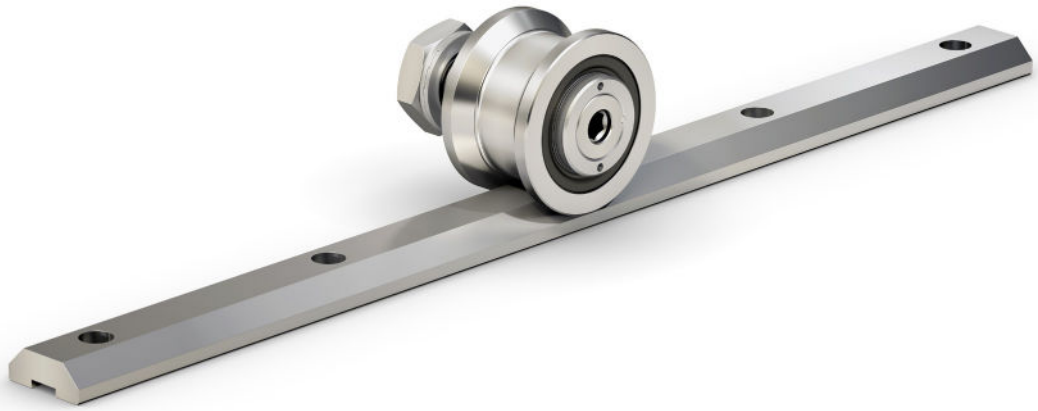
NADELLA ROLLON BY TIMKEN

HEAVY-LINE

Data sheet - rev. 1.1



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 all necessary services and information — saving time and boosting productivity in search of high-performance motion solutions.

SCAN ME!

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ORDERING KEY

▪ **Rail / slider system**

GU GP	35	MT	J	1500	SB	NW	

Optional Features - NW: Nickel plating.

Optional Features - SA: Boring layout A (only GP range). **SB**: Boring layout B (both GU and GP range).

Rail lenght [mm]

Optional Features - J: assembled codes composed by joined rails.

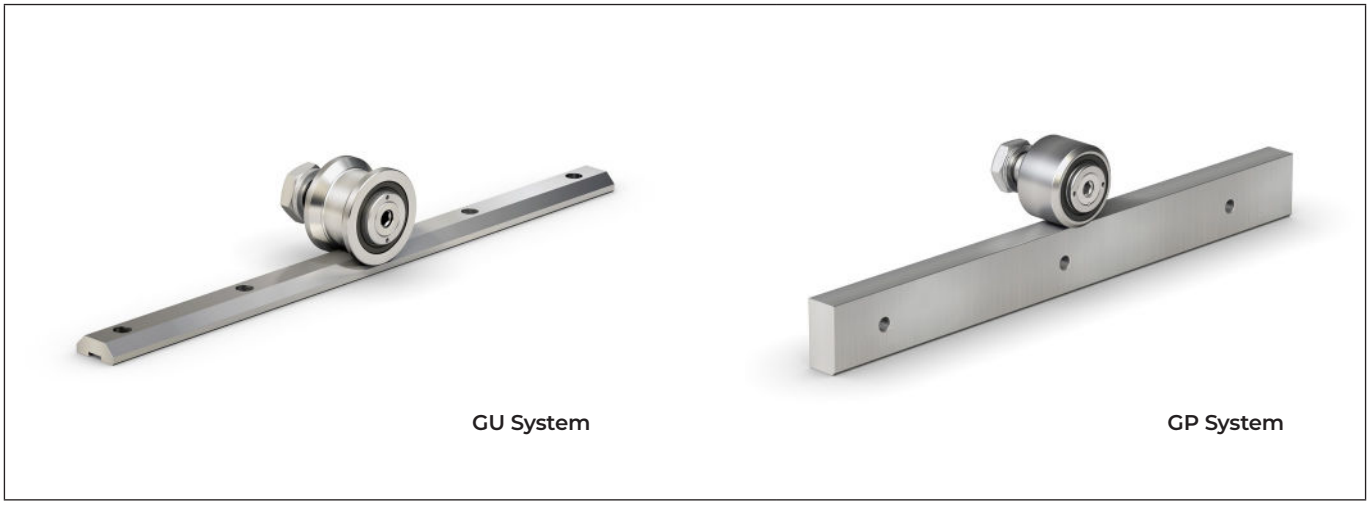
Type - M: Ground. **MT**: Cold drawn and sandblasted

Size

Series

Ordering example: GU 35 MT J 6000 SB

FEATURES AND ADVANTAGES



GU System

GP System

Fig. 1

Heavy-Line is based on prismatic linear guides with hardened raceways. It is designed for use with needle or tapered roller bearings and it's an ideal solution for dirty environments.

Heavy-Line is available in two configurations: the GU System with prismatic cross-sections and the GP System, which has rectangular or squared cross-sections. The combination of prismatic rails type GU and flat rails type GP compensates for guide rail misalignment and deformations in small and large structures.

The rails come in multiple sizes and can be supplied with chemical nickel plating as a surface treatment upon request. Heavy-Line rollers integrate double-row tapered roller bearings made from high-quality steel, they are available in a concentric and eccentric version, and they are supplied with self-locking washers and a hexagonal mounting nut. Guide wheels without studs are available for a different mounting configuration. Upon request, rollers and wheels are also available with external parts in stainless steel for enhanced corrosion resistance, and with Viton seals, suitable for operating temperatures up to 120°C. A lubrication kit with a pre-lubricated felt is provided, using a mineral oil-based lubricant.

Heavy-Line is particularly suited for industrial machinery, robotics and automation industries. It is widely used in metal production, paper and building industries.

The GP guide is also often used in combination with the FS guide of the V-Line system to compensate for parallelism errors. For a complete overview of solutions, please also refer to the V-Line Data Sheet.

Performance characteristics

- GU available sizes: 28, 35, 50 mm
- GP available sizes: 26x26, 32x32, 36x17, 43x21, 50x50, 62x22, 72x32, 82x22 mm
- Max. operating speed: 10 m/s (394 in/s)*
- Max. acceleration: 25 m/s² (984 in/s²)*
- Temperature range: - 20°C to + 120°C (- 4 °F to + 248 °F)

  * depending on application

Rails

- Material: induction hardened steel
- Max rail length for GU system: 4020 mm (158 in)
- Max rail length for GP system: 3000 mm (118 in)
- MT finishing type: cold drawn profile, induction hardened on raceways, sandblasted.
- M finishing type: cold drawn profile, induction hardened and ground raceways.

Rollers

- Material: hardened and tempered steel, carburized steel.
- GU System RKU rollers diameter: 55-65-75-95-115 mm.
- GP System PK rollers diameter: 52-62-72-90-110 mm.
- GP System KR...EE rollers diameter: from 16 mm to 90 mm.
- GU System GCU rollers diameter: from 100 mm to 130 mm.
- Integrated tapered roller bearings lubricated for life.

MAIN ADVANTAGES

Self-aligning system	High load capacity	Reliability in dirty environments	Precision	Long service life
The floating guide roller allows greater flexibility in structural design without the need for precise machining of the mounting surface, simplifying assembly and reducing installation time.	Induction-hardened raceways enable Heavy-Line guides to handle heavy loads with reliability and efficiency.	Rollers with profile are especially suitable for rough and dirty environment. Lubricators with slow releasing lubricating felt available as accessories.	The carefully engineered design, with extremely tight tolerances, helps ensure smooth and accurate linear motion, reducing play between sliding surfaces.	Built to offer high performance and durability; their longevity results from quality materials, precise engineering, and regular maintenance.

COMPONENTS AND DIMENSIONS

▪ GU System - Guide Rails GU ... MT

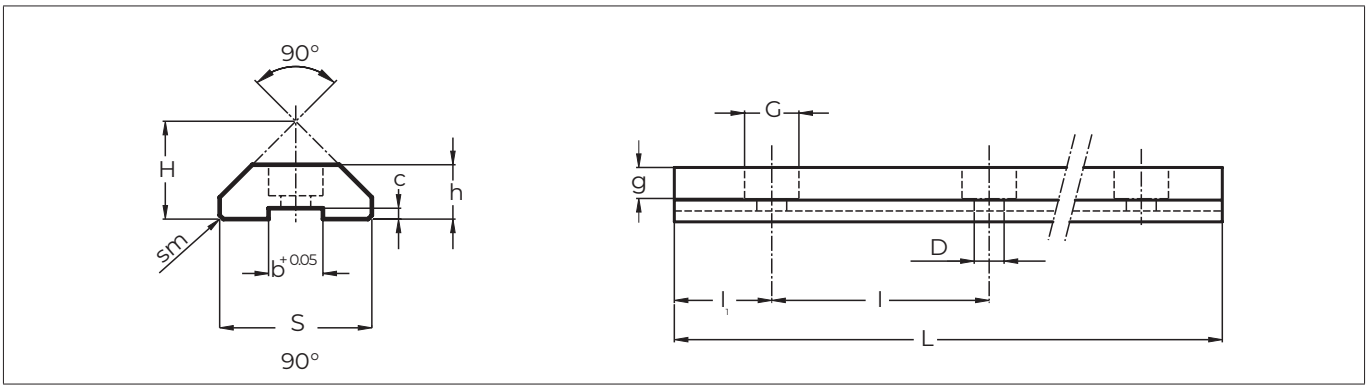


Fig.2

Type	H ± 0.05	h ± 0.05	S ± 0.05	D + 0.1	G	g	b + 0.05	c ± 0.05	sm	l	l_1	Weight 1) (kg/m)
GU 28 MT	19	11	28.8	5.5	10	5.7	10	2.5	1.4 x 45°	90	30	1.97
GU 35 MT	23.9	15.7	35.5	6.6	11	6.8	10	3.8	1.4 x 45°	90	30	3.35
GU 50 MT	35.5	21	50.8	11	18	11	16	4.3	1.4 x 45°	90	30	6.89

1) Weight without holes

Tab.1

Max. length in single element L = 4020 mm.
Longer rails are made by joining several elements with ground end.

▪ GU System - Guide Rails GU ... M

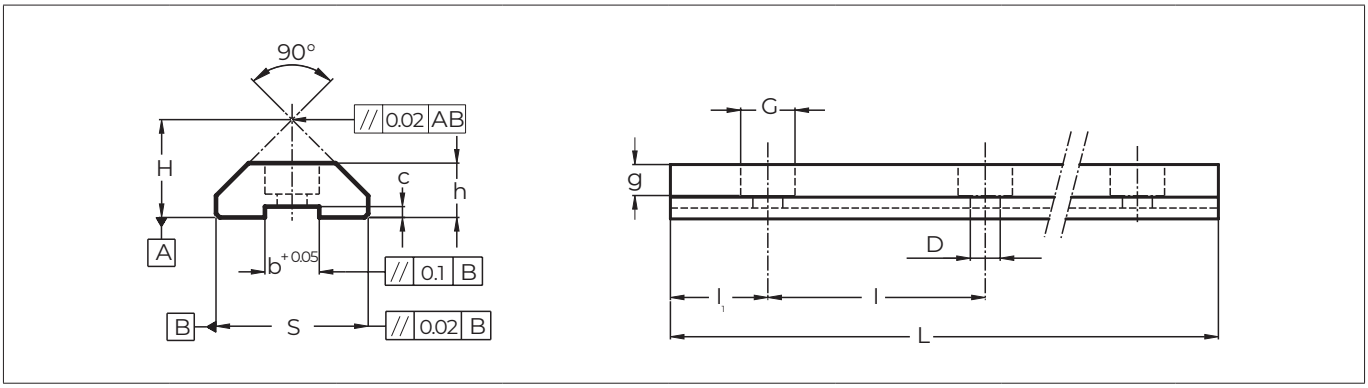


Fig.3

Type	H ± 0.05	h ± 0.05	S ± 0.05	D + 0.1	G	g	b + 0.05	c ± 0.05	l	l_1	Weight 1) (kg/m)
GU 28 M	18	10	28	5.5	10	5.7	10	2	90	30	1.8
GU 35 M	23	15	35	6.6	11	6.8	10	3.3	90	30	3.2
GU 50 M	34.5	20	50	11	18	11	16	3.8	90	30	6.8

2) Weight without holes

Tab.2

Max. length in single element L = 4020 mm.
Longer rails are made by joining several elements with ground end.

Rails Finishing

- Drawn, induction hardened and sandblasted tracks (MT).
- Drawn, induction hardened and ground tracks (M).
- Induction hardening on raceways only.

Optional Features

- Chemical nickel-plating (NW).

Hole Layout

- Holes according to catalogue (SB).
- Finishes to drawing (NZ).
- Without holes (NF).

Example of standard designation: GU 35 MT 2500 SB

▪ GU System - Guide Rollers RKU - Concentric - Eccentric

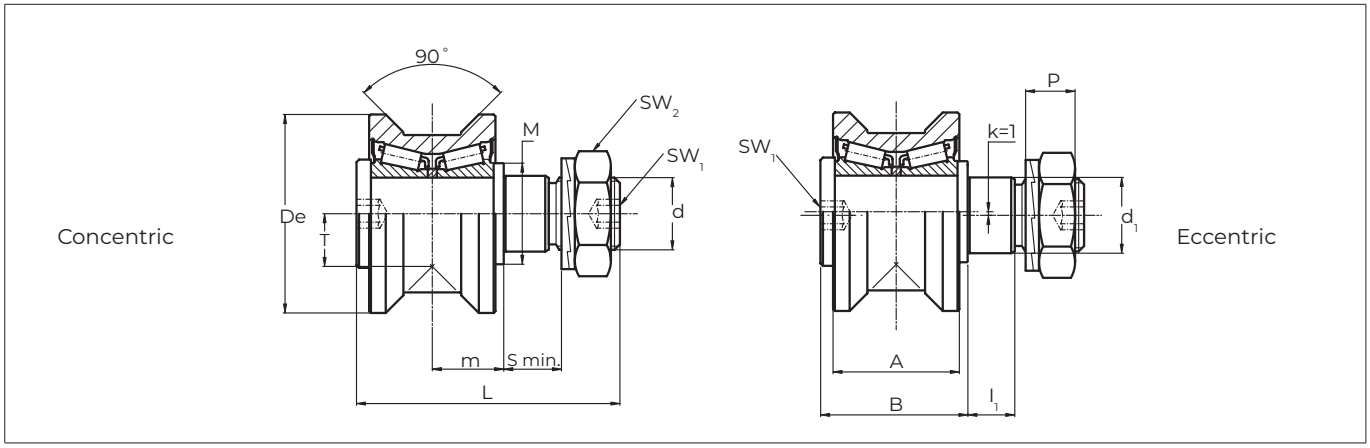


Fig.4

Type		De	d_1 [1]	D	T	m	S min.	P	L	A	B	l_1	M	SW_1	SW_2	k
Concentric	Eccentric															
RKU 55	RKUR 55	55	21	M20 x 1.5	14.6	19.8	15	13.4	73	35	41	14	28	8	30	1
RKU 65	RKUR 65	65	27	M24 x 1.5	18	20.8	19	15.4	83	37	44	18	35	10	36	1
RKU 75	RKUR 75	75	36	M30 x 1.5	23.7	27	19	21.6	100	45	55	18	44	12	46	1
RKU 95	RKUR 95	95	38	M36 x 1.5	25.5	30	24	24.6	115	53 / 56[2]	62	23	50	14	55	1
RKU 115	RKUR 115	115	42	M36 x 1.5	33.5	34	33	24.6	135	60 / 63[2]	70	32	56	14	55	1

Tab.3

Type		Dynamic load (N)	Limit loads (N)		Life coefficients		Torque wrench settings[4] (Nm)	Weight (kg)
Concentric	Eccentric	C_w [3]	Radial F_r	Axial F_a	X	Y		
RKU 55	RKUR 55	42000	11900	3900	1	4	80	0.6
RKU 65	RKUR 65	48000	17000	6900	1	3.7	160	0.9
RKU 75	RKUR 75	69000	28500	10200	1	3.4	300	1.6
RKU 95	RKUR 95	134000	29000	12700	1	4.5	450	2.8
RKU 115	RKUR 115	190000	45000	17900	1	4.4	450	4.9

Tab.4

Type		Dynamic load (N)	Limit loads (N)		Life coefficients		Torque wrench settings[4] (Nm)	Weight (kg)
Concentric	Eccentric	C_w [3]	Radial F_r	Axial F_a	X	Y		
RKU 55 NX	RKUR 55 NX	42000	10000	3300	1	4	80	0.6
RKU 65 NX	RKUR 65 NX	48000	13000	5800	1	3.7	160	0.9
RKU 75 NX	RKUR 75 NX	69000	26000	8500	1	3.4	300	1.3
RKU 95 NX	RKUR 95 NX	134000	19000	9000	1	4.5	450	2.8
RKU 115 NX	RKUR 115 NX	190000	30000	15000	1	4.4	450	4.9

1) Housing bore tolerance: H7
2) Dimensions relating to the stainless-steel rollers (suffix NX)
3) Cw basic load for 100 km
4) The torque wrench settings are given for non-lubricated threads; for lubricated threads, multiply figure by 0.8

Tab.5

Roller features

- On request, the guide rollers can be supplied with external parts in stainless steel (suffix NX). Internal rolling elements in standard bearing steel.
- Standard seals: material NBR, RS type.
- Pressure angle α for load calculation: 45°.
- On request, guide rollers can be supplied with Viton seals for operating temperatures up to 120°C (suffix V, not available for RKU 115).
- The guide rollers include self-locking washers and hexagonal nut (DIN 439B) for fitting.

▪ GU System - Guide Wheels FKU

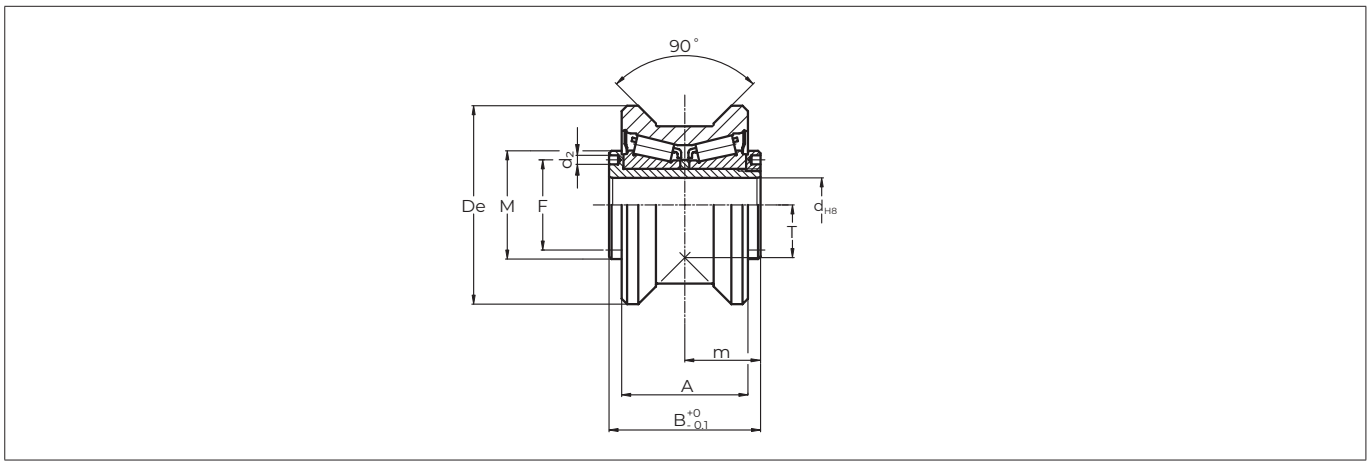


Fig.5

Type	De	d	T	m	A	B	F	d_2 [2]	M
FKU 55	55	15	14.6	21	35	42	25	2.5	30
FKU 65	65	20	18	22.5	37	45	29	3	35
FKU 75	75	25	23.7	28	45	56	37	4	44
FKU 95	95	28	25.5	32	53 / 56[1]	64	42	4	49
FKU 115	115	35	33.5	36	60 / 63[1]	72	52	4	59

Tab.6

Type	Dynamic load (N)	Limit loads (N) [4]		Life coefficients		Weight (kg)
	C_w [3]	Radial F_r	Axial F_a	X	Y	
FKU 55	42000	11900	3900	1	4	0.5
FKU 65	48000	17000	6900	1	3.7	0.6
FKU 75	69000	28500	10200	1	3.4	1.2
FKU 95	134000	29000	12700	1	4.5	2.3
FKU 115	190000	45000	17900	1	4.4	3.9

Tab.7

Type	Dynamic load (N)	Limit loads (N) [4]		Life coefficients		Weight (kg)
	C_w [3]	Radial F_r	Axial F_a	X	Y	
FKU 55 NX	42000	10000	3300	1	4	0.5
FKU 65 NX	48000	13000	5800	1	3.7	0.6
FKU 75 NX	69000	26000	8500	1	3.4	1.2
FKU 95 NX	134000	19000	9000	1	4.5	2.3
FKU 115 NX	190000	30000	15000	1	4.4	3.9

1) Dimensions relating to the stainless-steel rollers (suffix NX)
2) To prevent rotation between roller and shaft a pin can be fitted in one of the holes “d2” positioned in the side flange
3) C_w = Basic load for 100 km
4) The load capacities refer to rollers with a through shaft supported on both sides

Tab.8

Roller features

- On request, the guide rollers can be supplied with external parts in stainless steel (suffix NX). Internal rolling elements in standard bearing steel.
- Standard seals: material NBR, RS type.
- Pressure angle α for load calculation: 45°.
- On request, guide rollers can be supplied with Viton seals for operating temperatures up to 120°C (suffix V, not available for FKU 115).

▪ GU System - Floating Guide Rollers RKUL - Concentric - Eccentric

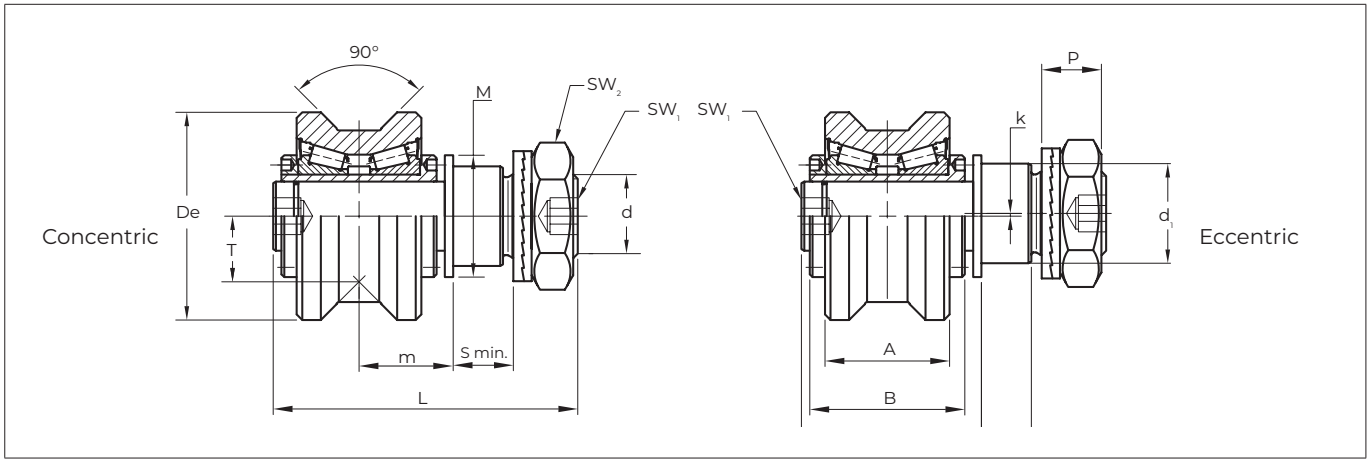


Fig.6

Type		De	d_1 [1]	d	T	m [2] min.	m [2] max.	S min.	P	L	A	B	C	l_1	M	SW_1	SW_2	k
Concentric	Eccentric																	
RKUL 55	RKULR 55	55	21	M20 x 1.5	14.6	24	30	15	13.4	83	35	42	51	14	30	8	30	1
RKUL 65	RKULR 65	65	27	M24 x 1.5	18	25.5	31.5	19	15.4	93	37	45	54	18	35	10	36	1
RKUL 75	RKULR 75	75	36	M30 x 1.5	23.7	31	37	19	21.6	110	45	56	65	18	44	12	46	1
RKUL 95	RKULR 95	95	38	M36 x 1.5	25.5	36	43	24	24.6	128	53 / 56[3]	64	75	23	49	14	55	1
RKUL 115	RKULR 115	115	42	M36 x 1.5	33.5	40	47	33	24.6	148	60 / 63[3]	72	83	32	59	14	55	1

Tab.9

Type		Dynamic load (N) C_w [4]	Limit loads (N) Radial F_r	Torque wrench settings[5] (Nm)	Weight (kg)
Concentric	Eccentric				
RKUL 55	RKULR 55	42000	3050	80	0.8
RKUL 65	RKULR 65	48000	6850	160	1.1
RKUL 75	RKULR 75	69000	11200	300	1.8
RKUL 95	RKULR 95	134000	13800	450	3.0
RKUL 115	RKULR 115	190000	24000	450	5.1

Tab.10

1) Housing bore tolerance: H7
2) To ensure safe and proper functioning the dimension m must not be higher than m max.
3) Dimensions for stainless steel (NX) version ousing bore tolerance: H7
4) C_w = Basic load for 100 km
5) The torque wrench settings are given for non-lubricated threads; for lubricated threads multiply figure by 0.8

Notes

- On request, the guide rollers can be supplied with external parts in stainless steel (suffix NX). Internal rolling elements in standard bearing steel.
- Standard seals: material NBR, RS type.
- Pressure angle α for load calculation: 45°.
- On request, guide rollers can be supplied with Viton seals for operating temperatures up to 120°C (suffix V, not available for RKUL 115).
- The guide rollers include self-locking washers and hexagonal nut (DIN 439B) for fitting.

Tables refer to steel rollers, in case of inox version load capacity may change. Please contact technical department for further information.

▪ GU System - Guide Roller Combinations (RKU, FKU, RKUL)

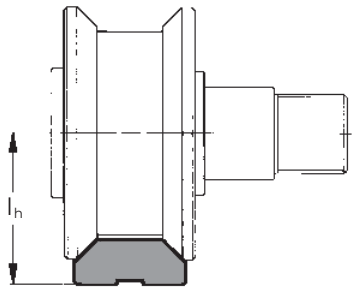


Fig.7

Guide type	Roller type				
	RKU, FKU, RKUL 55	RKU, FKU, RKUL 65	RKU, FKU, RKUL 75	RKU, FKU, RKUL 95	RKU, FKU, RKUL 115
GU 28 MT	33.6	37	–	–	–
GU 28 M	32.6	36	–	–	–
GU 35 MT	–	41.9	47.6	–	–
GU 35 M	–	41	46.7	–	–
GU 50 MT	–	–	–	61	69
GU 50 M	–	–	–	60	68

Tab.11

▪ GP System - Guide Rail GP ... M

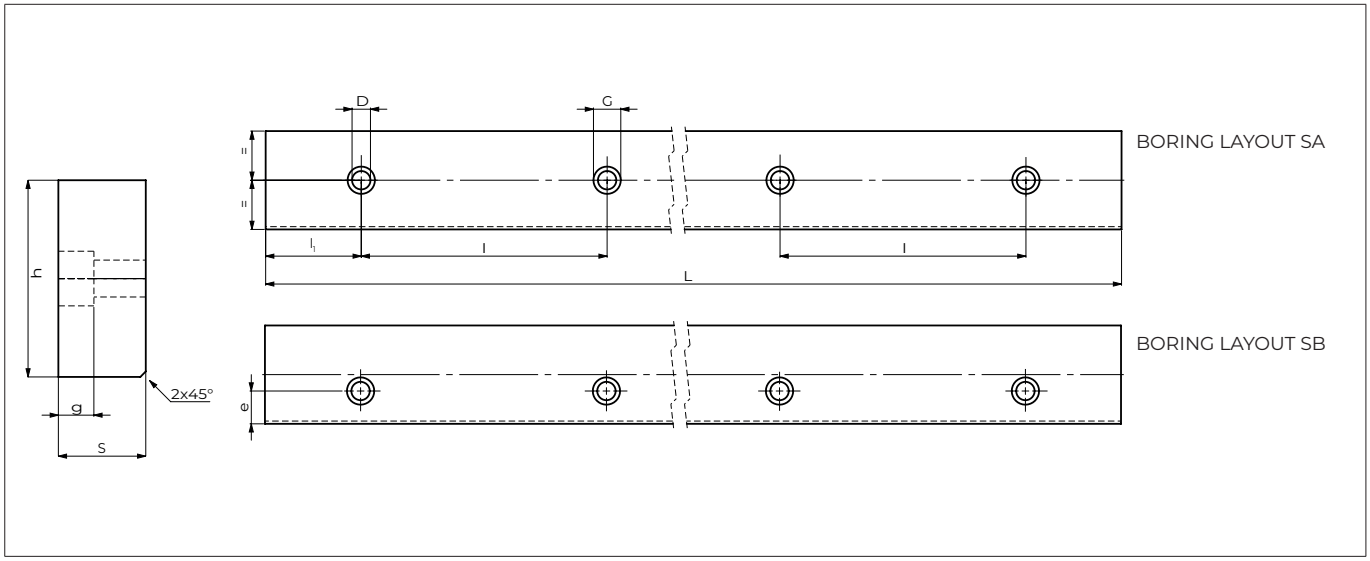


Fig.8

Type	h ± 0.05	S ± 0.05	D	G	g	e	l	l_1	Weight [1] (kg/m)
GP 2626 M	26	26	9	15	9	[2]	120	50	5.3
GP 3232 M	32	32	9	15	9	[2]	150	60	8.1
GP 3617 M	36	17	6.5	11	6.8	12.5	120	50	4.8
GP 4321 M	43	21	9	15	9	11.5	150	60	7
GP 5050 M	50	50	18	26	17	[2]	180	60	19.6
GP 6222 M	62	22	9	15	9	21	150	60	10.7
GP 7232 M	72	32	13.5	20	13	24	180	70	18.1
GP 8222 M	82	22	13.5	20	13	20	180	70	14.2

1) Weight without holes
2) For boring layout A only

Tab.12

Max. length in single element L = 3000 mm.
Longer rails are made by joining several elements with ground end.

Rails Finishing

- Material: induction hardened steel.
- Induction hardened on four sides.
- Surface finished by tangential grinding (M).

Hole Layout

- Holes according to catalogue (SA or SB).
- Finishes to drawing (NZ).
- Without holes (NF).

Optional Features

- Chemical nickel plating (NW).

Example of standard designation: GP 6222 M 2500 SA, GP 6222 M 2500 SB

▪ GP System - Guide Rollers PK - Concentric - Eccentric

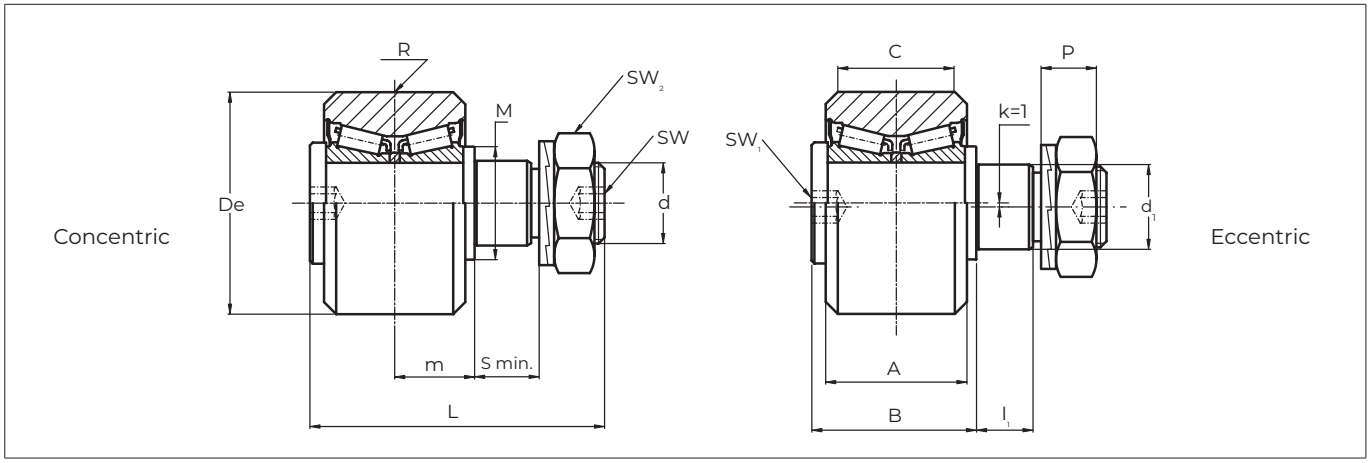


Fig.9

Type		D_e	d_1 [1]	d	m	S min.	P	L	A	B	C	R	l_1	M	SW_1	SW_2	k
Concentric	Eccentric																
PK 52 C	PKR 52 C	52	21	M20 x 1.5	19.8	15	13.4	73	35	41	29	800	14	28	8	30	1
PK 62 C	PKR 62 C	62	27	M24 x 1.5	20.8	19	15.4	83	37	44	29	800	18	35	10	36	1
PK 72 C	PKR 72 C	72	36	M30 x 1.5	27	19	21.6	100	45	55	33	1200	18	44	12	46	1
PK 90 C	PKR 90 C	90	38	M36 x 1.5	30	24	24.6	115	53 / 56[2]	62	45	1200	23	50	14	55	1
PK 110 C	PKR 110 C	110	42	M36 x 1.5	34	33	24.6	135	60/ 63[2]	70	48	1200	32	56	14	55	1

Tab.13

Type		Dynamic load (N) C_w [3]	Limit loads (N) Radial F_r	Torque wrench settings[4] (Nm)	Weight (kg)
Concentric	Eccentric				
PK 52 C	PKR 52 C	42000	11900	80	0.6
PK 62 C	PKR 62 C	48000	22100	160	0.9
PK 72 C	PKR 72 C	69000	31300	300	1.6
PK 90 C	PKR 90 C	134000	43800	450	2.8
PK 110 C	PKR 110 C	190000	55600	450	4.9

Tab.14

Type		Dynamic load (N) C_w [3]	Limit loads (N) Radial F_r	Torque wrench settings[4] (Nm)	Weight (kg)
Concentric	Eccentric				
PK 52 C NX	PKR 52 C NX	42000	10000	80	0.6
PK 62 C NX	PKR 62 C NX	48000	19000	160	0.9
PK 72 C NX	PKR 72 C NX	69000	26000	300	1.3
PK 90 C NX	PKR 90 C NX	134000	36000	450	2.8
PK 110 C NX	PKR 110 C NX	190000	47000	450	4.9

1) Housing bore tolerance: H7
2) Dimensions relating to the stainless-steel rollers (suffix NX)
3) C_w = basic load for 100 km
4) The torque wrench settings are given for non-lubricated threads; for lubricated threads, multiply figure by 0.8

Tab.15

Roller features

- On request, the guide rollers can be supplied with external parts in stainless steel (suffix NX). Internal rolling elements in standard bearing steel.
- Standard seals: material NBR, RS type.
- On request, guide rollers can be supplied with Viton seals for operating temperatures up to 120°C (suffix V, not available for PK 110 C).
- The guide rollers include self-locking washers and hexagonal nut (DIN 439B) for fitting.

▪ GP System - Guide Wheels FK

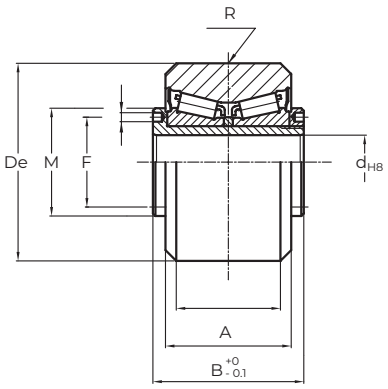


Fig.10

Type	Dimensions (mm)									Dynamic load (N) C_w [2]	Limit loads (N) [3] Radial F_r	Weight (kg)
	D_e	d	A	B	C	R	F	d_2	M			
FK 52 C	52	15	35	42	29	800	25	2.5	30	42000	11900	0.5
FK 62 C	62	20	37	45	29	800	29	3	35	48000	22100	0.6
FK 72 C	72	25	45	56	33	1200	37	4	44	69000	31300	1.2
FK 90 C	90	28	53 / 56[1]	64	45	1200	42	4	49	134000	43800	2.3
FK 110 C	110	35	60 / 63[1]	72	48	1200	52	4	59	190000	55600	3.9

Tab.16

Type	Dimensions (mm)									Dynamic load (N) C_w [2]	Limit loads (N) [3] Radial F_r	Weight (kg)
	D_e	d	A	B	C	R	F	d_2	M			
FK 52 C NX	52	15	35	42	29	800	25	2.5	30	42000	10000	0.5
FK 62 C NX	62	20	37	45	29	800	29	3	35	48000	19000	0.6
FK 72 C NX	72	25	45	56	33	1200	37	4	44	69000	26000	1.2
FK 90 C NX	90	28	53 / 56[1]	64	45	1200	42	4	49	134000	36000	2.3
FK 110 C NX	110	35	60 / 63[1]	72	48	1200	52	4	59	190000	47000	3.9

1) Dimensions relating to the stainless-steel rollers (suffix NX)
2) C_w = basic load for 100 km
3) The load capacities refer to rollers with a through shaft supported on both sides
4) To prevent rotation between roller and shaft a pin can be fitted in one of the holes “d2” positioned in the side flange

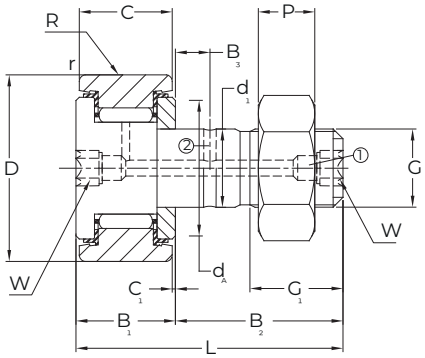
Tab.17

Roller features

- On request the guide rollers can be supplied with external parts in stainless steel (suffix NX). Internal rolling elements in standard bearing steel.
- Standard seals: material NBR, RS type.
- On request guide rollers can be supplied with Viton seals for operating temperatures up to 120°C (suffix V, not available for FK 110 C).

▪ GP System - Cam Followers KR..EE

Concentric



Bore hole 1 starting from D=22 mm
Bore hole 2 starting from D=30 mm

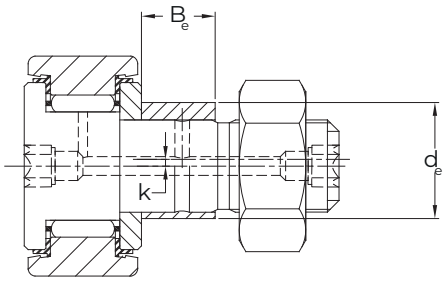
Fig.11

Ø outer D mm	Designation [1] KR, KR..EE	d_1 [2] mm	L mm	B_1 mm	B_2 mm	Threading G mm	G_1 mm	C mm	C_1 mm	d_A mm	B_3 mm	r mm	Rp [4] mm
16	KR16[3]	6	28	12.2	16	M6x1	8	11	0.6	12.5	-	0.15	500
	KR16EE[3]	6	28	12.2	16	M6x1	8	11	0.6	12.5	-	0.15	500
19	KR19[3]	8	32	12.2	20	M8x1.25	10	11	0.6	15	-	0.15	500
	KR19EE[3]	8	32	12.2	20	M8x1.25	10	11	0.6	15	-	0.15	500
22	KR22	10	36	13.2	23	M10x1	12	12	0.6	17.5	-	0.3	500
	KR22EE	10	36	13.2	23	M10x1	12	12	0.6	17.5	-	0.3	500
26	KR26	10	36	13.2	23	M10x1	12	12	0.6	17.5	-	0.3	500
	KR26EE	10	36	13.2	23	M10x1	12	12	0.6	17.5	-	0.3	500
30	KR30	12	40	15.2	25	M12x1.5	13	14	0.6	23	6	0.6	500
	KR30EE	12	40	15.2	25	M12x1.5	13	14	0.6	23	6	0.6	500
32	KR32	12	40	15.2	25	M12x1.5	13	14	0.6	23	6	0.6	500
	KR32EE	12	40	15.2	25	M12x1.5	13	14	0.6	23	6	0.6	500
35	KR35	16	52	19.6	32.5	M16x1.5	17	18	0.8	27.6	8	0.6	500
	KR35EE	16	52	19.6	32.5	M16x1.5	17	18	0.8	27.6	8	0.6	500
40	KR40	18	58	21.6	36.5	M18x1.5	19	20	0.8	31.5	8	1	500
	KR40EE	18	58	21.6	36.5	M18x1.5	19	20	0.8	31.5	8	1	500
47	KR47	20	66	25.6	40.5	M20x1.5	21	24	0.8	36.5	9	1	500
	KR47EE	20	66	25.6	40.5	M20x1.5	21	24	0.8	36.5	9	1	500
52	KR52	20	66	25.6	40.5	M20x1.5	21	24	0.8	36.5	9	1	500
	KR52EE	20	66	25.6	40.5	M20x1.5	21	24	0.8	36.5	9	1	500
62	KR62	24	80	30.6	49.5	M24x1.5	25	29	0.8	44	11	1	500
	KR62EE	24	80	30.6	49.5	M24x1.5	25	29	0.8	44	11	1.1	500
72	KR72	24	80	30.6	49.5	M24x1.5	25	29	0.8	44	11	1.1	500
	KR72EE	24	80	30.6	49.5	M24x1.5	25	29	0.8	44	11	1.1	500
80	KR80	30	100	37	63	M30x1.5	32	35	1	53	15	1.1	500
	KR80EE	30	100	37	63	M30x1.5	32	35	1	53	15	1.1	500
90	KR90	30	100	37	63	M30x1.5	32	35	1	53	15	1.1	500
	KR90EE	30	100	37	63	M30x1.5	32	35	1	53	15	1.1	500

1) Cam follower with stud designation KR.. Cam follower with stud, with no seals, KR..EE Cam follower with stud with axial drag discs and seals, KRE.. Cam follower with stud with no seals, with eccentric collar, KRE..EE Cam follower with stud with axial drag discs and seals and with eccentric collar.
2) Hole diameter for assembly of concentric cam follower without stud: d1 H7.
3) For 16 and 19 mm diameter the standard cam followers with stud on the head side are supplied with screwdriver slot and grease nipple. The version with built-in hexagonal socket and no grease nipple is identifiable by the SK suffix.

Tab.18

▪ GP System - Cam Followers KR..EE



Eccentric

Fig.11

W mm	P mm	Eccentric version			Load coefficients (N) [6]			Speed limit greasing (min^{-1})	Weight with nut and washers Kg	Clamping torque Nm	Ø outer D mm
		d_e [5] [6] mm	K [6] mm	B_e [5] mm	C_w	C_{uw} [8]	Stat. F_{or}				
-	3.2	9	0.5	7	2500	450	3350	14000	0.02	3	16
-	3.2	9	0.5	7	2500	450	3350	14000	0.02	3	
-	4	11	0.5	9	2900	540	4000	11000	0.032	8	19
-	4	11	0.5	9	2900	540	4000	11000	0.032	8	
5	5	13	0.5	10	4000	730	5300	8000	0.047	15	22
5	5	13	0.5	10	4000	730	5300	8000	0.047	15	
5	5	13	0.5	10	4700	840	6400	8000	0.062	15	26
5	5	13	0.5	10	4700	840	6400	8000	0.062	15	
6	6	15	0.5	11	6600	1220	8600	5500	0.093	22	30
6	6	15	0.5	11	6600	1220	8600	5500	0.093	22	
6	6	15	0.5	11	7100	1290	9200	5500	0.104	22	32
6	6	15	0.5	11	7100	1290	9200	5500	0.104	22	
8	8	20	1	14	9900	1830	14300	3600	0.177	58	35
8	8	20	1	14	9900	1830	14300	3600	0.177	58	
8	9	22	1	16	11600	2090	15800	2900	0.255	87	40
8	9	22	1	16	11600	2090	15800	2900	0.255	87	
10	10	24	1	18	17300	3400	26000	2400	0.4	120	47
10	10	24	1	18	17300	3400	26000	2400	0.4	120	
10	10	24	1	18	19200	3800	29000	2400	0.473	120	52
10	10	24	1	18	19200	3800	29000	2400	0.473	120	
14	12	28	1	22	31700	6800	48000	1900	0.798	220	62
14	12	28	1	22	31700	6800	48000	1900	0.798	220	
14	12	28	1	22	35700	7200	53000	1900	1.038	220	72
14	12	28	1	22	35700	7200	53000	1900	1.038	220	
14	15	35	1.5	29	50700	11000	77000	1300	1.665	450	80
14	15	35	1.5	29	50700	11000	77000	1300	1.665	450	
14	15	35	1.5	29	55300	11700	83000	1300	2.032	450	90
14	15	35	1.5	29	55300	11700	83000	1300	2.032	450	

4) Convex radius in the standard version. The version with cylindrical outer ring is identifiable by the X suffix. E.g. KR40EEX
5) Hole diameter for assembly of the eccentric cam follower: de H7
6) Dimensions of the eccentric version
7) Fr and For load for cam follower without eccentric bushing
8) Fatigue limit load
The KR concentric cam followers with stud are supplied with one clamping nut
The KRE eccentric cam followers with stud are supplied with an eccentric bushing already fitted and one clamping nut

Tab.19

▪ GP System - Cam Followers GCU

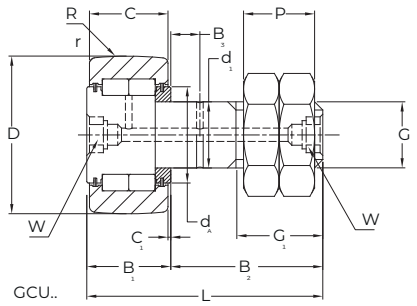


Fig.13

Ø outer D mm	Designation 1) GCU, GCU..MM	d_1 2) mm	L mm	B_1 mm	B_2 mm	Threading G mm	G_1 mm	C mm	C_1 mm	d_A mm	B_3 mm	r mm	R 3) mm
100	100	36	117	42	75	M36x3	38	40	1	61	20	2	1000
110	110	36	117	42	75	M36x3	38	40	1	61	20	2	1000
120	120	42	136	48	88	M42x3	44	46	1	71	24	2	1200
130	130	42	136	48	88	M42x3	44	46	1	71	24	2	1200

Tab.20

1) Cam follower with stud designation
GCU.. Concentric cam follower with stud and convex outer ring.
GCUL.. Concentric cam follower with stud and cylindrical outer ring.
GCUR.. Eccentric cam follower with stud and convex outer ring.
GCUR.. Concentric cam follower with stud and cylindrical outer ring.
No suffix Without shields.
Suffix..MM With metal shields.
2) Hole diameter for assembly of concentric cam follower without stud: d_1 H7
3) Convex radius in the standard version GCU.

▪ GP System - Cam Followers GCU

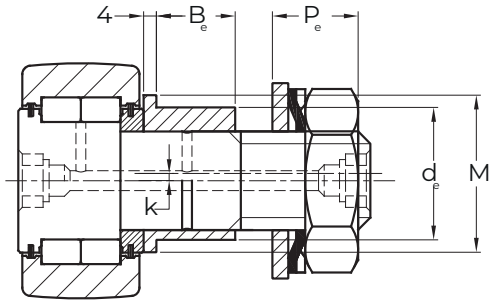


Fig.14

W mm	P [7] mm	Eccentric version (mm)					Load coefficients (kN) [6]			Greasing speed limit with grease (min^{-1})	Weight with nut and washers	Clamping torque Nm	Ø outer D mm
		d_e [4] [5]	k [5]	M [5]	B_e [5]	P_e [8]	C_w	Din. F_r	Stat. For.				
17	36	48	3	56	23	24.6	115	76.6	135	840	3.38	740	100
17	36	48	3	56	32	24.6	130	107	161	840	3.86	740	110
19	42	54	3	62	39	26.8	184	104	193	740	5.1	1200	120
19	42	54	3	62	39	26.8	202	142	228	740	5.59	1200	130

Tab.21

4) Hole diameter for assembly of the eccentric cam follower without stud: d_e H7
5) Dimensions of the eccentric version.
6) Fr and For load for cam follower without stud and no eccentric collar.
7) The GCU concentric cam followers are supplied with double clamping nuts.
8) The GCUR eccentric cam followers are supplied with eccentric bushing already fitted, clamping nut, cogged washer and flat washer.

▪ GP System - Guide Rollers Combinations

LAYOUT 1
Hole pattern A and B

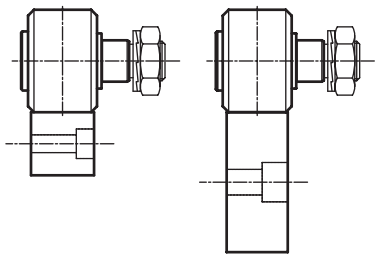


Fig.15

Layout 1	KR										PK / FK					GCU			
	19	22	26	30	32	35	40	47	52	62	52	62	72	90	110	100	110	120	130
GP 2626 M	•	•	•	•	•	•	•												
GP 3232 M								•	•	•	•	•							
GP 3617 M	•	•	•	•	•														
GP 4321 M				•	•	•													
GP 5050 M													•	•	•	•	•	•	•
GP 6222 M						•	•												
GP 7232 M								•	•	•	•	•							
GP 8222 M						•	•												

Tab.22

In the tables above are the suggested combinations. Other combinations are possible, but guide rollers must not run over the mounting holes.

▪ GP System - Guide Rollers Combinations

LAYOUT 2
Only hole pattern B

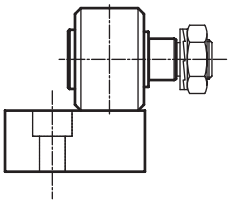


Fig.16

Layout 2	KR											PK / FK					GCU			
	19	22	24	26	30	32	35	40	47	52	62	52	62	72	90	110	100	110	120	130
GP 3617 M	•	•	•	•	•	•														
GP 4321 M						•	•	•												
GP 6222 M							•	•	•	•	•	•	•							
GP 7232 M									•	•	•	•	•	•						
GP 8222 M														•	•	•	•	•	•	•

Tab.23

In the tables above are the suggested combinations. Other combinations are possible but guide rollers must not run over the mounting holes.

ACCESSORIES

▪ Lubricators

Are composed by two main parts: a plastic box with the same shape profile of the rail, and a lubricated felt. The plastic box, that drags the raceways, works as a wiper, and removes dust and shavings.

The plastic box can be mounted directly on the guide roller plate using the appropriate aluminum plate included in the kit. In the lubricators for guide rollers size 52 or higher, the grease nipple allows an easy connection with a re-lubrication system. For the lubrication of the rails you can use one lubricator only on each raceway; in order to wipe the raceways it is better to mount two lubricators, before and after the carriage. The lubricators are supplied with the felt already lubricated.

GU System - Lubricator LUBU

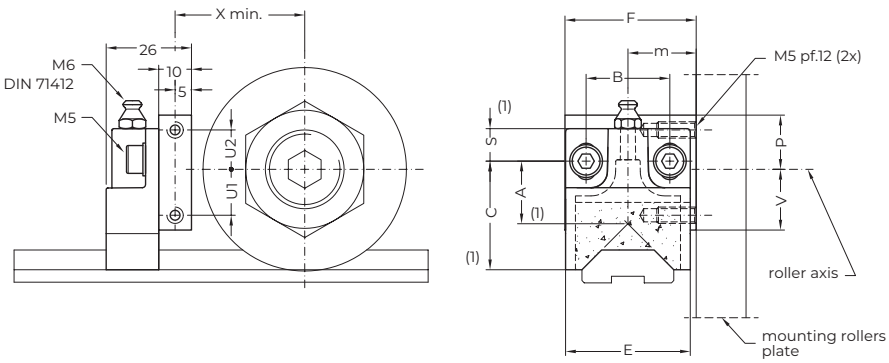


Fig.17

Type	X	U1	U2	F	m	B	S 1)	C 1)	A 1)	E	V	P	Weight (g)	Suggested combinations
LUBU 55	35	12	14	40	19.8	25.5	10	34	20	38	16.5	18.5	65	RKU 55. RKUR 55. FKU 55
LUBU 65	40	14	12	40	20.8	25.5	10	34	20	38	18.5	16.5	65	RKU 65. RKUR 65. FKU 65
LUBU 75	45	19	11	50	27	25.5	10	43	25.4	44	24	16	85	RKU 75. RKUR 75. FKU 75
LUBU 95	55	21	9	60	30	30	16.5	50	24.9	58	31	19	140	RKU 95. RKUR 95. FKU 95
LUBU 115	65	30	0	63	34	30	16.5	50	24.9	58	40	10	140	RKU 115. RKUR 115. FKU 115

1) The dimension of the plastic part refers to the center of the regulation slot. The slot allows an adjustment of +/- 3 mm

Tab.25

Features

- The lubricator is supplied with the felt already lubricated. The lubricant has a mineral oil base.
- During the mounting fix of the aluminum support to the rollers plate, adjust the height of the plastic part in order to put it in contact with the raceways and then block it in that position with the M5 screws.

Optional Features

- Felt without lubricant (D).

GU System - Guide Pins SAG

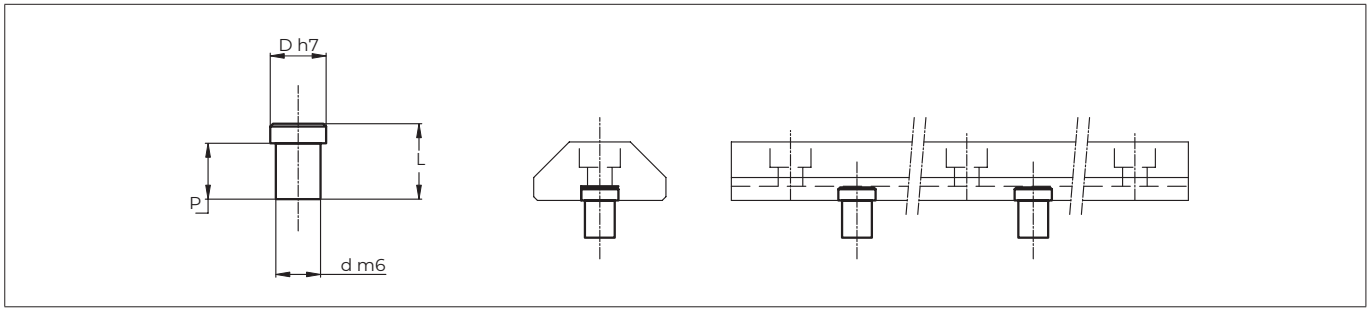


Fig.18

Pin type	Guide type	D	d [1]	P	L
SAG 28	GU 28 MT	10	8	10	12.3
SAG 35	GU 35 MT	10	8	10	13.5
SAG 50	GU 50 MT	16	10	11.2	15

1) Housing bore tolerance: H7

Tab.26

GP System - Lubricator LUBP

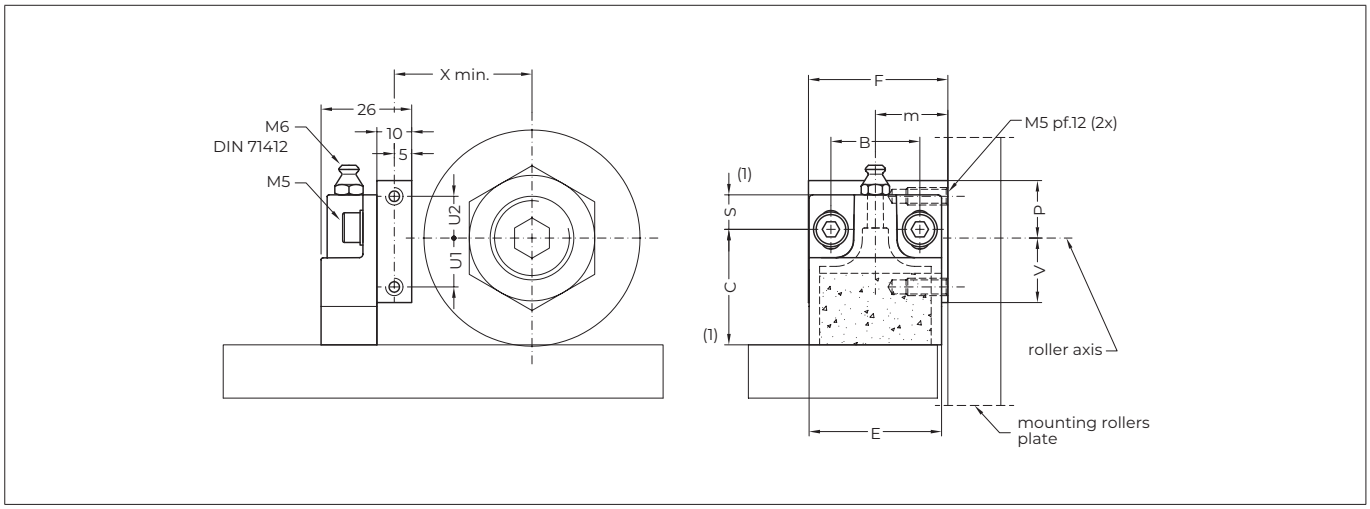


Fig.19

Type	X	U1	U2	F	m	B	S [1]	C [1]	A [1]	E	V	P	Weight (g)	Suggested combinations
LUBP 52	33.5	12	14	40	19.8	25.5	10	32.5	38	16.5	18.5	18.5	65	PK 52 C, PKR 52 C, FK 52 C
LUBP 62	38.5	14	12	40	20.8	25.5	10	32.5	38	18.5	16.5	16.5	65	PK 62 C, PKR 62 C, FK 62 C
LUBP 72	43.5	19	11	50	27	25.5	10	40	44	24	16	16	85	PK 72 C, PKR 72 C, FK 72C
LUBP 90	52.5	21	9	60	30	30	16.5	43.5	58	[3]	19	19	140	PK 90 C, PKR 90 C, FK 90 C
LUBP 110	62.5	30	0	63	34	30	16.5	43.5	58	40	10	10	140	PK 110 C, PKR 110 C, FK 110 C

1) The dimension of the plastic part refers to the center of the regulation slot. The slot allows an adjustment of +/- 3 mm

Tab.27

Features

- The lubricator is supplied with the felt already lubricated. The lubricant has a mineral oil base.
- During the mounting fix of the aluminum support to the rollers plate, adjust the height of the plastic part in order to put it in contact with the raceways and then block it in that position with the M5 screws.

Optional Features

- Felt without lubricant (D).

USE AND MAINTENANCE

▪ Use in Dirty Environment

Due to the design, cam rollers with profile are especially adapted to the use in rough and dirty environments. This property has been proven true in many applications such as welding plants, steel and grinding machines and is superior to recirculating ball bearing guides in continuous operation.

▪ Steel Guides

Steel rails are made of carbon steel to provide the best stability and durability. Raceways are induction hardened to achieve 58 HRC hardness minimum. The rail core remains soft to allow easy machining. Rails can be provided with different finishes to meet specific application requirements.

Guide rails MT type: Profile is produced by cold drawing process, raceways are induction hardened and sandblasted to improve surface strength and finish.

Guide rails M type: Profile is usually produced by cold drawing process, induction hardened on raceways and ground to improve surface finish and profile geometry and to remove the partially decarburized surface (0.1 mm max. on cold drawn rails ... MT).

Ground rails have to be used when there are high loads, heavy duty cycles or when there is a high accuracy requirement.

Temperature

Standard operating temperature range is –20°C up to 120°C. In lower or higher temperature applications please contact ROLLON Technical Service. Special care is required if guide rollers are operating at maximum temperature.

Straightness

Standard rail straightness (for non-mounted rails) is 0.5 mm/m max. Higher accuracy can be supplied on request.

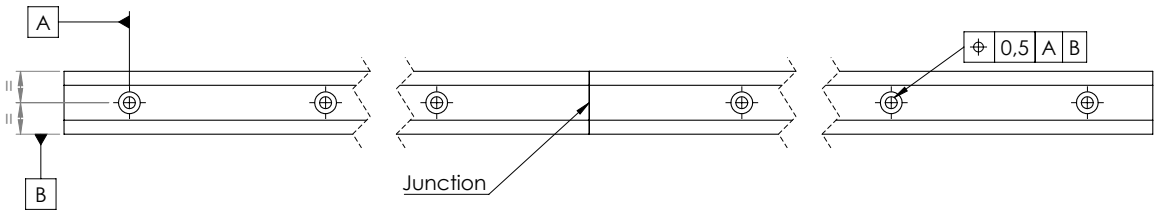
Length tolerances

Length	≥ 150 < 150	≥ 420 < 1050	≥ 1050 < 2040	≥ 2040 < 4020
Length tolerance	± 0.5	± 0.8	± 1.2	± 2

Tab.28

Fixing Holes

The guides are available with standard holes, as shown in dimensional tables, with special hole layout or without holes (see order code referencing) Standard tolerance for hole position is ± 0,25 mm. The standard boring layout is designed to fit most common application requirements, but connection strength has to be evaluated on the application case.



The standard boring layout is designed to fit most common application requirements, but connection strength has to be evaluated on the application case.

▪ Guide Rollers

Guide rollers based on needle or tapered roller bearings (RK ..., PK ...) are recommended for critical applications with heavy axial loads and/or shock loading.

Guide rollers are fitted with seals or shields for bearing protection and lubricant retention as described in dimensional tables.

Temperature

Guide rollers should not operate at a constant temperature above 80°C. For short durations 100°C is acceptable. For higher temperatures please see the “option” section.

Speed limit

Max. velocity has to be determined for each application relevant to the guide roller type, size and load conditions. Generally, in normal conditions maximum speed is 4 m/sec but, with the correct choice of components, the speed can reach 10 m/s. Contact ROLLON Technical service for specific requests.

Eccentric rollers (for backlash and preload adjustment)

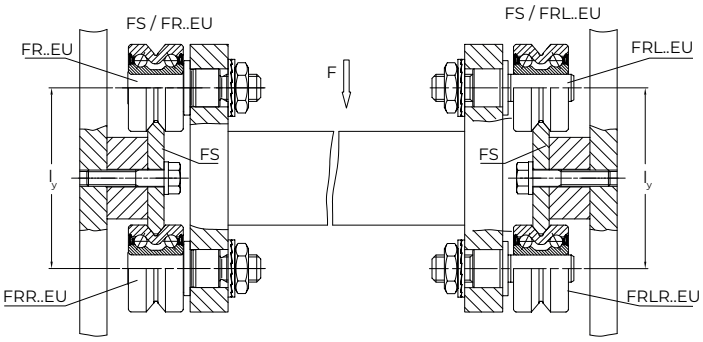
All guide rollers are produced in concentric and eccentric versions to allow backlash adjustment during assembly on final equipment. Eccentric rollers are identified by additional R in the code. The sides of the races of the guide roller are slightly convex. Besides reducing rolling friction, this also permits compensating slight guide deflection or small assembly alignment errors.

Floating rollers (for misalignment errors compensation)

When guide rails opposite to each other and axially rigid rollers are used to connect carriages, as shown in the next sketch, a high level of parallelism between the guide rails is required (lower that 0.050 mm).

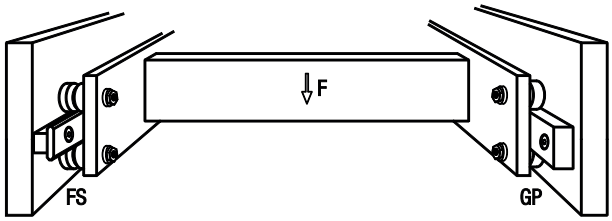
To avoid operating problems, two solutions are available:

- to use axially rigid fixed rollers on one carriage and axially movable rollers (floating rollers) on the other carriage. Movable rollers allow a little misalignment between the opposite mounted guide rails.



NOTE: ensure that load capacity of floating rollers RKUL is lower than fixed type RKU.

- to use one prismatic guide rail e.g. GU and on the opposite side a flat rail e.g. GP in connection with rollers PK.



NOTE: this solution also can be used to prevent parallelism errors with V-Line System (e.g. FS rail and GP rail on the opposite side).

The configuration with only GP guides is suitable for the heaviest applications.

▪ Lubrication

Roller lubrication

RKU..., PK ... rollers are all long life lubricated. This means that the grease inside the bearing is enough for the entire life of the roller guide.

Rail lubrication

Rails must be lubricated. This reduces friction, helps achieve the calculated system lifetime, allows operation at high speed. No or insufficient lubrication will cause rapid deterioration. The typical signal of tribocorrosion is the presence of a red / dark oxide and rapid wearing of the rail and guide rollers. The lubrication of the rail, the working environment and the load must be considered altogether for a correct estimation of the lifetime of the guide system. Generally speaking, for applications with low duty frequency, a periodic re-lubrication with a grease or with a viscous oil will sufficiently maintain the lubrication film. The re-lubrication interval depends on the application and must always be tested in the real working conditions.

In a system with ground rails and short stroke without lubricators, you can consider a re-lubrication interval every 10,000 cycles. Increasing the load, speed or stroke, or using an undersized bearing will increase lubrication demand and result in a shorter lubrication interval. For a constant lubrication we suggest the use of felt lubricators to ensure a constant layer of lubricant between guide rollers and raceways. Felt lubricators enlarge the lubrication interval more than fifty times.

The recommended lubricants are greases and oil for bearings, linear rails or chains, with a high viscosity of the basic oil and with EP additives, to separate the metallic surfaces even with low speed.

Lubricators (optional)

Are composed by two main parts: a plastic box with the same shape profile of the rail, and a lubricated felt. The plastic box, that drags the raceways, works as a wiper, and removes dust and shavings.

The plastic box can be mounted directly on the guide rollers plate using the appropriate aluminum plate included in the kit. In the lubricators for guide rollers size 52 or higher, the grease nipple allows an easy connection with a re-lubrication system. For the lubrication of the rails you can use one lubricator only on each raceway; in order to wipe the raceways, it is better to mount two lubricators, before and after the carriage. The lubricators are supplied with the felt already lubricated.

▪ Options

Corrosion protection

For use in oxidising environments or in the presence of corrosive agents, the guides are available with chemical nickel-plating protective anticorrosion treatment (suffix NW). On request, many rails are available in stainless-steel version (suffix NX) or different surface treatment, as chrome plating and phosphating.

The guide rollers with tapered rollers (RKU, FKU, PK) are available in stainless steel (suffix NX) and are equipped with standard bearings.

High temperature

On request, guide rollers can be equipped with Viton seals to operate at temperatures up to 120°C (suffix V). Check in the dimensional table component availability.

▪ Assembly Instructions

Guide Rollers

The eccentric guide rollers allow the preload or clearance of the carriage to be adjusted independently of the guide roller mounting hole positioning tolerance or the distance between the rails. Recommended mounting hole tolerance is H7. When adjusting the eccentric guide roller, care must be taken to avoid excessive preload. Excessive preload can reduce the life of the linear system. Set the preload turning the guide roller counterclockwise (looking at the roller from the bearing side) so that any movement caused by vibration will cause the nut to be tightened. Ensure the preload is not increased when tightening the nut.

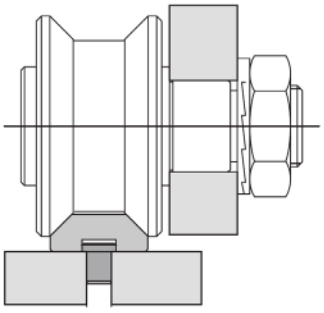
A simple way of setting a roller preload is as follows:

- Move the slider on the guide, holding the roller being adjusted with two fingers to prevent it from rotating
- Increase the preload by using the wrench
- Repeat step 1, making sure the roller slides without rolling
- When it is no longer possible to prevent roller rolling, slightly decrease the preload and fully tighten the lock nut, thereby setting the position of the eccentric

Guides

For multiple parallel rails parallelism must be checked to avoid guide rollers overload or excessive carriage play. When constant preload is required parallelism error has to be lower than 0.050 mm.

Connection between the rail and the mounting surface has to be designed accordingly with the operating condition to ensure proper product positioning and functionality. The direction and intensity of the load, the number and strength of the screws, the geometry of mounting surfaces, and use of pins or wedges must be evaluated to fully utilize the linear guide load capacity.



Carriages

For Heavy-Line, no carriages are available. However, systems are usually supplied with both concentric and eccentric rollers. Eccentric guide rollers have to be set and tightened during final assembly operation by customer.

STATIC LOAD AND SERVICE LIFE

▪ Calculating The Loads On The Guide Rollers

In the case of complex load situations, with forces acting in different directions, calculating the reactions on the rollers is difficult and hard to simplify. In the event of the applied load having a direction parallel to one of the co-ordinate axes, the radial Pr and axial Pa components of the reactions on the most loaded roller can be obtained using elementary formulas. With reference to the diagrams shown, we obtain the load components on the rollers relevant for checking and calculating the life, applying the following methods.

Angle α in the formulas is half the groove angle. Look in the dimensional table notes for the correct value.

Distance Ic is the effective contact distance. With the exception of Rolbloc system the correct value is calculated as the guide roller centre distance across the rail plus or minus the outer guide roller diameter De, depending if the guide is outside or between the rollers.

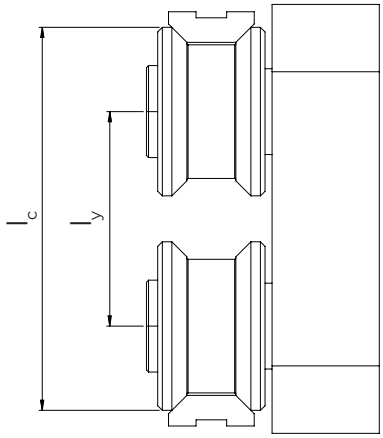
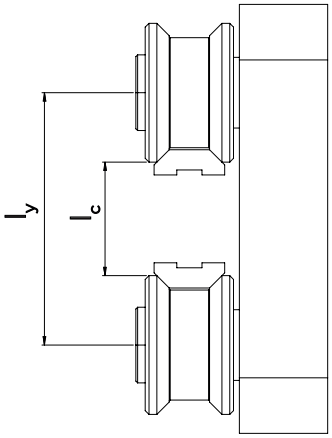
Guides outside the rollers	Guides between the rollers
	
$l_c = l_y + D_e$	$l_c = l_y - D_e$

Fig.22

▪ Diagram a)

Load F applied parallel to axis Y

$$P_a = \frac{F \cdot z_F}{2 \cdot l_c}$$

$$P_r = \frac{F \cdot (l_x + 2 \cdot x_F)}{2 \cdot l_x} + \frac{F \cdot z_F \cdot tan\ \alpha}{2 \cdot l_c}$$

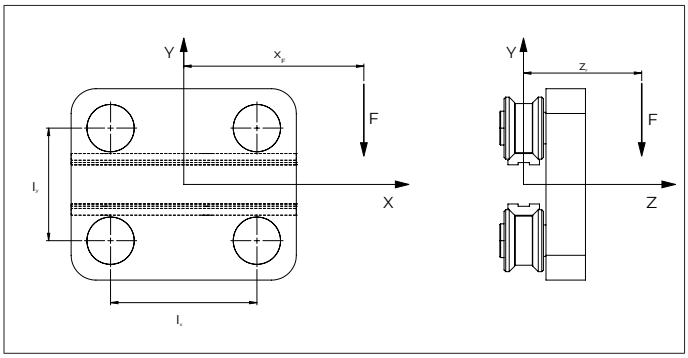


Fig.24

▪ **Diagram b)**

Load F applied parallel to axis X

$$P_a = \frac{F}{4} + \frac{F \cdot x_F}{2 \cdot l_x} \cdot \frac{F \cdot y_F}{2 \cdot l_c}$$

$$P_r = P_a \cdot tan\ \alpha$$

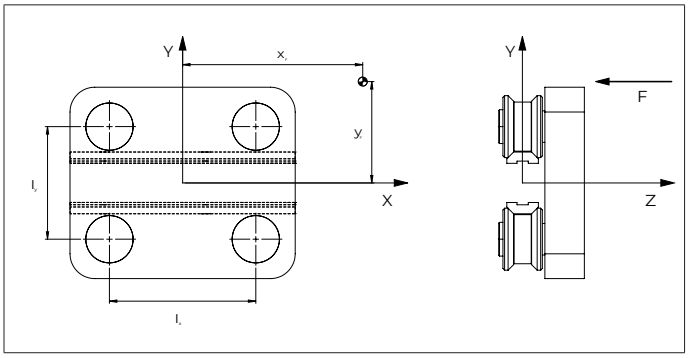


Fig.25

▪ **Diagramma c)**

Load F applied parallel to axis X

In this case the external load F_1, applied at the point of coordinate (y1; z1), should be considered together with reaction $F_2 = -F_1$ applied at the point of co-ordinate (y_2; z_2).

Calling Δy the absolute value of y_2-y_1 and Δz the absolute value of z_2-z_1, the following formula is used:

$$P_a = \frac{F_1 \cdot \triangle_z}{2 \cdot l_x}$$

$$P_r = \frac{F_1}{l_x} \cdot \left(\frac{\triangle_z \cdot tan\ \alpha}{2} + \triangle_y \right)$$

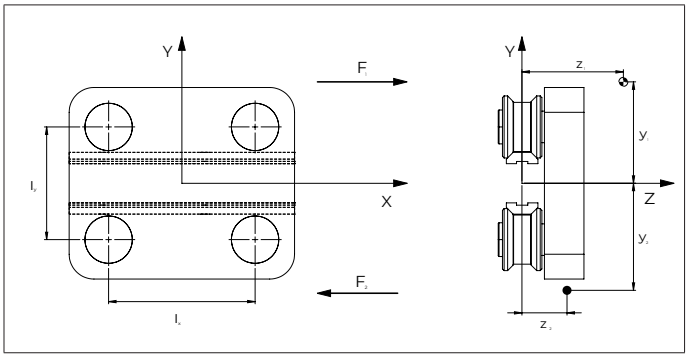


Fig.26

▪ **Guide Roller Calculation**

In the table for each roller, the following data is specified:

- C_w basic dynamic load, it is the radial load (N) that can be applied to the guide roller gives 100 km nominal life.
- F_r limit radial load, it is the maximum radial load (N) that can be applied on the guide roller; guide roller considering the strength of the stud.
- F_a limit axial load, it is the maximum axial load (N) that can be applied on the guide roller; guide roller considering the strength of the stud.
- X and Y coefficients to define the equivalent load for bearing life.
- α is the contact angle dependent on the guide roller type.

Note: ISO 281 states 'the nominal life will be exceeded by 90 % of bearings before the first sign of material fatigue'.

System life is the minimum life of either the bearings in the guide roller or the rail / roller contact surfaces.

For the rail / roller surface see the lubrication paragraph. For the bearings' life proceed as follows.

The loads Pr and Pa are calculated for ideal condition. However, in practice, because of the structure and operating conditions a better calculation and life estimation is performed using overload factor f_w as follows:

1.0 – 1.2 Smooth operation at low speed at constant load without shocks
1.2 – 1.5 Smooth operation with load variation
1.5 – 2.0 Operation with small shocks and vibrations
2.0 – 4.0 High acceleration, shocks and vibrations

Once P_a and P_r have been defined we can proceed to calculate the equivalent load P_{eq}.

$$P_{eq} = X \cdot P_R + Y \cdot P_a \qquad (N)$$

Coefficients X and Y can be obtained from guide roller tables (in the case of tapered bearings according to the ratio between P_a e P_r). In case of pure radial guide roller as PK and KR or floating bearings RKUL.

$$P_{eq} = P_r \qquad (N)$$

Nominal bearing life:

$$L_{10} = 100 \cdot \left(\frac{C_w}{P_{eq} \cdot f_w} \right)^p \qquad (km)$$

Where coefficient p = 10/3 for roller bearing guide rollers (PK ..., RKU, GCU...)

▪ Checking The Guide Roller Max. Load

The values of the radial limit loads F_r and axial limit loads F_a shown in the catalogue refer to extreme operating conditions, meaning:

- $P_a = 0$ (pure radial load)
- $P_r = P_a \cdot \tan \alpha$ (maximum axial load)

In intermediate cases, when the ratio is included between the extreme values, the equivalent limit load F_k to be considered must be calculated according to ratio $k = P_a/P_r$.

$$F_k = \frac{F_r \cdot F_a}{k \cdot F_r + (1 - k \tan \alpha) \cdot F_a} \qquad (N)$$

To check the strength of the guide roller, in relation to the limit load, the safety factor has to be greater than 1. Rollers that allow axial movement (floating rollers RKUL or rollers PK, GCU, KR for GP guides) don't support axial loads.

$$F_k / P_r > 1$$

Note: in the following common cases it is not necessary to calculate Fk and the evaluation can be completed easily.

In case of loads acting in the guide roller plane (F_x o F_y acting with Z=0) the axial load is also zero (0).
In these cases it has to be:

$$F_r / P_r > 1$$

In case of load F_z acting perpendicular to guide roller plane the axial load is maximum.

$$F_a / P_a > 1$$



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