

Shaft Steel

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Universal Shaft Blocks

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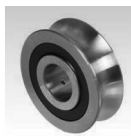
Precision Shaft Blocks and Linear Bearing Units ISO-Series 1

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Precision Shaft Blocks, Shaft Supports and Linear Bearing Units ISO-Series 3

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Profiled Track Rollers



Profiled Track Rollers
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Bolts for Profil Track
Rollers

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Rail-Guide Sets



Precision Rail-Guide
Sets RE and RE-ACS

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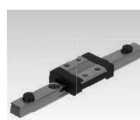
Miniature Slide Units



Miniature Slide Units

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Miniature Profile-Rail Guide



Miniature Profile-Rail
Guides

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Linear Motion Friction Guides



Linear motion
friction guide
DFG 115

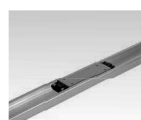
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Linear Motion Guides with Ball Carriage



Linear motion guide
with ball carriage
DA 0115

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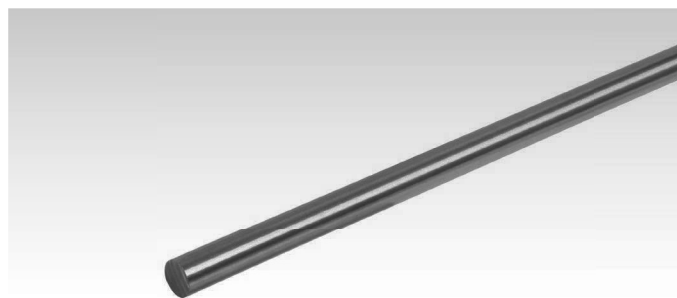
Linear motion guide
with ball carriage
DA 0116

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Silver Steel Material Nr. 1.2210 (115CrV3) According to DIN 175 (h9) Ground and Polished

Unhardened, strength 700 - 800 N/mm².
Subsequent hardening of short silver steel workpieces up to 64 HRC is
well possible.

Fixed lengths can be delivered on request.



Ordering Details: e.g.: Product No. 647 002 00, Silver Steel 2 mm, 500 mm long

Product No. 0.5 m	Product No. 1 m	Product No. 2 m	Diameter mm	Weight per m kg
647 002 00	647 102 00	647 202 00	2	0,02
647 003 00	647 103 00	647 203 00	3	0,06
647 004 00	647 104 00	647 204 00	4	0,11
647 005 00	647 105 00	647 205 00	5	0,15
647 006 00	647 106 00	647 206 00	6	0,22
647 008 00	647 108 00	647 208 00	8	0,39
-	647 110 00	647 210 00	10	0,62
-	647 112 00	647 212 00	12	0,89
-	647 114 00	647 214 00	14	1,21
-	647 115 00	647 215 00	15	1,38
-	647 116 00	647 216 00	16	1,57
-	647 117 00	647 217 00	17	1,78
-	647 118 00	647 218 00	18	2,00
-	647 119 00	647 219 00	19	2,22
-	647 120 00	647 220 00	20	2,45
-	647 125 00	647 225 00	25	3,83

Precision Shaft Steel, Hardened and Ground, on choice chromed

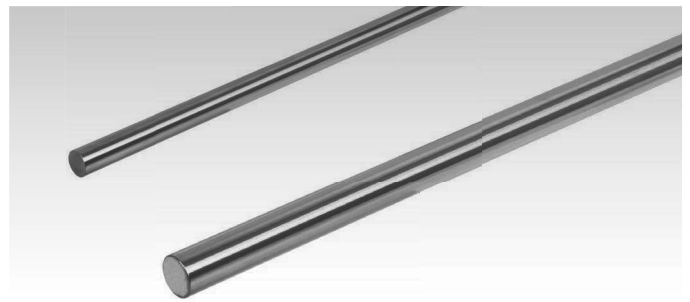
Material CF53: Steel 1.1213 (CF53), hardness min. 59 HRC.
Diameter tolerance: ISO h6.

Material CF53 CR: Steel 1.1213 (CF53), hardness min. 59 HRC,
chrome plated 10 µm, chrome-hardness min. 800 HV,
without CR(VI), suitable for food and medical industry.
Diameter tolerance: ISO h7.

Dimension-stable up to +120°C.

In lengths of 1 m and 2 m available ex stock.

Fixed lengths can be delivered on request.



Ordering Details: e.g.: Product No. 647 405 00, Shaft Steel CF53, 5 mm, length 1 m

Product No. CF53 1 m	Product No. CF53 2 m	Product No. CF53 CR 1 m	Product No. CF 53 CR 2 m	Shaft- Diameter mm	Hardness Depth DIN 13012 mm min.	Weight Length 1m kg	Weight Length 2m kg
647 403 01*	-	-	-	3	0,4	0,059	-
647 404 01	-	-	-	4	0,4	0,098	-
647 405 00	-	647 605 00	-	5	0,4	0,154	-
647 406 00	-	647 606 00	-	6	0,4	0,222	-
647 408 00	647 508 00	647 608 00	647 708 00	8	0,4	0,394	0,788
647 410 00	647 510 00	647 610 00	647 710 00	10	0,4	0,616	1,232
647 412 00	647 512 00	647 612 00	647 712 00	12	0,6	0,888	1,776
647 414 00	647 514 00	647 614 00	647 714 00	14	0,6	1,208	2,416
647 416 00	647 516 00	647 616 00	647 716 00	16	0,6	1,578	3,156
647 420 00	647 520 00	647 620 00	647 720 00	20	0,9	2,466	4,932
647 425 00	647 525 00	647 625 00	647 725 00	25	0,9	3,853	7,706
647 430 00	647 530 00	647 630 00	647 730 00	30	0,9	5,549	11,098
647 440 00	647 540 00	647 640 00	647 740 00	40	1,5	9,864	19,728
647 450 00	647 550 00	647 650 00	647 750 00	50	1,5	15,413	30,826

* Ø 3mm made from material 100CR6.

Precision Shaft Steel, Stainless, Hardened and Ground

Material X46: Stainless Steel 1.4043 (X46Cr13), min. 52 HRC.

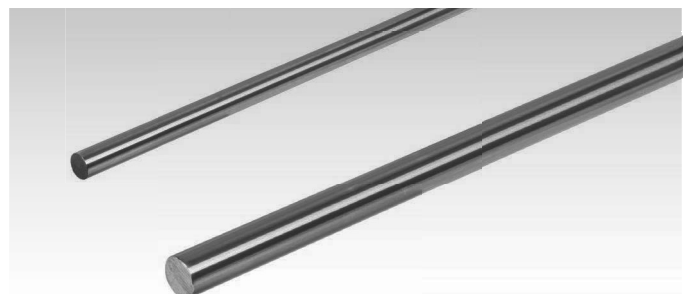
Material X90: Stainless Steel 1.4112 (X90CrMoV18), min. 54 HRC.

Diameter tolerance: ISO h6.

Dimension-stable up to +120°C.

In lengths of 1 m and 2 m available ex stock.

Fixed lengths can be delivered on request.



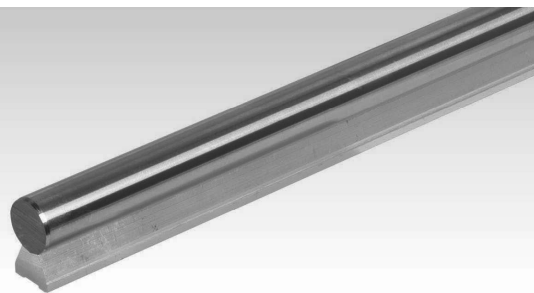
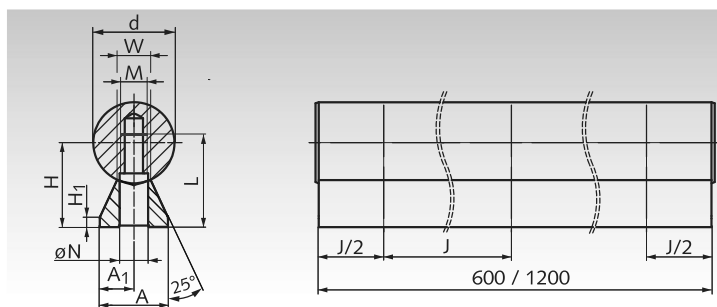
Ordering Details: e.g.: Product No. 647 992 06, Shaft Steel X46, 6 mm, length 1 m

Product No. X46 1 m	Product No. X46 2 m	Product No. X90 1 m	Product No. X90 2 m	Shaft- Diameter mm	Hardness Depth DIN 13012 mm min.	Weight Length 1m kg	Weight Length 2m kg
-	-	647 994 04	-	4	0,4	0,098	-
-	-	647 994 05	-	5	0,4	0,154	-
647 992 06	-	647 994 06	-	6	0,4	0,222	-
647 992 08	647 993 08	647 994 08	647 995 08	8	0,4	0,394	0,788
647 992 10	647 993 10	647 994 10	647 995 10	10	0,4	0,616	1,232
647 992 12	647 993 12	647 994 12	647 995 12	12	0,6	0,888	1,776
647 992 14	647 993 14	647 994 14	647 995 14	14	0,6	1,208	2,416
647 992 16	647 993 16	647 994 16	647 995 16	16	0,6	1,578	3,156
647 992 20	647 993 20	647 994 20	647 995 20	20	0,9	2,466	4,932
647 992 25	647 993 25	647 994 25	647 995 25	25	0,9	3,853	7,706
647 992 30	647 993 30	647 994 30	647 995 30	30	0,9	5,549	11,098
647 992 40	647 993 40	647 994 40	647 995 40	40	1,5	9,864	19,728
647 992 50	647 993 50	647 994 50	647 995 50	50	1,5	15,413	30,826

Dimension Tolerances for shafts with Ø-tolerance h6

		Shaft Diameter													
		3 mm	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	14 mm	16 mm	20 mm	25 mm	30 mm	40 mm	50 mm
Diameter	[µm]	0,6	-8	-8	-8	-9	-9	-11	-11	-11	-13	-13	-13	-16	-16
Straightness	[mm/m]	0,3	0,3	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Roundness	[µm]	3	4	4	4	4	4	5	5	5	6	6	6	7	7
Parallelity	[µm]	4	5	5	5	6	6	8	8	8	9	9	9	11	11

Precision Shaft Steel with Shaft Support, Low Version



Material shaft: Steel 1.1213 (Cf53), hardened and ground, hardness 62 ± 2 HRC, diameter tolerance ISO h6.

Material support: Extruded aluminium.

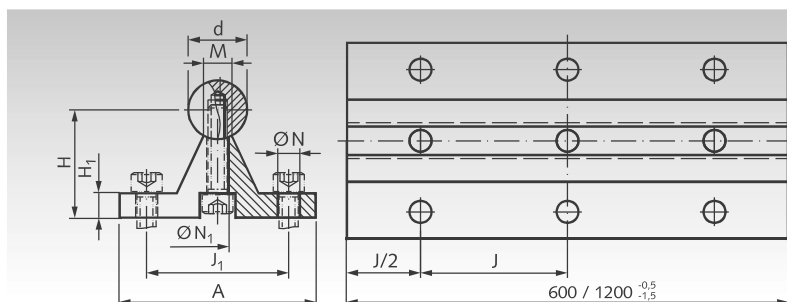
Length: Either 600 mm or 1200 mm.
Delivery without mounting screws.

Ordering Details: e.g.: Product No. 647 412 05, Shaft with Support, Low Version, \varnothing 12 mm, Length 600 mm

Ready-to-install, supported linear shafts to be used with open linear bearings or open linear bearing units. The shafts are supported over the entire length. Unit can be shortened by the customer using an angle grinder. The shaft supports have internal threads to get mounted from the downside of the customer's base plate. The required screw length depends also on the thickness of the base plate. Longer versions on request.

Product No. Length 600 mm	Product No. Length 1200 mm	d mm	A mm	A ₁ mm	H $\pm 0,15$ mm	H ₁ mm	J mm	M mm	N mm	L mm	W mm	Weight 600 mm kg	Weight 1200 mm kg
647 412 05	647 412 06	12	11	5,5	14,5	3	75	M4	4,5	15,5	5,4	0,66	1,32
647 416 05	647 416 06	16	14	7	18	3	75	M5	5,5	16	7	1,20	2,40
647 420 05	647 420 06	20	17	8,5	22	3	75	M6	6,6	20	8,1	1,79	3,58
647 425 05	647 425 06	25	21	10,5	26	3	75	M8	9	25	10,3	2,67	5,34
647 430 05	647 430 06	30	23	11,5	30	3	100	M10	11	30	11	3,76	7,52
647 440 05	647 440 06	40	30	15	39	4	100	M12	13,5	38	15	6,44	12,88

Precision Shaft Steel with Shaft Support



Material shaft: Steel 1.1213 (Cf53), hardened and ground, hardness 62 ± 2 HRC, diameter tolerance ISO h6.

Material support: Extruded aluminium.

Length: Either 600 mm or 1200 mm.

Ready-to-use, mounted, supported linear shafts to be used with open linear bearings or open linear bearing units. The shafts are supported over the entire length. The shaft supports have mounting holes for mounting them on a base plate. Unit can be shortened by the customer using an angle grinder. Longer versions on request.

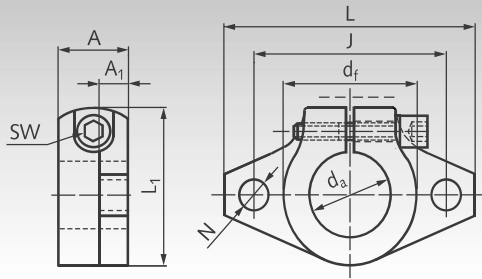
Ordering Details: e.g.: Product No. 647 412 03, Shaft with Support, \varnothing 12 mm, Length 600 mm

Product No. Length 600 mm	Product No. Length 1200 mm	d mm	A mm	H $\pm 0,15$ mm	H ₁ mm	J mm	J ₁ mm	M mm	N mm	N ₁ mm	β Degrees	Mounting Screw DIN 912	Weight 600 mm kg	Weight 1200 mm kg
647 412 03	647 412 04	12	40	22	5	75	29	5,8	4,5	4,5	50	M4x16	1,08	2,16
647 416 03	647 416 04	16	45	26	5	100	33	7	5,5	5,5	50	M5x20	1,61	3,22
647 420 03	647 420 04	20	52	32	6	100	37	8,3	6,6	6,6	50	M6x25	2,44	4,89
647 425 03	647 425 04	25	57	36	6	120	42	10,8	6,6	9	50	M8x25	3,46	6,92
647 430 03	647 430 04	30	69	42	7	150	51	11	9	11	50	M10x30	4,84	9,68
647 440 03	647 440 04	40	73	50	8	200	55	15	9	11	50	M10x35	7,82	15,64
647 450 03	647 450 04	50	84	60	9	200	63	19	11	13,5	46	M12x40	11,78	23,56



**Reworking within
24h-service possible.
Custom made parts
on request.**

Flange Shaft Block GWFL universal use



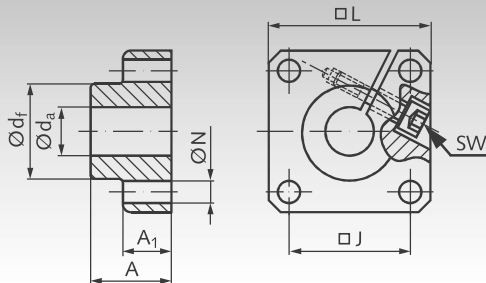
Material: Extruded Aluminium.
Clamp screw strength 8.8, Steel zinc-plated.

Universal use shaft blocks,
e.g. for flange fastening of guide shafts.

Ordering Details: e.g.: Product No. 646 405 10, Flange Shaft Block GWFL, for Shaft-Ø 10 mm

Product No.	d _a mm	L mm	A mm	A ₁ mm	d _f mm	J mm	L ₁ mm	N mm	Clamp- screw DIN 912	sw mm	Weight g
646 405 10	10	43	10	5	20	32	24	5,5	M4	3	13
646 405 12	12	47	13	7	25	36	28	5,5	M4	3	20
646 405 14	14	47	13	7	25	36	28	5,5	M4	3	18
646 405 16	16	50	16	8	28	40	31	5,5	M4	3	27
646 405 20	20	60	20	8	34	48	37	7	M5	4	40
646 405 25	25	70	25	10	40	56	42	7	M5	4	60
646 405 30	30	80	30	12	46	64	50	9	M6	5	110
646 405 40	40	105	40	16	56	80	67	12	M10	8	510
646 405 50	50	122	50	19	70	96	83	14	M12	10	890

Flange Shaft Blocks GWF universal use



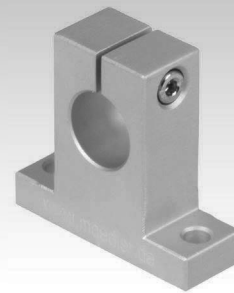
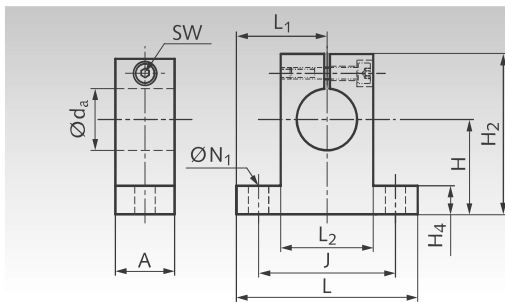
Material: Extruded aluminium.
Clamp screw strength 8.8, steel zinc-plated.

Universal use shaft blocks,
e.g. for flange connection of guide shafts.

Ordering Details: e.g.: Product No. 646 401 12, Flange Blocks for Shaft-Ø 12 mm

Product No.	d _a mm	L mm	A mm	A ₁ mm	d _f mm	J mm	NH ¹³ mm	Clamp- screw DIN 912	sw mm	Weight g
646 401 12	12	40	20	12	23,5	30±0,12	5,5	M4	3	60
646 401 16	16	50	20	12	27,5	35±0,12	5,5	M4	3	80
646 401 20	20	50	23	14	33,5	38±0,15	6,6	M5	4	100
646 401 25	25	60	25	16	42,0	42±0,15	6,6	M6	5	150
646 401 30	30	70	30	19	49,5	54±0,25	9,0	M8	6	300
646 401 40	40	100	40	26	65,0	68±0,25	11,0	M10	8	700
646 401 50	50	100	50	36	75,0	75±0,25	11,0	M10	8	1200

Shaft Block GWL universal use



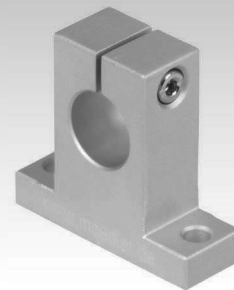
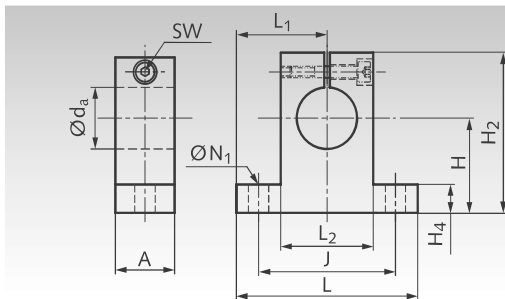
Material: Extruded Aluminium.
Clamp screw strength 8.8, Steel zinc-plated.

Universel use shaft blocks,
e.g. for fastening of guide shafts.

Ordering Details: e.g.: Product No. 646 406 08, Shaft Block GWL, for Shaft-Ø 8 mm

Product No.	d _a mm	A mm	H _{±0,02} mm	H ₂ mm	H ₄ mm	J mm	L mm	L _{1±0,05} mm	L ₂ mm	N ₁ mm	Clamp- screw DIN 912	sw mm	Weight g
646 406 08	8	14	20	32,8	6	32	42	21	18	5,5	M4	3	24
646 406 10	10	14	20	32,8	6	32	42	21	18	5,5	M4	3	24
646 406 12	12	14	23	37,5	6	32	42	21	20	5,5	M4	3	30
646 406 14	14	14	23	37,5	6	32	42	21	20	5,5	M4	3	28
646 406 16	16	16	27	44	8	38	48	24	25	5,5	M4	3	40
646 406 20	20	20	31	51	10	45	60	30	30	6,6	M5	4	70
646 406 25	25	24	35	60	12	56	70	35	38	6,6	M6	5	130
646 406 30	30	28	42	70	12	64	84	42	44	9	M6	5	180
646 406 40	40	36	60	96	15	90	114	57	60	11	M8	6	420
646 406 50	50	40	70	120	18	100	126	63	74	14	M12	10	750

Shaft Block GWLE universal use, European Dimensions



Material: Extruded Aluminium.
Clamp screw strength 8.8, Steel zinc-plated.

Universel use shaft blocks,
e.g. for fastening of guide shafts.

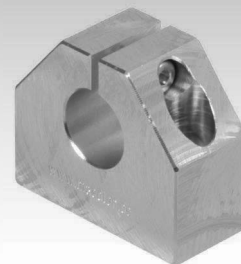
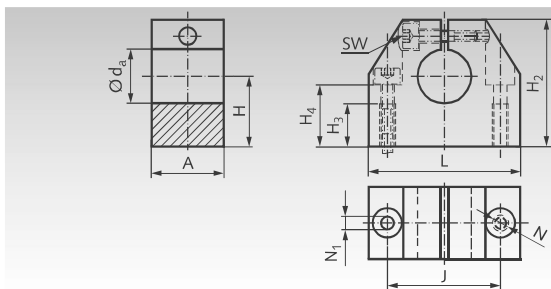
Ordering Details: e.g.: Product No. 646 407 08, Shaft Block GWLE, for Shaft-Ø 8 mm

Product No.	d _a mm	A mm	H _{±0,02} mm	H ₂ mm	H ₄ mm	J mm	L mm	L _{1±0,05} mm	L ₂ mm	N ₁ mm	Clamp- screw DIN 912	sw mm	Weight g
646 407 08	8	10	15	27	5	25	32	16	16	4,5	M3	2,5	24
646 407 12	12	12	20	35	5,5	32	42	21	20	5,5	M4	3	30
646 407 16	16	16	25	42	6,5	40	50	25	26	5,5	M4	3	40
646 407 20	20	20	30	50	8	45	60	30	32	5,5	M4	3	70
646 407 25	25	25	35	58	9	60	74	37	38	6,6	M5	4	130
646 407 30	30	28	40	68	10	68	84	42	45	9	M6	5	180
646 407 40	40	32	50	86	12	86	108	54	56	11	M8	6	420
646 407 50	50	40	60	100	14	108	130	65	80	11	M8	6	750



**Reworking within
24h-service possible.
Custom made parts
on request.**

Precision Shaft Blocks GW-1 ISO Series 1



Material: Extruded aluminium.

Matching linear-bearing units of ISO Series 1.

Robust machine elements to attach the guiding shaft of the linear bearings. They allow true to size and cost efficient constructions.

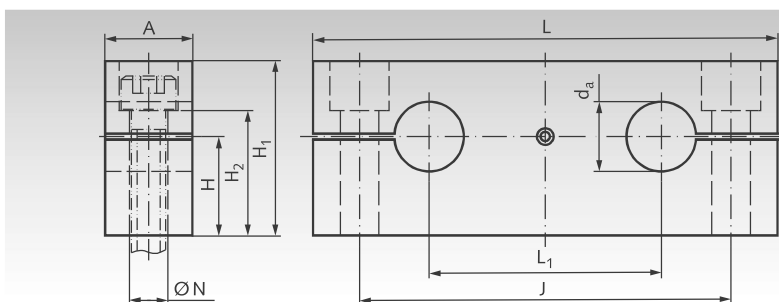
Ordering Details: e.g.: Product No. 646 406 06, Precision Shaft Block GW-1, for Shaft-Ø 6 mm

Product No.	d _a mm	A mm	H _{±0,02} mm	H ₂ mm	H ₃ mm	H ₄ mm	J _{±0,12} mm	L mm	N ₁ mm	N* mm	sw mm	Weight g
646 406 06	6	16	15	27	11	13	22	32	4,2	M5	2,5	30
646 408 08	8	16	16	27	11	13	22	32	4,2	M5	2,5	30
646 410 10	10	18	18	33	13	16	27	40	5,2	M6	3	50
646 412 12	12	18	19	33	13	16	27	40	5,2	M6	3	50
646 414 14	14	20	20	38	13	18	32	45	5,2	M6	3	70
646 416 16	16	20	22	38	13	18	32	45	5,2	M6	3	70
646 420 20	20	24	25	45	18	22	39	53	6,8	M8	4	120
646 425 25	25	28	31	54	22	26	44	62	8,6	M10	5	170
646 430 30	30	30	34	60	22	29	49	67	8,6	M10	5	220
646 440 40	40	40	42	76	26	38	66	87	10,3	M12	6	480
646 450 50	50	50	50	92	34	46	80	103	14,25	M16	8	820

Shaft steel page 466.

* When mounting from above choose the next smaller screw size.

Precision Double Shaft Blocks GWD-1 ISO Series 1



Material: Extruded aluminium.

Matching quadro linear-bearing units KGQ-1 of the ISO Series 1, page 474.

Robust machine elements to attach the guiding shafts of the linear bearings. They allow true to size and cost efficient constructions.

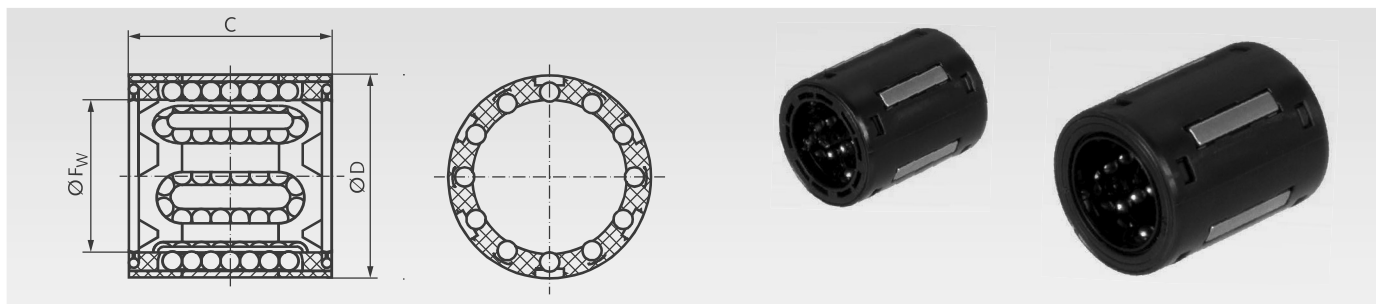
Ordering Details: e.g.: Product No. 646 402 12, Precision Shaft Block GWD-1 for Shaft-Ø 12 mm

Product No.	d _a mm	A mm	H _{±0,02} mm	H ₁ mm	H ₂ mm	J _{±0,02} mm	L mm	L ₁ mm	N* mm	Weight g
646 402 12	12	15	17	30	21,5	64	80	40	6,6	80
646 402 16	16	15	19,5	35	26,5	80	96	52	6,6	110
646 402 20	20	18	22	40	29	97	115	63	9	170
646 402 25	25	20	27	50	36,5	115	136	75	11	280
646 402 30	30	20	31	56	42,5	125	146	80	11	320
646 402 40	40	25	38	70	54	160	184	97	13,5	630
646 402 50	50	30	43	80	59	180	210	107	17,5	900

Shaft steel page 466.

* For cylindrical screws with Allen screw according to DIN 912 or ISO 4762.

Linear Bearings KB-1 ISO Series 1



Linear bearings Series 1 of ISO standard 10285 from premium brand in top quality.

Especially compact dimensions enable a space-saving and cost efficient linear support. Easy to mount and provide automatic retention in the mounting bore. I.e., if the boring in the housing

Ordering Details: e.g.: Product No. 646 003 03, Linear Bearing KB-1, Internal Ø 3 mm, with Shields

is exact, the bearing does not to be secured axially. Either with integral double-lip seal or with shields. Bearings up to FW 5mm must be lubricated before use.

All other bearings are lubricated ready-to-install.

Recommended shaft tolerance h6, housing tolerance H6.

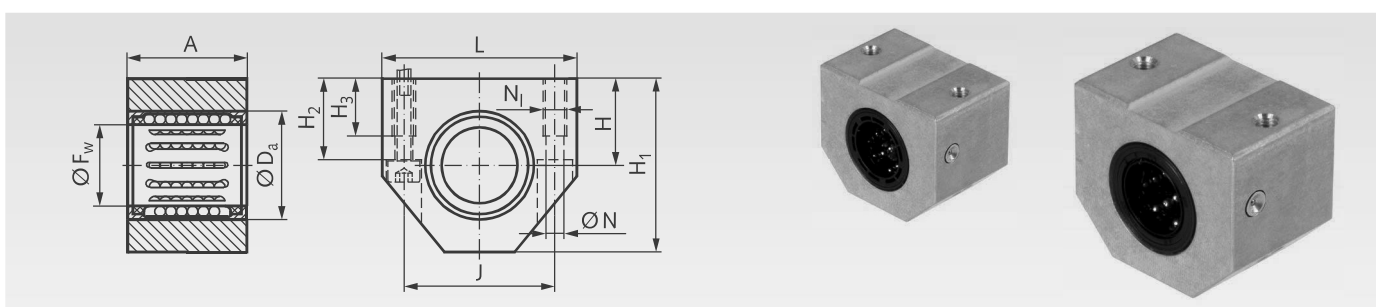
Product No. with Shields	Product No. with Seals	F _w mm	D mm	C mm	Number of Rows of Balls	Load Rating* dyn. C N	stat. C ₀ N	Weight g
646 003 03	646 103 03	3	7	10	4	60	44	0,7
646 004 04	646 104 04	4	8	12	4	75	60	1
646 005 05	646 105 05	5	10	15	4	170	129	2
646 006 06	646 106 06	6	12	22	4	335	270	6
646 008 08	646 108 08	8	15	24	4	490	355	7
646 010 10	646 110 10	10	17	26	5	585	415	11
646 012 12	646 112 12	12	19	28	5	695	510	12
646 014 14	646 114 14	14	21	28	5	710	530	14
646 016 16	646 116 16	16	24	30	5	930	630	18
646 020 20	646 120 20	20	28	30	6	1160	800	21
646 025 25	646 125 25	25	35	40	7	2120	1560	47
646 030 30	646 130 30	30	40	50	8	3150	2700	70
646 040 40	646 140 40	40	52	60	8	5500	4500	130
646 050 50	646 150 50	50	62	70	9	6950	6300	180

* On stainless shafts, the dynamic load rating has to be reduced by 18%, the static load rating by 8%,

Shaft steel page 466.

Shaft blocks page 468

Linear Bearings Units KG-1 ISO Series 1, with a Linear Bearing



Material: Housing made from extruded aluminium with a compact linear bearing of the ISO Series 1 from premium brand in top quality.

With integral double-lip seal or with shields.

All bearings are lubricated ready-to-install.

Recommended shaft tolerance h6.

Ordering Details: e.g.: Product No. 646 506 06, Linear Bearings Unit KG-1, Internal Ø 6 mm, with Shields

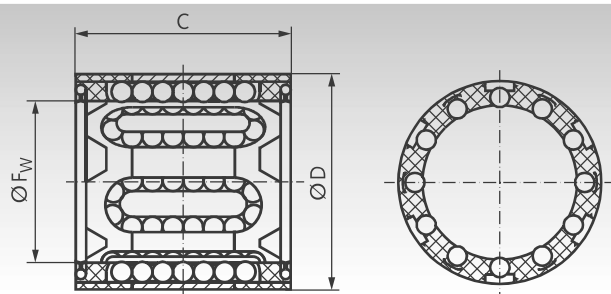
Product No. with Shields	Product No. with Seals	F _w mm	A mm	D _a mm	H±0,02 mm	H ₁ mm	H ₂ mm	H ₃ mm	L mm	J mm	N mm	N ₁ * mm	Load Rating C _{dyn.} N	stat. C ₀ N	Weight g	Spare Linear Bearings with Shields	with Seals
646 506 06	646 606 06	6	22**	12	13**	27**	13	9	32	23**	3,4	M4	335	270	50	646 006 06	646 106 06
646 508 08	646 608 08	8	24	15	14**	27	13	9	32	23**	3,4	M4	490	355	50	646 008 08	646 108 08
646 510 10	646 610 10	10	26	17	16	33**	16	11	40**	29**	4,3	M5	585	415	80	646 010 10	646 110 10
646 512 12	646 612 12	12	28	19	17	33	16	11	40	29	4,3	M5	695	510	90	646 012 12	646 112 12
646 514 14	646 614 14	14	28	21	18	36,5	18	11	43	34	4,3	M5	710	530	100	646 014 14	646 114 14
646 516 16	646 616 16	16	30	24	19	38	18	11	45	34	4,3	M5	930	630	100	646 016 16	646 116 16
646 520 20	646 620 20	20	30	28	23	45	22	13	53	40	5,3	M6	1160	800	140	646 020 20	646 120 20
646 525 25	646 625 25	25	40	35	27	54	26	18	62	48	6,6	M8	2120	1560	250	646 025 25	646 125 25
646 530 30	646 630 30	30	50	40	30	60	29	18	67	53	6,6	M8	3150	2700	370	646 030 30	646 130 30
646 540 40	646 640 40	40	60	52	39	76	38	22	87	69	8,4	M10	5500	4500	740	646 040 40	646 140 40
646 550 50	646 650 50	50	70	62	47	92	46	26	103	82	10,5	M12	6950	6300	1190	646 050 50	646 150 50

* When mounting from the bottom side choose the next smaller screw size.

** Dimension not in accordance with DIN ISO 13012-1.

Shaft steel page 466. Shaft blocks page 468.

Linear Bearings KB-1-ST ISO Series 1, with Steel Jacket



Linear bearings ISO Series 1 in high quality. With steel jacket. Ball cage from plastic. These linear bearings can be fitted inside a customer's housing or as spare parts for our closed units ISO Series 1.

All bearings must be lubricated before use.
Recommended shaft tolerance h6, housing tolerance H6.

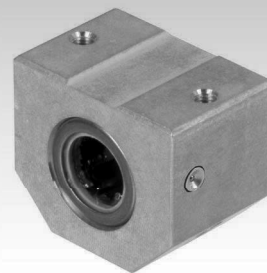
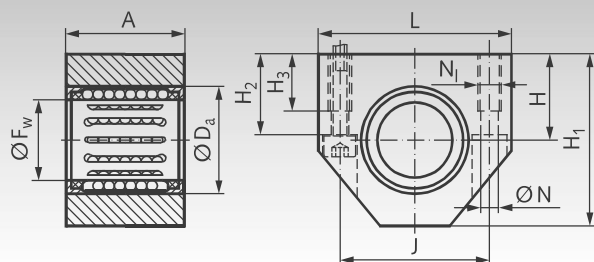
Optionally without seals or with wiping double-lip seals.

Ordering Details: e.g.: Product No. 646 206 06, Linear Bearing KB-1-ST, Internal Ø 6mm, without seals

Product No. without seals	Product No. with seals	F _w mm	D mm	C mm	Load Rating		Weight g
					dyn. C N	stat. C ₀ N	
646 206 06	646 306 06	6	12	22	400	239	7
646 208 08	646 308 08	8	15	24	435	280	12
646 210 10	646 310 10	10	17	26	500	370	14,5
646 212 12	646 312 12	12	19	28	620	510	18,5
646 214 14	646 314 14	14	21	28	620	520	20,5
646 216 16	646 316 16	16	24	30	800	620	27,5
646 220 20	646 320 20	20	28	30	950	790	32,5
646 225 25	646 325 25	25	35	40	1990	1670	66
646 230 30	646 330 30	30	40	50	2800	2700	95
646 240 40	646 340 40	40	52	60	4400	4450	182
646 250 50	646 350 50	50	62	70	5500	6300	252

Shaft steel with shaft support page 466.
Shaft blocks page 468.

Linear Bearings Units KG-1-ST ISO Series 1, with a Linear Bearing with Steel Jacket



Material: Housing made from extruded aluminium with a compact linear bearing of the ISO Series 1 with steel jacket, in quality.

With integral double-lip seals.

All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.

Ordering Details: e.g.: Product No. 646 806 06, Linear Bearings Unit KG-1-ST, Internal Ø 6 mm

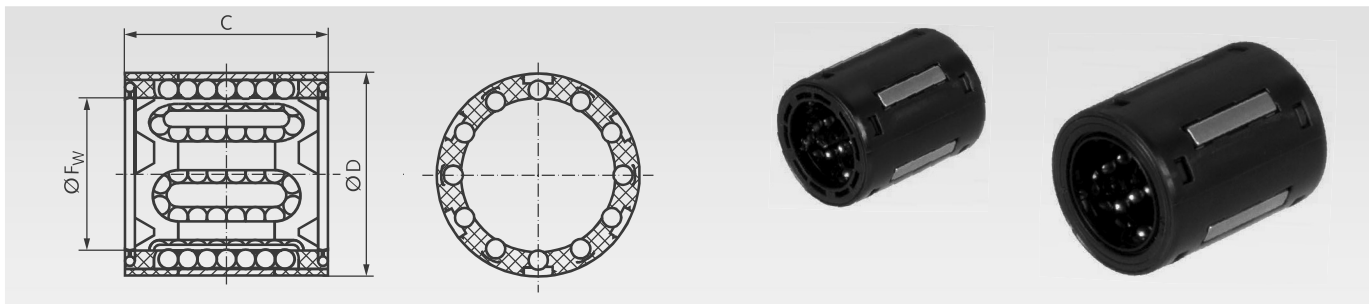
Product No. with seals	F _w mm	A mm	D _a mm	H _{±0,02} mm	H ₁ mm	H ₂ mm	H ₃ mm	L mm	J mm	N mm	N ₁ * mm	Load Rating		Weight g	Product No. Spare Linear Bearings
												dyn. C N	stat. C ₀ N		
646 806 06	6	22**	12	13**	27**	13	9	32	23**	3,4	M4	400	239	50	646 306 06
646 808 08	8	24	15	14**	27	13	9	32	23**	3,4	M4	435	280	50	646 308 08
646 810 10	10	26	17	16	33**	16	11	40**	29**	4,3	M5	500	370	80	646 310 10
646 812 12	12	28	19	17	33	16	11	40	29	4,3	M5	620	510	90	646 312 12
646 814 14	14	28	21	18	36,5	18	11	43	34	4,3	M5	620	520	100	646 314 14
646 816 16	16	30	24	19	38	18	11	45	34	4,3	M5	800	620	110	646 316 16
646 820 20	20	30	28	23	45	22	13	53	40	5,3	M6	950	790	150	646 320 20
646 825 25	25	40	35	27	54	26	18	62	48	6,6	M8	1990	1670	290	646 325 25
646 830 30	30	50	40	30	60	29	18	67	53	6,6	M8	2800	2700	420	646 330 30
646 840 40	40	60	52	39	76	38	22	87	69	8,4	M10	4400	4450	790	646 340 40
646 850 50	50	70	62	47	92	46	26	103	82	10,5	M12	5500	6300	1290	646 350 50

* When mounting from the bottom side choose the next smaller screw size.

** Dimension not in accordance with DIN ISO 13012-1.

Shaft steel page 466. Shaft blocks page 468.

Linear Bearings KB-1 ISO Series 1, Stainless



Stainless linear bearings Series 1 of ISO standard 10285 from premium brand in top quality.

Especially compact dimensions enable a space-saving and cost efficient linear support. Easy to mount and provide automatic retention in the mounting bore. I.e., if the boring in the housing

is exact, the bearing does not to be secured axially. Either with integral double-lip seal or with shields. Bearings up to FW 5mm must be lubricated before use.

All other bearings are lubricated ready-to-install.

Recommended shaft tolerance h6, housing tolerance H6.

Ordering Details: e.g.: Product No. 646 998 03, Linear Bearing KB-1, Internal Ø 3 mm, with Shields, stainless

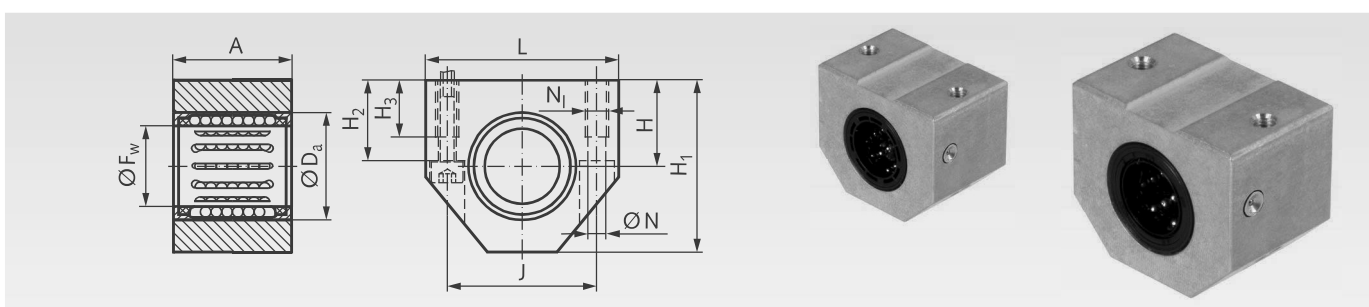
Product No. with Shields	Product No. with Seals	F _w mm	D mm	C mm	Number of Rows of Balls	Load Rating* dyn. C N	stat. C ₀ N	Weight g
646 998 03	646 999 03	3	7	10	4	49	40	0,7
646 998 04	646 999 04	4	8	12	4	62	55	1
646 998 05	646 999 05	5	10	15	4	139	119	2
646 998 06	646 999 06	6	12	22	4	275	248	6
646 998 08	646 999 08	8	15	24	4	402	327	7
646 998 10	646 999 10	10	17	26	5	480	382	11
646 998 12	646 999 12	12	19	28	5	570	469	12
646 998 14	646 999 14	14	21	28	5	582	488	14
646 998 16	646 999 16	16	24	30	5	763	580	18
646 998 20	646 999 20	20	28	30	6	951	736	21
646 998 25	646 999 25	25	35	40	7	1738	1435	47
646 998 30	646 999 30	30	40	50	8	2583	2484	70
646 998 40	646 999 40	40	52	60	8	4510	4140	130
646 998 50	646 999 50	50	62	70	9	5699	5796	180

* On stainless shafts X90.



Shaft steel page 466.
Shaft blocks page 468.

Linear Bearings Units KG-1 ISO Series 1, with a Linear Bearing, Stainless



Material: Housing made from extruded aluminium with a stainless linear bearing of the ISO Series 1 from premium brand in top quality.

With integral double-lip seal or with shields.

All bearings are lubricated ready-to-install.

Recommended shaft tolerance h6.



Ordering Details: e.g.: Product No. 646 995 06, Linear Bearings Unit KG-1, Internal Ø 6 mm, with Shields, stainless

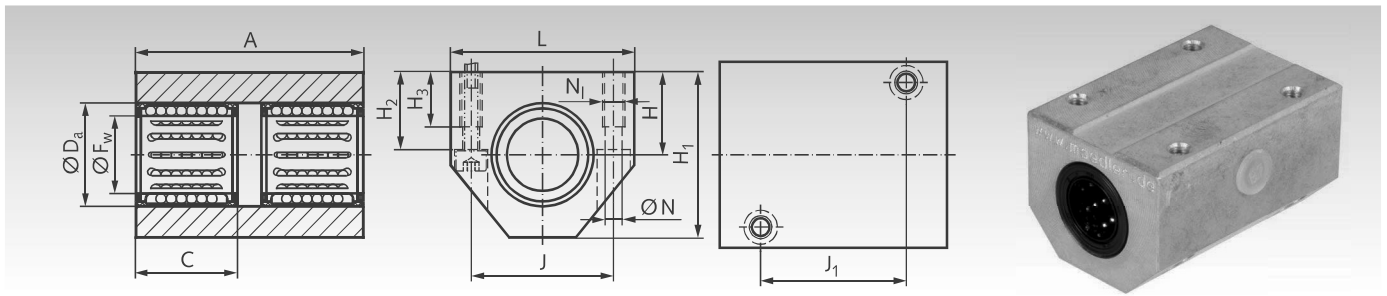
Product No. with Shields	Product No. with Seals	F _w mm	A mm	D _a mm	H±0.02 mm	H ₁ mm	H ₂ mm	H ₃ mm	L mm	J mm	N mm	N ₁ * mm	Load Rating* dyn.C N	stat.C ₀ N	Weight g	Spare Linear Bearings with Shields	with Seal
646 995 06	646 996 06	6	22**	12	13**	27**	13	9	32	23**	3,4	M4	275	248	50	646 998 06	646 999 06
646 995 08	646 996 08	8	24	15	14**	27	13	9	32	23**	3,4	M4	402	327	50	646 998 08	646 999 08
646 995 10	646 996 10	10	26	17	16	33**	16	11	40**	29**	4,3	M5	480	382	80	646 998 10	646 999 10
646 995 12	646 996 12	12	28	19	17	33	16	11	40	29	4,3	M5	570	469	90	646 998 12	646 999 12
646 995 14	646 996 14	14	28	21	18	36,5	18	11	43	34	4,3	M5	582	488	100	646 998 14	646 999 14
646 995 16	646 996 16	16	30	24	19	38	18	11	45	34	4,3	M5	763	580	100	646 998 16	646 999 16
646 995 20	646 996 20	20	30	28	23	45	22	13	53	40	5,3	M6	951	736	140	646 998 20	646 999 20
646 995 25	646 996 25	25	40	35	27	54	26	18	62	48	6,6	M8	1738	1435	250	646 998 25	646 999 25
646 995 30	646 996 30	30	50	40	30	60	29	18	67	53	6,6	M8	2583	2484	370	646 998 30	646 999 30
646 995 40	646 996 40	40	60	52	39	76	38	22	87	69	8,4	M10	4510	4140	740	646 998 40	646 999 40
646 995 50	646 996 50	50	70	62	47	92	46	26	103	82	10,5	M12	5699	5796	1190	646 998 50	646 999 50

* When mounting from the bottom side choose the next smaller screw size.

** Dimension not in accordance with DIN ISO 13012-1.

Shaft steel page 466. Shaft blocks page 468.

Tandem Linear-Bearing Units KGT-1 ISO Series 1, with Two Linear Bearings



Material: Housing made from extruded aluminium with two compact linear bearings of the ISO Series 1 from premium brand in top quality. With integral double-lip seal.

All bearing are lubricated ready-to-install.
Recommended shaft tolerance h6.

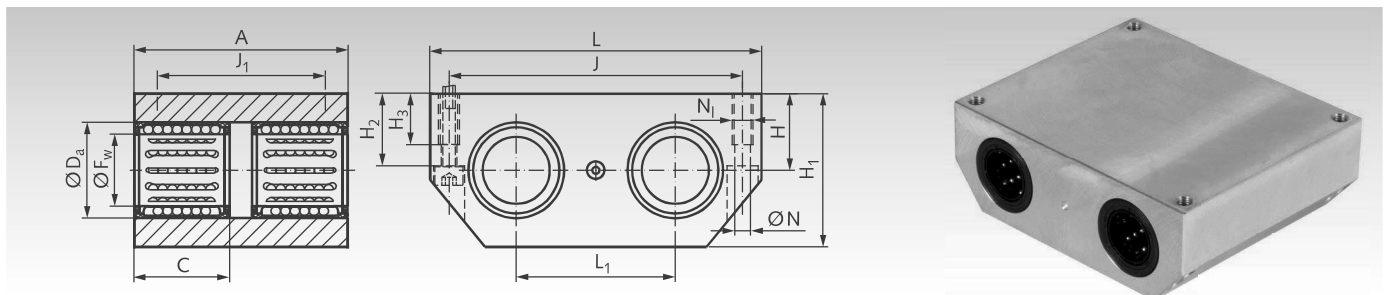
Ordering Details: e.g.: Product No. 646 403 12, Linear Bearings Unit KGT-1, Internal Ø 12 mm

Product No.	F _W mm	A mm	C mm	D _a mm	H _{±0.02} mm	H ₁ mm	H ₂ mm	H ₃ mm	J mm	J ₁ mm	L mm	N mm	N _i * mm	Load Rating dyn. C N	stat. C ₀ N	Weight g	Spare Linear Bearing with Seal
646 403 12	12	60	28	19	17	33	16	11	29	35	40	4,3	M5	1140	1020	170	646 112 12
646 403 16	16	65	30	24	19	38	18	11	34	40	45	4,3	M5	1530	1270	220	646 116 16
646 403 20	20	65	30	28	23	45	22	13	40	45	53	5,3	M6	1900	1600	310	646 120 20
646 403 25	25	85	40	35	27	54	26	18	48	55	62	6,6	M8	3450	3150	540	646 125 25
646 403 30	30	105	50	40	30	60	29	18	53	70	67	6,6	M8	5200	5400	800	646 130 30
646 403 40	40	125	60	52	39	76	38	22	69	85	87	8,4	M10	9000	9000	1570	646 140 40
646 403 50	50	145	70	62	47	92	46	26	82	100	103	10,5	M12	11400	12700	2510	646 150 50

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel page 466.
Shaft blocks page 468.

Quadro Linear-Bearing Units KGQ-1 ISO Series 1, with Four Linear Bearings



Material: Housing made from extruded aluminium with four compact linear bearings of the ISO Series 1 from premium brand in top quality. With integral double-lip seal.

All bearing are lubricated ready-to-install.
Recommended shaft tolerance h6.

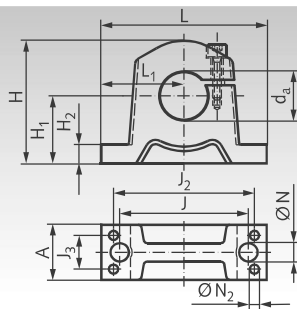
Ordering Details: e.g.: Product No. 646 404 12, Linear Bearings Unit KGQ-1, Internal Ø 12 mm

Product No.	F _W mm	A mm	C mm	D _a mm	H _{±0.02} mm	H ₁ mm	H ₂ mm	H ₃ mm	J mm	J ₁ mm	L mm	L ₁ mm	N mm	N _i * mm	Load Rating dyn. C N	stat. C ₀ N	Weight g	Spare Linear Bearing with Seal
646 404 12	12	70	28	19	15	30	14	11	69	59	80	40	4,3	M5	1860	2040	380	646 112 12
646 404 16	16	80	30	24	17,5	35	16,5	11	86	70	96	52	4,3	M5	2500	2550	570	646 116 16
646 404 20	20	85	30	28	20	40	19	13	103	73	115	63	5,3	M6	3100	3200	820	646 120 20
646 404 25	25	100	40	35	25	50	24	18	123	87	136	75	6,6	M8	5600	6300	1430	646 125 25
646 404 30	30	130	50	40	28	56	27	18	133	117	146	80	6,6	M8	8500	10800	2150	646 130 30
646 404 40	40	150	60	52	35	70	34	22	166	132	184	97	8,4	M10	14600	18000	3830	646 140 40
646 404 50	50	175	70	62	40	80	39	26	189	154	210	107	10,5	M12	18600	25500	5400	646 150 50

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel page 466.
Shaft blocks page 468.

Precision Shaft Blocks GW ISO Series 3



Material: Extruded aluminium.

Light Design, matching linear-bearing units of ISO Series 3.

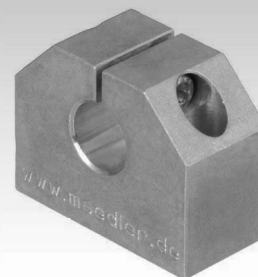
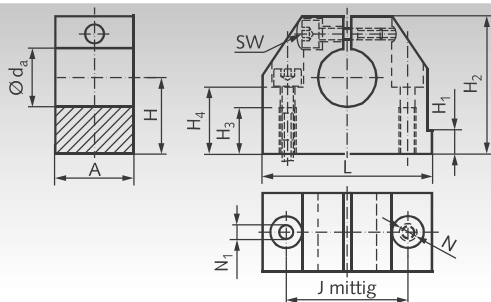
Robust machine elements to attach the guiding shafts of the linear bearings. They allow true to size and cost efficient constructions.

Ordering Details: e.g.: Product No. 646 408 00, Precision Shaft Block GW, for Shaft-Ø 8 mm

Product No.	d _a mm	A mm	H ₁ ±0,01 mm	H ₂ mm	H mm	J mm	J ₂ mm	J ₃ mm	L mm	L ₁ mm	N mm	N ₂ mm	Weight g
646 408 00	8	10	15	5,5	25	25	35	5	45	22,5	4,3	2,7	12
646 412 00	12	12	20	6	32,5	32	42	6	52	26	5,3	3,2	23
646 416 00	16	15	20	7	35,5	40	46	7,5	56	28	5,3	4,3	34
646 420 00	20	20	25	8	43,5	45	58	10	70	35	5,3	5,3	65
646 425 00	25	28	30	10	53	60	68	16	80	40	6,4	6,4	140
646 430 00	30	30	35	10	63	68	76	18	88	44	8,4	6,4	200
646 440 00	40	36	45	12	81	86	94	22	108	54	10,5	8,4	470
646 450 00	50	49	50	14	92,5	108	116	30	135	67,5	10,5	10,5	680

Shaft steel page 466.

Precision Shaft Blocks GW-3 ISO Series 3



Material: Extruded aluminium.

Matching linear-bearing units of ISO Series 3.

Robust machine elements to attach the guiding shafts of the linear bearings. They allow true to size and cost efficient constructions.

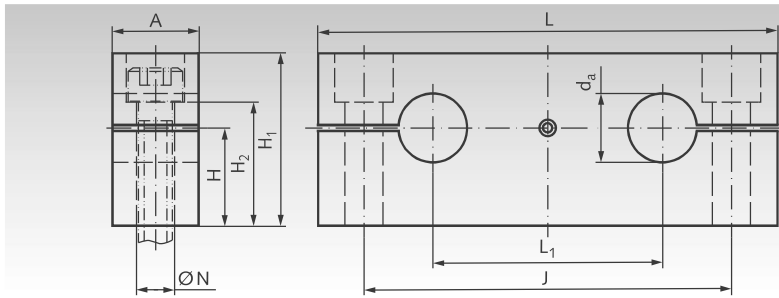
Ordering Details: e.g.: Product No. 646 412 01, Precision Shaft Block GW-3, for Shaft-Ø 12 mm

Product No.	d _a mm	A mm	H±0,02 mm	H ₁ mm	H ₂ mm	H ₃ mm	H ₄ mm	J±0,12 mm	L mm	N ₁ mm	N* mm	sw mm	Weight g
646 412 01	12	20	20	6	35	13	16,5	30	43	5,2	M6	3	60
646 416 01	16	24	25	7	42	18	21	38	53	6,8	M8	4	110
646 420 01	20	30	30	7,5	50	22	25	42	60	8,6	M10	5	170
646 425 01	25	38	35	8,5	61	26	30	56	78	10,3	M12	6	340
646 430 01	30	40	40	9,5	70	26	34	64	87	10,3	M12	6	460
646 440 01	40	48	50	11	90	34	44	82	108	14,25	M16	8	900
646 450 01	50	58	60	11	105	43	49	100	132	17,5	M20	10	1450

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel page 466.

Precision Double Shaft Blocks GWD-3 ISO Series 3



Material: Extruded aluminium.

Matching quadro linear-bearing units KGQ-3 of the ISO Series 3, page 488.

Robust machine elements to attach the guiding shafts of the linear bearings. They allow true to size and cost efficient constructions.

Ordering Details: e.g.: Product No. 646 412 02, Precision Shaft Block GWD-3 for Shaft-Ø 12 mm

Product No.	d _a mm	A mm	H _{±0,02} mm	H ₁ mm	H ₂ mm	J _{±0,02} mm	L mm	L ₁ mm	N*	Weight g
646 412 02	12	14	18	32	23,5	70	85	42	6,6	90
646 416 02	16	18	20	37	26,5	82	100	54	9	140
646 420 02	20	20	25	46	32,5	108	130	72	11	250
646 425 02	25	25	30	56	40	132	160	88	13,5	470
646 430 02	30	25	35	64	48	150	180	96	13,5	620
646 440 02	40	30	44	80	59	190	230	122	17,5	1150
646 450 02	50	30	52	96	75	240	280	152	17,5	1700

* For cylindrical screws with Allen screw according to DIN 912 or ISO 4762.

Shaft steel page 466.

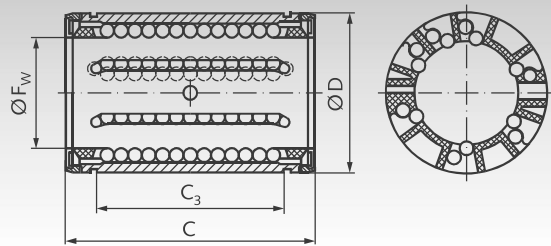
Collars
page 570



Retaining Rings
DIN 471 / DIN 472
page 582



Linear Bearings KB-3 ISO Series 3, Closed Design



Linear bearings series 3 of ISO standard 10285 from premium brand in top quality.

High load-bearing capacity, due to the asymmetric position of the rows of balls and the specially shaped raceway segments. These linear bearings can be fitted inside a closed or open housing and are thus adjustable.

With shields or wiping double-lip seals.

Bearings with FW 5mm must be lubricated before use. All other bearings are lubricated ready-to-install.

Recommended shaft tolerance h6, housing tolerance H6.

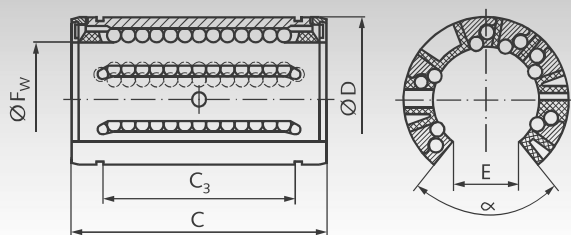
Stainless version on request.

Ordering Details: e.g.: Product No. 646 005 00, Linear Bearing KB-3, Internal Ø 5 mm, with Shields

Product No. with Shields	Product No. with Seals	F _w mm	D mm	C mm	C ₃ mm	Number of Rows of Balls	Load Rating dyn. C N	Load Rating stat. C ₀ N	Weight g	Product No. Retaining Ring DIN 471 Page 582	Weight g
646 005 00	646 105 00	5	12	22	12	4	280	210	5	617 412 00	0,5
646 008 00	646 108 00	8	16	25	14	4	490	355	9	617 416 00	0,8
646 012 00	646 112 00	12	22	32	20	5	1370	1120	20	617 422 00	1,7
646 016 00	646 116 00	16	26	36	22	5	1600	1290	26	617 426 00	2,1
646 020 00	646 120 00	20	32	45	28	6	3250	2650	56	617 432 00	3,6
646 025 00	646 125 00	25	40	58	40	6	4550	3800	108	617 440 00	6,3
646 030 00	646 130 00	30	47	68	48	6	7100	5700	122	617 447 00	7,8
646 040 00	646 140 00	40	62	80	56	6	11200	8300	205	617 462 00	14,4
646 050 00	646 150 00	50	75	100	72	7	13400	12200	460	617 475 00	21,0

Shaft steel page 466. Shaft blocks
page 475. Precision housings page 481.

Linear Bearings KB-3-0 ISO Series 3, Open Design



Linear bearings series 3 of ISO standard 10285 from premium brand in top quality.

High load-bearing capacity, due to the asymmetric position of the rows of balls and the specially shaped raceway segments.

With shields or wiping double-lip seals.

All bearings are lubricated ready-to-install.

Recommended shaft tolerance h6, housing tolerance H6.

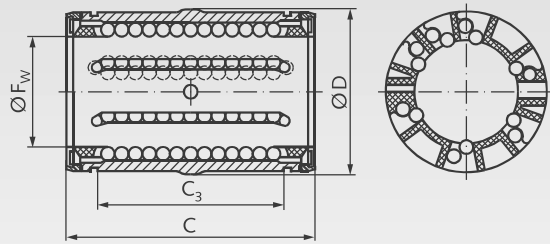
Stainless version on request.

Ordering Details: e.g.: Product No. 646 012 01, Linear Bearing KB-3-0, Internal Ø 12 mm, with Shields

Product No. with Shields	Product No. with Seals	F _w mm	D mm	C mm	C ₃ mm	E mm	α Degrees	Load Rating in N dyn. C stat. C ₀	Weight g
646 012 01	646 112 01	12	22	32	20	7,6	78	1160 980	13
646 016 01	646 116 01	16	26	36	22	10,4	78	1500 1290	17
646 020 01	646 120 01	20	32	45	28	10,8	60	2240 2040	36
646 025 01	646 125 01	25	40	58	40	13,2	60	3350 3350	71
646 030 01	646 130 01	30	47	68	48	14,2	50	5600 5700	114
646 040 01	646 140 01	40	62	80	56	18,7	50	9000 8150	230
646 050 01	646 150 01	50	75	100	72	23,6	50	13400 12200	390

Shaft steel with shaft support page 467.
Precision housings page 481.

Linear Bearings KB-3-A ISO Series 3, Self-Aligning, Closed Design



Self-aligning linear bearings series 3 of ISO standard 10285 from premium brand in top quality.

High load-bearing capacity, due to the asymmetric position of the rows of balls and the specially shaped raceway segments. These linear bearings can be fitted inside a closed or slotted housing and are thus adjustable.

With wiping double-lip seals.

These bearings are self-aligning up to $\pm 0,5^\circ$. All bearings are lubricated ready-to-install.

Recommended shaft tolerance h6, housing tolerance H6.

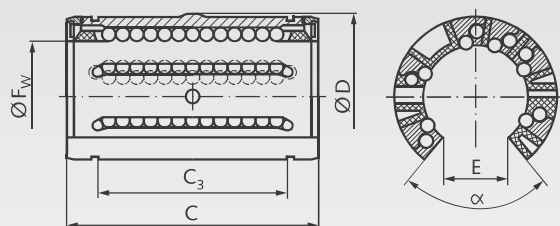
Stainless version on request.

Ordering Details: e.g.: Product No. 646 112 06, Linear Bearing KB-3-A, Internal Ø 12 mm

Product No. with Seals	F _w mm	D mm	C ^{-0,02} mm	C ₃ ^{-0,02} mm	Load rating dyn. C N	Load rating stat. C ₀ N	Weight g	Product No.	Weight
								Retaining Ring DIN 471 Page 582	g
646 112 06	12	22	32	20,3	1220	930	20	617 422 00	1,7
646 116 06	16	26	36	22,3	1400	1060	25	617 426 00	2,1
646 120 06	20	32	45	28,3	2550	1800	55	617 432 00	3,6
646 125 06	25	40	58	40,4	3800	2320	106	617 440 00	6,3
646 130 06	30	47	68	48,4	5600	3750	120	617 447 00	7,8
646 140 06	40	62	80	56,3	9650	5700	200	617 462 00	14,4
646 150 06	50	75	100	72,3	11200	6950	440	617 475 00	21,0

Shaft steel page 466. Shaft blocks page 475.
Precision housings page 481.

Linear Bearings KB-3-A-0 ISO Series 3, Self-Aligning, Open Design



Self-aligning linear bearings series 3 of ISO standard 10285 from premium brand in top quality.

High load-bearing capacity, due to the asymmetric position of the rows of balls and the specially shaped raceway segments.

With wiping double-lip seals.

These bearings are self-aligning up to $\pm 0,5^\circ$. All bearings are lubricated ready-to-install.

Recommended shaft tolerance h6, housing tolerance H6.

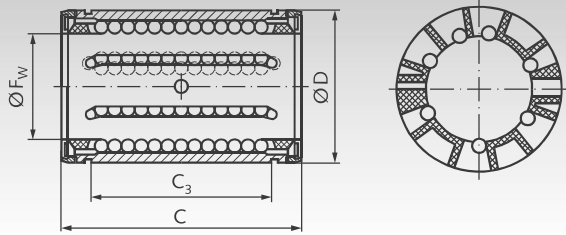
Stainless version on request.

Ordering Details: e.g.: Product No. 646 112 07, Linear Bearing KB-3-A-0, Internal Ø 12 mm

Product No. with Seals	F _w mm	D mm	C ^{-0,02} mm	C ₃ ^{-0,02} mm	E mm	α °	Load rating		Weight g
							dyn. C N	stat. C ₀ N	
646 112 07	12	22	32	20,3	7,6	78	1080	815	12
646 116 07	16	26	36	22,3	10,4	78	1320	865	16
646 120 07	20	32	45	28,3	10,8	60	2000	1370	35
646 125 07	25	40	58	40,4	13,2	60	2900	2040	70
646 130 07	30	47	68	48,4	14,2	50	4650	3250	110
646 140 07	40	62	80	56,3	18,7	50	7800	5200	220
646 150 07	50	75	100	72,3	23,6	50	11200	6950	370

Shaft steel with shaft support page 467.
Precision housings page 481.

Linear Bearings KB-3 ISO Series 3, Economy-Line, Closed Design



Linear bearings from reliable brand in good quality at low price.
These linear bearings can be fitted inside a customer's housing or as spare parts for our closed Economy-Line units.

These bearings are self-aligning up to $\pm 0,5^\circ$.
All bearings must be lubricated before use.
Recommended shaft tolerance h6, housing tolerance H6.

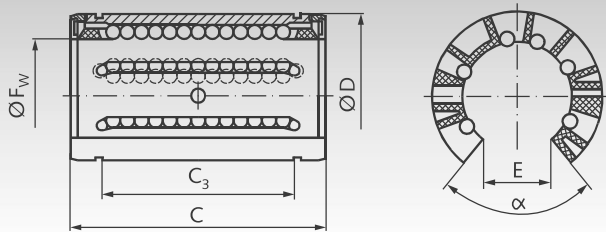
With wiping double-lip seals.

Ordering Details: e.g.: Product No. 646 112 02, Linear Bearing KB-3, Economy-Line, Internal \varnothing 12 mm

Product No. with Seals	F _w mm	D mm	C ^{-0,02} mm	C ₃ ^{-0,02} mm	Load rating	Load rating	Weight g	Product No.	Weight g
					dyn. C N	stat. C ₀ N		Retaining Ring DIN 471 Page 582	
646 112 02	12	22	32	20,3	1020	1290	16	617 422 00	1,7
646 116 02	16	26	36	22,3	1250	1550	21	617 426 00	2,1
646 120 02	20	32	45	28,3	2090	2630	43	617 432 00	3,6
646 125 02	25	40	58	40,4	3780	4720	85	617 440 00	6,3
646 130 02	30	47	68	48,4	5470	6810	130	617 447 00	7,8
646 140 02	40	62	80	56,3	6590	8230	260	617 462 00	14,4
646 150 02	50	75	100	72,3	10800	13500	460	617 475 00	21,0

Shaft steel page 466. Shaft blocks page 475.
Precision housings page 481.

Linear Bearings KB-3-0 ISO Series 3, Economy-Line, Open Design



Linear bearings from reliable brand in good quality at low price.
These linear bearings can be fitted inside a customer's housing or as spare parts for our open Economy-Line units.

These bearings are self-aligning up to $\pm 0,5^\circ$.
All bearings must be lubricated before use.
Recommended shaft tolerance h6, housing tolerance H6.

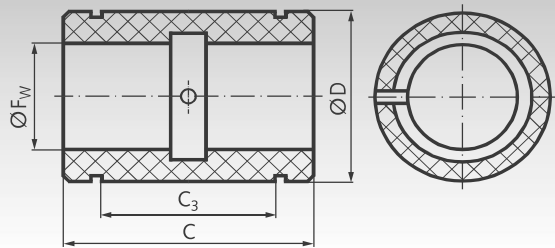
With wiping double-lip seals.

Ordering Details: e.g.: Product No. 646 112 03, Linear Bearing KB-3, Economy-Line, Open Design, Internal \varnothing 12 mm

Product No. with Seals	F _w mm	D mm	C ^{-0,02} mm	C ₃ ^{-0,02} mm	E mm	α °	Load rating	Load rating	Weight g
							dyn. C N	stat. C ₀ N	
646 112 03	12	22	32	20,3	6,5	66	1020	1290	13
646 116 03	16	26	36	22,3	9,0	68	1250	1550	17
646 120 03	20	32	45	28,3	9,0	55	2090	2630	36
646 125 03	25	40	58	40,4	11,5	57	3780	4720	71
646 130 03	30	47	68	48,4	14,0	57	5470	6810	114
646 140 03	40	62	80	56,3	19,5	56	6590	8230	230
646 150 03	50	75	100	72,3	22,5	54	10800	13500	390

Shaft steel with shaft support page 467.
Precision housings page 481.

Linear Slide Bearings PO-3 Made from Plastic, ISO Series 3, Closed Design



External dimensions like ISO Series 3 from premium brand in top quality. The sliding material is polyacetal with a specific polyethylene. The linear slide bearings should be specifically chosen if, due to unusual operating conditions, linear bearings cannot be used.

Linear slide bearings feature the same mounting and securing options as the linear bearings of the ISO Series 3 and can be fitted in the same housings.

Tolerances: Mounting hole H6, shaft h6.

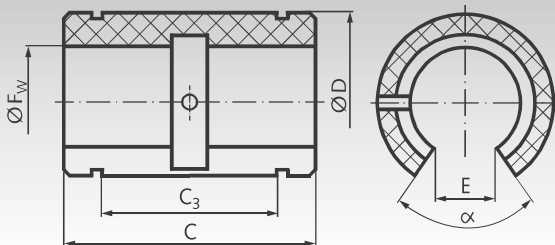
Temperature range: -40°C to +80°C.

Ordering Details: e.g.: Product No. 646 205 00, Linear Slide Bearings PO-3, Internal Ø 5 mm

Product No. Closed	F _w mm	D mm	C mm	C ₃ mm	Load Rating dyn. C		Load Rating static C ₀ N	Weight g	Product No. Retaining Ring DIN 471 Page 582	Weight g
					at 0.1m/s N	at 4m/s N				
646 205 00	5	12	22	12	280	7	980	3	617 412 00	0,5
646 208 00	8	16	25	14	510	13	1800	5	617 416 00	0,8
646 212 00	12	22	32	20	965	24	3350	12	617 422 00	1,7
646 216 00	16	26	36	22	1530	38	5400	16	617 426 00	2,1
646 220 00	20	32	45	28	2400	60	8300	30	617 432 00	3,6
646 225 00	25	40	58	40	4000	100	14000	60	617 440 00	6,3
646 230 00	30	47	68	48	5500	137	19300	90	617 447 00	7,8
646 240 00	40	62	80	56	8000	200	28000	200	617 462 00	14,4
646 250 00	50	75	100	72	12000	300	41500	340	617 475 00	21,0

Shaft steel page 466. Shaft blocks page 475.
Precision housings page 481.

Linear Slide Bearings PO-3-0 Made from Plastic, ISO Series 3, Open Design



External dimensions like ISO Series 3 from premium brand in top quality. The sliding material is polyacetal with a specific polyethylene. The linear slide bearings should be specifically chosen if, due to unusual operating conditions, linear bearings cannot be used.

Linear slide bearings feature the same mounting and securing options as the linear bearings of the ISO Series 3 and can be fitted in the same housings.

Tolerances: Mounting hole H6, shaft h6.

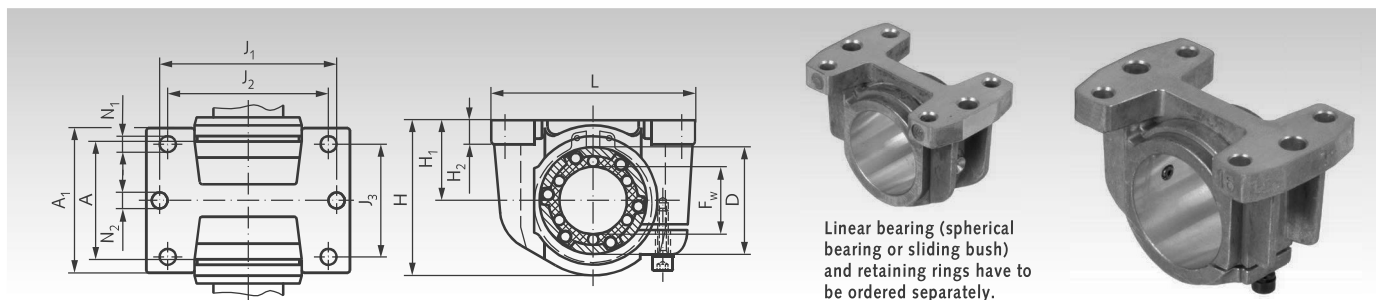
Temperature range: -40°C to +80°C.

Ordering Details: e.g.: Product No. 646 212 01, Linear Slide Bearings PO-3-0, Internal Ø 12 mm

Product No. Open	F _w mm	D mm	C mm	C ₃ mm	E mm	α Degrees	Load Rating dyn. C		Load Rating static C ₀ N	Weight g
							at 0.1m/s N	at 4m/s N		
646 212 01	12	22	32	20	7,6	78	965	24	3350	8
646 216 01	16	26	36	22	10,4	78	1530	38	5400	12
646 220 01	20	32	45	28	10,8	60	2400	60	8300	23
646 225 01	25	40	58	40	13,2	60	4000	100	14000	45
646 230 01	30	47	68	48	14,2	50	5500	137	19300	70
646 240 01	40	62	80	56	18,7	50	8000	200	28000	150
646 250 01	50	75	100	72	23,6	50	12000	300	41500	260

Shaft steel with shaft support page 467.
Precision housings page 481.

Precision Housings KG for Linear Bearings of Closed Design, ISO Series 3



Linear bearing (spherical bearing or sliding bush) and retaining rings have to be ordered separately.

Material: Aluminium die-cast.

Light housing for linear bearings of closed design, ISO Series 3 (linear bearing has to be ordered separately).

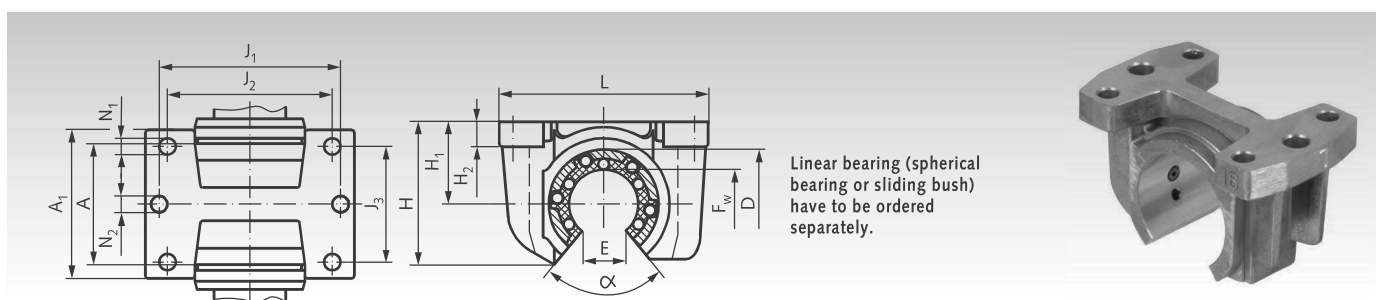
The housings can be mounted standing, upside-down or horizontally. The bearing is secured in the housing against axial and radial movement with a grease nipple. At the slotted housing, the desired radial clearance can be set with an adjusting screw during the mounting.

Ordering Details: e.g.: Product No. 646 508 00, Precision Housing KG, D = 16 mm, Closed

Product No. Closed	Product No. Slotted	F _w	D	A	A ₁	H	H ₁ ±0,01	H ₂	J ₁	J ₂	J ₃	L	N ₁	N ₂	Weight g	Product No. Matching Spherical Bearing or Slide Bearing			Product No. Retaining Ring		
																			DIN 471		Weight g
																Spher. Bear. / Spher. Bear. / Slide Bear.			Page 582		
646 508 00	646 608 00	8	16	14	27	28	15	5,5	35	25	20	45	3,2	5,3	18	646 008 00/ 646 108 00/ 646 208 00	617 416 00	0,8			
646 512 00	646 612 00	12	22	20	31	34,5	18	6	42	32	23	52	4,3	5,3	38	646 012 00/ 646 112 00/ 646 212 00	617 422 00	1,7			
646 516 00	646 616 00	16	26	22	34,5	40,5	22	7	46	40	26	56	4,3	5,3	54	646 016 00/ 646 116 00/ 646 216 00	617 426 00	2,1			
646 520 00	646 620 00	20	32	28	41	48	25	8	58	45	32	70	4,3	6,4	100	646 020 00/ 646 120 00/ 646 220 00	617 432 00	3,6			
646 525 00	646 625 00	25	40	40	52	58	30	10	68	60	40	80	5,3	6,4	200	646 025 00/ 646 125 00/ 646 225 00	617 440 00	6,3			
646 530 00	646 630 00	30	47	48	59	67	35	10	76	68	45	88	6,4	6,4	300	646 030 00/ 646 130 00/ 646 230 00	617 447 00	7,8			
646 540 00	646 640 00	40	62	56	74	85	45	12	94	86	58	108	8,4	8,4	460	646 040 00/ 646 140 00/ 646 240 00	617 462 00	14,4			
646 550 00	646 650 00	50	75	72	66	99	50	14	116	108	50	135	8,4	10,5	750	646 050 00/ 646 150 00/ 646 250 00	617 475 00	21,0			

Shaft steel page 466. Shaft blocks page 475.

Precision Housings KG-0 for Linear Bearings of Open Design, ISO Series 3



Linear bearing (spherical bearing or sliding bush) have to be ordered separately.

Material: Aluminium die-cast.

Light housing for linear bearings of open design, ISO Series 3 (linear bearing has to be ordered separately).

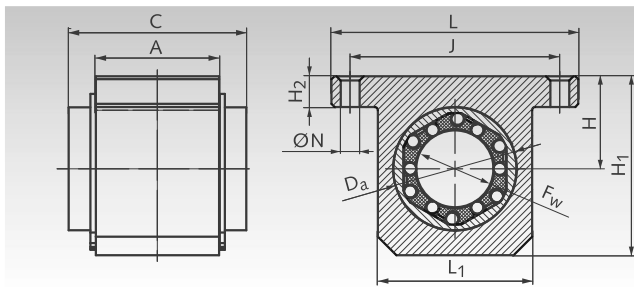
The housings can be mounted standing, upside-down or horizontally. The bearing is secured in the housing against axial and radial movement with a grease nipple.

Ordering Details: e.g.: Product No. 646 512 01, Precision Housing KG-O, D = 22 mm, Open

Product-No. Open	F _w mm	D mm	A mm	A ₁ mm	H±0,01 mm	H ₁ mm	H ₂ mm	J ₁ mm	J ₂ mm	J ₃ mm	L mm	N ₁ mm	N ₂ mm	E mm	α Grad	Weight g	Product-No. Matching Bearing		
																	Spher. Bear./	Spher. Bear. /	Slide Bea.
646 512 01	12	22	20	31	28	18	6	42	32	23	52	4,3	5,3	7,6	78	33	646 012 01	646 112 01	646 212 01
646 516 01	16	26	22	34,5	35	22	7	46	40	26	56	4,3	5,3	10,4	78	44	646 016 01	646 116 01	646 216 01
646 520 01	20	32	28	41	42	25	8	58	45	32	70	4,3	6,4	10,8	60	88	646 020 01	646 120 01	646 220 01
646 525 01	25	40	40	52	51	30	10	68	60	40	80	5,3	6,4	13,2	60	180	646 025 01	646 125 01	646 225 01
646 530 01	30	47	48	59	60	35	10	76	68	45	88	6,4	6,4	14,2	50	260	646 030 01	646 130 01	646 230 01
646 540 01	40	62	56	74	77	45	12	94	86	58	108	8,4	8,4	18,7	50	400	646 040 01	646 140 01	646 240 01
646 550 01	50	75	72	66	88	50	14	116	108	50	135	8,4	10,5	23,6	50	650	646 050 01	646 150 01	646 250 01

Shaft steel with shaft support page 467.

Linear Bearings Units KG-3-K ISO Series 3, Short Version, with Linear Bearing of Closed Design



Material: Housing made from extruded aluminium with a closed linear bearing of the ISO Series 3 from reliable brand in good quality. Self-aligning capability that accommodates tilting.

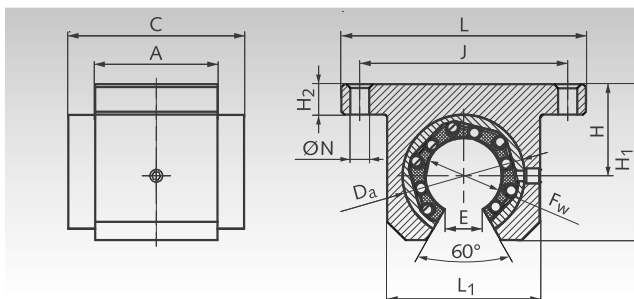
All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 479.

Ordering Details: e.g.: Product No. 646 712 04, Linear Bearings Unit KG-3-K, Short Version, Internal Ø 12 mm

Product No.	F _w	A	C	D _a	H ^{±0,015}	H ₁	H ₂	J	L	L ₁	N	Load dyn. C	Rating stat. C ₀	Weight
Closed	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	N	N	g
646 712 04	12	20	32	22	18	35	6	42	52	30	5,3	1020	1290	90
646 716 04	16	22	36	26	22	40,5	7	46	56	34	5,3	1250	1550	120
646 720 04	20	28	45	32	25	48	8	58	70	40	6,4	2090	2630	250
646 725 04	25	40	58	40	30	58	10	68	80	50	6,4	3780	4720	490
646 730 04	30	48	68	47	35	67	10	76	88	58	6,4	5470	6810	780
646 740 04	40	56	80	62	45	85	12	94	108	74	8,4	6590	8230	1280
646 750 04	50	72	100	75	50	100	12	116	135	96	10,5	10800	13500	1700

Shaft steel page 466. Shaft blocks page 475.

Linear Bearings Units KG-3-KO ISO Series 3, Short Version, with Linear Bearing of Open Design



Material: Housing made from extruded aluminium with an open linear bearing of the ISO Series 3 from reliable brand in good quality. Self-aligning capability that accommodates tilting.

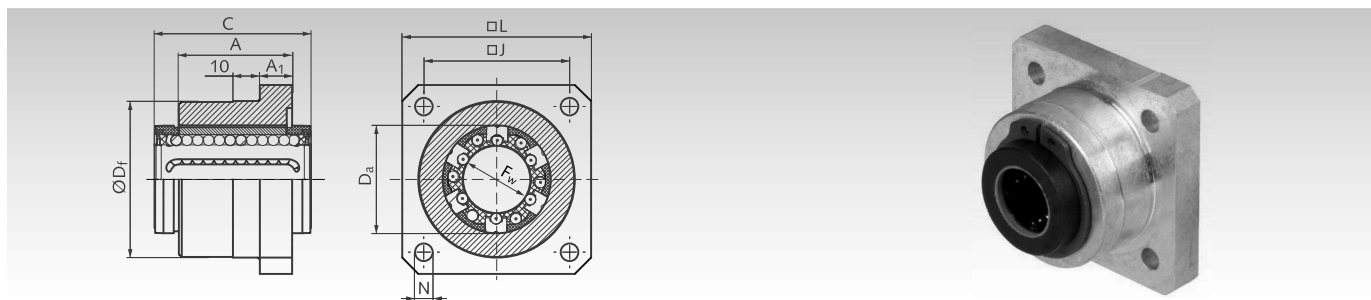
All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 479.

Ordering Details: e.g.: Product No. 646 712 05, Linear Bearings Unit KG-3-KO, Short Version, Internal Ø 12 mm

Product No. Open	F _w mm	A mm	C mm	D _a mm	H±0,015 mm	H ₁ mm	H ₂ mm	J mm	L mm	L ₁ mm	E mm	N mm	Load dyn. C N	Rating stat. C ₀ N	Weight g
646 712 05	12	20	32	22	18	28	6	42	52	30	7,5	5,3	1020	1290	90
646 716 05	16	22	36	26	22	33,5	7	46	56	34	10	5,3	1250	1550	120
646 720 05	20	28	45	32	25	42	8	58	70	40	10	6,4	2090	2630	250
646 725 05	25	40	58	40	30	51	10	68	80	50	12,5	6,4	3780	4720	490
646 730 05	30	48	68	47	35	60	10	76	88	58	12,5	6,4	5470	6810	780
646 740 05	40	56	80	62	45	77	12	94	108	74	16,8	8,4	6590	8230	1280
646 750 05	50	72	100	75	50	93	12	116	135	96	21	10,5	10800	13500	1700

Shaft steel with shaft support page 467.

Linear Bearings Units KG-3-F ISO Series 3, Flange Version, with Linear Bearing of Closed Design



Material: Housing made from extruded aluminium with a closed linear bearing of the ISO Series 3 from reliable brand in good quality. Self-aligning capability that accommodates tilting.

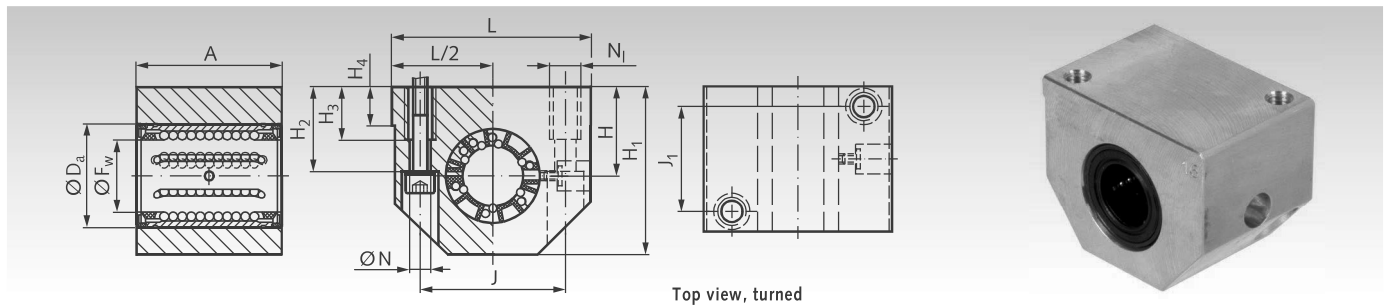
All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 479.

Ordering Details: e.g.: Product No. 646 712 06, Linear Bearings Unit KG-3-F, Flange Version, Internal Ø 12 mm

Product No.	F _w mm	A mm	A ₁ mm	C mm	D _a mm	D _f ^{g7} mm	J mm	L mm	N mm	Load Rating		Weight g
										dyn. C N	stat. C ₀ N	
646 712 06	12	22	6	32	22	32	30	40	5,5	1020	1290	90
646 716 06	16	24	8	36	26	38	35	50	5,5	1250	1550	120
646 720 06	20	30	10	45	32	46	42	60	6,6	2090	2630	250
646 725 06	25	42	12	58	40	58	54	70	6,6	3780	4720	490
646 730 06	30	50	14	68	47	66	60	80	9	5470	6810	780
646 740 06	40	59	16	80	62	90	78	100	11	6590	8230	1280

Shaft steel page 466. Shaft blocks page 475.

Linear Bearings Units KG-3 ISO Series 3, with Linear Bearing of Closed Design



Material: Housing made from extruded aluminium with a closed linear bearing of the ISO Series 3 from premium brand in top quality. With self-aligning capability that accommodates tilting.

All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 478.

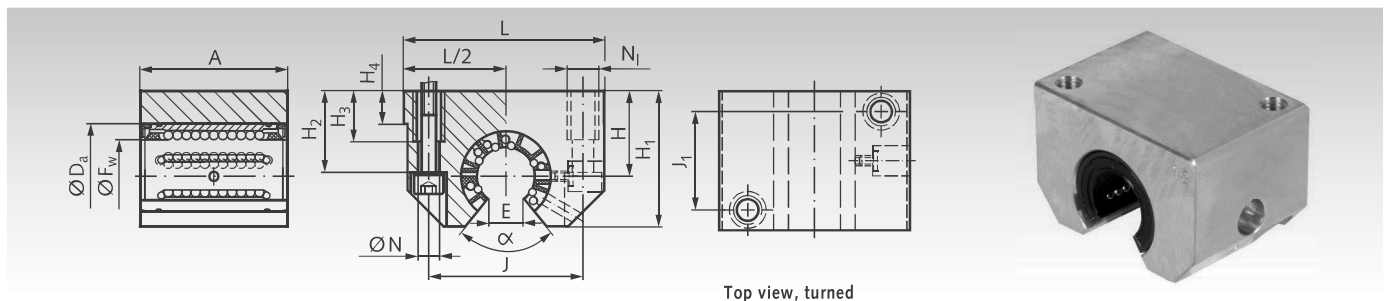
Ordering Details: e.g.: Product No. 646 712 00, Linear Bearings Unit KG-3, Internal Ø 12 mm

Product No. Closed	F _w mm	A mm	D _a mm	H _{±0.02} mm	H ₁ mm	H ₂ mm	H ₃ mm	H ₄ mm	J mm	J ₁ mm	L mm	N mm	N ₁ * mm	Load Rating		Weight g
														dyn. C N	stat. C ₀ N	
646 712 00	12	32	22	18	35	16,5	11	6	32	23	43	4,3	M5	1080	815	93
646 716 00	16	37	26	22	42	21	13	7	40	26	53	5,3	M6	1320	865	161
646 720 00	20	45	32	25	50	24	18	7,5	45	32	60	6,6	M8	2000	1370	225
646 725 00	25	58	40	30	61	29	22	8,5	60	40	78	8,4	M10	2900	2040	533
646 730 00	30	68	47	35	70	34	22	9,5	68	45	87	8,4	M10	4650	3250	790
646 740 00	40	80	62	45	90	44	26	11	86	58	108	10,5	M12	7800	5200	1440
646 750 00	50	100	75	50	105	49	35	11	108	50	132	13,5	M16	11200	6950	2470

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel page 466. Shaft blocks page 475.

Linear Bearings Units KG-3-O ISO Series 3, with Linear Bearing of Open Design



Material: Housing made from extruded aluminium with an open linear bearing of the ISO Series 3 from premium brand in top quality. With self-aligning capability that accommodates tilting, adjustable clearance and double-lip seals.

All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 478.

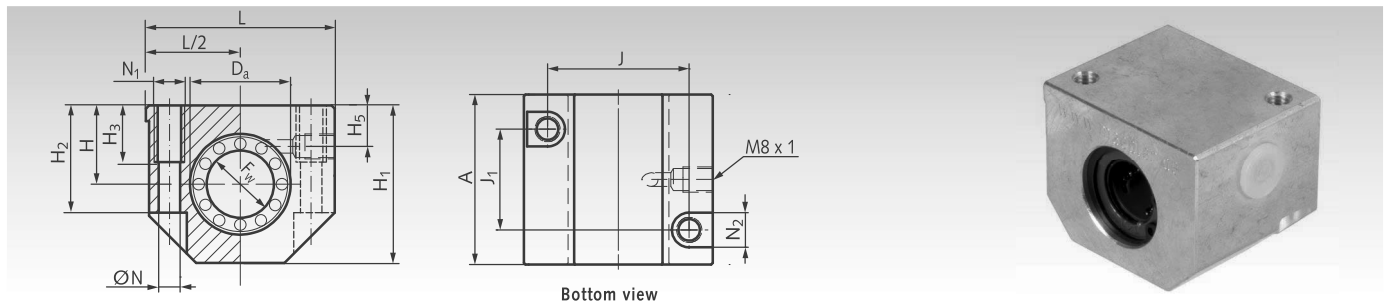
Ordering Details: e.g.: Product No. 646 712 01, Linear Bearings Unit KG-3-O, Internal Ø 12 mm

Product No. Open	F _w mm	A mm	D _a mm	H _{±0.02} mm	H ₁ mm	H ₂ mm	H ₃ mm	H ₄ mm	J mm	J ₁ mm	L mm	N mm	N ₁ * mm	E mm	α Degrees	Load Rating		Weight g
																dyn. C N	stat. C ₀ N	
646 712 01	12	32	22	18	28	16,5	11	6	32	23	43	4,3	M5	7,6	78	1080	815	74
646 716 01	16	37	26	22	35	21	13	7	40	26	53	5,3	M6	10,4	78	1320	865	132
646 720 01	20	45	32	25	42	24	18	7,5	45	32	60	6,6	M8	10,8	60	2000	1370	215
646 725 01	25	58	40	30	51	29	22	8,5	60	40	78	8,4	M10	13,2	60	2900	2040	443
646 730 01	30	68	47	35	60	34	22	9,5	68	45	87	8,4	M10	14,2	50	4650	3250	670
646 740 01	40	80	62	45	77	44	26	11	86	58	108	10,5	M12	18,7	50	7800	5200	1210
646 750 01	50	100	75	50	88	49	35	11	108	50	132	13,5	M16	23,6	50	11200	6950	2020

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel with shaft support page 467.

Linear Bearings Units KG-3 ISO Series 3, Economy-Line, with Linear Bearing of Closed Design



Material: Housing made from extruded aluminium with a closed linear bearing of the ISO Series 3 from reliable brand in good quality at low price. Self-aligning capability that accommodates tilting.

All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 479.

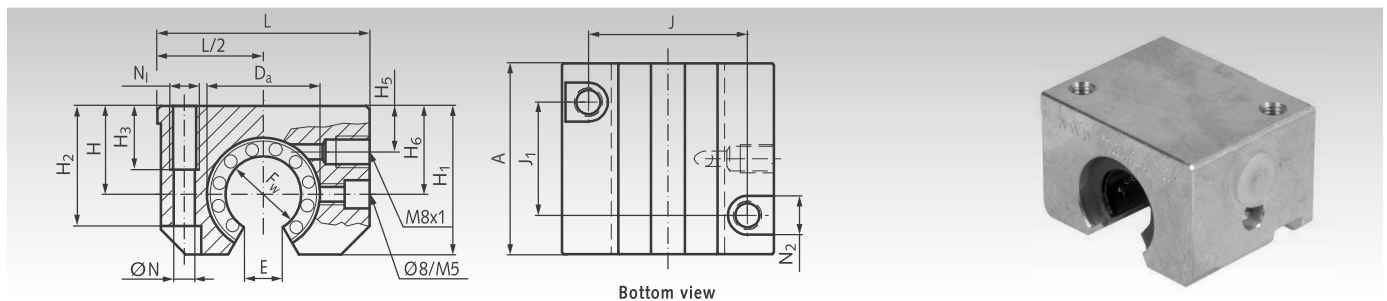
Ordering Details: e.g.: Product No. 646 712 02, Linear Bearings Unit KG-3, Economy-Line, Internal Ø 12 mm

Product No. closed	F _w mm	A mm	D _a mm	H _{±0,02} mm	H ₁ mm	H ₂ mm	H ₃ mm	H ₅ mm	J mm	J ₁ mm	L mm	N mm	N ₁ * mm	N ₂ mm	Load Rating dyn. C N	Rating stat. C ₀ N	Weight g
646 712 02	12	39	22	18	35	25	13	10	32	23	43	4,2	M5	8	1020	1290	130
646 716 02	16	43	26	22	42	30	13	12	40	26	53	5,2	M6	10	1250	1550	200
646 720 02	20	54	32	25	50	34	18	13	45	32	60	6,8	M8	11	2090	2630	330
646 725 02	25	67	40	30	60	40	22	15	60	40	78	8,6	M10	15	3780	4720	670
646 730 02	30	79	47	35	70	48	22	16	68	45	87	8,6	M10	15	5470	6810	1010
646 740 02	40	91	62	45	90	60	26	20	86	58	108	10,3	M12	18	6590	8230	1810
646 750 02	50	113	75	50	105	49	34	20	108	50	132	14,25	M16	20	10800	13500	2930

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel page 466. Shaft blocks page 475.

Linear Bearings Units KG-3-O ISO Series 3, Economy-Line, with Linear Bearing of Open Design



Material: Housing made from extruded aluminium with an open linear bearing of the ISO Series 3 from reliable brand in good quality at low price. Self-aligning capability that accommodates tilting.

All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 479.

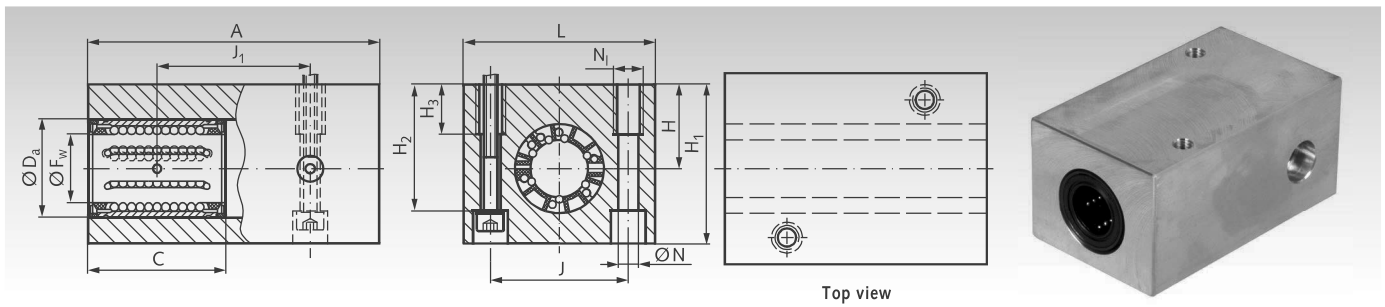
Ordering Details: e.g.: Product No. 646 712 03, Linear Bearings Unit KG-3-O, Economy-Line, Internal Ø 12 mm

Product No. open	F _w mm	A mm	D _a mm	H _{±0,02} mm	H ₁ mm	H ₂ mm	H ₃ mm	H ₅ mm	H ₆ mm	J mm	J ₁ mm	L mm	N mm	N ₁ * mm	N ₂ mm	E mm	Load Rating dyn. C N	Rating stat. C ₀ N	Weight g
646 712 03	12	39	22	18	28	23,5	11	8	16,7	32	23	43	4,2	M5	8	6,5	1020	1290	100
646 716 03	16	43	26	22	35	30	13	12	22,0	40	26	53	5,2	M6	10	9,0	1250	1550	170
646 720 03	20	54	32	25	42	34	18	13	25,0	45	32	60	6,8	M8	11	9,0	2090	2630	280
646 725 03	25	67	40	30	51	40	22	15	31,5	60	40	78	8,6	M10	15	11,5	3780	4720	570
646 730 03	30	79	47	35	60	48	22	16	33,0	68	45	87	8,6	M10	15	14,0	5470	6810	870
646 740 03	40	91	62	45	77	60	26	20	43,5	86	58	108	10,3	M12	28	19,5	6590	8230	1560
646 750 03	50	113	75	50	88	49	34	20	47,5	108	50	132	14,25	M16	20	22,5	10800	13500	2480

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel with shaft support page 467.

Tandem Linear-Bearing Units KGT-3 ISO Series 3, with Linear Bearings of Closed Design



Material: Housing made from extruded aluminium with two closed linear bearings of the ISO Series 3 from premium brand in top quality. With self-aligning capability that accommodates tilting and double-lip seals.

All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 478.

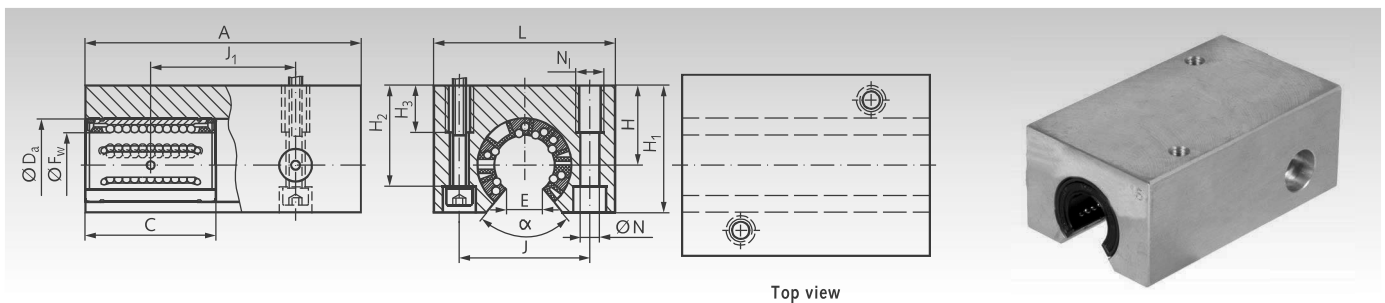
Ordering Details: e.g.: Product No. 646 812 00, Linear Bearings Unit KGT-3, Internal Ø 12 mm

Product No. Closed	F _w mm	A mm	C mm	D _a mm	H _{±0.01} mm	H ₁ mm	H ₂ mm	H ₃ mm	J mm	J ₁ mm	L mm	N mm	N ₁ * mm	Load Rating dyn. C N	stat. C ₀ N	Weight g
646 812 00	12	76	32	22	18	35	27	13	30	40	42	5,3	M6	1760	1630	236
646 816 00	16	84	36	26	22	41,5	33	13	36	45	50	5,3	M6	2160	1730	372
646 820 00	20	104	45	32	25	49,5	39,5	18	45	55	60	6,4	M8	3200	2750	670
646 825 00	25	130	58	40	30	59,5	47	22	54	70	74	8,4	M10	4750	4150	1236
646 830 00	30	152	68	47	35	69,5	55	26	62	85	84	10,5	M12	7500	6550	1870
646 840 00	40	176	80	62	45	89,5	71	34	80	100	108	13	M16	12700	10400	3550
646 850 00	50	224	100	75	50	99,5	81	34	100	125	130	13	M16	18300	14000	5920

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel page 466. Shaft blocks page 475.

Tandem Linear-Bearing Units KGT-3-0 ISO Series 3, with Linear Bearings of Open Design



Material: Housing made from extruded aluminium with two open linear bearings of the ISO Series 3 from premium brand in top quality. With self-aligning capability that accommodates tilting and double-lip seals.

All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 478.

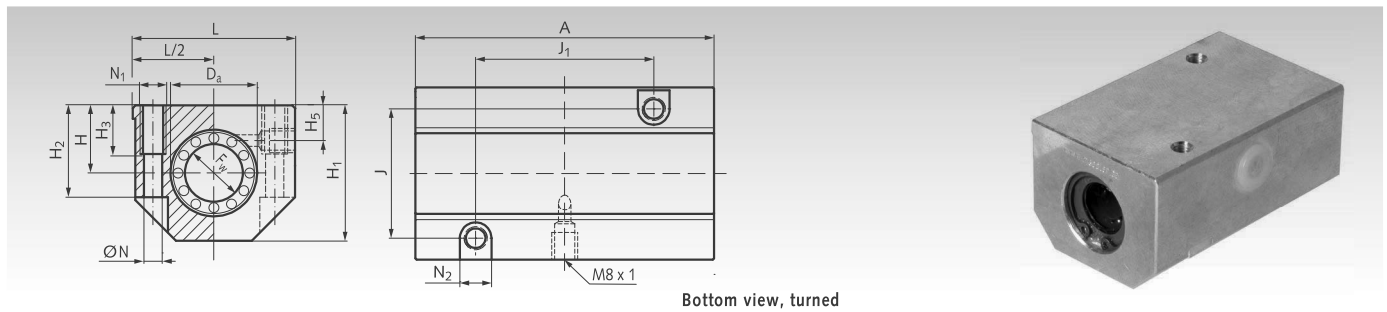
Ordering Details: e.g.: Product No. 646 812 01, Linear Bearings Unit KGT-3-0, Internal Ø 12 mm

Product No. Open	F _w mm	A mm	C mm	D _a mm	H _{±0.02} mm	H ₁ mm	H ₂ mm	H ₃ mm	J mm	J ₁ mm	L mm	N mm	N ₁ * mm	E mm	α Degrees	Load Rating dyn. C N	stat. C ₀ N	Weight g
646 812 01	12	76	32	22	18	29	23,5	13	30	40	42	5,3	M6	7,6	78	1760	1630	178
646 816 01	16	84	36	26	22	35	28	13	36	45	50	5,3	M6	10,4	78	2160	1730	284
646 820 01	20	104	45	32	25	42	33,5	18	45	55	60	6,4	M8	10,8	60	3200	2750	620
646 825 01	25	130	58	40	30	51	40	22	54	70	74	8,4	M10	13,2	60	4750	4150	966
646 830 01	30	152	68	47	35	60	46,5	26	62	85	84	10,5	M12	14,2	50	7500	6550	1490
646 840 01	40	176	80	62	45	77	61	34	80	100	108	13	M16	18,7	50	12700	10400	2810
646 850 01	50	224	100	75	50	88	72	34	100	125	130	13	M16	23,6	50	18300	14000	4830

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel with shaft support page 467.

Tandem Linear-Bearing Units KGT-3 ISO Series 3, Economy-Line, with Linear Bearings of Closed Design



Bottom view, turned

Material: Housing made from extruded aluminium with two closed linear bearings of the ISO Series 3 from reliable brand in good quality at low price. Self-aligning capability that accommodates tilting.

All bearings are lubricated ready-to-install.

Recommended shaft tolerance h6.

Spare linear bearing page 479.

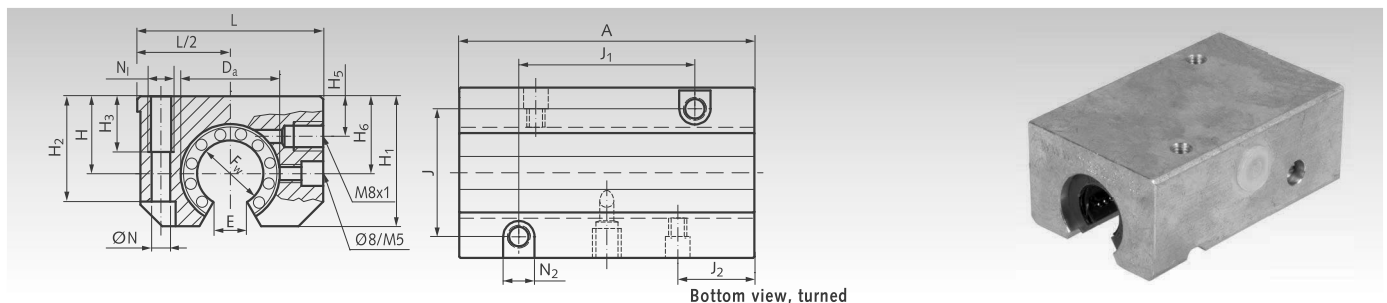
Ordering Details: e.g.: Product No. 646 812 02, Linear Bearings Unit KGT-3, Economy-Line, Internal Ø 12 mm

Product No. closed	F _w mm	A mm	D _a mm	H±0.02 mm	H ₁ mm	H ₂ mm	H ₃ mm	J mm	J ₁ mm	L mm	N mm	N ₁ * mm	N ₂ mm	Load Rating dyn. C N	Rating stat. C ₀ N	Weight g
646 812 02	12	76	22	18	35	25	13	30	40	43	5,2	M6	10	1660	2580	250
646 816 02	16	84	26	22	42	30	13	36	45	53	5,2	M6	10	2030	3100	410
646 820 02	20	104	32	25	50	34	18	45	55	60	6,8	M8	11	3400	5260	640
646 825 02	25	130	40	30	60	40	22	54	70	78	8,6	M10	15	6160	9440	1290
646 830 02	30	152	47	35	70	48	26	62	85	87	10,3	M12	18	8610	13620	1970
646 840 02	40	176	62	45	90	60	34	80	100	108	14,25	M16	20	10740	16460	3520
646 850 02	50	224	75	50	105	49	34	100	125	132	14,25	M16	20	17600	27000	5860

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel page 466. Shaft blocks page 475.

Tandem Linear-Bearing Units KGT-3-0 ISO Series 3, Economy-Line, with Linear Bearings of Open Design



Bottom view, turned

Material: Housing made from extruded aluminium with two open linear bearings of the ISO Series 3 from reliable brand in good quality at low price. Self-aligning capability that accommodates tilting.

All bearings are lubricated ready-to-install.

Recommended shaft tolerance h6.

Spare linear bearing page 479.

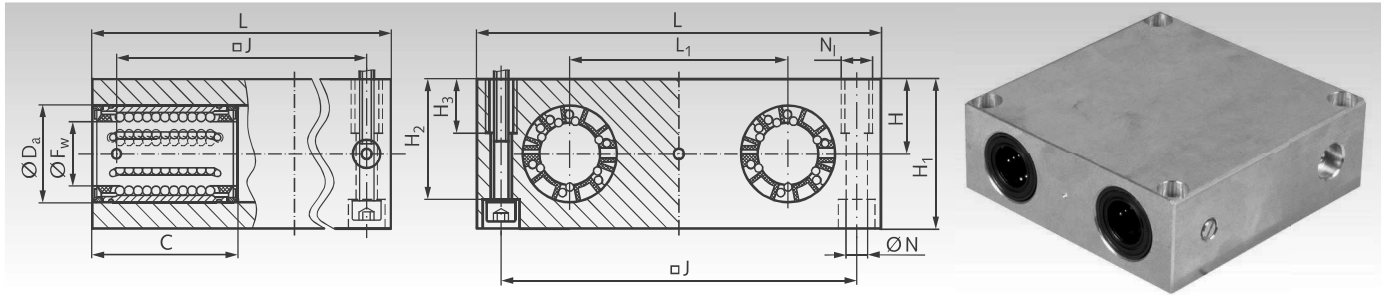
Ordering Details: e.g.: Product No. 646 812 03, Linear Bearings Unit KGT-3-0, Economy-Line, Internal Ø 12 mm

Product No. open	F _w mm	A mm	D _a mm	H±0.02 mm	H ₁ mm	H ₂ mm	H ₃ mm	H ₆ mm	J mm	J ₁ mm	J ₂ mm	L mm	N mm	N ₁ * mm	N ₂ mm	E mm	Load Rating dyn. C N	Rating stat. C ₀ N	Weight g
646 812 03	12	76	22	18	30	25	13	16,7	30	40	19,5	43	5,2	M6	10	6,5	1660	2580	210
646 816 03	16	84	26	22	35	30	13	22,0	36	45	21,5	53	5,2	M6	10	9,0	2030	3100	340
646 820 03	20	104	32	25	42	34	18	25,0	45	55	27,0	60	6,8	M8	11	9,0	3400	5260	560
646 825 03	25	130	40	30	51	40	22	31,5	54	70	33,5	78	8,6	M10	15	11,5	6160	9440	1140
646 830 03	30	152	47	35	60	48	26	33,0	62	85	39,5	87	10,3	M12	18	14,0	8910	13620	1670
646 840 03	40	176	62	45	77	60	34	43,5	80	100	45,0	108	14,25	M16	20	19,5	10740	16460	3020
646 850 03	50	224	75	50	88	49	34	47,5	100	125	56,5	132	14,25	M16	20	22,5	17600	27000	5010

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel with shaft support page 467.

Quadro Linear-Bearing Units KGQ-3 ISO Series 3, with Linear Bearings of Closed Design



Material: Housing made from extruded aluminium with four closed linear bearings of the ISO Series 3 from premium brand in top quality. With self-aligning capability that accommodates tilting and double-lip seals.

All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 478.

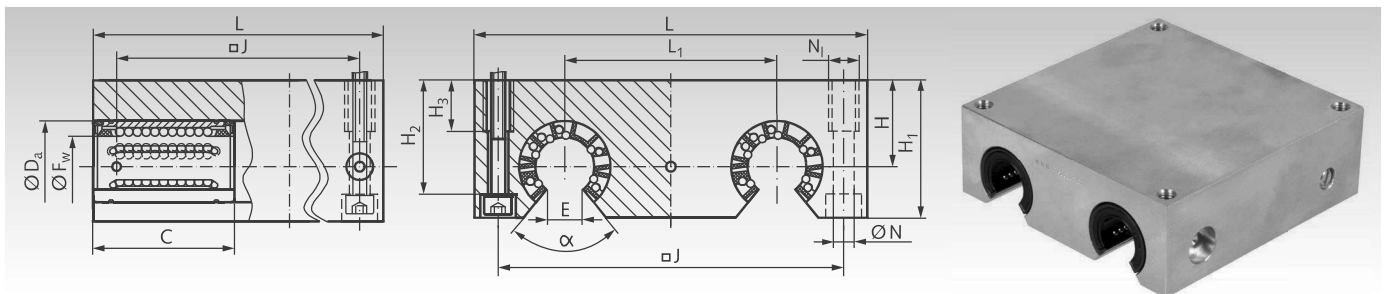
Ordering Details: e.g.: Product No. 646 912 00, Linear Bearings Unit KGQ-3, Internal Ø 12 mm

Product No. Closed	F _w mm	C mm	D _a mm	H±0.02 mm	H ₁ mm	H ₂ mm	H ₃ mm	J mm	L mm	L ₁ mm	N mm	N _i * mm	Load Rating		Weight g
													dyn. C N	stat. C ₀ N	
646 912 00	12	32	22	16	32	25	13	73	85	42	5,3	M6	2850	3250	492
646 916 00	16	36	26	18	36	29	13	88	100	54	5,3	M6	3450	3450	744
646 920 00	20	45	32	23	46	37,5	18	115	130	72	6,6	M8	5200	5500	1680
646 925 00	25	58	40	28	56	45	22	140	160	88	8,4	M10	7650	8150	3022
646 930 00	30	68	47	32	64	50,5	26	158	180	96	10,5	M12	12200	12900	4270
646 940 00	40	80	62	40	80	64	34	202	230	122	13,5	M16	20800	20800	8380
646 950 00	50	100	75	48	96	80	34	250	280	152	13,5	M16	30000	28000	14990

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel page 466. Shaft blocks page 475.

Quadro Linear-Bearing Units KGQ-3-0 ISO Series 3, with Linear Bearings of Open Design



Material: Housing made from extruded aluminium with four open linear bearings of the ISO Series 3 from premium brand in top quality. With self-aligning capability that accommodates tilting and double-lip seals.

All bearings are lubricated ready to install.
Recommended shaft tolerance h6.
Spare linear bearing page 478.

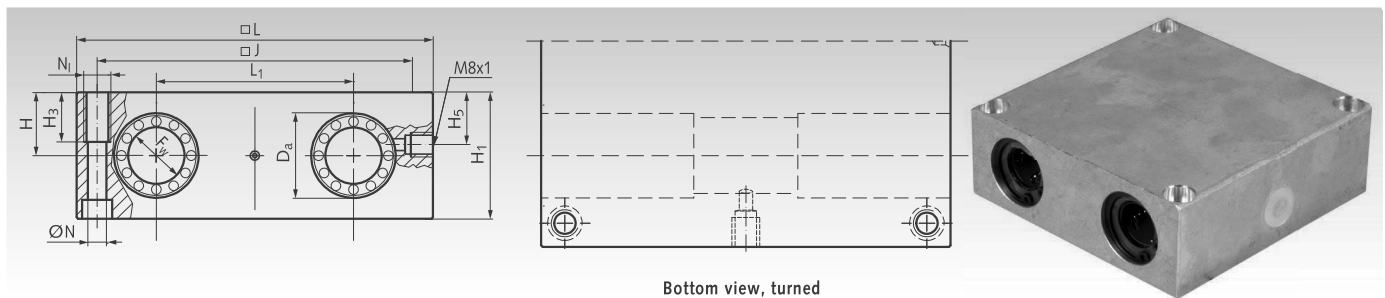
Ordering Details: e.g.: Product No. 646 912 01, Linear Bearings Unit KGQ-3-0, Internal Ø 12 mm

Product No. Open	F _w mm	C mm	D _a mm	H±0.02 mm	H ₁ mm	H ₂ mm	H ₃ mm	J mm	L mm	L ₁ mm	N mm	N _i * mm	E mm	α Degrees	Load Rating		Weight g
															dyn. C N	stat. C ₀ N	
646 912 01	12	32	22	18	30	23,4	13	73	85	42	5,3	M6	7,6	78	2850	3250	426
646 916 01	16	36	26	22	35	28,4	13	88	100	54	5,3	M6	10,4	78	3450	3450	698
646 920 01	20	45	32	25	42	33,5	18	115	130	72	6,6	M8	10,8	60	5200	5500	1420
646 925 01	25	58	40	30	51	40	22	140	160	88	8,4	M10	13,2	60	7650	8150	2572
646 930 01	30	68	47	35	60	46,5	26	158	180	96	10,5	M12	14,2	50	12200	12900	3790
646 940 01	40	80	62	45	77	61	34	202	230	122	13,5	M16	18,7	50	20800	20800	7800
646 950 01	50	100	75	55	93	77	34	250	280	152	13,5	M16	23,6	50	30000	28000	13960

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel with shaft support and shaft blocks page 467.

Quadro Linear-Bearing Units KGQ-3 ISO Series 3, Economy-Line, with Linear Bearings of Closed Design



Bottom view, turned

Material: Housing made from extruded aluminium with four closed linear bearings of the ISO Series 3 from reliable brand in good quality at low price. Self-aligning capability that accommodates tilting.

All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 479.

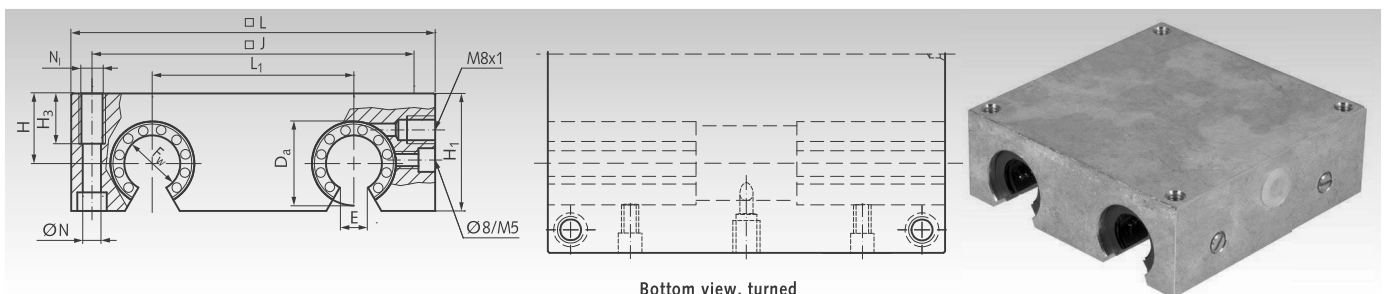
Ordering Details: e.g.: Product No. 646 912 02, Linear Bearings Unit KGQ-3, Economy-Line, Internal Ø 12 mm

Product No. closed	F _w mm	D _a mm	H±0.02 mm	H ₁ mm	H ₃ mm	H ₅ mm	J mm	L mm	L ₁ mm	N mm	N _I * mm	Load Rating		Weight g
												dyn. C N	stat. C ₀ N	
646 912 02	12	22	16	32	13	13	73	85	42	5,3	M6	2690	5160	520
646 916 02	16	26	18	36	13	15	88	100	54	5,3	M6	3300	6200	800
646 920 02	20	32	23	46	18	19	115	130	72	6,8	M8	5510	10520	1740
646 925 02	25	40	28	56	22	24	140	160	88	9,0	M10	9980	18880	3190
646 930 02	30	47	32	64	26	27	158	180	96	10,5	M12	14440	27240	4540
646 940 02	40	62	40	80	34	35	202	230	122	13,5	M16	17390	32920	8790
646 950 02	50	75	48	96	34	40	250	280	152	13,5	M16	28510	54000	15520

* When mounting from the bottom side choose the next smaller screw size.

Shaft steel page 466. Shaft blocks page 475.

Quadro Linear-Bearing Units KGQ-3-0 ISO Series 3, Economy-Line, with Linear Bearings of Open Design



Bottom view, turned

Material: Housing made from extruded aluminium with four open linear bearings of the ISO Series 3 from reliable brand in good quality at low price. Self-aligning capability that accommodates tilting.

All bearings are lubricated ready-to-install.
Recommended shaft tolerance h6.
Spare linear bearing page 479.

Ordering Details: e.g.: Product No. 646 912 03, Linear Bearings Unit KGQ-3-0, Economy-Line, Internal Ø 12 mm

Product No. open	F _w mm	D _a mm	H±0.02 mm	H ₁ mm	H ₃ mm	J mm	L mm	L ₁ mm	N mm	N _I * mm	E mm	Load Rating		Weight g
												C _{dyn.} N	stat. C ₀ N	
646 912 03	12	22	18	30	13	73	85	42	5,3	M6	6,5	2690	5160	470
646 916 03	16	26	22	35	13	88	100	54	5,3	M6	9,0	3300	6200	740
646 920 03	20	32	25	42	18	115	130	72	6,8	M8	9,0	5510	10520	1540
646 925 03	25	40	30	51	22	140	160	88	9,0	M10	11,5	9980	18880	2790
646 930 03	30	47	35	60	26	158	180	96	10,5	M12	14,0	14440	27240	4140
646 940 03	40	62	45	77	34	202	230	122	13,5	M16	19,5	17690	32920	8290
646 950 03	50	75	55	93	34	250	280	152	13,5	M16	22,5	28510	54000	14870

* When mounting from the bottom side choose the next smaller screw size.

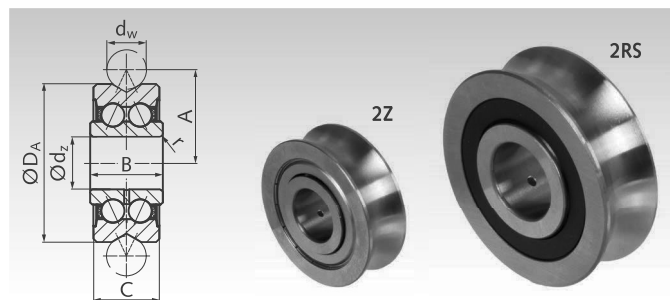
Shaft steel with shaft support and shaft blocks page 467.

Profiled Track Rollers LFR

- Standard rollers in high quality with very strong outer ring and special groove design for 2-point contact. Pressure angle 30°.
- Integrated double-row angular contact ball bearings for common axial and high radial load.
- Usable on hardened and ground linear shaft steel with shaft support or on special linear guides.
- On choice: With friction-free metal shields 2Z or with contacting rubber seals 2RS.

Accuracy class PN DIN 620. Radial clearance approaching class CN. Temperature range: -30°C to +90°C (for short time up to +110°C).

Ordering Details: e.g.: Product No. 647 801 01, Profiled Track Roller LFR50/5-4-2Z



From size d_w 16 with lubrication hole at the inner ring.

Profiled Track Rollers LFR...-2Z with Shields

Material: Roller bearing steel 100Cr6.

Product No.	Type	d_w mm	d_z mm	D_A mm	A mm	B mm	C mm	r mm	C_w kN	C_{w0} kN	F_{rz} kN	F_{0rz} kN	Weight g
647 801 01	LFR50/5-4-2Z	4	5	16	9,0	8	7	0,2	1,2	0,86	1,3	1,78	9
647 801 02	LFR50/5-6-2Z	6	5	17	10,5	8	7	0,2	1,27	0,82	1,3	1,78	10
647 801 03	LFR50/8-6-2Z	6	8	24	14,0	11	11	0,3	3,67	2,28	1,3	4,56	20
647 801 04	LFR5201-10-2Z	10	12	35	20,65	15,9	15,9	0,3	8,5	5,1	5,1	10,2	66
647 801 05	LFR5301-10-2Z	10	12	42	24,0	19	19	0,6	13,0	7,7	7,5	14,2	135
647 801 06	LFR5302-10-2Z	10	15	47	26,65	19	19	1,0	16,2	9,2	6,2	18,4	170
647 801 07	LFR5201-12-2Z	12	12	35	21,75	15,9	15,9	0,3	8,4	5,0	5,1	10,0	66
647 801 08	LFR5204-16-2Z	16	20	52	31,5	22,6	20,6	0,6	16,8	9,5	12,1	16,6	195
647 801 09	LFR5206-20-2Z	20	25	72	41,0	25,8	23,8	0,6	29,5	16,6	20,7	33,2	435
647 801 10	LFR5206-25-2Z	25	25	72	43,5	25,8	23,8	0,6	29,2	16,4	23,1	32,8	425
647 801 11	LFR5207-30-2Z	30	30	80	51,0	29	27	1,0	38,0	20,8	21,4	36,2	600
647 801 12	LFR5208-40-2Z	40	40	98	62,5	38	36	1,0	54,8	29,0	55,0	58,0	1100

Profiled Track Rollers LFR...-2RS with contacting Seals

Material: Roller bearing steel 100Cr6.
Stainless steel X105CrMo17.



Product No. Steel	Product No. Stainless Steel	Type	d_w mm	d_z mm	D_A mm	A mm	B mm	C mm	r mm	C_w kN	C_{w0} kN	F_{rz} kN	F_{0rz} kN	Weight g
647 802 01	647 806 01	LFR50/5-4-2RS	4	5	16	9,0	8	7	0,2	1,2	0,86	1,3	1,78	9
647 802 02	647 806 02	LFR50/5-6-2RS	6	5	17	10,5	8	7	0,2	1,27	0,82	1,3	1,78	10
647 802 03	647 806 03	LFR50/8-6-2RS	6	8	24	14,0	11	11	0,3	3,67	2,28	1,3	4,56	20
647 802 04	647 806 04	LFR5201-10-2RS	10	12	35	20,65	15,9	15,9	0,3	8,5	5,1	5,1	10,2	66
647 802 05	647 806 05	LFR5301-10-2RS	10	12	42	24,0	19	19	0,6	13,0	7,7	7,5	14,2	135
647 802 06	647 806 06	LFR5302-10-2RS	10	15	47	26,65	19	19	1,0	16,2	9,2	6,2	18,4	170
647 802 07	647 806 07	LFR5201-12-2RS	12	12	35	21,75	15,9	15,9	0,3	8,4	5,0	5,1	10,0	66
647 802 08	647 806 08	LFR5204-16-2RS	16	20	52	31,5	22,6	20,6	0,6	16,8	9,5	12,1	16,6	195
647 802 09	-	LFR5206-20-2RS	20	25	72	41,0	25,8	23,8	0,6	29,5	16,6	20,7	33,2	435
647 802 10	-	LFR5206-25-2RS	25	25	72	43,5	25,8	23,8	0,6	29,2	16,4	23,1	32,8	425
647 802 11	-	LFR5207-30-2RS	30	30	80	51,0	29	27	1,0	38,0	20,8	21,4	36,2	600
647 802 12	-	LFR5208-40-2RS	40	40	98	62,5	38	36	1,0	54,8	29,0	55,0	58,0	1100

C_w = effective dynamical bearing load rate, taking account of the deformation of the outer ring.

C_{w0} = effective statical bearing load rate, taking account of the deformation of the outer ring.

F_{rz} = max. dynamical radial load, regarding the breaking strength of the outer ring.

F_{0rz} = max. statical radial load, regarding the breaking strength of the outer ring.

Assignment of Profiled Track Rollers and Bolts, related to Linear Shaft Diameter d_w and Bolt Diameter d_z

d_w mm	d_z mm	D_A mm	Track Roller with Shields		Track Roller with Seals		Zentric Bolt		Eccentric Bolt	
			Product No.	Type	Product No.	Type	Product No.	Type	Artikel-Nr.	Type
4	5	16	647 801 01	LFR50/5-4-2Z	647 802 01	LFR50/5-4-2RS	647 803 01	LFZ5	647 804 01	LFE5
6	5	17	647 801 02	LFR50/5-6-2Z	647 802 02	LFR50/5-6-2RS	647 803 01	LFZ5	647 804 01	LFE5
6	8	24	647 801 03	LFR50/8-6-2Z	647 802 03	LFR50/8-6-2RS	647 803 03	LFZ8	647 804 03	LFE8
10	12	35	647 801 04	LFR5201-10-2Z	647 802 04	LFR5201-10-2RS	647 803 04	LFZ12	647 804 04	LFE12
10	12	42	647 801 05	LFR5301-10-2Z	647 802 05	LFR5301-10-2RS	647 803 05	LFZ12/M12	647 804 05	LFE12/M12
10	15	47	647 801 06	LFR5302-10-2Z	647 802 06	LFR5302-10-2RS	647 803 06	LFZ15	647 804 06	LFE15
12	12	35	647 801 07	LFR5201-12-2Z	647 802 07	LFR5201-12-2RS	647 803 07	LFZ12x45A1	647 804 07	LFE12x45A1
16	20	52	647 801 08	LFR5204-16-2Z	647 802 08	LFR5204-16-2RS	647 803 08	LFZ20x67A1	647 804 08	LFE20x67A1
20	25	72	647 801 09	LFR5206-20-2Z	647 802 09	LFR5206-20-2RS	647 803 09	LFZ25x82A1	647 804 09	LFE25x82A1
25	25	72	647 801 10	LFR5206-25-2Z	647 802 10	LFR5206-25-2RS	647 803 09	LFZ25x82A1	647 804 09	LFE25x82A1
30	30	80	647 801 11	LFR5207-30-2Z	647 802 11	LFR5207-30-2RS	647 803 11	LFZ30x95A1	647 804 11	LFE30x95A1
40	40	98	647 801 12	LFR5208-40-2Z	647 802 12	LFR5208-40-2RS	647 803 12	LFZ40x107A1	647 804 12	LFE40x107A1

Precision Rail-Guide Sets RE and RE-ACS

Material:

Rails: Tool steel 1.2842 (90MnCrV8), hardness 61±3 HRC.

Rollers: Bearing steel 100Cr6, hardness 62±4 HRC.

Cages and end pieces: Plastic.

Technical data:

- Speed: Up to 3 m/s.
- Acceleration: Up to 80 m/s².
- Accuracy class: P10 (max. 10µm/1000 mm).
Higher accuracy classes P5 and P2 on request.
- Temperature range: -20°C to +80°C.

Lubrication: The rails have to be lubricated before mounting (z.B. lithium soap grease on mineral oil basis). Relubrication intervals depend on the type of application.

Contents of Delivery: A set consists of 4 half-rails, 2 plastic cages with rollers and 8 end pieces (delivered unassembled).

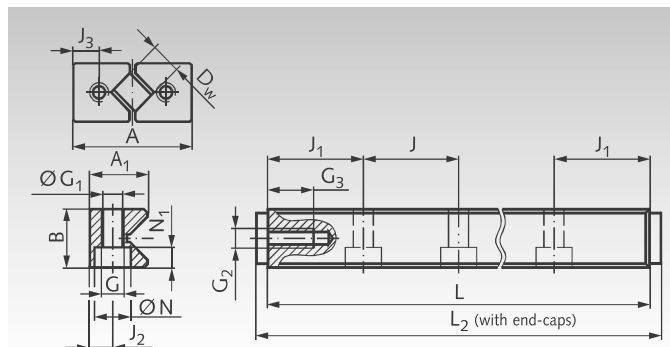
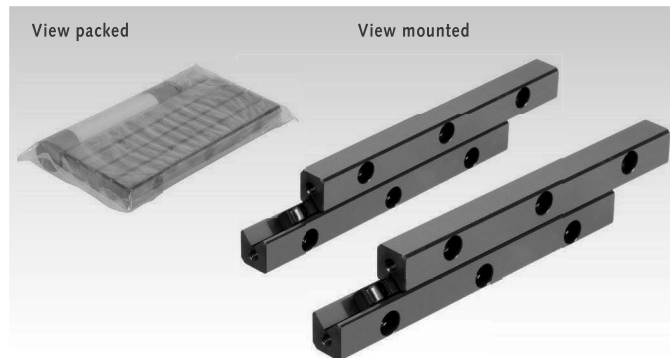
From these components a complete rail-pair unit can be assembled

Sizes: Two sizes with different lengths. Other sizes on request.

Design RE: For applications with limited travel, if high stiffness or load bearing capacity and positioning accuracy is required in very confined spaces. The rails are usually supplied in pairs, see contents of delivery.

Design RE-ACS: As version RE, but with an additional Anti-Creeper-System (ACS) that prevents the cage from creeping. This means the cage is guided by a plastic gear and teeth at the profile base. Hub and Load Rating are lower than for version RE (see table).

Applications: machine tools, handling systems, special machinery, measuring and testing equipment.



Ordering Details: e.g.: Product No. 649 703 01, Rail-Guide Sets RE Size 3, Length 50 mm

Product No. RE	Size	A-0.3 mm	B-0.2 mm	L mm	L ₂ mm	Stroke mm	A ₁ mm	D _w mm	J mm	J ₁ mm	J ₂ mm	G mm	G ₁ mm	N mm	N ₁ mm	J ₃ mm	G ₂ mm	G ₃ mm	Load Rating		Weight g
																			dyn. C N	stat. C ₀ N	
649 703 01	3	18	8	50	54	25	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	4230	5100	103
649 703 02	3	18	8	75	79	38	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	5803	7650	148
649 703 03	3	18	8	100	104	50	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	7263	10200	195
649 703 04	3	18	8	125	129	63	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	8644	12750	242
649 703 05	3	18	8	150	154	75	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	9964	15300	288
649 703 06	3	18	8	175	179	88	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	11238	17850	335
649 703 07	3	18	8	200	204	100	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	12471	20400	382
649 703 15	6	31	15	100	106	46	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	25743	27300	665
649 703 16	6	31	15	150	156	80	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	34000	39000	981
649 703 17	6	31	15	200	206	92	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	44204	54600	1302
649 703 18	6	31	15	250	256	126	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	51431	66300	1617
649 703 19	6	31	15	300	306	160	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	58382	78000	1933
649 703 20	6	31	15	350	356	172	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	67304	93600	2254
649 703 21	6	31	15	400	406	206	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	73781	105300	2569

Product No. RE-ACS	Size	A-0.3 mm	B-0.2 mm	L mm	L ₂ mm	Stroke mm	A ₁ mm	D _w mm	J mm	J ₁ mm	J ₂ mm	G mm	G ₁ mm	N mm	N ₁ mm	J ₃ mm	G ₂ mm	G ₃ mm	Load Rating		Weight g
																			dyn. C N	stat. C ₀ N	
649 703 29	3	18	8	50	54	20	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	3465	4250	102
649 703 30	3	18	8	75	79	30	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	5294	6800	103
649 703 31	3	18	8	100	104	45	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	6300	8500	193
649 703 32	3	18	8	125	129	62	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	7731	11050	240
649 703 33	3	18	8	150	154	79	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	9090	13600	286
649 703 34	3	18	8	175	179	94	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	9964	15300	333
649 703 35	3	18	8	200	204	100	8,7	4	25	12,5	3,5	M4	3,3	6	3,2	4	M3	6	11653	18700	381
649 703 43	6	31	15	100	106	37	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	22826	23400	660
649 703 44	6	31	15	150	156	71	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	31318	35100	976
649 703 45	6	31	15	200	206	105	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	39196	46800	1291
649 703 46	6	31	15	250	256	117	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	49056	62400	1612
649 703 47	6	31	15	300	306	151	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	56093	74100	1928
649 703 48	6	31	15	350	356	163	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	65107	89700	2249
649 703 49	6	31	15	400	406	197	15,2	8	50	25	6	M6	5,2	9,5	5,2	6,75	M5	9	71640	101400	2564

Miniature Slide Units

Material: Slides, rail and balls: Stainless steel 1.4034.
Cage and end pieces: Plastic.

Technical data:

- Speed: Up to 3 m/s.
- Acceleration: Up to 80 m/s².
- Accuracy class: P5 (standard, for most applications).
- Preload class: T0 (standard, slight clearance).
Other accuracy classes and preload classes on request.
- Temperature range: -20°C to +80°C.
Four rail widths to choose from (7, 9, 12 and 15 mm).

Lubrication: Prelubricated with „Paraliq P460“.

Relubrication intervals depend on the type of application.

Ready-to-mount, pre-assembled. for limited stroke. Especially compact construction. High running accuracy

(5 µm/100 mm stroke). Extremely smooth motion.

All technical parameters were set to ensure high system stiffness and precision guidance.

Contents of Delivery: One slide mounted on a rail.

Application:

- Pneumatics.
- Semi Conductors manufacturing.
- Medical.
- electronics and micro assembly.
- Precision engineering.
- Measuring applications.

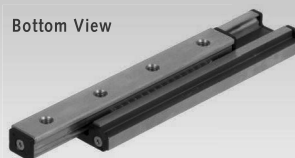
Advantages:

- Compact design.
- High load bearing capacity.
- Excellent running accuracy.
- Smooth running.
- High stiffness.
- Easy mounting.

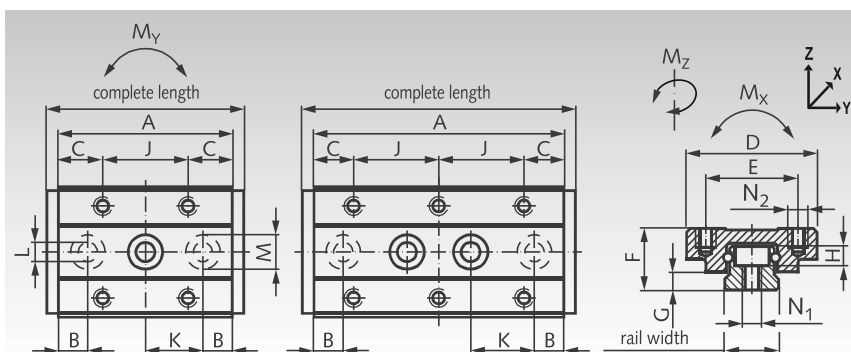
Ordering Details: e.g.: Product No. 649 701 01, Miniature Slide Overall Length 29 mm



Bottom View



Top View



Product No.	Rail Width mm	Overall Length mm	Max. Stroke* mm	A mm	B mm	C mm	Number of Bores Slide pcs.	Rail pcs.	Load Rating dyn. C N	stat. Co N	Torques M_x Nm	M_y, M_z Nm	Weight g
649 701 01	7	29	24	26	5,5	5	6	2	700	1100	6	3,5	18,4
649 701 02	7	37	34	34	9,5	5	8	2	900	1400	7	5,5	24,2
649 701 03	7	53	50	50	10	5	12	3	1100	2000	10	12	60,5
649 701 04	7	69	66	66	10,5	5	16	4	1400	2700	14	21	79,8
649 701 05	9	35	28	32	6	9,5	4	2	1200	1800	12	7	30,5
649 701 06	9	45	40	42	11	8	6	2	1400	2100	15	11	40,3
649 701 07	9	58	54	55	7,5	8	8	3	1900	3400	19	18	52,3
649 701 08	9	84	78	81	10,5	8	12	4	2500	4900	29	43	76,9
649 701 09	9	97	92	94	7	8	14	5	2700	5500	33	57	87,8
649 701 10	12	40	32	37	6	11	4	2	2200	3300	21	11	64,1
649 701 11	12	54	47	51	13	10,5	6	2	2600	4300	28	22	89,3
649 701 12	12	69	62	66	8	10,5	8	3	3000	5300	36	36	112,9
649 701 13	12	99	95	96	10,5	10,5	12	4	3800	7200	52	76	167,0
649 701 14	12	129	122	126	13	10,5	16	5	4700	9700	68	131	217,4
649 701 15	15	56	50	52	6	16,0	4	2	2800	3900	42	25	134,4
649 701 16	15	89	80	85	22,5	12,5	8	2	4600	7800	70	73	219,7
649 701 17	15	109	102	105	12,5	12,5	10	3	5100	9100	84	106	273,0
649 701 18	15	169	162	165	22,5	12,5	16	4	7300	15000	131	264	426,4

* Overall stroke from one mechanical end stop to the other.

Further Dimensions

Rail Width	D mm	E mm	F mm	G mm	H mm	J mm	K mm	L mm	M mm	N_1 mm	N_2 mm
7	17	12	8	2,35	2,5	8	15	2,5	4,5	M3	M2 x 2,5
9	20	15	10	3,55	3,5	13	20	3,5	6,5	M4	M3 x3
12	27	20	13	4,7	4,5	15	25	3,5	6,5	M4	M3 x 3,5
15	32	25	16	6	4,5	20	40	3,5	6,5	M4	M3 x 4

Miniature Profile Rail Guides

Material: Rails: Stainless steel 1.4037. Guide Carriage: Stainless steel 1.4037 with return zones of POM. Balls: Stainless steel 1.4037. Seals: Polyurethane.



Technical Data:

- Structure: 4-point contact ball recirculation system with identical load angles and 2 ball recirculation paths per carriage for unlimited stroke.
- Product range: four different rail widths: 7, 9, 12, 15 mm with one or two carriages.
- Speed: Up to max. 3 m/s. Acceleration: Up to 80 m/s².
- Accuracy class: P5 (standard, for most applications).
- Preload class: T0 (standard, slight clearance). Other accuracy classes and preload classes on request.
- Temperature range: -20°C to +80°C.

Use: e.g. for applications in the fields of precision engineering, medical engineering, electronics production and the optical industry. High load bearing capacity at a minimum of mounting space.

Compact: Simple design, compact and cost efficient.

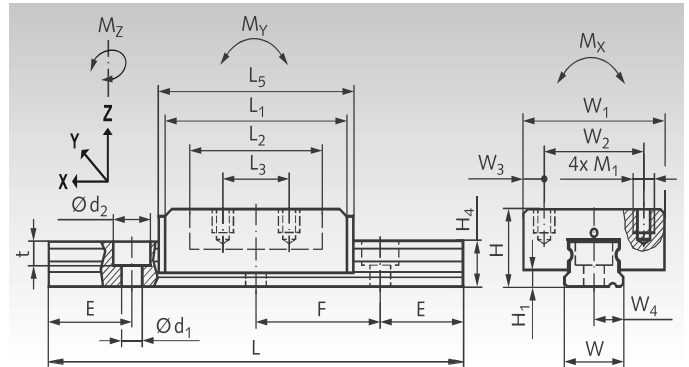
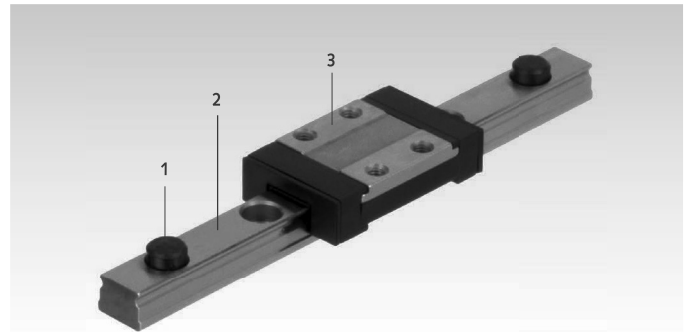
Fast: Ideal for linear movements up to 3 m/s.

Durability: Due to the pointed-arch shaped raceways, the carriages can take up loads and torques acting in any direction. High load bearing capacity and long service life.

Corrosion-resistant: All components are made from rust-resistant steel or of plastic.

Easy maintenance: Easily relubricatable through lubrications holes located in the end pieces of the carriage.

Lubrication and Sealing: Delivery prelubricated and ready for mounting. The individual carriages can be relubricated through lubrication holes located at the face side. The lubrication intervals depend on the distance travelled, the cycles and ambient conditions.



Ordering Details: e.g.: Product No. 649 010 71, Miniature Profile Guide Rails, 100 mm long, 1 Carriage

Product No. Complete	Rail Width W mm	Rail Length mm	No. of carriages Pcs.	E mm	Weight g	Spare part / Additional Product No. Carriage	Weight g
649 010 71	7	100	1	5,0	29	649 010 79	10
649 010 73	7	300	1	7,5	67	649 010 79	10
649 020 73	7	300	2	7,5	77	649 010 79	10
649 010 75	7	500	1	2,5	105	649 010 79	10
649 020 75	7	500	2	2,5	115	649 010 79	10
649 010 91	9	100	1	10,0	51	649 010 99	20
649 010 93	9	300	1	10,0	113	649 010 99	20
649 020 93	9	300	2	10,0	133	649 010 99	20
649 010 95	9	500	1	10,0	175	649 010 99	20
649 020 95	9	500	2	10,0	195	649 010 99	20
649 011 23	12	300	1	12,5	216	649 011 29	30
649 021 23	12	300	2	12,5	246	649 011 29	30
649 011 24	12	400	1	12,5	278	649 011 29	30
649 021 24	12	400	2	12,5	308	649 011 29	30
649 011 25	12	500	1	12,5	340	649 011 29	30
649 021 25	12	500	2	12,5	370	649 011 29	30
649 011 53	15	300	1	10,0	366	649 011 59	60
649 021 53	15	300	2	10,0	426	649 011 59	60
649 011 54	15	400	1	20,0	470	649 011 59	60
649 021 54	15	400	2	20,0	530	649 011 59	60
649 011 56	15	600	1	20,0	672	649 011 59	60
649 021 55	15	600	2	20,0	732	649 011 59	60

Demounting and Mounting of the Carriages

The system is premounted when delivered. To demount the system please regard the following instructions:

- Remove the end stop (1) from the rail.
- Position the mounting rail at the end of the rail (2), make sure there is no misalignment or gap.
- Move the carriage (3) from the rail onto the mounting rail while keeping both rails firm in position. For mounting the carriage on the rail, please proceed in reverse order.

Attention: please always use the enclosed mounting rail, as otherwise the ball retention inside the carriage is not guaranteed.

Dimensions and Performance Values

Rail Width W mm	d ₁ x d ₂ x t mm	F mm	H mm	H ₁ mm	H ₄ mm	L ₁ mm	L ₂ mm	L ₃ mm	L ₅ mm	M ₁ mm	Fastening Torque Nm
7	2,5 x 4,5 x 2,5	15	8	1,5	4,8	22	16,0	8	23,5	M2 x 2,5	0,32
9	3,5 x 6,0 x 3,5	20	10	2	6,5	30	21,5	10	32,0	M3 x 3,0	1,1
12	3,5 x 6,0 x 4,5	25	13	3	8,8	33	23,0	15	36,0	M3 x 3,5	1,1
15	3,5 x 6,0 x 4,5	40	16	4	10,8	41,5	29,5	20	44,5	M3 x 4,0	1,1

Rail Width W mm	W ₁ mm	W ₂ mm	W ₃ mm	W ₄ mm	Dyn. Load C kN	Stat. Load C ₀ kN	Stat. Torque M _x Nm	Stat. Torque M _y Nm	Stat. Torque M _z Nm
7	17	12	2,5	3,5	0,86	1,67	5,2	4,9	4,9
9	20	15	2,5	4,5	1,85	3,13	13,2	11,2	11,2
12	27	20	3,5	6,0	2,55	4,00	21,7	15	15
15	32	25	3,5	7,5	2,88	5,39	40,2	21	21

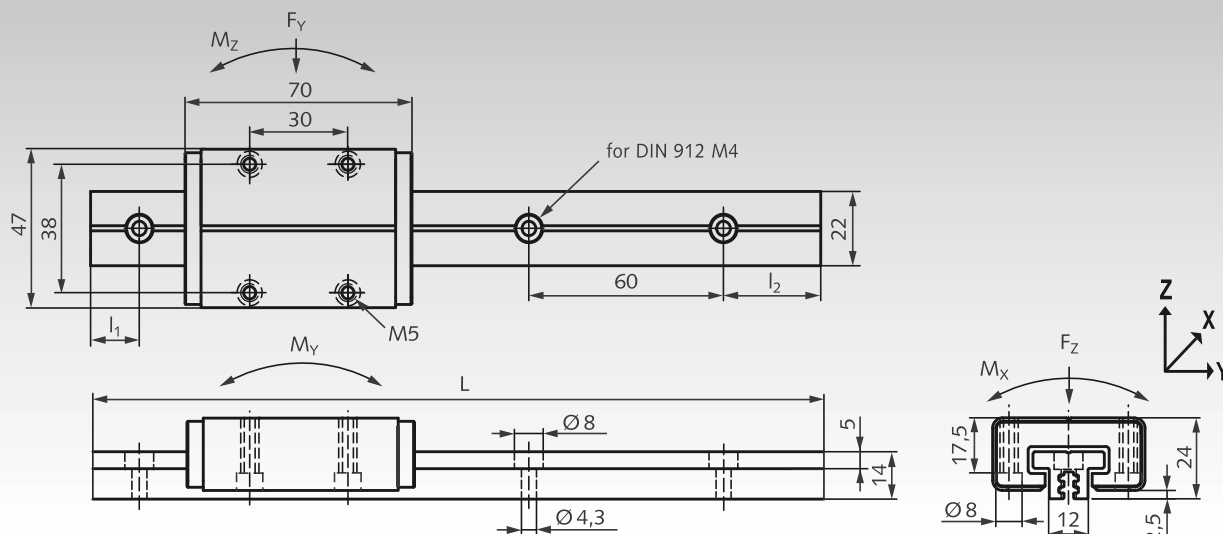
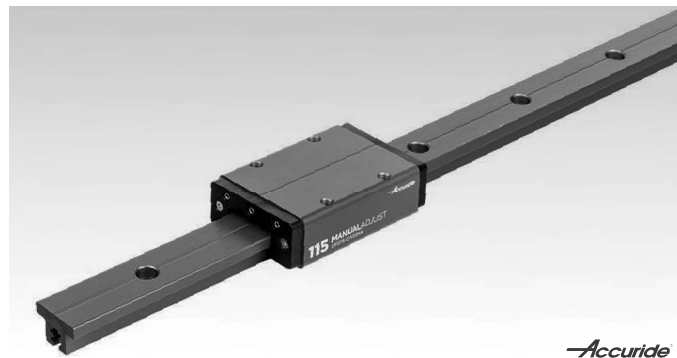
Linear Motion Guides DFG 115, Friction Guides

Material: Track and carriage from aluminium, hard anodised.
Plain bearings from advanced technical polymer.

Linear Motion Guides with plain bearings for universal use.

- Dimensionally interchangeable with rolling bearing linear motion guides ISO 12090 size 15.
- Three types of carriages on choice: non-adjustable / manual adjustable / automatic adjustment.
- Four track lengths on choice (for to cut by the customer).
- Several carriages can be used on one track.
- Resistant against corrosion, suitable for high pressure wash down.
- Long service life, maintenance-free.
- All parts have to be ordered separately.
- Temperature range: -40°C to +90°C.

Ordering details: e.g.: 1x Prod. No. 649 707 01, Carriage Non-Adjustable
1x Prod. No. 649 707 05, Track 500mm



Product No. Carriage	Type	Version	Weight g
649 707 01	DFG115-CASSNA	non-adjustable	92
649 707 02	DFG115-CASSMA	manuel adjustable	98
649 707 03	DFG115-CASSAA	automatic adjustment	96

Product No. Track	Type	L mm	l ₁ mm	l ₂ mm	Weight g
649 707 05	DFG115-0050	500	40	40	240
649 707 10	DFG115-0100	1000	20	20	480
649 707 15	DFG115-0150	1500	40	20	720
649 707 20	DFG115-0200	2000	40	40	960

Performance Values

Static loads: $F_Y = 2\text{ kN}$; $F_Z = 4\text{ kN}$; $-F_Z = 4\text{ kN}$.

Dynamic loads: $F_Y = 0.25\text{ kN}$; $F_Z = 0.5\text{ kN}$; $-F_Z = 0.5\text{ kN}$.

Static moments: $M_X = 10\text{ Nm}$; $M_Y = 10\text{ Nm}$; $M_Z = 10\text{ Nm}$.

Dynamic moments: $M_X = 1.25\text{ Nm}$; $M_Y = 1.25\text{ Nm}$; $M_Z = 1.25\text{ Nm}$.

Maximum values are mutually exclusive.

Speed: $v_{\text{max}} = 2\text{ m/s}$. **Temperature range:** -40°C to +90°C.

Travel at $v=1\text{ m/s}$ and 20°C, with load F_Z without moments:

Load F_Z :	100N	200N	300N	400N	500N
Travel:	9600km	4600km	3000km	2500km	2000km

Description of Carriage Types

Non-Adjustable



Product No. 649 707 01:
Carriage non-adjustable.
Most cost-effective version.
The clearance cannot be adjusted.
Play of new carriage: max. 0.125mm in Y and Z direction. It can be used for simpler applications or as 'floating bearing' on parallel rails.

Manuel Adjustable



Allen key SW 1.5mm not included

Product No. 649 707 02:
Carriage manual adjustable.
For the most applications, this is the preferable type. The clearance or preload can be manual adjusted with an Allen key (SW 1.5mm). Adjustment range: from max. clearance 0.125mm in Y and Z direction up to a preload of 30N. Torque at the adjusting screws max. 0.1Nm.

Automatic Adjustment



Product No. 649 707 03:
Carriage with automatic adjustment.
Before installing the carriage, the 3 supplied installation pins must be inserted, pushed in and turned a quarter turn to reset and fix the preload springs. After setting the carriage on the track, the 3 installation pins must be turned a quarter turn again and taken out. This releases the preload springs for the automatic adjustment to a preload of approx. 4.5N (+/-1N). This adjustment will continue to operate throughout the life of the product.

Installation Pins



Linear Motion Guide DA 0115 RC with Ball Carriage

Material: Track made from aluminium.

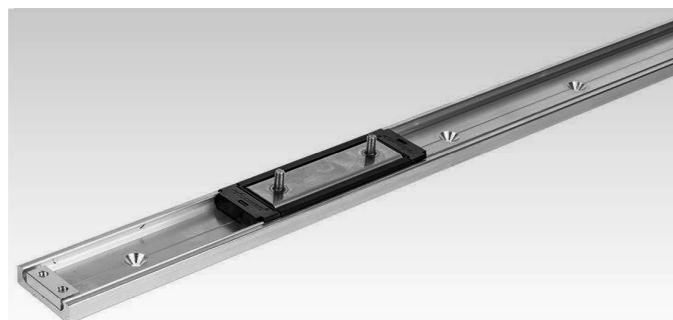
Carriage: Stainless steel housing with plastic sealings.

On choice: With stainless steel balls (greased) or polymer balls (grease free).

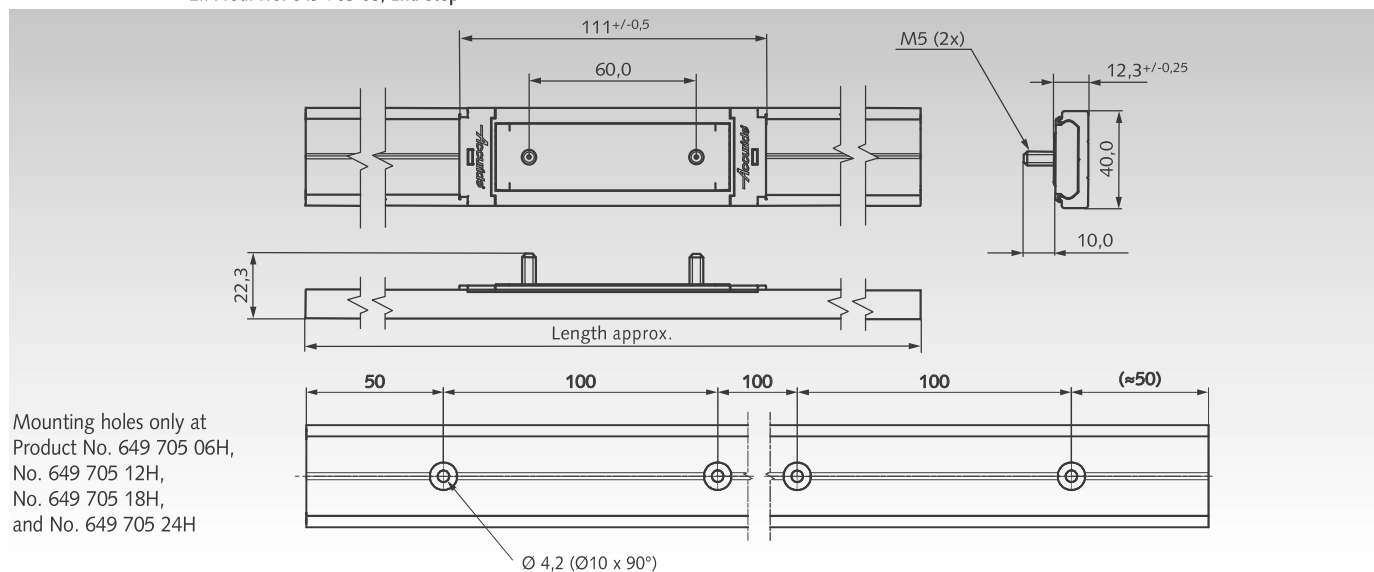
Linear guide for universal use.

- Four track lengths on choice (for to cut by the customer).
- Without boreholes, or with mounting holes.
- Several carriages can be used on one track.
- Resistant against corrosion and dirt.
- All parts have to be ordered seperately.
- Long service life, tested to 80,000 meters of travel distance.
- Temperature range: -20°C to +70°C.

Ordering details: e.g.: 1x Prod. No. 649 705 01, Carriage,
1x Prod. No. 649 705 06H, Track 600mm with Mounting Holes,
2x Prod. No. 649 705 03, End Stop

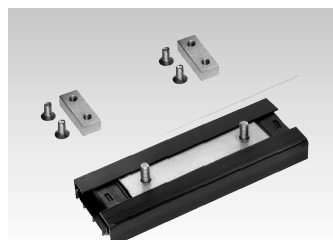


Accuride

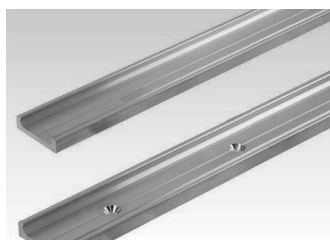


Product No.	Product	Load ratings in kg depending on mounting position and number of carriages									Weight g
		vertically mounted			horizontally monted, lying			horizontally monted, hanging			
		1 Carriage	2 Carri.	3 Carri.	1 Carriage	2 Carri.	3 Carri.	1 Carriage	2 Carri.	3 Carri.	
649 705 01	Carriage with stainless steel balls	50	90	130	30	55	70	40	70	90	120
649 705 02	Carriage with polymer balls	30	54	75	18	32	42	24	42	54	85
649 705 06	Track, length 600mm										320
649 705 06H	Track, length 600mm with holes										320
649 705 12	Track, length 1200mm										635
649 705 12H	Track, length 1200mm with holes										635
649 705 18	Track, length 1800mm										950
649 705 18H	Track, length 1800mm with holes										950
649 705 24	Track, length 2400mm										1270
649 705 24H	Track, length 2400mm with holes										1270
649 705 03*	End Stop (1 piece)*										15

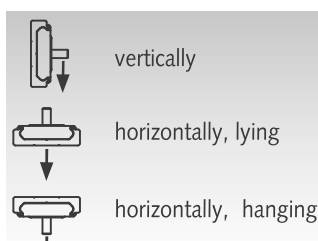
* Depending on the application, 2 pieces may be required. 2 screws included.



Carriage (with mounting aid) and End Stops have to be ordered seperately.



Tracks on choice without bores or with mounting holes.



The load ratings depend on the mounting position (see table).



Drilling jig: to drill pinholes for permanent pinned connection of tracks.

Note

Not recommended for high torque applicatins.

Fix track on a rigid and levelm surface. Fixing recommendation:

M4 countersunk screw or 4mm countersunk wood screw.

Drill countersunk holes in the middle of track, hole distance from 100mm up to 200mm, depending on mounting position and load.

Push the carriages with the mounting aid carefully onto the track. Distribute weight evenly across carriages. Infinte track lengths possible. Butt tracks end to end and align the centre lines. For permanent pinned connection, use drilling jig (on request) for 3mm pins. Reworking on request.

Linear Motion Guide DA 0116 RC with Ball Carriage

Material: Track made from aluminium.

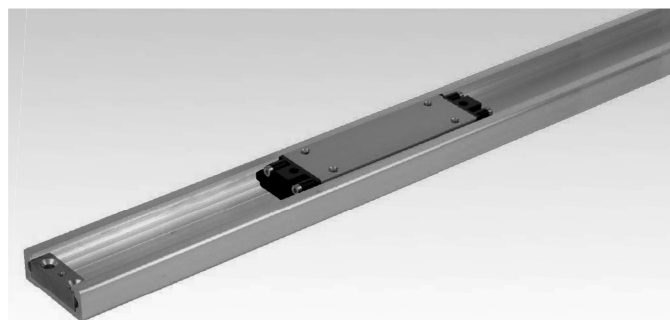
Carriage: Stainless steel housing with plastic sealings.

On choice: With stainless steel balls (greased) or polymer balls (grease free).

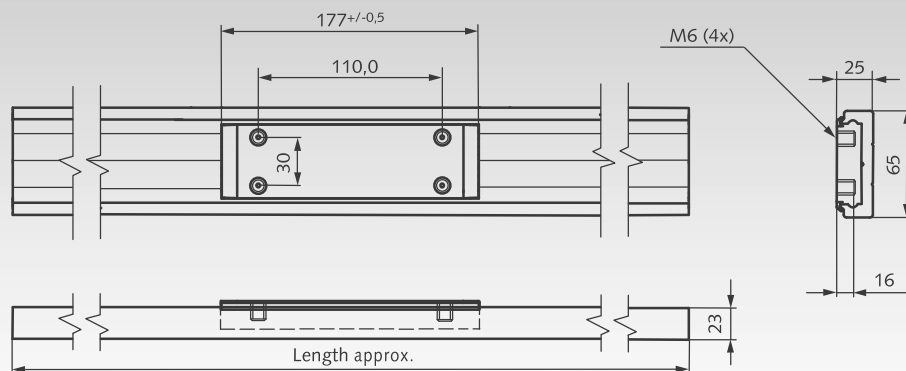
Linear guide for universal use.

- Five track lengths on choice (for to cut by the customer).
- Tracks without boreholes.
- Several carriages can be used on one track.
- Resistant against corrosion and dirt.
- All parts have to be ordered seperately.
- Long service life, tested to 100,000 meters of travel distance.
- Temperature range: -20°C to +70°C.

Ordering details: e.g.: 1x Prod. No. 649 905 01, Carriage,
1x Prod. No. 649 905 06, Track 600mm,
1x Prod. No. 649 905 03, Pair of End Stops

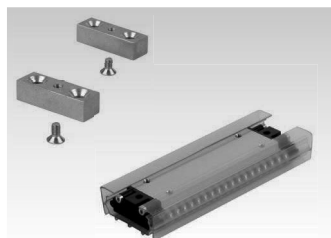


Accuride

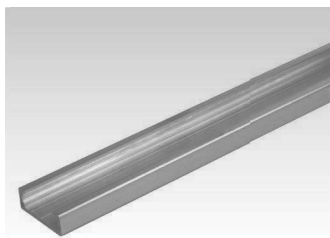


Product No.	Product	Load ratings in kg depending on mounting position and number of carriages									Weight g
		vertically mounted			horizontally monted, lying			horizontally monted, hanging			
		1 Carriage	2 Carri.	3 Carri.	1 Carriage	2 Carri.	3 Carri.	1 Carriage	2 Carri.	3 Carri.	
649 905 01	Carriage with stainless steel balls	150	290	360	90	164	211	120	211	270	559
649 905 02	Carriage with polymer balls	100	180	240	60	109	140	80	141	180	412
649 905 06	Track, length 600mm										785
649 905 12	Track, length 1200mm										1570
649 905 18	Track, length 1800mm										2360
649 905 24	Track, length 2400mm										3150
649 905 36	Track, length 3600mm										4720
649 905 03*	End Stops (1 pair)										51

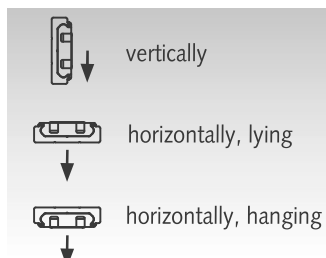
* One pair, with two screws. Each end stop has a central, threaded hole for one screw, to be mounted from the bottom of the rail. In each end stop are two additional through holes, for optional mounting through the rail and the customer's ground plate.



Carriage (with mounting aid) and End Stops have to be ordered seperately.



Tracks on stock without bores. Customized mounting holes against extra charge.



The load ratings depend on the mounting position (see table).

Note

Not recommended for high torque applicatins.
Fix track on a rigid and levelm surface. Fixing recommendation:
M6 countersunk screw or 6mm countersunk wood screw.

Push the carriages with the mounting aid carefully onto the track. Distribute weight evenly across carriages. Infinte track lengths possible. The ends must be reworked fine. Butt tracks end to end and align the centre lines. Reworking on request.