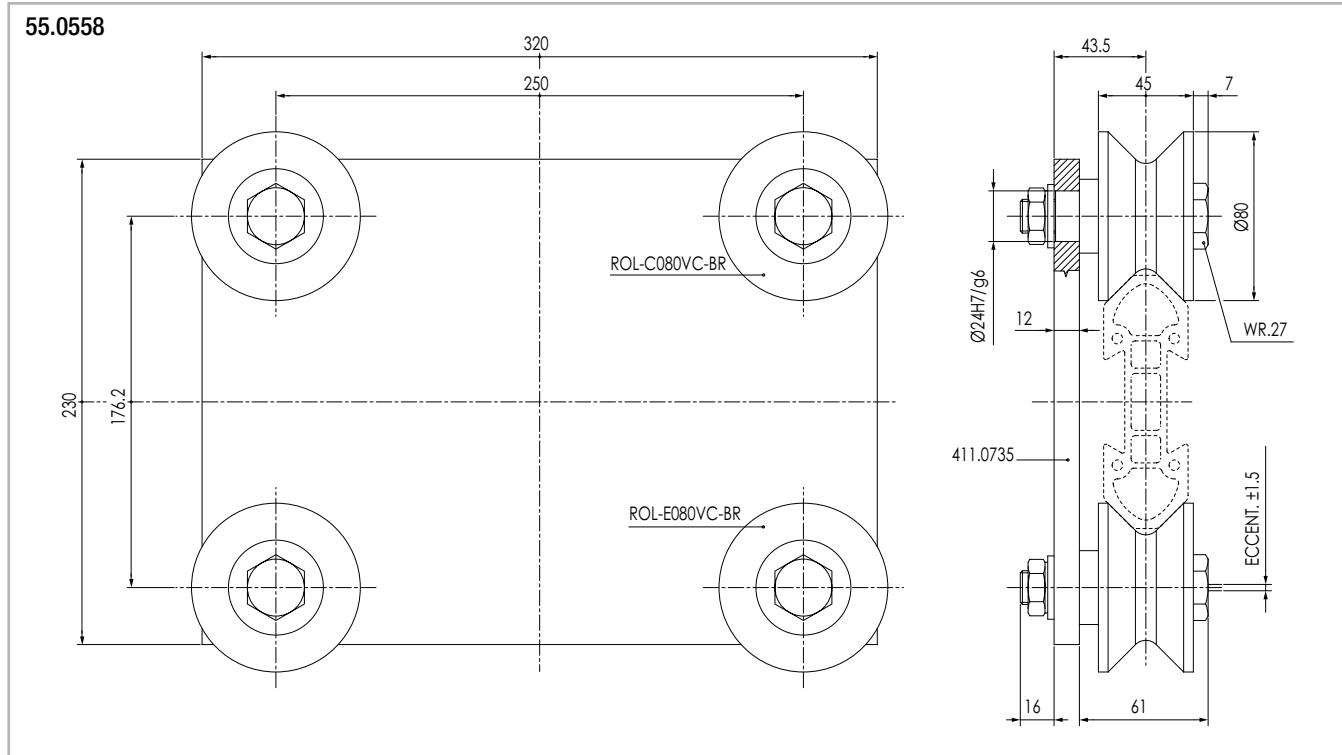


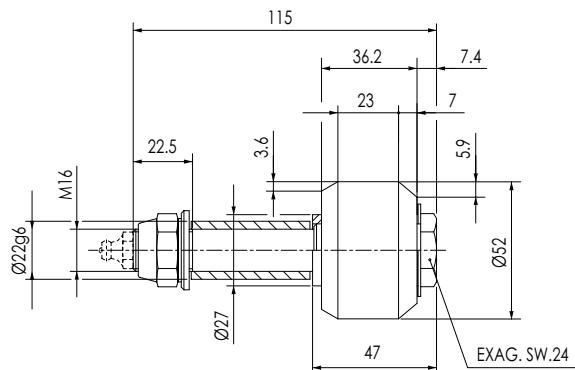
Fig. 100

The plate -cod. 411.0735 - is made in aluminium alloy with hard anodization. The rollers -cod. ROL-C080VC-BVA ROL-E080VC-BVA, carriage cod. 55.0636, - and/or different combinations from the ones shown on this page can be mounted on the above plates after consulting our technical department.

## Plastic compound shell rollers

Concentric roller radial load: 1280 N max.  
Lifetime lubrication

ROL-C052CCL-BV

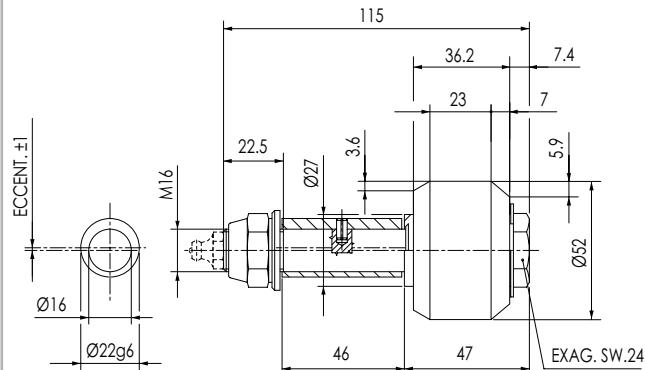


Periodical lubrication cod. ROL-C052CCL-BP

Fig. 101

Eccentric roller radial load: 1280 N max.  
Lifetime lubrication

ROL-E052CCL-BV

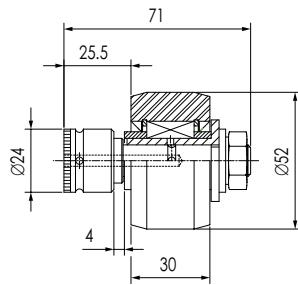


Periodical lubrication cod. ROL-E052CCL-BP

Fig. 102

Concentric roller radial load: 1280 N max. Periodical lubrication

ROL-C052CCC-BP-S01

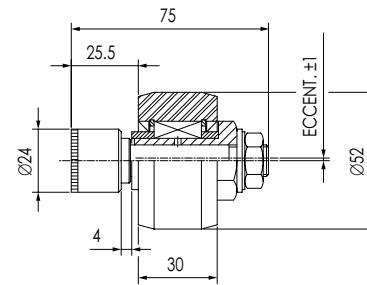


Lifetime lubrication cod. ROL-C052CCC-BV-S01

Fig. 103

Eccentric roller radial load: 1280 N max. Periodical lubrication

ROL-E052CCC-BP-S02

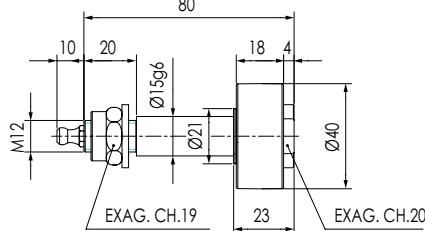


Lifetime lubrication cod. ROL-E052CCC-BV-S02

Fig. 104

Concentric roller radial load: 880 N max.  
Periodical lubrication

ROL-C040CC-BP

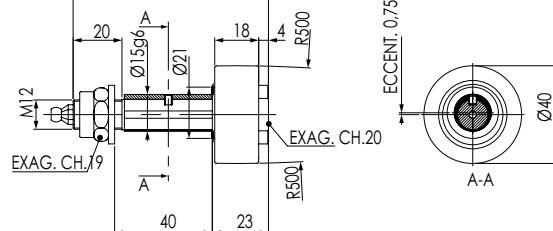


Lifetime lubrication cod. ROL-C040CC-BV

Fig. 105

Eccentric roller radial load: 880 N max.  
Periodical lubrication

ROL-E040CC-BP



Lifetime lubrication cod. ROL-E040CC-BV

Fig. 106

## 2 Rollers light full-block assembly

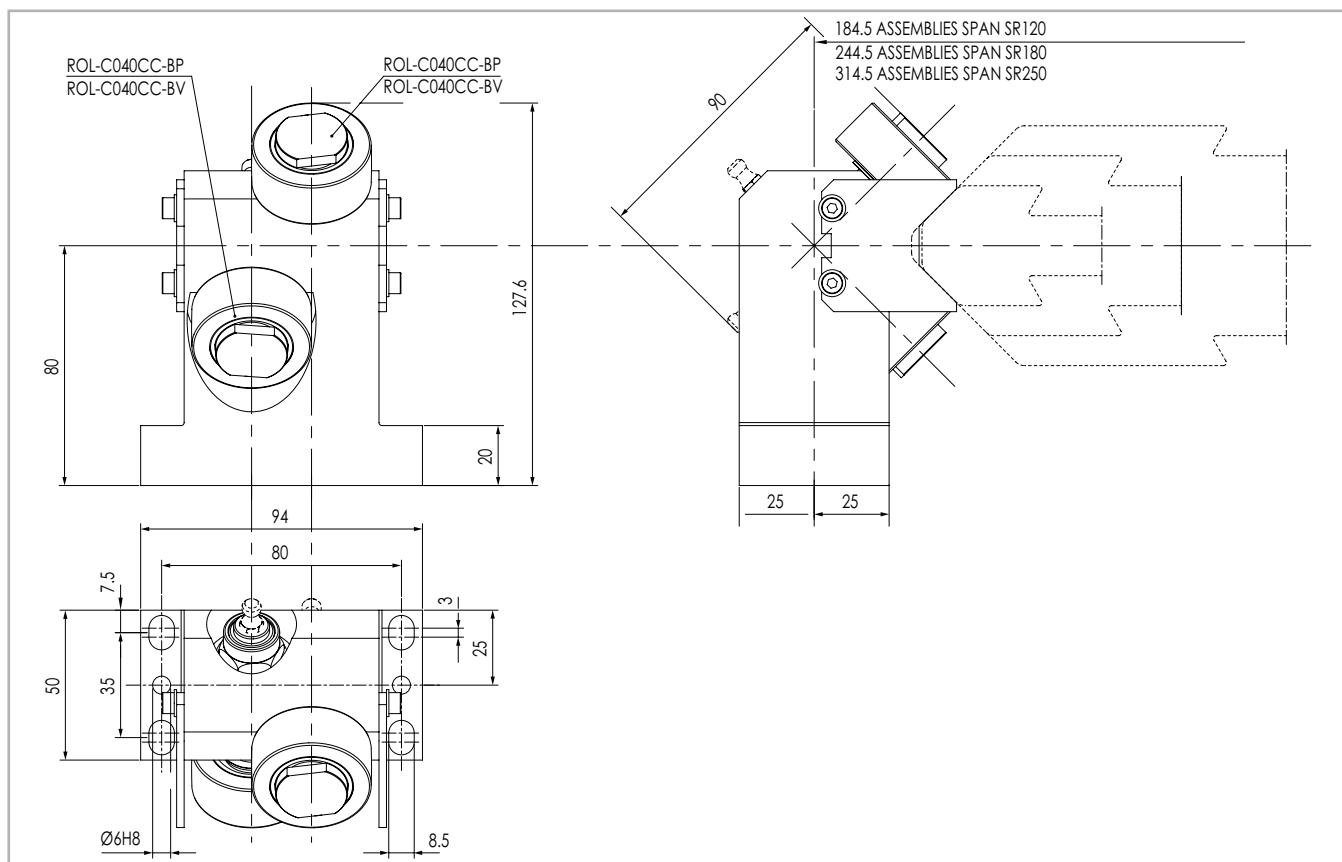


Fig. 107

**55.1550**

Light alloy rollers assembly with 2 Ø40 rollers. ROL-C040CC-BP  
Periodical lubrication.

**55.1570**

Light alloy rollers assembly with 2 Ø40 rollers, ROL-C040CC-BV  
Lifetime lubricated.

## Compact roller assembly with plastic compound rollers

Light alloy compact roller assembly periodical lubrication version

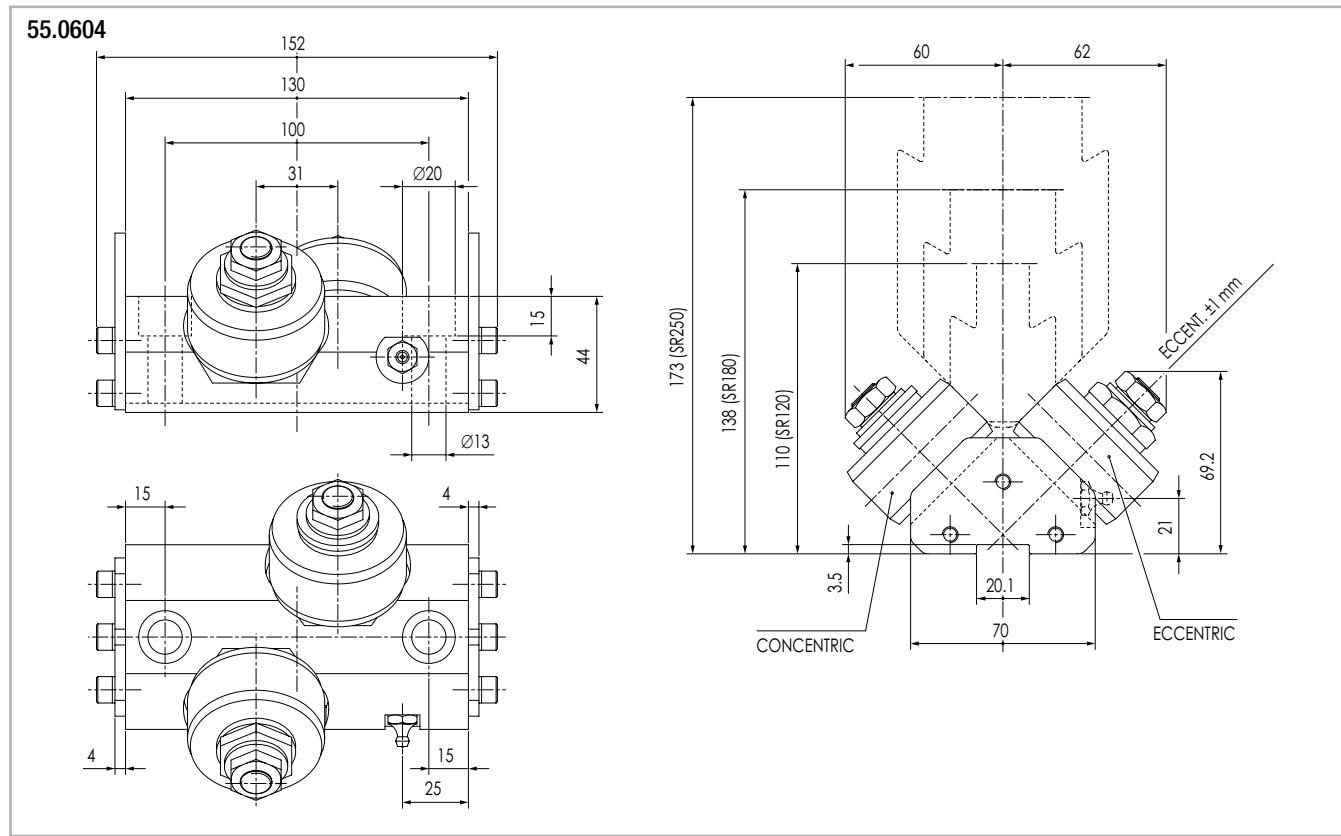


Fig. 108

Light alloy compact roller assembly lifetime lubrication version

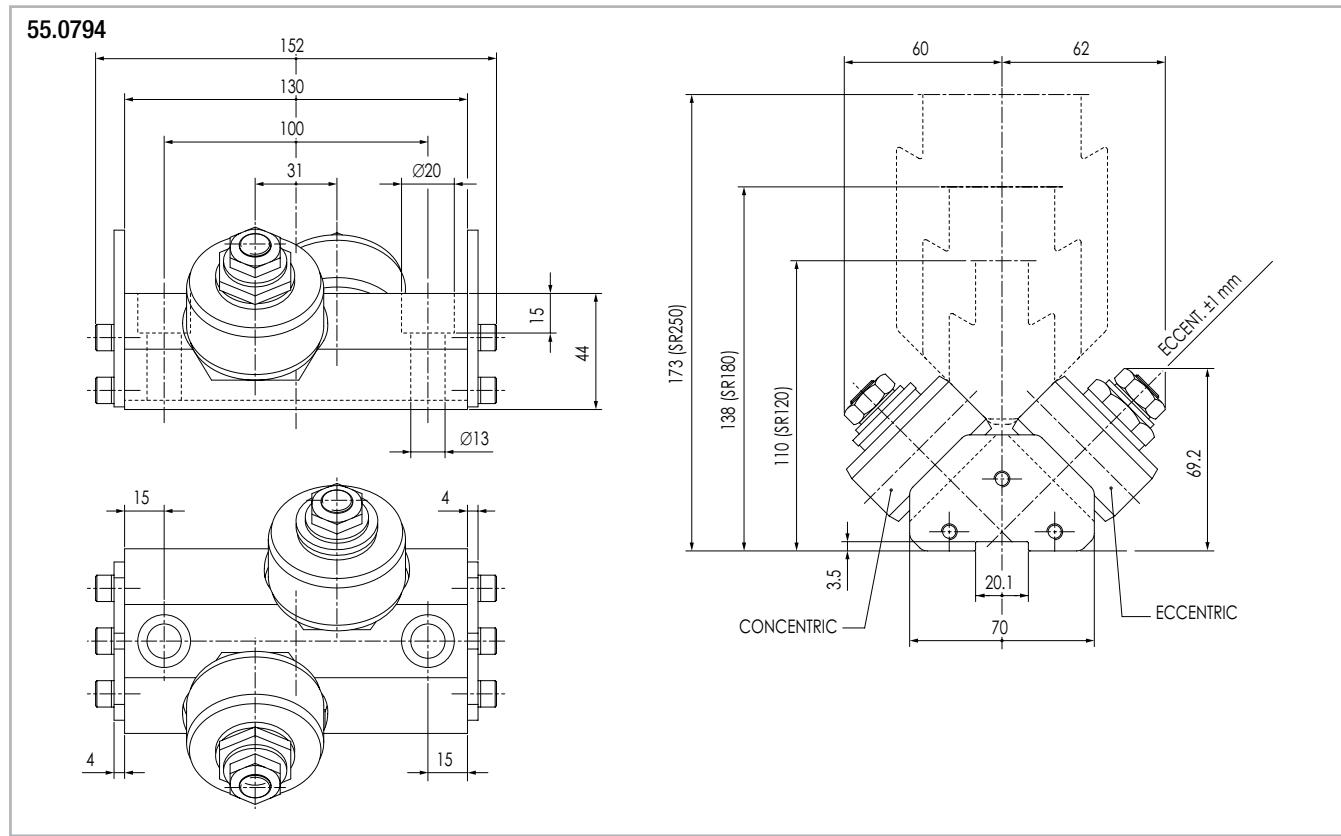


Fig. 109

## Full-block roller assembly

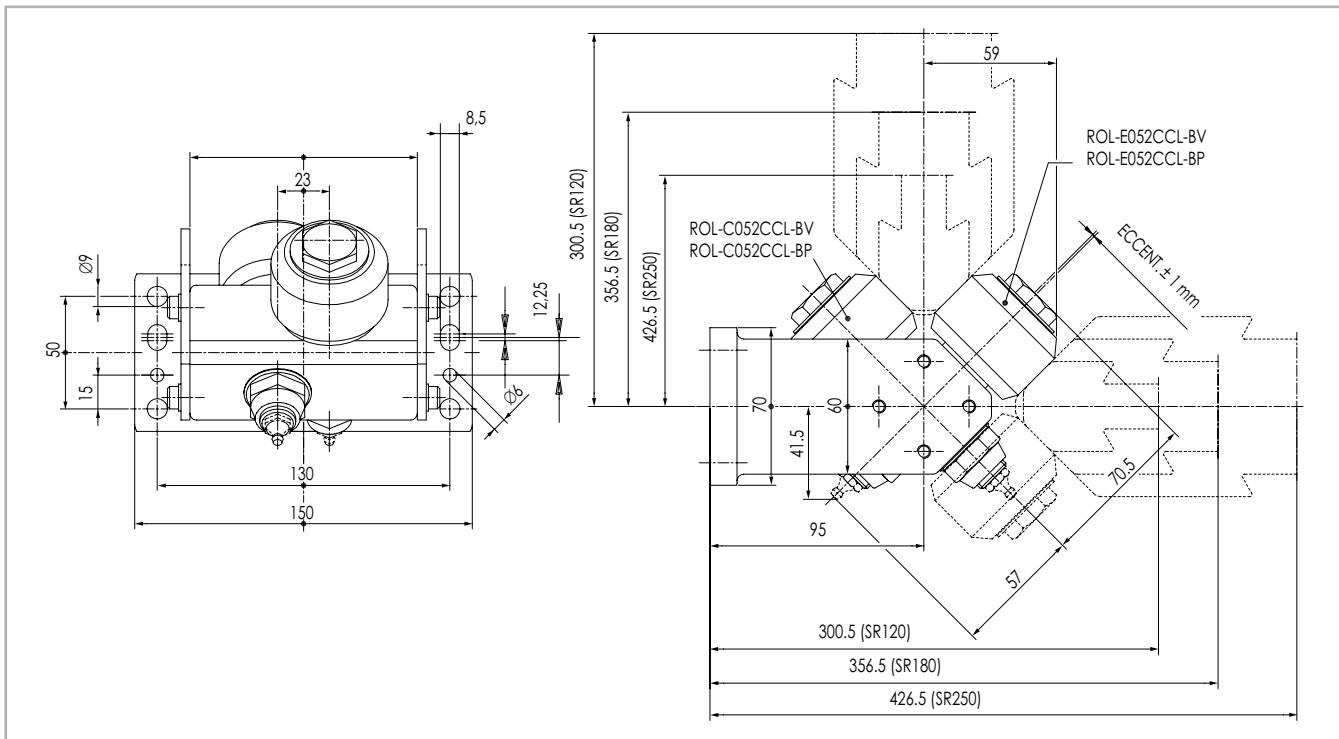


Fig. 110

**55.0325**

Light alloy body roller assembly with mounting holes on short sides and plastic compound rollers, periodical lubrication version, rollers ROL-C052CCL-BP, ROL-E052CCL-BP

**55.0725**

Lifetime lubrication version rollers ROL-C052CCL-BV, ROL-E052CCL-BV

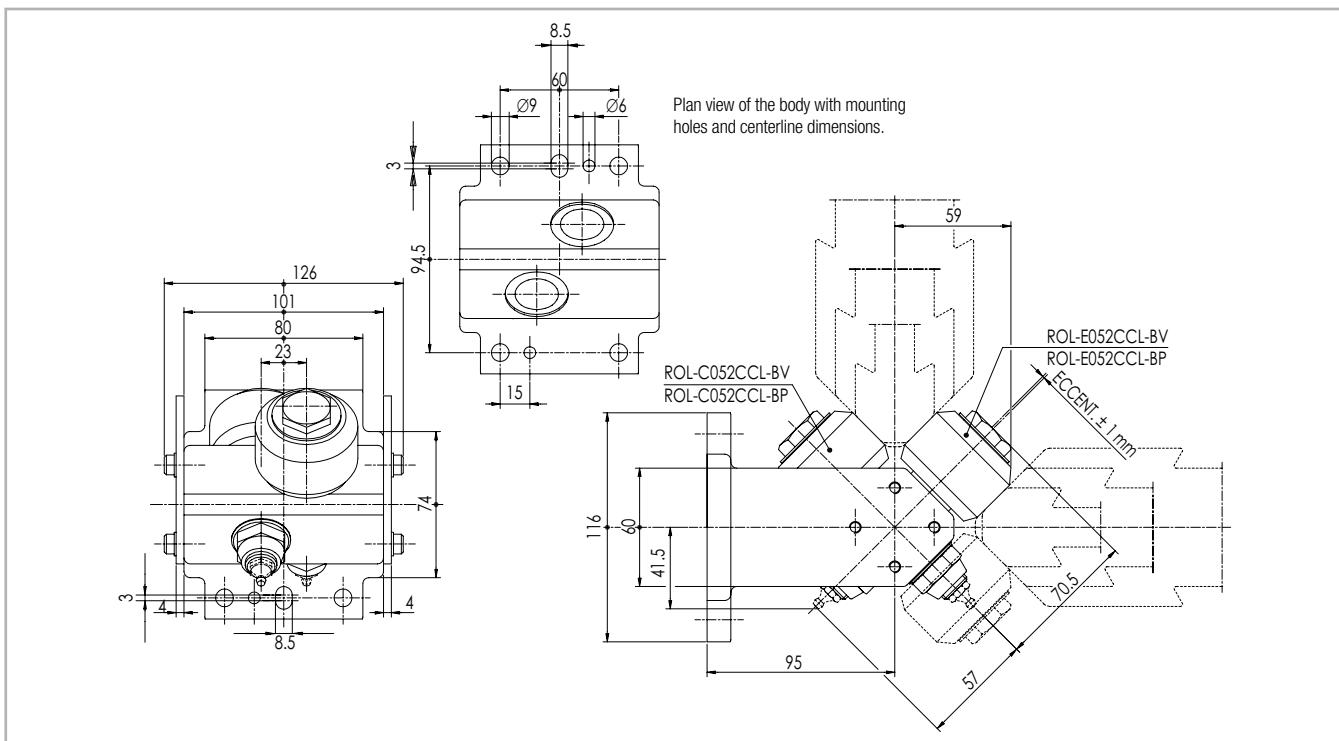


Fig. 111

**55.0433**

Light alloy body roller assembly with mounting holes on long sides and plastic compound rollers, periodical lubrication version, rollers ROL-C052CCL-BP, ROL-E052CCL-BP

**55.0733**

Lifetime lubrication version rollers ROL-C052CCL-BV, ROL-E052CCL-BV

## ➤ Roller assembly with 4 rollers

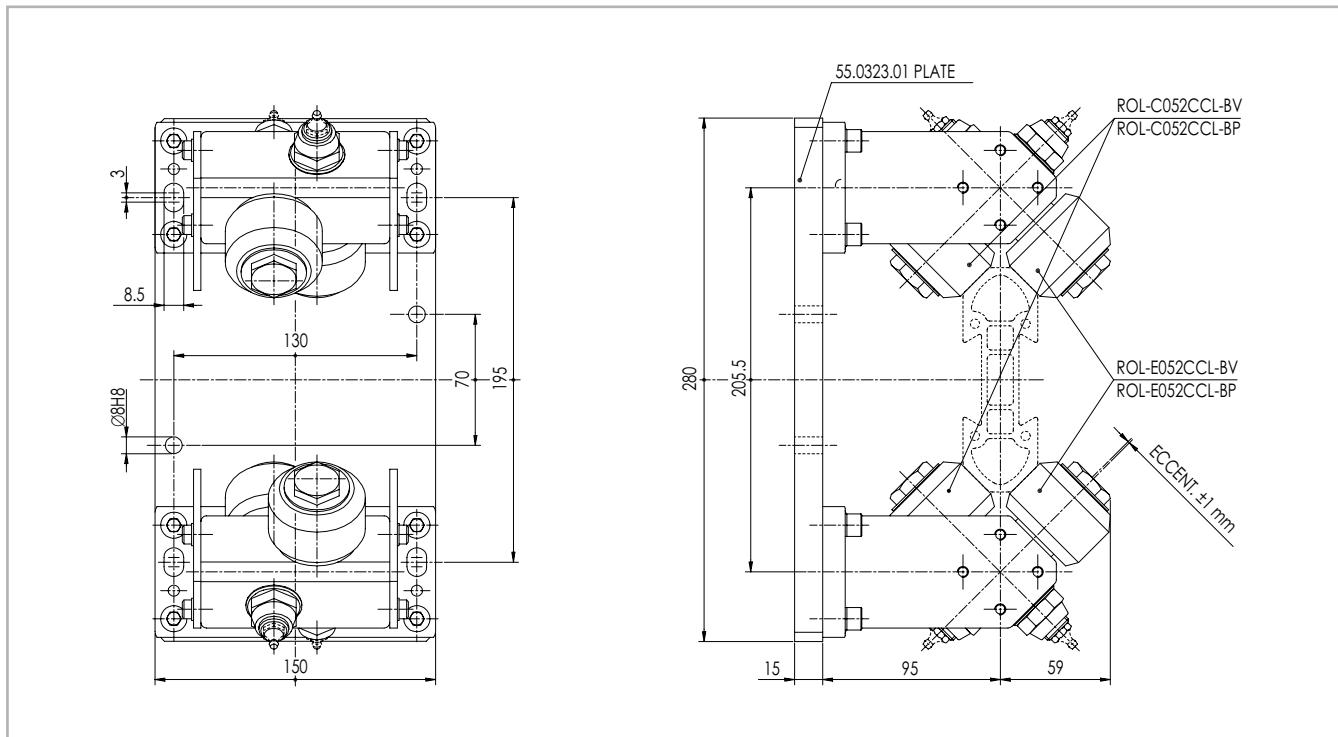


Fig. 112

**55.0323**

Roller assembly with backing plate 280x150x15.

Rollers ROL-C052CCL-BP, ROL-E052CCL-BP with periodical lubrication

**55.0723**

Roller assembly with backing plate 280x150x15.

Rollers ROL-C052CCL-BV, ROL-E052CCL-BV, lifetime lubricated

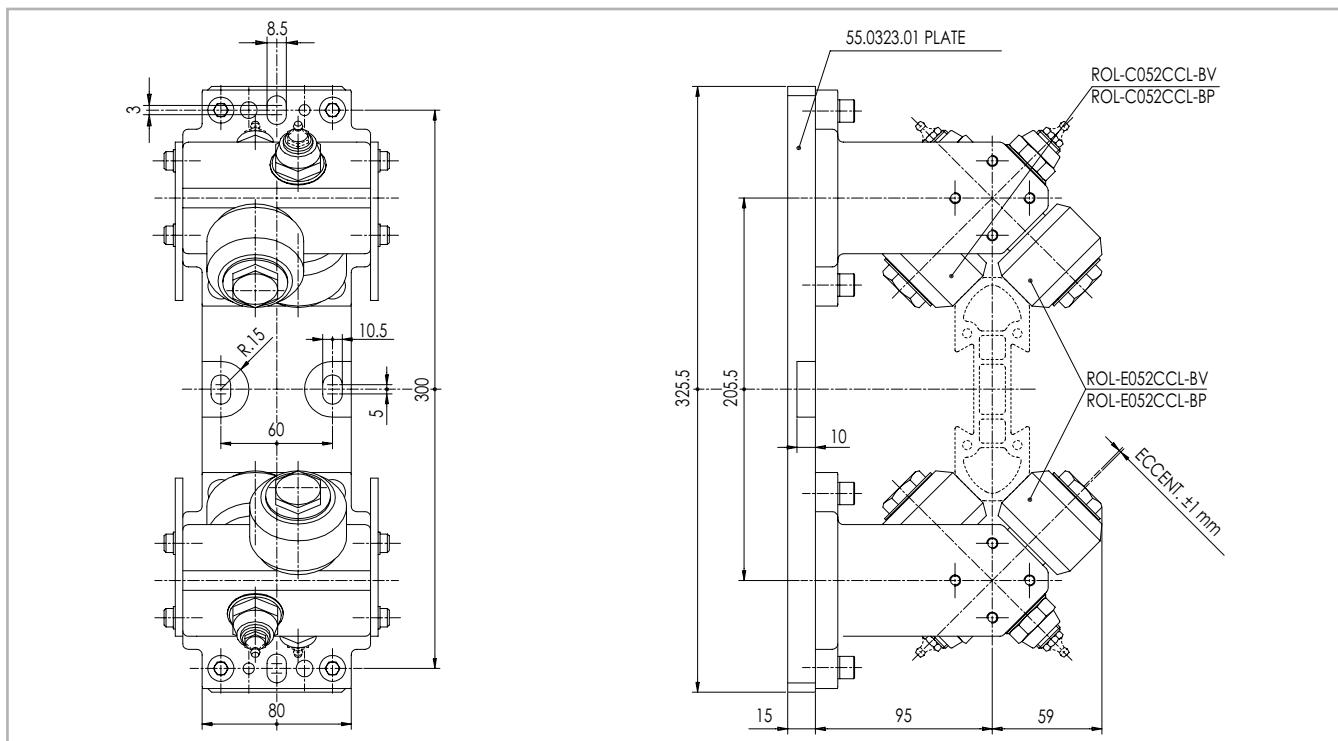


Fig. 113

**55.0324**

Roller assembly with backing plate 325.5x80x15.

Rollers ROL-C052CCL-BP, ROL-E052CCL-BP with periodical lubrication

**55.0724**

Roller assembly with backing plate 325.5x80x15.

Rollers ROL-C052CCL-BV, ROL-E052CCL-BV lifetime lubricated

## > Narrow/wide base blindo beam roller assembly

### Narrow base roller assembly

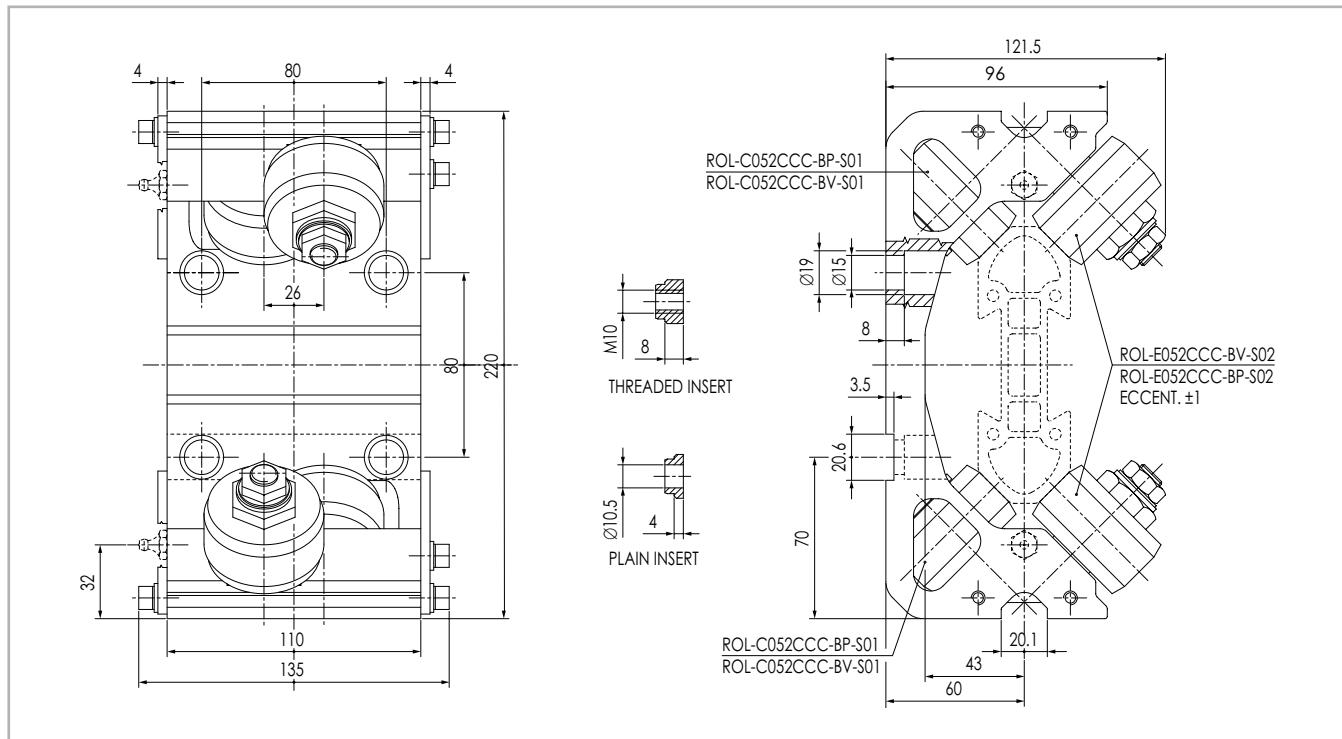


Fig. 114

#### 55.0472-FIL

Equipped with 4 threaded fixing inserts  
Periodical lubrication

#### 55.0472-PAS

Equipped with 4 through hole fixing inserts  
Periodical lubrication

### Wide base roller assembly

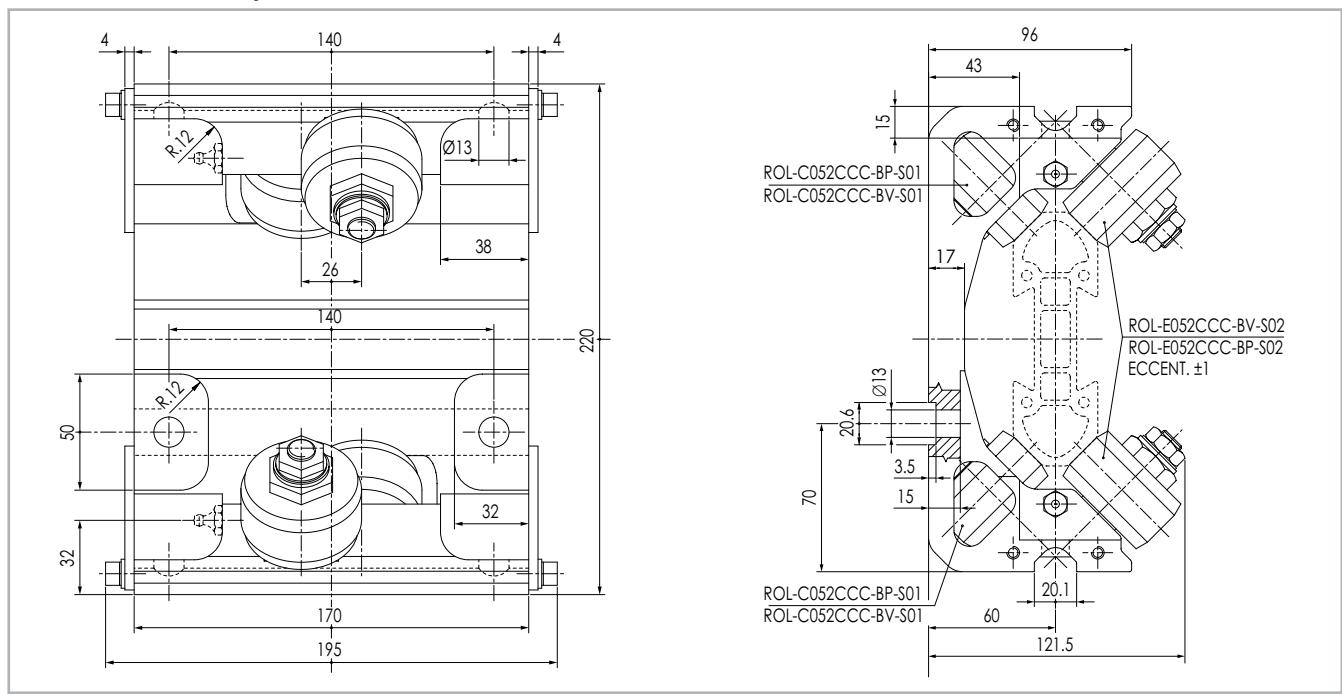


Fig. 115

#### 55.0411

Periodical lubrication

#### 55.0711

Lifetime lubrication

## 8 Rollers blindo beam roller assembly

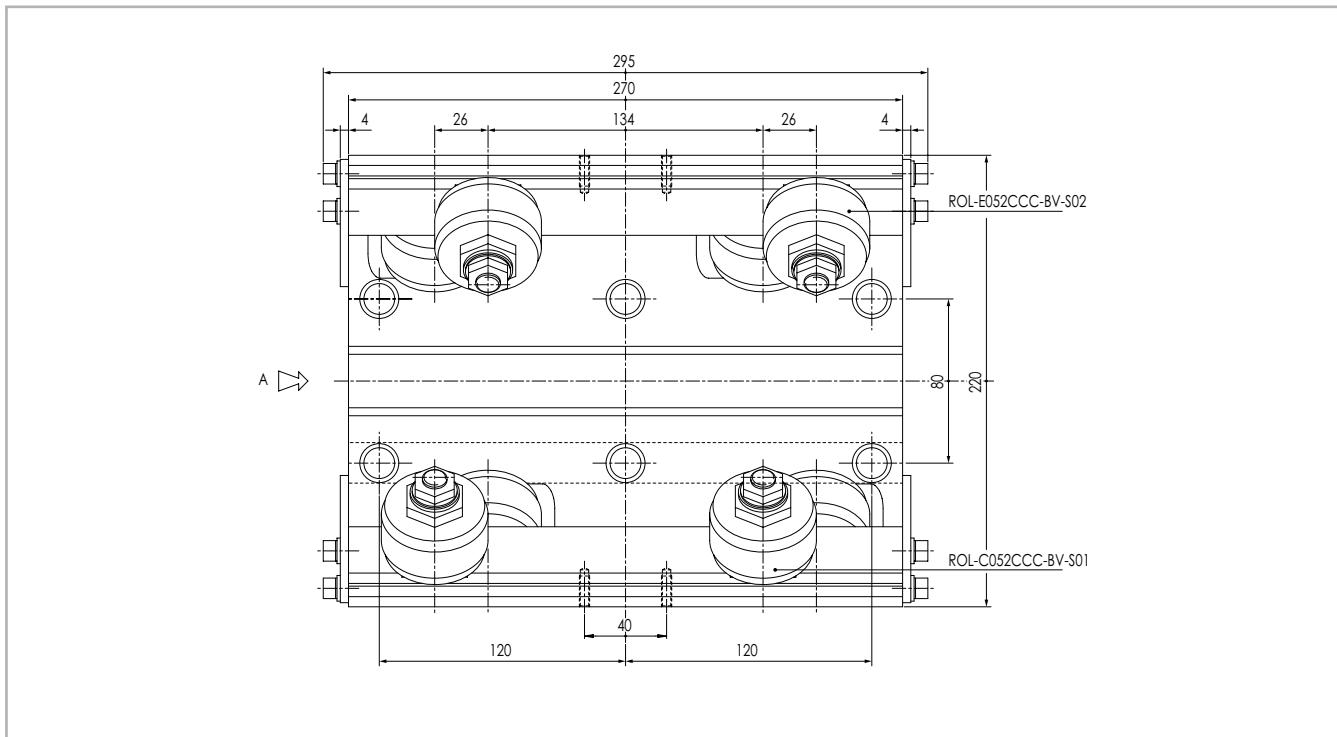


Fig. 116

### 55.0222-FIL

Equipped with 6 threaded fixing inserts

Lifetime lubrication

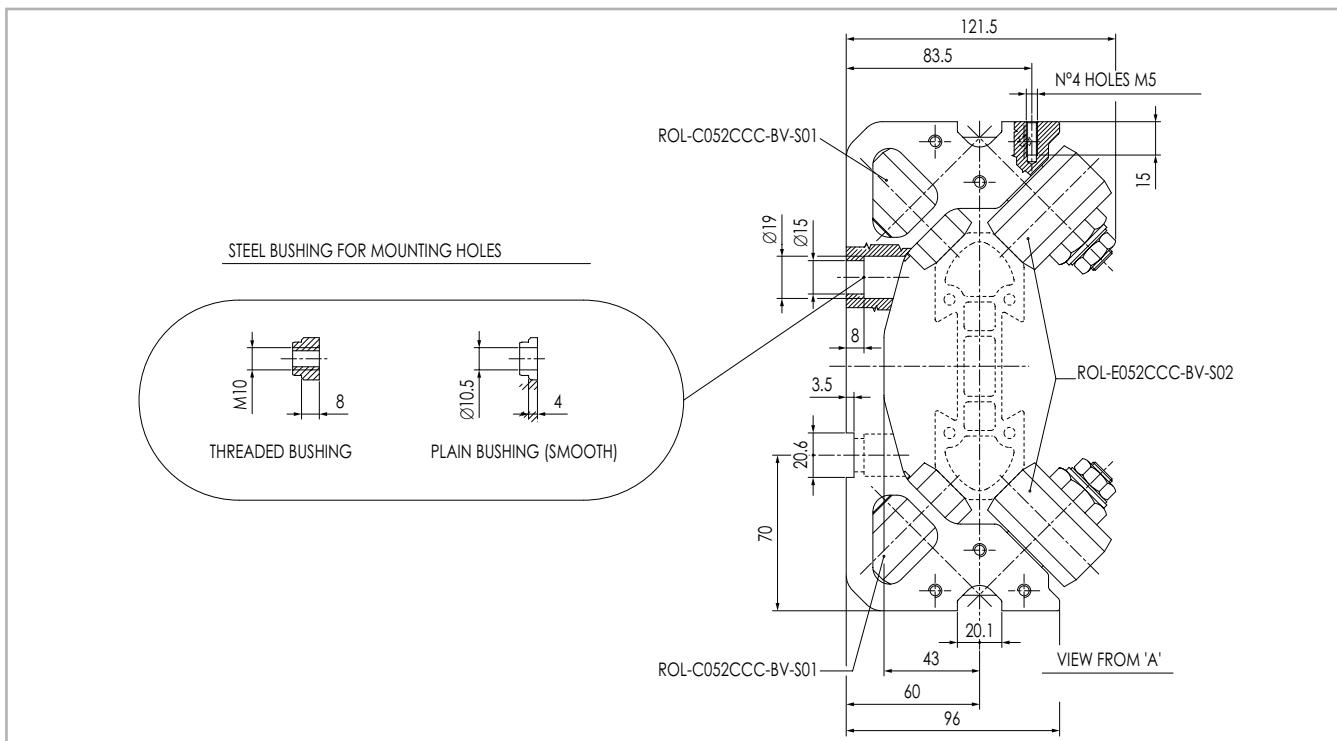


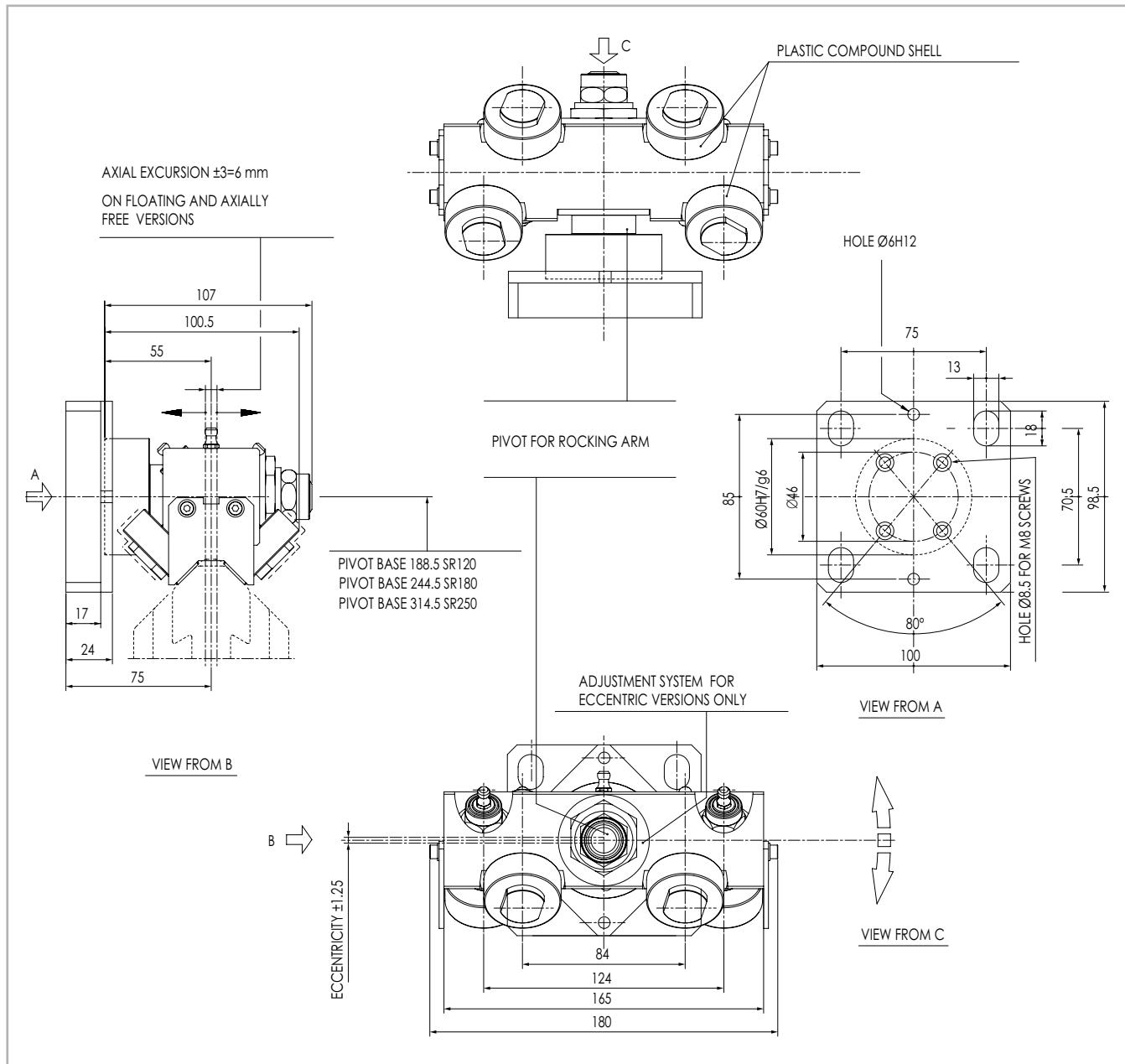
Fig. 117

### 55.0222-PAS

Equipped with 6 through hole fixing inserts

Lifetime lubrication

## > Light 4 rollers floating assembly for Speedy Rail guides



\* Lubrication nipple mounted for periodic lubrication versions only

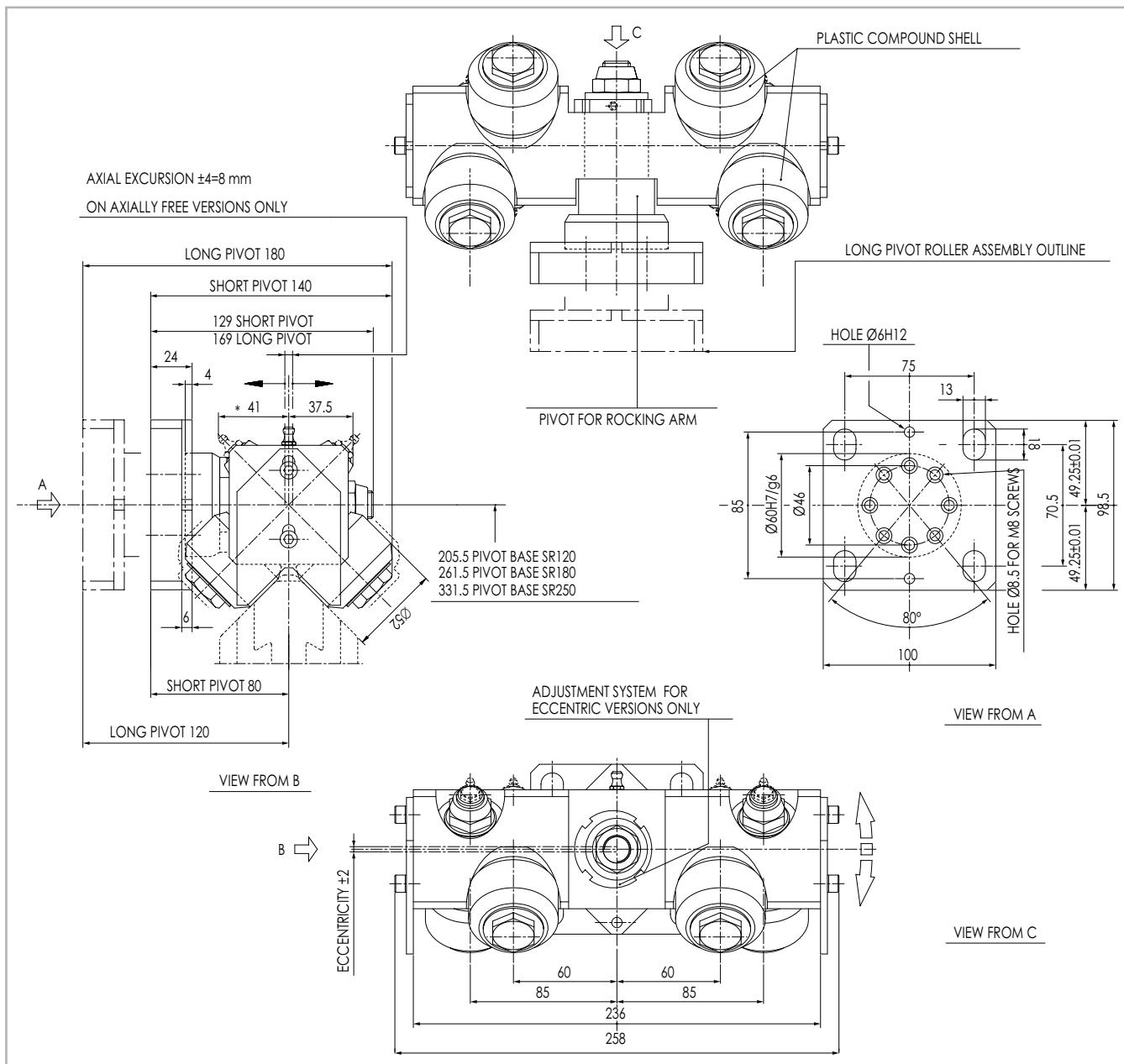
Fig. 118

Assemblies without baseplate have the same code followed by "SP"  
(i.e. 55.1565/SP)

Roller assemblies reference	Axially constrained	Axially free	Rollers code
PERIODICAL LUBRICATION	ECC.	55.1565	55.3563
	CONC.	55.1566	55.3564
LIFETIME LUBRICATION	ECC.	55.1555	55.3553
	CONC.	55.1556	55.3554

Tab. 10

## > Floating roller assembly with 4 rollers - short/long pivot



\* Lubrication nipple mounted for periodic lubrication versions only

Fig. 119

### Notes:

The axially free version of the assemblies are normally mounted on trolleys running on parallel rails. Coupled with axially constrained assemblies provide a flexible structure able to withstand minor misalignments between runways.

Assemblies without baseplate have the same code followed by "SP" (ad es. 55.1361/SP).

Roller assemblies reference		Axially constrained	Axially free	Rollers code
Short pivot	PERIODICAL LUBRICATION	ECC.	55.1361	55.3361
	LIFETIME LUBRICATION	CONC.	55.1364	55.3364
Long pivot	PERIODICAL LUBRICATION	ECC.	55.1354	55.1358
	LIFETIME LUBRICATION	CONC.	55.1355	55.1359

► **Rollers assembly, one fixed, one self adjusting**

Fixed 5 concentric rollers assembly

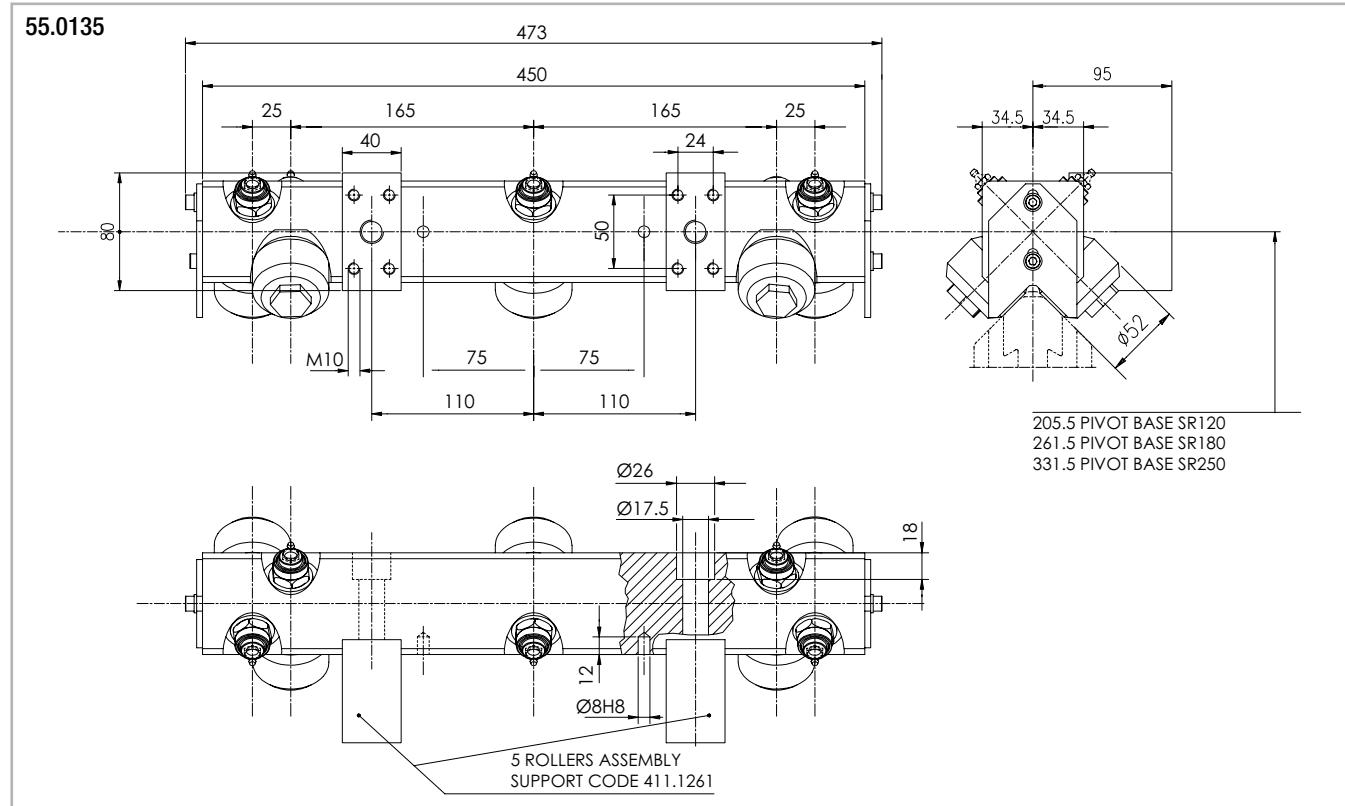
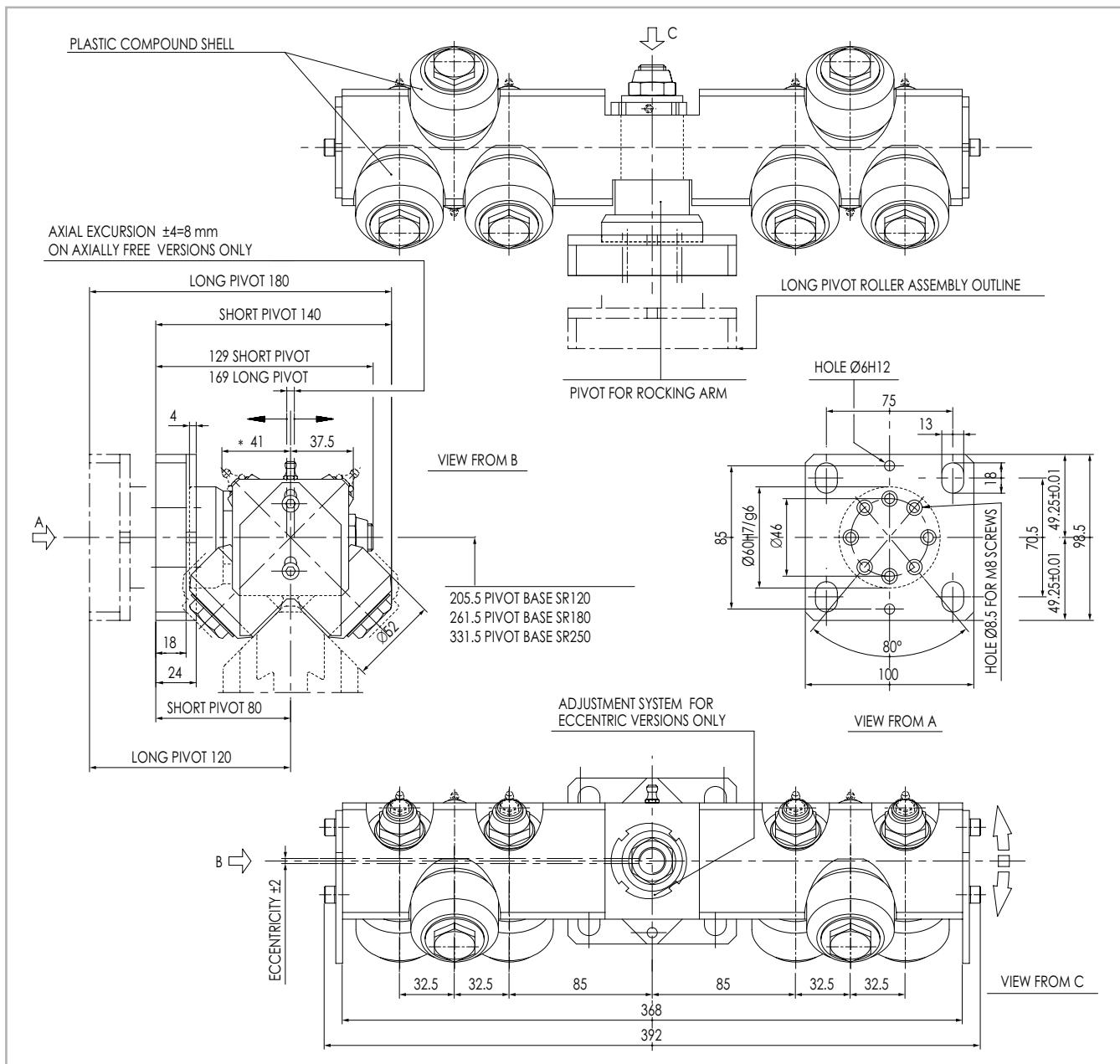


Fig. 120

## ➤ Floating roller assembly with 6 rollers - short/long pivot



\* Lubrication nipple mounted for periodic lubrication versions only

Fig. 121

### Notes:

The axially free version of the assemblies are normally mounted on trolleys running on parallel rails. Coupled with axially constrained assemblies provide a flexible structure able to withstand minor misalignments between runways.

Assemblies without baseplate have the same code followed by "SP" ( i.e. 55.1366/SP ).

Roller assemblies reference		Axially constrained	Axially free	Rollers code
Short pivot	PERIODICAL LUBRICATION	ECC.	55.1423	55.3423
		CONC.	55.1424	55.3424
	LIFETIME LUBRICATION	ECC.	55.1425	55.3425
		CONC.	55.1426	55.3426
Long pivot	PERIODICAL LUBRICATION	ECC.	55.1419	55.3419
		CONC.	55.1420	55.3420
	LIFETIME LUBRICATION	ECC.	55.1421	55.3421
		CONC.	55.1422	55.3422

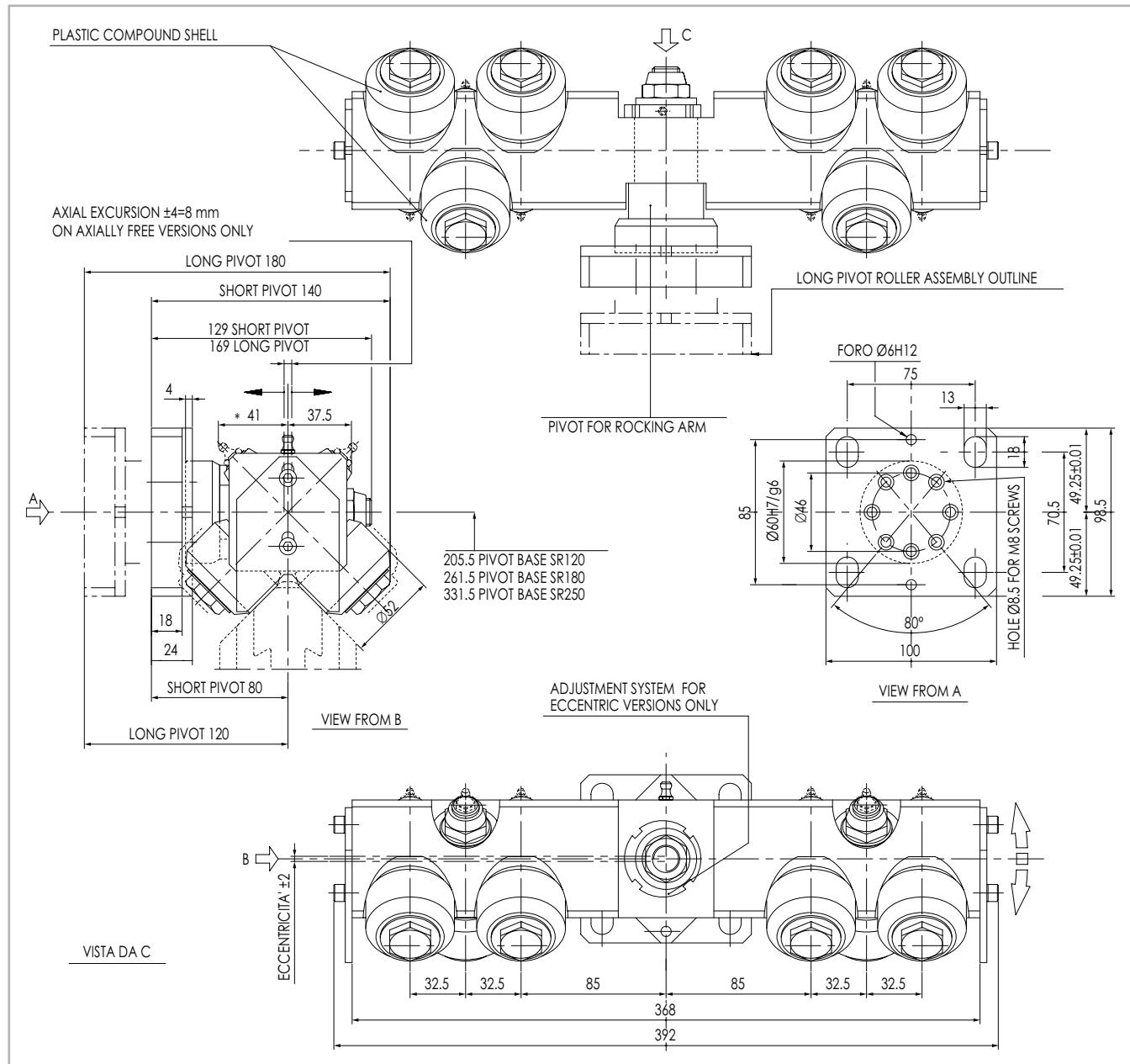


Fig. 122

**Notes:**

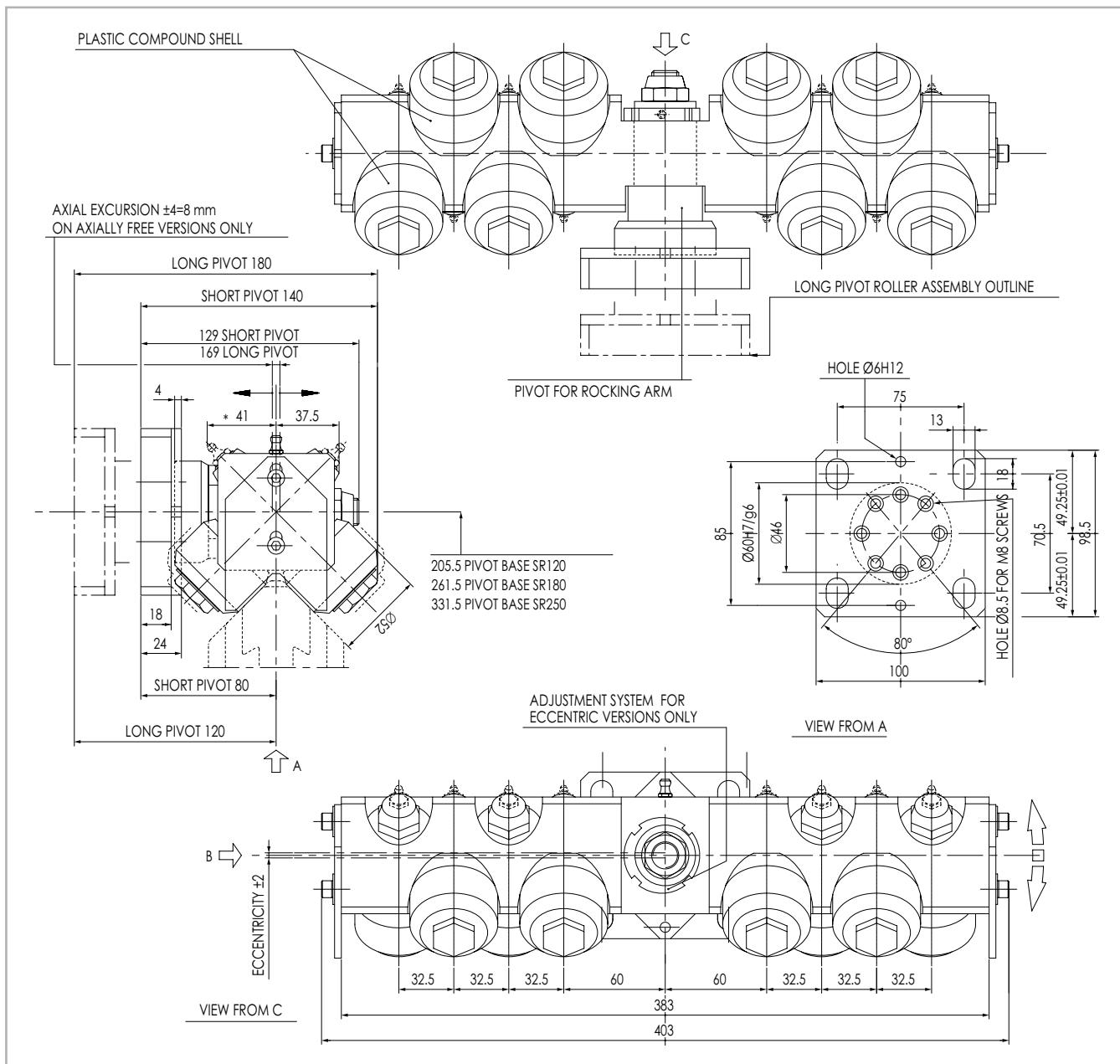
The axially free version of the assemblies are normally mounted on trolleys running on parallel rails. Coupled with axially constrained assemblies provide a flexible structure able to withstand minor misalignments between runways.

Assemblies without baseplate have the same code followed by "SP" (i.e. 55.1366/SP)

Roller assemblies reference		Axially constrained	Axially free	Rollers code
Short pivot	PERIODICAL LUBRICATION	ECC.	55.1366	55.3366 ROL-C052CCL-
		CONC.	55.1370	55.3370 BP
	LIFETIME LUBRICATION	ECC.	55.1367	55.3367 ROL-C052CCL-
		CONC.	55.1371	55.3371 BV
Long pivot	PERIODICAL LUBRICATION	ECC.	55.1368	55.3368 ROL-C052CCL-
		CONC.	55.1372	55.3372 BP
	LIFETIME LUBRICATION	ECC.	55.1369	55.3369 ROL-C052CCL-
		CONC.	55.1373	55.3373 BV

Tab. 13

## ➤ Floating roller assembly with 8 rollers - short/long pivot



\* Lubrication nipple mounted for periodic lubrication versions only

Fig. 123

### Notes:

The axially free version of the assemblies are normally mounted on trolleys running on parallel rails. Coupled with axially constrained assemblies provide a flexible structure able to withstand minor misalignments between runways.

Assemblies without baseplate have the same code followed by "SP" (i.e. 55.1366/SP).

Roller assemblies reference		Axially constrained	Axially free	Rollers code
Short pivot	PERIODICAL LUBRICATION	ECC.	55.1143	55.3143
		CONC.	55.1144	55.3144
	LIFETIME LUBRICATION	ECC.	55.1145	55.3145
		CONC.	55.1146	55.3146
Long pivot	PERIODICAL LUBRICATION	ECC.	55.1147	55.3147
		CONC.	55.1148	55.3148
	LIFETIME LUBRICATION	ECC.	55.1149	55.3149
		CONC.	55.1150	55.3150

> Assembling diagram for rigid mounted rack

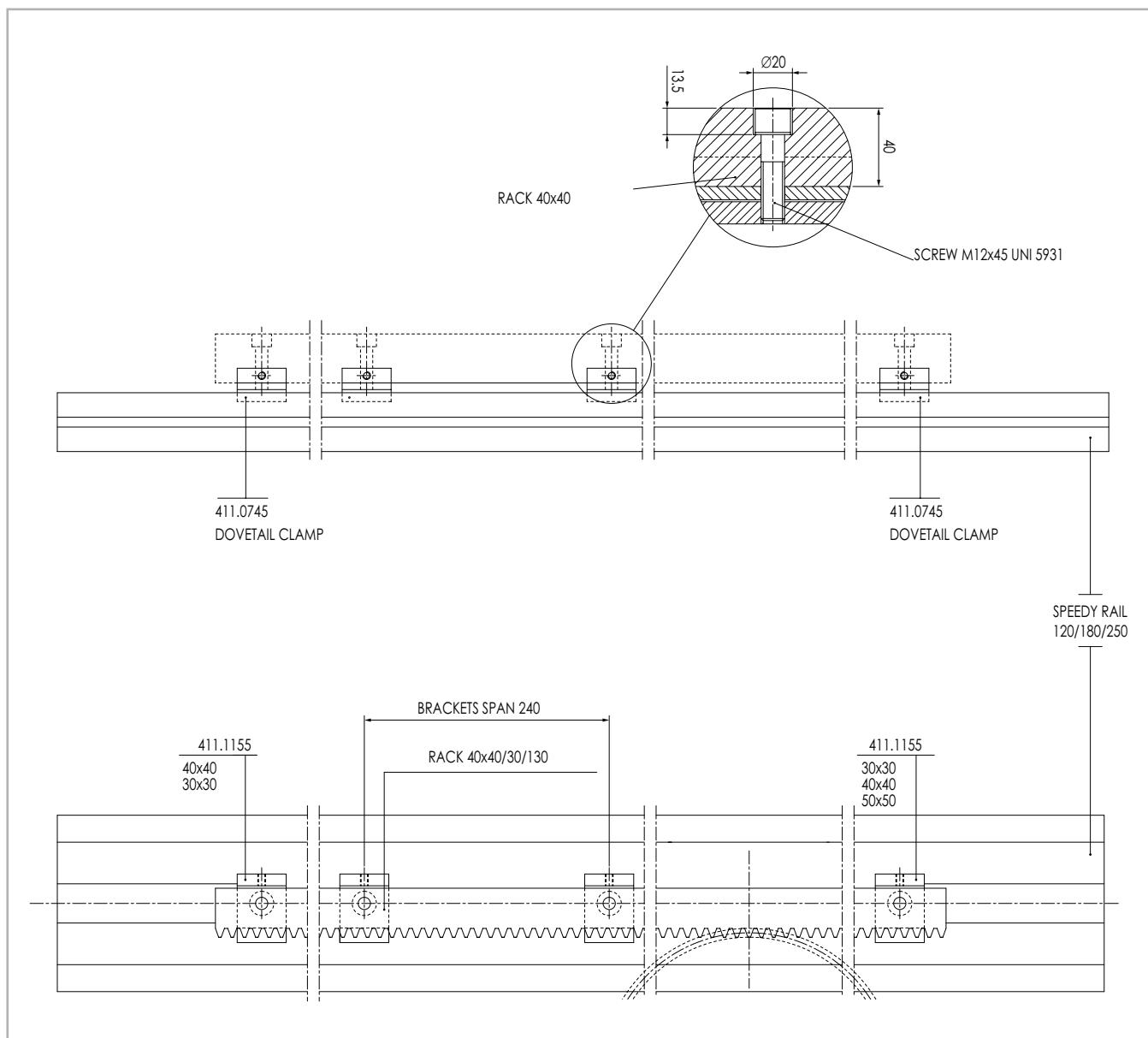


Fig. 124

## ➤ Standard racks

### Straight toothed hardened rack

Cod.	C	D	d	E	F	H	L	N	P	Mod.
411.1489	10	11	7	19,41	7	20	998,82	5	240	2
411.1491	10	11	7	42,07	7	20	2004,14	9	240	2
411.1499	17	14	9	19,41	9	30	998,82	5	240	3
411.1501	17	14	9	38,92	9	30	1997,84	9	240	3
411.1509	20,5	17	11	22,55	11	40	1005,10	5	240	4
411.1511	20,5	17	11	45,21	11	40	2010,42	9	240	4

Tab. 15

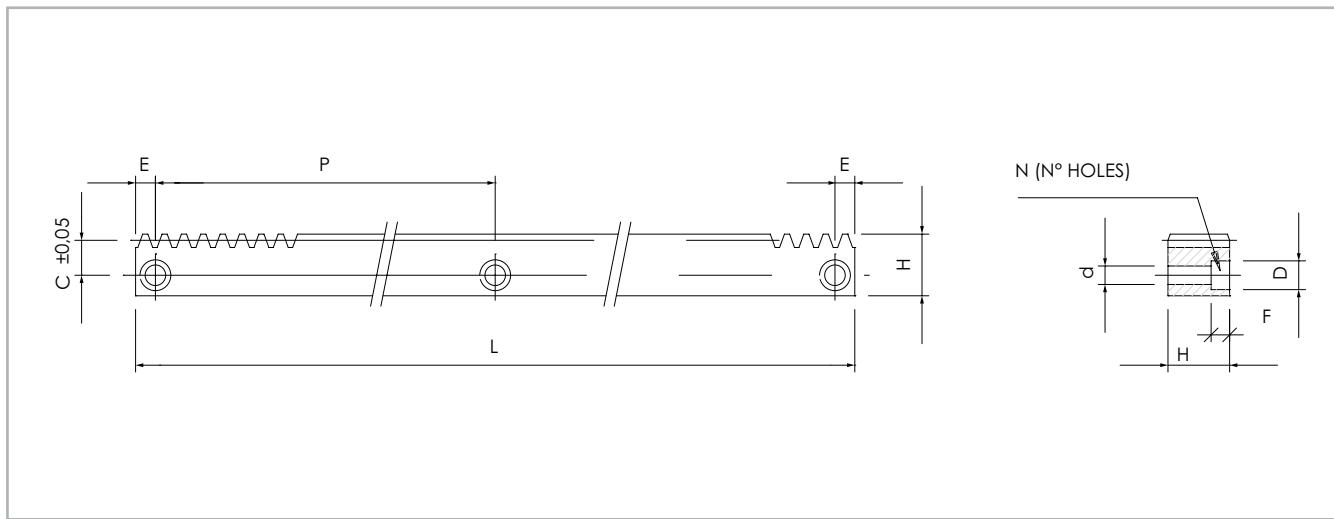


Fig. 125

### Indexing rack mounting components

Rack	Mounting plates	Dovetails	Inserts
m2	SR-16, SR-22, SR-54, SR-62	SR-15, SR-22, SR-29	SR-53
m3	SR-30, SR-54, SR-62	SR-29	SR-53
m4	SR-30, SR-54, SR-62	SR-29	SR-53

Tab. 16

## > Standard scrapers

### Scrapers for floating and full-block assemblies

411.0685

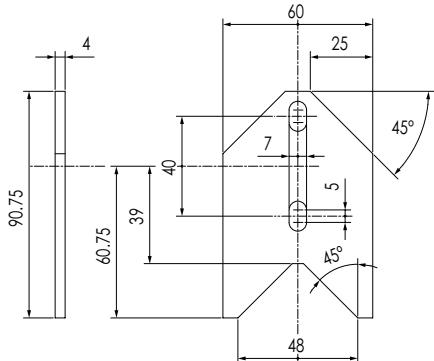


Fig. 126

### Sliding brush for speedy rail and steel rail.

Brushes are kept against tracks by springs.

55.1000

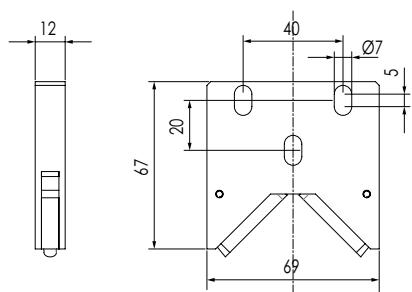


Fig. 128

### Scrapers for blind beam roller assemblies

55047202

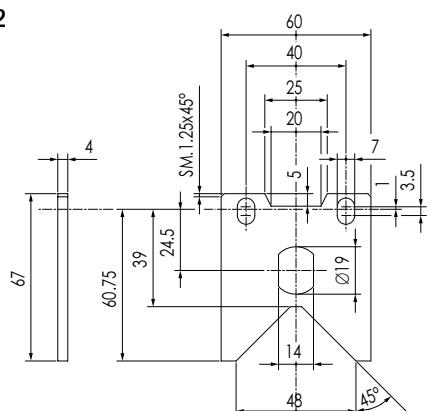


Fig. 130

### Scrapers for compact

411.0686

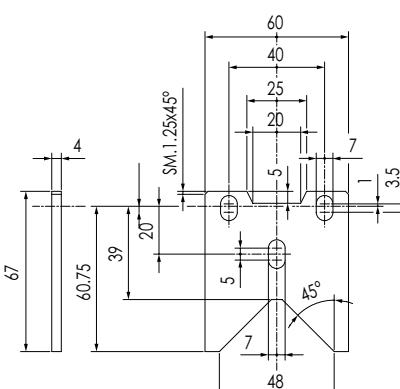


Fig. 127

### Scrapers for light floating rollers assemblies

55.1794.05

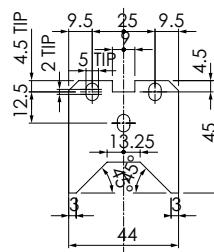


Fig. 129

### Note:

All roller assemblies are equipped with the relate scrapers.

## Speedy Rail 180



### Wide body multi groove speedy rail guide and specifications

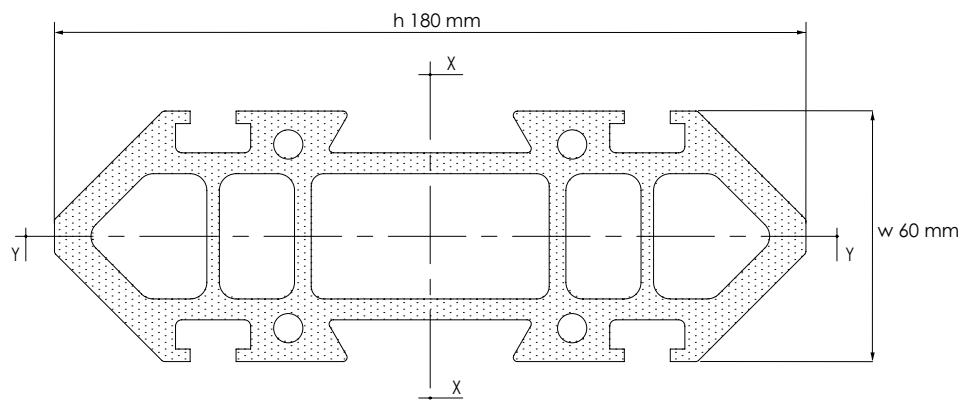


Fig. 131

Surface quadratic moment: X-X axis = 10.291.100 mm<sup>4</sup> / Y-Y axis = 1.278.700 mm<sup>4</sup>.

Max. manufacturing tolerances =  $\pm 0.30$  mm across opposite rolling surfaces.

Max. angular distortion =  $\pm 20'$ /m.

Linear mass = 10.2 Kg/m.

Max. linear distortion =  $\pm 0.7$  mm/m.

Standard lengths: 3000-3500-4000-4500-5000-5500-6000-6500-7000-7500 mm.

External surface: deep hard anodizing

> **Roller assemblies and components**

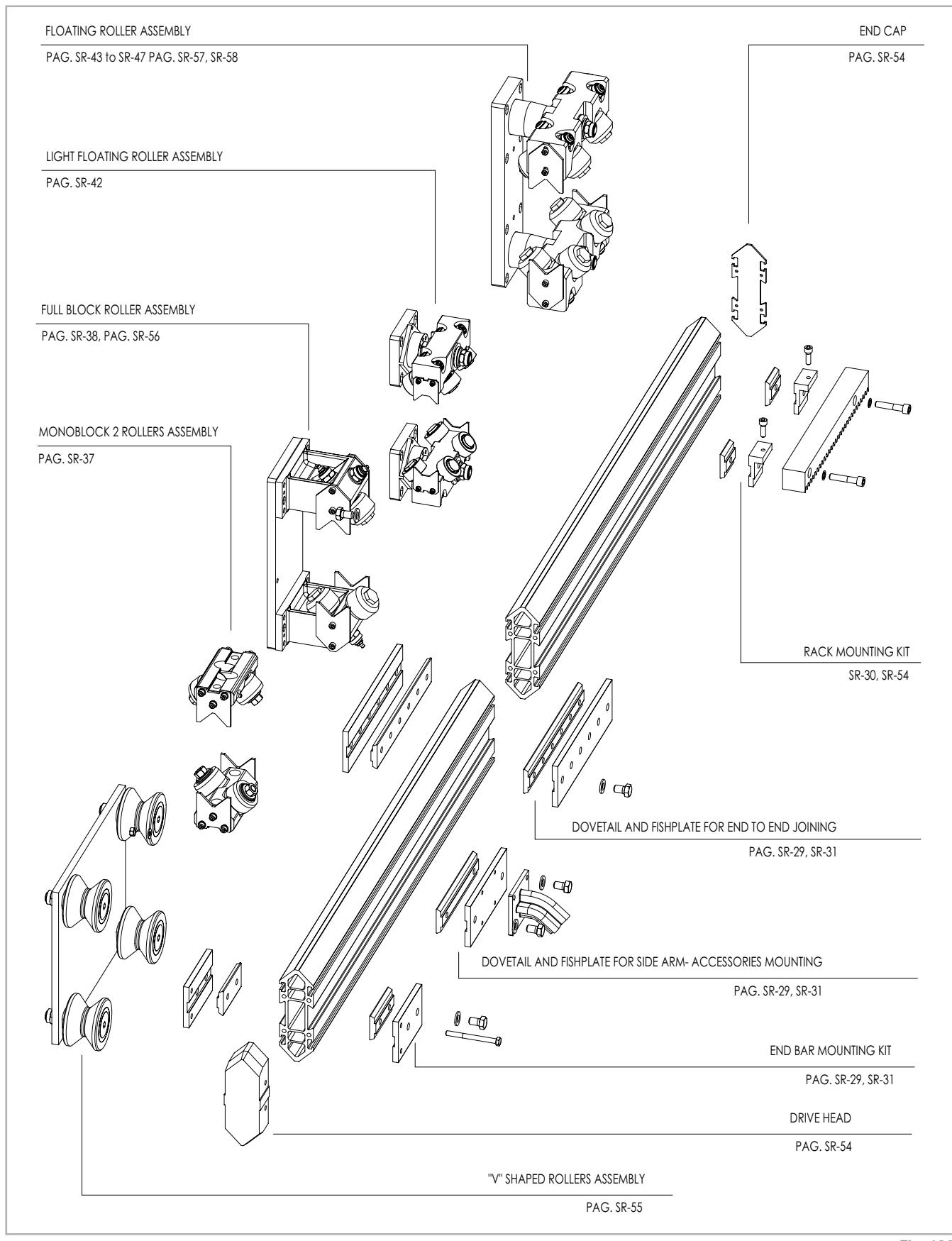


Fig. 132

## ► Wide body multi groove speedy rail guide and specifications

### Speedy Rail 180 with plain ends: SR180-T

## Speedy Rail 180 with drilled ends: SR180-F

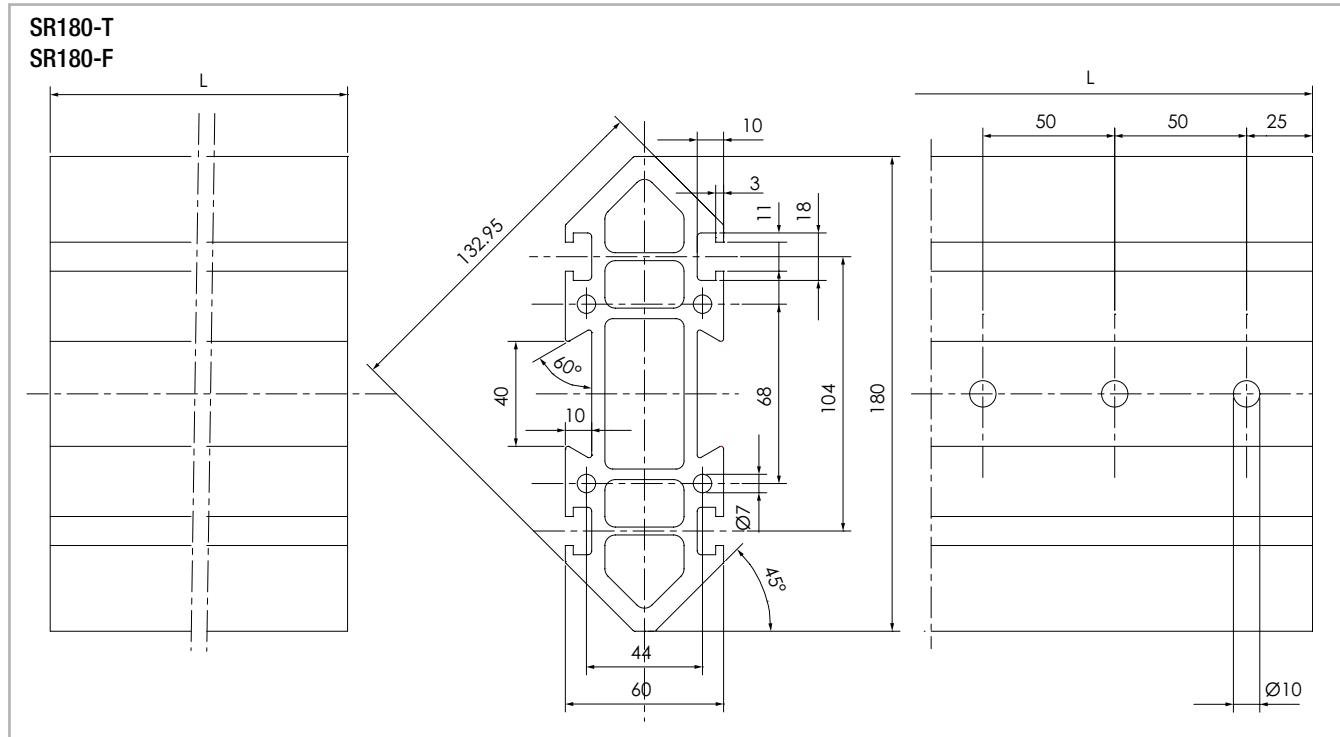


Fig. 133

### Note:

Drillings on the bar end are required as a safety measure whith end-to-end joining in moving rails.

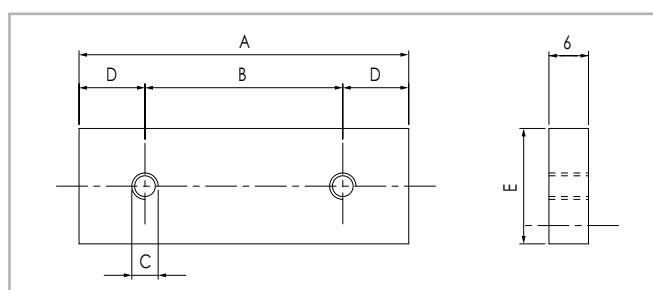


Fig. 134

Insert					Material	Nº Holes	Cod.
A	B	C	D	E			
496	60	M4	8	16	Burnished steel	9	411.2534
496	60	M5	8	16		9	411.2533
496	80	M6	8	16		9	411.3633

Tab. 17

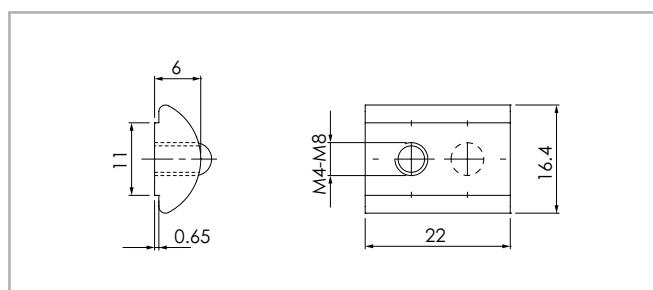


Fig. 135

Insert							
A	B	C	D	E	Material	Nº Holes	Cod.
-	-	M4	-	-	Zinc plated steel	1	411.1349
-	-	M5	-	-		1	411.1351
-	-	M6	-	-		1	411.1352
-	-	M8	-	-		1	411.1353

Tab. 18

Wide body multi groove speedy rail guide (SR180) uses the same dovetails, plates, fishplates and joining components of speedy rail standard.

(SR120 section) see page SR-29, SR-30, SR-31.

## Components for wide body multi groove Speedy Rail guide

### Drive head

411.0696

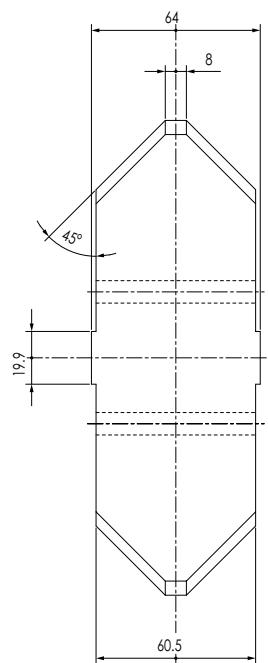
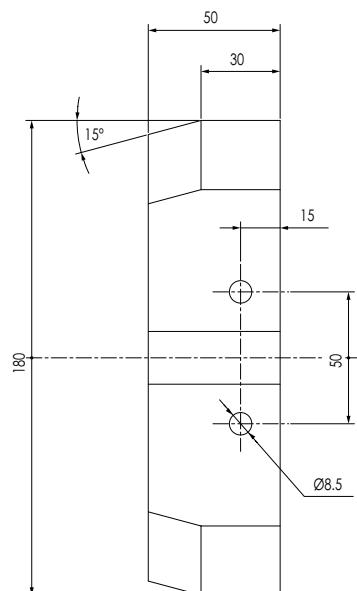


Fig. 136

### Bolt for drive head

411.0744

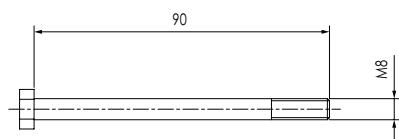


Fig. 137

### Aluminium alloy end cap

411.1964

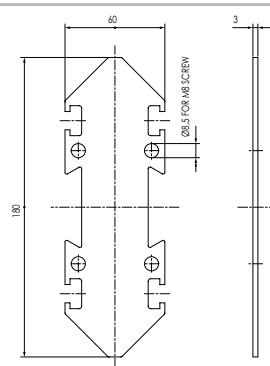


Fig. 138

### Fishplate for mod.2 Rack mounting on SR180, SR250 T grooves

411.1179

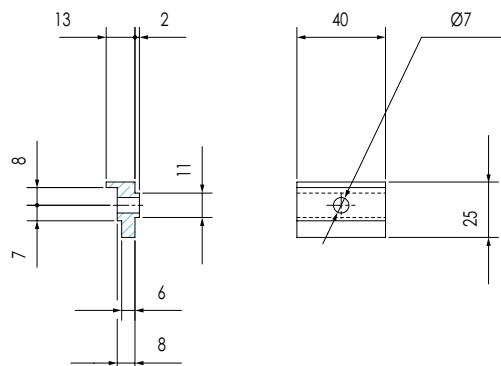


Fig. 139

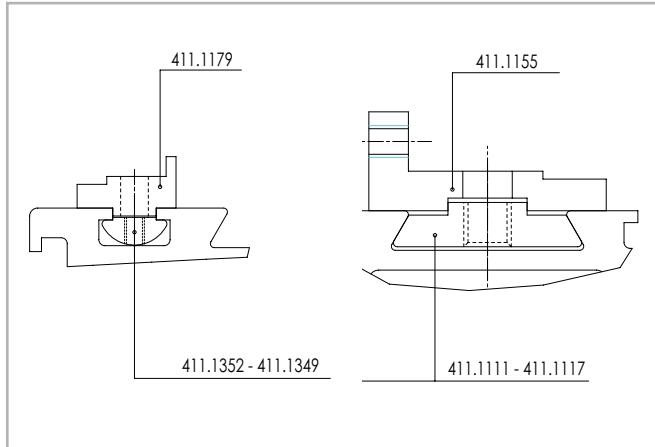


Fig. 140

For rack mounting plate mod.2 Use insert 411.1352

## ➤ Roller assembly with "V" shaped rollers

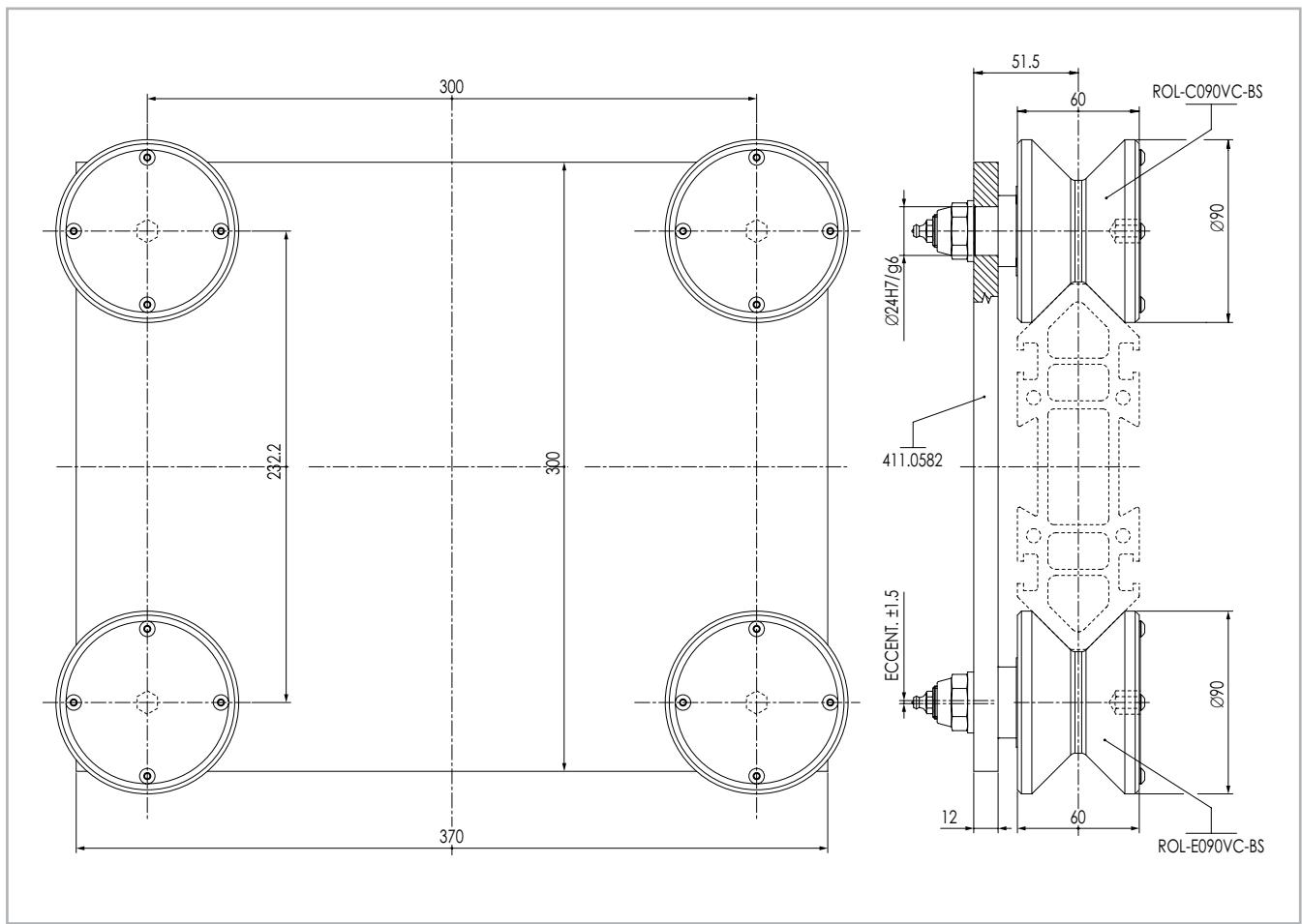


Fig. 141

55.1180

Heavy duty roller assembly with 4 rollers, two ROL-C090VC-BS and two ROLE090VC-BS.

## ► Roller assembly with 4 rollers

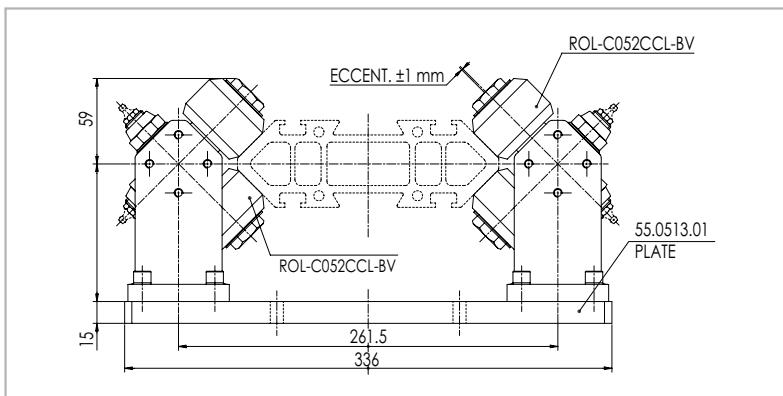


Fig. 142

**55.0713**

Roller assembly with backing plate 336x150x15 rollers with lifetime lubrication

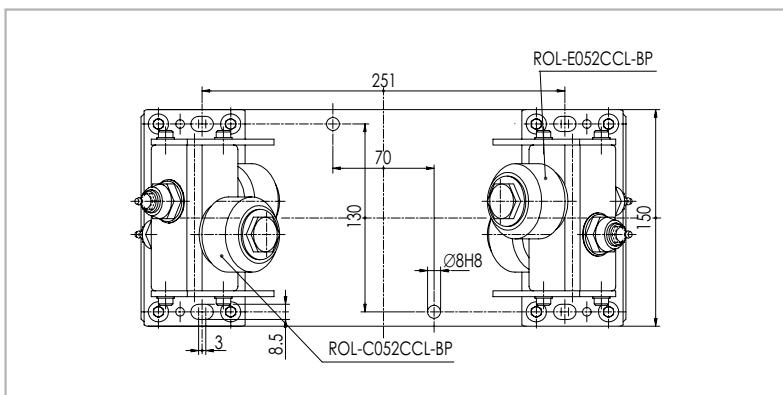


Fig. 143

**55.0513**

Roller assembly with backing plate 336x150x15 rollers with periodical lubrication

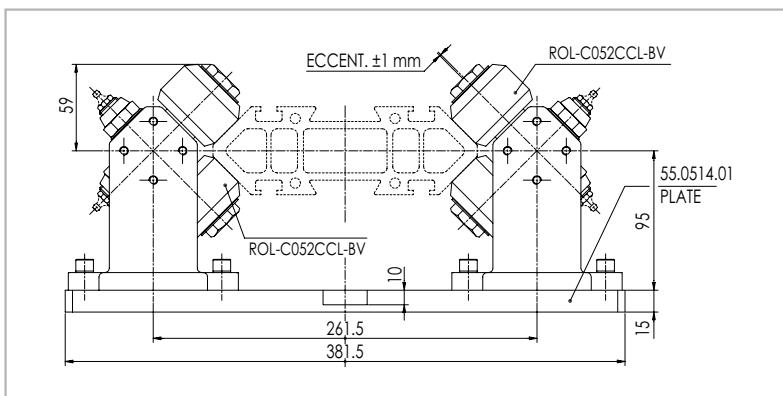


Fig. 144

**55.0740**

Roller assembly with backing plate 381.5x80x15 rollers with lifetime lubrication

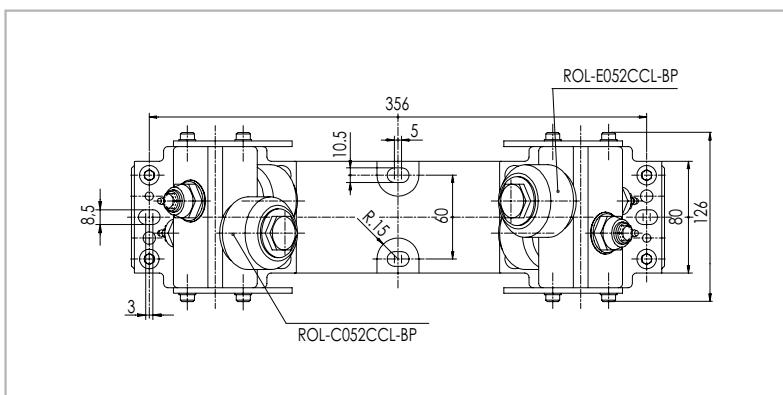
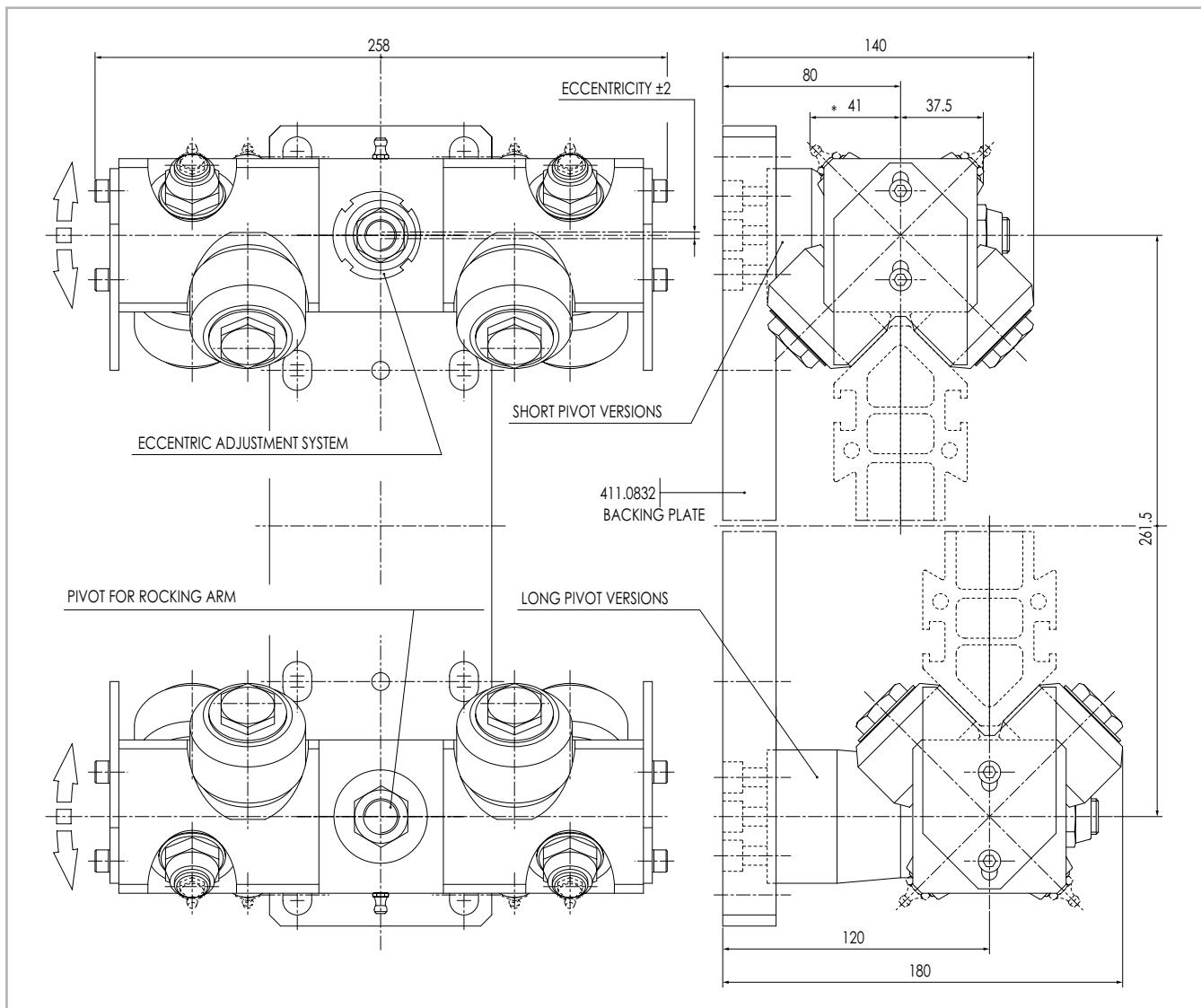


Fig. 145

**55.0514**

Roller assembly with backing plate 381.5x80x15 rollers with periodical lubrication

## ➤ 8 Rollers floating assembly - complete pairing



\* Lubricator nipple mounted for periodic lubrication versions only

Fig. 146

### Notes:

The complete pairing kit comes with one eccentric and one concentric roller assembly mounted on a backing plate. The concentric roller assembly should take the heavier load. For trolley on 2 parallel guides use one guide axially free roller assemblies ( $\pm 4\text{mm}$ ).

Pairing kits are available with two roller assemblies having the same number of rollers. For different combinations (i.e. upper assembly with 6 rollers and lower assembly with 4 rollers, two eccentric rollers assemblies) please order the assemblies separately, without baseplate and add the backing plate shown in this page. However we suggest to verify always with our technical department prior to ordering.

Pivot type	Lubrication type	Axially constrained	Axially free
Short pivot	Periodical	55.1380	55.3380
	Lifetime	55.1381	55.3381
Long pivot	Periodical	55.1382	55.3382
	Lifetime	55.1383	55.3383

Tab. 19

## ➤ Backing plate for floating roller assemblies

Backing plate - Material: hard anodized aluminium alloy

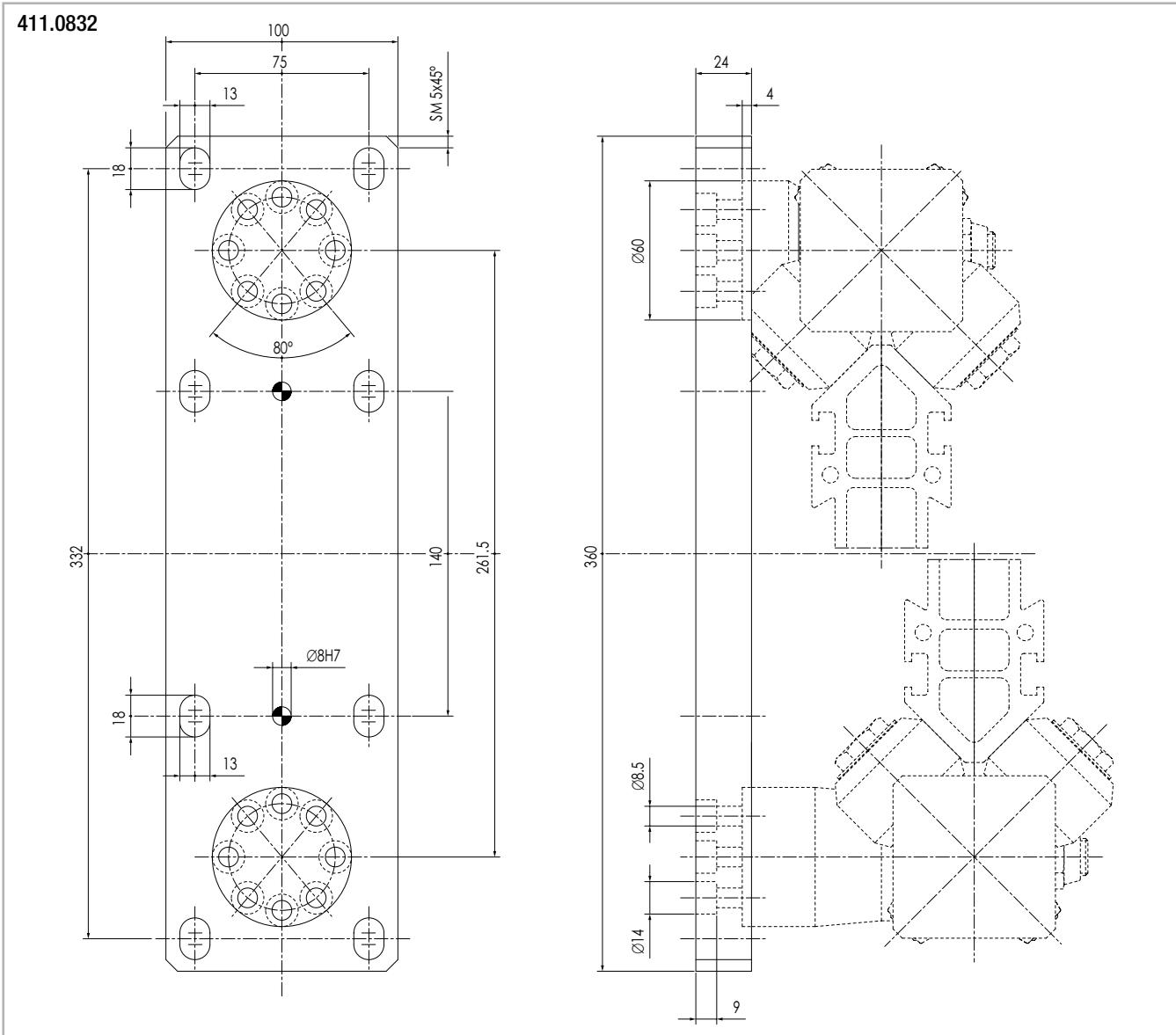


Fig. 147

## Speedy Rail 250



### ► Super wide body multi groove Speedy Rail guide and specifications

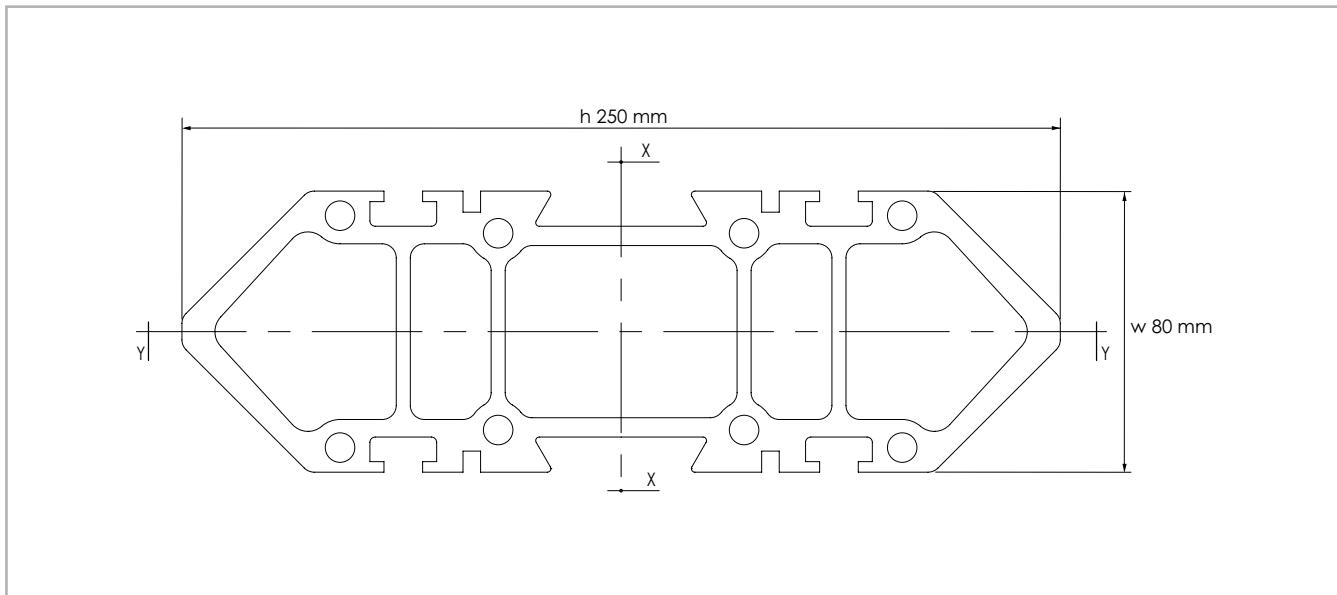


Fig. 148

Surface quadratic moment X-X axis = 27.345.460 mm<sup>4</sup> / Y-Y axis = 4.120.150 mm<sup>4</sup>.

Max. manufacturing tolerances =  $\pm 0.65$  mm across opposite rolling surfaces.

Max. angular distortion =  $\pm 30'$ /m.

Linear mass = 15.20 Kg/m.

Max. linear distortion =  $\pm 0.5$  mm/m.

Standard lengths: 3000-3500-4000-4500-5000-5500-6000-6500-7000-7500 mm.

External surface: deep hard anodizing

## > Roller assemblies and components

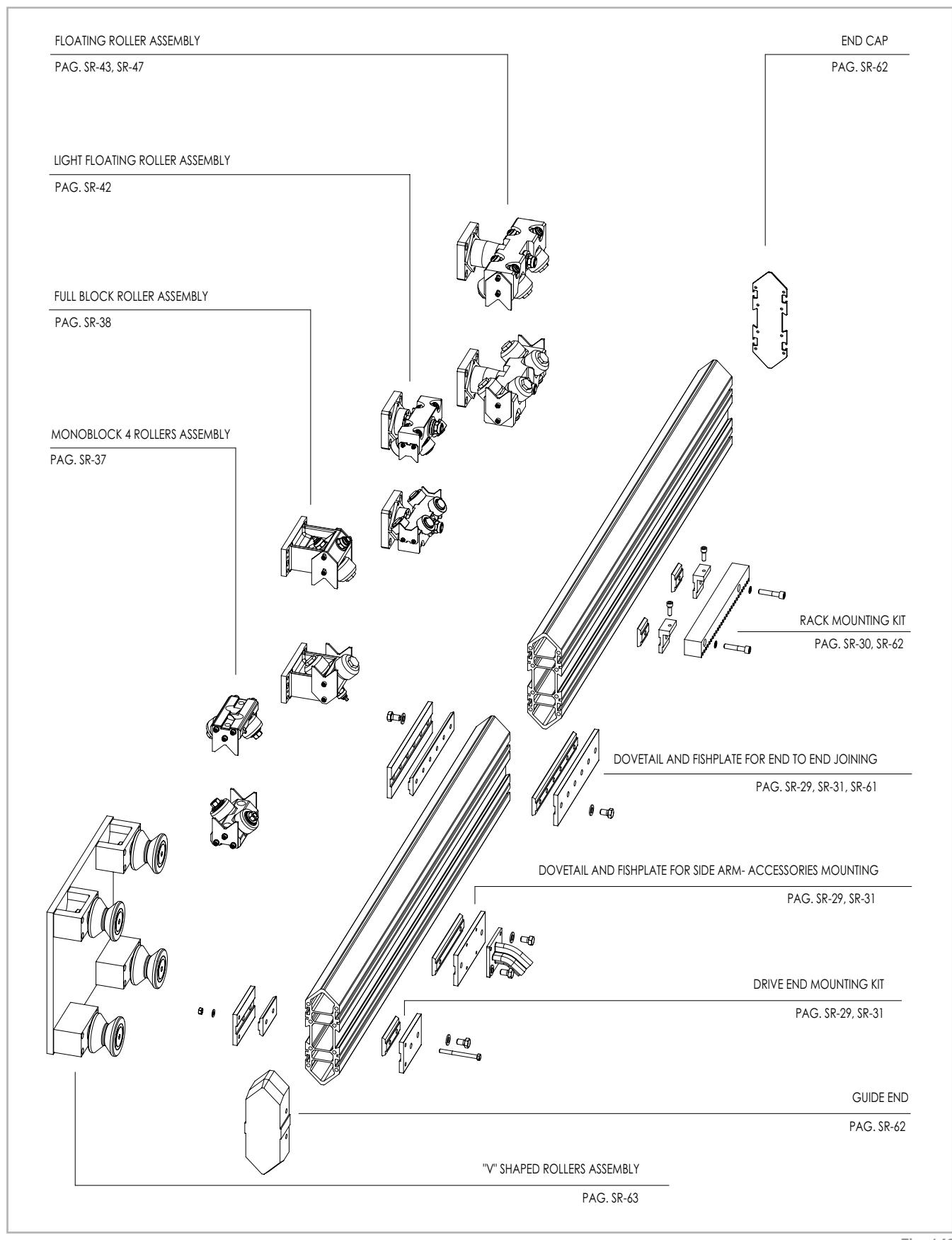


Fig. 149

## ➤ Superwide body multi groove Speedy Rail guide and specifications

Speedy Rail 250 with plain ends: SR250-T

Speedy Rail 250 with drilled ends: SR250-F

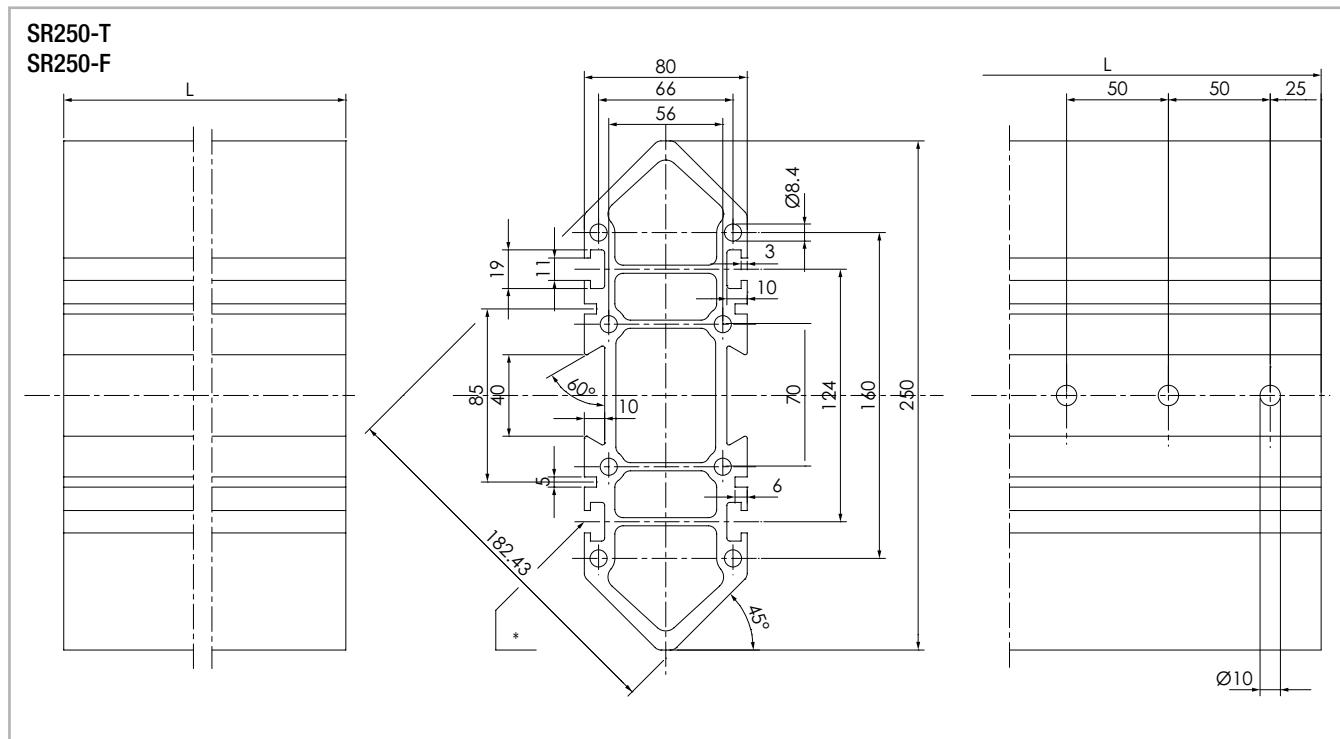


Fig. 150

### Note:

Drillings on the bar end are required as a safety measure with end-to-end joining in moving rails.

Super wide body multi groove speedy rail guide (SR250) uses the same dovetails, plates, fishplates and joining components of speedy rail standard (sr 120m section) see pages SR-29, SR-30, SR-31. Special plates, 411.0960, are also available for end-to-end joining in heavy duty applications.

\* Particularly for side grooves the same inserts for SR180 (pag.SR-53) are used.

### Steel fishplates for end to end joining

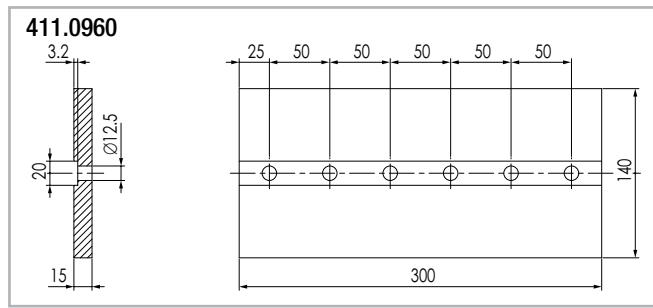


Fig. 151

## Components for super wide body Speedy Rail guide

Aluminium alloy end cap

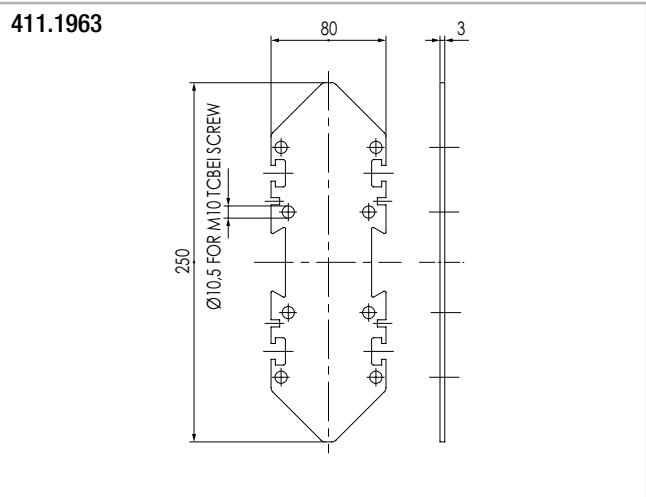


Fig. 152

Elastomer drive head

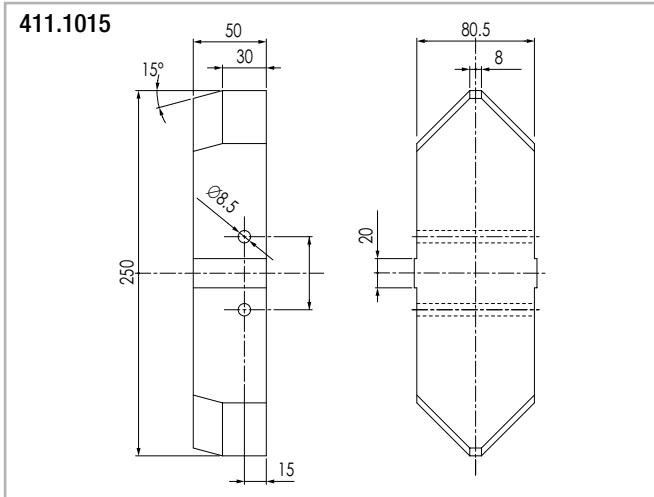
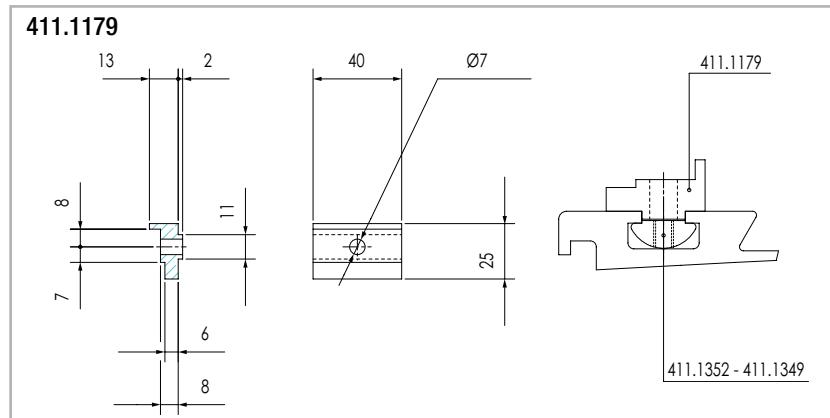


Fig. 153

Fishplate for m2 Rack mounting on, SR180, SR250 T grooves

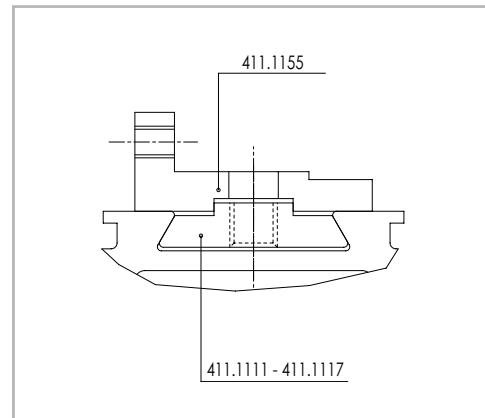


m2 straight toothed

Fig. 154

For rack mounting plate m2 use insert 411.1352

Fishplate for m3 and m4 rack mounting on dovetail grooves



m3 and m4

Fig. 155

➤ **Roller assembly with "V" shaped rollers**

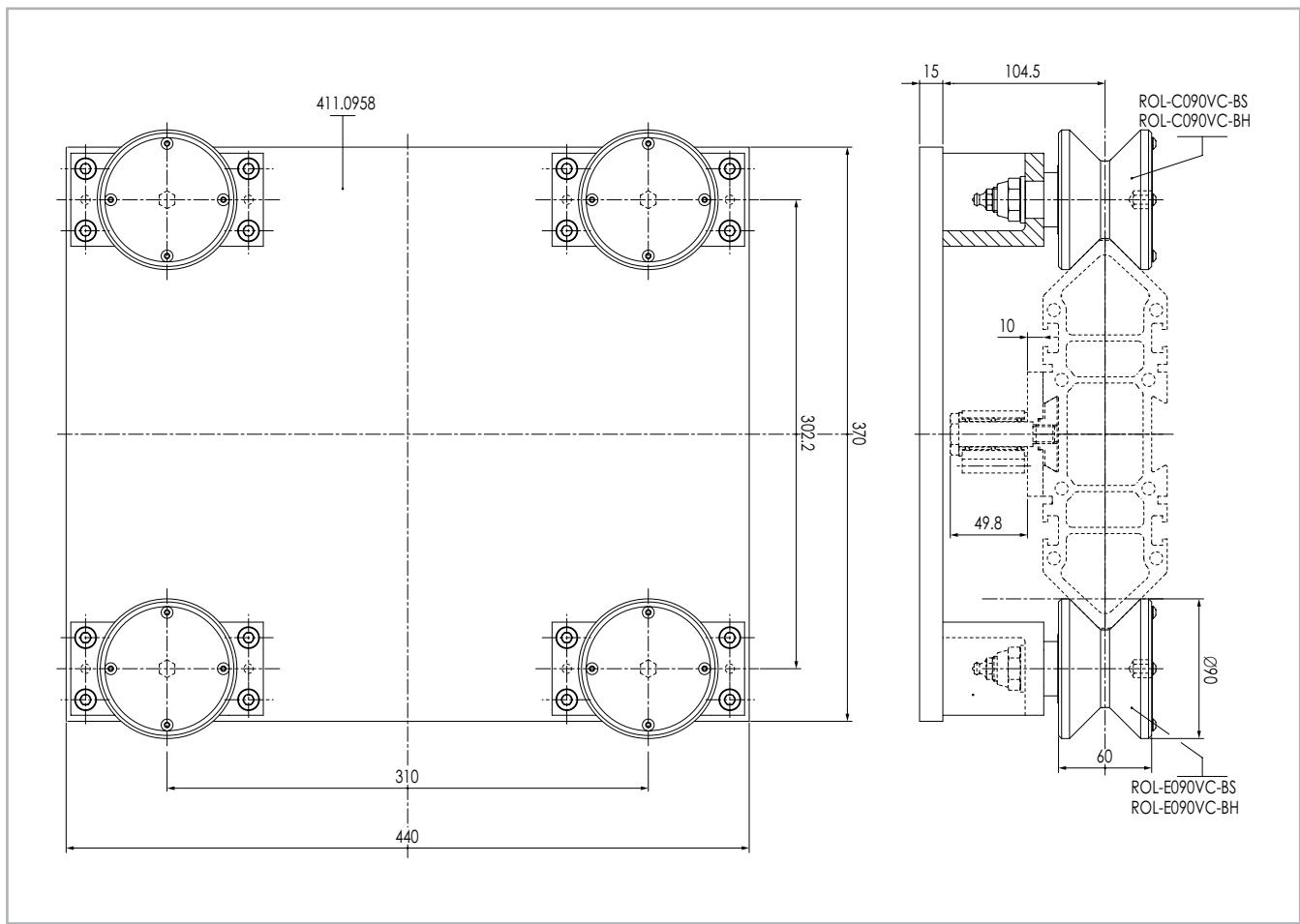


Fig. 156

**55.0808**

Roller assembly with 4 rollers, two ROL-C090VC-BS and two ROL-E090VC-BS

## Technical detail



### ➤ Mechanical and technological components specifications

Guides	Accessories	Material	Tensile strength
Speedy Rail SR 35			Tensile strength: $R = 245 \text{ N/mm}^2$
Speedy Rail SR C 48			Yield stress: $S = 195 \text{ N/mm}^2$
Speedy Rail Mini SR 60			Elongation: 10% ÷ 13%
Speedy Rail Middle SR 90			Modulus of elasticity: $E=70000 \text{ N/mm}^2$
Speedy Rail Standard SR 120			$G=26000 \text{ N/mm}^2$
Speedy Rail Wide Body multiple grooves SR 180			Mass density: 2,7 kg/dm <sup>3</sup>
Speedy Rail Super Wide Body Multiple Grooves SR 250			Coefficient of expansion: $K=23 \times 10^{-6} \text{ mm/mm}^\circ\text{C}$

Tab. 20

Components	Material	Tensile strength
Base plates		Tensile strength: $R = 275 \text{ N/mm}^2$
Rocking arms		Yield stress: $S = 200 \text{ N/mm}^2$
Compact rollers assembly body		Elongation: 10% ÷ 13%
		Modulus of elasticity: $E=70000 \text{ N/mm}^2$
		$G=26000 \text{ N/mm}^2$
		Mass density: 2,7 kg/dm <sup>3</sup>
Monoblock roller assembly case	Aluminum Alloy	Tensile strength: $R = 225 \text{ N/mm}^2$
Full-block roller assembly case		Yield stress: $S = 142 \text{ N/mm}^2$
		Elongation: 3% ÷ 5%
		Modulus of elasticity: $E=70000 \text{ N/mm}^2$
		$G=26000 \text{ N/mm}^2$
		Mass density: 2,7 kg/dm <sup>3</sup>

Tab. 21

## > Treatments on all light alloy components

Heat treatment	Age hardening
Surface treatment	<p>Surface hardening: Low temperature deep anodizing to give a surface hardness of 600 ÷ 700 HV</p> <p>Surface layer depth: 50÷60 micron (0.050÷0.060 mm) for rails, 25÷35 micron (0.025÷0.035 mm) for supports bodies and plates.</p> <p>Chemical composition of surface layer: <math>\text{Al}_2\text{O}_3</math></p> <p>Fusion temperature of surface layer: 2100° C</p> <p>Surface layer electric resistance at 20°C: <math>4 \times 10^{15}</math> Ohm/cm/cm<sup>2</sup></p> <p>Dielectric constant: approx. 7.5</p> <p>Puncture voltage of surface layer: 1500 V</p>

Tab. 22

## > Rollers

### Speedy Rail system

Rollers are manufactured with a steel shaft, high quality ball-needle bearings, rubber seals labyrinth.

The external surface of the roller is machined with a slightly convex profile, finished with a sintered plastic compound having the following properties:

Tensile strength:	85 N/mm <sup>2</sup>
Rockwell hardness:	120 R
Melting point:	+ 220 °C
Max. continuous working temperature:	+80°C
Min. continuous working temperature:	- 20°C

Chemical resistance: excellent to mineral and organic oils; good to basic solutions; fairly good to acid solutions.

We always recommend a preliminary test for the rollers in the actual working environment.

S  
R

## > Roller assemblies

Roller assemblies with four (4) rollers have the two inner rollers mounted on a plain, concentric sleeve while the outer ones have an eccentric sleeve. This setup allows the proper adjustments to compensate dimensional tolerances on the rail. Two roller assemblies have one roller with an eccentric sleeve and the other with a concentric setup.

Floating roller assemblies: all the rollers on this type of support have a concentric sleeve.

The adjustments are made possible by the pivot settings (hub), which comes either with an eccentric or concentric setup.

Custom configuration for roller assemblies are available upon request.

## > Rollers adjustments

Adjusting the rollers on a single section rail requires the rollers in a position that allows them to touch the running surface with no play - slightly pre-loaded- A different and more accurate setting is required when the runway is assembled with multiple sections.

The rollers setting must leave  $0.15 \div 0.20$  mm backslack (play) from the rail –Use a feeler gauge for best results- The setting requirement is determined by the dimensional tolerances on the rail sections.

## > Torque settings

Bolt purpose torque:

M6	(fixing scrapers)	10 Nm
M8	(fixing assemblies)	25 Nm
M10	(fixing assemblies)	45 Nm
M12	(dovetails & fishplates)	55 Nm
M16	(fixing rollers)	75 Nm

Drillings of the end bars:

These are made in order to create a security connection for two or more moving rails that have an end to end joining, through the shaft of the special screws that are used for fixing the fishplate and the dovetails. This additional connection is not a guarantee for the precision but has got the aim to avoid injuries in the case that the moving rails unhook.

## > Scrapers

Are manufactured from a sintered compound, self lubricating, having a low friction coefficient. All the roller assemblies come with the scrapers.

The purpose of this item is to keep foreign bodies out of the rollers.

Scrapers shall never be set to slide on the rail.

They are equipped with mounting and adjustment holes so that a 0.2 mm minimum clearance can be applied.

For application environments with an excessive pollution or dust use the mobile brush assembly.

## > Drive head

For Speedy Rail profiles. Machined from a hard polymer rubber molding - Shore A hardness 90÷95 - Normally mounted on the bar ends when the system has a rail that moves in and out the roller assemblies. This rubber end piece allows the rail to be easily guided into the roller assemblies.

## > Lubrication

There is no need to lubricate our Speedy Rail profiles. It provides continuous lubrication and keeps the rail clean.

Rollers: standard rollers with regular maintenance/greasing schedule have its own grease nipple. Please use grade 3 grease for working temperature of 10°C÷60°C.

Grade 2 grease is required when the working temperature drop below 10°C. Lubricate every 5-6 months.

For the "lifetime" lubrication version, the rollers are supplied with a high tech grease.

The grease nipples are removed from the assemblies since this configuration does not require any periodic lubrication.

## > Life testing and speed

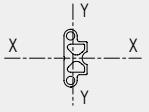
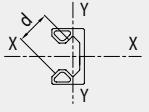
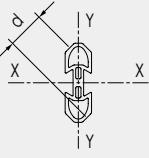
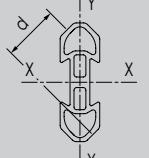
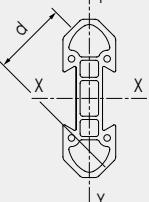
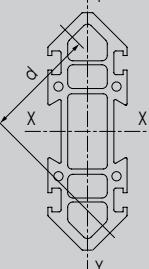
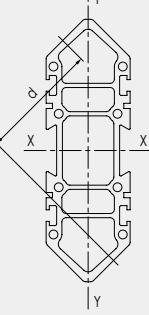
### **Speedy rail and system with plastic shell rollers**

The max applicable load, stated in the description of each roller of the Speedy Rail systems, is determined depending on the characteristics of the plastic compound shell. The cylindrical rollers of Speedy Rail system can be used with translation speed up to 15 metres/second and with accelerations and decelerations up to 10 metres/sec<sup>2</sup>. For Speedy Rail and Speedy Rail C 48 systems with "V" shaped and for Speedy Rail 35 plastic compound rollers, the max translation speed is of 8 metres/second while the max accelerations and decelerations are of 8 metres/sec<sup>2</sup>. For higher dynamics please contact our technical department. For all roller types the working temperature limits are -20°C and +80°C.

The rollers with plastic compound shell do not damage themselves and do not damage the rails where the invert direction, even in presence of high accelerations and decelerations. Speedy Rail C 48 and Speedy Rail 35 systems have good performance and excellent life even in presence of dust. With stresses on the rollers within the max values stated on the catalogue, the Speedy Rail systems enable a life time of more than 80.000 km for the cylindrical rollers and 50.000 km for the systems with "V" shaped rollers.

The life can be lower due to excessive presence of dust or pollutants.

## ➤ Summary table Speedy Rail guides

Profile type and code N°	Simple profiles mechanical and specifications	Surface quadratic moment I (X) mm <sup>4</sup>	Surface quadratic moment I (Y) mm <sup>4</sup>	Section modulus W (X) mm <sup>3</sup> :	Section modulus W (Y) mm <sup>3</sup> :	Section mm <sup>2</sup>	Distance d mm: (Roller contact axis)	Linear mass t kg/mt
SR 35 SIMP - T SIMP - F		17.779	3.665	1016	118	203	/	0.60
SR C 48 CR48 - D CR48 - T CR48 - F		152.026	36.823	6334	2045	526	28.26	1.42
SR Mini (60) SR060 - T SR060 - F		138.600	18.000	4.620	1.800	470	29	1,27
SR Middle (90) SR090 - T SR090 - F		630.000	76.500	14.250	5.170	965	39,6	2,6
SR Standard (120) SR120 - T SR120 - F		2.138.988	259.785	35.650	12.989	1.645	56,1	4,4
SR Wide Body (180) SR180 - T SR180 - F		10.291.100	1.278.700	114.345	42.620	3.730	95,7	10,2
SR Super Wide body (Speedy Rail 250) SR250 - T SR250 - F		27.345.460	4.120.150	218.760	103.000	5.609	113.95	15,2

Tab. 23

## ➤ Loads on a 4 'V' rollers trolley

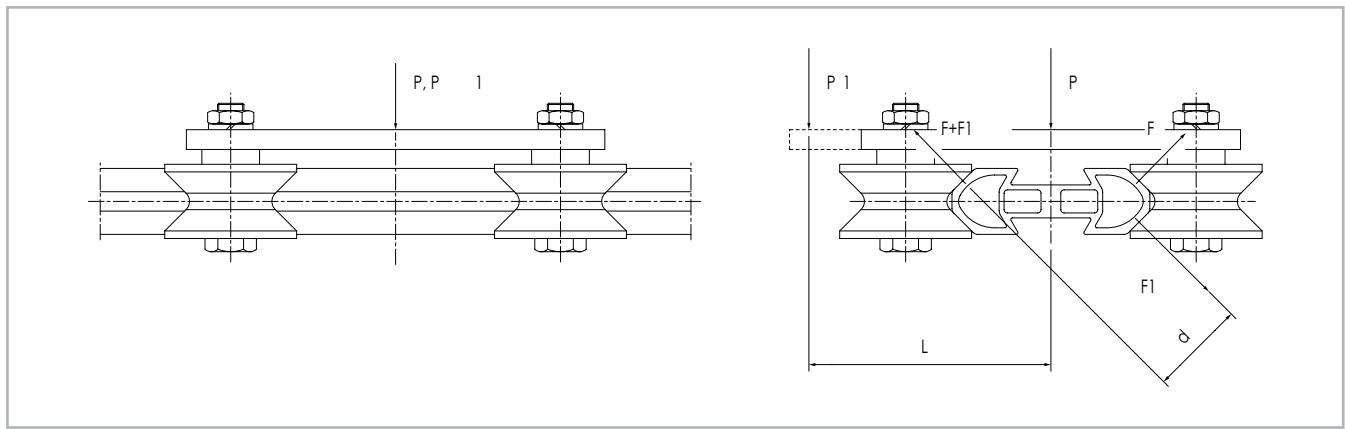


Fig. 157

Rollers load with force 'P' applied on the rail axle

$$F = P \cdot \left( \frac{1}{2\sqrt{2}} \right) (N)$$

$$F_r = F_a = F \cdot \left( \frac{1}{\sqrt{2}} \right) (N)$$

$P, P_1$  = Applied forces (N)

$F_r$  = Radial load (N)

$F_a$  = Axial load (N)

Fig. 158

Rollers load with ' $P_1$ ' force applied at 'L' distance (mm) from rail centerline

$$F = P_1 \cdot \left( \frac{1}{2\sqrt{2}} \right) (N)$$

$$F_1 = \frac{P_1 \cdot L}{2 \cdot d} (N)$$

$$F_r = F_a = \frac{F+F_1}{\sqrt{2}} (N)$$

$P, P_1$  = Applied forces (N)

$F_r$  = Radial load (N)

$F_a$  = Axial load (N)

Fig. 159

**Important:** the load on most loaded rollers must be, for each roller type, less or equal to the corresponding rated load on the catalogue.

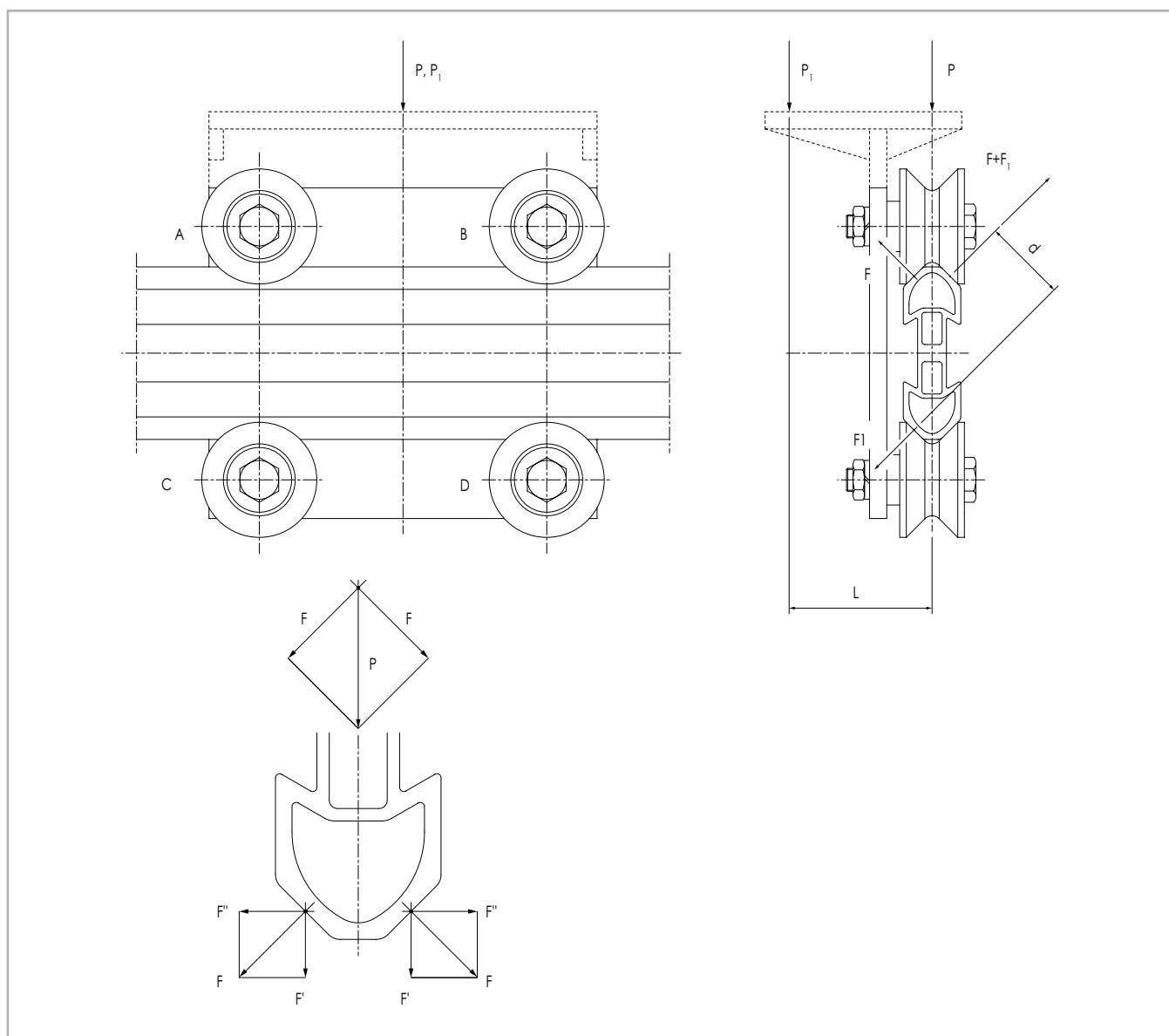


Fig. 160

$$F' = F'' = \frac{F}{\sqrt{2}}$$

A, B      Concentric rollers

C, D      Eccentric rollers

$P, P_1$       = Applied forces (N)

$F_r$       = Radial load (N)

$F_a$       = Axial load (N)

Fig. 161

## Rollers load with force 'P' applied on the rail axle

$F_r = \frac{P}{2}$ (N)	$F_a = 0$ (N)	A, B = Concentric rollers C, D = Eccentric rollers P, P <sub>1</sub> = Applied forces (N) F <sub>r</sub> = Radial load (N) F <sub>a</sub> = Axial load (N)
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Fig. 162

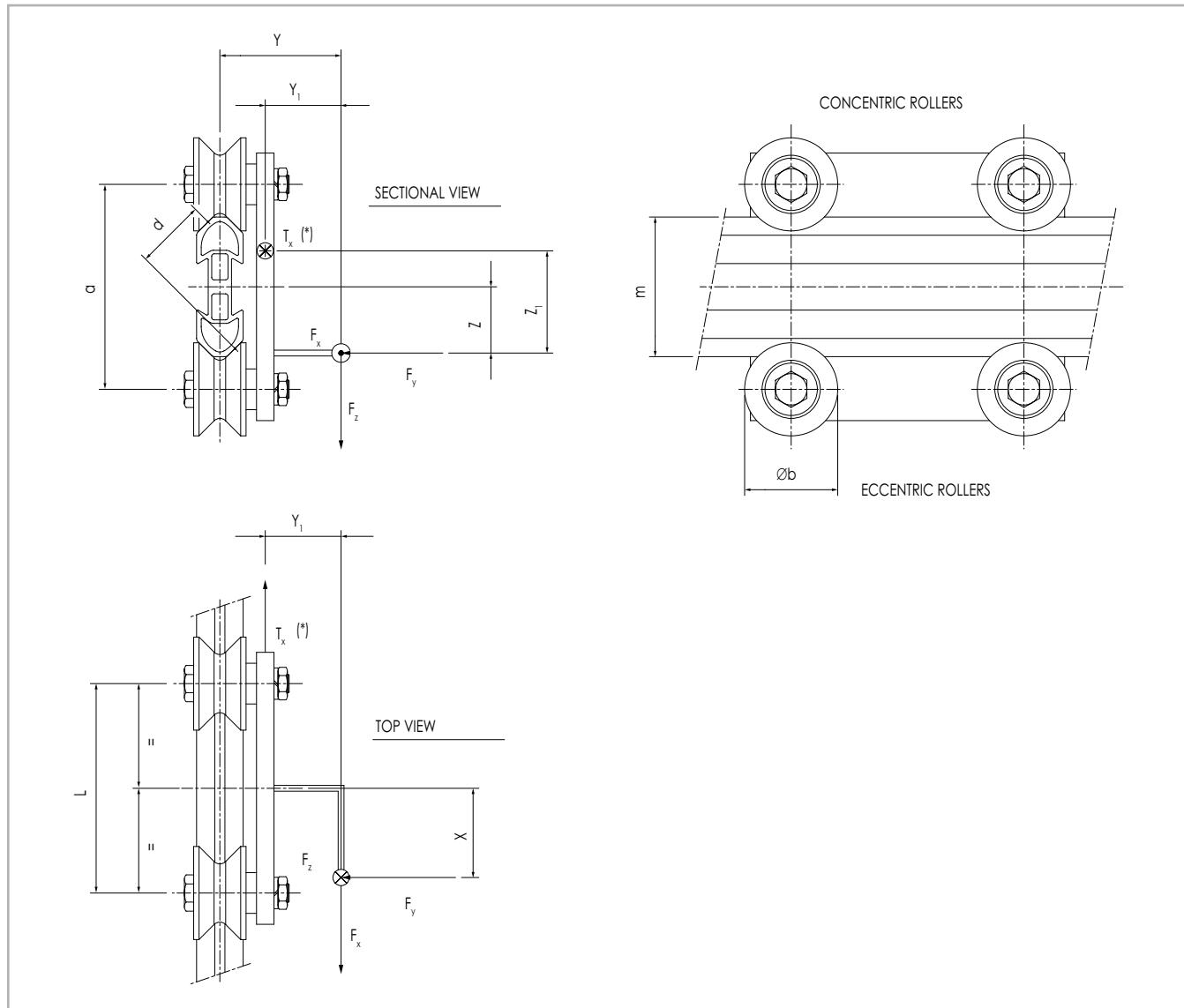
Rollers load with 'P<sub>1</sub>' force applied at 'L' Distance (mm) from rail centerline

$F = P_1 \cdot \frac{1}{2 \cdot \sqrt{2}}$ (N)	$F_1 = \frac{P_1 \cdot L}{2 \cdot d}$ (N)	$F_r = \sqrt{2} F + \frac{F_1}{\sqrt{2}}$ (N)	$F_a = \frac{F_1}{\sqrt{2}}$ (N)	A, B = Concentric rollers C, D = Eccentric rollers P, P <sub>1</sub> = Applied forces (N) F <sub>r</sub> = Radial load (N) F <sub>a</sub> = Axial load (N)
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Fig. 163

**Important:** the load on most loaded rollers must be, for each roller type, less or equal to the corresponding rated load on the catalogue.

## Trolley on single rail horizontal



(\*) Traction force (chain or belt)  $T_x = F_x$

Fig. 164

The rollers with concentric sleeve are mounted where there is the highest load and the ones with eccentric sleeve on the opposite end.

All 'F' values must include the dynamic component obtained by:

Inertia force = mass (kg) x acceleration ( mt/s<sup>2</sup> ).

## Roller-guide load verification

$$F_{Ass} \Rightarrow \frac{F_y}{4} + \frac{F_y \cdot X + F_x \cdot Y_1}{2 \cdot L} + \frac{F_z \cdot Y + F_y \cdot Z}{2 \cdot d \cdot 1.41}$$

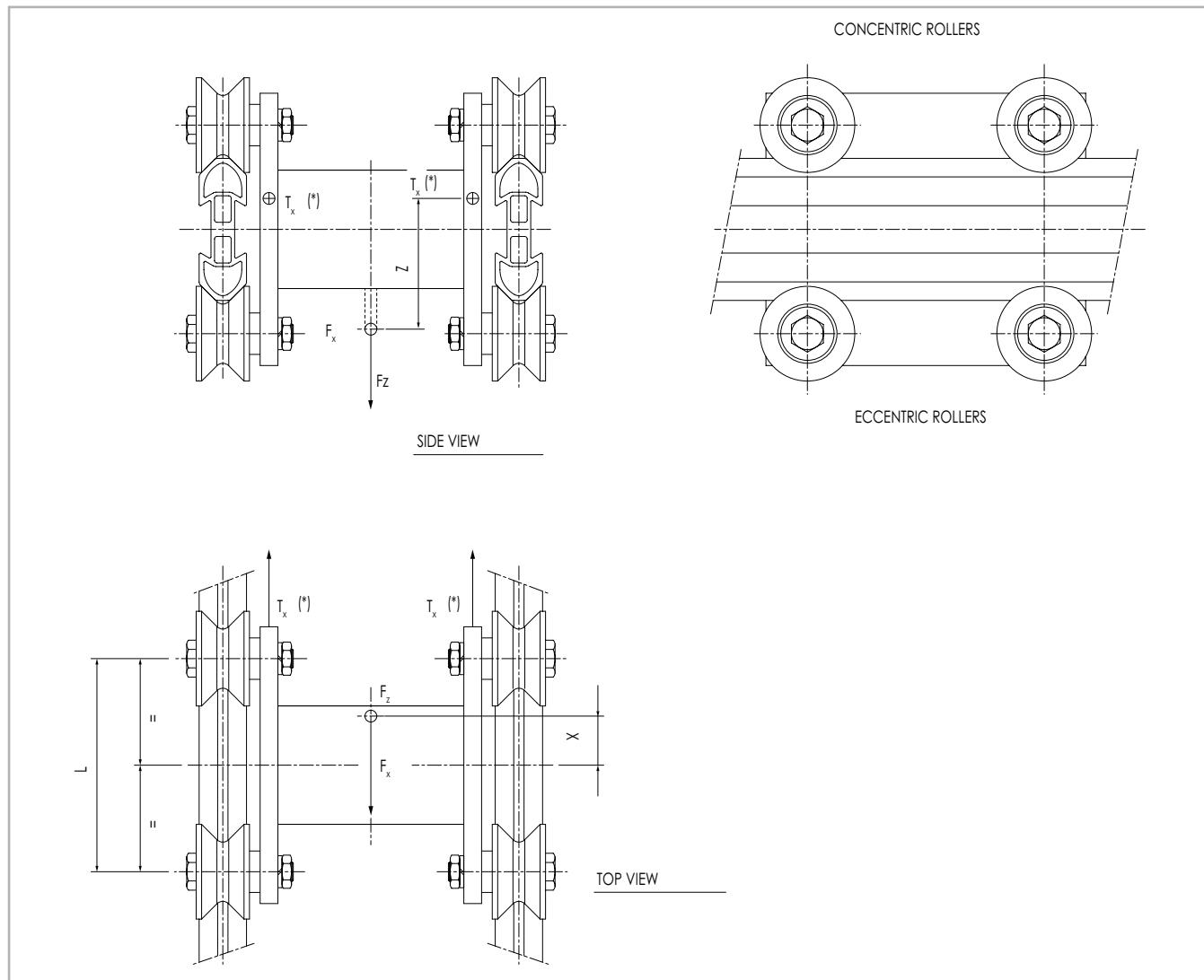
$$F_{Rad} \Rightarrow \frac{F_z}{2} + \frac{F_y}{4} + \frac{F_z \cdot X - F_x \cdot Z_1}{L} + \frac{F_z \cdot Y + F_y \cdot Z}{2 \cdot d \cdot 1.41}$$

Fig. 165

**Important:** the load on most loaded rollers must be, for each roller type, less or equal to the corresponding rated load on the catalogue.

## Loads on twin 4 'V' rollers trolleys

### Trolley on double rail horizontal



(\*) Traction force (chain or belt)  $T_x = F_x/2$

Fig. 166

When assembling lines with parallel rail and long strokes it would be wise to use axially-free roller assemblies on one of the rails in order to withstand minor misalignments due either to assembly or maintenance errors.

All 'F' values must include the dynamic component obtained by:  
Inertia Force = mass (kg) x acceleration (mt/s<sup>2</sup>).

### Roller-guide load verification

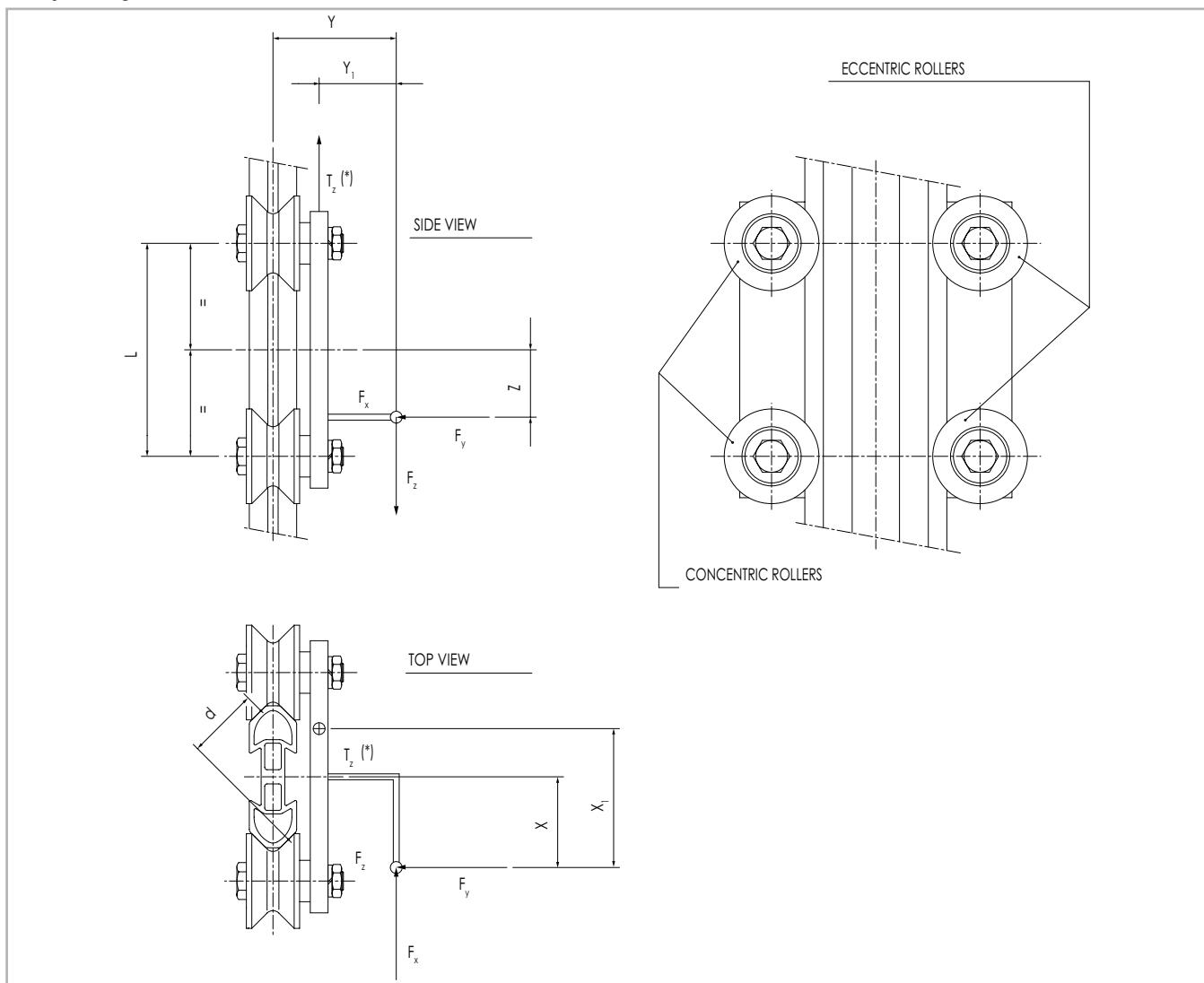
$$F_{\text{Rad}} \Rightarrow \frac{F_z}{4} + \frac{F_x \cdot Z + F_z \cdot X}{2 \cdot L}$$

Fig. 167

**Important:** the load on most loaded rollers must be, for each roller type, less or equal to the corresponding rated load on the catalogue.

## > Loads on a 4 'V' rollers vertical trolley

### Trolley on single vertical rail



(\*) Lifting force (chain or belt)  $T_z = F_z$

Fig. 168

The rollers with concentric sleeve are mounted where there is the highest load and the ones with eccentric sleeve on the opposite end.

All 'F' values must include the dynamic component obtained by:

Inertia Force = mass (kg) x acceleration (mt/s<sup>2</sup>).

### Roller-guide load verification

$$F_{Ass} \Rightarrow \frac{F_y}{4} + \frac{F_y \cdot Z + F_z \cdot Y_1}{2 \cdot L} + \frac{F_y \cdot X - F_x \cdot y}{2 \cdot d \cdot 1.41}$$

$$F_{Rad} \Rightarrow \frac{F_z \cdot X_1 + F_x \cdot Z}{L} + \frac{F_x \cdot Y - F_y \cdot X}{2 \cdot d \cdot 1.41} + \frac{F_y}{4} + \frac{F_z}{2}$$

**Important:** the load on most loaded rollers must be, for each roller type, less or equal to the corresponding rated load on the catalogue.

Fig. 169

## > Cylindrical roller loads

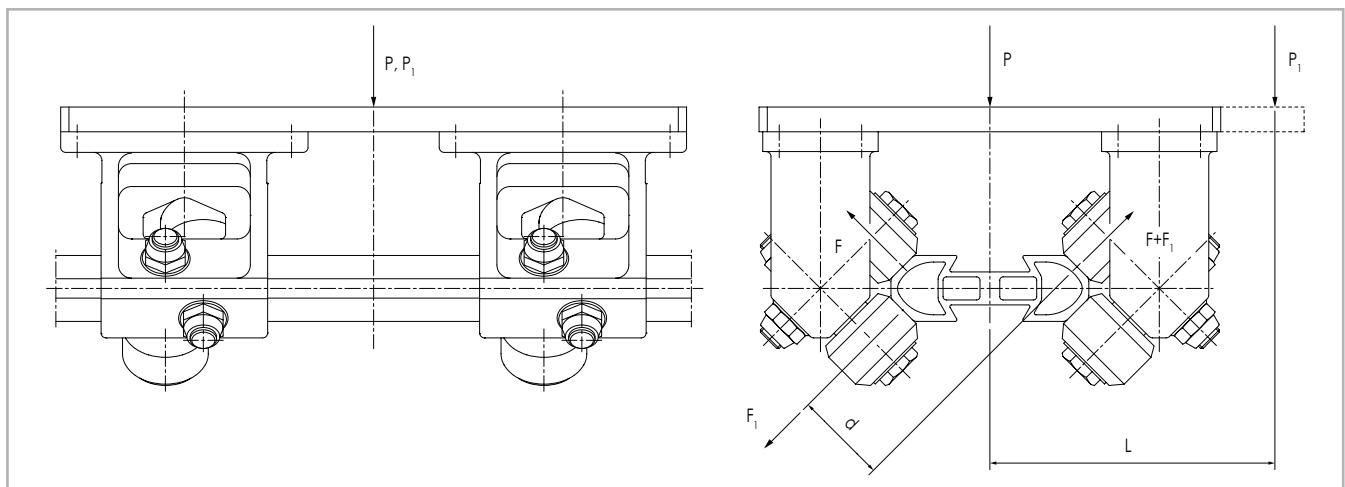


Fig. 170

Rollers load with 'P' force applied on the rail axle

$F = P \cdot \left( \frac{1}{2\sqrt{2}} \right) \text{ (N)}$	$F_1 = 0 \text{ (N)}$	$F_r = F \text{ (N)}$	$P, P_1 = \text{Applied forces (N)}$ $F_r = \text{Radial load (N)}$
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Fig. 171

Rollers load with 'P<sub>1</sub>' force applied at 'L' distance (mm) from rail centerline

$F = P_1 \cdot \left( \frac{1}{2\sqrt{2}} \right) \text{ (N)}$	$F_1 = \frac{P_1 \cdot L}{2 \cdot d} \text{ (N)}$	$F_r = F + F_1 \text{ (N)}$	$P, P_1 = \text{Applied forces (N)}$ $F_r = \text{Radial load (N)}$
--	---	-----------------------------	--

Fig. 172

S  
R

**Important:** the load on most loaded rollers must be, for each roller type, less or equal to the corresponding rated load on the catalogue.

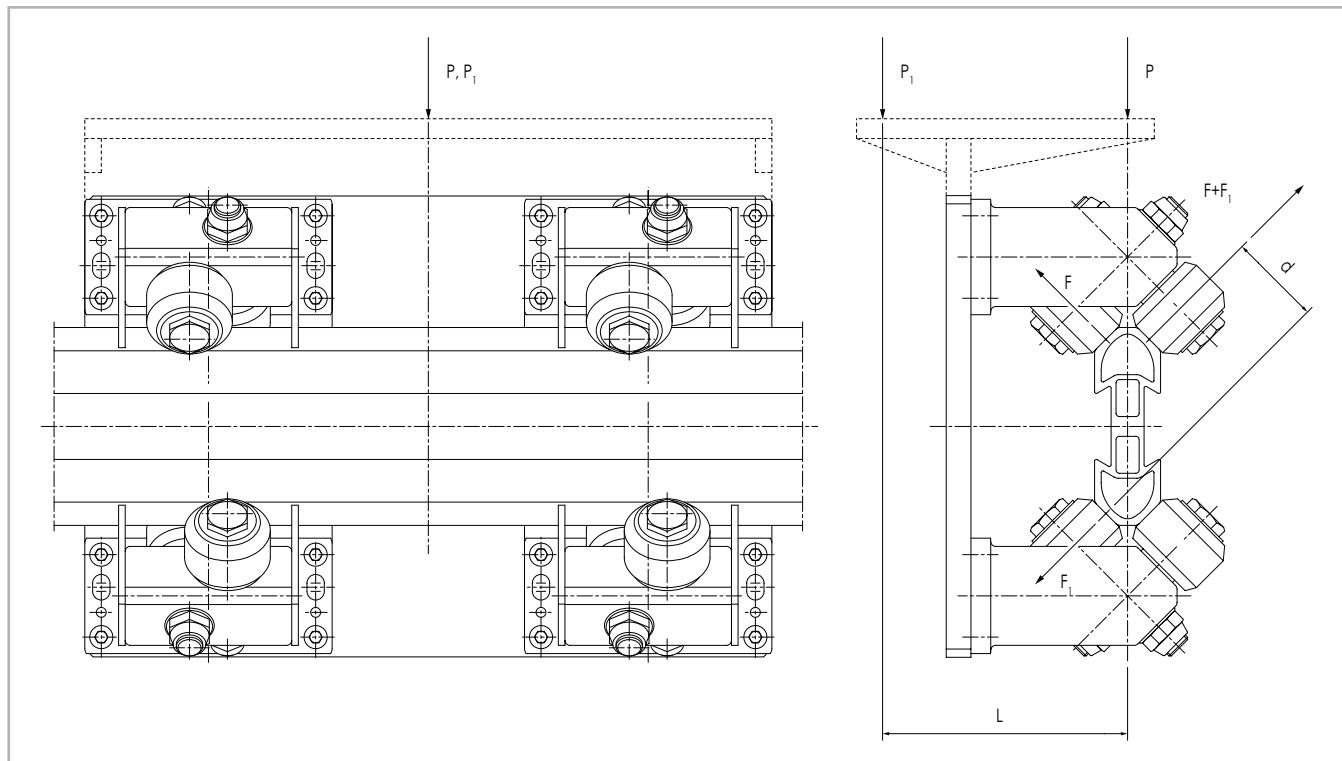


Fig. 173

Rollers load with 'P' force applied on the rail axle

$F = P \cdot \left( \frac{1}{2 \cdot \sqrt{2}} \right) \text{ (N)}$	$F_1 = 0 \text{ (N)}$	$F_r = F \text{ (N)}$	$P, P_1 = \text{Applied forces (N)}$ $F_r = \text{Radial load (N)}$
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Fig. 174

Rollers load with 'P' force applied at 'L' distance (mm) from rail centerline

$F = P \cdot \left( \frac{1}{2 \cdot \sqrt{2}} \right) \text{ (N)}$	$F_1 = \frac{P \cdot L}{2 \cdot d} \text{ (N)}$	$F_r = F + F_1 \text{ (N)}$	$P, P_1 = \text{Applied forces (N)}$ $F_r = \text{Radial load (N)}$
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Fig. 175

**Important:** the load on most loaded rollers must be, for each roller type, less or equal to the corresponding rated load on the catalogue.

## Load capacities for C Rollers assemblies

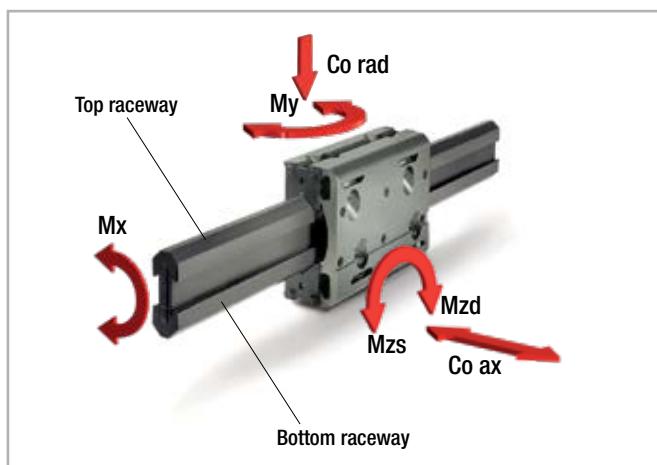


Fig. 176

Code	Nº of rollers	Type of roller	Roller configuration* <sup>4</sup>	C <sub>orad</sub> [N]	C <sub>ox</sub> [N]	Mx <sup>1</sup> [Nm]			M <sub>y</sub> <sup>2</sup> [Nm]	M <sub>zs</sub> <sup>3</sup> [Nm]	M <sub>zd</sub> <sup>3</sup> [Nm]
						SpeedyRail 120	SpeedyRail 180	SpeedyRail 250			
55.0222-FIL	8	ROL-C052CCC-BV ROL-E052CCC-BV	4+4	3620,4	3620,4	143,6	-	-	289,6	289,6	
55.0222-PAS	8	ROL-C052CCC-BV ROL-E052CCC-BV	4+4	3620,4	3620,4	143,6	-	-	289,6	289,6	
55.0323	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	1810,2	1810,2	71,8	-	-	0,0	0,0	
55.0324	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	1810,2	1810,2	71,8	-	-	0,0	0,0	
55.0325	2	ROL-C052CCL-BP ROL-E052CCL-BP	1+1	1810,2	905,1	71,8	122,5	145,9	0,0	0,0	
55.0411	4	ROL-C052CCC-BP ROL-E052CCC-BP	2+2	1810,2	1810,2	71,8	-	-	0,0	0,0	
55.0433	2	ROL-C052CCL-BP ROL-E052CCL-BP	1+1	1810,2	905,1	71,8	122,5	145,9	0,0	0,0	
55.0472-FIL	4	ROL-C052CCC-BP ROL-E052CCC-BP	2+2	1810,2	1810,2	71,8	-	-	0,0	0,0	
55.0472-PAS	4	ROL-C052CCC-BP ROL-E052CCC-BP	2+2	1810,2	1810,2	71,8	-	-	0,0	0,0	
55.0513	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	1810,2	1810,2	-	122,5	-	0,0	0,0	
55.0514	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	1810,2	1810,2	-	122,5	-	0,0	0,0	
55.0604	2	ROL-C052CCC-BP ROL-E052CCC-BP	1+1	1810,2	905,1	71,8	122,5	145,9	0,0	0,0	
55.0711	4	ROL-C052CCC-BV ROL-E052CCC-BV	2+2	1810,2	1810,2	71,8	-	-	0,0	0,0	
55.0713	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	1810,2	1810,2	-	122,5	-	0,0	0,0	
55.0723	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	1810,2	1810,2	71,8	-	-	0,0	0,0	
55.0724	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	1810,2	1810,2	71,8	-	-	0,0	0,0	
55.0725	2	ROL-C052CCL-BV ROL-E052CCL-BV	1+1	1810,2	905,1	71,8	122,5	145,9	0,0	0,0	
55.0733	2	ROL-C052CCL-BV ROL-E052CCL-BV	1+1	1810,2	905,1	71,8	122,5	145,9	0,0	0,0	
55.0740	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	1810,2	1810,2	-	122,5	-	0,0	0,0	

\*1 For sliders with rollers only on one raceway, the Mx moment refers to two sliders mounted on both opposite raceways of the rail.

\*2 The My moment can only be applied with two sliders mounted on both opposite raceways of the rail.

Therefore, for sliders with rollers only on one raceway, the values in the table refer to two sliders.

\*3 For sliders with rollers only on one raceway, the Mz moment refers to two sliders mounted on both opposite raceways of the rail.

\*4 For sliders with rollers only on one raceway, the codes show the roller type on each side of the assembly.

For sliders with rollers on both raceways of the rail, the codes show the roller type on the top raceway and the bottom raceway.

Tab. 24

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Code	N° of rollers	Type of roller	Roller configuration* <sup>4</sup>	C <sub>orad</sub> [N]	C <sub>oax</sub> [N]	Mx* <sup>1</sup> [Nm]			My* <sup>2</sup> [Nm]	M <sub>zs</sub> * <sup>3</sup> [Nm]	M <sub>zd</sub> * <sup>3</sup> [Nm]
						SpeedyRail 120	SpeedyRail 180	SpeedyRail 250			
55.0772-FIL	4	ROL-C052CCC-BV ROL-E052CCC-BV	2+2	1810,2	1810,2	71,8	-	-	0,0	0,0	
55.0772-PAS	4	ROL-C052CCC-BV ROL-E052CCC-BV	2+2	1810,2	1810,2	71,8	-	-	0,0	0,0	
55.0794	2	ROL-C052CCC-BV ROL-E052CCC-BV	1+1	1810,2	905,1	71,8	122,5	145,9	0,0	0,0	
55.0930	6	ROL-C052CCL-BP ROL-E052CCL-BP	3+3	5430,6	2715,3	215,4	367,5	437,6	597,4	644,4	
55.1135	5	ROL-C052CCL-BP ROL-E052CCL-BP	3+2	3620,4	1810,2	215,4	367,5	437,6	642,6	642,6	
55.1136	5	ROL-C052CCL-BV ROL-E052CCL-BV	3+2	3620,4	1810,2	215,4	367,5	437,6	642,6	642,6	
55.1143	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	7240,8	3620,4	287,2	490,0	583,4	0,0	0,0	
55.1144	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	7240,8	3620,4	287,2	490,0	583,4	0,0	0,0	
55.1145	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	7240,8	3620,4	287,2	490,0	583,4	0,0	0,0	
55.1146	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	7240,8	3620,4	287,2	490,0	583,4	0,0	0,0	
55.1147	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	7240,8	3620,4	287,2	490,0	583,4	0,0	0,0	
55.1148	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	7240,8	3620,4	287,2	490,0	583,4	0,0	0,0	
55.1149	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	7240,8	3620,4	287,2	490,0	583,4	0,0	0,0	
55.1150	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	7240,8	3620,4	287,2	490,0	583,4	0,0	0,0	
55.1350	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	3620,4	1810,2	143,6	245,0	291,7	0,0	0,0	
55.1351	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	3620,4	1810,2	143,6	245,0	291,7	0,0	0,0	
55.1354	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	3620,4	1810,2	143,6	245,0	291,7	0,0	0,0	
55.1355	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	3620,4	1810,2	143,6	245,0	291,7	0,0	0,0	
55.1358	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	
55.1359	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	
55.1361	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	3620,4	1810,2	143,6	245,0	291,7	0,0	0,0	
55.1363	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	3620,4	1810,2	143,6	245,0	291,7	0,0	0,0	
55.1364	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	3620,4	1810,2	143,6	245,0	291,7	0,0	0,0	
55.1365	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	3620,4	1810,2	143,6	245,0	291,7	0,0	0,0	
55.1366	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	
55.1367	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	
55.1368	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	
55.1369	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	
55.1370	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	

\*1 For sliders with rollers only on one raceway, the Mx moment refers to two sliders mounted on both opposite raceways of the rail.

\*2 The My moment can only be applied with two sliders mounted on both opposite raceways of the rail.

Therefore, for sliders with rollers only on one raceway, the values in the table refer to two sliders.

\*3 For sliders with rollers only on one raceway, the Mz moment refers to two sliders mounted on both opposite raceways of the rail.

\*4 For sliders with rollers only on one raceway, the codes show the roller type on each side of the assembly.

For sliders with rollers on both raceways of the rail, the codes show the roller type on the top raceway and the bottom raceway.

Tab. 25

Code	Nº of rollers	Type of roller	Roller configuration* <sup>4</sup>	C <sub>orad</sub> [N]	C <sub>ox</sub> [N]	Mx* <sup>1</sup> [Nm]			My* <sup>2</sup> [Nm]	M <sub>2s</sub> * <sup>3</sup> [Nm]	M <sub>zd</sub> * <sup>3</sup> [Nm]
						SpeedyRail 120	SpeedyRail 180	SpeedyRail 250			
55.1371	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1372	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1373	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1380	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	3620,4	3620,4	-	245,0	-	0,0	0,0	0,0
55.1381	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	3620,4	3620,4	-	245,0	-	0,0	0,0	0,0
55.1382	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	3620,4	3620,4	-	245,0	-	0,0	0,0	0,0
55.1383	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	3620,4	3620,4	-	245,0	-	0,0	0,0	0,0
55.1419	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1420	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1421	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1422	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1423	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1424	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1425	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1426	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	1810,2	287,2	490,0	583,4	0,0	0,0	0,0
55.1550	2	ROL-C040CC-BP	1+1	1244,5	622,3	49,4	84,2	100,3	0,0	0,0	0,0
55.1555	4	ROL-C040CC-BV	2+2	2489,0	1244,5	98,7	168,4	200,6	0,0	0,0	0,0
55.1556	4	ROL-C040CC-BV	2+2	2489,0	1244,5	98,7	168,4	200,6	0,0	0,0	0,0
55.1565	4	ROL-C040CC-BP	2+2	2489,0	1244,5	98,7	168,4	200,6	0,0	0,0	0,0
55.1566	4	ROL-C040CC-BP	2+2	2489,0	1244,5	98,7	168,4	200,6	0,0	0,0	0,0
55.1570	2	ROL-C040CC-BV	1+1	1244,5	622,3	49,4	84,2	100,3	0,0	0,0	0,0
55.3143	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	7240,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3144	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	7240,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3145	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	7240,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3146	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	7240,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3147	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	7240,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3148	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	7240,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3149	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	7240,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3150	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	7240,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0

\*1 For sliders with rollers only on one raceway, the Mx moment refers to two sliders mounted on both opposite raceways of the rail.

\*2 The My moment can only be applied with two sliders mounted on both opposite raceways of the rail.

Therefore, for sliders with rollers only on one raceway, the values in the table refer to two sliders.

\*3 For sliders with rollers only on one raceway, the Mz moment refers to two sliders mounted on both opposite raceways of the rail.

\*4 For sliders with rollers only on one raceway, the codes show the roller type on each side of the assembly.

For sliders with rollers on both raceways of the rail, the codes show the roller type on the top raceway and the bottom raceway.

Tab. 26

S  
R

Code	Nº of rollers	Type of roller	Roller configuration <sup>*4</sup>	C <sub>orad</sub> [N]	C <sub>oax</sub> [N]	Mx <sup>*1</sup> [Nm]			My <sup>*2</sup> [Nm]	M <sub>zs</sub> <sup>*3</sup> [Nm]	M <sub>zd</sub> <sup>*3</sup> [Nm]
						SpeedyRail 120	SpeedyRail 180	SpeedyRail 250			
55.3350	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3351	4	ROL-C052CCL-BV ROL-E052CCL-BV	2+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3361	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3363	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3364	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3365	4	ROL-C052CCL-BP ROL-E052CCL-BP	2+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3366	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3367	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3368	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3369	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3370	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3371	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3372	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3373	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3380	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	3620,4	0,0	-	0,0	-	0,0	0,0	0,0
55.3381	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	3620,4	0,0	-	0,0	-	0,0	0,0	0,0
55.3382	8	ROL-C052CCL-BP ROL-E052CCL-BP	4+4	3620,4	0,0	-	0,0	-	0,0	0,0	0,0
55.3383	8	ROL-C052CCL-BV ROL-E052CCL-BV	4+4	3620,4	0,0	-	0,0	-	0,0	0,0	0,0
55.3419	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3420	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3421	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3422	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3423	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3424	6	ROL-C052CCL-BP ROL-E052CCL-BP	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3425	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3426	6	ROL-C052CCL-BV ROL-E052CCL-BV	4+2	3620,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3553	4	ROL-C040CC-BV	2+2	2489,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3554	4	ROL-C040CC-BV	2+2	2489,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3563	4	ROL-C040CC-BP	2+2	2489,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55.3564	4	ROL-C040CC-BP	2+2	2489,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

\*1 For sliders with rollers only on one raceway, the Mx moment refers to two sliders mounted on both opposite raceways of the rail.

\*2 The My moment can only be applied with two sliders mounted on both opposite raceways of the rail.

Therefore, for sliders with rollers only on one raceway, the values in the table refer to two sliders.

\*3 For sliders with rollers only on one raceway, the Mz moment refers to two sliders mounted on both opposite raceways of the rail.

\*4 For sliders with rollers only on one raceway, the codes show the roller type on each side of the assembly.

For sliders with rollers on both raceways of the rail, the codes show the roller type on the top raceway and the bottom raceway.

Tab. 27

## Load capacities for V Rollers assemblies

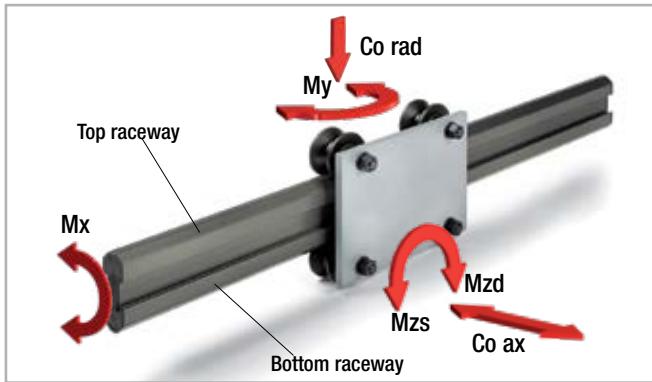


Fig. 177

Code	Nº of rollers	Type of roller	Roller configuration* <sup>4</sup>	$C_{orad}$ [N]	$C_{ox}$ [N]	$Mx^{*1}$ [Nm]	$My^{*2}$ [Nm]	$M_{zs}^{*3}$ [Nm]	$M_{zd}^{*3}$ [Nm]	Rail type
55.0372	3 rollers	ROL-C032VC-B ROL-E032VC-B	2+1	540,0	146,0	3,0	7,3	13,5		Speedy rail 60
55.0375	4 rollers	ROL-C032VC-B ROL-E032VC-B	2+2	540,0	292,0	6,0	14,6	27,0		Speedy rail 60
55.0557	4 rollers	ROL-C080VC-B ROL-E080VC-B	2+2	1400,0	622,0	24,7	77,8	175,0		Speedy rail 120
55.0558	4 rollers	ROL-C080VC-BR ROL-E080VC-BR	2+2	2000,0	1143,0	45,3	142,9	250,0		Speedy rail 120
55.0605	3 rollers	ROL-C050VC-B ROL-E050VC-B	2+1	800,0	160,0	3,3	9,6	24,0		Speedy rail 60
55.0606	4 rollers	ROL-C050VC-B ROL-E050VC-B	2+2	800,0	320,0	6,6	19,2	48,0		Speedy rail 60
55.0636	4 rollers	ROL-C080VC-BVA ROL-E080VC-BVA	2+2	2000,0	0,0	0,0	0,0	250,0		Speedy rail 120
55.0665	3 rollers	ROL-C062VC-B ROL-E062VC-B	2+1	900,0	225,0	6,3	18,0	36,0		Speedy rail 90
55.0666	4 rollers	ROL-C062VC-B ROL-E062VC-B	2+2	900,0	450,0	12,6	36,0	72,0		Speedy rail 90
55.0759	3 rollers	ROL-C062VC-BH ROL-E062VC-BR	2+1	1400,0	400,0	11,2	32,0	56,0		Speedy rail 90
55.0760	4 rollers	ROL-C062VC-BH ROL-E062VC-BR	2+2	1400,0	800,0	22,4	64,0	112,0		Speedy rail 90
55.0808	4 rollers	ROL-C090VC-BS ROL-E090VC-BS	2+2	2300,0	1661,0	133,8	257,5	356,5		Speedy rail 250
55.0831	4 rollers	ROL-C062VC-BA ROL-E062VC-BA	2+2	1400,0	0,0	0,0	0,0	112,00		Speedy rail 90
55.1060	3 rollers	ROL-C031WC-X ROL-E031WC-B	2+1	540,0	160,5	2,1	5,1	9,5		Speedy rail C 48
55.1064	4 rollers	ROL-C031WC-X ROL-E031WC-B	3+1	642,6	160,5	2,1	7,7	18,9	9,5	Speedy rail C 48
55.1069	4 rollers	ROL-C031WC-X ROL-E031WC-B	2+2	540,0	291,9	4,1	7,7	18,9		Speedy rail C 48
55.1180	4 rollers	ROL-C090VC-BS ROL-E090VC-BS	2+2	2300,0	1661,0	112,4	249,2	345,0		Speedy rail 180

\*1 For sliders with rollers only on one raceway, the  $Mx$  moment refers to two sliders mounted on both opposite raceways of the rail.

\*2 The  $My$  moment can only be applied with two sliders mounted on both opposite raceways of the rail.

Therefore, for sliders with rollers only on one raceway, the values in the table refer to two sliders.

\*3 For sliders with rollers only on one raceway, the  $Mz$  moment refers to two sliders mounted on both opposite raceways of the rail.

\*4 Being a single bearing configuration axial load applies if more than one slider is assembled in the rail to avoid bearing movement.

Tab. 28

## > User suggestions

### When and how to use speedy rail:

When a linear transfer system requires one or more of the following features:

- Lightweight
- Quiet
- Resistant to dust and chemical agents
- Easy to assemble
- Interchangeable

### How:

The **Speedy Rail®** beam moves within fixed roller assemblies.

The lightness of the beam offers power and energy cost-savings, increasing the acceleration and speed. Side arm and/or manipulators can be fitted on the moving beam.

The **Speedy Rail®** beam is static and the roller assemblies, connected to a frame, are moving. Either with a static or moving beam, the movement can be realized through several means such as rack-pivot coupling, belts, chain, pneumatic or hydraulic cylinder. For preassembled modular units will you please refer to the catalogue of Rollon modules and portals.

### Calculations data:

Important calculation factors to consider:

- 1) Maximum beam deflection under the load action
- 2) Maximum roller stress

#### 1) Elastic deflection

Usually in a transfer system the deformations derived from elastic deflection are not a disturbing element.

#### 2) Roller stress

Considering a roller assembly with two cylindric plastic compound rollers, the maximum load on the highest stressed roller should not exceed 128 daN. With the following formula it's possible to calculate the load on the most stressed roller.

$$F = \frac{P \cdot a}{d} + \frac{P}{\sqrt{2}}$$

If the value is more than 128 daN, it will be necessary to provide either more supports or only one self-aligning roller assembly with 8 - 10 or 12 rollers, so than the "F" value, divided by the number of rollers on the specified point of application will be equal or less than 128 daN.

Compared to steel beams and roller assemblies, the **Speedy Rail®** surface treatment and plastic compound shells on the rollers allows the utilization of Rollon components in high speed and high accelerations systems. These benefits remove typical damages due to wear normally present in metal to metal sliding situations. When building a system with one single segment of **Speedy Rail®** section, it is possible to slightly pre-load the rollers.

Do not pre-load rollers on a system with a rail composed of 2 or more segments.

### Power required to drive a trolley or bar

The following calculations are true in a system without overloads generated either by misalignment or an incorrect assembly. The following sliding friction factors are approximate with excess.

### Terminology and dimensional units

M [kg]	moving mass
$n_r$	number of moving rollers
$C_r = 100 \text{ Nmm}$	internal max resisting torque for each roller
a [ $\text{m/s}^2$ ]	moving mass acceleration
g [ $\text{m/s}^2$ ]	gravity acceleration
$f_{oc} = 0.05$	drive resisting coefficient of plastic compound rollers
$f_{vc} = 0.065$	drive resisting coefficient of 'V' shaped plastic compound rollers
F [N]	drive resisting force
V [m/s]	max traverse speed
N [W]	power
d [mm]	average roller diameter

### Calculations

traverse

resisting force	$F = M a + M g f + \frac{2 n_r C_r}{d}$	max power	$N = F \cdot V$
-----------------	---	-----------	-----------------

Fig. 178

vertical lift

resisting force	$F = M a + M g (1 + f) + \frac{2 n_r C_r}{d}$	max power	$N = F \cdot V$
-----------------	---	-----------	-----------------

Fig. 179

**Thermal expansion of profiles, simple and compound**

All profiles specifications are located on pages SR-64.

**Terminology and dimensional units**

$K_l = 23 \times 10^{-6}$ 1/°C	light alloy linear thermal expansion coefficient
$D_t$ [°C]	temperature variation in comparison with the assembling
$A_l$ [mm <sup>2</sup> ]	light alloy profile section
$L$ [mm]	rail length
$D_1$ [mm]	rail length variation

**Calculations**

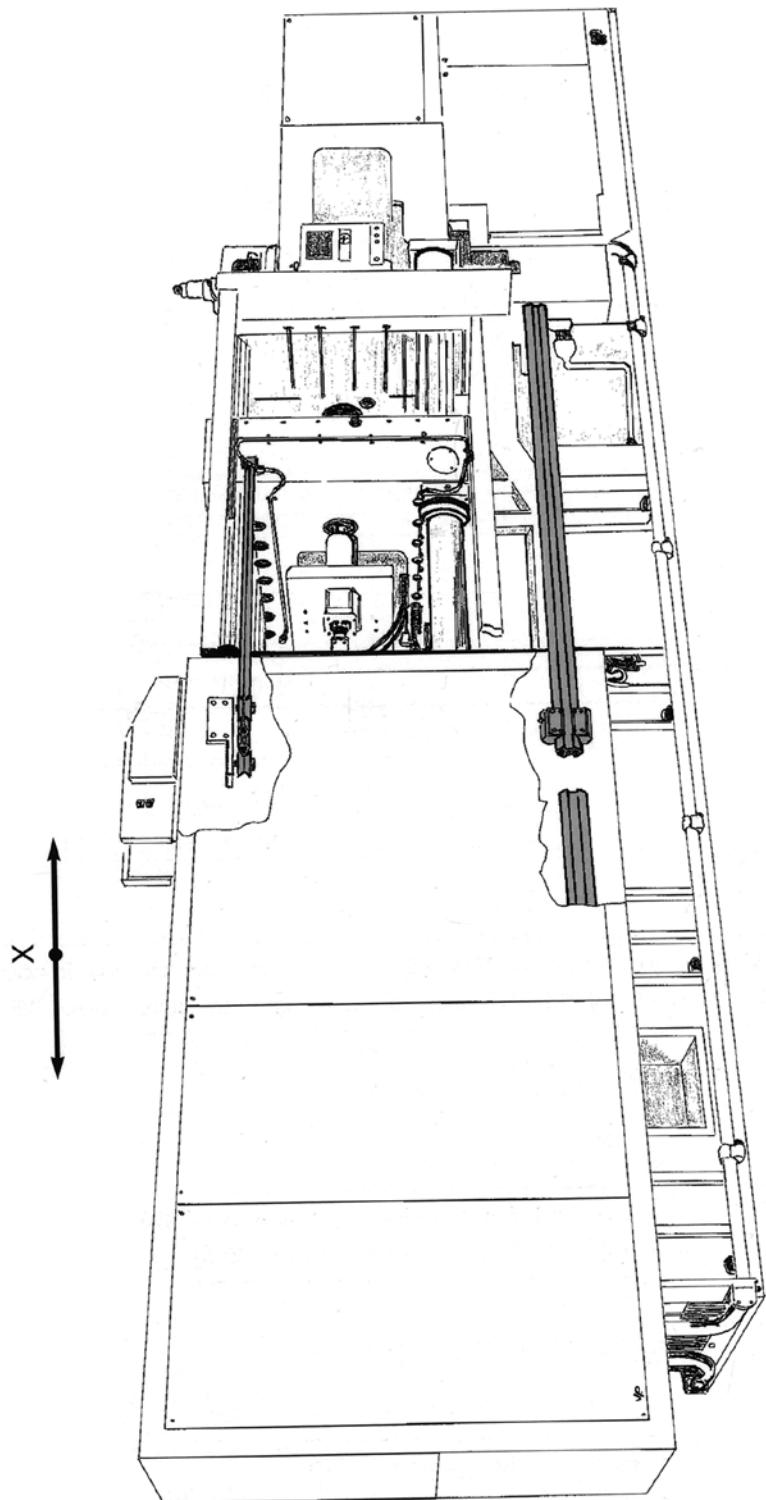
light alloy rails

$$D_1 = K_l \times D_t \times L$$

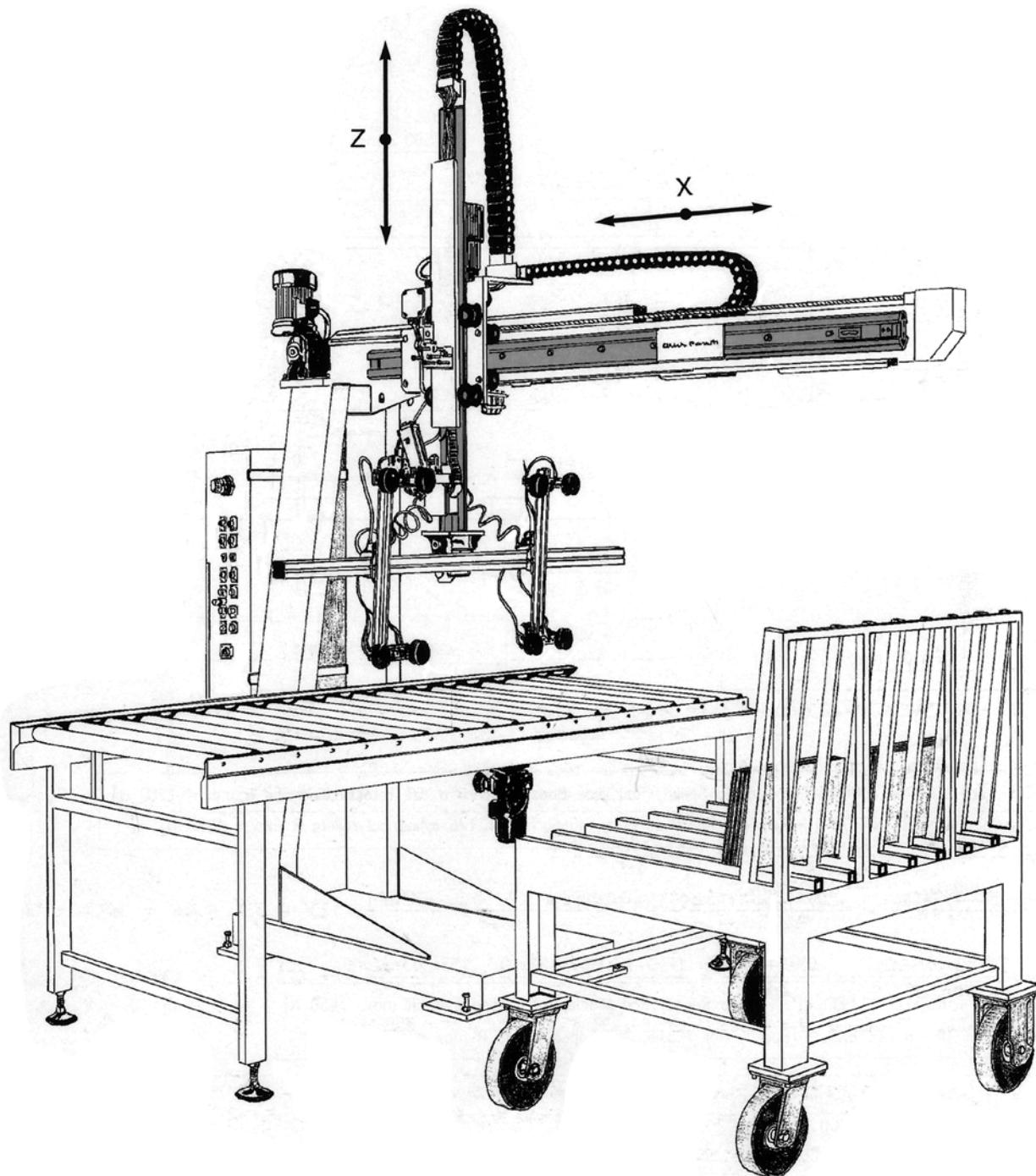
## Applications



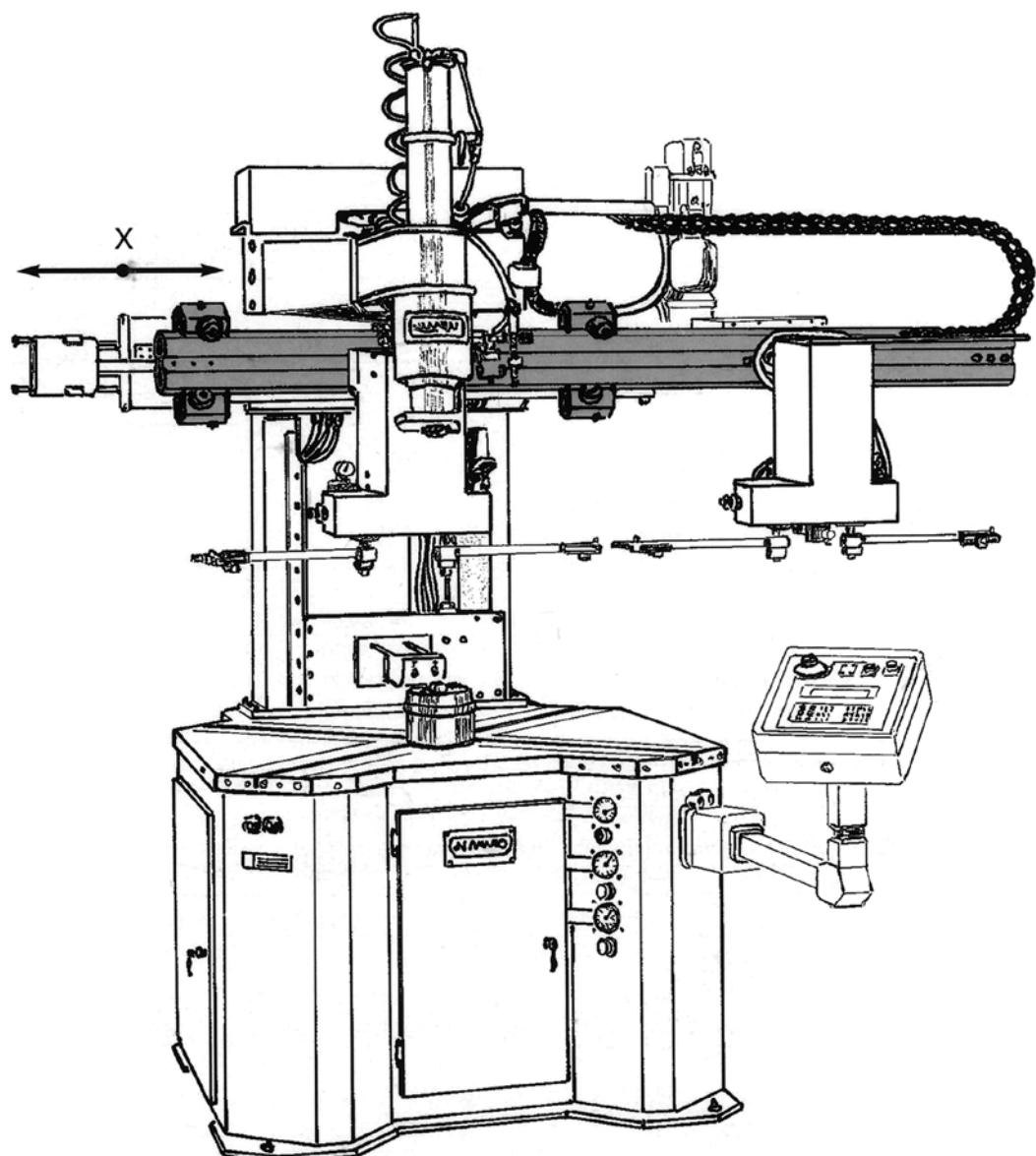
Rails for sliding doors



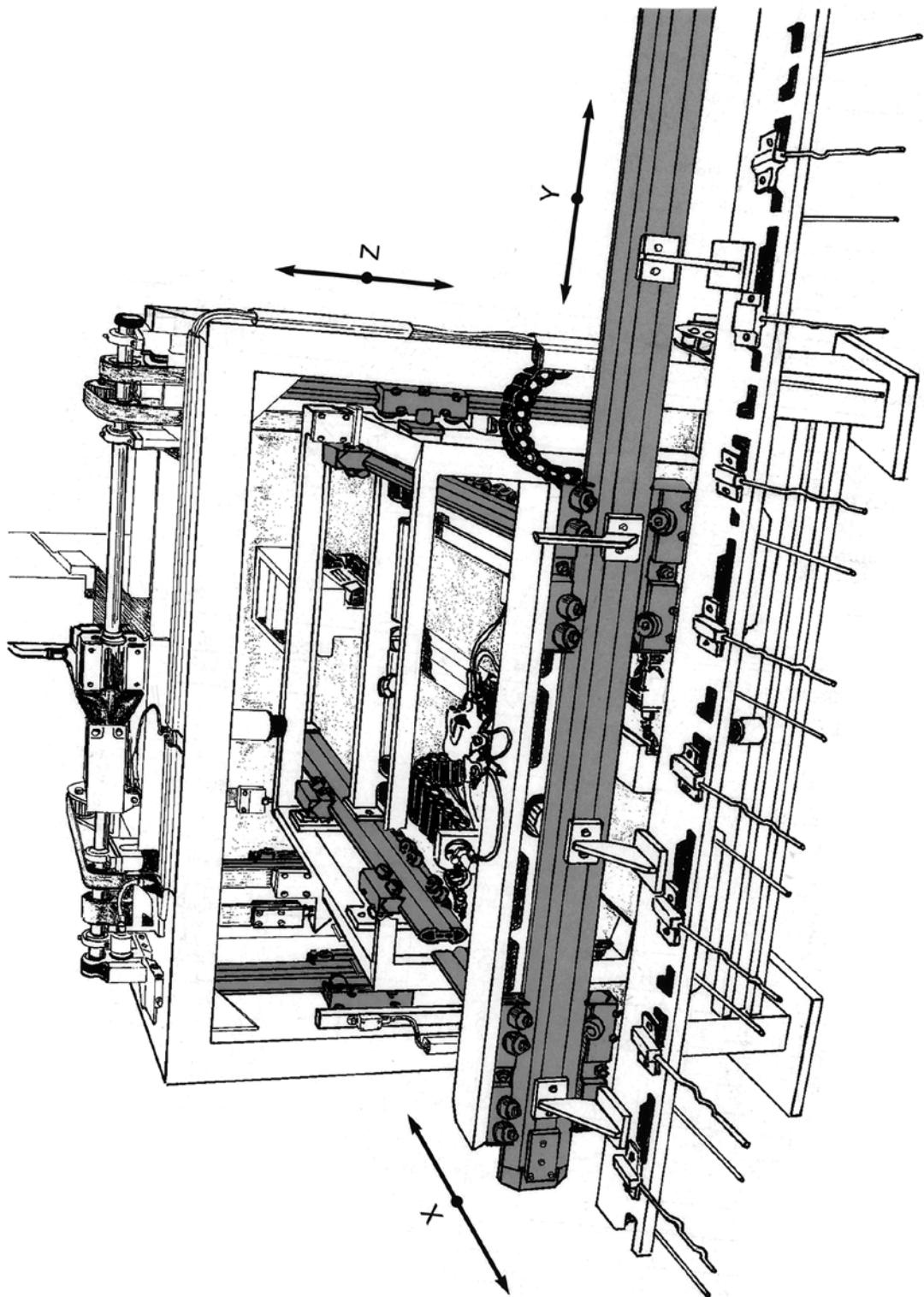
Glass sheet manipulator



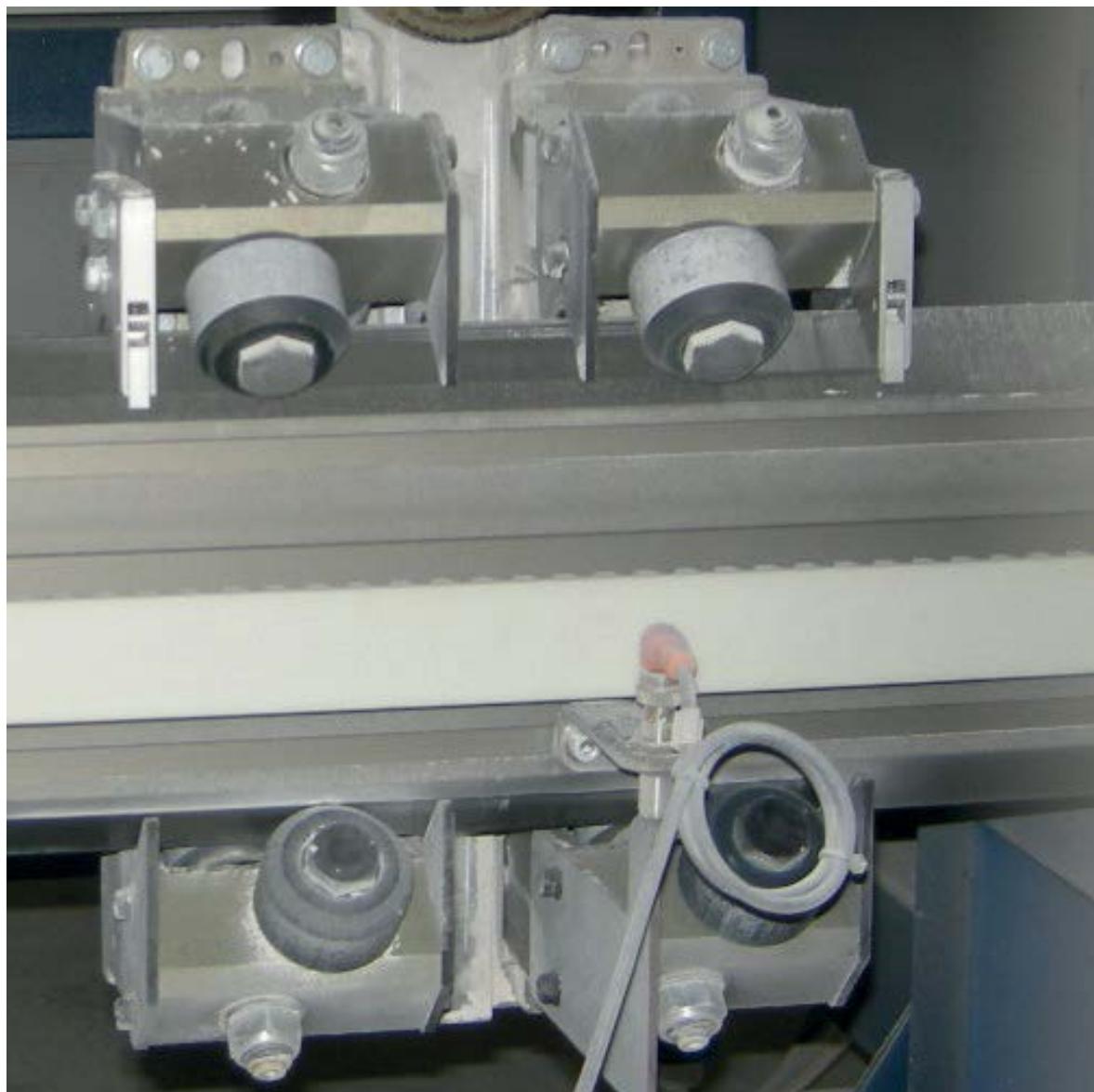
## Automatic press feeder



Automated oven feeder - tile production



Speedy Rail SR180 and plastic compound cylindric rollers in enviroment with strong presence of impurities



**Ordering key**

Code	Pag	Description	Profile
<b>Light alloy guides</b>			
SIMP-T	SR-6	Speedy Rail 35 guide	\\
SIMP-F	SR-6	Speedy Rail 35 guide with drilled ends	\\
CR48-T	SR-8	Speedy Rail C48 guide	\\
CR48-F/CR48-D	SR-8	Speedy Rail C 48 guide drilled	\\
SR060 - T	SR-14	'Mini Speedy Rail' SR60 guide	\\
SR060 - F	SR-14	'Mini Speedy Rail' SR60 guide with drilled ends	\\
SR090 - T	SR-21	'Middle Speedy Rail' SR90 guide	\\
SR090 - F	SR-21	Middle Speedy Rail with drilled ends	\\
SR120 - T	SR-27	"Standard Speedy Rail" SR120 guide	\\
SR120 - F	SR-27	"Standard Speedy Rail" SR120 with drilled ends	\\
SR180 - T	SR-53	Speedy Rail 'Wide Body' SR180 guide	\\
SR180 - F	SR-53	Speedy Rail 'Wide Body' SR180 guide with drilled ends	\\
SR250 - T	SR-61	Speedy Rail 'Super Wide Body' SR250 guide	\\
SR250 - F	SR-61	Speedy Rail 'Super Wide Body' SR250 guide with drilled ends	\\
<b>Roller</b>			
ROL-C062VC-BA	SR-23	Concentric roller axially free	SR90
ROL-E062VC-BA	SR-23	Eccentric roller axially free	SR90
ROL-C032VC-B	SR-16	Light concentric 'V'-Shaped roller	SR60
ROL-E032VC-B	SR-16	Light eccentric 'V'-Shaped roller	SR60
ROL-C090VC-BH	SR-33	Heavy duty concentric 'V' roller	SR120/SR180/SR250
ROL-E090VC-BH	SR-33	Heavy duty eccentric 'V' roller	SR120/SR180/SR250
ROL-C062VC-BH	SR-23	Concentric roller heavy duty	SR90
ROL-E062VC-BR	SR-23	Eccentric roller heavy duty	SR90
ROL-C080VC-BR	SR-32	High stiffness concentric roller	SR120
ROL-E080VC-BR	SR-32	High stiffness eccentric roller	SR120
ROL-C050VC-B	SR-17	Plastic compound concentric roller	SR60
ROL-E050VC-B	SR-17	Plastic compound eccentric roller	SR60
ROL-C080VC-BVA	SR-32	Concentric roller - axially free	SR120
ROL-E080VC-BVA	SR-32	Eccentric roller - axially free	SR120
ROL-C080VC-B	SR-32	Concentric roller	SR120
ROL-E080VC-B	SR-32	Eccentric roller	SR120
ROL-C062VC-B	SR-23	Concentric 'V'-shaped roller	SR90
ROL-E062VC-B	SR-23	Eccentric 'V'-shaped roller	SR90
ROL-C090VC-BAH	SR-33	Heavy duty concentric 'V' roller - axially free	SR120/SR180/SR250
ROL-E090VC-BAH	SR-33	Heavy duty eccentric 'V' roller - axially free	SR120/SR180/SR250

Code	Pag	Description	Profile
ROL-E031WC-B	SR-10	Axially constrained eccentric roller	SR48
ROL-C031WC-X	SR-10	Axially constrained concentric roller	SR48
ROL-C031VC-XA	SR-10	Axially free concentric roller	SR48
ROL-E031VC-BA	SR-10	Axially free eccentric roller	SR48
ROL-C030CC-B	SR-7	Concentric contrast roller	SR35
ROL-E030CC-B	SR-7	Eccentric contrast roller	SR35
ROL-C034VC-B	SR-6	Concentric roller	SR35
ROL-E034VC-B	SR-6	Eccentric roller	SR35
ROL-C090VC-BS	SR-33	Protected concentric 'V' roller for heavy duties	SR120/SR180/SR250
ROL-E090VC-BS	SR-33	Protected eccentric 'V' roller for heavy duties	SR120/SR180/SR250
ROL-E052CCC-BP-S02	SR-35	Eccentric roller	SR120
ROL-C052CCC-BP-S01	SR-35	Concentric roller	SR120
ROL-E052CCC-BV-S02	SR-35	Eccentric roller	SR120
ROL-C052CCC-BV-S01	SR-35	Concentric roller	SR120
ROL-C052CCL-BV	SR-35	Concentric roller	SR120/SR180/SR250
ROL-E052CCL-BV	SR-35	Eccentric roller	SR120/SR180/SR250
ROL-C052CCL-BP	SR-35	Concentric roller	SR120/SR180/SR250
ROL-E052CCL-BP	SR-35	Eccentric roller	SR120/SR180/SR250
ROL-C040CC-BP	SR-35	Concentric roller radial load - Periodical lubrication	SR120/SR180/SR250
ROL-C040CC-BV	SR-35	Concentric roller radial load - Lifetime lubrication	SR120/SR180/SR250

Roller assemblies			
55.0222	SR-41	8 Rollers blido beam roller assembly	SR120
55.0323	SR-39	Roller assembly with backing plate 280x150	SR120
55.0324	SR-39	Roller assembly with backing plate 235.5X80	SR120
55.0325	SR-38	Light alloy body roller assembly with side holes	SR120/SR180/SR250
55.0372	SR-16	Roller assembly with 3 rollers	SR60
55.0375	SR-17	Roller assembly with 4 rollers	SR60
55.0411	SR-40	Narrow base blido beam roller assembly	SR120
55.0433	SR-38	Light alloy body roller assembly with side mounting holes	SR120/SR180/SR250
55.0472	SR-40	Wide base blido beam roller assembly	SR120
55.0513	SR-56	Roller assembly with backing plate 336x150	SR180
55.0514	SR-56	Roller assembly with backing plate 381.5x80	SR180
55.0557	SR-34	Light weight roller assembly with 4 rollers	SR120
55.0558	SR-34	Roller assembly with 4 high stiffness rollers	SR120
55.0604	SR-37	Compact roller assembly	SR120/SR180/SR250
55.0605	SR-17	Roller assembly with 3 rollers	SR60
55.0606	SR-18	Roller assembly with 4 rollers	SR60
55.0665	SR-24	Roller assembly with 3 rollers	SR90
55.0666	SR-24	Roller assembly with 4 rollers	SR90
55.0711	SR-40	Wide base roller assembly	SR120
55.0713	SR-56	Roller assembly with backing plate 336x150	SR180

Code	Pag	Description	Profile
55.0723	SR-39	Roller assembly with backing plate 280x150	SR120
55.0724	SR-39	Roller assembly with backing plate 235.5X80	SR120
55.0725	SR-38	Light alloy body roller assembly with mounting holes on short sides	SR120/SR180/SR250
55.0733	SR-38	Light alloy body roller assembly with mounting holes on long sides	SR120/SR180/SR250
55.0740	SR-56	Roller assembly with backing plate 381.5x80	SR180
55.0772	SR-40	Wide base blinido beam roller assembly	SR120
55.0794	SR-37	Compact roller assembly	SR120/SR180
55.0808	SR-63	Roller assembly with 4 V-shaped rollers	SR 250
55.1060	SR-11	Roller assembly with two concentric rollers and one eccentric roller	SRC48
55.1062	SR-10	Roller assembly with one concentric and one eccentric roller	SRC48
55.1064	SR-11	Roller assembly with one conc. roller	SRC48
55.1065	SR-10	Roller assembly with 4 rollers, 3 conc. and 1 ecc.	SRC48
55.1066	SR-10	Roller assembly with one ecc. axial free roller	SRC48
55.1067	SR-10	Roller assembly with one conc. axial free roller	SRC48
55.0135	SR-44	Roller assembly with one ecc. roller	SRC48
55.1143	SR-47	Fixed 5 roller assembly, with 2 eccentric rollers for auto backlash retrival	SR120
55.1144	SR-47	Floating roller assembly with 8 rollers - short pivot ecc. - periodical lubrication	SR120/SR180/SR250
55.1145	SR-47	Floating roller assembly with 8 rollers - short pivot conc. - periodical lubrication	SR120/SR180/SR250
55.1146	SR-47	Floating roller assembly with 8 rollers - short pivot ecc. - lifetime lubrication	SR120/SR180/SR250
55.1147	SR-47	Floating roller assembly with 8 rollers - short pivot conc. - lifetime lubrication	SR120/SR180/SR250
55.1148	SR-47	Floating roller assembly with 8 rollers - long pivot ecc. - periodical lubrication	SR120/SR180/SR250
55.1149	SR-47	Floating roller assembly with 8 rollers - long pivot conc. - periodical lubrication	SR120/SR180/SR250
55.1150	SR-47	Floating roller assembly with 8 rollers - long pivot ecc. - lifetime lubrication	SR120/SR180/SR250
55.1180	SR-55	Floating roller assembly with 8 rollers - long pivot conc. - lifetime lubrication	SR120/SR180/SR250
55.1350	SR-43	Heavy duty roller assembly with 4 rollers	SR180
55.1351	SR-43	Floating roller assembly with 4 rollers - long pivot ecc.	SR120/SR180/SR250
55.1354	SR-43	Floating roller assembly with 4 rollers - long pivot conc.	SR120/SR180/SR250
55.1355	SR-43	Floating roller assembly with 4 rollers - short pivot ecc.	SR120/SR180/SR250
55.1358	SR-43	Floating roller assembly with 4 rollers - short pivot conc.	SR120/SR180/SR250
55.1359	SR-43	Floating roller assembly with 4 rollers - short pivot ecc. with axially free	SR120/SR180/SR250
55.1361	SR-43	Floating roller assembly with 4 rollers - short pivot conc. with axially free	SR120/SR180/SR250
55.1363	SR-43	Floating roller assembly with 4 rollers - short pivot ecc.	SR120/SR180/SR250
55.1364	SR-43	Floating roller assembly with 4 rollers - long pivot ecc.	SR120/SR180/SR250
55.1365	SR-43	Floating roller assembly with 4 rollers - short pivot conc.	SR120/SR180/SR250
55.1366	SR-46	Floating roller assembly with 4 rollers - long pivot conc.	SR120/SR180/SR250
55.1367	SR-46	Floating roller assembly with 6 rollers - short pivot ecc.	SR120/SR180/SR250
55.1368	SR-46	Floating roller assembly with 6 rollers - short pivot ecc.	SR120/SR180/SR250
55.1369	SR-46	Floating roller assembly with 6 rollers - long pivot ecc.	SR120/SR180/SR250
55.1370	SR-46	Floating roller assembly with 6 rollers - long pivot ecc.	SR120/SR180/SR250
55.1371	SR-46	Floating roller assembly with 6 rollers - short pivot conc.	SR120/SR180/SR250
55.1372	SR-46	Floating roller assembly with 6 rollers - long pivot conc.	SR120/SR180/SR250
55.1373	SR-46	Floating roller assembly with 6 rollers - long pivot conc.	SR120/SR180/SR250

Code	Pag	Description	Profile
55.1380	SR-57	Complete pairing floating assembly - short pivot	SR180
55.1381	SR-57	Complete pairing floating assembly - short pivot	SR180
55.1382	SR-57	Complete pairing floating assembly - long pivot	SR180
55.1383	SR-57	Complete pairing floating assembly - long pivot	SR180
55.1419	SR-45	Floating roller assembly with 6 rollers - long pivot ecc.	SR120/SR180/SR250
55.1420	SR-45	Floating roller assembly with 6 rollers - long pivot conc.	SR120/SR180/SR250
55.1421	SR-45	Floating roller assembly with 6 rollers - long pivot ecc.	SR120/SR180/SR250
55.1422	SR-45	Floating roller assembly with 6 rollers - long pivot conc.	SR120/SR180/SR250
55.1423	SR-45	Floating roller assembly with 6 rollers - short pivot ecc.	SR120/SR180/SR250
55.1424	SR-45	Floating roller assembly with 6 rollers - short pivot conc.	SR120/SR180/SR250
55.1425	SR-45	Floating roller assembly with 6 rollers - short pivot ecc.	SR120/SR180/SR250
55.1426	SR-45	Floating roller assembly with 6 rollers - short pivot conc.	SR120/SR180/SR250
55.1550	SR-36	2 Rollers light full-block assembly	SR120/SR180/SR250
55.1555	SR-42	Floating roller assembly with 4 rollers ecc.	SR120/SR180/SR250
55.1556	SR-42	Floating roller assembly with 4 rollers conc.	SR120/SR180/SR250
55.1565	SR-42	Floating roller assembly with 4 rollers ecc.	SR120/SR180/SR250
55.1566	SR-42	Floating roller assembly with 4 rollers conc.	SR120/SR180/SR250
55.1570	SR-36	Light alloy rollers assembly with 2 rollers - Lifetime lubricated.	SR120/SR180/SR250
55.3143	SR-47	Floating roller assembly with 8 rollers - short pivot ecc. - periodical lub. axially free	SR120/SR180/SR250
55.3144	SR-47	Floating roller assembly with 8 rollers - short pivot conc. - periodical lub. axially free	SR120/SR180/SR250
55.3145	SR-47	Floating roller assembly with 8 rollers - short pivot ecc. - lifetime lub. axially free	SR120/SR180/SR250
55.3146	SR-47	Floating roller assembly with 8 rollers - short pivot conc. - lifetime lub. axially free	SR120/SR180/SR250
55.3147	SR-47	Floating roller assembly with 8 rollers - long pivot ecc. - periodical lub. axially free	SR120/SR180/SR250
55.3148	SR-47	Floating roller assembly with 8 rollers - long pivot conc. - periodical lub. axially free	SR120/SR180/SR250
55.3149	SR-47	Floating roller assembly with 8 rollers - long pivot ecc. - lifetime lub. axially free	SR120/SR180/SR250
55.3150	SR-47	Floating roller assembly with 8 rollers - long pivot conc. - lifetime lub. axially free	SR120/SR180/SR250
55.3350	SR-43	Floating roller assembly with 4 rollers - long pivot ecc. with axially free	SR120/SR180/SR250
55.3351	SR-43	Floating roller assembly with 4 rollers - long pivot conc. with axially free	SR120/SR180/SR250
55.3361	SR-43	Floating roller assembly with 4 rollers - short pivot ecc. with axially free	SR120/SR180/SR250
55.3363	SR-43	Floating roller assembly with 4 rollers - long pivot ecc. with axially free	SR120/SR180/SR250
55.3364	SR-43	Floating roller assembly with 4 rollers - short pivot conc. with axially free	SR120/SR180/SR250
55.3365	SR-43	Floating roller assembly with 4 rollers - long pivot conc. with axially free	SR120/SR180/SR250
55.3366	SR-46	Floating roller assembly with 6 rollers - short pivot ecc. with axially free	SR120/SR180/SR250
55.3367	SR-46	Floating roller assembly with 6 rollers - short pivot ecc. with axially free	SR120/SR180/SR250
55.3368	SR-46	Floating roller assembly with 6 rollers - long pivot ecc. with axially free	SR120/SR180/SR250
55.3369	SR-46	Floating roller assembly with 6 rollers - long pivot ecc. with axially free	SR120/SR180/SR250
55.3370	SR-46	Floating roller assembly with 6 rollers - short pivot conc. with axially free	SR120/SR180/SR250
55.3371	SR-46	Floating roller assembly with 6 rollers - short pivot conc. with axially free	SR120/SR180/SR250
55.3372	SR-46	Floating roller assembly with 6 rollers - long pivot conc. with axially free	SR120/SR180/SR250
55.3373	SR-46	Floating roller assembly with 6 rollers - long pivot conc. with axially free	SR120/SR180/SR250
55.3419	SR-45	Floating roller assembly with 6 rollers - long pivot ecc. with axially free	SR120/SR180/SR250
55.3420	SR-45	Floating roller assembly with 6 rollers - long pivot conc. with axially free	SR120/SR180/SR250

Code	Pag	Description	Profile
55.3421	SR-45	Floating roller assembly with 6 rollers - long pivot ecc. with axially free	SR120/SR180/SR250
55.3422	SR-45	Floating roller assembly with 6 rollers - long pivot conc. with axially free	SR120/SR180/SR250
55.3423	SR-45	Floating roller assembly with 6 rollers - short pivot ecc. with axially free	SR120/SR180/SR250
55.3424	SR-45	Floating roller assembly with 6 rollers - short pivot conc. with axially free	SR120/SR180/SR250
55.3425	SR-45	Floating roller assembly with 6 rollers - short pivot ecc. with axially free	SR120/SR180/SR250
55.3426	SR-45	Floating roller assembly with 6 rollers - short pivot conc. with axially free	SR120/SR180/SR250
55.3553	SR-42	Floating roller assembly with 4 rollers ecc. with axially free	SR120/SR180/SR250
55.3554	SR-42	Floating roller assembly with 4 rollers conc. with axially free	SR120/SR180/SR250
55.3563	SR-42	Floating roller assembly with 4 rollers ecc. with axially free	SR120/SR180/SR250
55.3564	SR-42	Floating roller assembly with 4 rollers conc. with axially free	SR120/SR180/SR250

**Dovetails and inserts**

411.0462	SR-15	Steel dovetail 2 holes M6 L=50 mm	SR60
411.0469	SR-29	Steel dovetail 2 holes M12 L=100 mm	SR120/SR180/SR250
411.0470	SR-29	Steel dovetail 6 holes M12 L=300 mm	SR120/SR180/SR250
411.0472	SR-29	Steel dovetail 2 holes M12 L=200 mm	SR120/SR180/SR250
411.0503	SR-29	Steel dovetail 2 holes M12 L=70 mm	SR120/SR180/SR250
411.0588	SR-29	Steel dovetail 3 holes M12 L=150 mm	SR120/SR180/SR250
411.0675	SR-29	Steel dovetail 2 holes M8 L=50 mm	SR120/SR180/SR250
411.0732	SR-15	Steel dovetail 1 hole M6 L=20 mm	SR60
411.0745	SR-29	Steel dovetail 1 hole M12 L=50 mm	SR120/SR180/SR250
411.0754	SR-15	Steel dovetail 3 holes M6 L=80 mm	SR60
411.0768	SR-15	Steel dovetail 2 holes M6 L=60 mm	SR60
411.0769	SR-15	Steel dovetail 6 holes M6 L=200 mm	SR60
411.0771	SR-15	Steel dovetail 2 holes M6 L=150 mm	SR60
411.0845	SR-29	Steel dovetail quick front insertion 1 hole M12 L=50 mm	SR120/SR180/SR250
411.0855	SR-22	Steel dovetail quick front insertion 1 hole M8 L=29 mm	SR90
411.0888	SR-30	Steel dovetail without step 3 holes M12 L=150 mm	SR120/SR180/SR250
411.0970	SR-29	Steel dovetail 6 holes M12 L=300 mm	SR120/SR180/SR250
411.1025	SR-22	Steel dovetail 1 hole M4 L=50mm	SR90
411.1045	SR-22	Steel dovetail 1 hole M8 L=50 mm	SR90
411.1047	SR-22	Steel dovetail 1 hole M6 L=50 mm	SR90
411.1046	SR-22	Steel dovetail without step 3 holes M8 L=50 mm	SR90
411.1069	SR-22	Steel dovetail 2 holes M8 L=100 mm	SR90
411.1070	SR-22	Steel dovetail 6 holes M8 L=300 mm	SR90
411.1072	SR-22	Steel dovetail 4 holes M8 L=200 mm	SR90
411.1088	SR-22	Steel dovetail 3 holes M8 L=150 mm	SR90
411.1111	SR-29	Steel dovetail 1 hole M8 L=50 mm	SR120/SR180/SR250
411.1112	SR-29	Steel dovetail 2 holes M8 L=100 mm	SR120/SR180/SR250
411.1113	SR-29	Steel dovetail 3 holes M8 L=150 mm	SR120/SR180/SR250
411.1117	SR-29	Steel dovetail 1 hole M10 L=50 mm	SR120/SR180/SR250
411.1119	SR-29	Steel dovetail 2 holes M10 L=100 mm	SR120/SR180/SR250

Code	Pag	Description	Profile
411.1120	SR-29	Steel dovetail 3 holes M10 L=150 mm	SR120/SR180/SR250
411.1174	SR-30	Steel dovetail quick front insertion without step 1 hole M8 L=50 mm	SR120/SR180/SR250
411.1178	SR-29	Steel dovetail quick front insertion 1 hole M10 L=50 mm	SR120/SR180/SR250
411.1185	SR-30	Steel dovetail without step 1 hole M12 L=50 mm	SR120/SR180/SR250
411.1186	SR-30	Steel dovetail without step 1 hole M10 L=50 mm	SR120/SR180/SR250
411.1349	SR-53	Zinc plated steel insert 1 hole M4 L=16 mm, with spring loaded ball	SR180/SR250
411.1351	SR-53	Zinc plated steel insert 1 hole M5 L=16 mm, with spring loaded ball	SR180/SR250
411.1352	SR-53	Zinc plated steel insert 1 hole M6 L=16 mm, with spring loaded ball	SR180/SR250
411.1353	SR-53	Zinc plated steel insert 1 hole M8 L=16 mm, with spring loaded ball	SR180/SR250
411.1675	SR-30	Steel dovetail without step 2 holes M8 L=50 mm	SR120/SR180/SR250
411.1732	SR-15	Steel dovetail 1 hole M4 L=20 mm	SR60
411.2533	SR-53	9 holes steel insert M5 L=496 mm	SR180/SR250
411.2534	SR-53	9 holes steel insert M4 L=496 mm	SR180/SR250
411.2732	SR-15	Steel dovetail 1 hole M5 L=20 mm	SR60
411.2733	SR-15	Steel dovetail 9 holes M5 L=496 mm	SR60
411.2736	SR-15	Dovetail quick front insertion 1 hole M6	SR60
411.3532	SR-15	Steel dovetail 1 hole M8 L=20 mm	SR60
411.3633	SR-53	9 holes steel insert M6 L=496 mm	SR180/SR250

Fishplates			
411.0567	SR-31	Fishplate for drive head L=130 mm	SR120/SR180/SR250
411.0570	SR-31	Fishplate for side-arm attachment L=200 mm	SR120/SR180/SR250
411.0572	SR-31	Fishplate for end to end joining L=300 mm	SR120/SR180/SR250
411.0573	SR-31	Fishplate for end to end joining L=300 mm countersuk holes	SR120/SR180/SR250
411.0582	SR-55	Fishplate for roller assembly 55.1180	SR180
411.0463	SR-15	Light alloy fishplate	SR60
411.0690	SR-31	Steel fishplate for end to end joining L=300 mm	SR120/SR180/SR250
411.0735	SR-34	Fishplate for roller assemblies 55.0557 / 55.0558	SR120
411.0749	SR-17	Fishplate for roller assemblies 55.0605	SR60
411.0750	SR-18	Fishplate for roller assemblies 55.0606	SR60
411.0767	SR-14	Fishplate for drive head L=80 mm	SR60
411.0770	SR-16	Fishplate for side-arm attachment L=150 mm	SR60
411.0772	SR-15	Fishplate for drive head L=200 mm	SR60
411.0824	SR-24	Fishplate for roller assemblies 55.0665	SR90
411.0825	SR-24	Fishplate for roller assemblies 55.0666	SR90
411.0866	SR-21	Fishplate for drive head L=130 mm	SR90
411.0872	SR-22	Fishplates for end to end joining L=300 mm	SR90
411.0913	SR-16	Fishplate for roller assemblies 55.0372	SR60
411.0914	SR-17	Fishplate for roller assemblies 55.0375	SR60
411.0957	SR-63	Light alloy fishplate for roller assemblies 55.0788, 55.0808	SR250
411.0960	SR-61	Steel fishplates for end to end joining L=300mm	SR250
411.1124	SR-22	Fishplate for side-arm attachment L=150 mm	SR90

Code	Pag	Description	Profile
411.1041	SR-16	Plate for m <sup>2</sup> rack mounting	SR60
411.1155	SR-30	Fishplate for mod.3-4 rack mounting	SR120/SR180/SR250
411.1179	SR-54	Fishplate for mod.2 Rack mounting	SR180/SR250
411.1226	SR-22	Steel plate for m <sup>2</sup> rack mounting m <sup>2</sup>	SR90

Racks			
411.1489	SR-49	Rack m2 Q10 L=998,82 straight toothed	\\
411.1491	SR-49	Rack m2 Q10 L=2004,14 straight toothed	\\
411.1499	SR-49	Rack m3 Q10 L=998,82 straight toothed	\\
411.1501	SR-49	Rack m3 Q10 L=1997,84 straight toothed	\\
411.1509	SR-49	Rack m4 Q10 L=1005,10 straight toothed	\\
411.1511	SR-49	Rack m4 Q10 L=2010,42 straight toothed	\\

Components			
411.0476	SR-28	Drive head	SR120
411.0610	SR-21	Bolt for drive head mount TE M6x55	SR90
411.0617	SR-28	Bolt for drive head mount TE M8x70	SR120
411.0685	SR-50	Scraper for floating and full-block assemblies	SR120/SR180/SR250
411.0686	SR-50	Scraper for compact	SR120/SR180/SR250
411.0696	SR-54	Drive head	SR180
411.0739	SR-14	Drive head	SR60
411.0744	SR-54	Bolt for drive head TE M8x90	SR180
411.0775	SR-14	M6 allen round head screw	SR60
411.0776	SR-14	Drive head	SR60
411.0818	SR-15	Bolt for drive head mount TE M5x40	SR60
411.0832	SR-58	Fishplate for drive head	SR180
411.0856	SR-21	Drive head	SR90
411.0858	SR-21	End cap	SR90
411.1015	SR-62	Drive head	SR 250
411.1261	SR-44	5 rollers assembly supports	SR120/SR180/SR250
411.1963	SR-62	End cap	SR 250
411.1964	SR-54	End cap	SR180
411.1740	SR-28	Alluminium alloy end cap	SR120
55047202	SR-50	Scraper for blindo beam roller assemblies	SR120
55.1000	SR-50	Sliding brush for speedy rail and steel rail	SR120/SR180/SR250

Notes

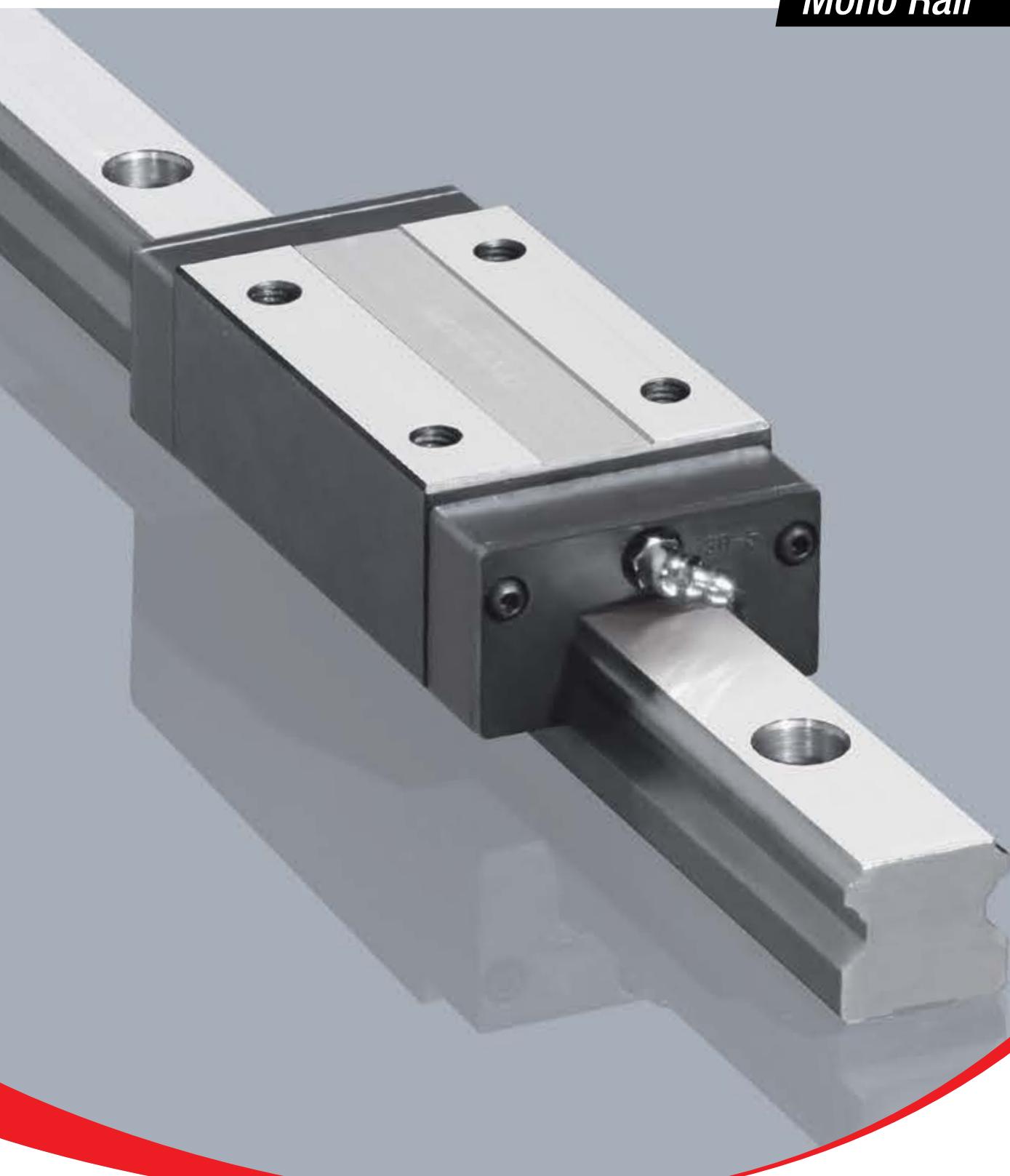






**ROLLON®**  
BY TIMKEN

*Mono Rail*



## Product explanation



### ➤ Mono Rails are profile rails for the highest degree of precision



Fig. 1

The running grooves are ground in semicircular profile and have a contact angle of 45° in X-arrangement so that the same load capacity is guaranteed in all principle directions. Use of large steel balls enables high load and moment capacities. All carriages in size 55 are equipped with ball chains.

#### The most important characteristics:

- X-arrangement with 2-point contact of the raceways
- Uniform loading capacity in all main directions
- High ability for self-regulating
- Small differential slip in comparison to 4-point contact
- Very quiet running and low operating noise
- Low maintenance due to advanced lubrication chamber
- Small displacement force in preload compared to 4-point contact
- Mono Rail profile rails meet the market standard and can replace linear rails of the same design from other manufacturers while maintaining the main dimensions
- Miniature Mono Rail available in a standard or large version
- Miniature Mono Rail available in Martensite stainless steel.

#### Preferred areas of application:

- Construction and machine technology (safety doors, feeding)
- Packaging machines
- Special purpose machinery
- Logistics (e.g., handling units)
- Medical technology (e.g., X-ray equipment, hospital gurneys)
- Semiconductors and electronics industry

**MRS**

Standard carriage with flange.



Fig. 2

**MRS...W / MRT...W**

Carriage without flange, also called block. Available in two different heights. MRT is the lower version.



Fig. 3

**MRS...L**

Carriage in long version for holding larger loads. MRS...L is the version with flange.



Fig. 4

**MRS...LW**

Carriage in long version without flange.



Fig. 5

### MRT...SW

Carriage without flange in short version for lower loads with equally high precision.



Fig. 6

### MRR...F

Guide rail MRR...F for bolting from below with threaded holes. Design with smooth surface without bevels.



Fig. 7

### Standard width

Compact technology and high performance in its smallest structural shape.



Fig. 8

### Large width

Wide miniature profile rails, with a compact size, allow the acceptance of higher forces and moments. Especially suited for single rail applications.



Fig. 9

## Technical data

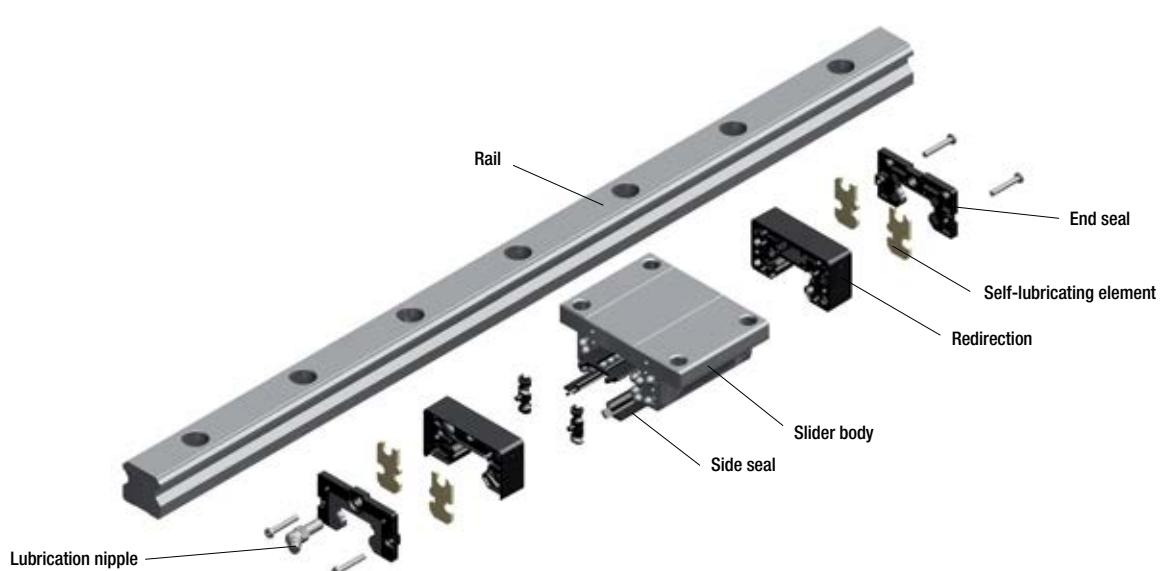


Fig. 10

### Performance characteristics:

- Mono Rail available sizes: 15, 20, 25, 30, 35, 45, 55
- Standard version Miniature Mono Rail available sizes: 7, 9, 12, 15
- Large version Miniature Mono Rail available sizes: 9, 12, 15
- Max. operating speed: 3.5 m/s (137.79 in/s)  
(depending on application)
- Max. operating temperature: +80 °C (+176 °F)  
(depending on application)
- Available rail lengths up to approx. 4,000 mm (157.5 in)  
for Mono Rail (see Ordering key, pag. MR-45)
- Four preload classes for Mono Rail: G1, K0, K1, K2
- Three precision classes: N, H, P
- Three preload classes for the Miniature Mono Rails: V0, VS, V1
- Lengths for single rails are available up to 1,000mm (39.37 in) for the Miniature Mono Rail

### Remarks:

- Combining rails is possible (joining)
- The fixing holes on the carriages with flange can also be used as through holes for fastening from below. Here, the reduction in size of the screw diameter must be observed
- Various surface coatings on request
- Manual and pneumatic clamping elements available as accessories. Depending on the height of the carriage, additional adapter plates must be used
- Dimensions  $H_2$  and L of the carriage change when using metal deflectors and other seals. Refer to Sec. 4 Accessories, pg. MR-15f
- The carriages in size 55 are equipped with ball chains
- Primary lubricated systems have an increased displacement resistance

## > Mono Rail load capacities

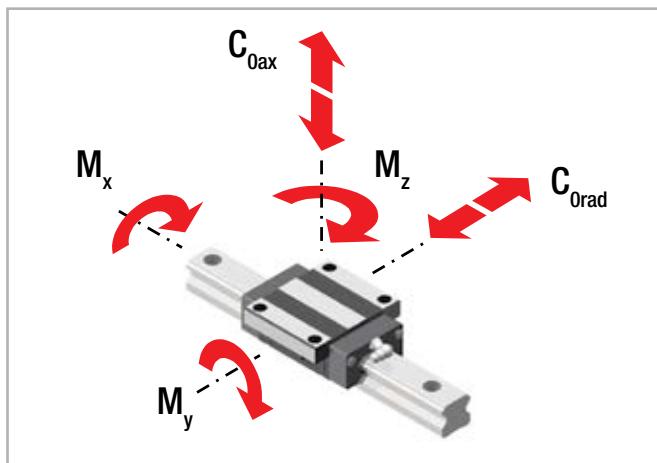


Fig. 11

Type	Load capacities [N]		Static moments [Nm]		
	dyn. C	stat. C <sub>0rad</sub> stat. C <sub>0ax</sub>	M <sub>x</sub>	M <sub>y</sub>	M <sub>z</sub>
<b>MRS15</b> <b>MRS15W</b> <b>MRT15W</b>	8500	13500	100	68	68
<b>MRT15SW</b>	5200	6800	51	18	18
<b>MRS20</b> <b>MRS20W</b> <b>MRT20W</b>	14000	24000	240	146	146
<b>MRT20SW</b>	9500	14000	70	49	49
<b>MRS20L</b> <b>MRS20LW</b>	16500	30000	300	238	238
<b>MRS25</b> <b>MRS25W</b> <b>MRT25W</b>	19500	32000	368	228	228
<b>MRT25SW</b>	12500	17500	175	69	69
<b>MRS25L</b> <b>MRS25LW</b>	26000	46000	529	455	455

Tab. 1

Type	Load capacities [N]		Static moments [Nm]		
	dyn. C	stat. C <sub>0rad</sub> stat. C <sub>0ax</sub>	M <sub>x</sub>	M <sub>y</sub>	M <sub>z</sub>
<b>MRS30</b> <b>MRS30W</b> <b>MRT30W</b>	28500	48000	672	432	432
<b>MRT30SW</b>	17500	24000	336	116	116
<b>MRS30L</b> <b>MRS30LW</b>	36000	64000	896	754	754
<b>MRS35</b> <b>MRS35W</b> <b>MRT35W</b>	38500	62000	1054	620	620
<b>MRT35SW</b>	25000	36500	621	209	209
<b>MRS35L</b> <b>MRS35LW</b>	48000	83000	1411	1098	1098
<b>MRS45</b> <b>MRS45W</b> <b>MRT45W</b>	65000	105000	2363	1378	1378
<b>MRS45L</b> <b>MRS45LW</b>	77000	130000	2925	2109	2109
<b>MCS55</b> <b>MCS55W</b>	123500	190000	4460	3550	3550
<b>MCS55L</b>	155000	249000	5800	6000	6000

Tab. 2

## > Miniature Mono Rail load capacities

Standard width

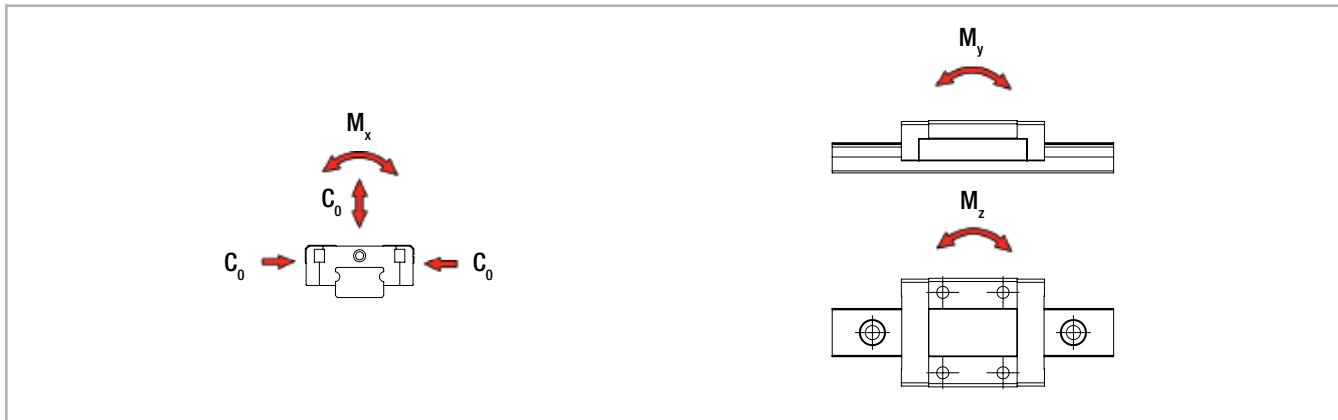


Fig. 12

Type	Load capacities [N]		Static moments [Nm]		
	dyn. $C_{100}$	stat. $C_0$	$M_x$	$M_y$	$M_z$
<b>MR07MN</b>	890	1400	5.2	3.3	3.3
<b>MR09MN</b>	1570	2495	11.7	6.4	6.4
<b>MR12MN</b>	2308	3465	21.5	12.9	12.9
<b>MR15MN</b>	3810	5590	43.6	27	27

Tab. 3

Large width

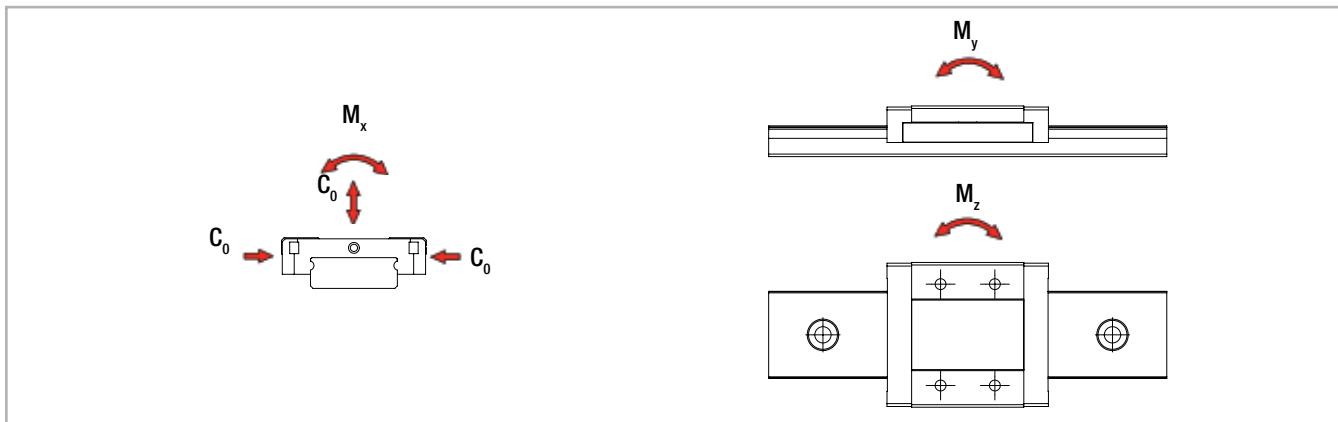


Fig. 13

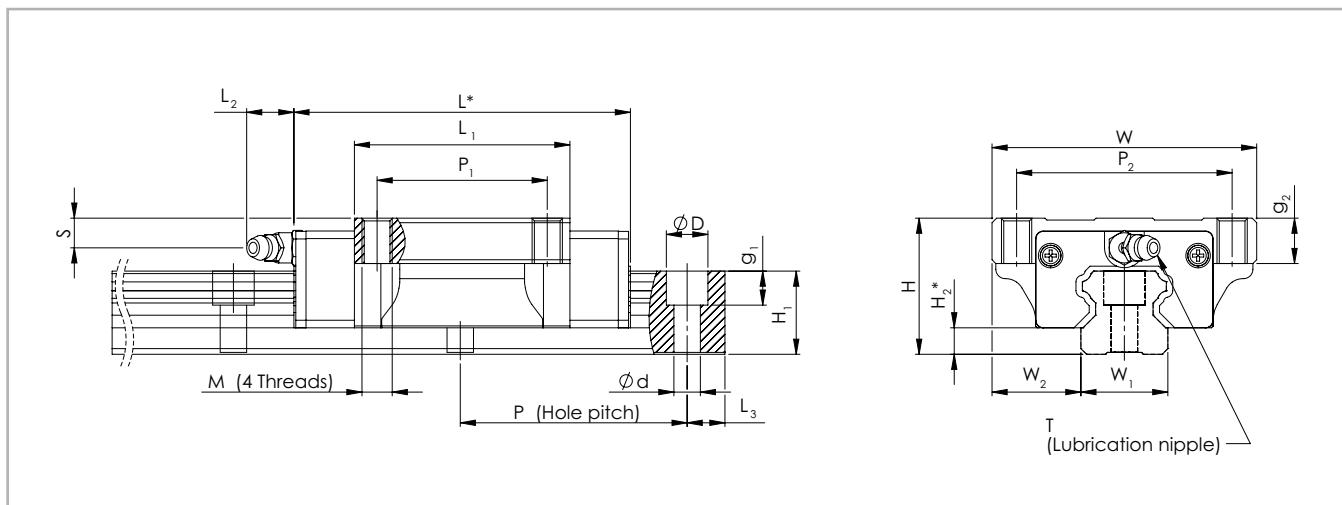
Type	Load capacities [N]		Static moments [Nm]		
	dyn. $C_{100}$	stat. $C_0$	$M_x$	$M_y$	$M_z$
<b>MR09WN</b>	2030	3605	33.2	13.7	13.7
<b>MR12WN</b>	3065	5200	63.7	26.3	26.3
<b>MR15WN</b>	5065	8385	171.7	45.7	45.7

Tab. 4

## Product dimensions



### ➤ MRS – carriage with flange



\* If additional sealing options are used, the dimension L changes. [see Tab. 15 Page MR-15].

Fig. 14

Type	System [mm]				Slider MRS [mm]									Weight [kg]	Rail MRR [mm]					Weight [kg/m]		
	H	W	W <sub>2</sub>	H <sub>2</sub>	L	P <sub>2</sub>	P <sub>1</sub>	M	g <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	T	S		W <sub>1</sub>	H <sub>1</sub>	P	d	D	g <sub>1</sub>	L <sub>3</sub> <sup>*</sup>	
MRS15-A	24	47	16	2.5	73	38	30	M5	8	40	5	Ø3	4.3	0.19	15	14		4.5	7.5	5.8		1.4
MRS20-A	30	63	21.5	2.9	85	53	40	M6	9	48.8	7	0.4	20	18	60	6	9.5	9	20	2.6		
MRS20L				5	95.7					63.4												
MRS25-A	36	70	23.5	4.9	94.7	57	45	M8		57	7.8	0.57	23	22	7	11	9.5	20	3.6			
MRS25L				7	113					79.1												
MRS30-A	42	90	31	6.9	117	72	52		12	72	7	1.1	28	26	80	9	14	12.5	5.2			
MRS30L				9	135.3					94.3												
MRS35-A	48	100	33	7.6	118	82	62		13	80	8	1.6	34	29	80	9	14	12.5	7.2			
MRS35L				9.5	139.6					105.8												
MRS45-A	60	120	37.5	12.05	146.7	100	80	M12	15	105	17	M8 x 1	8.5	2.7	45	38	105	14	20	17.5	22.5	12.3
MRS45L				14	167					129.8												

\* Only applies when using max. rail lengths (see Ordering key)

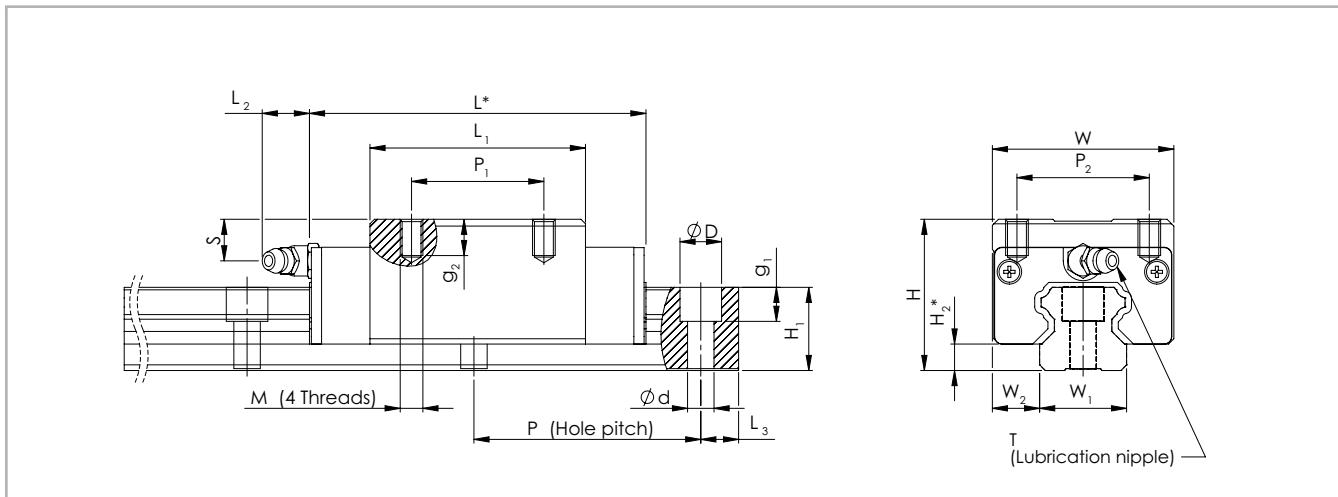
Tab. 5

Type	System [mm]				Slider MCS [mm]									Weight [kg]	Rail MRC [mm]					Weight [kg/m]		
	H	W	W <sub>2</sub>	H <sub>2</sub>	L	P <sub>2</sub>	P <sub>1</sub>	M	g <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	T	S		W <sub>1</sub>	H <sub>1</sub>	P	d	D	g <sub>1</sub>		
MCS55	70	140	43.5	12.7	181.5	116	95	M14	21	131	12	M8 x 1	20	5.4	53	38	120	16	23	20	30	14.5
MCS55L					223.7					173												

\* Only applies when using max. rail lengths (see Ordering key)

Tab. 6

## > MRS...W – carriage without flange



\* If additional sealing options are used, the dimension L changes. [see Tab. 15 Page MR-15].

Fig. 15

Type	System [mm]				Slider MRS [mm]									Weight [kg]	Rail MRR [mm]						Weight [kg/m]	
	H	W	W <sub>2</sub>	H <sub>2</sub>	L	P <sub>2</sub>	P <sub>1</sub>	M	g <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	T	S		W <sub>1</sub>	H <sub>1</sub>	P	d	D	g <sub>1</sub>	L <sub>3</sub> *	
MRS15W-A	28	34	9.5	2.5	73	26	26	M4	6.4	40	5	Ø3	8.3	0.21	15	14		4.5	7.5	5.8		1.4
MRS20W-A	30	44	12	2.9	85	36	32	M5	8	48.8	7	12	M6 x 1	0.31	20	18	60	6	9.5	9	20	2.6
MRS20LW				5	95.7																	
MRS25W-A	40	48	12.5	4.9	94.7	35	35	M6	9.6	57	11.8	12	M6 x 1	0.45	23	22	7	11	9.5	20	3.6	
MRS25LW				7	113																	
MRS30W-A	45	60	16	6.9	117	40	40	M8	12.8	72	10	12	M6 x 1	0.91	28	26	80	9	14	12.5	5.2	
MRS30LW				9	135.3																	
MRS35W-A	55	70	18	7.6	118	50	50	M8	12.8	94.3	15	12	M6 x 1	1.5	34	29	80	9	14	12.5	7.2	
MRS35LW				9.5	139.6																	
MRS45W-A	70	86	20.5	12.05	146.7	60	60	M10	16	105	17	12	M8 x 1	2.3	45	38	105	14	20	17.5	22.5	12.3
MRS45LW				14	167																	

\* Only applies when using max. rail lengths (see Ordering key)

Tab. 7

Type	System [mm]				Slider MCS [mm]									Weight [kg]	Rail MRC [mm]						Weight [kg/m]	
	H	W	W <sub>2</sub>	H <sub>2</sub>	L	P <sub>2</sub>	P <sub>1</sub>	M	g <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	T	S		W <sub>1</sub>	H <sub>1</sub>	P	d	D	g <sub>1</sub>	L <sub>3</sub> *	
MCS55W	80	100	23.5	12.7	181.5	75	75	M12	19	131	12	M8 x 1	30	5.2	53	38	120	16	23	20	30	14.5

\* Only applies when using max. rail lengths (see Ordering key)

Tab. 8

## > MRT...W – carriage without flange

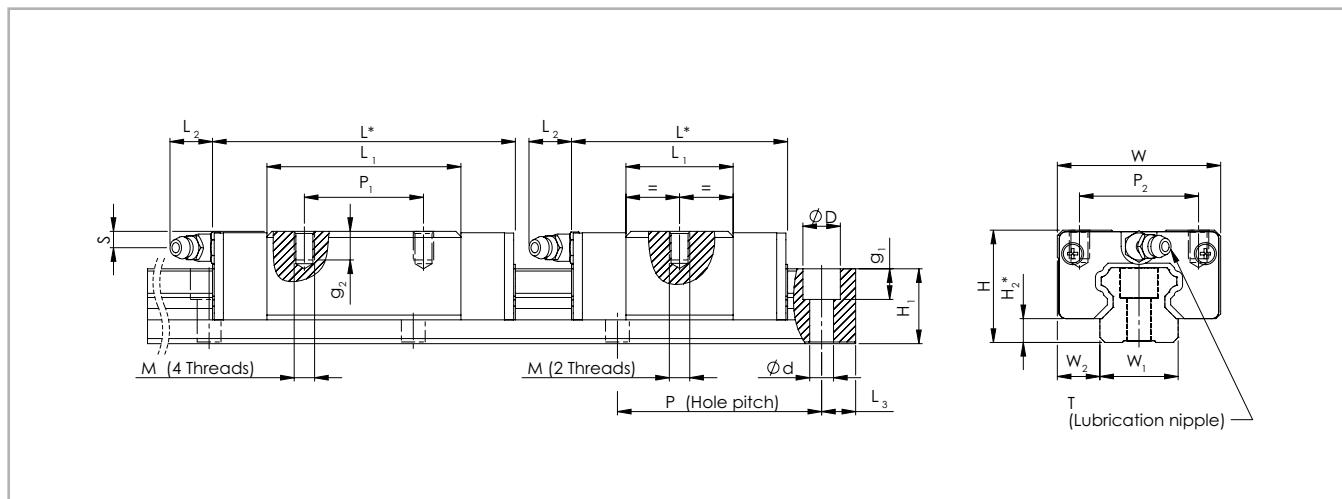


Fig. 16

Type	System [mm]				Slider MRT [mm]								Weight [kg]	Rail MRR [mm]						Weight [kg/m]		
	H	W	W <sub>2</sub>	H <sub>2</sub>	L	P <sub>2</sub>	P <sub>1</sub>	M	g <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	T		W <sub>1</sub>	H <sub>1</sub>	P	d	D	g <sub>1</sub>	L <sub>3</sub> <sup>*</sup>		
MRT15W-A	24	34	9.5	2.5	73	26	26	M4	5.6	40	5	Ø3	4.3	0.17	15	14		4.5	7.5	5.8		1.4
MRT15SW				4.6	50.6		-			21.6				0.1								
MRT20W-A	28	42	11	2.9	85	32	32	M5	7	48.8				0.26	20	18	60	6	9.5	9		2.6
MRT20SW				5	60.3		-			28				0.17								
MRT25W-A	33	48	12.5	4.9	94.7	35	35	M6	8.4	57				0.38	23	22		7	11	9.5	20	3.6
MRT25SW				7	65.5		-			31.5				0.21								
MRT30W-A	42	60	16	6.9	117	40	40			72				0.81	28	26						5.2
MRT30SW				9	80		-			38.6				0.48				80	9	14	12.5	
MRT35W-A	48	70	18	7.6	118	50	50	M8	11.2	80				1.2	34	29						7.2
MRT35SW				9.5	79.7		-			45.7				0.8								
MRT45W-A	60	86	20.5	12.05	146.7	60	60	M10	14	105	17	M8 x 1	8.5	2.1	45	38	105	14	20	17.5	22.5	12.3

\* Only applies when using max. rail lengths (see Ordering key)

Tab. 9

> **MRR...F – rails mounted from below**

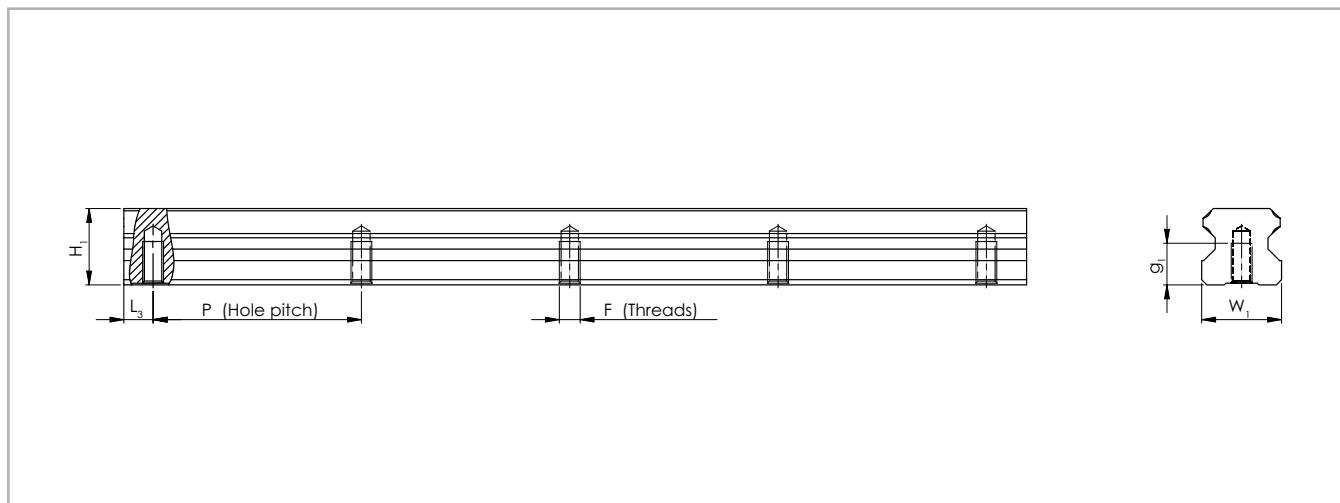


Fig. 17

Rail type	$W_1$ [mm]	$H_1$ [mm]	$L_3^*$ [mm]	$P$ [mm]	$F$	$g_1$ [mm]
<b>MRR15...F</b>	15	14			M5	8
<b>MRR20...F</b>	20	18		60	M6	10
<b>MRR25...F</b>	23	22	20			12
<b>MRR30...F</b>	28	26		80	M8	15
<b>MRR35...F</b>	34	29				17
<b>MRR45...F</b>	45	38	22.5	105	M12	24

\* Only applies when using max. rail lengths (see Ordering key)

Tab. 10

## ➤ Miniature Mono Rail standard width

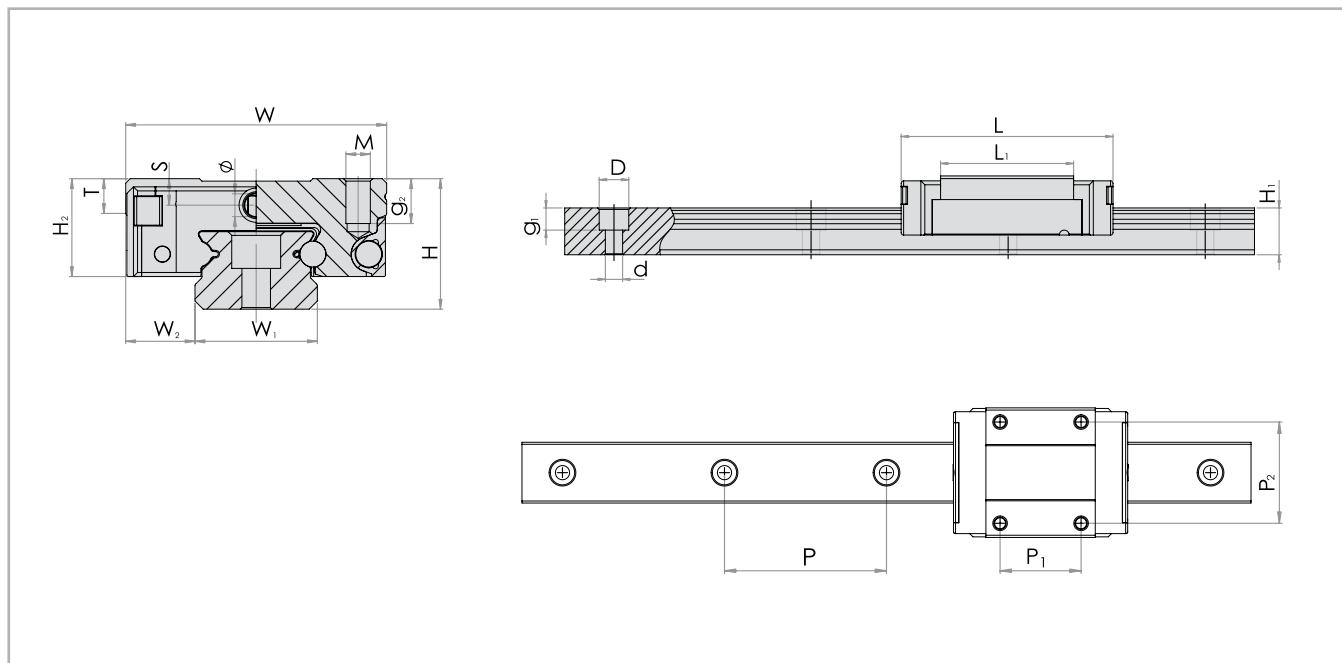


Fig. 18

Type	System [mm]			
	H	W	W <sub>2</sub>	H <sub>2</sub>
MR07MN	8	17	5	6.5
MR09MN	10	20	5.5	7.8
MR12MN	13	27	7.5	10
MR15MN	16	32	8.5	12

Tab. 11

Type	Slider [mm]											Rail [mm]							
	L	P <sub>2</sub>	P <sub>1</sub>	M	g <sub>2</sub>	L <sub>1</sub>	T	S	Ø	Weight [kg]	W <sub>1</sub>	H <sub>1</sub>	P	d	D	g <sub>1</sub>	Weight [kg/m]		
MR07MN	23.7	12	8	M2	2.5	14.3	2.8	1.6	1.1	0.008	7	4.7	15	2.4	4.2	2.3	0.215		
MR09MN	30.6	15	10	M3	3.0	20.5	3.3	2.2	1.3	0.018	9	5.5	20	3.5	6	3.5	0.301		
MR12MN	35.4	20	15	M3	3.5	22.0	4.3	3.2	1.3	0.034	12	7.5	25	3.5	6	4.5	0.602		
MR15MN	43.0	25	20	M3	5.5	27.0	4.3	3.3	1.8	0.061	15	9.5	40	3.5	6	4.5	0.93		

Tab. 12

## > Miniature Mono Rail large width

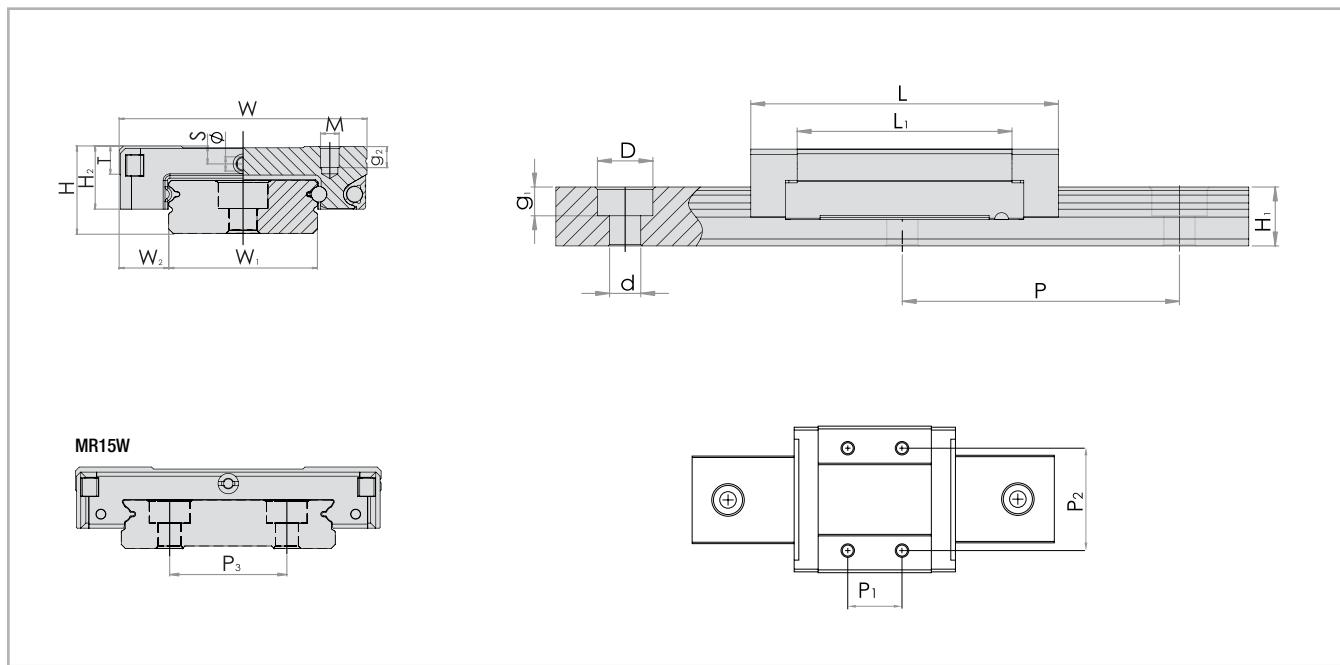


Fig. 19

Type	System [mm]			
	H	W	W <sub>2</sub>	H <sub>2</sub>
MR09WN	12	30	6	8.6
MR12WN	14	40	8	10.1
MR15WN	16	60	9	12

Tab. 13

Type	Slider [mm]										Rail [mm]							
	L	P <sub>2</sub>	P <sub>1</sub>	M	g <sub>2</sub>	L <sub>1</sub>	T	S	Ø	Weight [kg]	W <sub>1</sub>	H <sub>1</sub>	P	P <sub>3</sub>	d	D	g <sub>1</sub>	Weight [kg/m]
MR09WN	39.1	21	12	M3	3	27.9	4	2.6	1.3	0.037	18	7.3	30	-	3.5	6		0.94
MR12WN	44.4	28	15	M3	3.5	31.0	4.5	3.1	1.3	0.065	24	8.5	40	-	4.5	8	4.5	1.472
MR15WN	55.3	45	20	M4	4.5	38.5	4.5	3.3	1.8	0.137	42	9.5	40	23	4.5	8		2.818

Tab. 14

## Accessories



### ➤ Safety equipment and covers

#### End seal

Carriages of Mono Rail profile rails are equipped with end seals for contamination protection as standard.

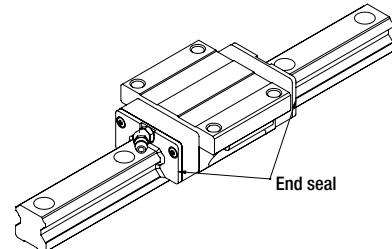


Fig. 20

#### Side seal

Carriages are equipped with side seals to prevent permeation of contaminants.

No side seals are available for carriages in long or short version (...SW/...L/...LW).

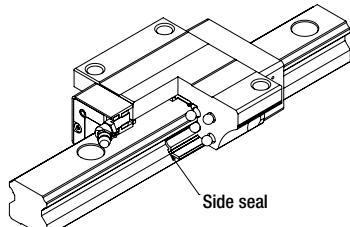


Fig. 21

#### Double seal

To improve the protection from contamination at higher loads the carriage can be provided with double end seals.

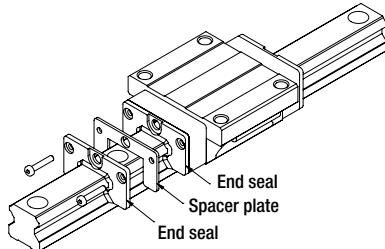


Fig. 22

#### Metal deflector (non-contacting)

Metal cuttings or coarse contamination can damage the end seals of the carriage. Metal deflector covers protect seal lips against damage.

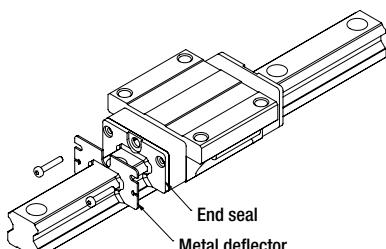


Fig. 23

**Seal variants:**

A: Carriage with end and side seal  
 C: Carriage with end and side seals and metal deflector  
 D: Carriage with double end seal and side seal  
 E: Carriage with double end seal and side seal and metal deflector

Length of carriages change when using the corresponding seal variants

Seal variant		A	C	D	E
Slider type <sup>1</sup>	Size	Changed length L* [mm]			
<b>MRS</b> <b>MRS...W</b> <b>MRT</b> <b>MRT...W</b>	15	73	75	79	83
	20	85	87	91	95.2
	25	94.7	97.7	101.4	106.6
	30	117	119	132	136
	35	118	120	128	132.6
	45	146.7	148.7	157.4	161.9
<b>MCS</b> <b>MCS...W</b> <b>MCT</b> <b>MCT...W</b>	55	-	192	191	200
<b>MRS...L</b> <b>MRS...LW</b> <b>MRT...LW</b>	20	-	99.5	103.5	107.7
	25	-	117.7	121.4	126.6
	30	-	138.3	151.3	155.3
	35	-	143.6	151.6	156.2
	45	-	171.2	179.9	184.4
<b>MCS...L</b> <b>MCS...LW</b> <b>MCT...LW</b>	55	-	234.2	233.2	242.2
<b>MRT...S</b> <b>MRT...SW</b>	15	-	54.6	58.6	62.6
	20	-	64.1	68.1	72.3
	25	-	70.2	73.9	79.1
	30	-	83	96	100
	35	-	83.7	91.7	96.3

Tab. 15

<sup>1</sup> No side seals are available for carriages in long or short version (...S / ...W and ...L / ...W)

\* For comparison see Chapter 3 Product dimensions, pg. MR-8ff

## > Metal cover strip

A rail cover strip made of corrosion resistant steel is available to improve the seal after guide rail installation. The metal cover strip is 0.3 mm wide and can have a maximum length of 50 m.

Size	Width [mm]
15	10
20	13
25	15
30	20
35	24
45	32
55	38

Tab. 16

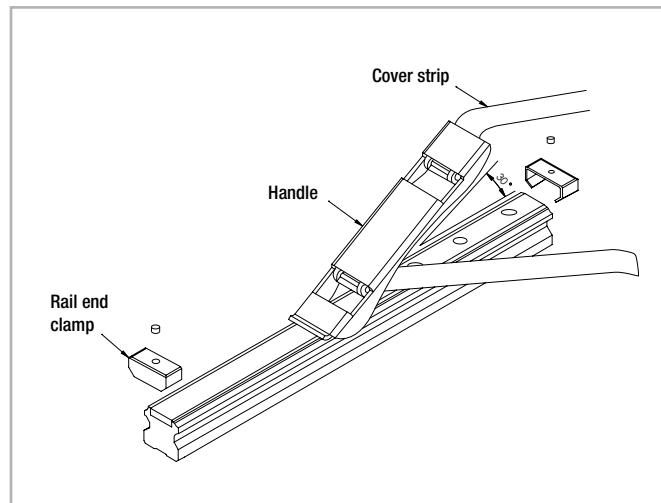


Fig. 24

## > Flush cap

Metal debris and other foreign substance can collect in the fixing holes of the rails and thus end up the carriage.

To prevent penetration of contamination in the carriage, the fixing holes should be capped with perforated caps flush with the rail surface.

Flush caps are made of wear and oil resistant synthetic resin. Various sizes of perforated caps for the counter sunk holes for hexagon socket bolts M3 to M22 are included as standard in the scope of supply.

Flush caps are driven in flush with the rail surface with light hammer taps using a flat piece of metal (see fig. 25).

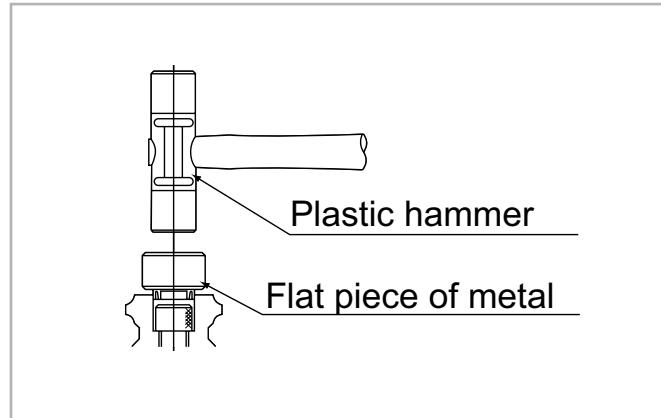


Fig. 25

## > Clamping elements

Mono Rail profile rails can be secured with manual or pneumatic clamping elements. Areas of application are:

- Table cross beams and sliding beds
- Width adjustment, stops
- Positioning of optical equipment and measuring tables

### Manual clamp elements HK

The HK series is a manually activated clamping element.

Contact profiles press synchronously on the free surfaces of the profile rail by using the freely adjustable clamping lever.

The floating mounted contact profiles guarantee symmetrical introduction of force on the guide rail.

Special characteristics of the clamping elements HK:

- Simple and safe design
- Floating contact profile
- Precise positioning
- Holding force up to 2,000 N

Variants:

An additional adapter plate must be used depending on the height of the carriage (see pg. MR-20, tab. 19).

Activation:

Standard with hand lever, further activation options, e.g. using DIN 912 screw, possible on request.

### Pneumatic clamp elements MK / MKS

The patented wedge slide gear puts into effect high holding forces. The pressurised medium moves the wedge slide gear in the longitudinal direction.

Contact profiles press with high force on the free surfaces of the profile rail by the resulting cross movement. MK is an element that closes with pneumatic pressure. The custom design MKS closes with spring energy storage and is opened via air impingement.

Special characteristics of clamp elements MK / MKS:

- Short shape
- High clamp forces
- Precise positioning
- High axial and horizontal rigidity

Areas of application of MK:

- Positioning axes
- Setting vertical axes
- Positioning lifting gear
- Clamping machine tables

Variants:

An additional adapter plate must be used depending on the height of the carriage (see pg. MR-20, tab. 20).

Connection options:

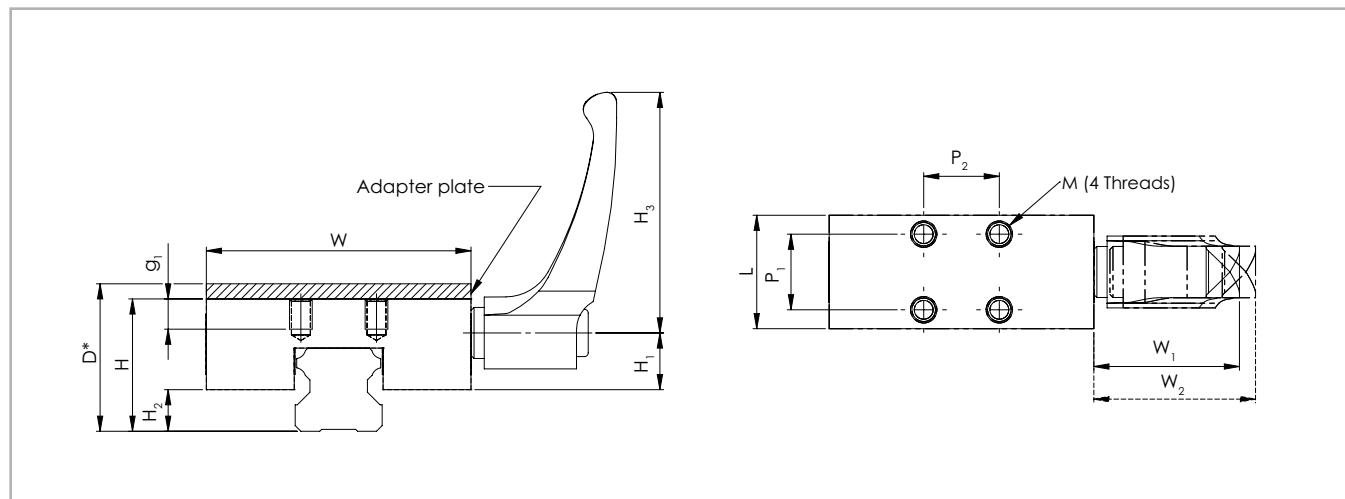
The basic MK / MKS series versions are equipped with air connections on both sides, i.e. the factory default settings air connections and the ventilation filter can be exchanged to the opposite side surfaces.

Custom design MKS opens with impingement of an air pressure of > 5.5 bar.

Areas of application of MKS:

- Clamping with drop in pressure (Normally Open)
- Clamping without power required (Normally Closed)

## ► Manual clamp HK



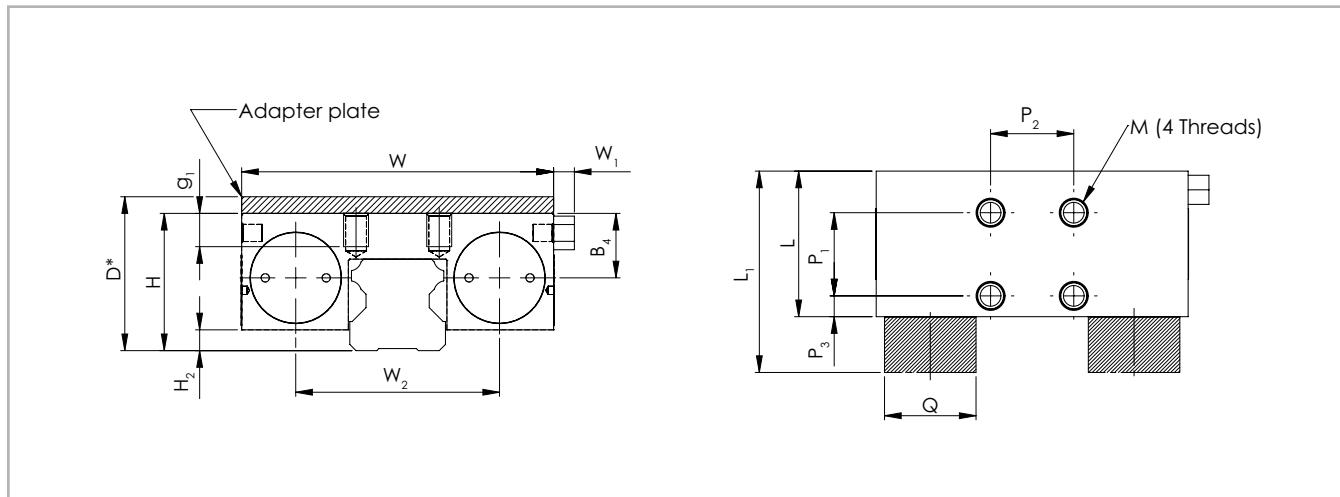
\* Changed dimensions when using the adapter plate, see pg. MR-20, tab. 19

Fig. 26

Type	Size	Holding force [N]	Tightening torque [Nm]	Dimensions [mm]											M
				H	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W	W <sub>1</sub>	W <sub>2</sub>	L	P <sub>1</sub>	P <sub>2</sub>	g <sub>1</sub>	
HK1501A	15	1200	5	24	12.5	6.5	44	47	30.5	33.5	25	17	17	5	M4
HK2006A	20			28	17.5	5		60			24	15	15	6	M5
HK2514A	25		7	33	15	11.5	63	70	38.5	41.5	30	20	20	8	M6
HK3001A	30	2000	15	42	21.5	12	78	90	46.5	50.5	39	22	22		M6
HK3501A	35			48		16		100				24	24	10	M8
HK4501A	45			60	26.5	18		120			44	26	26	14	M10
HK5501A	55		22	70	31	21	95	140	56.5	61.5	49	30	30	16	M14

Tab. 17

## > Pneumatic clamp MK / MKS



\* Changed dimensions when using the adapter plate, see pg. MR-20, tab. 20

Fig. 27

Type	Size	MK holding force [N]	MKS holding force [N]	Dimensions [mm]													M
				H	H <sub>2</sub>	W	W <sub>1</sub>	W <sub>2</sub>	B <sub>4</sub>	L <sub>1</sub> *	L	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Q [Ø]	g <sub>1</sub>	
MK / MKS 1501A	15	650	400	24	2.5	55	34	12	58	39	15	15	15.5	16	4.5	M4	
MK / MKS 2001A	20	1000	600	28	66	6	43	14.4	61		20	20	5	20	5	M5	
MK / MKS 2501A	25	1200	750	36	8	75	49	15.5	56	35				22	8	M6	
MK / MKS 3001A	30	1750	1050	42	7	90	58	20.5	68	39	22	22	8.5	25		10	M8
MK / MKS 3501A	35	2000	1250	48	11.5	100	5	68	67		24	24	7.5	28			
MK / MKS 4501A	45			60	16.5	120		78.8	26.8		26	26	11.5		15		
MK / MKS 5501A	55		2250	1450	70	21.5	128		82	49		30	30	9.5		18	M10

\* Only for model MKS

Tab. 18

## Adapter plate

### For HK clamps

Clamp	Size	Slider type	Adapter plate	D	
HK1501A	15	MRS, MRT...W, MRT...SW	-	24	
		MRS...W	PHK 15-4	28	
HK2006A	20	MRT...W, MRT...SW	-	28	
		MRS, MRS...L, MRS...W, MRS...LW	PHK 20-2	30	
HK2514A	25	MRT...W, MRT...SW	-	33	
HK2501A		MRS, MRS...L,	-	36	
		MRS...W, MRS...LW	PHK 25-4	40	
HK3001A	30	MRS, MRS...L, MRT...W, MRT...SW	-	42	
		MRS...W, MRS...LW	PHK 30-3	45	
HK3501A	35	MRS, MRS...L, MRT...W, MRT...SW	-	48	
		MRS...W, MRS...LW	PMK 35-7	55	
HK4501A	45	MRS, MRS...L, MRT...W	-	60	
		MRS...W, MRS...LW	PHK 45-10	70	
On request	55		-	68	
HK5501A		MCS, MCS...L	-	70	
		MCS...W	PHK 55-10	80	

Tab. 19

### For MK / MKS clamps

Clamp	Size	Slider type	Adapter plate	D	
MK / MKS 1501A	15	MRS, MRT...W, MRT...SW	-	24	
		MRS...W	PMK 15-4	28	
MK / MKS 2001A	20	MRT...W, MRT...SW	-	28	
		MRS, MRS...L, MRS...W, MRS...LW	PMK 20-2	30	
On request	25	MRT...W, MRT...SW	-	33	
MK / MKS 2501A		MRS, MRS...L, MRZ	-	36	
		MRS...W, MRS...LW	PMK 25-4	40	
MK / MKS 3001A	30	MRS, MRS...L, MRT...W, MRT...SW	-	42	
		MRS...W, MRS...LW	PMK 30-3	45	
MK / MKS 3501A	35	MRS, MRS...L, MRT...W, MRT...SW	-	48	
		MRS...W, MRS...LW	PMK 35-7	55	
MK / MKS 4501A	45	MRS, MRS...L, MRT...W	-	60	
		MRS...W, MRS...LW	PMK 45-10	70	
On request	55		-	68	
MK / MKS 5501A		MCS, MCS...L	-	70	
		MCS...W	PMK 55-10	80	

Tab. 20

## Technical instructions



### > Mono Rail precision

Precision means the guide accuracy or the maximal deviation of the carriage based on the side and support surfaces during the movement along the rails.

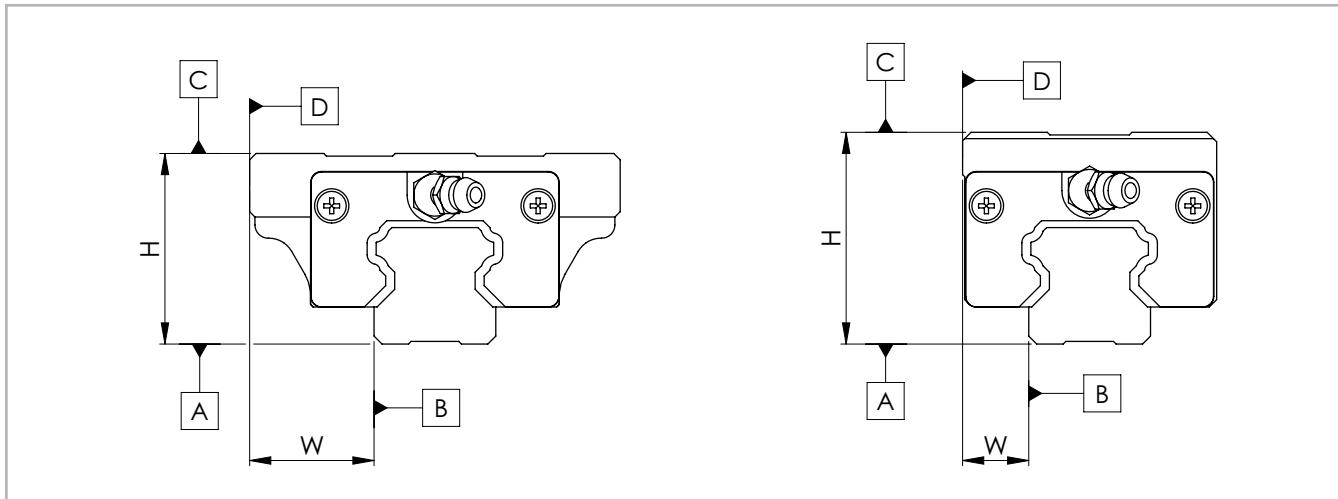


Fig. 28

	Precision class [mm]		
	Normal [N]	High [H]	Precise [P]
Height tolerance H	$\pm 0.1$	$\pm 0.04$	0 to -0.04
Side tolerance W			
Height difference ( $\Delta H$ )	0,03	0,02	0,01
Width difference ( $\Delta W$ )			
Guide accuracy of raceway C based on surface A	$\Delta C$ see graph in fig. 29		
Guide accuracy of raceway D based on surface B	$\Delta D$ see graph in fig. 29		

Tab. 21

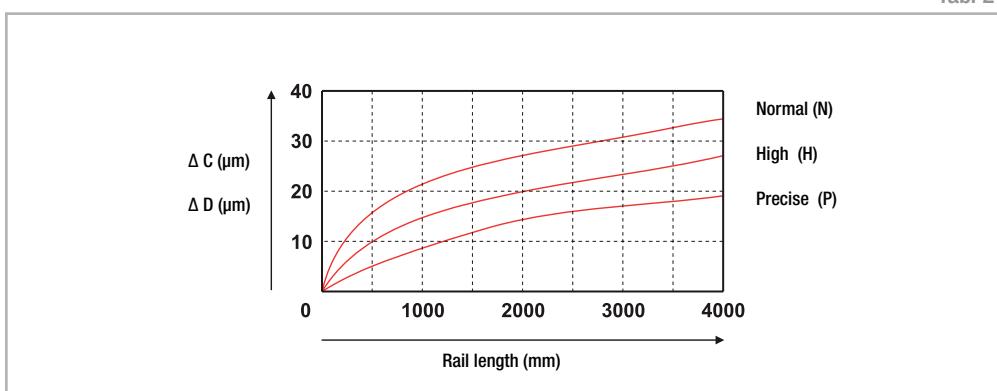


Fig. 29

## ➤ Miniature Mono Rail precision

There are three precision classes to choose from for the Mono Rail Miniature profile rails: Classes P, H, and N are manufactured.

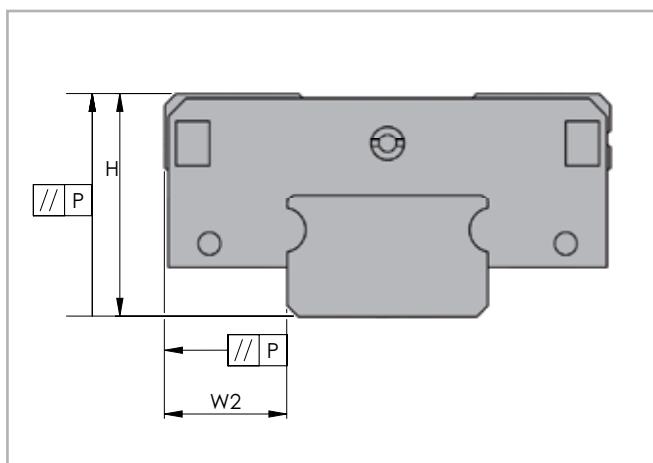


Fig. 30

	Precision classes	Precision P [ $\mu\text{m}$ ]	High H [ $\mu\text{m}$ ]	Normal N [ $\mu\text{m}$ ]
$H$	Tolerance of height $H$	$\pm 10$	$\pm 20$	$\pm 40$
$\Delta H$	Permissible height difference of different carriages at the same position on the rail	7	15	25
$W_2$	Tolerance of width $W_2$	$\pm 15$	$\pm 25$	$\pm 40$
$\Delta W_2$	Permissible width difference of different carriages at the same position on the rail	10	20	30

Tab. 22

### Running accuracy

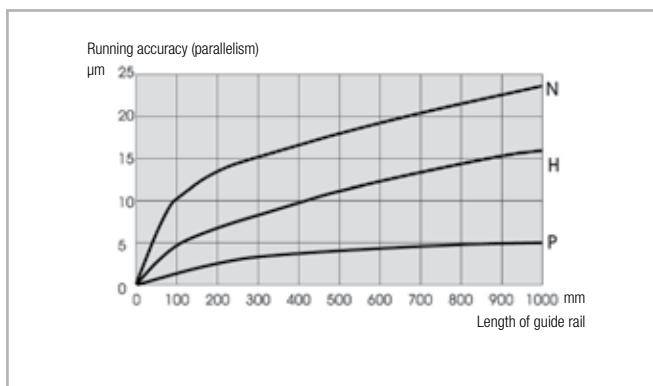


Fig. 31

## > Mono Rail Radial clearance / preload

Radial clearance describes the value for the radial movement of the carriage at a constant vertical load, while the carriage moves in longitudinal direction.

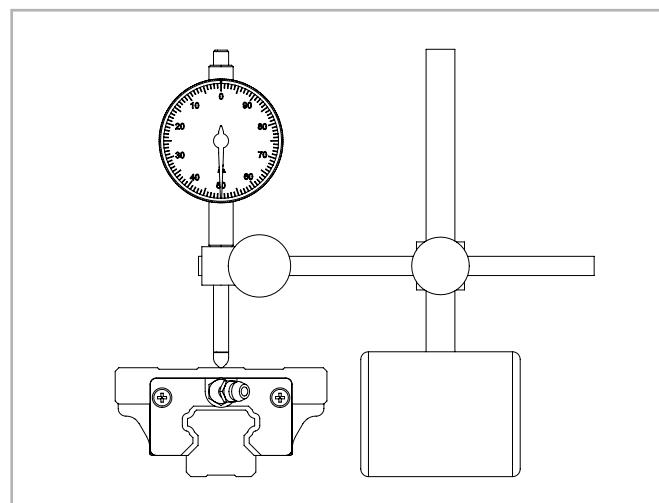


Fig. 32

Preload is defined as an effective load on the rolling element in the interior of the carriage in order to remove an existing clearance or to increase the rigidity.

The Mono Rail profile rails are available in the four different preload classes G1, K0, K1 and K2 (see tab. 23). The preload influences the rigidity, precision and torque resistance and also affects the service life and displacement force.

The radial clearance for the respective preload classes are listed in table 24.

Degree of preload	Preload class	Preload
With clearance	G1	0
No clearance	K0	0
Small preload	K1	0,02 x C*
Average preload	K2	0,05 x C*

\* C is the dynamic load capacity, see pg. MR-6, Tab. 1.

Tab. 23

Size	Radial clearance of the preload classes [ $\mu\text{m}$ ]			
	G1 Impact free movement, compensation of assembly tolerances	K0 Impact free and easy movement	K1 Small moments, one rail application, low vibrations	K2 Average vibrations and moments, light impacts
15	+4 to +14	-4 to +4	-12 to -4	-20 to -12
20	+5 to +15	-5 to +5	-14 to -5	-23 to -14
25	+6 to +16	-6 to +6	-16 to -6	-26 to -16
30	+7 to +17	-7 to +7	-19 to -7	-31 to -19
35	+8 to +18	-8 to +8	-22 to -8	-35 to -22
45	+10 to +20	-10 to +10	-25 to -10	-40 to -25
55	+12 to +22	-12 to +12	-29 to -12	-46 to -29

Tab. 24

## ➤ Miniature Mono Rail Preload

The Mono Rail Miniature profile rails are available in the three different preload classes  $V_0$ ,  $V_s$  and  $V_1$  (see table 25). The preload influences the rigidity, precision and torque resistance and also affects the product service life and displacement force.

Type	Preload classes		
	<b><math>V_0</math></b> [ $\mu\text{m}$ ]	<b><math>V_s</math></b> [ $\mu\text{m}$ ]	<b><math>V_1</math></b> [ $\mu\text{m}$ ]
MR07	from +5 to +2	from +1 to -2	from -2 to -4
MR09	from +5 to +2	from +2 to -2	from -2 to -5
MR12	from +6 to +2	from +2 to -2	from -2 to -5
MR15	from +7 to +2	from +2 to -3	from -2 to -6

Tab. 25

## > Anticorrosive protection

There are numerous application-specific surface treatments available for profile rails of the Mono Rail product family.

For more information please contact Rollon technical support. All linear rails of the Miniature Mono Rail series are made of stainless steel.

## > Mono Rail lubrication

Profile rails must generally be lubricated before commissioning. They can be lubricated with oil or grease.

The correct lubricant selection has a large influence on the service life and the function of the profile rail, insufficient lubrication and tribocorrosion can ultimately lead to total failure.

As well as reducing friction and wear, lubricants also serve as sealant, noise damper and corrosion protection for the linear guide. Different lubricants for special applications are available upon request.

For more information please contact Rollon technical support.

### Important instructions for lubrication

- Mono Rail profile rails must be lubricated for operation.
- The carriage must be moved back and forth during lubrication.
- The lubricant is inserted through a lubrication nipple.
- There should be a thin film of lubricant on the rail surface at all times.
- Please inform us in advance if the guides are to be used in acid or base containing environments or in clean rooms.

- Primary lubricated systems have an increased displacement resistance.
- Please contact Rollon technical support if the rail will be oriented vertically.
- If the stroke is <2 or >15 times the carriage length, the lubrication intervals should be shortened.

### Grease lubrication

We recommend the use of a lithium emulsified lubricant NLGI Class 2 for lubrication.

### Oil lubrication

We recommend a synthetic oil for operating temperatures between 0 °C and +70 °C. For application-specific custom lubrication, please contact Rollon technical support.

### Relubrication

- Relubrication of the system must be done before the lubricant used is dirty or shows discolouration.
- Relubrication is performed at operating temperature. The carriage must be moved back and forth during relubrication.
- If the stroke is <2 or >15 times the carriage length, the lubrication intervals should be more often.

### Lubrication intervals

Operating speed, stroke length and ambient conditions influence the selection of time between lubrication intervals. Establishing a safe lubrication interval is based exclusively on the experienced practical values determined on site. However, in any case a lubrication interval should not be longer than one year or 100 km of use, depending on the value reached first.

### Lubrication condition on delivery

Single parts (separate sliders and rails) are provided with an anticorrosion oil and they have to be lubricated first thing after assembly. Assemblies are provided with lubrication grease applied.

### Initial lubrication and relubrication

#### Self-lubricating

The carriages of the following sizes have a self-lubrication element to extend lubrication intervals.

#### Not self-lubricating

The carriages of sizes 35 and 45 are not self-lubricating due to the design.

Size	Initial lubrication grease [cm <sup>3</sup> ]	Relubrication [cm <sup>3</sup> ]	Initial lubrication oil [cm <sup>3</sup> ]
15	1.3	1.1	1.5
20	2.3	2	2.5
25	2.8	2.5	3.5
30	3.5	3	4.5
55	5.5	4	5.5

The given lubrication quantities apply to preload K1 and speeds ≤ 1 m/s

Tab. 26

Size	Initial lubrication grease [cm <sup>3</sup> ]	Relubrication [cm <sup>3</sup> ]	Initial lubrication oil [cm <sup>3</sup> ]
35	3.5	3	3.5
45	4.5	3.5	4.5

The given lubrication quantities apply to preload K1 and speeds ≤ 1 m/s

Tab. 27

## ➤ Miniature Mono Rail lubrication

### Function

The contact points between ball and track are separated from each other by a microscopically thin oil film. The lubrication effects:

- Reduction of friction
- Reduction of wear
- Corrosion protection
- Better thermal distribution and therefore increased of service life

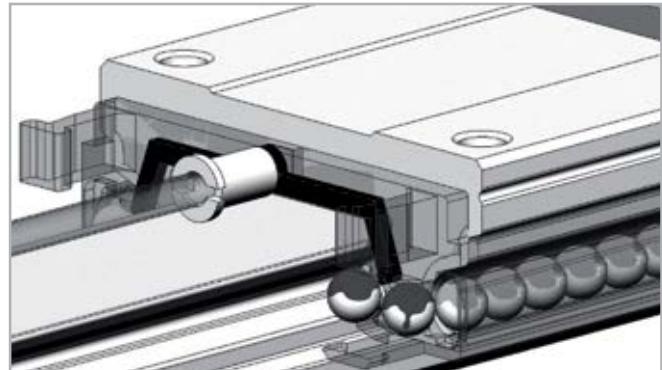


Fig. 33

### Important instructions for lubrication

- Mono Rail Miniature profile rails must be lubricated for operation.
- The carriage must be moved back and forth during lubrication.
- The lubricant can also be applied to the tracks.
- The lubricant can be injected into the lubrication holes on both sides of the carriage.
- There should be a thin film of lubricant on the rail surface at all times.
- Please inform us in advance if the guides are to be used in acid or base containing environments or in clean rooms.
- Please contact the sales department if the oil lubrication should be used for vertical use of the guide.
- If the stroke is < 2 or > 15 times the carriage length, the lubrication intervals should be more often.

Type	First lubrication [cm <sup>3</sup> ]
MR07MN	0.12
MR09MN	0.23
MR12MN	0.41
MR15MN	0.78

Tab. 28

Type	First lubrication [cm <sup>3</sup> ]
MR09WN	0.30
MR12WN	0.52
MR15WN	0.87

Tab. 29

### Grease lubrication

When using grease lubrication, we recommend synthetic-oil based lithium grease with a viscosity according to ISO VG 32 to ISO VG 100.

### Oil lubrication

We recommend CLP or CGLP synthetic oil conforming to DIN 51517 or HLP to DIN 51524 and a viscosity range conforming to ISO VG 32 to ISO VG 100 for operating temperatures between 0 °C and +70 °C. We recommend a viscosity according to ISO VG 10 for use at low temperatures. For application-specific special lubrication please contact Rollon technical support.

### Lubrication intervals

Operating speed, stroke length and ambient conditions influence the selection of time between lubrication intervals. Establishing a safe lubrication interval is based exclusively on the experienced practiced values determined on site. However, in any case a lubrication interval should not be longer than one year or 100 km of use, depending on the value reached first.

### Relubrication

- Relubrication of the system must be done before the lubricant used is dirty or shows discolouration.
- Relubrication is performed at operating temperature. During relubrication, the carriage should be moved back and forth.
- If the stroke is < 2 or > 15 times the carriage length, the lubrication intervals should be more often.

### Lubrication condition on delivery

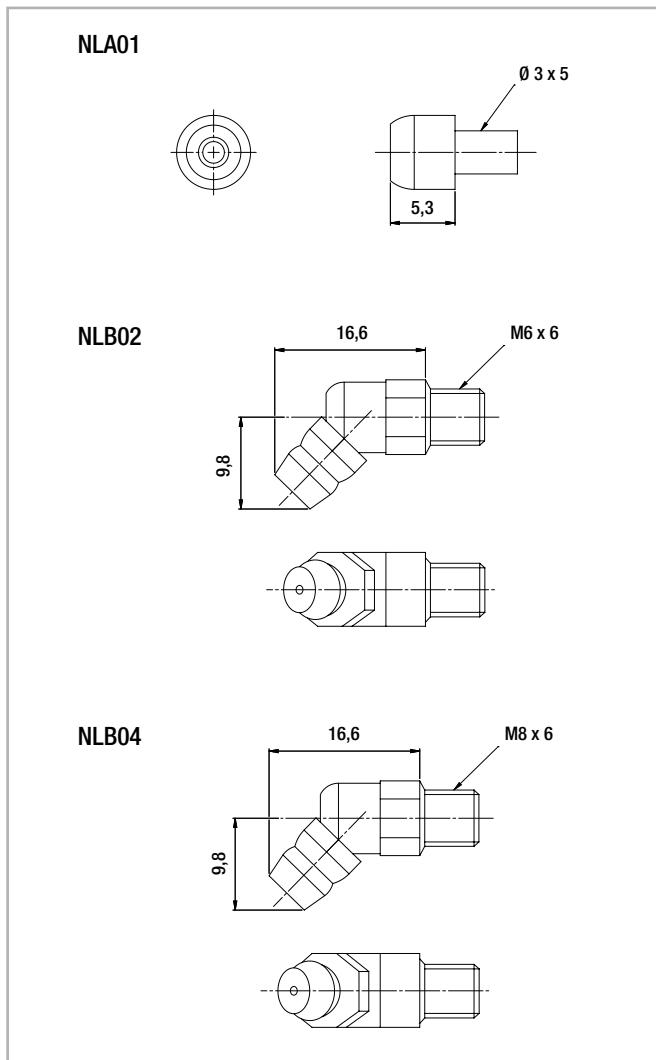
Single parts (separate sliders and rails) are provided with an anticorrosion oil and they have to be lubricated first thing after assembly. Assemblies are provided with lubrication oil applied.

ISO VG 10	$\hat{=}$	Viscosity of 10 $\frac{\text{mm}^2}{\text{s}}$	at 40 °C
ISO VG 32	$\hat{=}$	Viscosity of 32 $\frac{\text{mm}^2}{\text{s}}$	at 40 °C
ISO VG 100	$\hat{=}$	Viscosity of 100 $\frac{\text{mm}^2}{\text{s}}$	at 40 °C

Fig. 34

## > Mono Rail lubrication nipple

The following lubrication nipples are part of the standard delivery:



Lubrication nipple	Size
<b>NLA01</b>	15
	20
	25
<b>NLB02</b>	30
	35
	45
<b>NLB04</b>	55

Tab. 30

Other lubrication nipples, such as lubrication adapters with hose inlet or with quick-coupling, are available on request. Please observe that the thread lengths (see fig. 35) can be changed when using additional deflectors and end seals. For more information please contact Rollon technical support.

Fig. 35

## > Mono Rail loading

The given static load capacity for each carriage represents the maximum permissible load value, which if exceeded causes permanent deformations of the raceways and adverse effects of the running properties.

Checking the load must be done as follows:

- through determination of the simultaneously occurring forces and moments for each carriage
- by comparison of these values with the corresponding load capacities.

The ratio of the actual load to maximum permissible load may be as large as the reciprocal of the accepted safety factor,  $S_0$ , at the most.

$\frac{P_{0\text{rad}}}{C_{0\text{rad}}} \leq \frac{1}{S_0}$	$\frac{P_{0\text{ax}}}{C_{0\text{ax}}} \leq \frac{1}{S_0}$	$\frac{M_1}{M_x} \leq \frac{1}{S_0}$	$\frac{M_2}{M_y} \leq \frac{1}{S_0}$	$\frac{M_3}{M_z} \leq \frac{1}{S_0}$
--	--	--------------------------------------	--------------------------------------	--------------------------------------

Fig. 36

The above formulas are valid for a single load case.

If two or more forces are acting simultaneously, please check the following formula:

$\frac{P_{0\text{rad}}}{C_{0\text{rad}}} + \frac{P_{0\text{ax}}}{C_{0\text{ax}}} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} \leq \frac{1}{S_0}$	$P_{0\text{rad}}$ $C_{0\text{rad}}$ $P_{0\text{ax}}$ $C_{0\text{ax}}$ $M_1, M_2, M_3$ $M_x, M_y, M_z$	= effective radial load (N) = permissible radial load (N) = effective axial load (N) = permissible axial load (N) = external moments (Nm) = maximum permissible moments in the different loading directions (Nm)
--	--	--

Fig. 37

### Safety factor

Operating conditions	$S_0$
Normal operation	1 ~ 2
Loading with vibration or shock effect	2 ~ 3
Loading with strong vibration or impacts	$\geq 3$

Tab. 31

The safety factor  $S_0$  can lie on the lower given limit if the occurring forces can be determined with sufficient precision. If shock and vibration are present, the higher value should be selected. For dynamic applications higher safety is required. Please contact Rollon technical support.

## > Mono Rail service life

### Calculation of service life:

The dynamic load capacity  $C$  is a conventional variable used for calculating the service life. This load corresponds to a nominal service life of 50 km. The relationship between calculated service life  $L_{km}$  (in km), dynamic load capacity  $C$  (in N) and equivalent load  $P$  (in N) is given in the formula to the right:

The equivalent load  $P$  corresponds in its effects to the sum of the forces and moments working simultaneously on a slider. If these different load components are known,  $P$  results from the equation to the right:

$$L_{km} = \left( \frac{C}{P} \cdot \frac{f_c}{f_i} \right)^3 \cdot 50 \text{ km}$$

$f_c$  = contact factor  
 $f_i$  = application coefficient

Fig. 38

$$P = |P_{0ax}| + |P_{0rad}| + \left( \frac{|M_1|}{M_x} + \frac{|M_2|}{M_y} + \frac{|M_3|}{M_z} \right) \cdot C_{0rad}$$

Fig. 39

### Contact factor $f_c$

The contact factor  $f_c$  refers to applications in which several carriages pass the same rail section. If two or more carriages are moved over the same point on a rail, the static and dynamic loading values must be multiplied with the numbers from the table below:

Number of carriages	1	2	3	4	5
$f_c$	1	0.81	0.72	0.66	0.61

Tab. 32

### Application coefficient $f_i$

The application coefficient  $f_i$  can be understood as the dynamic safety factor. Refer to the table below for the values:

Operational conditions	Speed	$f_i$
Neither external impacts nor vibrations	Low speed $V \leq 15 \text{ m/min.}$	1 - 1.5
Light impacts or vibrations	Average speed $15 < V \leq 60 \text{ m/min.}$	1.5 - 2
Average and high external impacts or vibrations	High speed $V > 60 \text{ m/min.}$	2 - 3.5

Tab. 33

## > Miniature Mono Rail loading

### Static load ( $P_0$ ) and static moment ( $M_0$ )

Permissible static load

The permissible static load of the Mono Rail Miniature profile rail is limited by:

- Static load of each linear guide
- Permissible load of the fixing screws
- Permissible load of all components used in the surrounding construction
- Static safety factor, which is required by the corresponding application

The equivalent static load and the static moment are the largest load, or the largest moment, which are calculated based on formulas 3 and 4.

### Static safety factor $S_0$

When observing the static safety factor  $S_0$  the Mono Rail Miniature profile rails allow a permissible operation and high running precision as is required for each application. Calculation of the static safety factor  $S_0$ : see fig. 39

$S_0$  static safety factor

$C_0$  static load capacity in loading direction (N)

$P_0$  equivalent static load (N)

$M_0$  static moment in loading direction (Nm)

$M$  equivalent static moment in loading direction (Nm)

### Static load capacity $C_0$

The static load capacity  $C_0$  of ball recirculating guides is defined according to DIN 636, Part 2 as the only load which gives a Hertzian stress of 4,200 MPa with the existing lubrication between track and balls in the center of the highest loaded contact surface.

Note: In the loading center, there is a permanent deformation of approx 0.01 % of the ball diameter under this load (according to DIN 636, Part 2).

$S_0 = C_0 / P_0$	Formula 1	Operating conditions	$S_0$
$S_0 = M_0 / M$	Formula 2	Normal operation	1 ~ 2
$P_0 = F_{\max}$	Formula 3	Loading with vibration or shock effect	2 ~ 3
$M_0 = M_{\max}$	Formula 4	High precision and smooth running	$\geq 3$

Fig. 40

## ➤ Miniature Mono Rail service life

An example of a profile rail or a lot of identical profile rails under the same running conditions, which use ordinary materials with normal manufacturer's quality and operating conditions, can reach 90 % of the calculated service life (as per DIN 636 Part 2). By taking 50 km traverse as a basis, the dynamic load capacity is usually 20 % over the values as per DIN. The relationship between the two load capacities can be seen from formulas 5 and 6.

### Calculation of service life

Formulas 7 and 8 are used for calculating the service life, if equivalent dynamic load and average speed are constant.

$$C_{(50)} = 1,26 \cdot C_{(100)}$$

Formula 5

$$C_{(100)} = 0,79 \cdot C_{(50)}$$

Formula 6

$$L = \left( \frac{C_{100}}{P} \right)^3 \cdot 10^5$$

Formula 7

$$L_h = \frac{L}{2 \cdot s \cdot n \cdot 60} = \frac{L}{V_m} \cdot \left( \frac{C_{100}}{P} \right)^3$$

Formula 8

$L$  = service life based on 100,000 (m)

$L_h$  = service life (h)

$C$  = dynamic load capacity (N)

$P$  = equivalent dynamic load (N)

$S$  = stroke length (m)

$n$  = stroke frequency ( $\text{min}^{-1}$ )

$V_m$  = average speed (m/min)

Fig. 41

## Dynamic load capacity C

If the dynamic loads work vertically on the last zones with equal size and direction, the calculated service life of the linear guide can theoretically reach 100 km piston travel (as per DIN 636, Part 2).

## Combined loads in combination with moments

If both loads and moments work on the profile rails, the equivalent dynamic load is calculated with formula 13. According to DIN 636, Part 1, the equivalent load should not exceed  $\frac{1}{2} C$ .

## Equivalent dynamic load and speed

With changing load and speed, these must be considered individually since each parameter helps determine the service life.

## Equivalent dynamic load

If only the load changes, the equivalent dynamic load can be calculated with formula 9.

## Equivalent speed

If only the speed changes, the equivalent speed is calculated with formula 6.

If speed and load change, the equivalent dynamic load is calculated with formula 11.

## Combined dynamic load

With combined exterior load in an arbitrary angle, the equivalent dynamic load is calculated with formula 12.

$$P = \sqrt[3]{\frac{q_1 \cdot F_1^3 + q_2 \cdot F_2^3 + \dots + q_n \cdot F_n^3}{100}} \quad \text{Formula 9}$$

$$\bar{v} = \frac{q_1 \cdot v_1 + q_2 \cdot v_2 + \dots + q_n \cdot v_n}{100} \quad \text{Formula 10}$$

$$P = \sqrt[3]{\frac{q_1 \cdot v_1 \cdot F_1^3 + q_2 \cdot v_2 \cdot F_2^3 + \dots + q_n \cdot v_n \cdot F_n^3}{100}} \quad \text{Formula 11}$$

$$P = |F_x| + |F_y| \quad \text{Formula 12}$$

$$P = |F_x| + |F_y| + \left( \frac{|M_1|}{M_x} + \frac{|M_2|}{M_y} + \frac{|M_3|}{M_z} \right) \cdot C_0 \quad \text{Formula 13}$$

P	= equivalent dynamic load (N)
q	= stroke (in %)
F <sub>1</sub>	= individual load levels (N)
v	= average speed (m/min)
$\bar{v}$	= individual speed levels (m/min)
F	= external dynamic load (N)
F <sub>y</sub>	= external dynamic load – vertical (N)
F <sub>x</sub>	= external dynamic load – horizontal (N)
C <sub>0</sub>	= static load capacity (N)
M <sub>1</sub> , M <sub>2</sub> , M <sub>3</sub>	= external moments (Nm)
M <sub>x</sub> , M <sub>y</sub> , M <sub>z</sub>	= maximum permissible moments in the different loading directions (Nm)

Fig. 42

## Friction / displacement resistance

Mono Rail profile rails have a low friction characteristic and thus low displacement resistance. The low start-up friction (breakaway force) is almost identical to the moving friction (running resistance).

The displacement resistance is dependent upon several factors:

- Friction of the sealing system
- Friction of the balls with each other
- Friction between balls and redirection
- Rolling resistance of the balls in the running grooves
- Resistance of lubricant in the carriage
- Resistance by contamination in the lubricant
- Preload for increase of rigidity
- Moment load

### Resistance of the seals

Type	f [N]
MRS15	0.15
MRS20	0.2
MRS25	0.35
MRS30	0.7
MRS35	0.8
MRS45	0.9
MCS55	1.0

Tab. 34

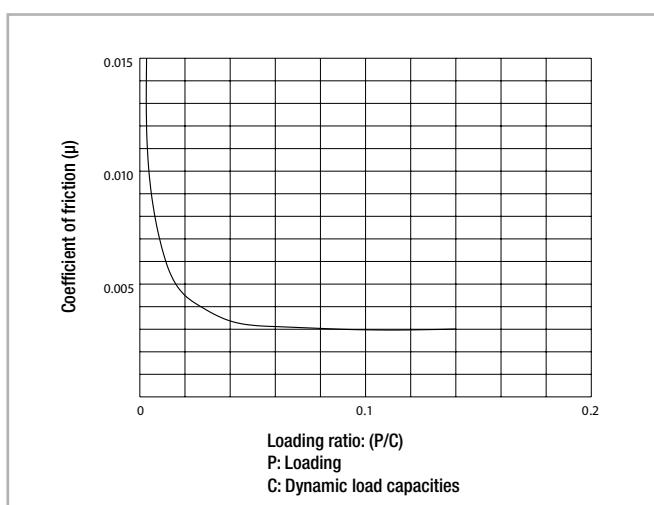


Fig. 43

### Displacement resistance

The following formula is used for general approximate calculation of the displacement resistance. Please note that the level of preload or the viscosity of the lubricant used can also influence the displacement resistance.

$F_m = \mu \cdot F + f$	$F_m$ = Displacement resistance (N) $F$ = Load (N) $\mu$ = Coefficient of friction $f$ = Resistance of the seals (N)
-------------------------	---

Fig. 44

Mono Rail profile rails have a coefficient of friction of approx.  
 $\mu = 0.002 - 0.003$ .

## > Mono Rail installation instructions

The given radii and shoulder heights in the table must be observed when assembling rails and carriages on the stop edges to ensure perfect seating of carriages or raceways.

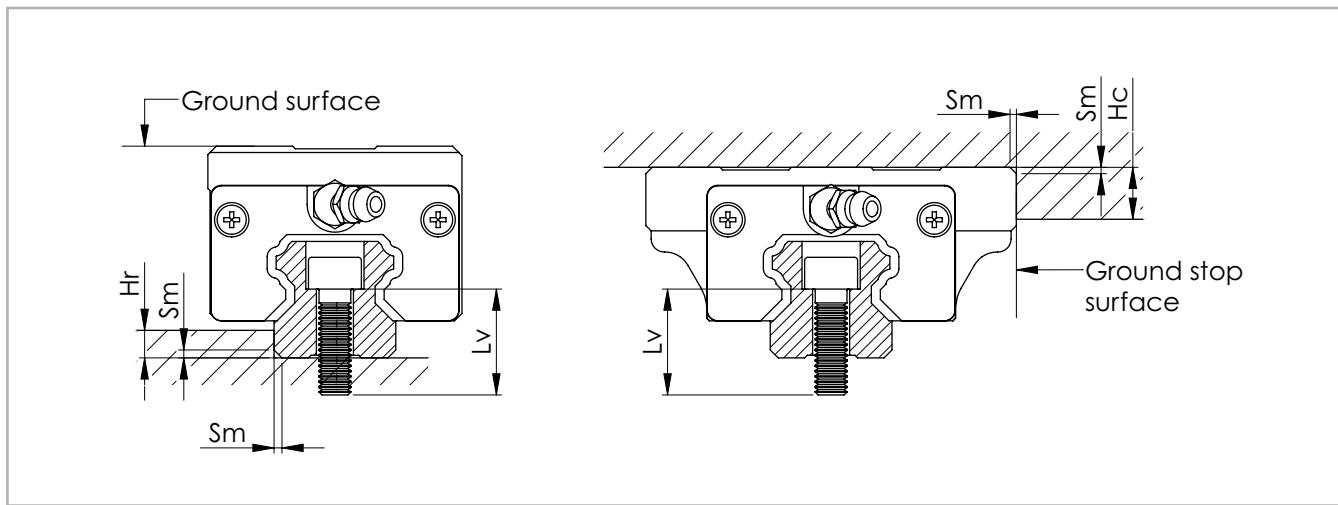


Fig. 45

Size	Maximum level of incline	Maximum height of rail shoulder	Maximum height of rail shoulder when using the side seal	Maximum height of slider shoulder	Required bolt lengths (rails)
	Sm [mm]	Hr [mm]	Hr* [mm]	Hc [mm]	Lv [mm]
15	0.8	4	1.9	5	M4 x 16
20		4.5	2.4	6	M5 x 20
25		6	3.9	7	M6 x 25
30	1.2	8	5.9	8	M8 x 30
35		8.5	6.6	9	
45		12	10.5	11	M12 x 40
55	1.6	13	-	12	M14 x 45

\* For use of various seals, see pg. MR-14, fig. 20

Tab. 35

## Assembly precision

The maximum permissible deviations of the rail surfaces for assembly are given in the following drawing (see fig. 46) and the table below (see tab. 36):

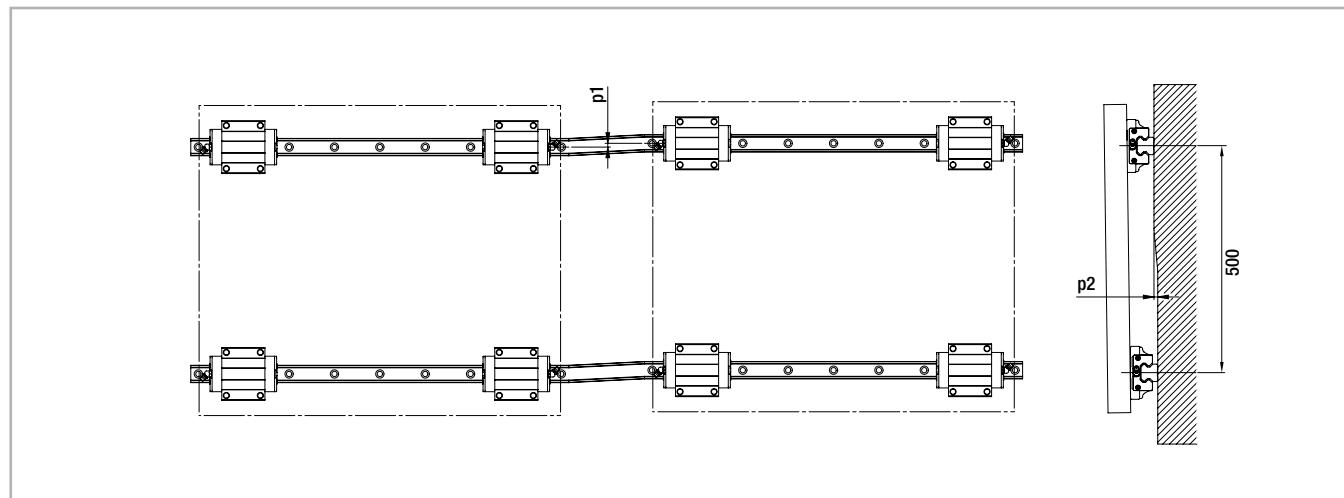


Fig. 46

Size	Permissible tolerance for parallelism p1 [µm]				Permissible tolerance for parallelism p2 [µm]			
	K2	K1	K0	G1	K2	K1	K0	G1
15	-	18			-			
20	18	20	25	35	50	85	130	190
25	20	22	30	42	70			195
30	27	30	40	55	90	110	170	250
35	30	35	50	68	120	150	210	290
45	35	40	60	85	140	170	250	350
55	45	50	70	95	170	210	300	420

Tab. 36

The bolt sizes to be used and optimum tightening torques for rail assembly are listed in the table below (see tab. 37).

Screw quality 12.9, DIN 912	Tightening torque $M_t$ [Nm]		
	Steel	Cast iron	Aluminium
M4	4	3	2
M5	9	6	4
M6	14	9	7
M8	30	20	15
M12	118	78	59
M14	157	105	78

Tab. 37

## > Miniature Mono Rail installation instructions

### Shoulder heights and radius of stop edges

Rounding of the stop edges of the surrounding construction should be made so as to avoid contact with the edges of the carriage and the rail. Please observe the following table with the information on the radius and height of the stop surfaces.

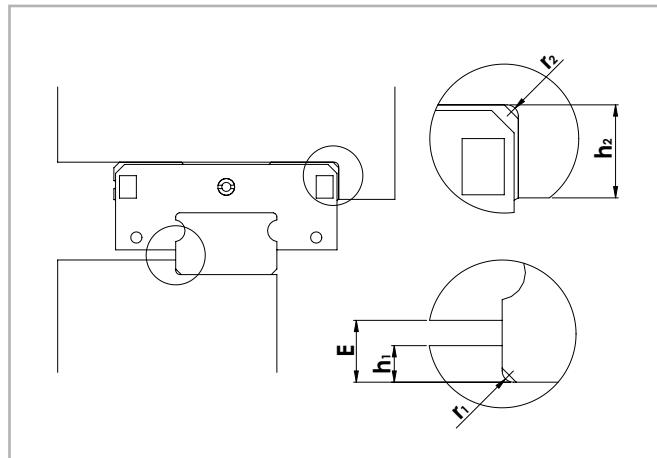


Fig. 47

### Dimensions of the stop edges

Type	$h_1$ [mm]	$r_{1\max}$ [mm]	$h_2$ [mm]	$r_{2\max}$ [mm]	E [mm]
<b>MR07M</b>	1.2	0.3	2.8	0.3	1.5
<b>MR09M</b>	1.5	0.3	3	0.3	2.2
<b>MR12M</b>	2.5	0.5	4	0.5	3
<b>MR15M</b>	2.5	0.5	4.5	0.5	4

Tab. 38

Type	$h_1$ [mm]	$r_{1\max}$ [mm]	$h_2$ [mm]	$r_{2\max}$ [mm]	E [mm]
<b>MR09W</b>	2.5	0.3	3	0.3	3.4
<b>MR12W</b>	2.5	0.5	4	0.5	3.9
<b>MR15W</b>	2.5	0.5	4.5	0.5	4

Tab. 39

### Geometric and positional accuracy of the mounting surfaces

Inaccuracies of the mounting surface negatively influence the running accuracy and reduce the service life of the Mono Rail Miniature profile rails. If the inaccuracies of the mounting surfaces exceed the values calculated using formulas 14, 15 and 16, the service life is shortened according to formulas 12 und 13.

### Mounting surface

The mounting surface should be ground or milled very finely and have a surface roughness of  $R_a$  1.6.

### Reference surface

Rail: Both sides of the rails can be used as a reference surface without further marks.

Slider: The reference surface is located across from the running side identified with a notch mark.

Calculation of the positional accuracy

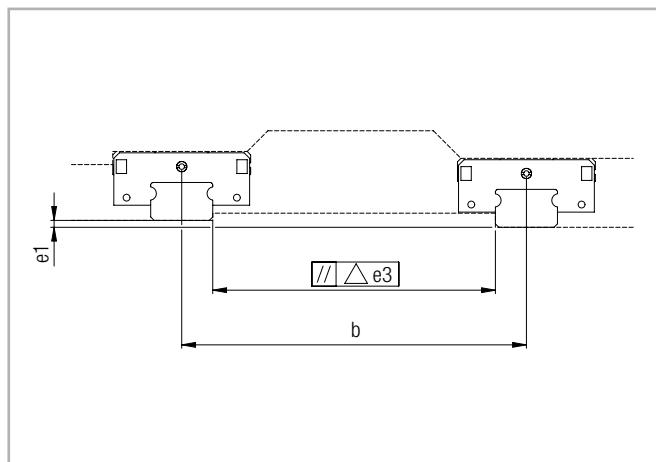


Fig. 48

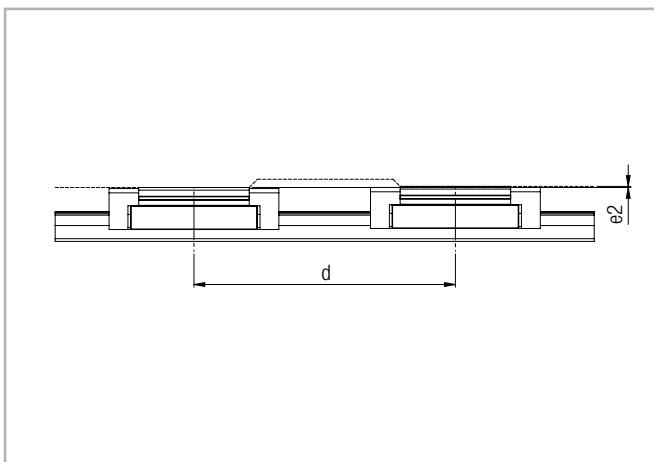


Fig. 49

$$e1 \text{ (mm)} = b \text{ (mm)} \cdot f1 \cdot 10^{-4} \quad \text{Formula 14}$$

$$e2 \text{ (mm)} = d \text{ (mm)} \cdot f2 \cdot 10^{-5} \quad \text{Formula 15}$$

$$e3 \text{ (mm)} = f3 \cdot 10^{-3} \quad \text{Formula 16}$$

Fig. 50

Type	$V_o, V_s$			$V_1$		
	f1	f2	f3	f1	f2	f3
MR07MN	5	11	4	3	10	3
MR09MN	5	11	6	4	10	4
MR12MN	6	13	8	4	12	6
MR15MN	7	11	12	5	10	8

Tab. 40

Type	$V_o, V_s$			$V_1$		
	f1	f2	f3	f1	f2	f3
MR09WN	2	7	6	2	5	4
MR12WN	3	8	8	2	5	5
MR15WN	2	9	11	1	6	7

Tab. 41

Tightening torque for fixing screws (Nm)

Screw quality 12.9	Steel	Cast iron	Non-ferrous metal
M2	0.6	0.4	0.3
M3	1.8	1.3	1
M4	4	2.5	2

Tab. 42

### Composite rails

Guide rails longer than the one part maximum length (see Ordering key), are put together from two or more rails.

When putting guide rails together, be sure that the register marks shown in fig. 51 are positioning correctly.

These are fabricated axisymmetric for parallel application of composite guide rails, unless otherwise specified.

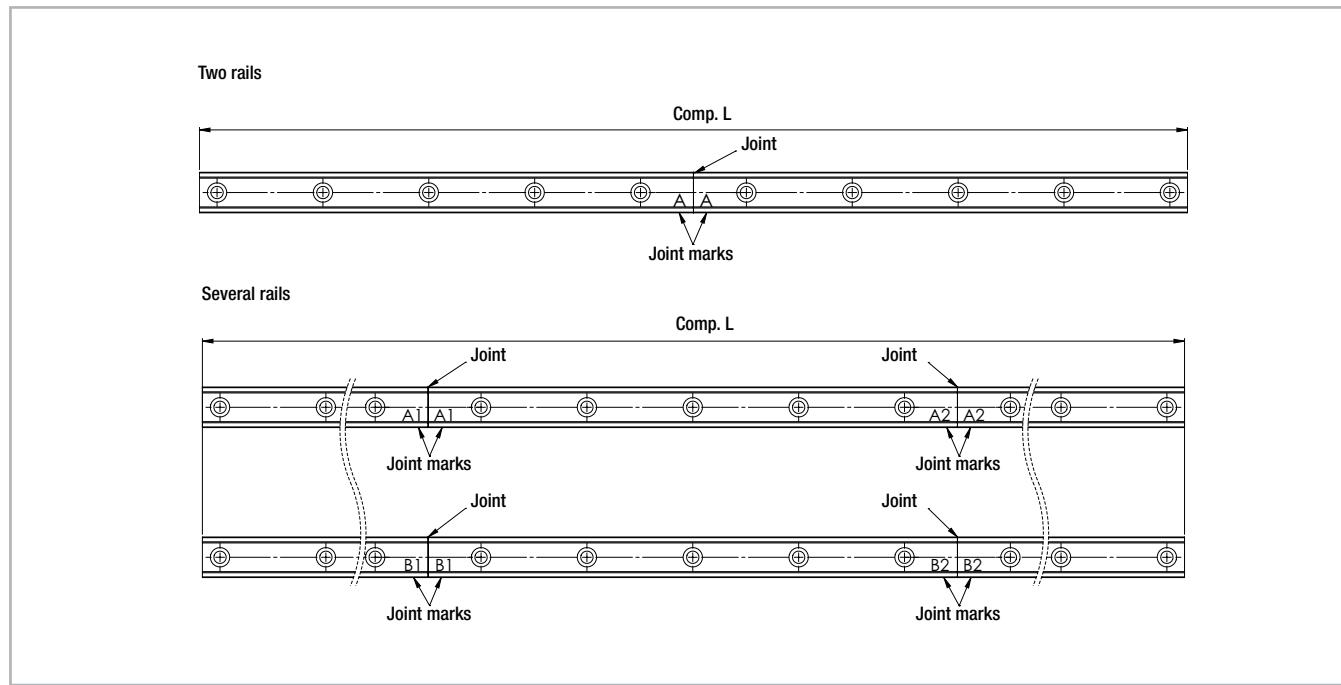


Fig. 51

Assembly process

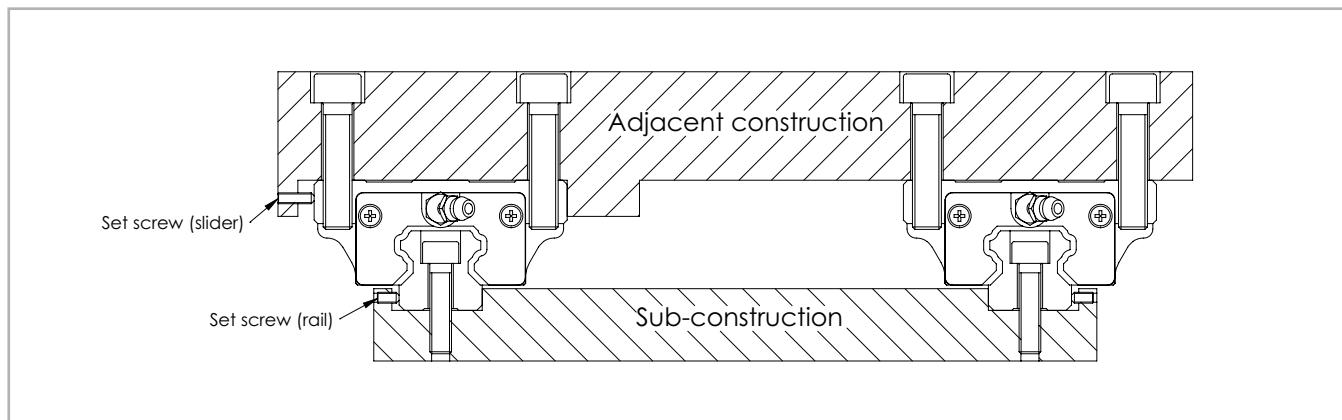


Fig. 52

Fixing guide rails:

(1) Whet the assembly surface with a whetstone and also remove burrs, unevenness and dirt (see fig. 53).

Note: All linear guides are preserved with anticorrosion oil at the factory.

This protection must be removed before installation.

In doing so, please ensure that the surfaces are coated with low-viscosity oil for the purpose of further protection against corrosion.

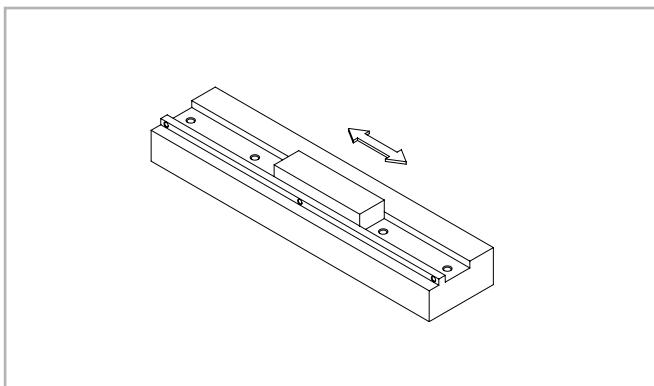


Fig. 53

(2) Carefully lay the guide rail on the assembly surface (see fig. 54) and slightly tighten the fixing screws so that the guide rail lightly touches the assembly surface (align the guide rail along the shoulder edge of the assembly surface, see fig. 55).

Note: The fixing screws of the linear guide must be clean. Check if the fixing holes are located in the correct place when you insert the bolts. A forced tightening of a fixing screw in an offset hole can negatively affect accuracy.

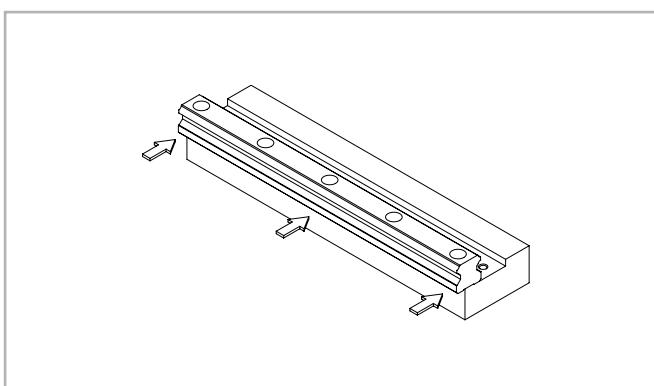


Fig. 54

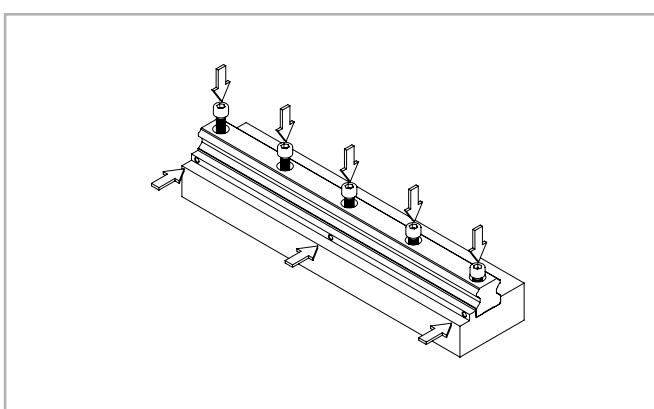


Fig. 55

(3) Tighten the thrust bolts on the guide rail until there is close contact on the side stop surface (see fig. 56).

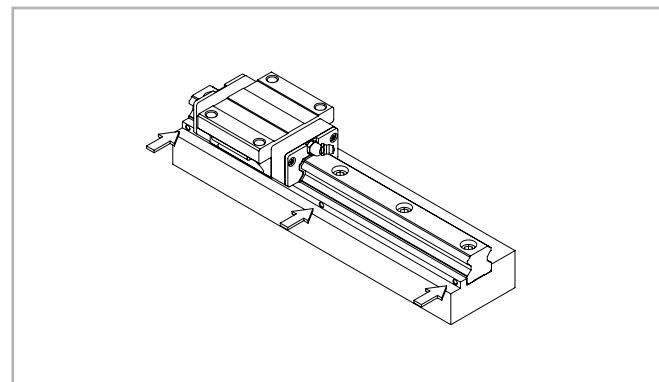


Fig. 56

(4) Tighten the fixing screws with a torque wrench to the prescribed torque (see pg. MR-36, tab. 37).

Note: For a high degree of accuracy, the fixing screws of the guide rail must be tightened in sequence outward from the centre (see fig. 57).

(5) Assemble the other rails in the same manner to complete the installation of the guide rails.

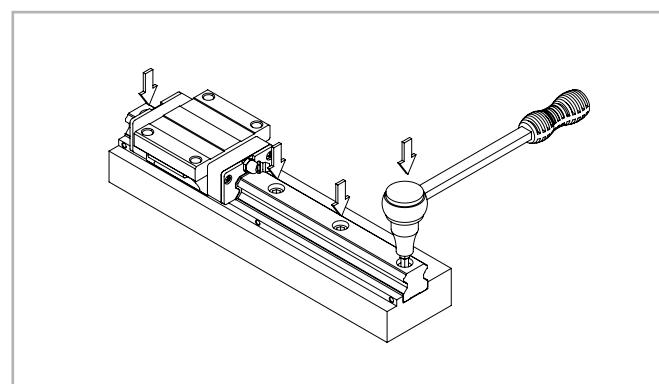


Fig. 57

**Table assembly:**

(6) Set the table carefully on the carriage and tighten the fixing screws only lightly.

(7) Press the carriage on the main guide side with the thrust bolts against the shoulder edge of the table and position the table.

(8) Tighten the fixing screws on the main side and the lateral side completely tight to finish the installation. Note:

To attach the table uniformly, tighten the fixing screws diagonally (see fig. 58). This method saves time when straightening the guide rail and makes the manufacture of positioning pins unnecessary, which considerably reduces assembly time.

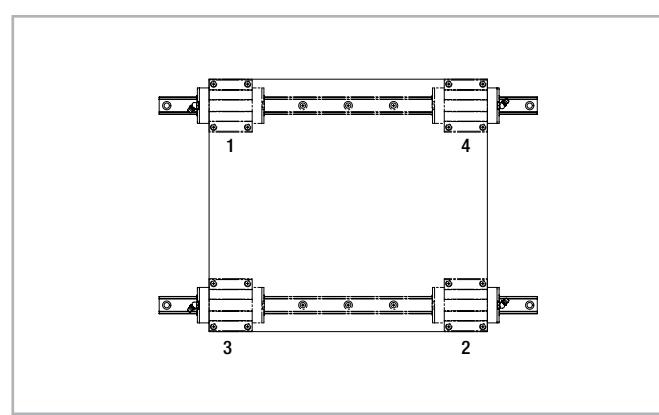


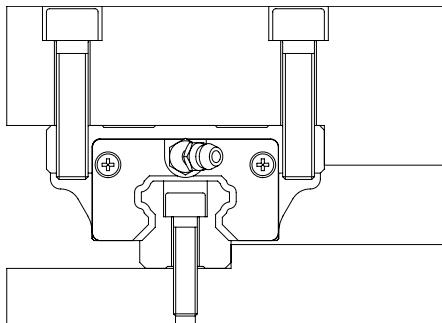
Fig. 58

## Installation examples

The following drawings illustrate some assembly examples for rail/carriage combinations corresponding to the structure of various machine frames:

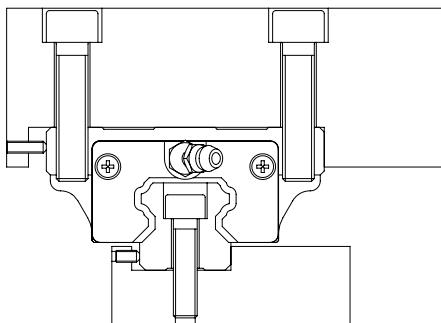
### Example 1:

Assembly of carriage and rail on shoulder edges



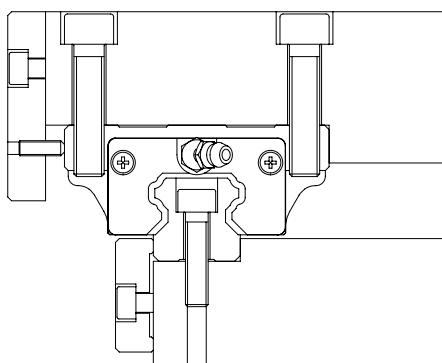
### Example 2:

Securing carriage and rail using set screws



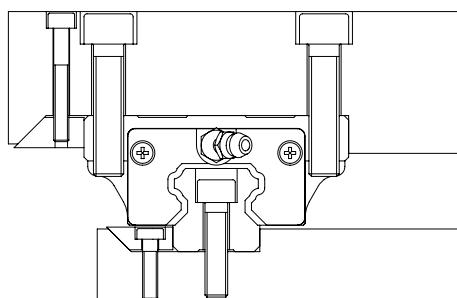
### Example 3:

Securing carriage and rail using set pressure plates



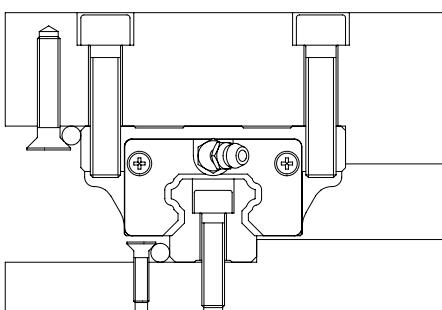
### Example 4:

Securing carriage and rail using taper gib



### Example 5:

Securing carriage and rail using bolts



## Ordering key



### > Rail / Mono Rail slider system

MRS30W	H	K1	A	1	05960	F	T	NIC
								Surface coating for rail optional see pg. MR-25, <i>Anticorrosive protection</i>
								Joint processed rails optional see pg. MR-39, <i>Composite rails</i>
								Rails bolted from below, optional see pg. MR-11
								Total rail length
								Number of carriages
								Seal variants see pg. MR-15f
								Preload class see pg. MR-23, tab. 23f
								Precision class see pg. MR-21, tab. 21
Type								

Ordering example: MRS30W-H-K1-A-1-05960F-T-NIC

Rail composition: 1x3100+1x2860 (only for joint processed rails)

Hole pattern: 20-38x80-40//40-35x80-20 (please always indicate the hole pattern separately)

Notes on ordering: The rail lengths are always indicated as 5 digits with 0 prefixes

### > Rail

MRR	20	6860	N	F	T	NIC
						Surface coating for rail optional see pg. MR-25, <i>Anticorrosive protection</i>
						Joint processed rails optional see pg. MR-39, <i>Composite rails</i>
						Rails bolted from below, optional see pg. MR-11
						Precision class see pg. MR-21, tab. 21
						Total rail length
Size						
Rail type						

Ordering example: MRR20-06850-NF-T-NIC

Rail composition: 1x2920+1x3940 (only for joint processed rails)

Hole pattern: 10-48x60-30//30-65x60-10 (please always specify the hole pattern separately)

Notes on ordering: The rail lengths are always indicated as 5 digits with 0 prefixes

## > Carriage

MRS35	N	K0	A	NIC			
				Surface coating for carriage optional		see pg. MR-25, Anticorrosive protection	
				Seal variants	see pg. MR-15f		
				Preload class	see pg. MR-23, tab. 23f		
				Precision class	see pg. MR-21, tab. 21		
				Type			

Ordering example: MRS35-N-K0-A-NIC

## > Rail / Miniature Mono Rail slider system

MR	15	M	N	SS	2	V1	P	310	
								Rail length	see tab. 44 and 45
								Precision class	see pg. MR-22, tab. 22
								Preload class	see pg. MR-24, tab. 25
								Number of sliders on one rail	
								End seal	
								Slider type	
								Rail type	see pg. MR-12, tab. 11 / pg. MR-13, tab. 13
								Rail width	see pg. MR-12, tab. 12 / pg. MR-13, tab. 14
								Product type	

Ordering example: MR15MN-SS-2-V1-P-310

Hole pattern: 15-7x40-15, see fig. 61, tab. 44 / fig. 62, tab. 45

## > Mono Rail hole pattern

Rail

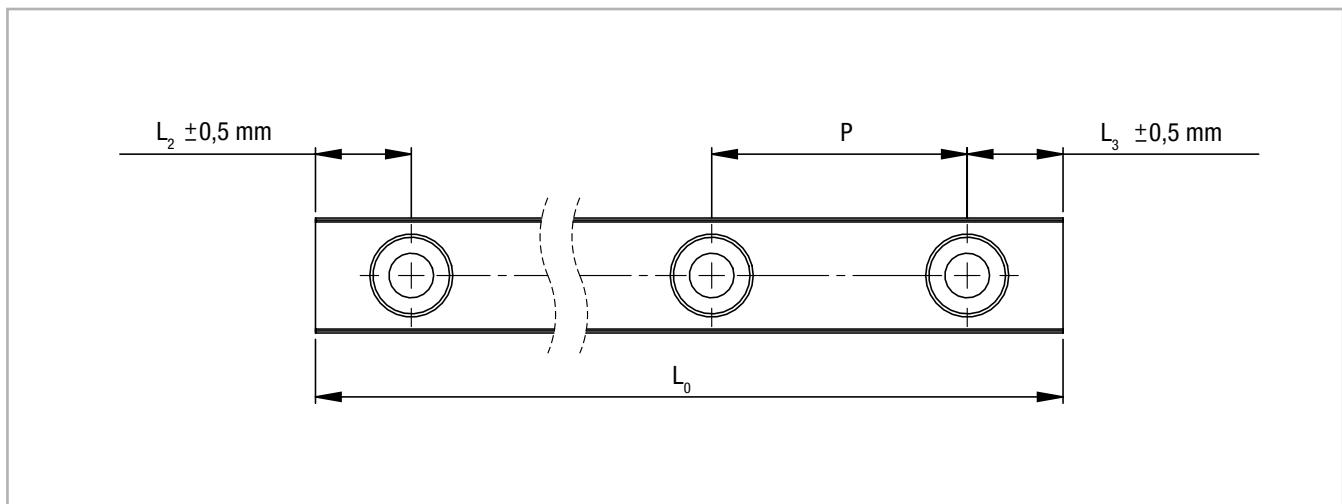


Fig. 59

Size	Hole pitch P [mm]	$L_{2\min}, L_{3\min}$ [mm]	$L_{2\max}^*, L_{3\max}^*$ [mm]	$L_{0\max}$ [mm]
15				
20	60	7		4000
25			20	
30				3960
35				
45	105	11.5	22.5	3930
55	120	13	30	3900

\* Only applies when using max. rail lengths

Tab. 43

## ➤ Miniature Mono Rail hole pattern

### Standard width

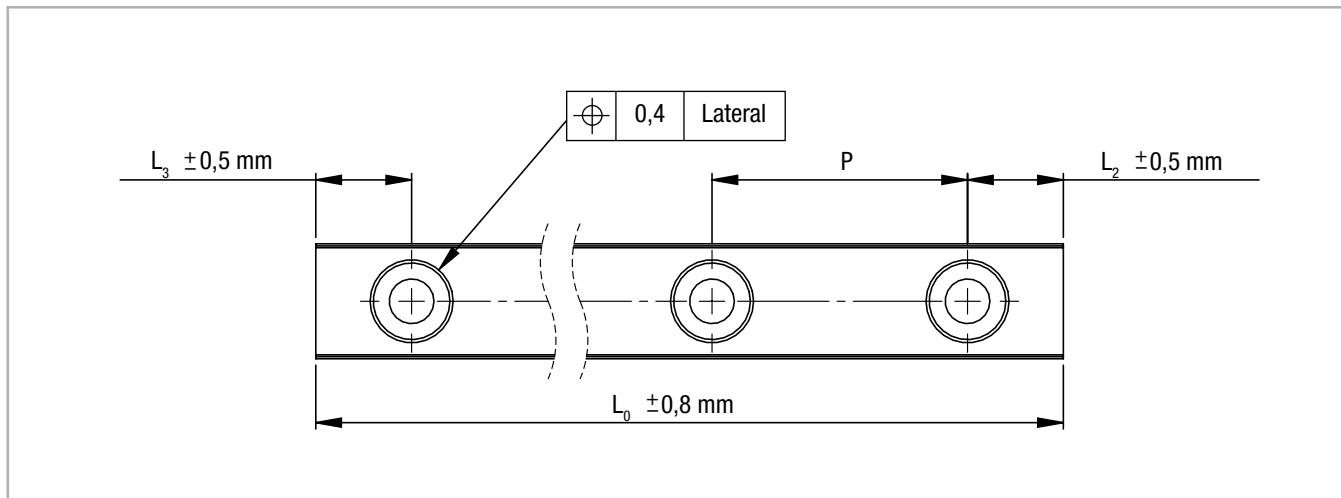


Fig. 60

Size	$L_{\min}$ [mm]	Hole pitch P [mm]	$L_2, L_{3\min}$ [mm]	$L_2, L_{3\max}^*$ [mm]	$L_{\max}$ [mm]
7	40	15	3	10	1000
9	55	20	4	15	
12	70	25	4	20	
15	70	40	4	35	

\* does not apply to minimum ( $L_{\min}$ ) and maximum rail length ( $L_{\max}$ )

Tab. 44

### Large width

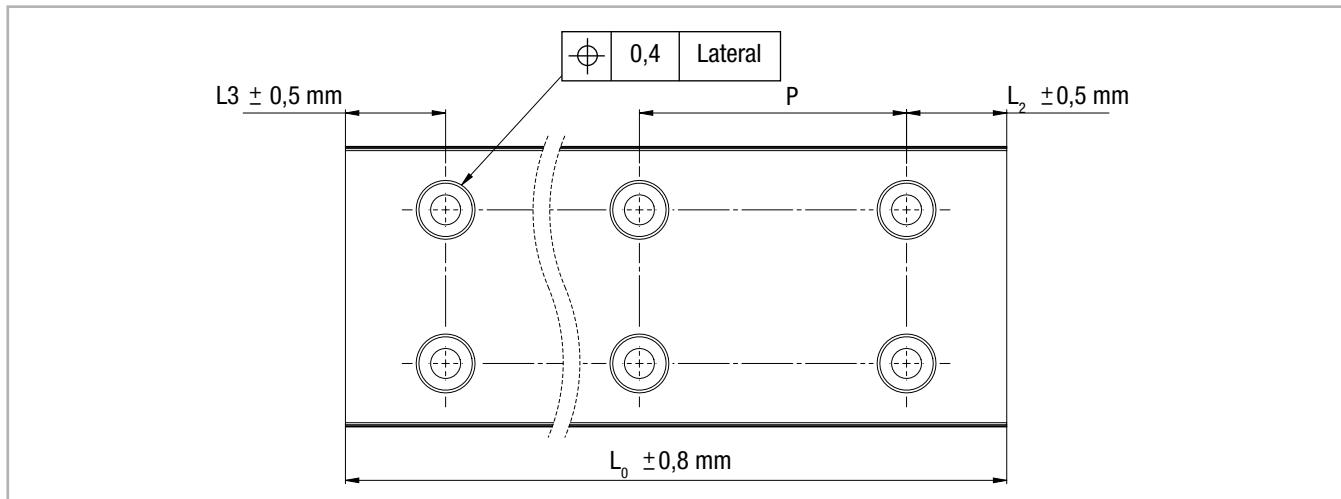


Fig. 61

Size	$L_{\min}$ [mm]	Hole pitch P [mm]	$L_2, L_{3\min}$ [mm]	$L_2, L_{3\max}^*$ [mm]	$L_{\max}$ [mm]
9	50	30	4	25	1000
12	70	40	35		
15	110	40	5	35	

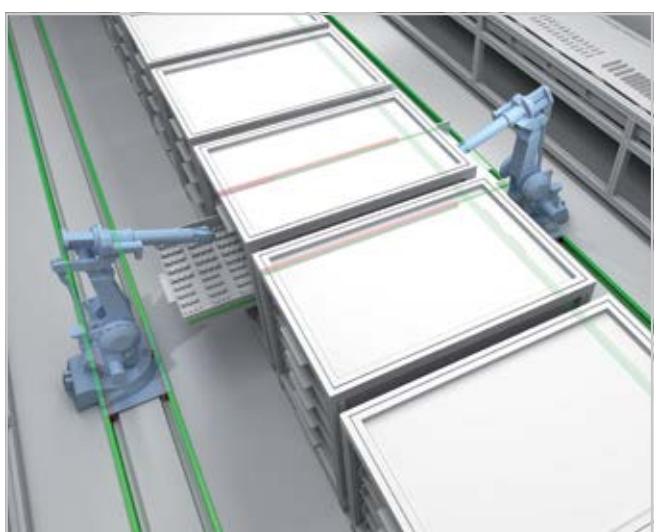
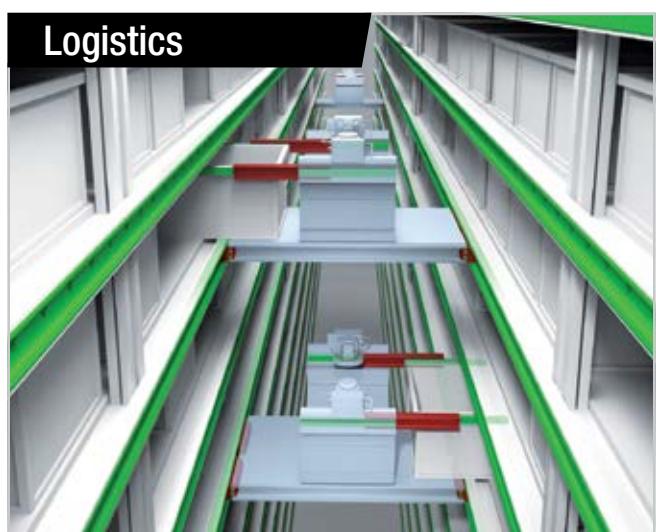
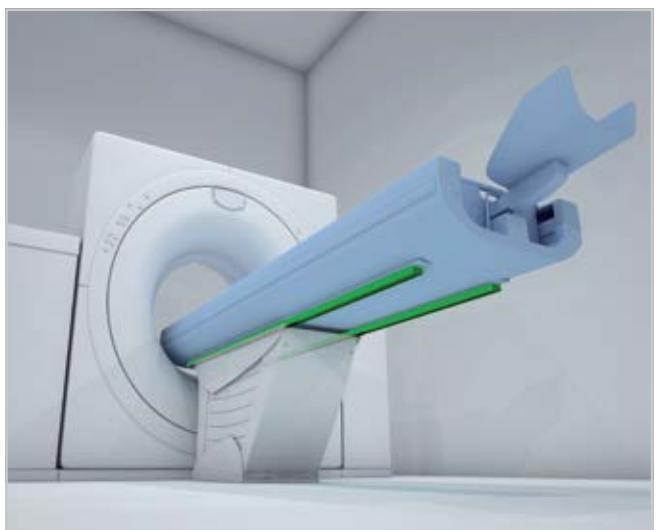
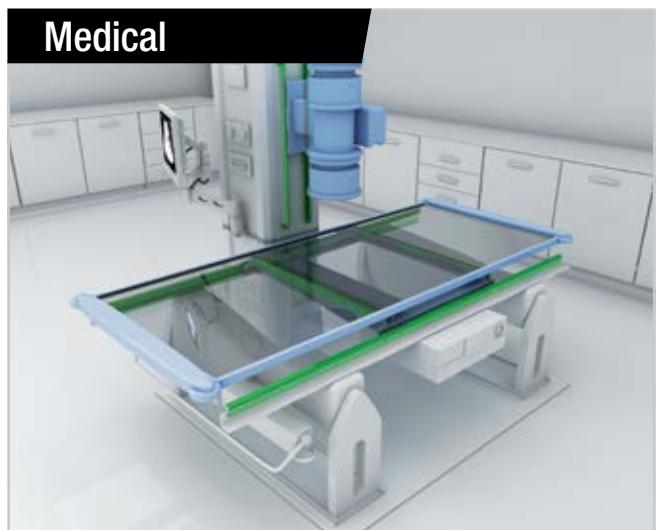
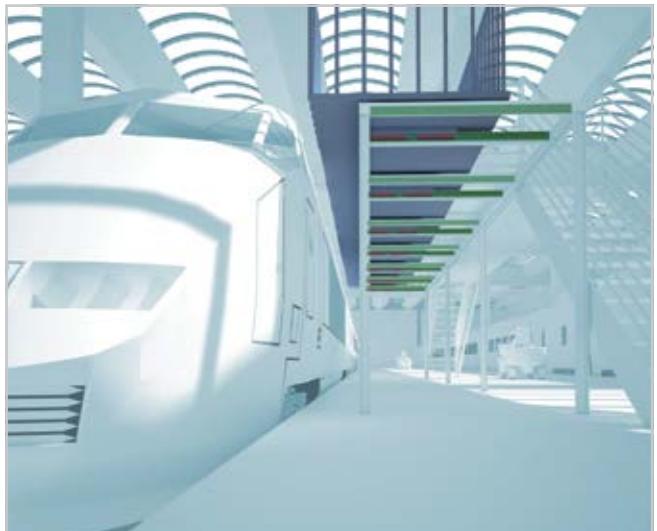
\* does not apply to minimum ( $L_{\min}$ ) and maximum rail length ( $L_{\max}$ )

Tab. 45

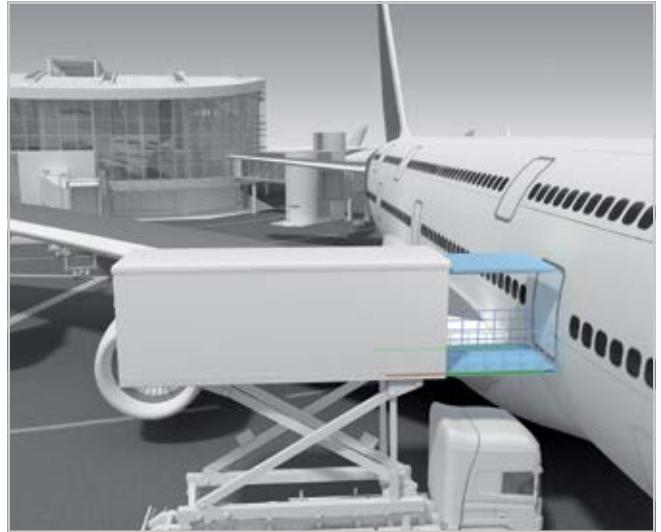
Notes



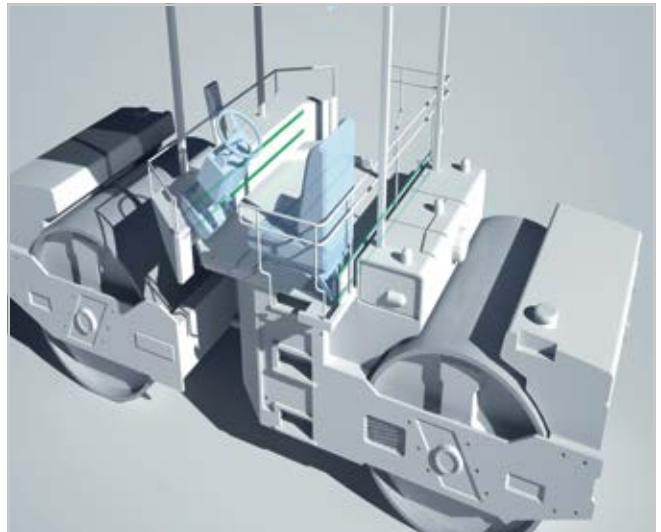
## Guides suitable for all applications



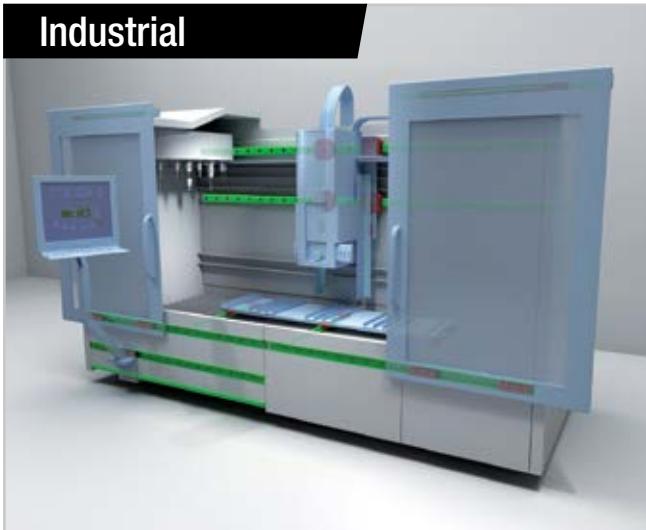
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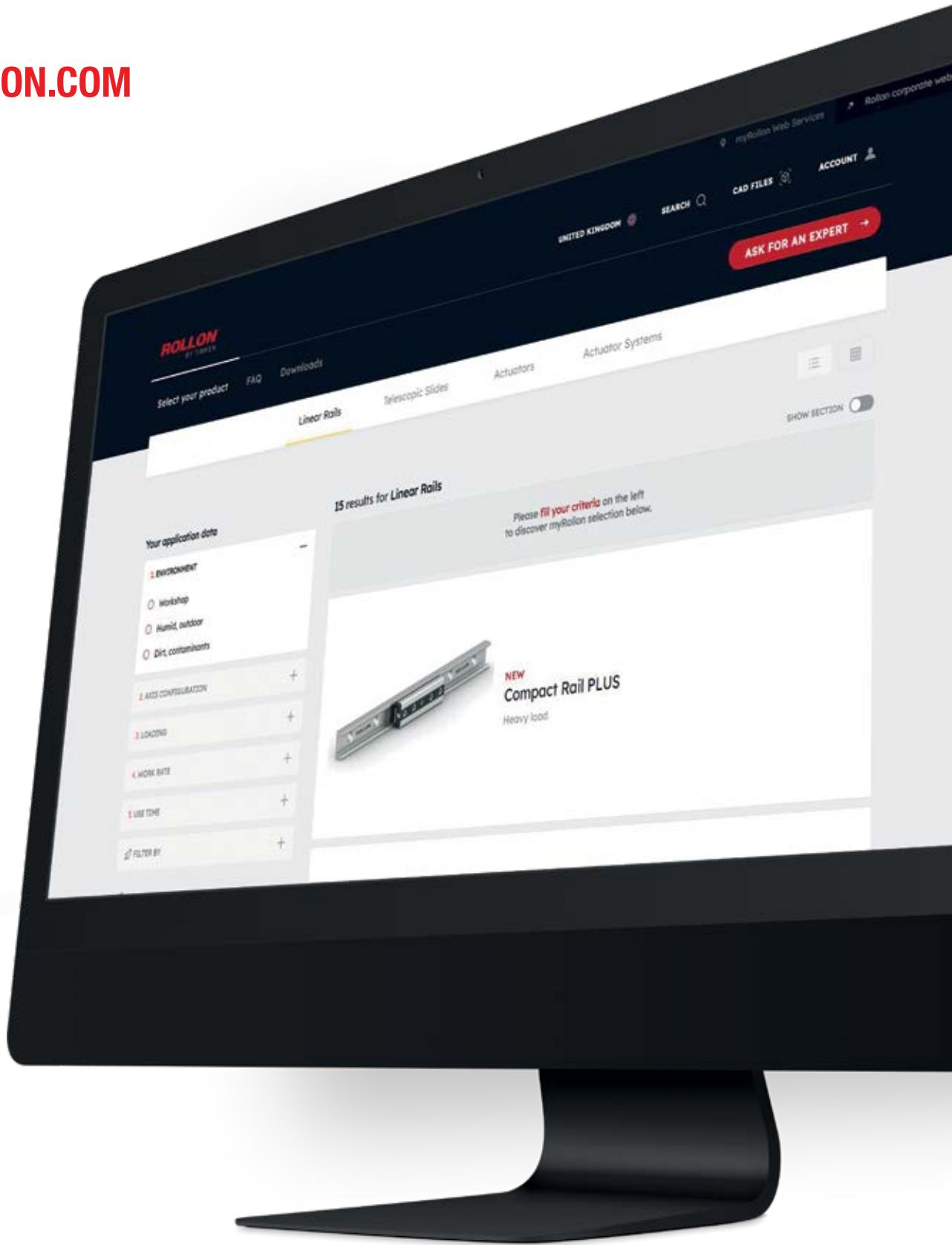
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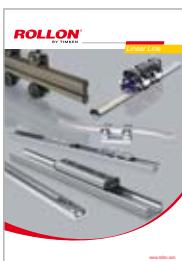
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