

COMPACT RAIL

Data sheet - rev. 1.0



LINEAR COMPONENTS

myRollon

myRollon is Rollon's **digital working platform** designed to simplify the selection and configuration of linear and rotary motion solutions. It enables users to identify the most suitable motion system based on their specific application requirements, enhancing design precision and efficiency.

By centralizing essential tools and resources in a unified environment, myRollon empowers users to access necessary services and information — saving time and boosting productivity in search of high-performance motion solutions.

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► ORDERING KEY

■ Rail / slider system

TLC	18	1280	/ 2 /	NSW	28	4	B	2RS		
ULC	28			CSW				2Z	N	
KLC	35			NSD					K	
TLV	43			NSA					Z	
ULV	63			NSDA						
KLV										

Surface treatments - Standard = zinc plating, N = nickel plating, K = Rollon E-coating, Z = zinc-nickel
Roller seal - 2RS = nitrile splash proof seal, 2Z = steel cover disk
Configuration [depending on type of slider] from p.10, 47
Number of rollers (NSW slider) / slider length (CS slider)
Size
Slider type p.10 to 17
Number of sliders inside the rail
Rail length [mm] standard length (p.8). If not standard or joined, indicate hole pattern. For joined rails (see p.53) indicate rail composition
Size
Type p.8

Ordering example: **TLC28-1280/2/NSW28-4B-2Z-N, TLC28-1280/2/CS28-100-2RS-B-N**

For joined rail indicate rail composition: e.g. length 4560 = 1x3280+1x1280

Specify the hole pattern separately for out of standard length and joined length : 1st hole position - number of hole x hole distance - last hole position (e.g. length 4560 = 1x3200+1x1280 hole pattern : 40-40 x 80-40 // 40-15 x 80-40)

■ Rail

TLC	18	-3040								
ULC	28		N							
KLC	35		K							
TLV	43		Z							
ULV	63									
KLV										

Surface treatments - Standard = zinc plating, N = nickel plating, K = Rollon E-coating, Z = zinc-nickel
Rail length [mm] standard length (p.8). If not standard or joined, indicate hole pattern. For joined rails (see p.53) indicate rail composition
Size
Type p.8

Ordering example: **TLC43-3040-N**

For joined rail indicate rail composition: e.g. length 4560 = 1x3280+1x1280

Specify the hole pattern separately for out of standard length and joined length : 1st hole position - number of hole x hole distance - last hole position (e.g. length 4560 = 1x3200+1x1280 hole pattern : 40-40 x 80-40 // 40-15 x 80-40)

■ Slider

NSW	18	-4	B	2RS	ULC				
NSD	28			2Z	KLC	N			
NSA	35				TLV	K			
NSDA	43				ULV	Z			
	63				KLV				
Surface treatments - Standard = zinc plating, N = nickel plating, K= Rollon E-coating, Z = zinc-nickel									
Roller seal - 2RS = nitrile splash proof seal, 2Z = steel cover disk									
Configuration [depending on type of slider] from p.10, 17									
Number of rollers p.10 to 17									
Size									
Type									

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

■ Slider

CS		18	80	2RS	A	T			
	W	28		2Z	B	U	N		
		35				K	K		
		43					Z		
Surface treatments - Standard = zinc plating, N = nickel plating, K= Rollon E-coating, Z = zinc-nickel									
Wiper shape - according to rail type,									
Configuration [depending on type of slider] from p.10, 47									
Roller seal - 2RS = nitrile splash proof seal, 2Z = steel cover disk									
Slider length [depending on the number of roller]									
Size									
Wiper - = no wiper, W = with wiper									
Type p.16									

Ordering example: **CS28-80-2RS** (without wiper); **CSW35-100-T-N** (with wiper for rail T)

■ Wipers

ZK-WNS	28								
	Size								
Type									

Ordering example: **ZK-WNS28**

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

► FEATURES AND ADVANTAGES



Fig.1

Compact Rail is the product family of guide rails consisting of roller sliders with radial bearings which roll on the internal, induction hardened and ground raceways of a C-profile made from cold-drawn roller bearing carbon steel. All products are available in zinc plating, with other treatments for higher corrosion resistance as an option.

Compact Rail consists of three rail profiles: the guiding rail T-rail, the compensating rail K-rail and the floating rail U-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°.

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.

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)*
Max. acceleration: 20 m/s² (787 in/s²)*
- Temperature range: -20 °C to +120 °C (-4 °F to +248 °F) briefly up to max. +150 °C (+302 °F)

*Depending on size and application

Rails

- Material of T- and U-rails in sizes 18: cold-drawn roller bearing carbon steel C43 F
- Material of K-rails, T- and U-rails in size 28 to 63: Cf53
- Available rail lengths: from 160 mm to 3600 mm (from 6.3 in to 142 in), longer single rails up to max 4080 mm (160.6 in) on request
- Rail raceways are induction hardened and ground
- Surface treatments: zinc plating (ISO 2081 standard) in standard, also available in zinc-nickel, E-coating and nickel plating for increased protection.(see "Anticorrosive protection", p. "Anticorrosion treatments", p. 31).

Sliders

- Material: steel
- Roller seal/shield: standard 2Z (steel cover disk), 2RS (splash-proof)
- Rollers material: steel 100Cr6 (also available stainless steel AISI 440 combined with optional surface treatment)
- Rollers lubricated for life
- Surface treatments: zinc plating (ISO 2081 standard) in standard, also available in zinc-nickel, E-coating and nickel plating for increased protection.(see "Anticorrosion treatments", p. 31)

MAIN ADVANTAGES

Self-aligning system

Thanks to the self-alignment feature, it's possible to mount directly to the structure without worrying about machining the surface, resulting in reduced assembly time.

Corrosion resistant

Various surface treatments and material options make Compact Rail a reliable choice for diverse environments, suitable for both indoor and outdoor applications.

Easy assembly

Compact Rail can be easily mounted on non-machined structures, streamlining assembly. The roller adjustment system allows for simple regulation of sliding force during the assembly phase.

Strength and sturdiness

The carefully engineered design of the steel slider body help ensure superior sturdiness and the hardened raceways provide high load capacities.

Reliability in dirty environments

The designed polymer wipers help ensure optimal cleaning of the raceways, while a removable slow-release lubricating felt is available for reduced maintenance needs.

■ Guiding rails (T-rails)

Guiding rail enables the slider to run along the rail length while restricting movement in other directions, thereby supporting radial and axial loads.

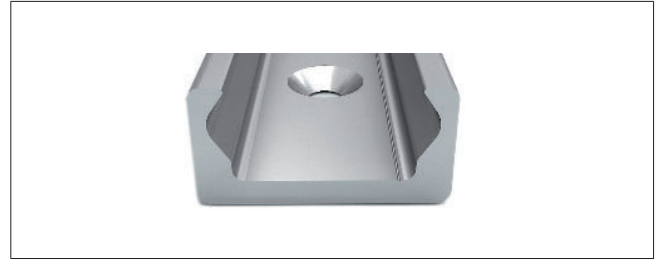


Fig.2

■ Floating rails (U-rails)

The floating rails are designed to support radial forces only, due to their axial clearance. In combination with the guiding T-rail or compensation K-rail, they can compensate for misalignment in the mounting structure.



Fig.3

■ Angular compensation rail (K-rails)

The compensation rails support radial and axial forces. When used in combination with the U-rail, they compensate for mounting misalignment in two planes, providing both axial and angular compensation.

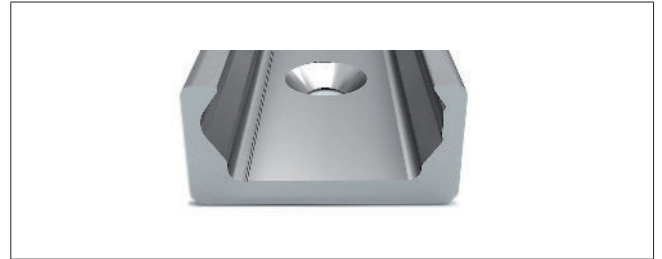


Fig.4

■ 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 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.5

■ 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.6

■ NSD/NSDA-slider

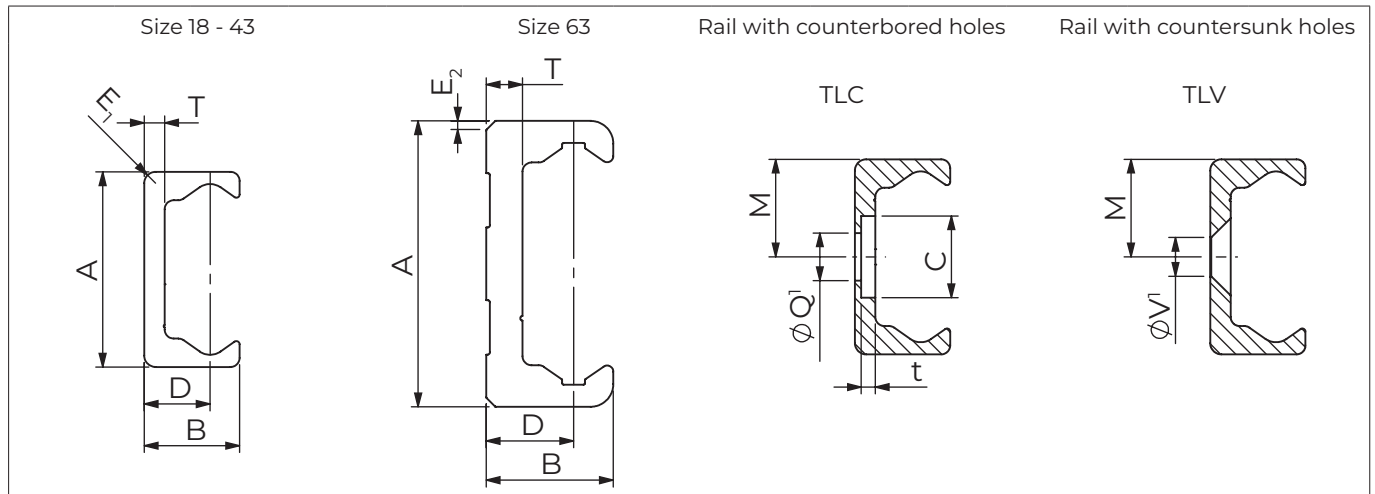
Constructed as the NSW/NSA-slider with mounting holes on the side, parallel to the direction of preferred loading. It is available for sizes 28 and 43, with three or five rollers, depending on load case and load direction set with the corresponding configuration.



Fig.7

COMPONENTS AND DIMENSIONS

■ Rail T



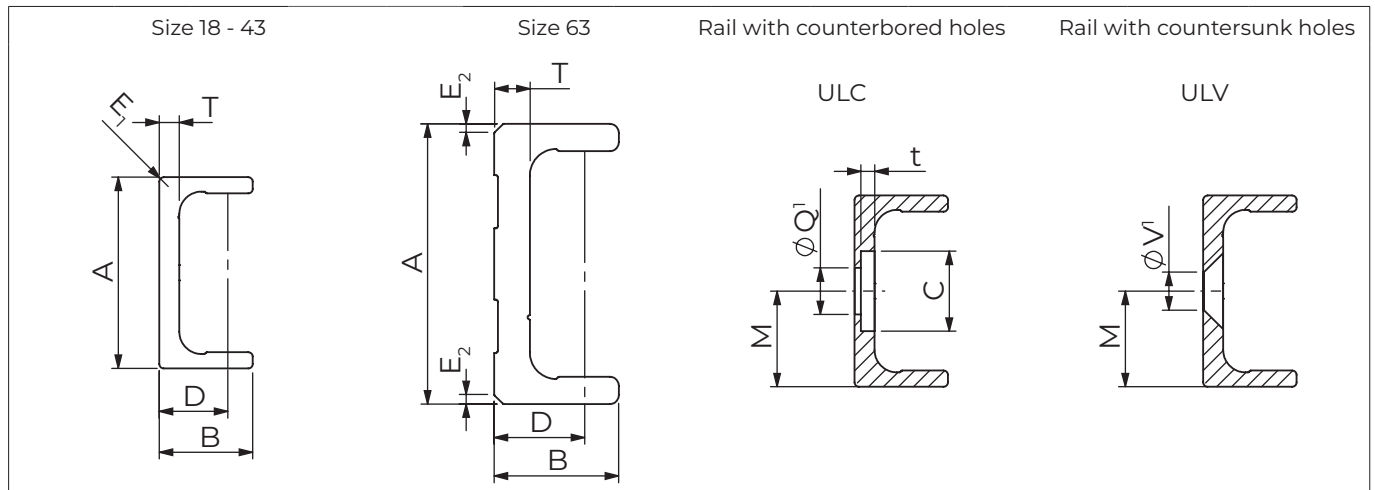
Q¹ Fixing holes for Torx® screws with low head (custom design) included in scope of supply
 V¹ Fixing holes for countersunk head screws according to DIN 7991 (screws not included)

Fig.8

Type	Size	A [mm]	B [mm]	D [mm]	M [mm]	E ₁ [mm]	T [mm]	C [mm]	Weight [kg/m]	E ₂ [°]	t [mm]	Q ¹ [mm]	V ¹ [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

Tab.1

■ Rail U



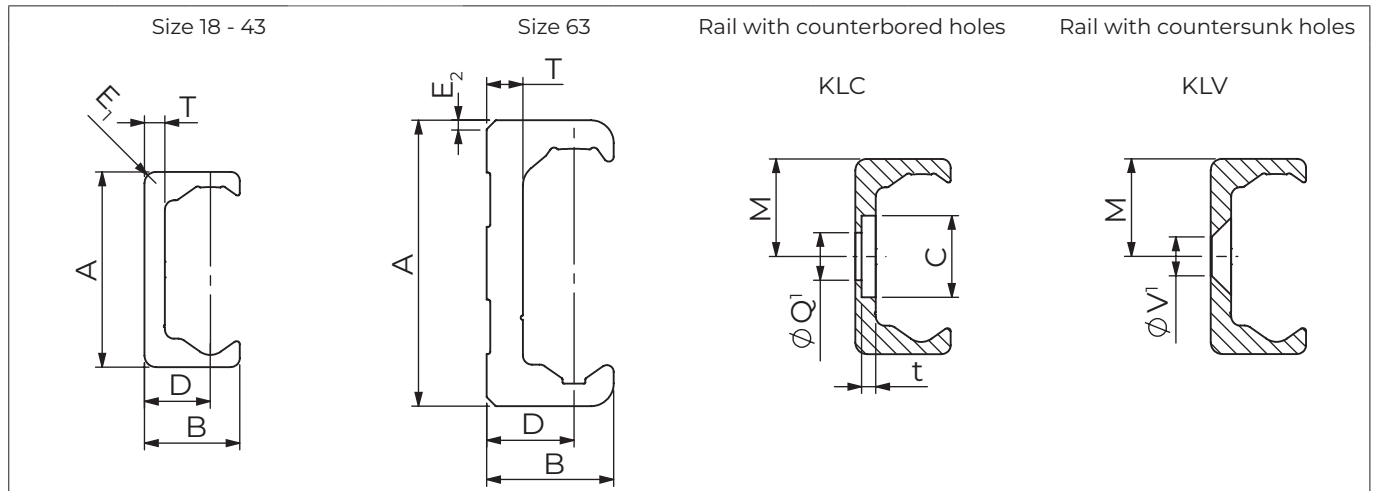
Q¹ Fixing holes for Torx® screws with low head (custom design) included in scope of supply
 V¹ Fixing holes for countersunk head screws according to DIN 7991 (screws not included)

Fig.9

Type	Size	A [mm]	B [mm]	D [mm]	M [mm]	E ₁ [mm]	T [mm]	C [mm]	Weight [kg/m]	E ₂ [°]	t [mm]	Q ¹ [mm]	V ¹ [mm]
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

Tab.2

■ Rail K



Q¹ Fixing holes for Torx® screws with low head (custom design) included in scope of supply
 V¹ Fixing holes for countersunk head screws according to DIN 7991 (screws not included)

Fig.10

Type	Size	A [mm]	B [mm]	D [mm]	M [mm]	E ₁ [mm]	T [mm]	C [mm]	Weight [kg/m]	E ₂ [°]	t [mm]	Q ¹ [mm]	V ¹ [mm]
KLC	43	43	21	14.5	21.5	2.5	4.5	18	2.6	-	3.1	M8	M8
KLV	63	63	28	19.25	31.5	-	8	15	6.0	2x45	5.2	M8	M10

Tab.3

■ Rail length

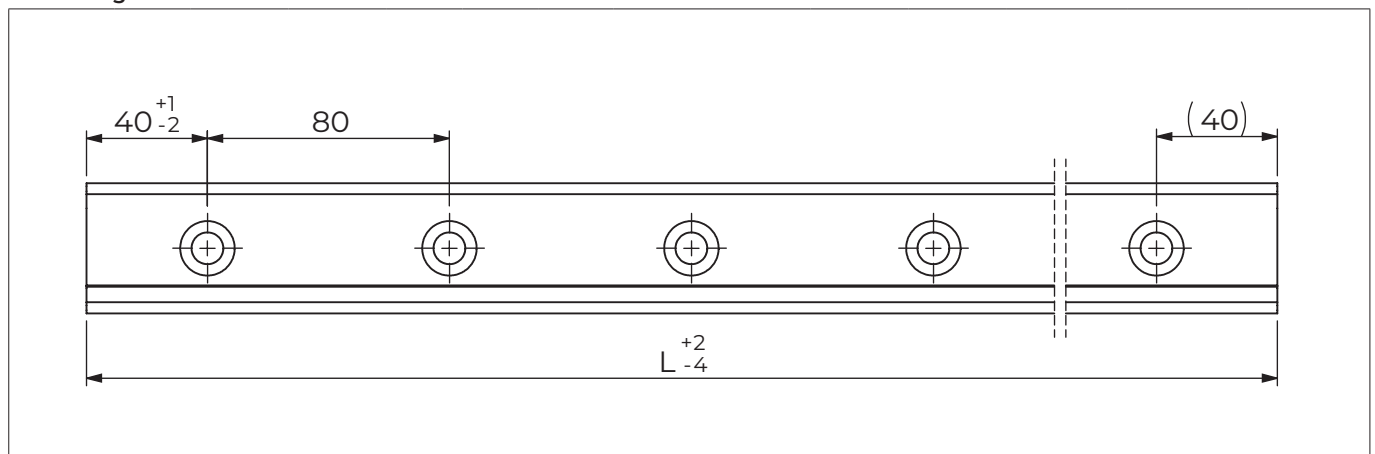


Fig.11

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

Longer single rails up to max. 4,080 mm on request, or longer rail systems possible with joined rails (see p. 53)
 Max length for single rail with ZincNickel treatment is 2680 mm (see p. 31)

Tab.4

■ NSW/NSA-version slider

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

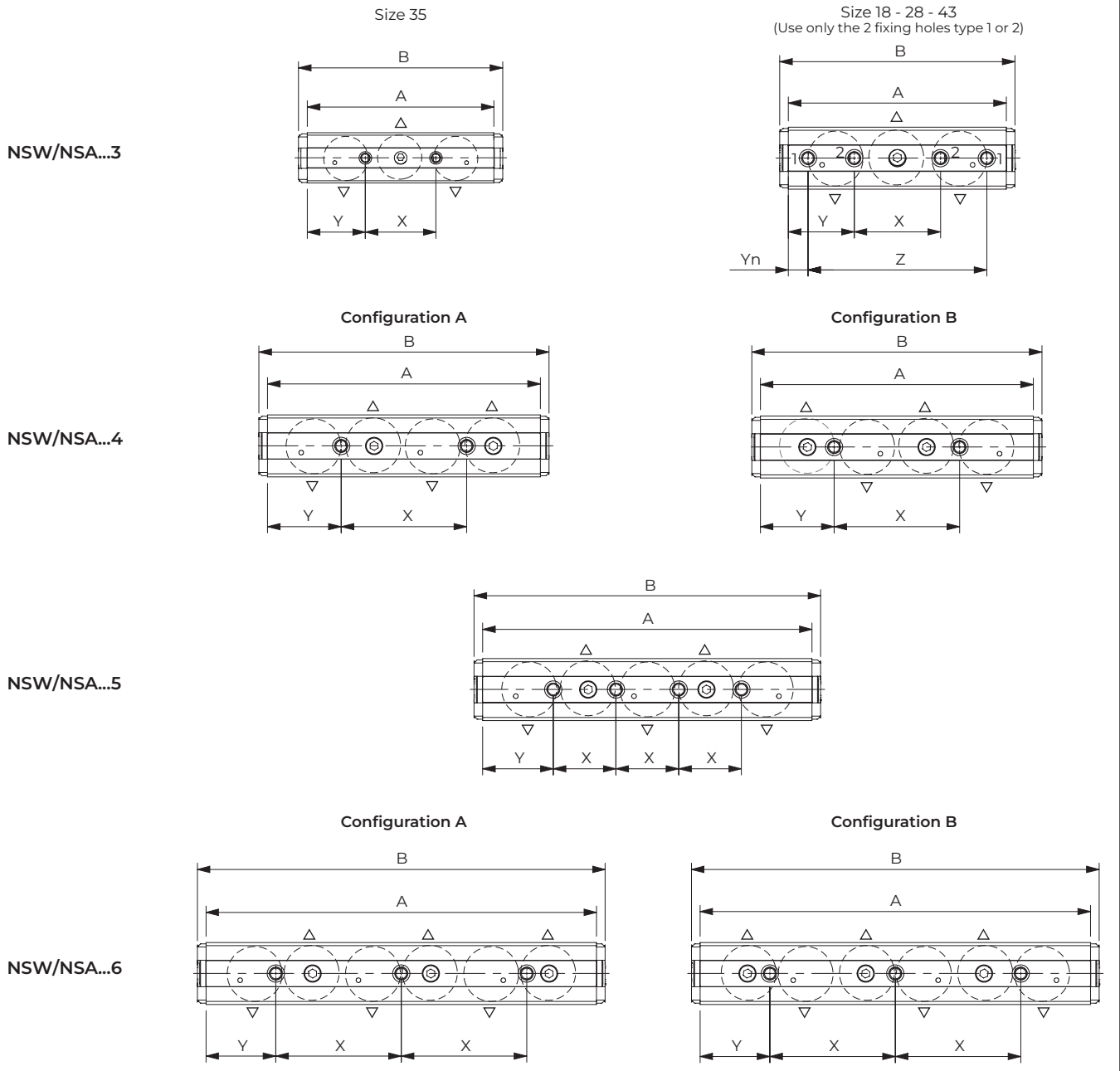


Fig.12

NSW-slider with prismatic rollers for use in T- and U-rails

NSA-slider with crowned rollers for use in K-rails

Size 43



Fig.13

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*	Weight [kg]
NSW	18	3	70	78	16	7.2	M5	20	25	52	9	4	CPA18-CPN18	0.076
		4	92	100				40	26			2	CPA18	0.096
		5	112	120				20	26	-	-	4	CPA18	0.11
		6	132	140				40	26			3	CPA18	0.138
	28	3	97	108	24.9	9.7	M5	35	31	78	9.5	4	CPA28-CPN28	0.23
		4	117	128				50	33.5			2	CPA28	0.29
		5	142	153				25	33.5	-	-	4	CPA28	0.35
		6	167	178				50	33.5			3	CPA28	0.42
	35	3	119	130	32	11.9	M6	45	37			2	CPA35-CPN35	0.44
		4	139	150				60	39.5			2	CPA35	0.53
		5	169	180				30	39.5	-	-	4	CPA35	0.64
		6	199	210				60	39.5			3	CPA35	0.76
	43	3	139	150	39.5	14.5	M8	55	42	114	12.5	4	CPA43-CPN43	0.8
		4	174	185				80	47			2	CPA43	1.02
		5	210	221				40	45	-	-	4	CPA43	1.24
		6	249	260				80	44.5			3	CPA43	1.47
	43	3	139	150	39.5	14.5	M8	55	42	114	12.5	4	CRPA43-CRPN43	0.8
		4	174	185				80	47			2	CRPA43	1.02
		5	210	221				40	45	-	-	4	CRPA43	1.24
		6	249	260				80	44.5			3	CRPA43	1.47

* Information about the roller type, see p. 27, Tab.18

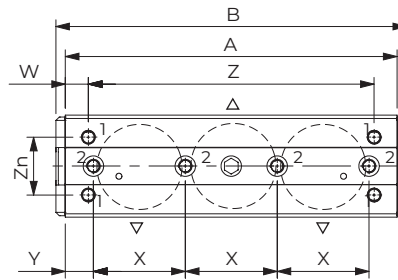
Tab.5

■ NSW/NSA-series 63

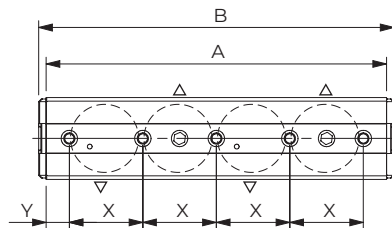
NSW/NSA-series 63

NSW/NSA...3

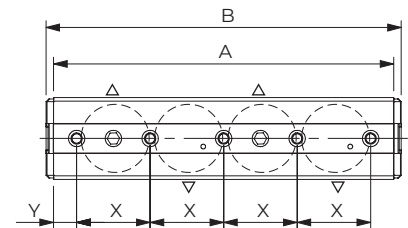
(Use only the 4 fixing holes type 1 or 2)



Configuration A

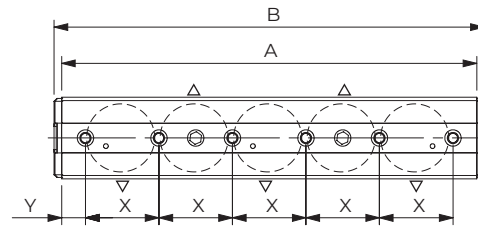


Configuration B

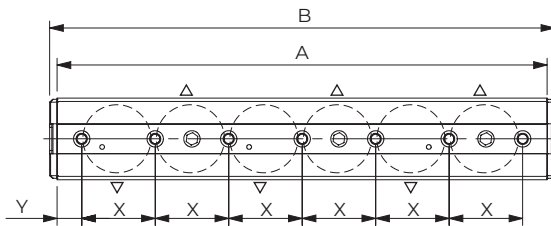


NSW/NSA...4

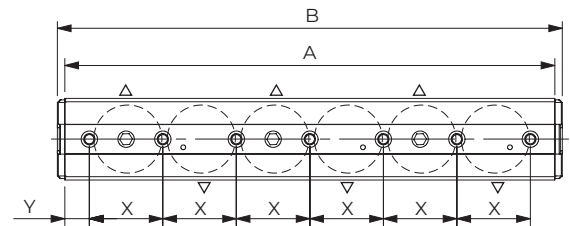
NSW/NSA...5



Configuration A



Configuration B



NSW/NSA...6

Fig.14

NSW-slider with prismatic rollers for use in T- and U-rails

NSA-slider with crowned rollers for use in K-rails

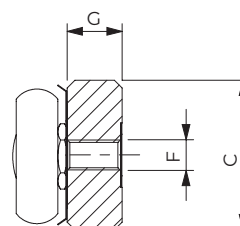
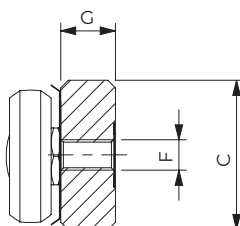


Fig.15

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*	Weight [kg]
NSW	63	3	195	206	60	20.2	M8	54	16.5	168	34	13.5	4+4	CPA63	2.44
		4	250	261				54	17				5	CPA63	3.17
		5	305	316				54	17.5	-	-		6	CPA63	3.89
		6	360	371				54	18				7	CPA63	4.60
NSA	63	3	195	206	60	20.2	M8	54	16.5	168	34	13.5	4+4	CRPA63	2.44
		4	250	261				54	17				5	CRPA63	3.17
		5	305	316				54	17.5	-	-		6	CRPA63	3.89
		6	360	371				54	18				7	CRPA63	4.60

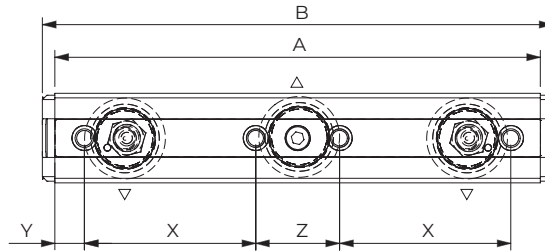
* Information about the roller type, see p. 27, Tab.18

Tab.6

■ NSW...L/NSA...L-version slider

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

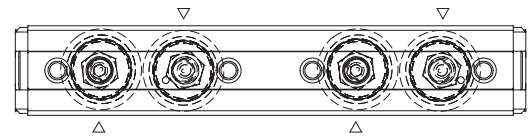
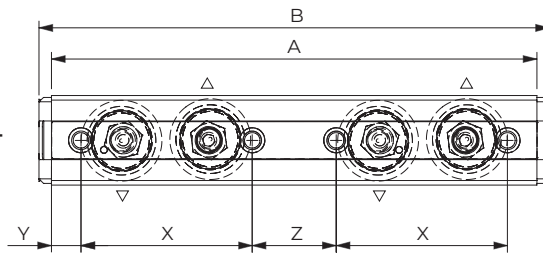
NSW...L/NSA...L-3



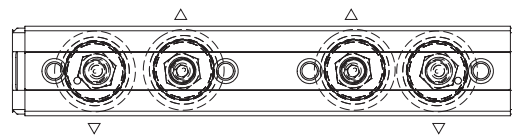
Configuration A

Configuration B

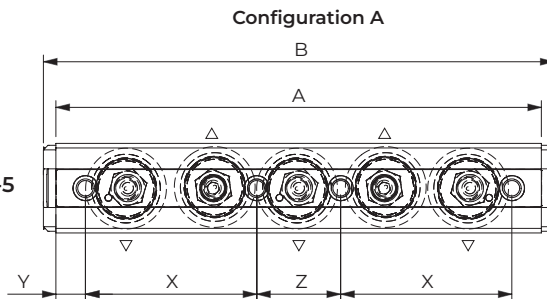
NSW...L/NSA...L-4



Configuration C



NSW...L/NSA...L-5



Configuration B

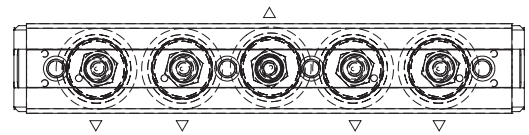


Fig.16

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*	Weight [kg]
NSW28L	28	3	149	160	24.9	9.7	M5	52	9.5	26	4	CPA28	0.32
		4											0.34
		5											0.36
NSW43L	43	3	214	225	39.5	14.5	M8	75.5	13	37	4	CPA43	1.10
4		1.17											
NSA43L		5										CRA43	1.25

Tab.7

■ NSD/NSDA-version slider

NSD/NSDA-series

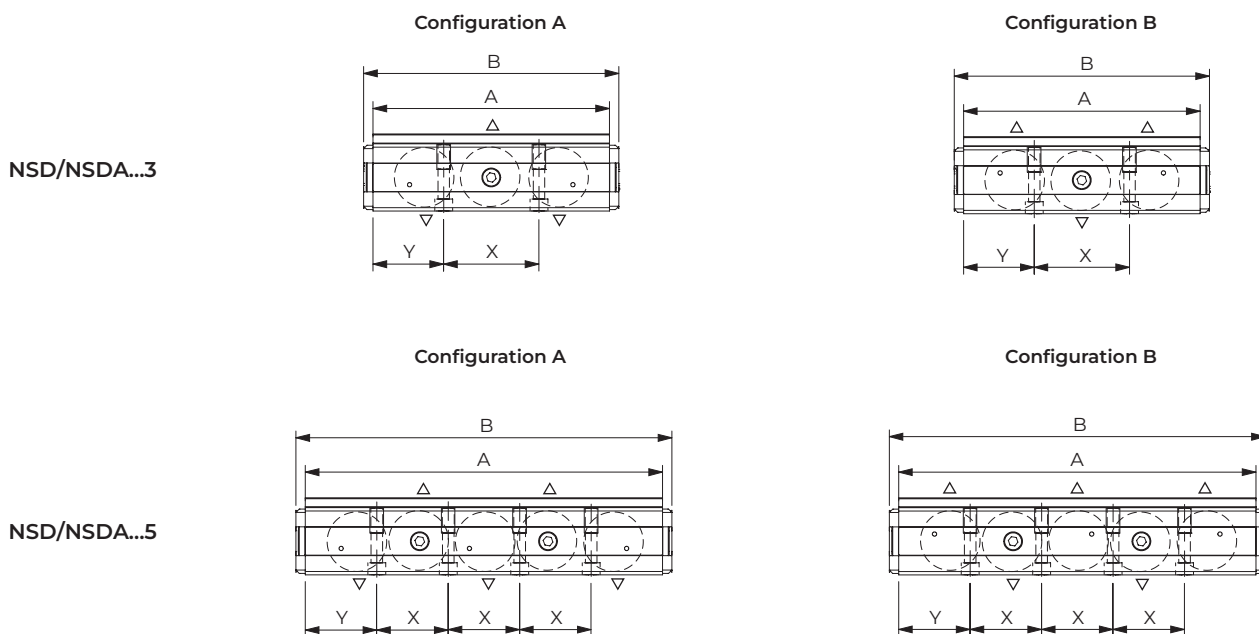


Fig.17

NSD-slider with prismatic rollers for use in T- and U-rails

NSDA-slider with crowned rollers for use in K-rails Size 43

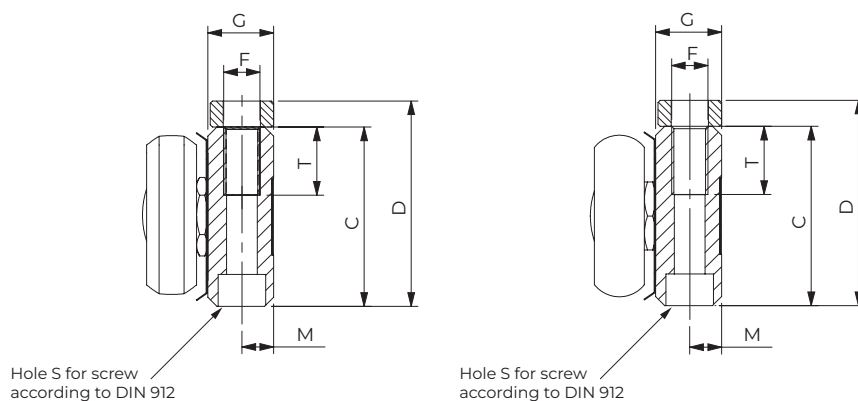


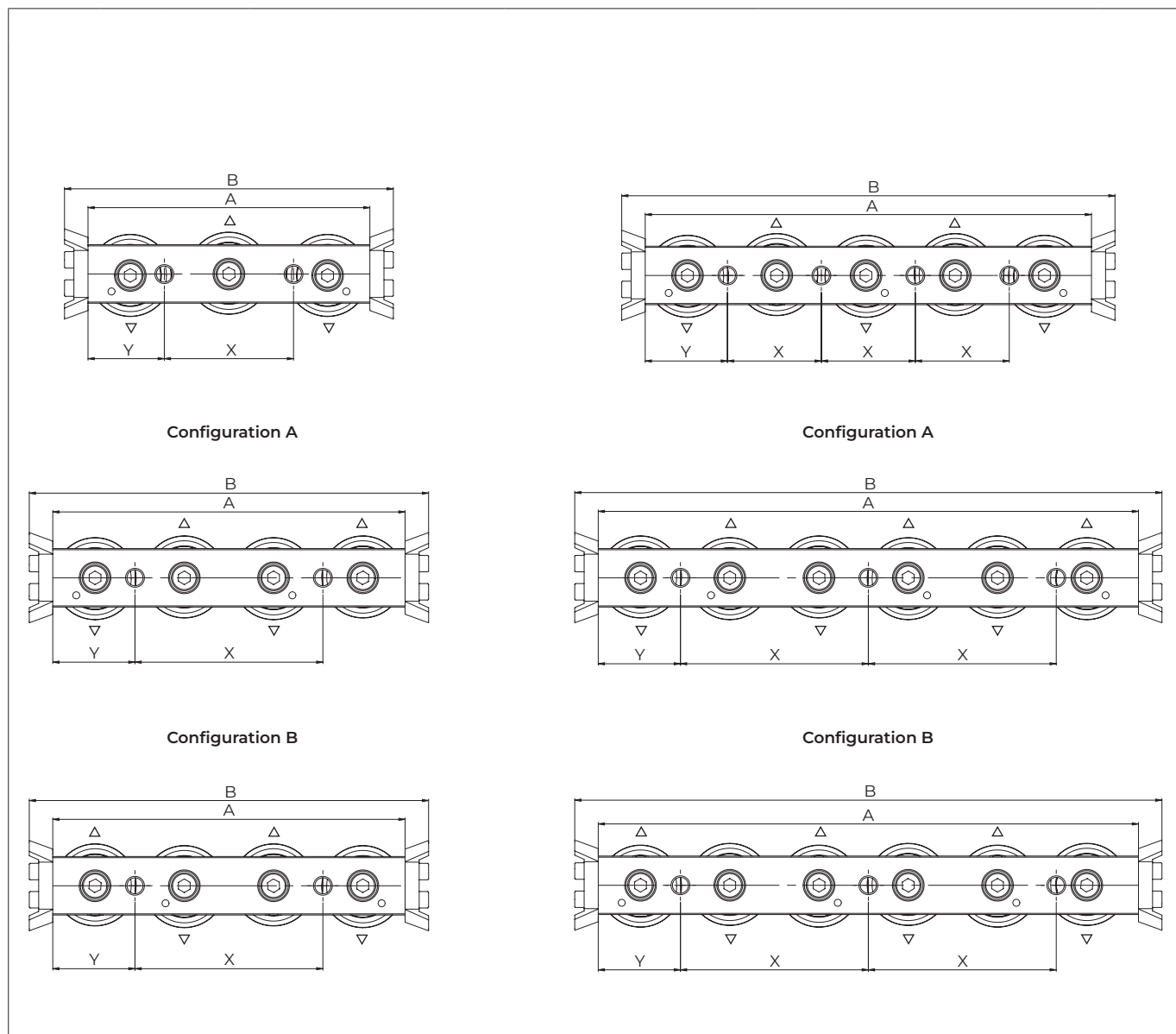
Fig.18

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*	Weight [kg]
NSD	28	3	97	108	24.9	30.45	9.7	4.7	M5	15	M6	36	30.5	2	CPA28	0.26
		5	142	153								27	30.5	4	CPA28	0.40
	35	3	119	130	32	36.35	12.4	6	M6	15	M8	45	37	2	CPA35	0.48
		5	169	180								30	39.5	4	CPA35	0.69
	43	3	139	150	39.5	45.25	14.5	7	M6	15	M8	56	41.5	2	CPA43	0.87
		5	210	221								42	42	4	CPA43	1.35
NSDA	43	3	139	150	39.5	45.25	14.5	7	M6	15	M8	34	41.5	2	CRPA43	0.87
		5	210	221								42	42	4	CRPA43	1.35

* Information about the roller type, see p. 27, Tab.18

Tab.8

■ CS-version slider



Representation of slider with wiper

Fig.19

CS-slider with prismatic rollers for use in T- and U-rails

CSK-slider with crowned rollers for use in K-rails
Sizes 43 and 63

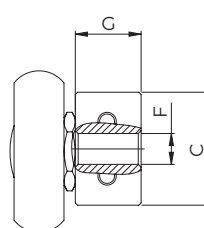
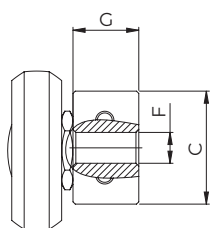


Fig.20

Type	Size	No. of Rollers	A [mm]	B [mm]	C [mm]	G [mm]	F [mm]	X [mm]	Y [mm]	No. of holes	Roller type used*	Weight [kg]
CS	18	3	60	76	9.5	5.7	M5	20	20	2	CPA18-CPN18	0.04
		4	80	96	9.5	5.7	M5	40	20	2	CPA18	0.05
		5	100	116	9.5	5.7	M5	20	20	4	CPA18	0.06
		6	120	136	9.5	5.7	M5	40	20	3	CPA18	0.07
	28	3	80	100	14.9	9.7	M5	35	22.5	2	CPA28-CPN28	0.155
		4	100	120	14.9	9.7	M5	50	25	2	CPA28	0.195
		5	125	145	14.9	9.7	M5	25	25	4	CPA28	0.24
		6	150	170	14.9	9.7	M5	50	25	3	CPA28	0.29
	35	3	100	120	19.9	11.9	M6	45	27.5	2	CPA35-CPN35	0.27
		4	120	140	19.9	11.9	M6	60	30	2	CPA35	0.33
		5	150	170	19.9	11.9	M6	30	30	4	CPA35	0.41
		6	180	200	19.9	11.9	M6	60	30	3	CPA35	0.49
	43	3	120	140	24.9	14.5	M8	55	32.5	2	CPA43-CPN43	0.53
		4	150	170	24.9	14.5	M8	80	35	2	CPA43	0.68
		5	190	210	24.9	14.5	M8	40	35	4	CPA43	0.84
		6	230	250	24.9	14.5	M8	80	35	3	CPA43	1.01
	63	3	180	200	39.5	19.5	M8	54	9	4	CPA63	1.66
		4	235	255	39.5	19.5	M8	54	9.5	5	CPA63	2.17
		5	290	310	39.5	19.5	M8	54	10	6	CPA63	2.67
		6	345	365	39.5	19.5	M8	54	10.5	7	CPA63	3.17
CSK	43	3	120	140	24.9	14.5	M8	55	32.5	2	CRPA43-CRPN43	0.53
		4	150	170	24.9	14.5	M8	80	35	2	CRPA43	0.68
		5	190	210	24.9	14.5	M8	40	35	4	CRPA43	0.84
		6	230	250	24.9	14.5	M8	80	35	3	CRPA43	1.01
	63	3	180	200	39.5	19.5	M8	54	9	4	CRPA63	1.66
		4	235	255	39.5	19.5	M8	54	9.5	5	CRPA63	2.17
		5	290	310	39.5	19.5	M8	54	10	6	CRPA63	2.67
		6	345	365	39.5	19.5	M8	54	10.5	7	CRPA63	3.17

* Information about the roller type, see p. 27, Tab.18

Tab.9

The reference notch indicate the orientation of the sliders : the maximum load must be supported by the rollers on the side of the notch. The standard orientation of the slider in the rail is made compared to the reference line (see Configurations and behavior of the slider under yawing moment M_z on p. 47 and 48).

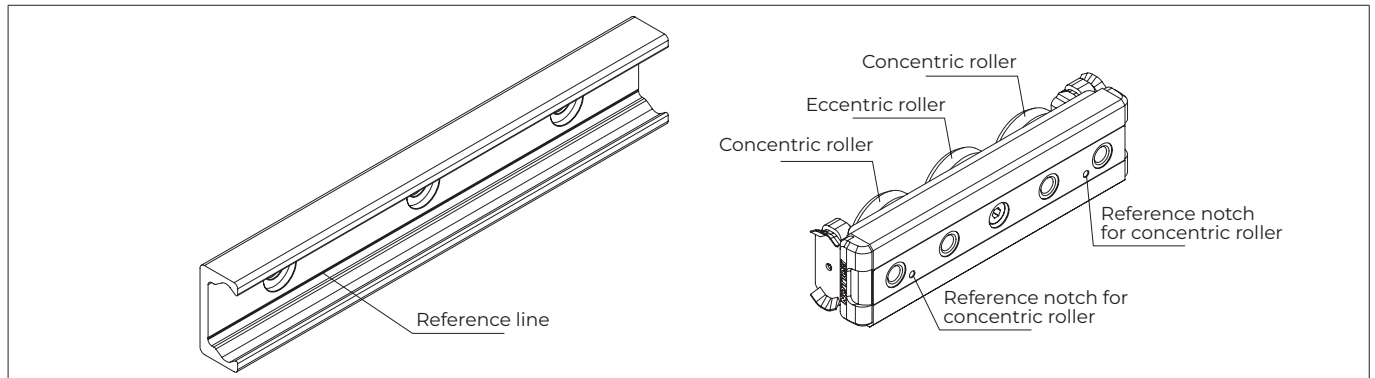


Fig.21

On 3 roller sliders, the eccentric rollers can be set. It is differentiated through a point engraved in the middle of the roller. The concentric roller axis are blackened. On slider with more than 3 rollers, all rollers are eccentric, only the one with accessible screws can be regulated, the others are fixed

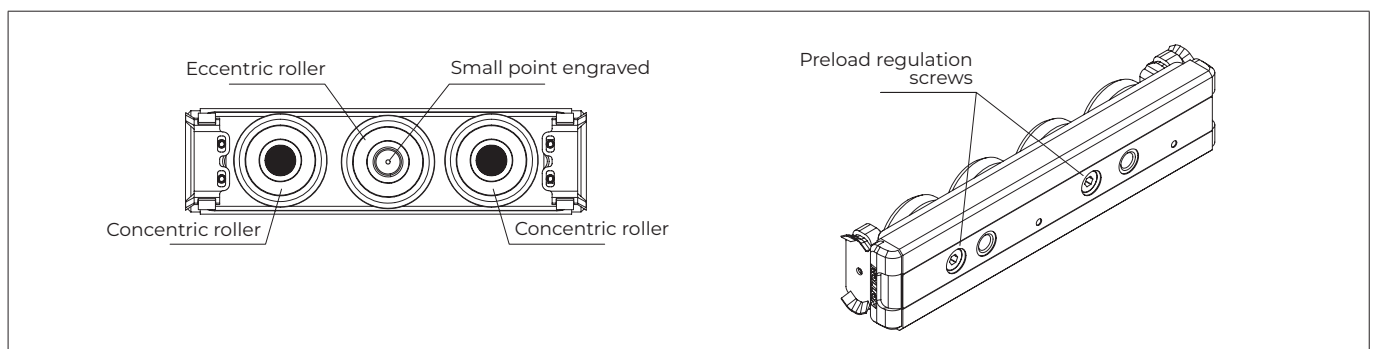
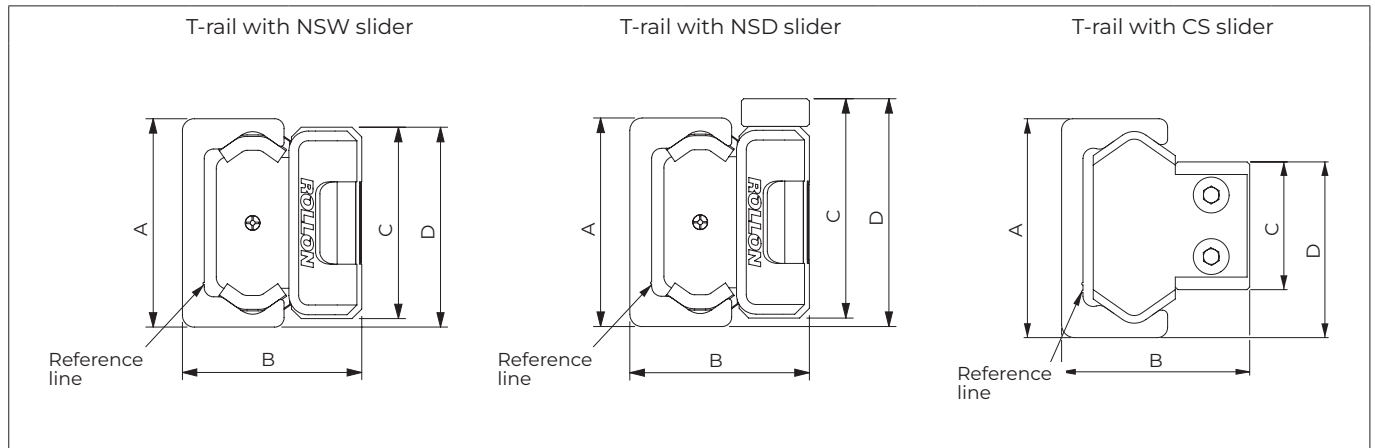


Fig.22

■ T-rail with NSW / NSD / CS slider - Rail slider assembly dimensions and tolerances

Fig.23

Configuration	Size	A [mm]		B [mm]		C [mm]		D [mm]	
TL... / NSW	18	18	+0.25 -0.10	16.5	±0.15	16	0 -0.2	17	+0.1 -0.3
	28	28	+0.25 -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	+0.35 -0.10	37	±0.15	39.5	0 -0.2	41.25	+0.2 -0.4
	63	63	+0.35 -0.10	50.5	±0.15	60	0 -0.2	61.5	+0.2 -0.4
TL... / NSD	28	28	+0.25 -0.10	23.9	±0.15	30.45	0 -0.2	32	+0.1 -0.3
	35	35	+0.35 -0.10	30.2	±0.15	36.35	0 -0.2	37.85	+0.2 -0.4
	43	43	+0.35 -0.10	37	±0.15	42.25	0 -0.2	47	+0.2 -0.4
TL... / CS	18	18	+0.25 -0.10	15	±0.15	9.5	0 -0.05	14	+0.05 -0.25
	28	28	+0.25 -0.10	23.9	±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	24.9	0 -0.15	34.3	+0.10 -0.30
	63	63	+0.35 -0.10	49.8	±0.15	39.5	+0.15 0	51.6	+0.15 -0.30

Tab.10

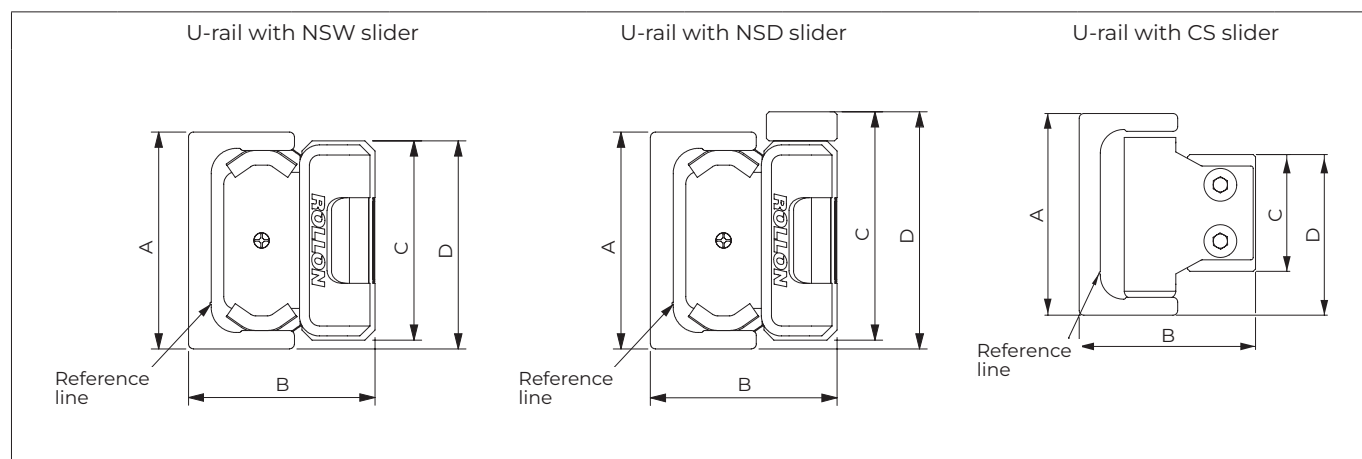
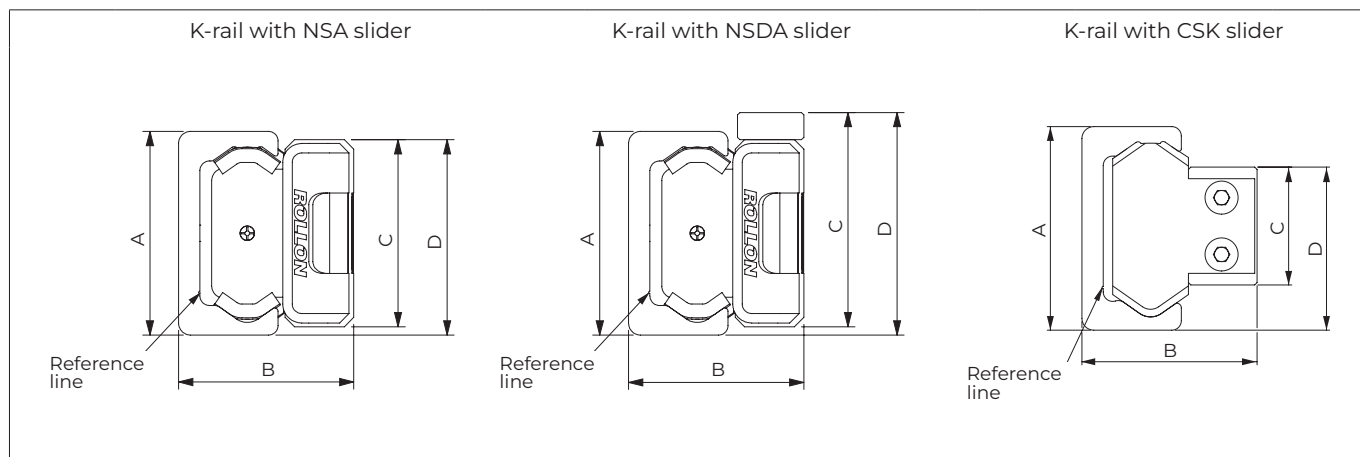
■ U-rail with NSW / NSD / CS slider - Rail slider assembly dimensions and tolerances


Fig.24

Configuration	Size	A [mm]		B _{nom} * [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	30.45	0 -0.2	32	+0.1 -0.3
	35	35	+0.35 -0.10	30.2	36.35	0 -0.2	37.85	+0.2 -0.4
	43	43	+0.35 -0.10	37	45.25	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

*B_{nom} is the nominal dimension, minimum and maximum values defined for T+U on p. 33.
 B_{nom} value are different in K+U configuration, see p. 35.

Tab.11

■ K-rail with NSA / NSDA / CSK slider - Rail slider assembly dimensions and tolerances


K-rail enables the slider to rotate around its longitudinal axis (see p. 35)

Fig.25

Configuration	Size	A [mm]		B [mm]		C [mm]		D [mm]	
KL... / NSA	43	43	+0.35 -0.10	37	±0.15	39.5	0 -0.2	41.25	+0.2 -0.4
	63	63	+0.35 -0.10	50.5	±0.15	60	0 -0.2	61.5	+0.2 -0.4
KL... / NSDA	43	43	+0.35 -0.10	37	±0.15	45.25	0 -0.2	47	+0.2 -0.4
KL... / CSK	43	43	+0.35 -0.10	37	±0.15	24.9	0 -0.15	34.3	+0.10 -0.30
	63	63	+0.35 -0.10	49.8	±0.15	39.5	+0.15 0	51.6	+0.15 -0.30

Tab.12

■ Offset of fixing holes

Principle representation of offset

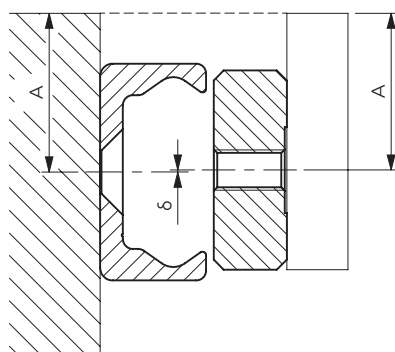


Fig.26

Configuration	Size	δ nominal [mm]	δ maximum [mm]	δ minimum [mm]
TLC / NSW	18	0	+0.5	-0.5
	28		+0.5	-0.5
	35		+0.6	-0.6
	43		+0.6	-0.6
	63		+0.65	-0.65
KLC / NSA	43		+0.6	-0.6
	63		+0.65	-0.65
ULC / NSW	18		+0.5	-0.5
	28		+0.5	-0.5
	35		+0.6	-0.6
	43		+0.6	-0.6
	63		+0.65	-0.65
TLV / NSW	18		+0.35	-0.35
	28		+0.35	-0.35
	35		+0.45	-0.45
	43		+0.45	-0.45
	63		+0.5	-0.5
KLV / NSA	43		+0.45	-0.45
	63		+0.5	-0.5
ULV / NSW	18		+0.35	-0.35
	28		+0.35	-0.35
	35		+0.45	-0.45
	43		+0.45	-0.45
	63		+0.5	-0.5
TLC / CS	18	0.35	+0.75	-0.2
	28	0.25	+0.6	-0.35
	35	0.35	+0.7	-0.35
	43	0.35	+0.8	-0.35
	63	0.35	+0.6	-0.35
KLC / CSK	43	0.35	+0.8	-0.35
	63	0.35	+0.6	-0.35
ULC / CS	18	0.3	+0.7	-0.2
	28	0.3	+0.6	-0.3
	35	0.35	+0.7	-0.35
	43	0.4	+0.75	-0.35
	63	0.35	+0.6	-0.25

Configuration	Size	δ nominal [mm]	δ maximum [mm]	δ minimum [mm]
TLV / CS	18	0.35	+0.6	-0.15
	28	0.25	+0.45	-0.3
	35	0.35	+0.55	-0.3
	43	0.35	+0.65	-0.3
	63	0.35	+0.45	-0.35
KLV / CSK	43	0.35	+0.65	-0.3
	63	0.35	+0.45	-0.35
ULV / CS	18	0.3	+0.55	-0.15
	28	0.3	+0.45	-0.25
	35	0.35	+0.55	-0.3
	43	0.4	+0.6	-0.3
	63	0.35	+0.45	-0.25

Tab.13

■ Load capacities

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

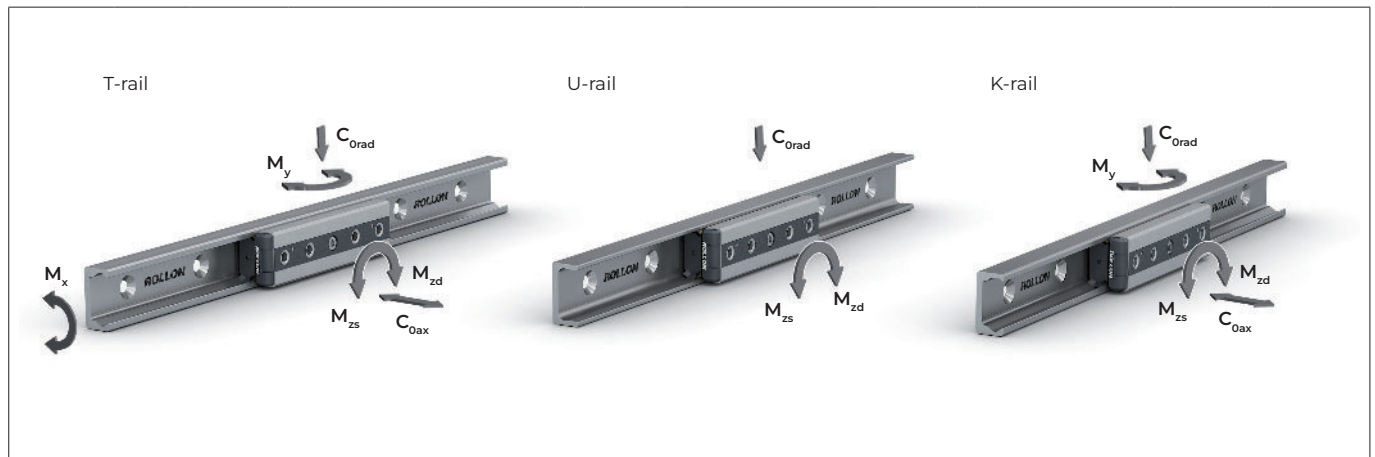


Fig.27

Sliders with 3 and 5 rollers do not have symmetric load capacity C_{Orad} from top or bottom being an uneven number of rollers.

For slider with uneven number of rollers, C_{Orad} value is defined considering the biggest number of roller in contact.

Please, respect the orientation of the slider according the direction of load.

In case of simultaneous radial loads from top and bottom, the sliders with 4 or 6 rollers must be preferred.

Load capacities for single slider - NSW / NSA / NSD / NSDA

Type	Rollers configuration	Load capacities and moments for single slider						
		C [N]	C_{Orad} [N]	C_{Oax}^* [N]	M_x^* [Nm]	M_y^* [Nm]	M_z [Nm]	
							M_{zd}	M_{zs}
NSW18-3 -...	3	1530	820	260	1.5	4.7	8.2	8.2
NSW18-4A -...	4A			300	2.8	7		24.7
NSW18-4B -...	4B			300	2.8	7	24.7	8.2
NSW18-5 -...	5	1830	975	360	2.8	9.4	24.7	24.7
NSW18-6A -...	6A			440	3.3	11.8		41.1
NSW18-6B -...	6B			440	3.3	11.8	41.1	24.7
NSW28-3 -...	3	4260	2170	640	6.2	16	27.2	27.2
NSD28-3A -...	3A			640	6.2	16		27.2
NSD28-3B -...	3B			640	6.2	16	27.2	27.2
NSW28-4A -...	4A	4260	2170	750	11.5	21.7	27.2	81.7
NSW28-4B -...	4B						81.7	27.2
NSW28-5 -...	5	5065	2580	900	11.5	29	81.7	81.7
NSD28-5A -...	5A							81.7
NSD28-5B -...	5B						81.7	81.7
NSW28-6A -...	6A	5065	2580	1070	13.7	36.2	81.7	136.1
NSW28-6B -...	6B						136.1	81.7

* When using the slider in U-rails (floating bearing rails) the values are $C_{Oax} = 0$, $M_x = 0$ and $M_y = 0$.

* When using the sliders in K-rails (compensation rails) the value is: $M_x = 0$.

Tab.14

Type	Rollers configuration	Load capacities and moments for single slider						
		C [N]	C _{0rad} [N]	C _{0ax} * [N]	M _x * [Nm]	M _y * [Nm]	M _z [Nm]	
							M _{zd}	M _{zs}
NSW35-3 -...	3							
NSD35-3A -...	3A	8040	3510	1060	12.9	33.7	61.5	61.5
NSD35-3B -...	3B							
NSW35-4A -...	4A	8040	3510	1220	23.9	43.3	52.7	158.1
NSW35-4B -...	4B						158.1	52.7
NSW35-5 -...	5							
NSD35-5A -...	5A	9565	4180	1460	23.9	57.7	158.1	158.1
NSD35-5B -...	5B							
NSW35-6A -...	6A	9565	4180	1780	28.5	72.2	158.1	263.4
NSW35-6B -...	6B						263.4	158.1
NSW43-3 -...	3							
NSD43-3A -...	3A	12280	5500	1570	23.6	60	104.5	104.5
NSD43-3B -...	3B							
NSA43-3 -...	3							
NSDA43-3A -...	3A	12280	5100	1320	0	50.4	96.9	96.9
NSDA43-3B -...	3B							
NSW43-4A -...	4A	12280	5500	1855	43.6	81.5	104.5	313.5
NSW43-4B -...	4B						313.5	104.5
NSA43-4A -...	4A	12280	5100	1320	0	54.3	96.9	290.7
NSA43-4B -...	4B						290.7	96.9
NSW43-5 -...	5							
NSD43-5A -...	5A	14675	6540	2215	43.6	108.6	313.5	313.5
NSD43-5B -...	5B							
NSA43-5 -...	5							
NSDA43-5A -...	5A	14675	6065	1570	0	108.7	290.7	290.7
NSDA43-5B -...	5B							
NSW43-6A -...	6A	14675	6540	2645	52	135.8	313.5	522.5
NSW43-6B -...	6B						522.5	313.5
NSA43-6A -...	6A	14675	6065	1570	0	108.7	290.7	484.5
NSA43-6B -...	6B						484.5	290.7

* 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.

Tab.15

Type	Rollers configuration	Load capacities and moments for single slider						
		C [N]	C_{0rad} [N]	C_{0ax}^* [N]	M_x^* [Nm]	M_y^* [Nm]	M_z [Nm]	
							M_{zd}	M_{zs}
NSW63-3-2ZR	3	30750	12500	6000	125	271	367	367
NSA63-3-2ZR	3	30750	11550	5045	0	235	335	335
NSW63-4A-2ZR	4A	30750	12500	7200	250	413	367	1100
NSW63-4B-2ZR	4B						1100	367
NSA63-4A-2ZR	4A	30750	11550	5045	0	294	335	935
NSA63-4B-2ZR	4B						935	335
NSW63-5-2ZR	5	36600	15000	8500	250	511	1100	1100
NSA63-5-2ZR	5	36600	13745	6000	0	589	935	935
NSW63-6A-2ZR	6A	36600	15000	10000	350	689	1100	1830
NSW63-6B-2ZR	6B						1830	1100
NSA63-6A-2ZR	6A	36600	13745	6000	0	589	935	1560
NSA63-6B-2ZR	6B						1560	935

* 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: $M_x = 0$.

Tab.16

Load capacities CS / CSK

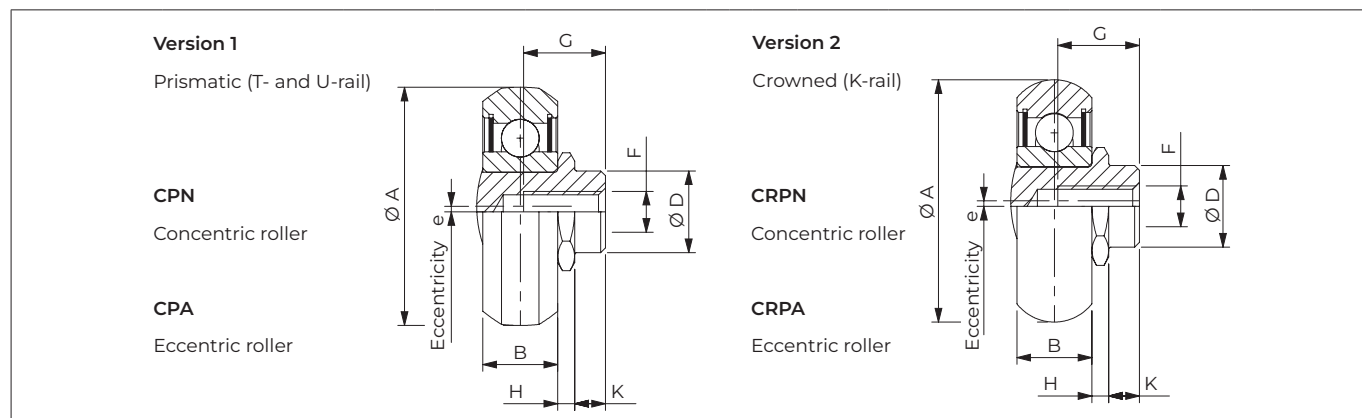
Type	Rollers configuration	Load capacities and moments for single slider						
		C [N]	C _{0rad} [N]	C _{0ax} * [N]	M _x * [Nm]	M _y * [Nm]	M _z [Nm]	
							M _{zd}	M _{zs}
CS18-060-...	3	1530	820	260	1.5	4.7	8.2	8.2
CS18-080-...-A	4A	1530	820	300	2.8	7	8.2	24.7
CS18-080-...-B	4B						24.7	8.2
CS18-100-...	5	1830	975	360	2.8	9.4	24.7	24.7
CS18-120-...-A	6A	1830	975	440	3.3	11.8	24.7	41.1
CS18-120-...-B	6B						41.1	24.7
CS28-080-...	3	4260	2170	640	6.2	16	27.2	27.2
CS28-100-...-A	4A	4260	2170	750	11.5	21.7	27.2	81.7
CS28-100-...-B	4B						81.7	27.2
CS28-125-...	5	5065	2580	900	11.5	29	81.7	81.7
CS28-150-...-A	6A	5065	2580	1070	13.7	36.2	81.7	136.1
CS28-150-...-B	6B						136.1	81.7
CS35-100-...	3	8040	3510	1060	12.9	33.7	61.5	61.5
CS35-120-...-A	4A	8040	3510	1220	23.9	43.3	52.7	158.1
CS35-120-...-B	4B						158.1	52.7
CS35-150-...	5	9565	4180	1460	23.9	57.7	158.1	158.1
CS35-180-...-A	6A	9565	4180	1780	28.5	72.2	158.1	263.4
CS35-180-...-B	6B						263.4	158.1
CS43-120-...	3	12280	5500	1570	23.6	60	104.5	104.5
CSK43-120-...	3	12280	5100	1320	0	50.4	96.9	96.9
CS43-150-...-A	4A	12280	5500	1855	43.6	81.5	104.5	313.5
CS43-150-...-B	4B						313.5	104.5
CSK43-150-A	4A	12280	5100	1320	0	54.3	96.9	290.7
CSK43-150-B	4B						290.7	96.9
CS43-190-...	5	14675	6540	2215	43.6	108.6	313.5	313.5
CSK43-190-...	5	14675	6065	1570	0	108.7	290.7	290.7
CS43-230-...-A	6A	14675	6540	2645	52	135.8	313.5	522.5
CS43-230-...-B	6B						522.5	313.5
CSK43-230-A	6A	14675	6065	1570	0	108.7	290.7	484.5
CSK43-230-B	6B						484.5	290.7
CS63-180-2ZR	3	30750	12500	6000	125	271	367	367
CSK63-180-2ZR	3	30750	11550	5045	0	235	335	335
CS63-235-2ZR-A	4A	30750	12500	7200	250	413	367	1100
CS63-235-2ZR-B	4B						1100	367
CSK63-235-2ZR-A	4A	30750	11550	5045	0	294	335	935
CSK63-235-2ZR-B	4B						935	335
CS63-290-2ZR	5	36600	15000	8500	250	511	1100	1100
CSK63-290-2ZR	5	36600	13745	6000	0	589	935	935
CS63-345-2ZR-A	6A	36600	15000	10000	350	689	1100	1830
CS63-345-2ZR-B	6B						1830	1100
CSK63-345-2ZR-A	6A	36600	13745	6000	0	589	935	1560
CSK63-345-2ZR-B	6B						1560	935

 * 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.

Tab.17

Rollers



Seals: 2RS is the splash-proof seal, 2Z (2ZR for size 63) is the steel cover shield
 Note: The rollers are lubricated for life

Fig.28

Type		A [mm]	B [mm]	D [mm]	e [mm]	H [mm]	K [mm]	G [mm]	F	C [N]	C _{rad} [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.18

■ Wipers

Wipers for NSW / NSA / NSD / NSDA

Rail size	Rail type	Ordering code (for a 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.19

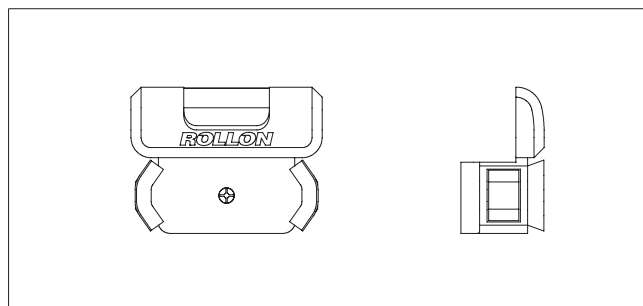


Fig.29

Wipers for CS / CSK

Rail size	Ordering code (for a pair of wipers)
18	ZK-WCS....18
28	ZK-WCS....28
35	ZK-WCS....35
43	ZK-WCS....43
63	ZK-WCS....63

Tab.20

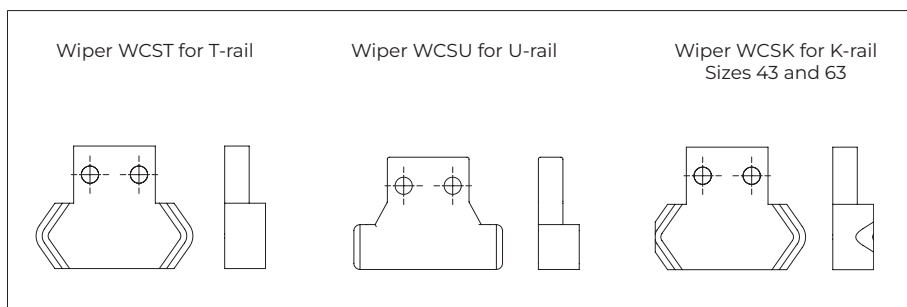


Fig.30

► ACCESSORIES

■ 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. Using the freely adjustable clamping lever (except for HK 18, which uses an M6 DIN 913 hexagon socket set screw with a 3 mm drive), the contact profiles are pressed synchronously against the free surfaces of the rail. The floating-mounted contact profiles ensure symmetrical force distribution on the guide rail.

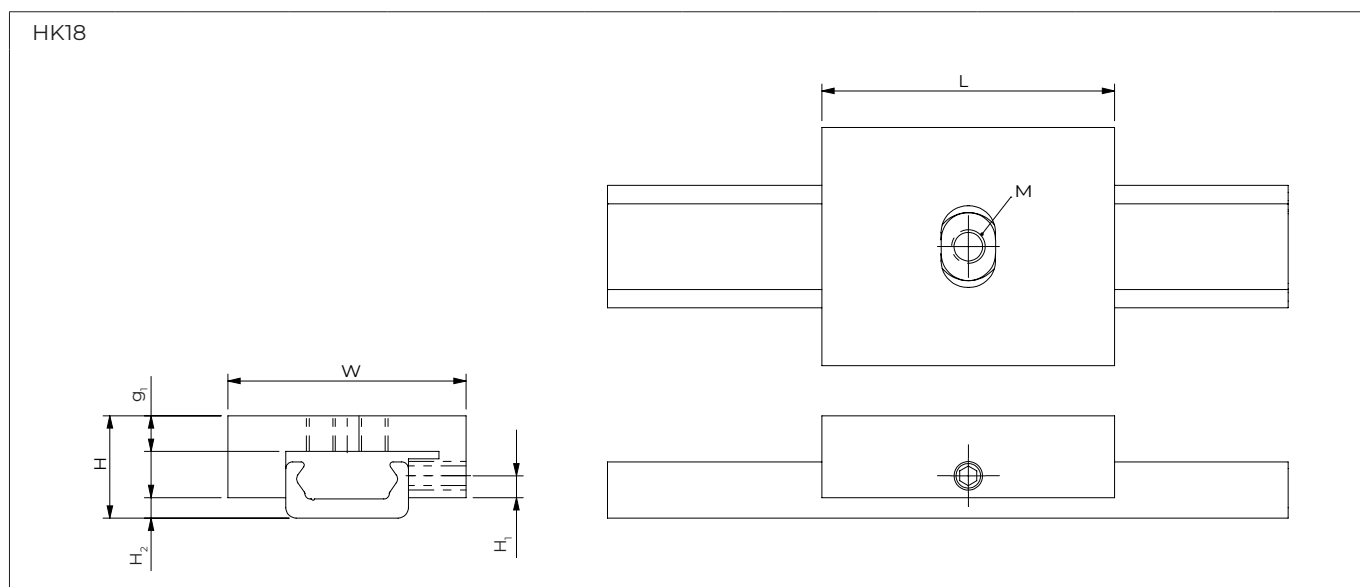


Fig.31

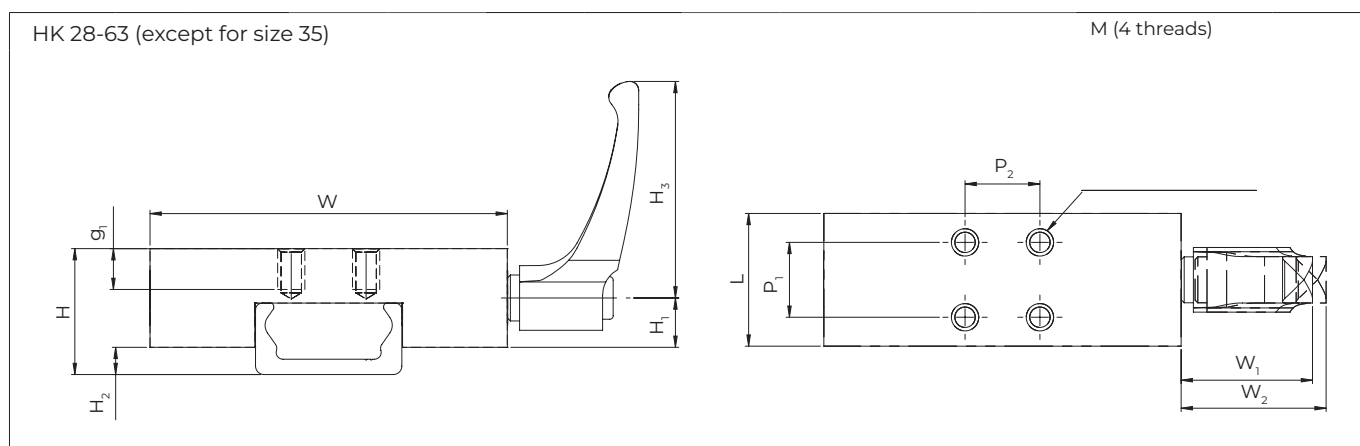


Fig.32

Type	Size	Holding force [N]	Tightening torque [Nm]	Dimensions [mm]											M
				H	H ₁	H ₂	H ₃	W	W ₁	W ₂	L	P ₁	P ₂	g ₁	
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.21

► USE AND MAINTENANCE

■ Lubrication

Rail raceways lubrication

The bearings inside the rollers are lubricated for life.

Rail raceways lubrication

To reach the calculated service life (see p. 56), a film of lubricant should always be present between the raceway and roller, this also serves to protect against corrosion of the ground raceways.

Under normal conditions, correct lubrication:

- ▣ Reduces friction
- ▣ Reduces wear
- ▣ Reduces stress on contact surfaces caused by elastic deformation
- ▣ Reduces noise during operation
- ▣ Improves the consistency of the rolling movement

Lubrication of the raceways procedure depends on the type of slider.

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, see dimension Fig.34, by means of an oiling syringe.

Size	Øa [mm]
18	2
28	3
35	3
43	3
63	4

Tab.22

Lubricant	Temperature range [°C]	Kinematic viscosity 40°C [mm²/s]
Mineral oil or synthetic oil	-20... to +120	approx 110

Tab.23

The durability of the lubrication delivered by the wiper heads depends on the conditions of use. In 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 occurs first. 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.

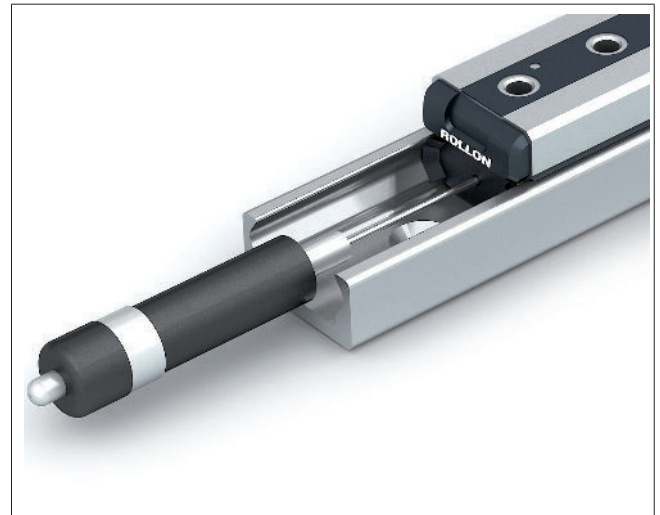


Fig.33

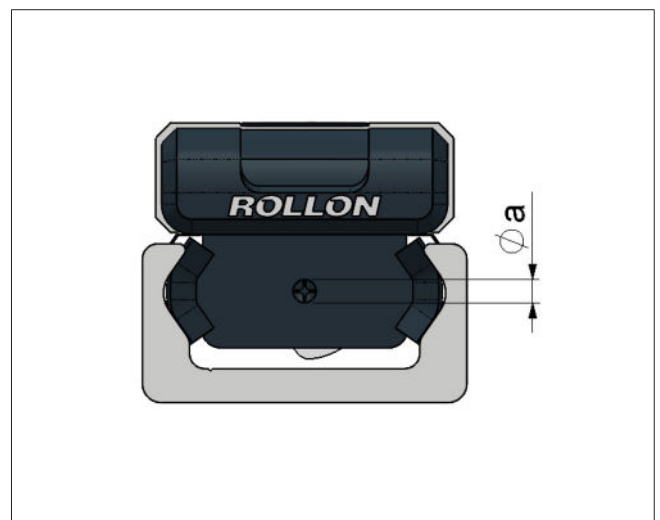


Fig.34

CSW-slider lubrication

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.24).

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

Tab.24

For industry-specific requirements and norms, different lubricants are available on request:

- ▣ FDA-approved lubricants
- ▣ Cleanroom-approved lubricants
- ▣ Marine lubricants
- ▣ High-/low-temperature lubricants

■ Anticorrosion treatments

Treatment	Features
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 ISO 19598 (Z)	Ideal for outdoor applications. Sliders ordered with ZincNickel treatment are supplied with stainless steel rollers to further increase the corrosion resistance. Maximum length 2680 mm.
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.25

■ Speed and acceleration

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

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

Tab.26

■ Operating temperatures

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

■ 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.

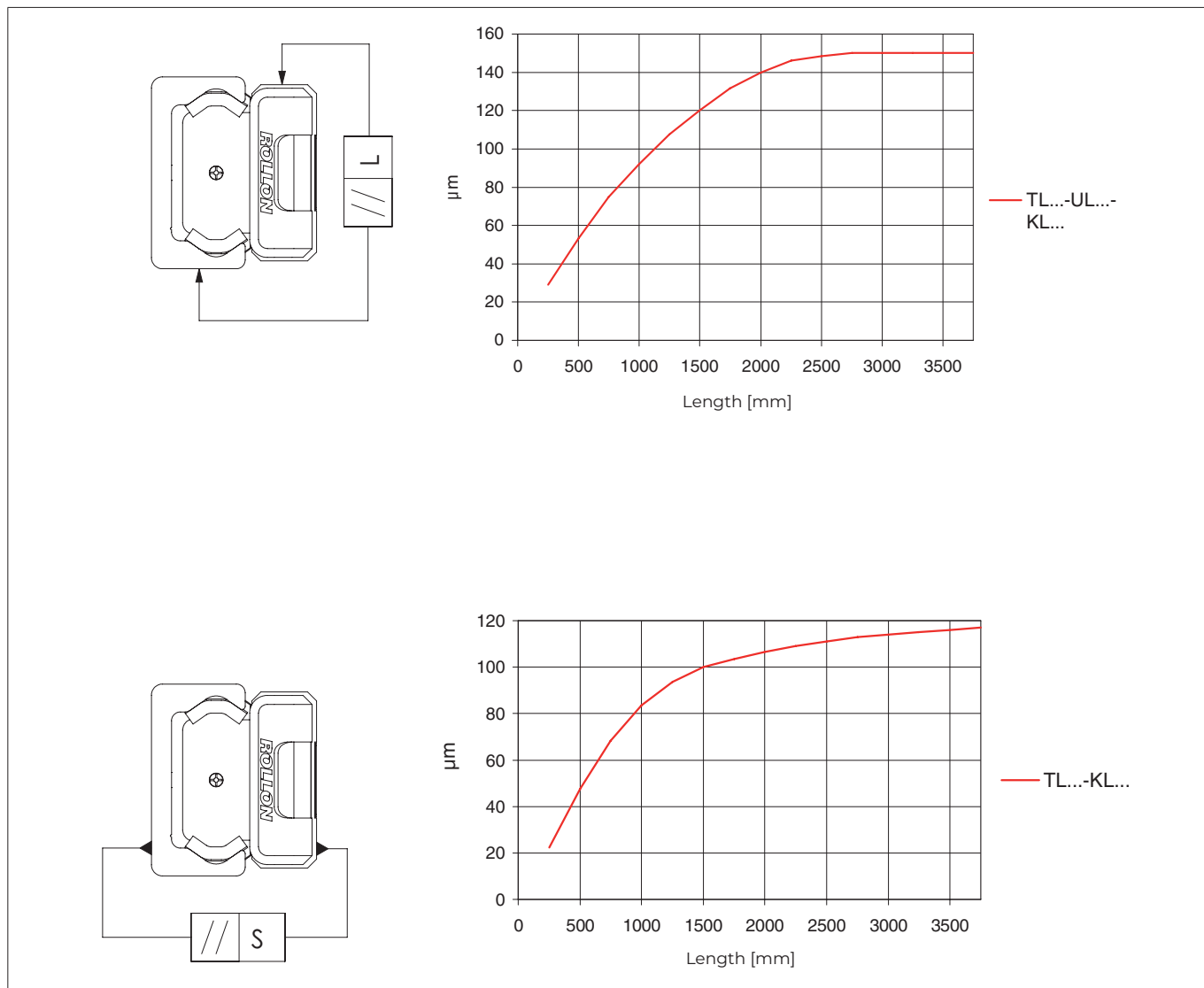
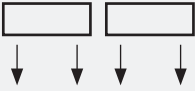
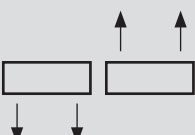


Fig.35

Permissible width and height difference of two different 3-roller sliders at the same position in the rail.

Mounting configuration	TL..., UL..., KL...
Difference in height ΔL [mm] Slider with equal arrangement 	0.2
Difference in height ΔL [mm] Slider with opposite arrangement 	1.0
Difference in width ΔS [mm]	0.05

Tab.27

■ T+U-System

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 guiding rail and floating 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.

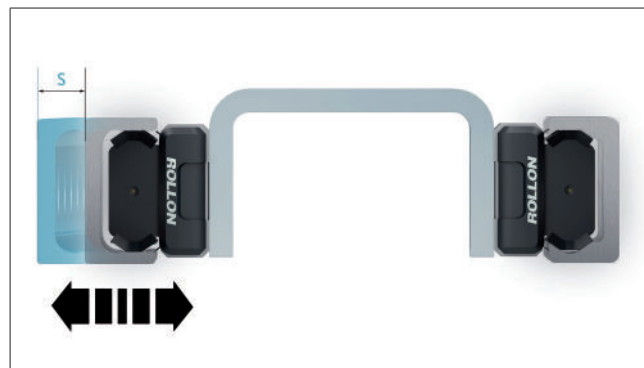


Fig.36

Maximum/Minimum offset

U rails have flat, parallel raceways that allow free lateral movement of the sliders. The maximum freedom a slider in the U rail can offer is calculated using the values S_1 and S_2 (see Fig.37, Tab.28 and the formula in Fig.38). With nominal value B_{nom} as the starting point, S_1 indicates the maximum allowed movement into the rail, while S_2 represents the maximum offset toward the outside of the rail.

If the length of the guide rail is known, the maximum allowable angular deviation of the mounting surface (Fig.38, Fig.39 and Tab.29) can be calculated. In this case, the slider in the U rail has the freedom to travel from the innermost position S_1 to the outermost position S_2 .

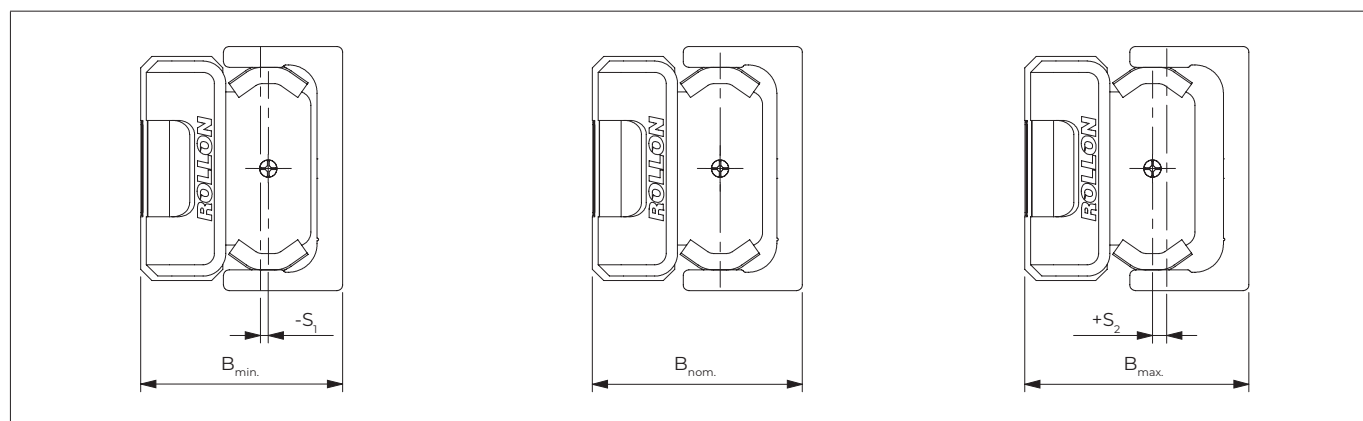


Fig.37

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

Tab.28

Guideline for the maximum angle α and deviation achievable with the longest guide rail.

$\alpha = \arctan \frac{S}{L}$	S = sum of S_1 and S_2 L = length of the rail
--------------------------------	---

Fig.38

Rail size	Rail length [mm]	Offset S^* [mm]	Angle α [°]
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.29

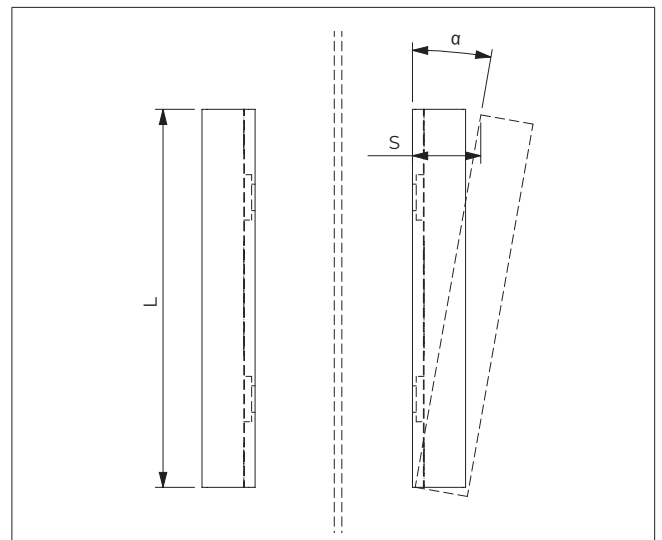


Fig.39

The T+U-system can be designed in different arrangements (see Fig.40).

A T-rail accepts the vertical components of load 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.40

■ **K+U-System**

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.

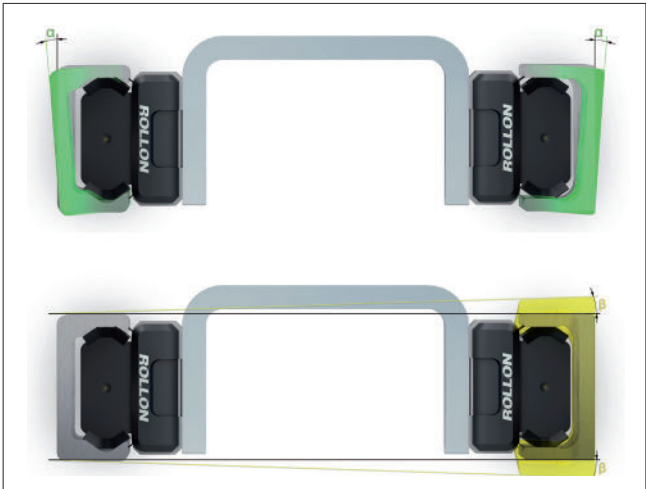


Fig.41

K-rails and sliders are available in both sizes 43 and 63.

The custom NSA slider and CSK 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 Tab.30 and Fig.42. α_1 is the maximum rotation angle counterclockwise, α_2 is clockwise.

Type	α_1 [°]	α_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.30

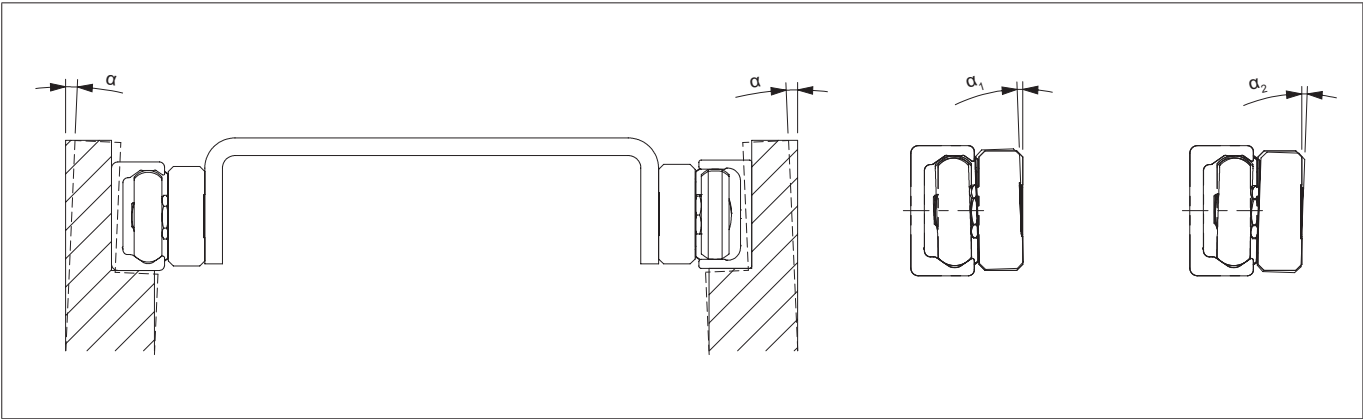


Fig.42

Maximum/Minimum 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.31).

If a maximum rotated NSW or CSW- slider is observed (2° for size 43 and 1° for size 63), the maximum and minimum position of the slider in the U rail results from the values B_{0max} and B_{0min} , which are already considered by the additional rotation caused axial offset. B_{0nom} is a recommended nominal starting value for the position of a NSW or CSW-slider in the U-rail of a K+U-system.

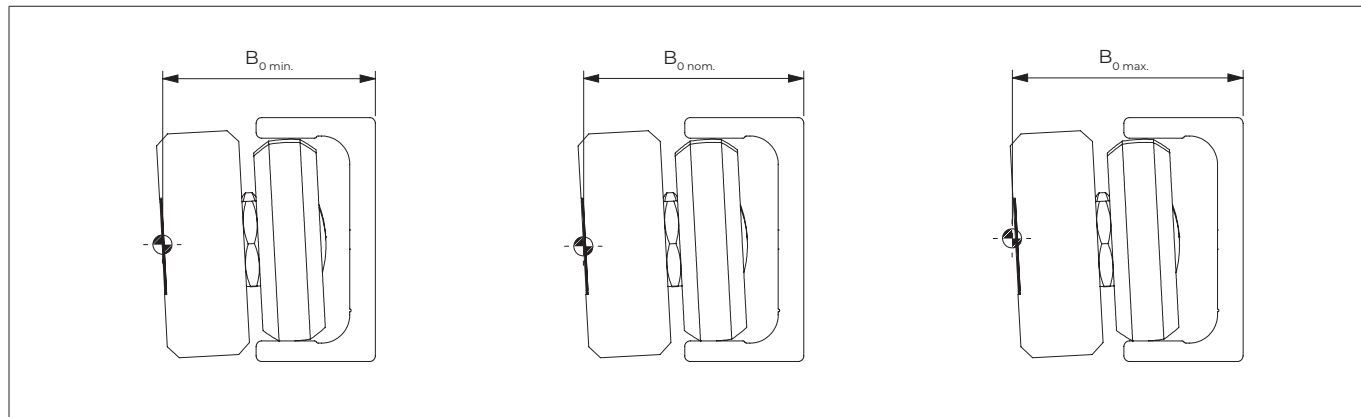


Fig.43

Type	B_{0min} [mm]	B_{0nom} [mm]	B_{0max} [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.31

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.44).

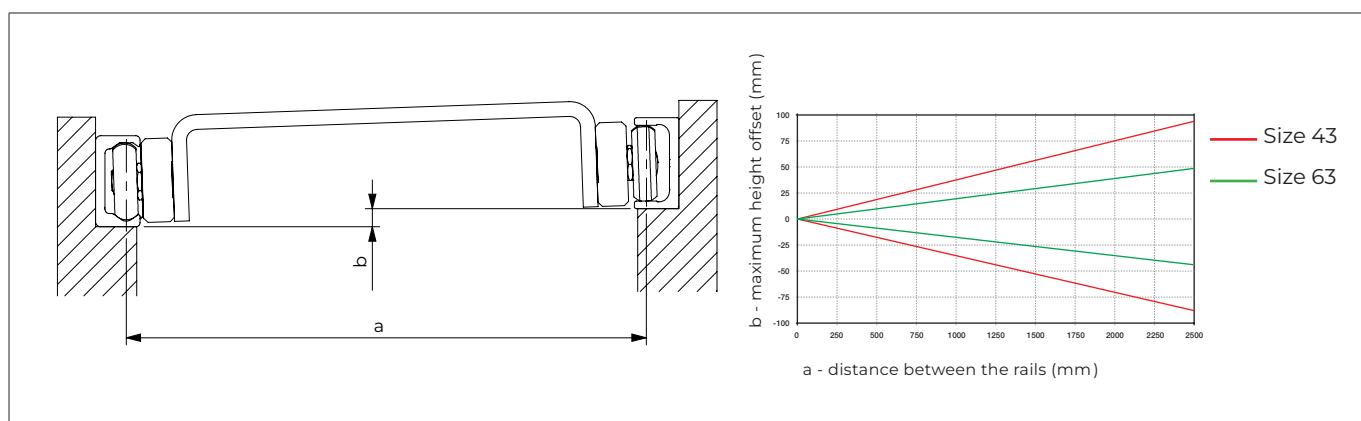


Fig.44

Even the K+U-system can be used in different arrangements.

If the same example as with the T+U-system is observed (see p. 34, Fig.40), 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.45

■ 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. Tab.32 below contains the coefficients of friction for each slider type.



Fig.46

Rail size	μ Roller friction (for $P/C_0 > 10\%$)	μ_w Wiper friction	μ_s Friction of longitudinal seals
18	0.003	$\frac{\ln(m \cdot 1000)^*}{0.98 \cdot m \cdot 1000}$	0.0015
28	0.003	$\frac{\ln(m \cdot 1000)^*}{0.06 \cdot m \cdot 1000}$	$\frac{\ln(m \cdot 1000)^*}{0.15 \cdot m \cdot 1000}$
35	0.005		
43	0.005		
63	0.006		

* Kilograms must be used for load m.

Tab.32

The values μ given in Tab.32 apply to external loads P, which, with sliders with three rollers, are at least 10 % of the maximum load rating (P/C_0), see Fig.50, on p. 39. 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.32) and the following formula (see Fig.47)

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

$$m = \text{mass (kg)}$$

$$g = 9.81 \text{ m/s}^2$$

Fig.47

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.48

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.49

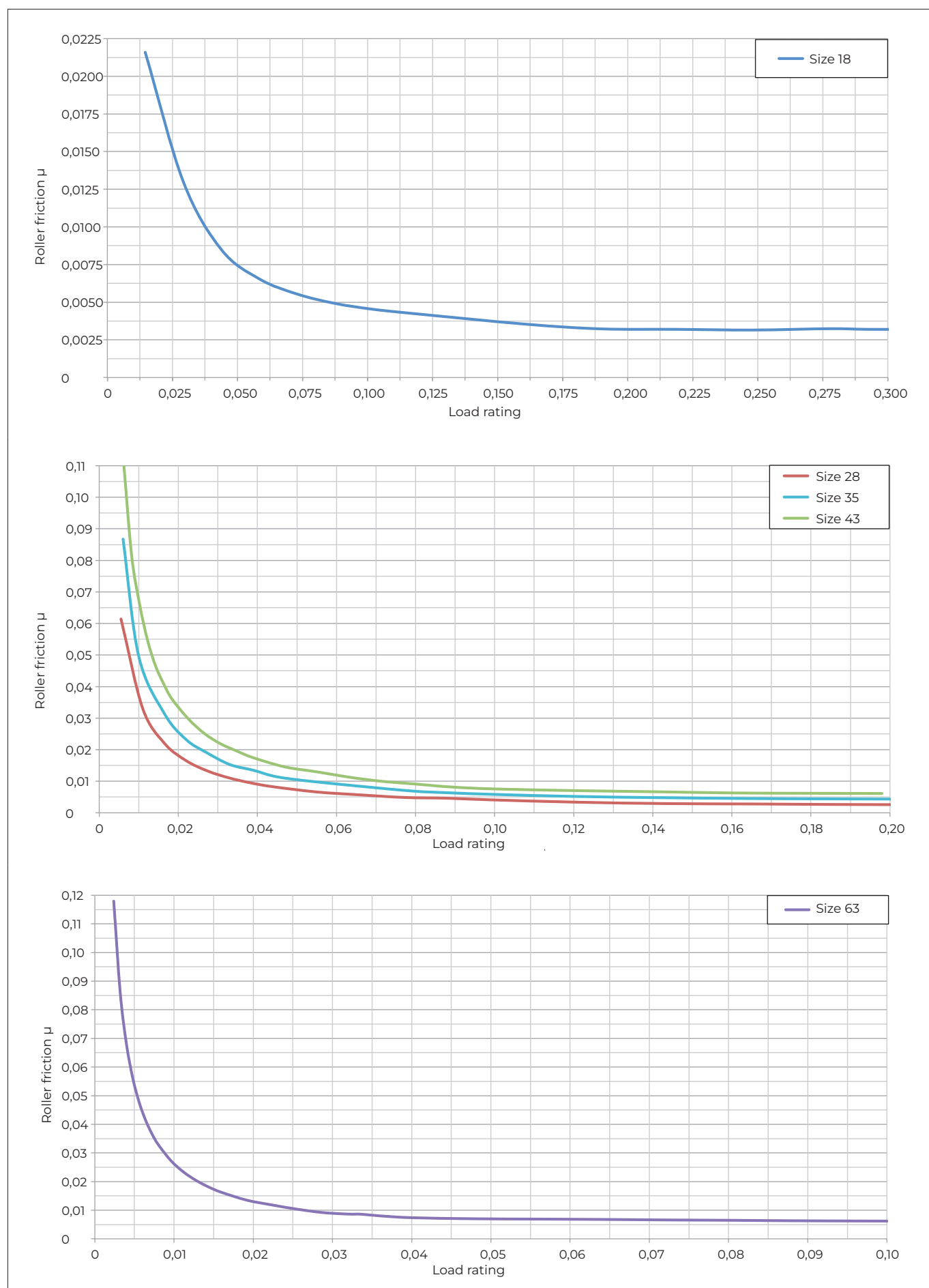


Fig.50

■ 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.

Countersunk screws are not supplied because standard from the market, please use DIN 7991 standards, in class resistance 10.9. The tightening torque is the one of the screw class resistance.

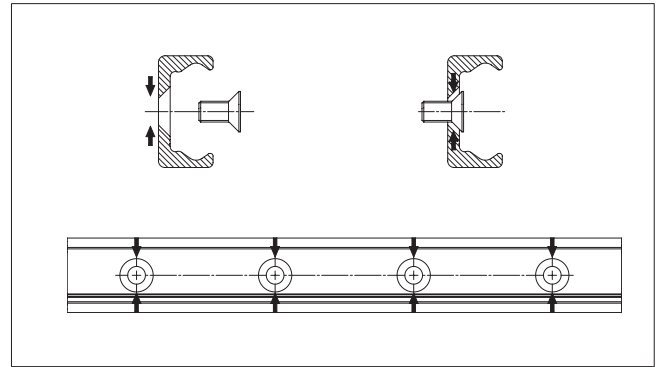


Fig.51

■ 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.52).

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

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.33

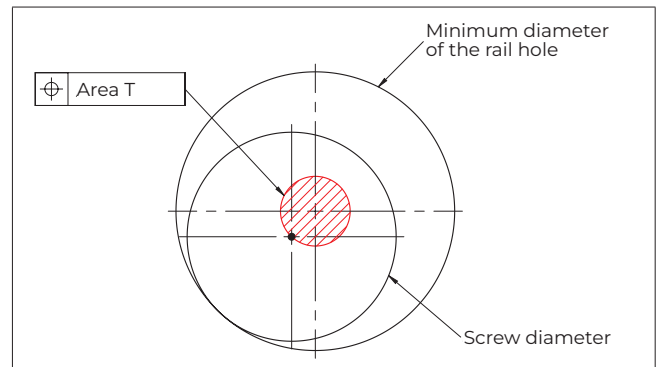


Fig.52

Fixing screws

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

Rail size	d [mm]	D [mm]	L [mm]	K [mm]	S [mm]	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.34

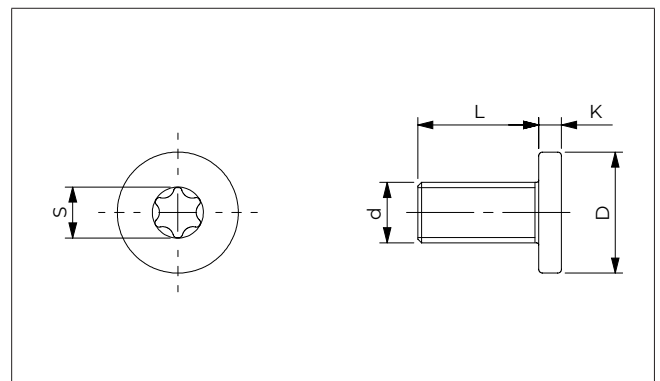


Fig.53

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

Also available in other lengths for ordering.

Tab.35

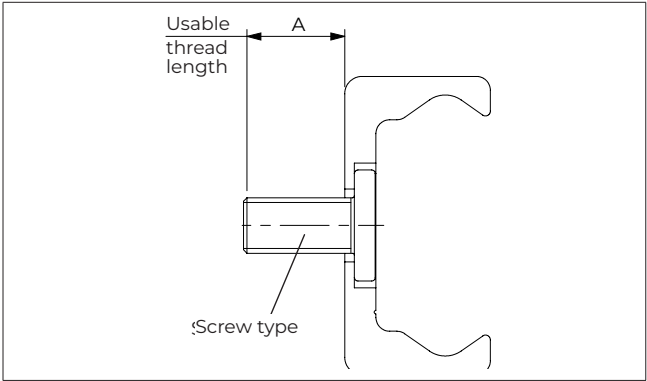


Fig.54

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.

Rail 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.36

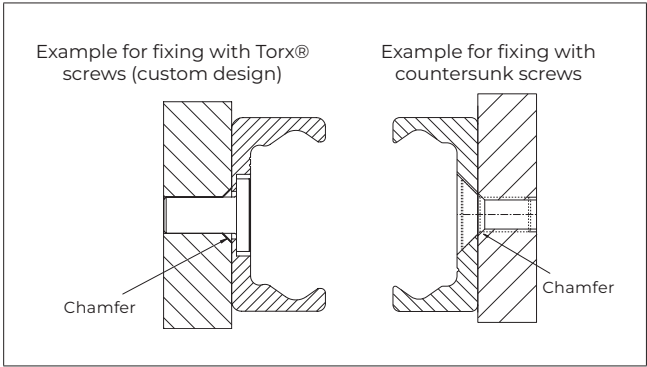


Fig.55

■ 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.37).

This coefficient y is used in the calculation formula for checking the static load and lifetime (see p. 55, Fig.94 and p. 56, Fig.96).

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

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.56). 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-preloaded 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.

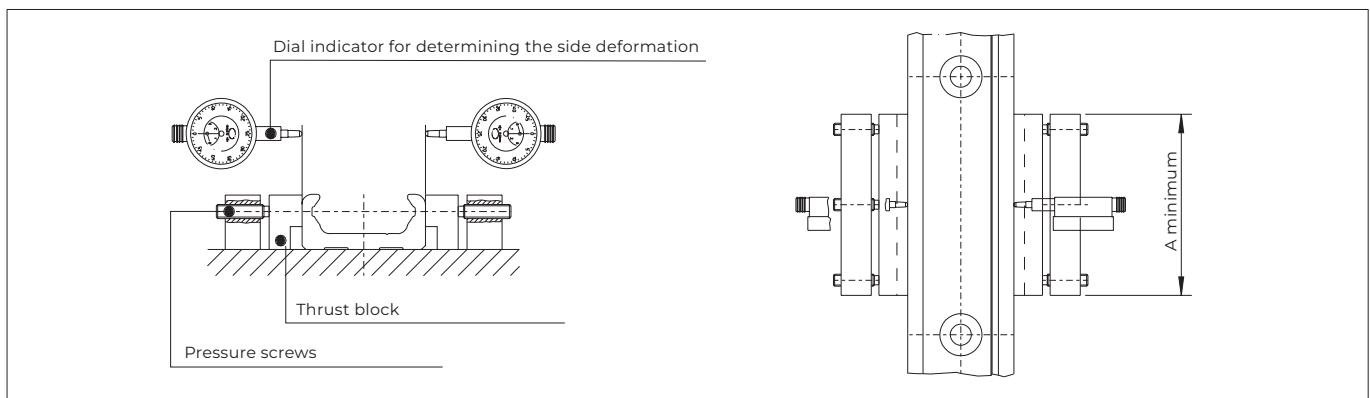


Fig.56

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.57).

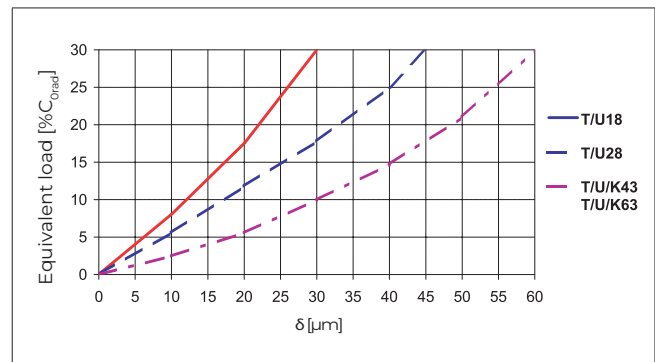


Fig.57

Preload class	Reduction y
K1 - standard	-
K2	0.1

Tab.37

Preload class	Interference* [mm]	Rail type
K1 - standard	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.38

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

Tab.39

■ How to adjust the slider

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 (with a point engraved see p. 17).
- (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.58). Engage the hexagon of the eccentric bearing 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 (for NSW, only the rollers with accessible screws on top of the slider can 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 Tab.40.
- (12) Reinstall the wipers.
- (13) For CSW/CDW series, lubricate the raceways.

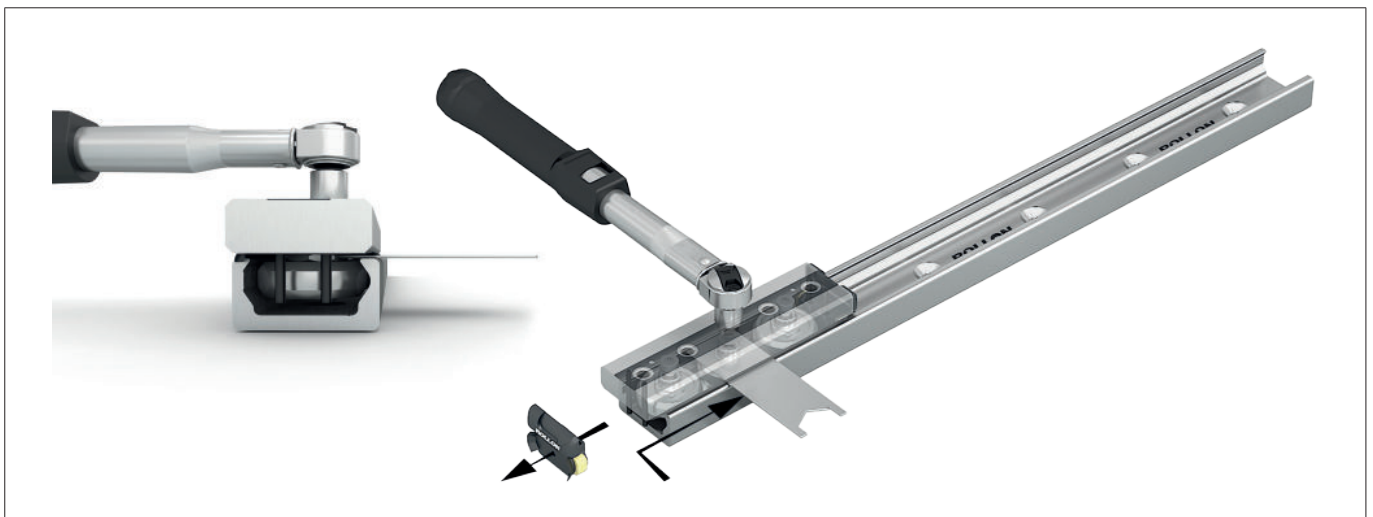


Fig.58

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

Tab.40

You can find a video tutorial on our Youtube channel.

■ Assembly of single rollers

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.41

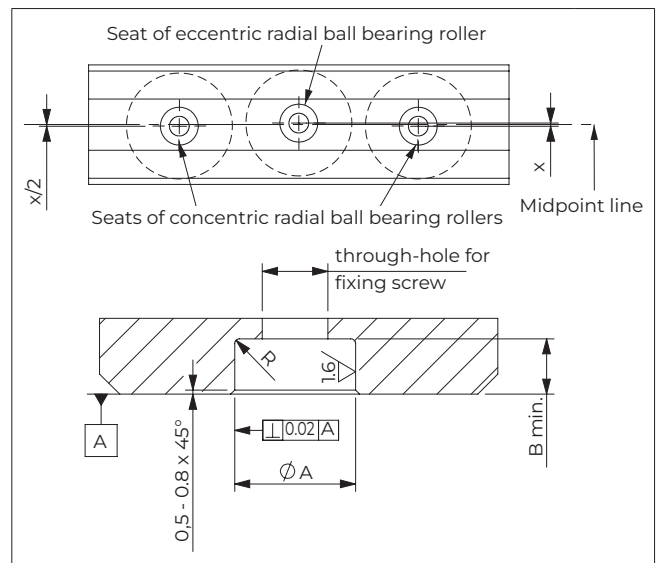


Fig.59

How install Compact Rail rollers on your own structure (see p. 27):

- ▣ 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.41).
- ▣ To install roller types CPN/CPA, CXPNX/CXPAX, CRPN/CRPA, and RXPNX/CRXPAX, a seat must be made in the structure according to the dimensions shown in Fig.59.
- ▣ Two concentric and two eccentric rollers are recommended for the four-roller slider. The two concentric rollers must engage with the lower raceway of the rail.
- ▣ Maintain the recommended offset distance between the midpoint line of the concentric rollers and that of the eccentric rollers (Fig.60).
- ▣ Two concentric rollers are recommended for the slider with five or more rollers (Fig.60). The two concentric rollers must engage with the lower raceway of the rail. The other rollers must all be eccentric and engage with the upper or lower raceway, depending on the application. Maintain the recommended offset distance between the midpoint line of the concentric rollers and that of the eccentric rollers.
- ▣ In the case of a configuration with all eccentric rollers, the seats must all be drilled along the midpoint line, and the rollers must then be adjusted to engage with either the upper or lower raceway of the rail.

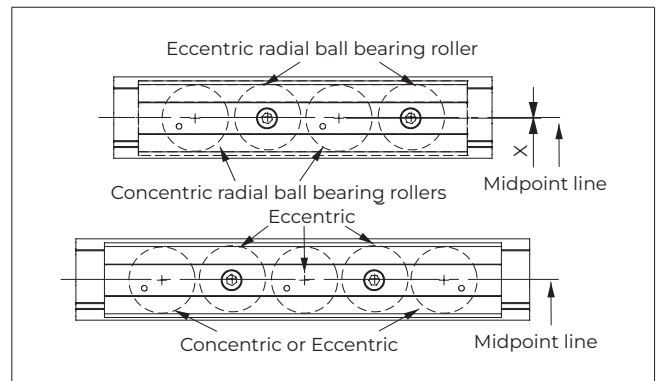


Fig.60

■ 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.61). The minimum required support depth can be taken from the Tab.42

The support reduces the shear forces on the fixing screws.

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

Tab.42

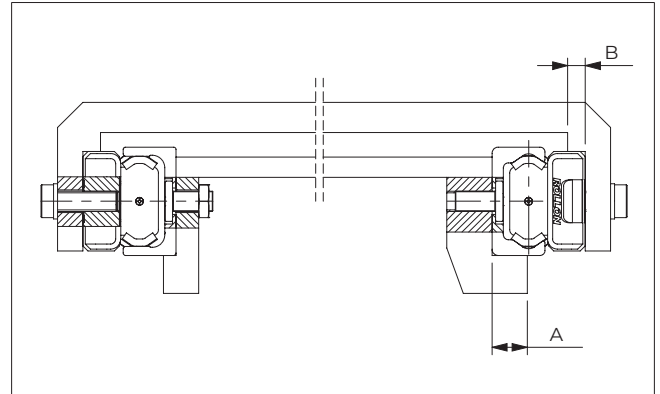


Fig.61

■ 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 (Tightening torque on Tab.43).
- (4) Continue tightening the remaining screws sequentially along the rail, moving from one end to the other.

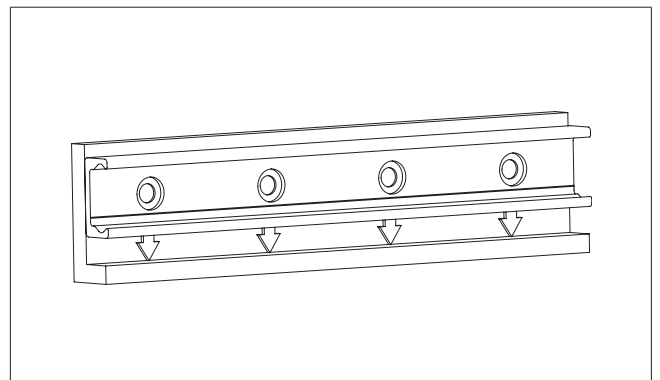


Fig.62

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.43

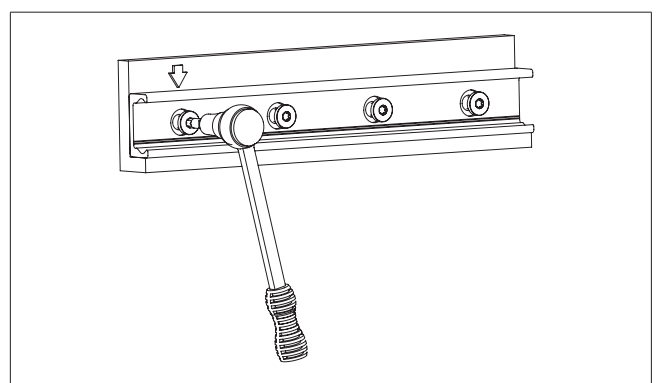


Fig.63

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.

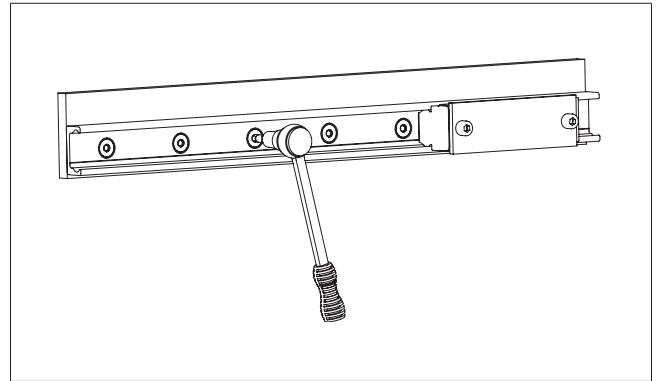


Fig.64

- (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 Fig.65 (Tightening torque on Tab.43).
- (3) Now position the slider on one end of the rail and carefully align the rail to zero on the dial indicator.

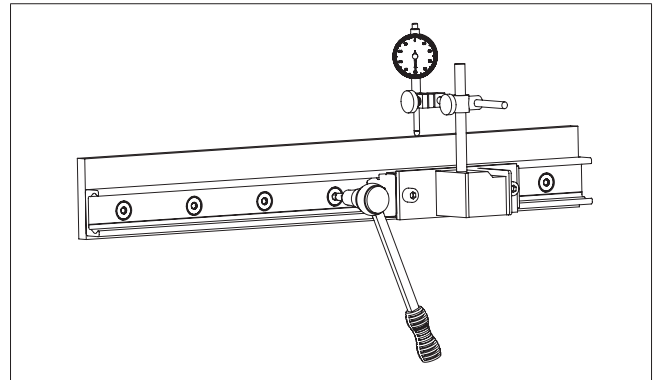


Fig.65

- (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 opposite end of the rail.

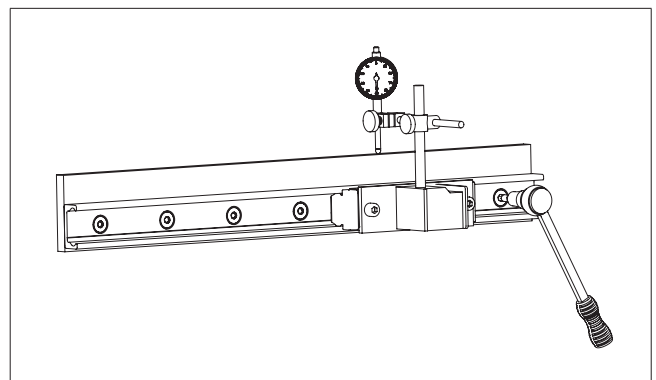


Fig.66

■ 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.

Slider with 4 rollers
Configuration A

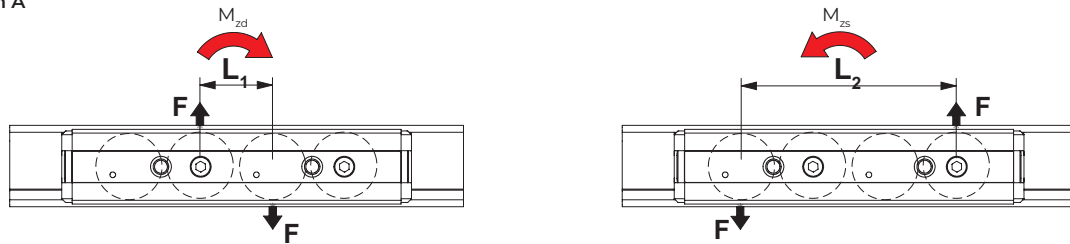


Fig.68

Slider with 4 rollers
Configuration B

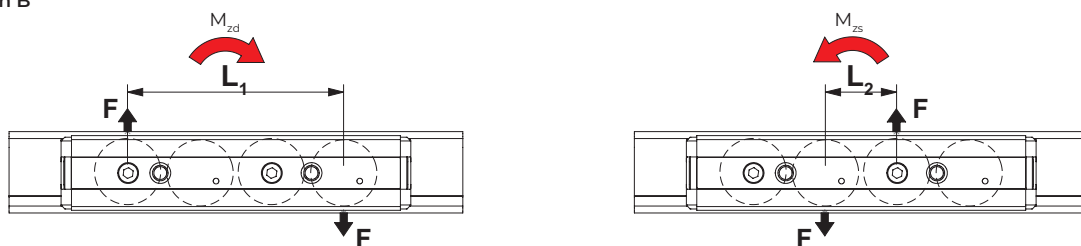


Fig.69

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. 64).

NSW-slider under load moment M_z

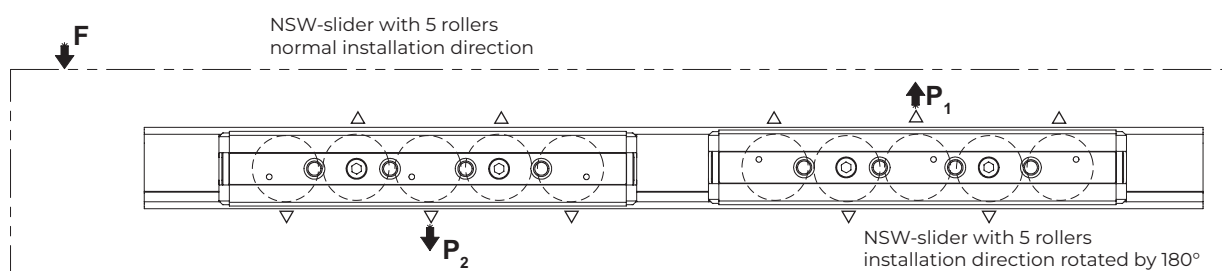


Fig.67

NSD-slider under load moment M_z

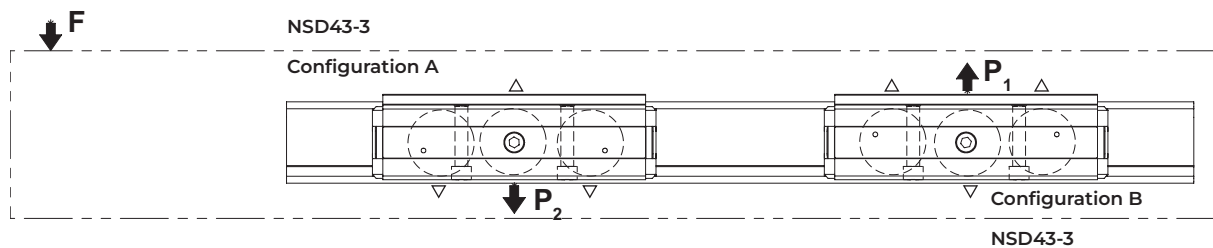


Fig.70

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.

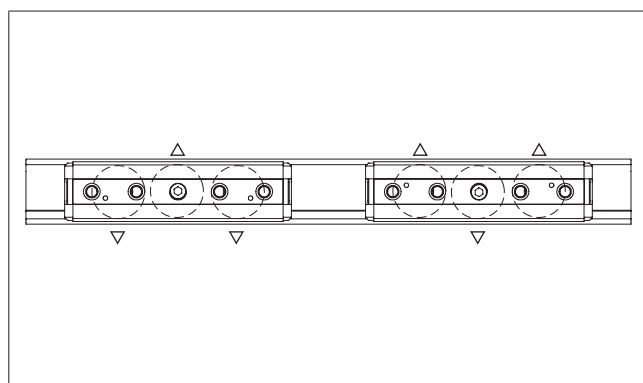


Fig.71

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.

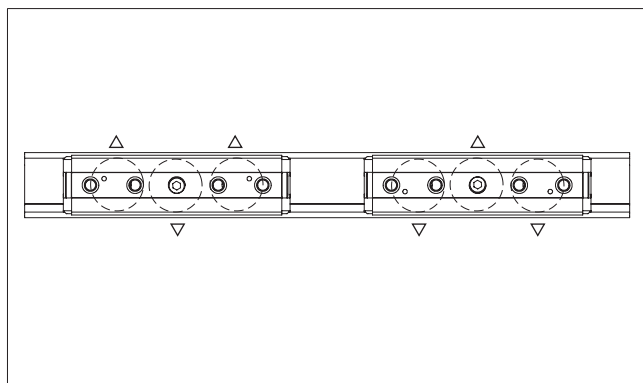


Fig.72

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.

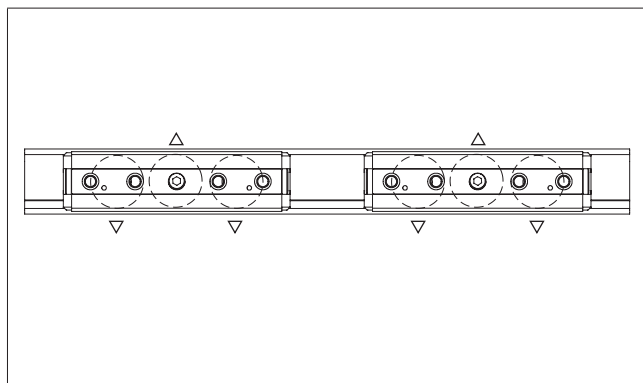


Fig.73

■ 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.74. 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.74. pos. 1). The number of fixing holes, used with property class 10.9 screws, is sized to meet the specified load capacity. For applications involving vibration or increased rigidity requirements, additional rail support (Fig.74. pos. 3) is recommended.

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 p. 40, Fig.51).

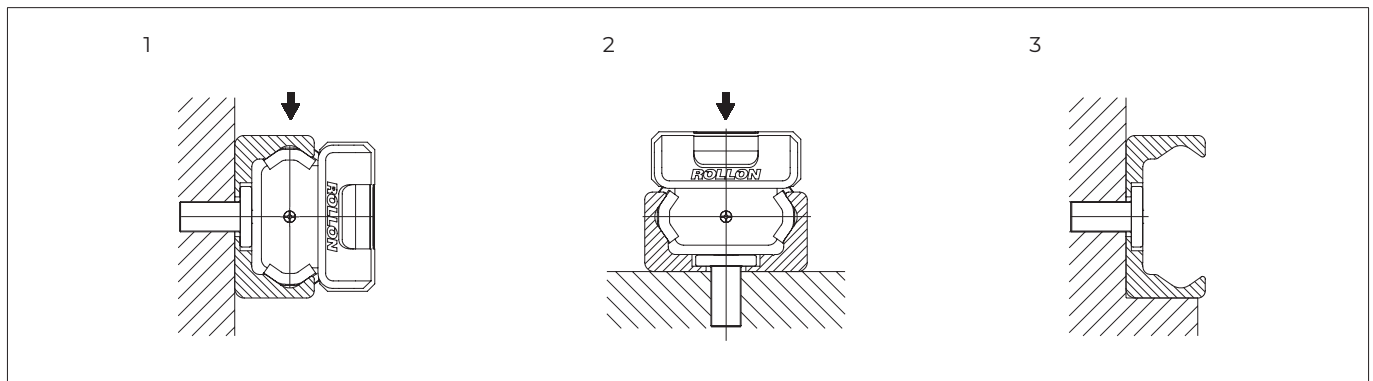


Fig.74

■ 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.44). These values account for a load capacity reduction of 30% on the T-rail and must absolutely be maintained in every case.

Rail size	α
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.44

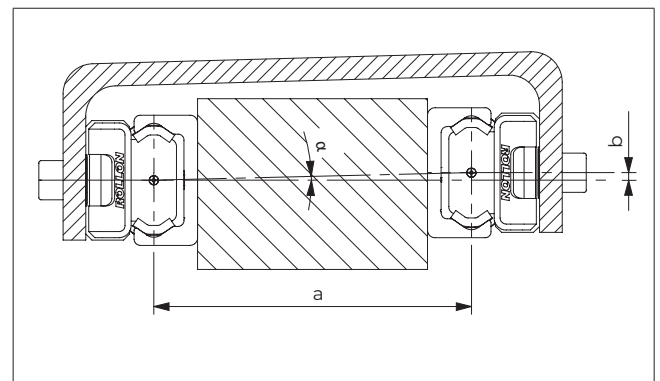


Fig.75

Example: NSW43: if $a = 500 \text{ mm}$; $b = a \cdot \tan \alpha = 1.5 \text{ mm}$

When using two T-rails, the maximum parallelism deviation must not be exceeded (see Tab.45). Otherwise, stresses can occur, which can result in a reduction in load capacity and service life. Parallelism tolerance depending on K1 and K2 preload.

Rail size	K1 - standard [mm]	K2 [mm]
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.45

Note: For parallelism problems, it is recommended to use a T+U or K+U system, since these combinations compensate for inaccuracies (see p. 33 and following).

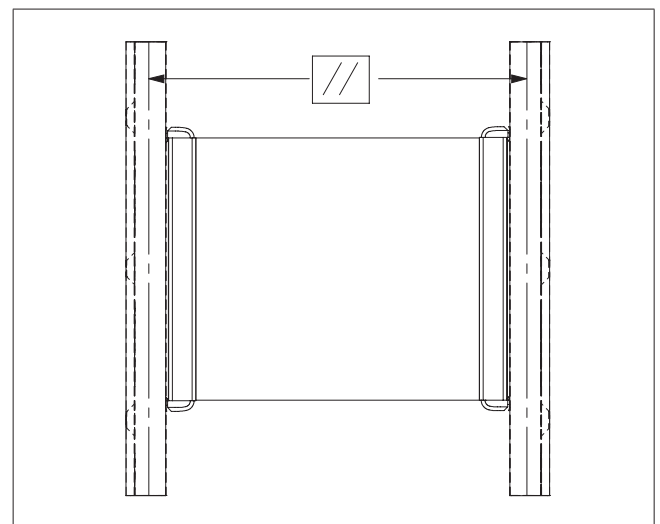


Fig.76

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.

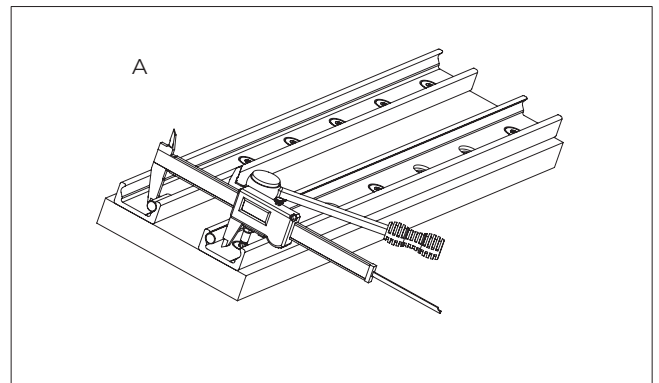


Fig.77

- (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 p. 49, Tab.45) for parallel rail installation.

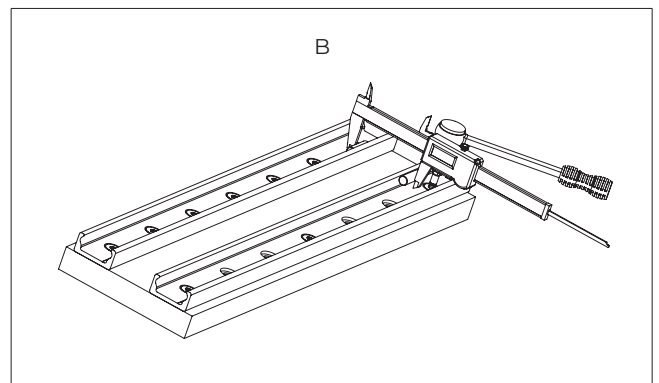


Fig.78

- (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 p. 49, Tab.45).

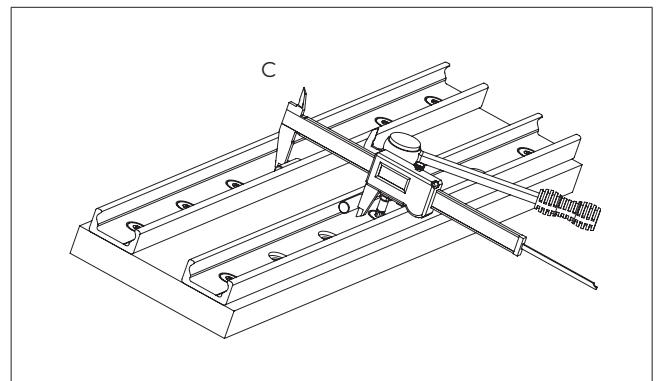


Fig.79

■ 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 p. 49).

- (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, using class 10.9 screws for the sliders (see Fig.80).

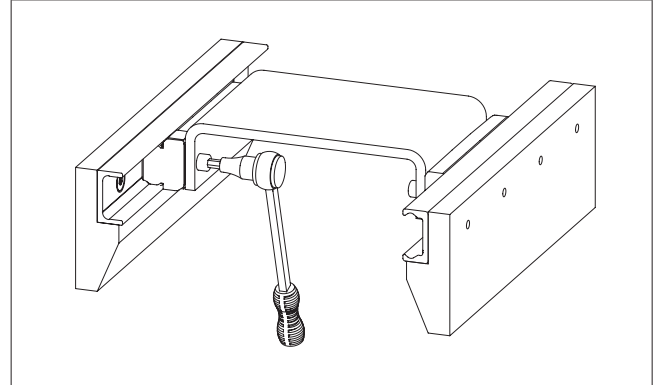


Fig.80

- (5) Tighten the center rail fixing screws to the specified torque (see p. 45, Tab.43).

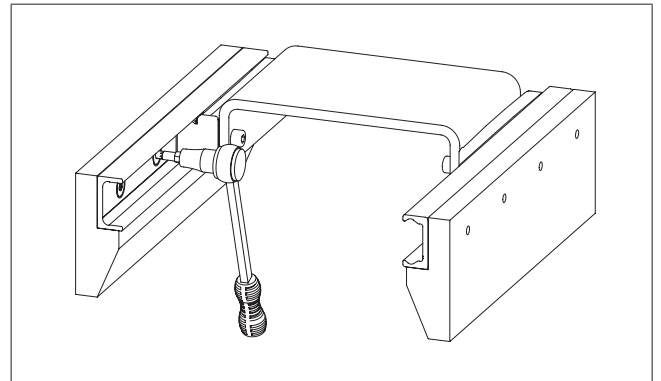


Fig.81

- (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.

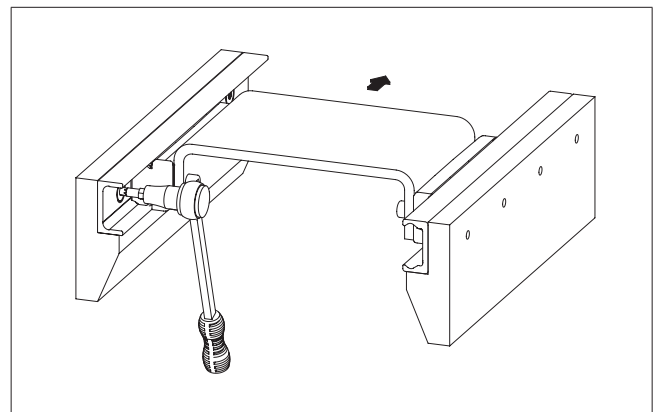


Fig.82

■ Alignment fixture AT (for T- and U-rail)

Rail size	Ordering key
18	AT 18
28	AT 28
35	AT 35
43	AT 43
63	AT 63

Tab.46

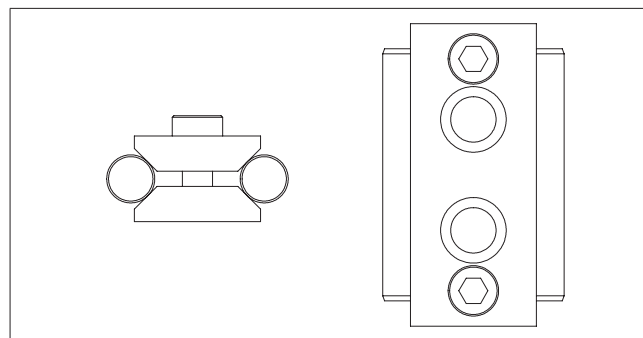


Fig.83

■ Alignment fixture AK (for K-rail)

Rail size	Ordering key
43	AK 43
63	AK 63

Tab.47

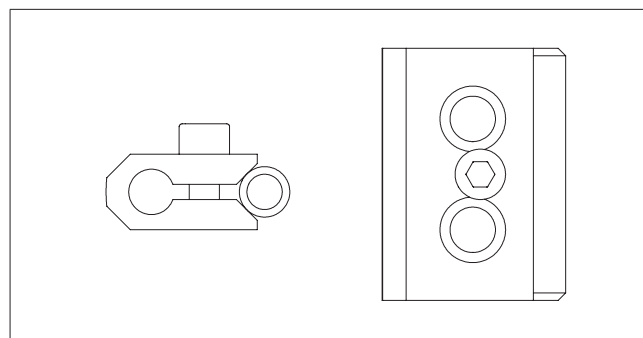


Fig.84

■ 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.85 are positioned correctly.

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

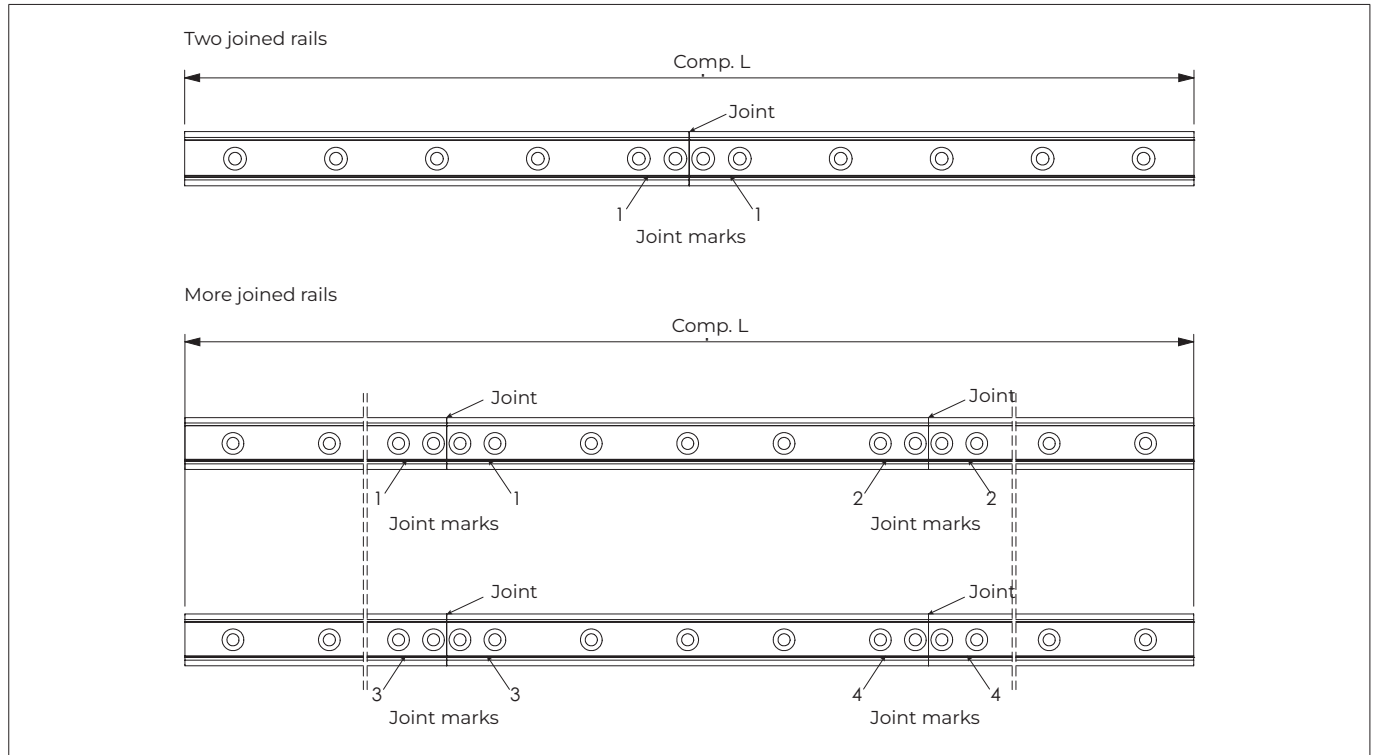


Fig.85

General information

The maximum available rail length in one piece is indicated in Tab.4 on p. 9. Longer lengths are achieved by joining two or more rails (joined rails).

Rollon then machines the rail ends and marks them. Additional fixing holes are added on the extremity of joined rails, to ensure a smooth transition of the slider over the joints, if installation procedures on p. 54 are followed. Two additional threaded holes (see Fig.86) are required in the mounting structure. For TLC rails, with cylindrical counterbores holes, additional fixing screws are supplied. (see p. 40).

The fixture for aligning the rail joint can be ordered using the provided table (see p. 52, Tab.46 and Tab.47).

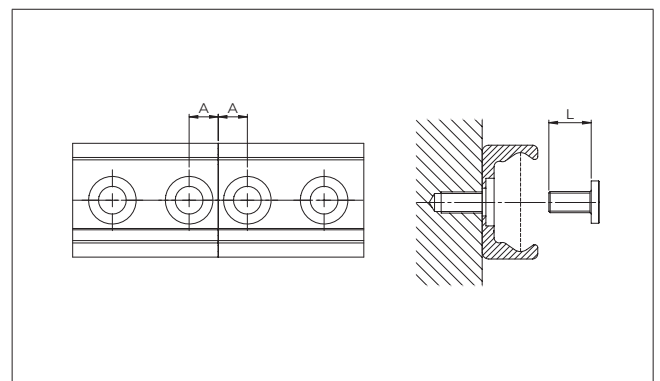


Fig.86

Type	A [mm]	Threaded hole (mounting structure)	Screw type	L [mm]	Alignment fixture
T..., U...18	7	M4	see p. 40	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.48

■ 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 the last one on the rail joint.
- (2) Install the end fixing screws without tightening them (see Fig.87).

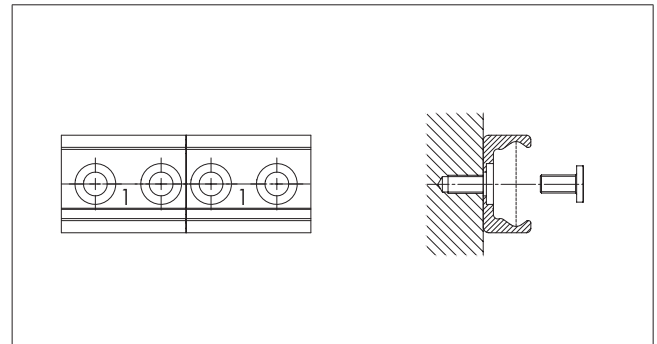


Fig.87

- (3) Place the alignment fixture on the rail joint and tighten both set screws uniformly, until the raceways are aligned (see Fig.88).
- (4) After the previous step (3), check if both rail backs lie evenly on the mounting surface. If a gap has formed this must be shimmed.

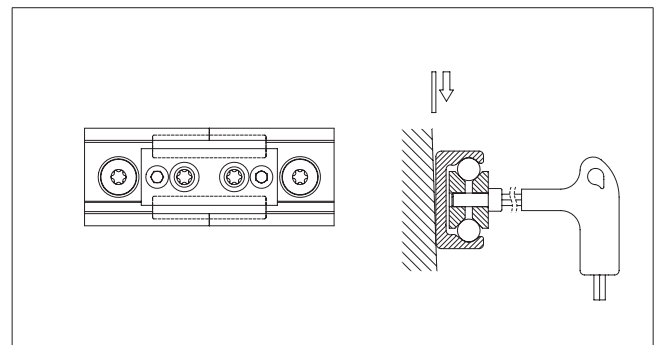


Fig.88

- (5) The bottom of the rails should be supported in the area of the transition. Here, check for an existing gap, which must be closed by shims for proper support of the rail.

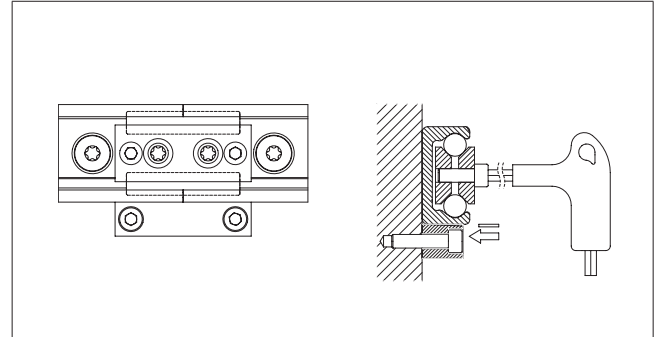


Fig.89

- (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 towards 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.

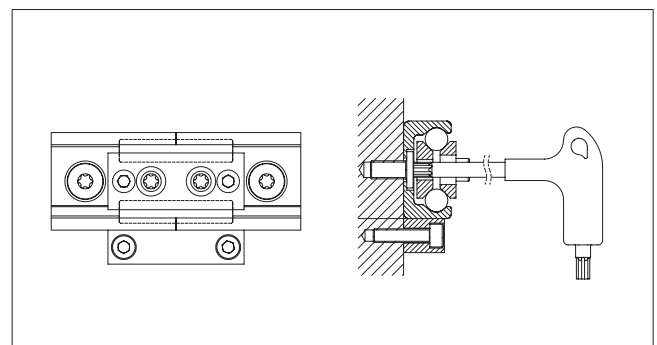


Fig.90

You can find a video tutorial on our Youtube channel.

► **STATIC LOAD AND SERVICE LIFE**

■ **Static load**

The radial load capacity rating, C_{Orad} , the axial load capacity rating C_{Oax} and moments M_x , M_y , M_z indicate the maximum capacity load values (see from p. 23 to 26). Higher loads will negatively affect running quality.

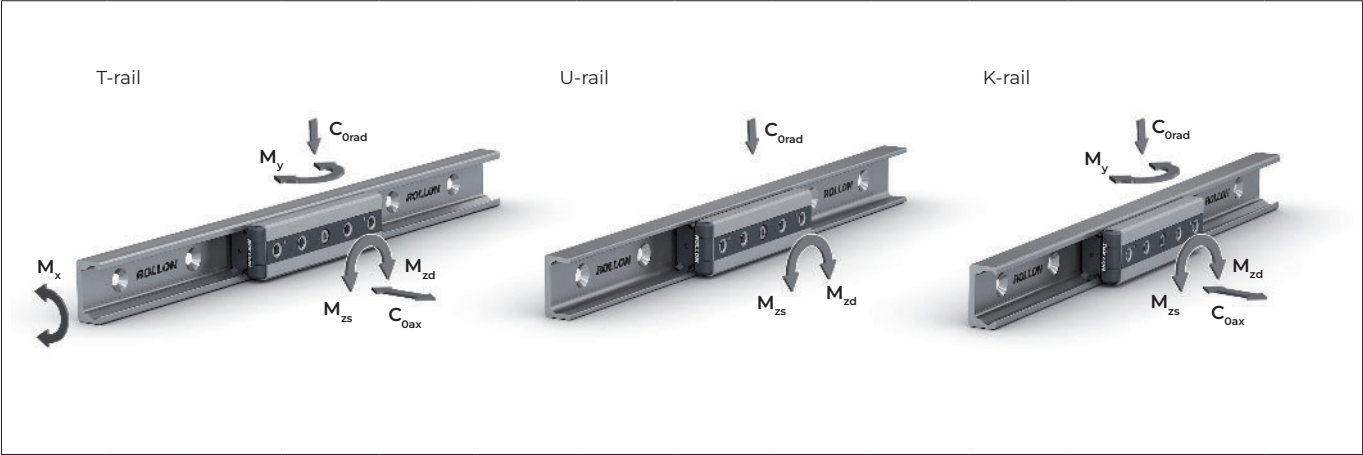


Fig.91

A safety factor, S_o , is used to check the static loads, taking into account the basic parameters of the application. It is defined in more detail in the following table:

Safety factor S_o

No shocks or vibrations, smooth and low-frequency reversals, high assembly accuracy, no elastic deformations.	1 - 1.5
Normal installation conditions	1.5 - 2
Shocks and vibrations, high-frequency reversals, significant elastic deformation.	2 - 3.5

Fig.93

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

$\frac{P_{Orad}}{C_{Orad}} \leq \frac{1}{S_o}$	$\frac{P_{Oax}}{C_{Oax}} \leq \frac{1}{S_o}$	$\frac{M_1}{M_x} \leq \frac{1}{S_o}$	$\frac{M_2}{M_y} \leq \frac{1}{S_o}$	$\frac{M_3}{M_z} \leq \frac{1}{S_o}$
--	--	--------------------------------------	--------------------------------------	--------------------------------------

Fig.92

The above formulas are valid for a single load case. If two or more forces act simultaneously, please refer to the following formula:

$\frac{P_{0rad}}{C_{0rad}} + \frac{P_{0ax}}{C_{0ax}} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} + y \leq \frac{1}{S_0}$	P_{0rad} = applied radial load (N) C_{0rad} = radial load capacity (N) P_{0ax} = applied axial load (N) C_{0ax} = axial load capacity (N) M_1, M_2, M_3 = applied moments (Nm) M_x, M_y, M_z = capacity moments in the different loading directions (Nm) y = reduction due to preload (see p. 42, Tab.37)
--	---

Fig.94

The safety factor (S_0) may be set at the lower limit if the applied forces can be determined with sufficient accuracy. If shocks and vibrations are present, the higher value should be selected. For dynamic applications, a higher safety factor is required. Please contact Rollon technical support.

■ 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 p. 23 to 26. The following formula (see Fig.95) links the calculated theoretical service life to the dynamic load capacity and the equivalent load:

$L_{km} = 100km \cdot \left(\frac{C}{P} \cdot \frac{f_c}{f_i} \cdot f_h \right)^3$	L_{km} = theoretical service life (km) C = dynamic load capacity (N) P = applied equivalent load (N) f_c = contact factor f_i = application coefficient f_h = stroke factor
---	---

Fig.95

The equivalent load (P) to the combined effect of all forces acting simultaneously on a slider. If these different load components are known, (P) is calculated 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 p. 42, Tab.37)
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Fig.96

Here, the external loads are assumed to be constant over time. Brief loads that do not exceed the maximum load capacities have no significant effect on service life and can therefore be neglected. The contact factor (f_c) applies to applications in which several sliders pass over the same rail section. If two or more sliders move over the same point of a rail, the contact factor, according to Tab.49, must be taken into account in the formula for calculating service life.

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

Tab.49

The application coefficient (f_i) accounts for the operational conditions in the service life calculation. It is determined as described in the following table:

f_i	
No shocks or vibrations, smooth and low-frequency direction changes; clean operating conditions; low speeds (<1 m/s)	1 - 1.5
Slight vibrations, average speeds (1–2.5 m/s), and a moderate frequency of direction changes.	1.5 - 2
Shocks and vibrations, high speeds (> 2.5 m/s), and high-frequency direction change; extreme dirt contamination	2 - 3.5

Tab.50

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

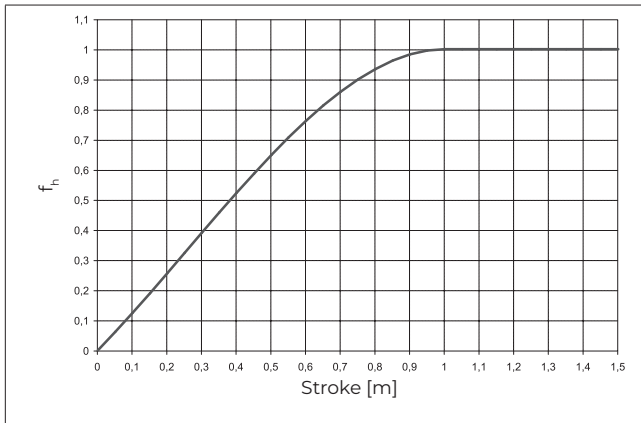


Fig.97

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

For an explanation of the parameters in the formulas see p. 59, Fig.112

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.98

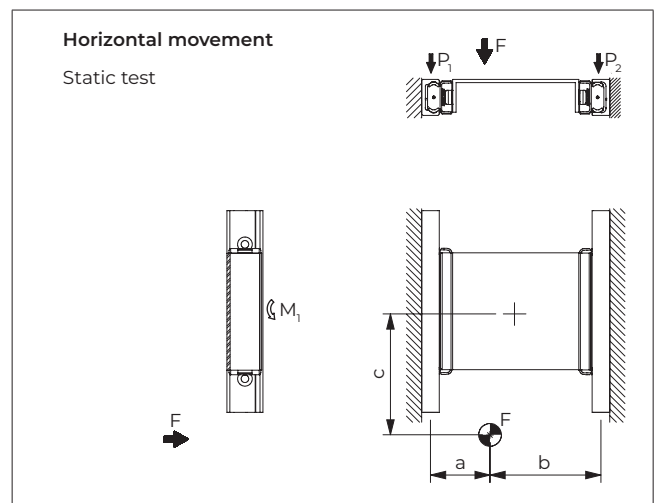


Fig.100

Slider load:

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

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

Fig.99

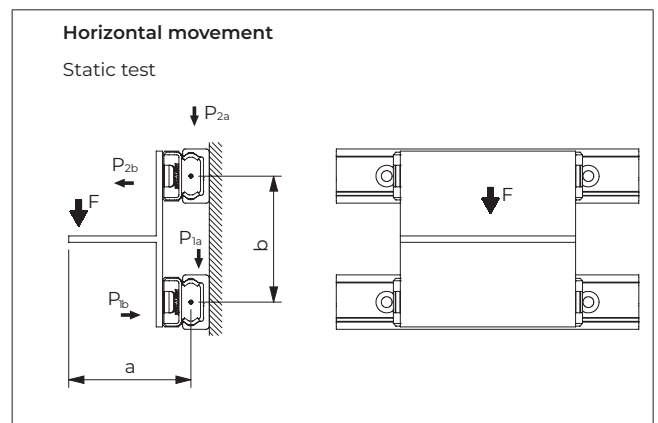


Fig.101

Slider load:

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

$$P_1 = P_2 + F$$

Fig.102

Note:

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

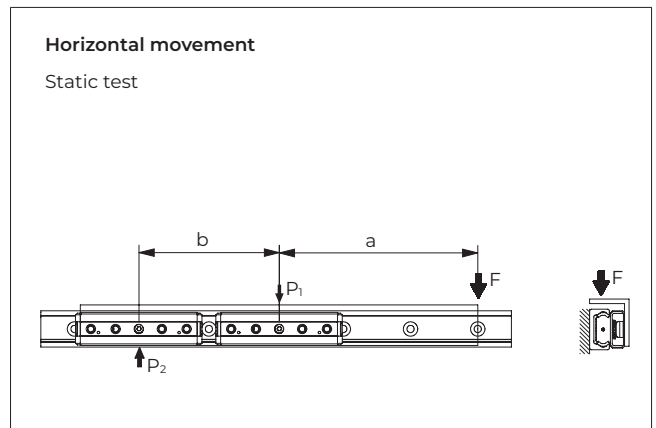


Fig.103

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.104

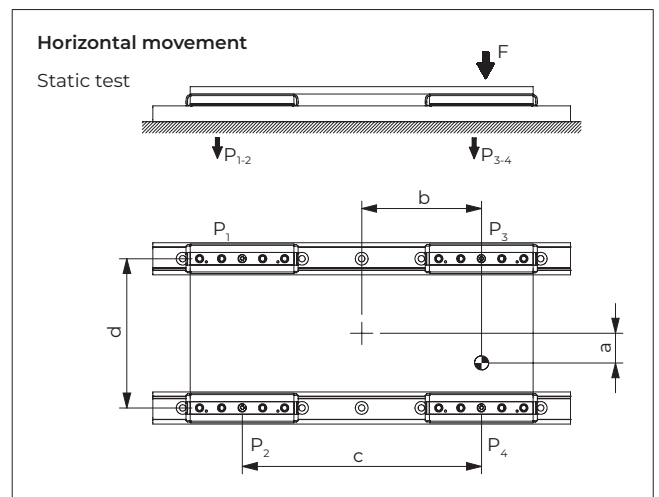


Fig.106

Note:

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

Slider load:

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

Fig.105

Note:

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

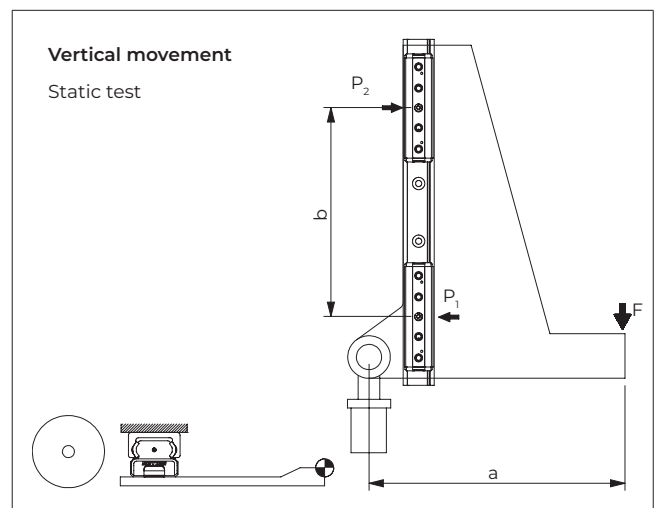


Fig.107

Slider load:

$$P_1 = F$$

$$M_2 = F \cdot a$$

Fig.108

Horizontal movement

Static test

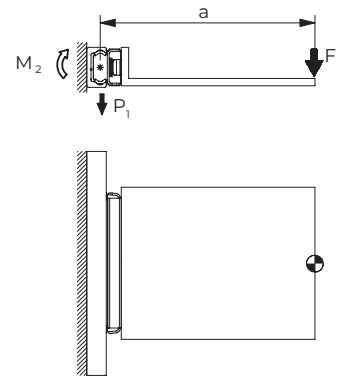


Fig.109

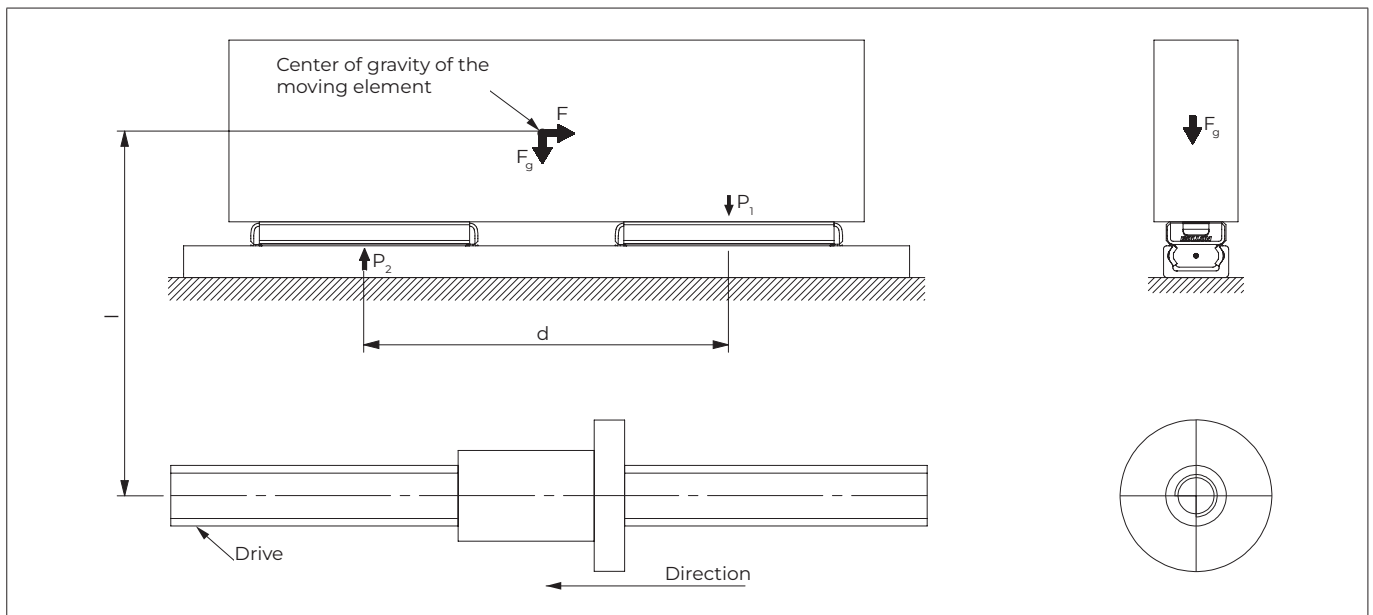


Fig.110

Horizontal movementTest 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

$$P_1 = \frac{F \cdot l}{d} + \frac{F_g}{2} \quad P_2 = \frac{F_g}{2} - \frac{F \cdot l}{d}$$

Fig.111

Explanation of the calculation formula

F = applied 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 = applied moment (Nm)

m = mass (kg)

a = acceleration (m/s^2)

Fig.112



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