

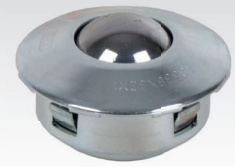
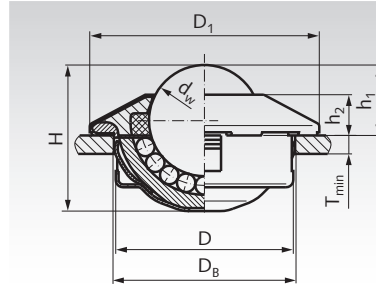
Ball Transfer Units 310 / 320, with Fastening Element

Material Type 310: Housing: Steel, zinc plated.
Ball cup: Steel, case hardened.
Ball: Steel, hardened.

Material Type 320: Housing: Steel, zinc plated.
Ball cup: Steel, case hardened.
Ball: Stainless steel, hardened,
Material No. 1.3541.

Premium ball transfer unit, for low noise pollution and long service life. Due to the special shape of the top part, an assembly plug should be used, see page 439. With felt seal. Conveying speed max. 2m/sec. Temperature range -30°C to +100°C.

Ordering Details: e.g.: Product No. 654 310 15, Ball Transfer Unit 310 Size 15



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Other sizes and versions on request.

Product No. Type 310	Size dw mm	Load Rating N	D mm	D ₁ mm	D _B mm	H mm	h ₁ mm	h ₂ mm	T _{min} mm	Weight kg	Product No. Assembly Plug*
654 310 15	15	500	24 ^{-0,13}	31	24 ^{+0,5}	20,0	9,5 ^{+0,2}	5,5	1,5	0,044	654 300 15
654 310 22	22	1300	36 ^{-0,16}	45	36 ^{+0,8}	28,6	9,8 ^{+0,2}	6,2	2,0	0,146	654 300 22
654 310 30	30	2500	45 ^{-0,25}	55	45 ^{+1,0}	37,2	13,8 ^{+0,3}	8,2	2,5	0,290	654 300 30

Product No. Type 320	Size dw mm	Load Rating N	D mm	D ₁ mm	D _B mm	H mm	h ₁ mm	h ₂ mm	T _{min} mm	Weight kg	Product No. Assembly Plug*
654 320 15	15	370	24 ^{-0,13}	31	24 ^{+0,5}	20,0	9,5 ^{+0,2}	5,5	1,5	0,044	654 300 15
654 320 22	22	970	36 ^{-0,16}	45	36 ^{+0,8}	28,6	9,8 ^{+0,2}	6,2	2,0	0,146	654 300 22
654 320 30	30	1900	45 ^{-0,25}	55	45 ^{+1,0}	37,2	13,8 ^{+0,3}	8,2	2,5	0,290	654 300 30

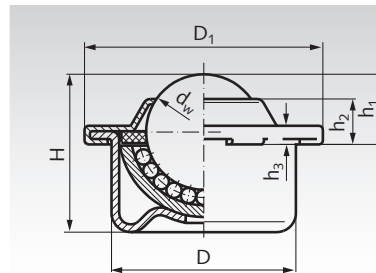
* Assembly plug see page 439.

Ball Transfer Units 330 / 340 / 350, Steel-Sheet Housing

Material Type 330: Housing: Steel, zinc plated.
Ball cup: Steel, case hardened.
Ball: Steel, hardened.

Material Type 340: Housing: Steel, zinc plated.
Ball cup: Steel, case hardened.
Ball: Stainless steel, hardened,
Material No. 1.3541.

Material Type 350: Housing and other parts: Stainless steel,
Material No. 1.4301.
Ball cup: Stainless steel, Material
No. 1.4301, hardened.
Ball: Stainless steel, hardened,
Material No. 1.3541.



rexroth
A Bosch Company

Other sizes and versions on request.

Premium ball transfer unit, for low noise pollution and long service life. With felt seal. Conveying speed max. 2m/sec. Tolerance rings see page 439. Temperature range -30°C to +100°C

Ordering Details: e.g.: Product No. 654 330 08, Ball Transfer Unit 330 Size 08

Product No. Type 330	Size dw mm	Load Rating N	D mm	D ₁ mm	H mm	h ₁ mm	h ₂ mm	h ₃ mm	Weight kg	Product No. Seating Bore Tolerance Ring*	Seating Bore mm
654 330 08	8	130	12,6 ^{+0,055}	17	11,2	4,8 ^{+0,015}	3,2	1,9	0,007	654 390 08	13,87 ^{+0,15}
654 330 12	12	250	18 ^{+0,055}	23,3	15,4	7,4 ^{+0,015}	4,4	2,1	0,018	654 390 12	19,70 ^{+0,2}
654 330 15	15	500	24 ^{+0,065}	31	21,5	9,5 ^{+0,2}	6,1	2,5	0,038	654 390 15	25,7 ^{+0,2}
654 330 22	22	1300	36 ^{+0,080}	45	29,5	9,8 ^{+0,2}	5,7	2,9	0,132	654 390 22	37,7 ^{+0,2}
654 330 30	30	2500	45 ^{+0,080}	55	37,5	13,8 ^{+0,3}	7,9	3,7	0,265	654 390 30	46,7 ^{+0,2}
654 330 45	45	6000	62 ^{+0,095}	75	53,7	19,0 ^{+0,4}	10,3	4,2	0,720	654 390 45	64,1 ^{+0,3}

Product No. Type 340	Product No. Type 350	Size dw mm	Load Rating N	D mm	D ₁ mm	H mm	h ₁ mm	h ₂ mm	h ₃ mm	Weight kg	Product No. Seating Bore Tolerance Ring*	Seating Bore mm
654 340 08	654 350 08	8	100	12,6 ^{+0,055}	17	11,2	4,8 ^{+0,015}	3,2	1,9	0,007	654 390 08	13,87 ^{+0,15}
654 340 12	654 350 12	12	180	18 ^{+0,055}	23,3	15,4	7,4 ^{+0,015}	4,4	2,1	0,018	654 390 12	19,70 ^{+0,2}
654 340 15	654 350 15	15	370	24 ^{+0,065}	31	21,5	9,5 ^{+0,2}	6,1	2,5	0,038	654 390 15	25,7 ^{+0,2}
654 340 22	654 350 22	22	970	36 ^{+0,080}	45	29,5	9,8 ^{+0,2}	5,7	2,9	0,132	654 390 22	37,7 ^{+0,2}
654 340 30	654 350 30	30	1900	45 ^{+0,080}	55	37,5	13,8 ^{+0,3}	7,9	3,7	0,265	654 390 30	46,7 ^{+0,2}
654 340 45	-	45	6000	62 ^{+0,095}	75	53,7	19,0 ^{+0,4}	10,3	4,2	0,720	654 390 45	64,1 ^{+0,3}

* Tolerance ring see page 439.

Note: Due to unevenness of the running surface, there are often only three rollers carrying the weight. Therefore the chosen load rating should equal at least one third of the load. Max. distance of ball transfer units = edge length of the object divided by 2.5.

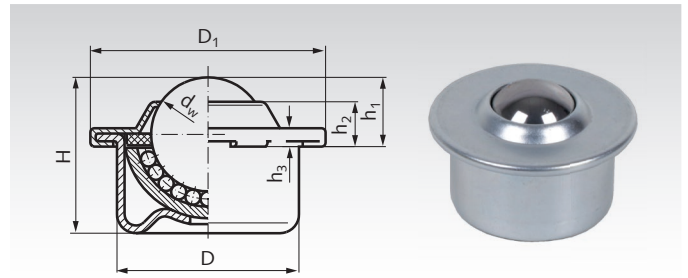
Ball Transfer Units 360 / 363, Steel-Sheet Housing

Material Type 360: Housing: Steel, zinc plated.
Ball cup: Steel.
Balls: Steel, hardened.

Material Type 363: Stainless steel.



Light duty ball transfer unit for medium high load.
Orientation: Ball up or horizontal. Size 22 and 30 with felt seal.
Without drain hole. Can be used with fixing clip page 439.
Conveying speed max. 1m/sec.
Temperature range -20°C to +70°C.



Other sizes and versions on request.

Ordering Details: e.g.: Product No. 654 360 15, Ball Transfer Unit 360 Size 15

Product No. Type 360	Product No. Type 363	Size dw mm	Load Rating Type 360 N	Load Rating Type 363 N	D mm	D ₁ mm	H mm	h ₁ mm	h ₂ mm	h ₃ mm	Weight Type 360 kg	Weight Type 363 kg
654 360 15	654 363 15	15	600	400	24	31	21	9,5	4,9	2,8	0,041	0,039
654 360 22	654 363 22	22	1600	900	36	45	29,5	9,8	5,9	2,9	0,128	0,125
654 360 30	654 363 30	30	2800	2000	45	55	37	13,8	7	3,6	0,253	0,271
654 360 45	654 363 45	45	6000	2600	62	75	53,5	19,0	10	4,0	0,720	0,710

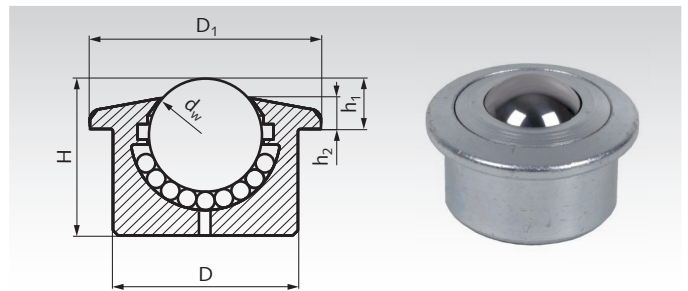
Ball Transfer Units 364 / 367, Solid Steel Housing

Material Type 364: Housing: Steel, zinc plated.
Ball cup: Steel, case hardened.
Balls: Steel 100Cr6, hardened.

Material Type 367: Stainless steel 1.4021.



Medium duty ball transfer unit for medium high load.
Orientation: Ball up or horizontal. From size 22 with felt seal and drain hole. Can be used with fixing clip page 439.
Conveying speed max. 1.5m/sec.
Temperature range -30°C to +100°C.



Other sizes and versions on request.

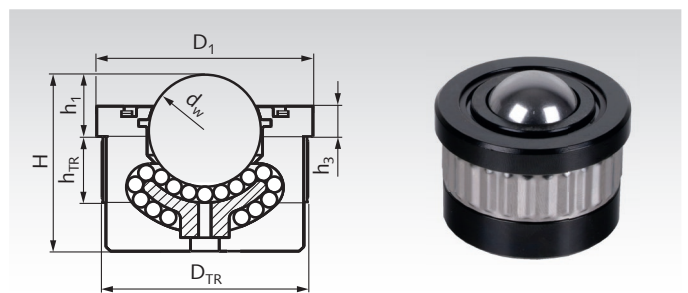
Ordering Details: e.g.: Product No. 654 364 12, Ball Transfer Unit 364 Size 12

Product No. Type 364	Product No. Type 367	Size dw mm	Load Rating Type 364 N	Load Rating Type 367 N	D mm	D ₁ mm	H mm	h ₁ mm	h ₂ mm	Weight Type 364 kg	Weight Type 367 kg
654 364 12	654 367 12	12	250	200	22	27	16,7	8,0	4,8	0,038	0,038
654 364 15	654 367 15	15	600	400	24	31	21,0	9,5	5,5	0,059	0,058
654 364 22	654 367 22	22	1800	1260	36	45	30,5	9,8	6	0,189	0,188
654 364 30	654 367 30	30	3500	2200	45	55	36,8	13,8	8	0,360	0,357
654 364 45	654 367 45	45	6000	3500	62	75	53,5	19,0	10	1,01	1,02

Ball Transfer Units 368, Solid Steel Housing, with Tolerance Ring

Material: Housing: Steel, with KTL "Anti-Oxide" electrophoretic coating.
Ball cup: Steel, case hardened.
Balls: Steel 100Cr6, hardened.

Heavy duty ball transfer unit for high load.
High shock resistance. Very low friction.
Orientation: Anyway.
From size 25.4 with felt seal. With drain hole.
Conveying speed max. 2m/sec.
Temperature range -30°C to +160°C.



Other sizes and versions on request.

Ordering Details: e.g.: Product No. 654 368 12, Ball Transfer Unit 368 Size 12

Product No. Type 368	Size dw mm	Load Rating N	D _{TR} * mm	D ₁ mm	H mm	h ₁ mm	h ₃ mm	h _{TR} mm	Weight kg
654 368 12	12,7	500	22	24	21	6	2,4	12	0,20
654 368 25	25,4	2250	45	49	40	14	6,9	15	0,45
654 368 26	25,4	3850	50	55	44	15	8,6	16	0,70
654 368 38	38,1	11000	65	70	60	25	12,3	20	1,50

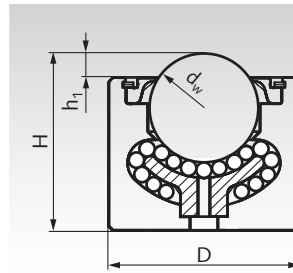
* Bore size. Recommended bore tolerance: H9.

Note: Due to unevenness of the running surface, there are often only three rollers carrying the weight. Therefore the chosen load rating should equal at least one third of the load. Max. distance of ball transfer units = edge length of the object divided by 2.5.

Ball Transfer Units 370, Solid Steel Housing, plain fit

Material: Housing: Steel, with KTL "Anti-Oxide" electrophoretic coating.
 Ball cup: Steel, case hardened.
 Balls: Steel 100Cr6, hardened.

Heavy duty ball transfer unit for high load.
 High shock resistance. Very low friction.
 Orientation: Anyway.
 From size 25.4 with felt seal. With drain hole.
 Conveying speed max. 2m/sec.
 Temperature range -30°C to +160°C.



Other sizes and versions on request.

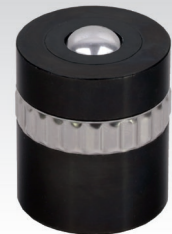
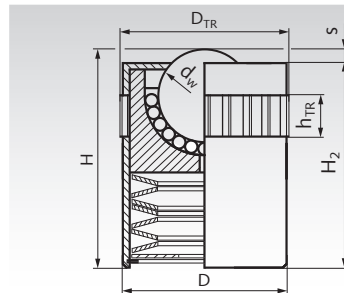
Ordering Details: e.g.: Product No. 654 370 12, Ball Transfer Unit 370 Size 12

Product No. Type 370	Size dw mm	Load Rating N	D mm	H mm	h ₁ mm	Weight kg
654 370 12	12,7	500	20,0	20,0	3,8	0,04
654 370 13	12,7	500	22,2	22,2	3,8	0,05
654 370 25	25,4	2250	44,5	41,3	7,1	0,39
654 370 26	25,4	3850	50,8	44,5	6,4	0,53
654 370 38	38,1	11000	60,3	60,3	12,7	1,00

Ball Transfer Units 374, Solid Steel Housing, plain fit, with Tolerance Ring, Spring Loaded

Material: Housing: Steel, burnished. Inside this sleeve, there is a zinc plated ball cup.
 Ball cup: Steel, case hardened.
 Balls: Steel 100Cr6, hardened.

Medium duty ball transfer unit for medium high load, spring-loaded. Orientation: Ball up or horizontal. Shock loads may be higher than the stated load range. At force $F_{s \max}$ the end of spring travel is reached. With drain hole.
 Conveying speed max. 1.5m/sec.
 Temperature range -30°C to +100°C.



Other sizes and versions on request.

Ordering Details: e.g.: Product No. 654 374 12, Ball Transfer Unit 374 Size 12.7

Product No. Type 374	Size dw mm	Load Rating N	$F_{s \max}$ N	D mm	D _{TR} * mm	H mm	H ₂ mm	h _{TR} mm	s mm	Weight kg
654 374 12	12,7	400	900	23,9	24,5	30	28,5	10,5	1,5	0,070
654 374 15	15,8	600	1100	29,9	30,5	36	34,5	10,5	1,5	0,130
654 374 25	25,4	1000	1750	39,8	40,5	48	46,5	10,5	1,5	0,320
654 374 30	30	3350	5850	49,9	50,5	60	58,5	12,3	1,5	0,650

* Bore size. Recommended bore tolerance: H9.

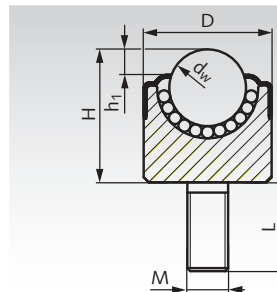
Ball Transfer Units 376 / 377, Solid Steel Housing, plain fit, with Threaded Stud

Material Type 376: Housing: Steel, zinc plated.
 Ball cup: Steel, case hardened.
 Balls: Steel 100Cr6, hardened.

Material Type 377: Stainless steel 1.4021.



Medium duty ball transfer unit for medium high load.
 Orientation: Ball up or horizontal. From size 22 with felt seal.
 Without drain hole.
 Conveying speed max. 1.5m/sec.
 Temperature range -30°C to +100°C.



Other sizes and versions on request.

Ordering Details: e.g.: Product No. 654 376 15, Ball Transfer Unit 376 Size 15

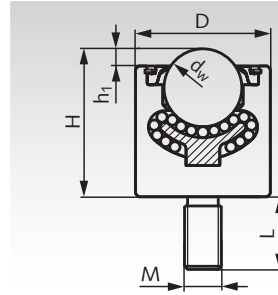
Product No. Type 376	Product No. Type 377	Size dw mm	Load Rating N	D mm	H mm	h ₁ mm	L mm	M mm	Weight kg
654 376 15	-	15	600	25	26	5,0	20,0	M8x1,25	0,083
654 376 19	654 377 19	19	750	30	26	4,8	20,5	M8x1,25	0,109
654 376 22	654 377 22	22	1800	36	37,5	4,5	25,4	M12x1,75	0,256
654 376 30	-	30	3500	45	43,8	6,5	25,4	M12x1,75	0,44

Note: Due to unevenness of the running surface, there are often only three rollers carrying the weight. Therefore the chosen load rating should equal at least one third of the load. Max. distance of ball transfer units = edge length of the object divided by 2.5.

Ball Transfer Units 378, Solid Steel Housing, plain fit, with Threaded Stud

Material: Housing: Steel, with KTL "Anti-Oxide" electrophoretic coating.
 Ball cup: Steel, case hardened.
 Balls: Steel 100Cr6, hardened.

Heavy duty ball transfer unit for high load.
 High shock resistance. Very low friction.
 Orientation: Anyway.
 From size 25.4 with felt seal. Without drain hole.
 Conveying speed max. 2m/sec.
 Temperature range -30°C to +160°C.



Other sizes and versions on request.

Ordering Details: e.g.: Product No. 654 378 12, Ball Transfer Unit 378 Size 12.7

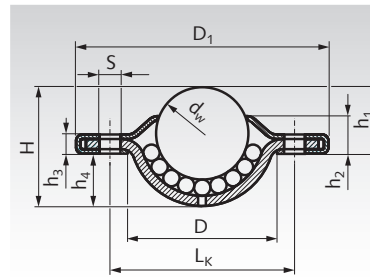
Product No. Type 378	Size dw mm	Load Rating N	D mm	H mm	h ₁ mm	L mm	M mm	Weight kg
654 378 12	12,7	500	20	19,1	3,8	16,1	M8x1,25	0,04
654 378 13	12,7	500	20,6	19,1	3,8	28,7	M8x1,25	0,04
654 378 25	25,4	2250	44	48,3	5,6	25	M12x1,75	0,49
654 378 26	25,4	3850	50	51,3	6,4	25	M12x1,75	0,63
654 378 38	38,1	11000	60	73,5	12,7	40	M20x2,5	1,34

Ball Transfer Units 380 / 383, Top Flange mounted, without Cup

Material Type 380: Housing: Steel, zinc plated.
 Ball cup: Steel.
 Balls: Steel, hardened.

Material Type 383: Stainless steel.

Light duty ball transfer unit for low load.
 Orientation: Ball up or horizontal. From size 19 with felt seal and drain hole. Size 32 stainless is without felt seal.
 Conveying speed max. 1m/sec.
 Temperature range -20°C to +70°C.



Other sizes and versions on request.

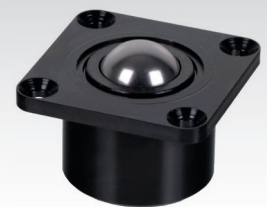
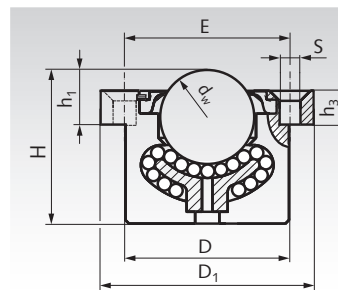
Ordering Details: e.g.: Product No. 654 380 15, Ball Transfer Unit 380 Size 15

Product No. Type 380	Product No. Type 383	Size dw mm	Load Rating N	D mm	D ₁ mm	H mm	h ₁ mm	h ₂ mm	h ₃ mm	h ₄ mm	L _k mm	S mm	Weight kg
654 380 15	-	15	150	24	41	19,3	10,8	5,8	3,2	8,5	30	2 x 3,4	0,045
654 380 19	654 383 19	19	250	29,1	61	22	10,0	6,8	3,2	12,0	44,5	2 x 5,1	0,090
654 380 23	-	23	1200	33	45	27,7	9,8	3,6	3,6	17,9	39	3 x 3,5	0,096
654 380 25	-	25	600	36	56	30	14,6	6,8	3,3	15,4	45	2 x 4,0	0,125
654 380 32	654 383 32	32	1250	45,5	73,7	36,1	16,2	8,2	4,2	19,9	58,7	2 x 5,1	0,269

Ball Transfer Units 384, Top Flange mounted, Solid Steel Housing

Material: Housing: Steel, with KTL "Anti-Oxide" electrophoretic coating.
 Ball cup: Steel, case hardened.
 Balls: Steel 100Cr6, hardened.

Heavy duty ball transfer unit for high load.
 High shock resistance. Very low friction.
 Orientation: Anyway.
 From size 25.4 with felt seal. With drain hole.
 Conveying speed max. 2m/sec.
 Temperature range -30°C to +160°C.



Other sizes and versions on request.

Ordering Details: e.g.: Product No. 654 384 12, Ball Transfer Unit 384 Size 12.7

Product No. Type 384	Size dw mm	Load Rating N	D mm	D ₁ mm	E mm	H mm	h ₁ mm	h ₃ mm	S mm	Qty. S	Weight kg
654 384 12	12,7	500	23,8	47,7 x 32 ¹⁾	34,9	22,2	7,9	2,0	4,0 ²⁾	2	0,06
654 384 25	25,4	2250	44,5	57,2	44,5	41,3	11,9	4,8	6,1	4	0,44
654 384 26	25,4	3850	50	76,2	57,9	44,5	12,7	6,4	8,1	4	0,70
654 384 38	38,1	11000	60	76,2	57,9	60	25,4	12,7	8,1	4	1,20

¹⁾ Elliptical flange with 2 bores. ²⁾ Not countersunk.

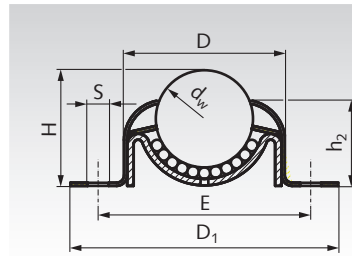
Note: Due to unevenness of the running surface, there are often only three rollers carrying the weight. Therefore the chosen load rating should equal at least one third of the load. Max. distance of ball transfer units = edge length of the object divided by 2.5.

Ball Transfer Units 386 / 387, Bottom Flange mounted, Steel-Sheet Housing

Material Type 386: Housing: Steel, zinc plated.
Ball cup: Steel.
Balls: Steel, hardened.

Material Type 387: Stainless steel.

Light duty ball transfer unit for low load.
Orientation: Ball up or horizontal.
With felt seal and drain hole.
Conveying speed max. 1m/sec.
Temperature range -20°C to +70°C.



Other sizes and versions on request.

Ordering Details: e.g.: Product No. 654 386 26, Ball Transfer Unit 386 Size 25.4

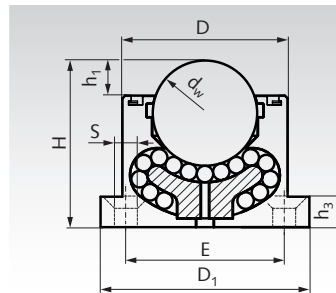
Product No. Type 386	Product No. Type 387	Size dw mm	Load Rating N	D mm	D ₁ mm	E mm	H mm	h ₂ mm	S ¹⁾ mm	Qty. S	Weight kg
654 386 26	654 387 26	25,4	550	45	69 x 51	55,9 - 60,3	30,4	24,1	5,5 x 7,7	2	0,155

¹⁾ Slot hole.

Ball Transfer Units 388 Bottom Flange mounted, Solid Steel Housing

Material: Housing: Steel, with KTL "Anti-Oxide"
electrophoretic coating.
Ball cup: Steel, case hardened.
Balls: Steel 100Cr6, hardened.

Heavy duty ball transfer unit for high load.
High shock resistance. Very low friction.
Orientation: Anyway.
From size 25.4 with felt seal. With drain hole.
Conveying speed max. 2m/sec.
Temperature range -30°C to +160°C.



Other sizes and versions on request.

Ordering Details: e.g.: Product No. 654 388 12, Ball Transfer Unit 388 Size 12.7

Product No. Type 388	Size dw mm	Load Rating N	D mm	D ₁ mm	E mm	H mm	h ₁ mm	h ₃ mm	S mm	Qty. S	Weight kg
654 388 12	12,7	500	23,8	47,7 x 32 ¹⁾	34,9	22,2	3,8	2,0	4,0 ²⁾	2	0,08
654 388 25	25,4	2250	44,5	57,2	44,5	41,3	7,1	4,8	6,1	4	0,44
654 388 26	25,4	3850	50	76,2	57,9	44,5	6,4	6,4	8,1	4	0,68
654 388 38	38,1	11000	60,3	76,2	57,9	60,3	12,7	12,7	8,1	4	1,23

¹⁾ Elliptical flange with 2 bores. ²⁾ Not countersunk.

Note: Due to unevenness of the running surface, there are often only three rollers carrying the weight. Therefore the chosen load rating should equal at least one third of the load. Max. distance of ball transfer units = edge length of the object divided by 2.5.

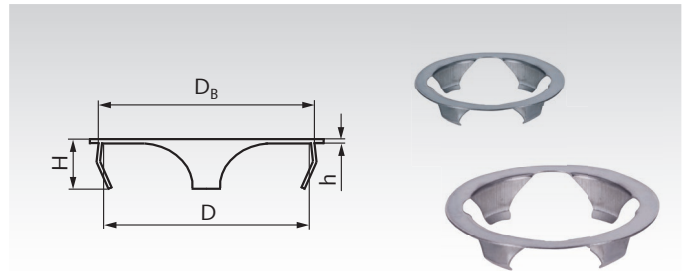
Fixing Clips for Ball Transfer Units

Material Standard: Spring band steel.

Material Stainless: Stainless Steel.



Matching to ball transfer units with flange and the same housing diameter D like the fixing clip. By using these clips, the fitting height increases 0.3mm.



Ordering Details: e.g.: Product No. 654 310 15, Fixing Clip D 24 mm

Product No. Standard	Product No. Stainless	D mm	D _B ¹⁾ mm	H mm	h mm	Weight g
654 391 24	654 392 24	24	25,0 - 25,5	7	0,3	0,5
654 391 36	654 392 36	36	37,0 - 37,5	7	0,3	0,8
654 391 45	654 392 45	45	46,0 - 46,5	7	0,3	1,0
654 391 62	-	62	63,0 - 63,5	7	0,3	1,5

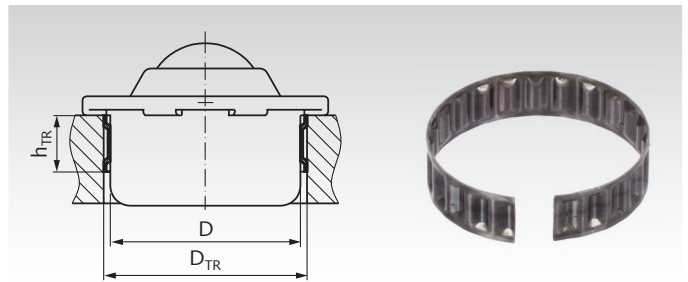
¹⁾ Seating bore.

Tolerance Rings for Ball Transfer Units with Steel-Sheet Housing

Material: Spring band steel.

Matching ball transfer units with the same housing diameter D like the tolerance ring.

The use of tolerance rings permits more generous tolerances in the mounting hole (dimension D_{TR}).



Ordering Details: e.g.: Product No. 654 390 08, Tolerance Ring D 12,6mm

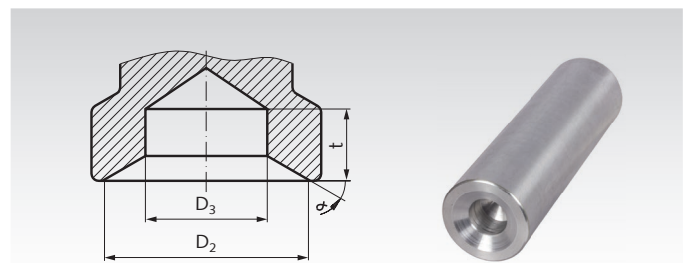
Product No.	Tolerance Ring Matching Ball Cups with $\varnothing d_w$ mm	D mm	Mounting Dim. D_{TR}^* mm	h_{TR} mm	Weight g
654 390 08	8	12,6	13,87 ^{+0,15}	6,1 ^{+0,2}	0,4
654 390 12	12	18	19,7 ^{+0,2}	6,1 ^{+0,2}	0,9
654 390 15	15	24	25,7 ^{+0,2}	7,1 ^{+0,2}	1,5
654 390 22	22	36	37,7 ^{+0,2}	12,1 ^{+0,2}	5,7
654 390 30	30	45	46,7 ^{+0,2}	12,1 ^{+0,2}	7,5
654 390 45	45	62	64,1 ^{+0,3}	15,1 ^{+0,2}	12,5

Assembly Plugs for Ball Transfer Units with Fastening Element

Material: Aluminium.

For ball transfer unit types 310 and 320 with fastening element.

Avoids damage to the upper, conical part of the housing.



Ordering Details: e.g.: Product No. 654 300 15, Assembly Plug for Ball Transfer Units 15 mm

Product No.	Ball Cup- $\varnothing d_w$ mm	D_2 mm	D_3 mm	t_{min} mm	α °	Weight kg
654 300 15	15	29	17	10	30	0,34
654 300 22	22	43	24	10	20	0,46
654 300 30	30	53	30	10	24	0,63