

# Ruedas Libres

# Freewheels

- Backstop
- Indexing unit
- Overrunning clutch

## FREEWHEELS

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### ***Manufacturing:***

RULISA freewheels are basically designed with two cylindrical races within which a metallic cage is housed with sprags, each one provided with positions which cover the annular space.

Each of the individual sprags blocks and transmits the stress from one track to the other in one direction only. Compared with the traditional roller freewheels, these ones have the advantage of being provided with a higher number of backstop elements for the same race diameter; so that it can transmit a *greater torque moment*. *These elements constantly change position on the raceways and therefore their wear and tear is uniform (and not only on a specific surface as in roller wheels). This ensures a significantly longer life span for the Free Wheel.*

### ***Ways of extending service life***

The standard freewheels are supplied with hardened and ground tracks of 1,5 to 2 mm depth; and steel bearing chrome sprags.

In those cases in which top durability is required the following options are possible:

Surface "S" treatment of the backstop elements with a carbonitride titanium coat, which allows the maintenance of the driving specifications and the extension of their service life from 5 up to 20 times. We are now researching into the surface treatment field in order to improve our designs with latest technology

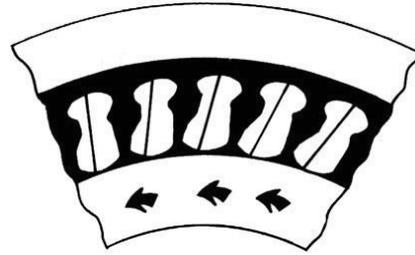
When requesting, please add the letter "S" to the end of the freewheel designation

(e.g. A90S freewheel).





Outer Centrifugal elevation



Inner Centrifugal Elevation

**Centrifugal detachment** by quick turn in the free direction of the E outer ring or of the I inner ring

When -one of the rings rotates quickly, the backstop elements swing, due to their shape, which has the center of gravity of the element slippages from its rotary shaft, and stop making contact with the tracks when it rotates in the free direction once the elevating speed is overcome. With this solution and being free, no friction is produced and thus the working life is indefinitely extended.

All series can be supplied with E outer centrifugal elevation with neither shape modifications, nor price changes, exception made when they have centrifugal elevation by quick rotary motion of the inner ring, for which the special series ECI, BTI and AI have been designed.

### **Lubrication**

Freewheels with bearings and oil bath are supplied full of oil. The freewheels supplied with neither bearings nor oil bath must be accurately assembled in order to guarantee true running between tracks and must have a proper, lubrications to protect them.

Initially, the oil must be changed after one hundred hours of work and, later every two thousand hours along with a thorough check of the retainers.

A free blending agent oil with an Engler 4º or 6º viscosity at 50ºC(hydraulic type oils) is advisable in order to avoid variations in the friction coefficient and , consequently for the torque moments to be transmitted.

In case of centrifugal elevation, when the assembly is running at a speed higher than the elevation speed, it is only necessary to grease or oil during the assembly in order to avoid rusting.

### **Torque moment selection**

The torque moments' listed in the tables have a safety factor higher than 2; i.e., Higher peak torques than double of those listed must not be used.

### **Speeds**

The maximum speeds as free rotary backstopping are mentioned in the catalogue for durability of 8000 hours' work. Service life could be widely extended by means of "S" superficial treatment. For intermittent feeds service life will depend on the frequency and on the angle as well as on its accuracy and other factors. Therefore, please request our engineers to propose you a cost-effective technical solution for your specific needs.

When a freewheel is chosen to work as an automatic overrunning clutch, for instance between a main motor and auxiliary starting motor, customers should bear in mind that the driving element drag speed must not be higher than 40 % of the centrifugal speed. In fact, we suggest you request our engineers for technical advice since we can modify the lifting speed by changing the string pressures

### **Used as backstop element**

In this case one of the tracks must be kept fixed. The aim is to allow the assembling rotary motion in one direction only. Typical applications are: belt conveyors, bucket lifters, pumps, reducers, motors, ropeways, etc

### **Used as an indexing unit**

It changes, by means of indexation, a circular movement into a linear one in one direction.

Typical applications are: feeders in textile machinery, printing press, wrapping and packing machinery, wire conversion, press feeders, continuous furnaces, agricultural machinery, grinders, planning machines, etc.

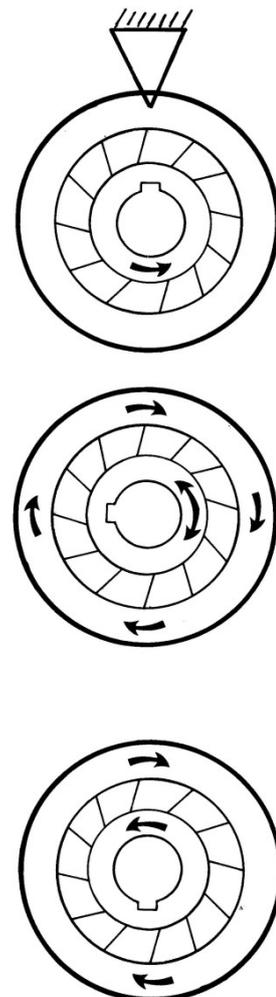
A feeding exact pitch at high frequencies can be guaranteed since the drive by the individual springs upon the sprag is continuous, so no backlash is produced.

### **Used as an overrunning clutch**

It allows, by means of overrunning, the automatic disconnection of the two driving elements that rotate at different speeds; it also secures the absence of the inertia mass influence in the assembly. Typical applications are: starting of electric motors, combustions engines, turbines, generators, gas circulators, etc.

Fine feeds of machinery readiness, quick positioning feeds in automatic gear boxes, laminators, continuous furnaces etc.

Unplugging the inertial mass in fans, centrifugal machinery, etc.

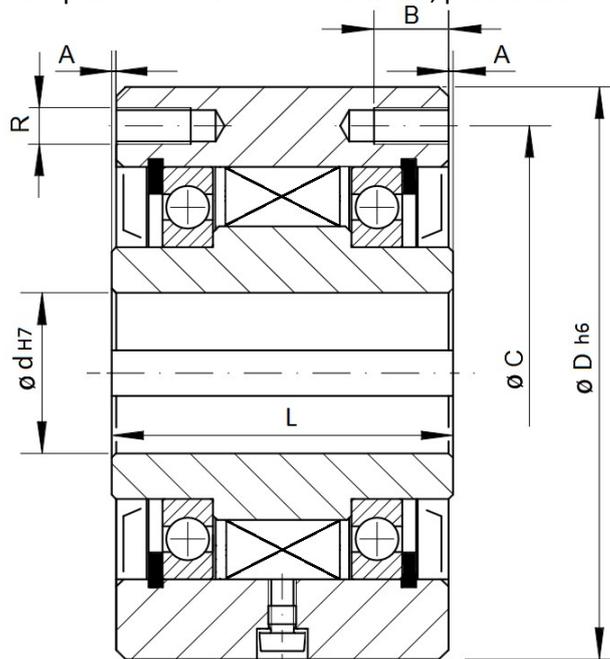


## A TYPE FREEWHEEL

**RULISA** freewheeling designations beginning with “A” refer to freewheels provided with bearings. This “A” series is a symmetric wheel for lateral clamping with threaded holes in the outer ring. It is supplied with oil bath and three lubrication holes for its maintenance.

They can be supplied with intermediate shaft holes corresponding to engine standardized shafts. Larger sizes or non-standard sizes can be supplied within short delivery times. Please request it to our engineers.

For orders calling for backstop elements with “S” treatment, please ask for an “S” type (e.g. A-75 S freewheel  $\varnothing 25$ )



Z= number of threaded holes in the  $\varnothing C$

Size	d H7		Standard or S treatment		Centrifugal Elevation E		$\varnothing D h6$ mm	$\varnothing C$ mm	Z	B mm	L mm	A mm
	min. mm	max. mm	Torque Nm	max speed rpm	Torque Nm	Elev. Speed. rpm						
42	12	15*	85	3500	----	-----	62	51	3M5	8	55	1
48	15	20*	170	2500	----	-----	68	56	3M5	8	52	1
55	12	22*	220	2500	170	2900	75	65	4M6	10	48	0,5
62	20	25*	315	2100	250	2200	90	75	6M6	10	50	0,5
75	25	32*	600	1700	450	2000	100	88	6M8	12	65	0,5
90	35	42*	1200	1200	800	1500	125	108	12M8	12	74	1
100	45	50*	1800	800	1700	1400	135	115	12M10	16	75	2
125	60	65*	2700	600	2500	1300	170	150	12M10	16	94	2,5
145	70	75*	6000	500	5000	1200	200	180	12M12	18	112	3
180	90	100*	12000	300	10000	1000	250	225	12M16	25	150	5

\*keyway according to DIN 6885 page 3; other according to page 1

Safety coefficient 2.

**We keep the right to make modifications for product improvements.**

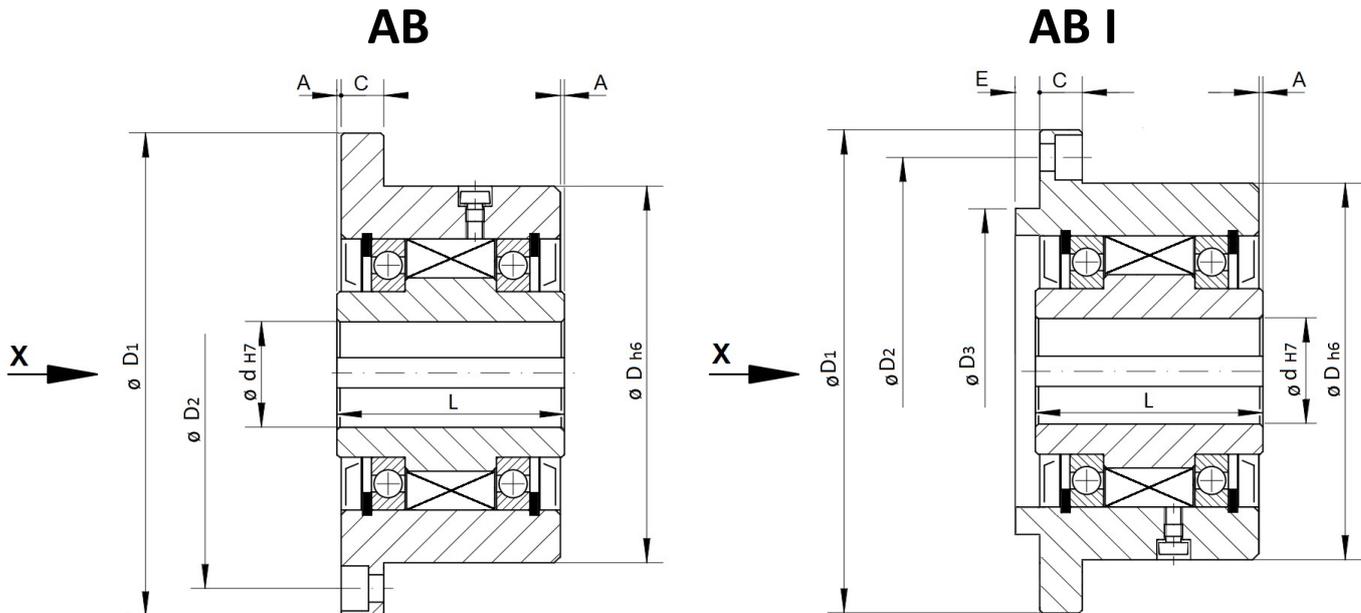
## AB, ABI, ABII TYPE FREEWHEEL

The RULISA freewheel series share characteristics with those of "A" type.

**AB** type is designed for lateral clamping on the tracks of the elements such as gears, pulleys, etc., with hole diameter tolerance H7.

**ABI** type is also designed for lateral clamping to drive attachment. It is supplied with a flange in order to guarantee concentricity.

**ABII** type has a keyway in the outer diameter and lateral stops to allow fixing with this system.



Z = Number of clamping screws

Size	d H7		Standard or S treatment		Centrifugal Elevation E		ØD h6 mm	ØD <sub>1</sub> mm	ØD <sub>2</sub> mm	ØD <sub>3</sub> h7 mm	ØD <sub>4</sub> mm	Z	L mm	C mm	A mm	E mm
	min. mm.	max. mm.	Torque Nm	max speed rpm	Torque Nm	Elev. Speed rpm										
42	12	15*	85	3500	----	-----	62	85	72	55	70	3M5	55	10	1	3
48	15	20*	170	2500	----	-----	68	92	78	55	76	3M5	52	11	1	3
55	12	22*	220	2500	170	2900	75	98	85	65	84	8M5	48	11	0,5	3
62	20	25*	315	2100	250	2200	90	118	104	80	99	8M6	50	12	0,5	3,5
75	25	32*	600	1700	450	2000	100	128	114	90	109	12M6	65	12	0,5	3,5
90	35	42*	1200	1200	800	1500	125	160	142	110	135	12M8	74	14	1	4
100	45	50*	1800	800	1700	1400	135	180	155	130	145	8M10	75	16	2	4
125	60	65*	2700	600	2500	1300	170	214	192	140	182	10M10	94	18	2,5	4
145	70	75*	6000	500	5000	1200	200	250	225	160	220	12M12	112	20	3	4
180	90	100*	12000	300	10000	1000	250	315	280	210	280	12M16	150	22	5	5

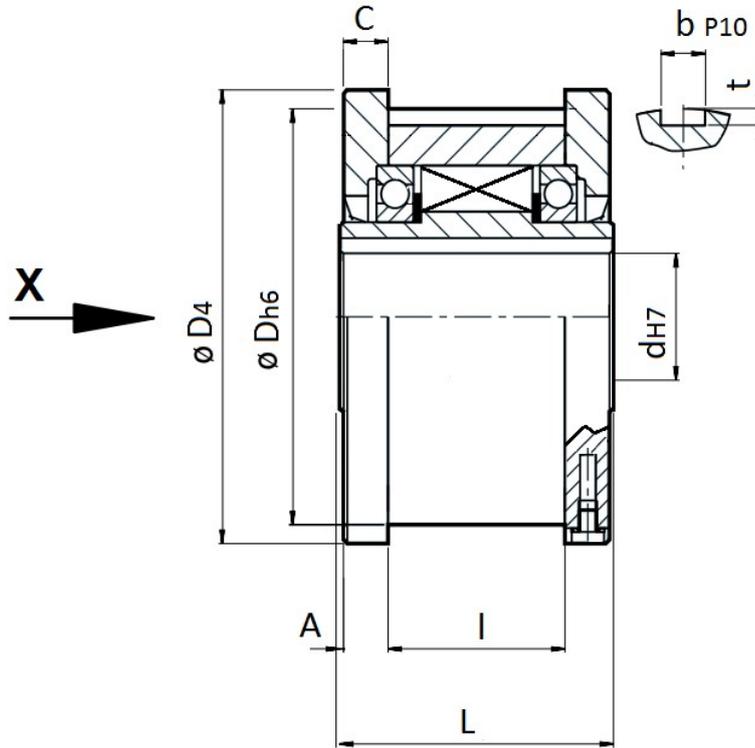
\*keyway according to DIN 6885 page 3; other according to page 1

Safety coefficient =2.

**Rotating direction.** Please specify in the order the shaft rotating direction seen "from X" when the outer ring is fixed.

**We keep the right to make modifications for product improvements.**

## AB II



Z = Number of clamping screws

Size	d H7		Standard or S treatment		Centrifugal Elevation E		ØD h6	ØD <sub>4</sub>	Z	L	C	A	E	I	t	b p10
	min. mm.	max. mm.	Torque Nm	max speed rpm	Torque Nm	Elev. Speed rpm										
42	12	15*	85	3500	----	-----	62	70	3M5	55	85	72	55	28	2,5	4
48	15	20*	170	2500	----	-----	68	76	3M5	52	92	78	55	28	3	5
55	12	22*	220	2500	170	2900	75	84	8M5	48	98	85	65	25	3,5	6
62	20	25*	315	2100	250	2200	90	99	8M6	50	118	104	80	25	4	8
75	25	32*	600	1700	450	2000	100	109	12M6	65	128	114	90	40	4	8
90	35	42*	1200	1200	800	1500	125	135	12M8	74	160	142	110	44	5	12
100	45	50*	1800	800	1700	1400	135	145	8M10	75	180	155	130	39	5,5	14
125	60	65*	2700	600	2500	1300	170	182	10M10	94	214	192	140	49	7	18
145	70	75*	6000	500	5000	1200	200	220	12M12	112	250	225	160	66	9	22
180	90	100*	12000	300	10000	1000	250	280	12M16	150	315	280	210	96	9	25

\*keyway according to DIN 6885 page 3; other according to page 1; Safety coefficient =2.

**Rotating direction.** Please specify in the order the shaft rotating direction seen "from X" when the outer ring is fixed.

**We keep the right to make modifications for product improvements.**

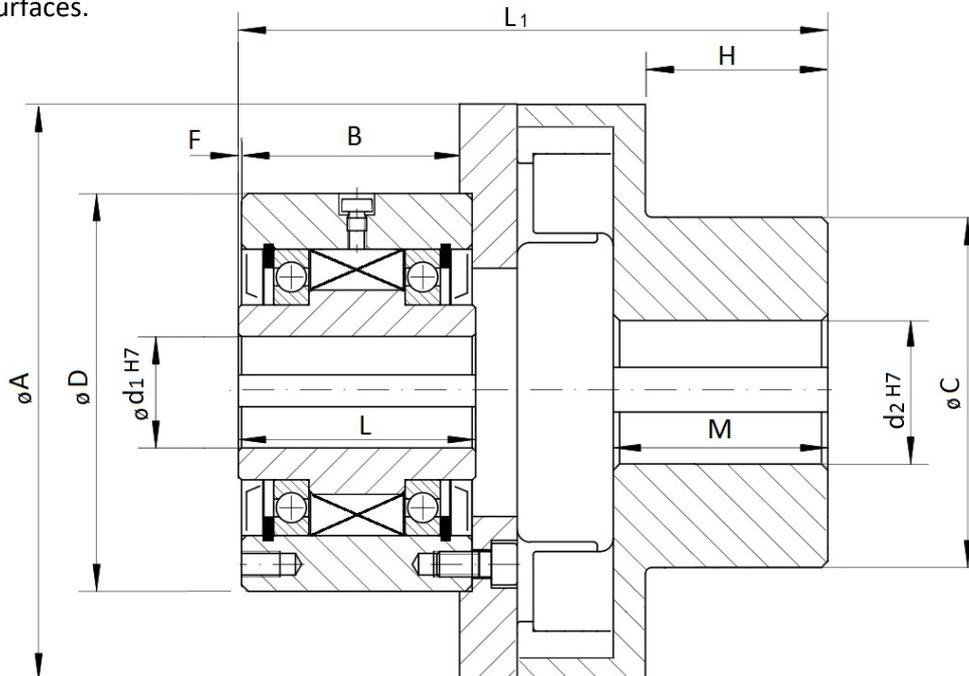
## AE TYPE FREEWHEEL

Our AE type Freewheel is designed for well aligned axel joints including an elastic coupling system. It is supplied with an oil bath. The coupling system included is high quality and has high resistance to oils and a long life span. When ordering, it is required to provide the direction of the rotation when looking straight at the coupling system.

### IMPORTANT:

When fitting the Freewheel to create centrifugal lift of the blocking elements, the side of the coupling system needs to be seen on the side of the drive system we want in movement and the axel of the freewheel on the side that remains still.

When we want to transmit the movement from the side of the freewheel, the installation must be shut down or the speed reduced to near 0 rpm, so that all the blocking elements have connected with the rolling surfaces.



Size	Ød <sub>1</sub> H7 max. mm	Ød <sub>2</sub> H7 max. mm	Standard		Centrifugal Elevation E		A mm	B mm	C mm	D mm	F mm	H** mm	L mm	M** mm	L1 mm
			Torque Nm	Max speed rpm	Torque Nm	Elev. Speed. rpm									
55	20-32*	55-62*	220	2500	170	2900	105	45	72	75	0,5	35	48	43	114
62	22-25*	55-60*	315	2100	250	2200	120	47	70	90	0,5	31	50	40	114
75	30-32*	60-65*	600	1700	450	2000	135	62	75	100	0,5	36	65	45	139
90	40-42*	65-70*	1200	1200	800	1500	150	70	80	125	1	40	74	50	156
100	45-50*	75-80*	1800	800	1700	1400	175	69	95	135	2	46	75	58	169
125	60-65*	105-110*	2700	600	2500	1300	200	81	130	170	2,5	54	94	67	194
145	70-75*	135-150*	6000	500	5000	1200	245	102	170	200	3	90	112	110	268
180	90-100*	165-175*	12000	300	10000	1000	300	136	200	250	5	150	150	173	378

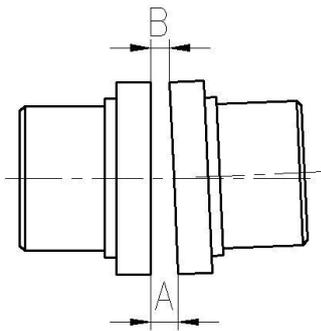
\*keyway according to DIN 6885 page 3; other according to page 1;

Safety coefficient= 2

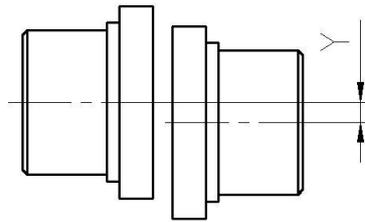
\*\* The exit of the coupling system can be supplied with larger cube dimensions.

**We keep the right to make modifications fore product improvements.**

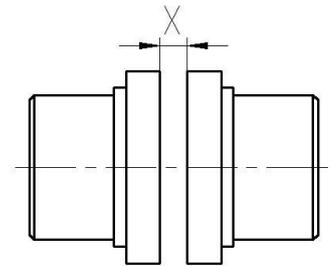
Size	Axial desalination	Radial desalination	Angular desalination
55	0,5 – 1,6	0,6	1° 10'
62	0,5 – 1,7	0,7	1° 10'
75	0,6 – 2,0	0,7	1° 10'
90	0,7 – 2,2	0,8	1° 10'
100	0,8 – 2,5	0,8	1° 10'
125	1,2 – 3,5	0,8	1° 10'
145	1,2 – 4,0	1,0	1° 10'
180	2,0 – 5,0	1,2	1° 10'



**ANGULAR**



**RADIAL**



**AXIAL**

## AR TYPE FREEWHEEL

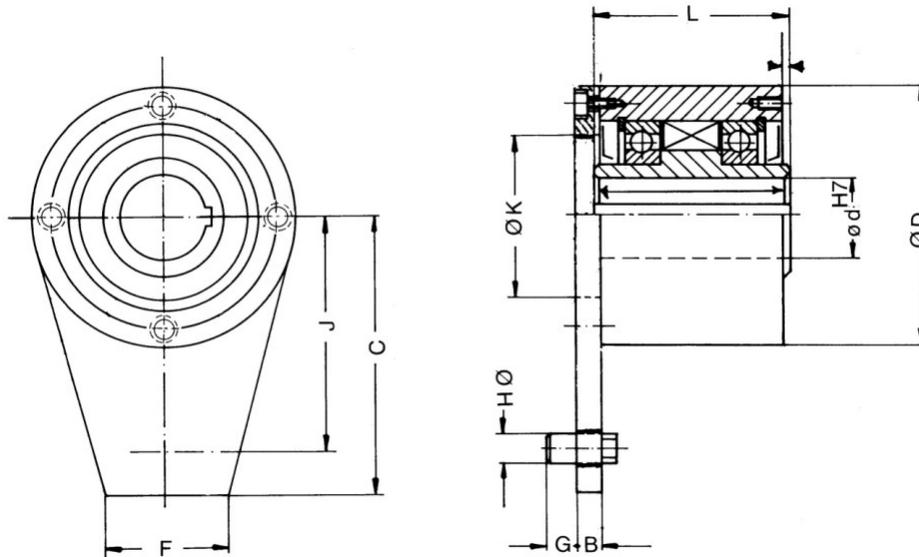
Our AR RULISA freewheels are designed to work as backstop elements at the end of a shaft and to be fitted to the housing with a removable bolt.

When the freewheel works as a backstop element in a housing, it is advisable to assemble the bolt with a clearance of at least 0,5 mm in order to balance misalignment.

The bolt must be adjusted and lined up when the freewheel is used as overrunning unit. This freewheel is designed to work at high indexing speeds.

For idling speeds, please refer to ARR series which carry antifriction elements instead of bearings.

When the freewheel works as backstop element at high speeds please refer to ARI type.



Size	d H7		Standard / S treatment		ØD h7	ØK	ØH	J	G	A	B	C	L	F
	min mm	max mm	Torque Nm	Max. Speed Rpm										
42	12	15*	85	3500	62	32	10	44	10	1	8	59	55	30
30	15	20*	170	2500	68	37	10	47	10	1	8	62	52	30
55	12	22*	220	2500	75	50	12	54	11	0,5	10	72	48	55
62	20	25*	315	2100	90	55	16	62	14	0,5	10	84	50	70
75	25	32*	600	1700	100	70	16	68	14	0,5	12	92	65	75
90	35	42*	1200	1200	125	85	20	85	18	1	12	112	74	95
100	45	50*	1800	800	135	95	25	102	22	2	15	135	75	110
125	60	65*	2700	600	170	115	32	112	25	2,5	15	145	94	130
145	70	75*	6000	500	200	140	38	135	30	3	16	165	112	150
180	90	100*	12000	300	250	170	50	180	40	5	16	230	150	230

keyway according to DIN 6885 page 3; other according to page 1

Safety coefficient: 2.

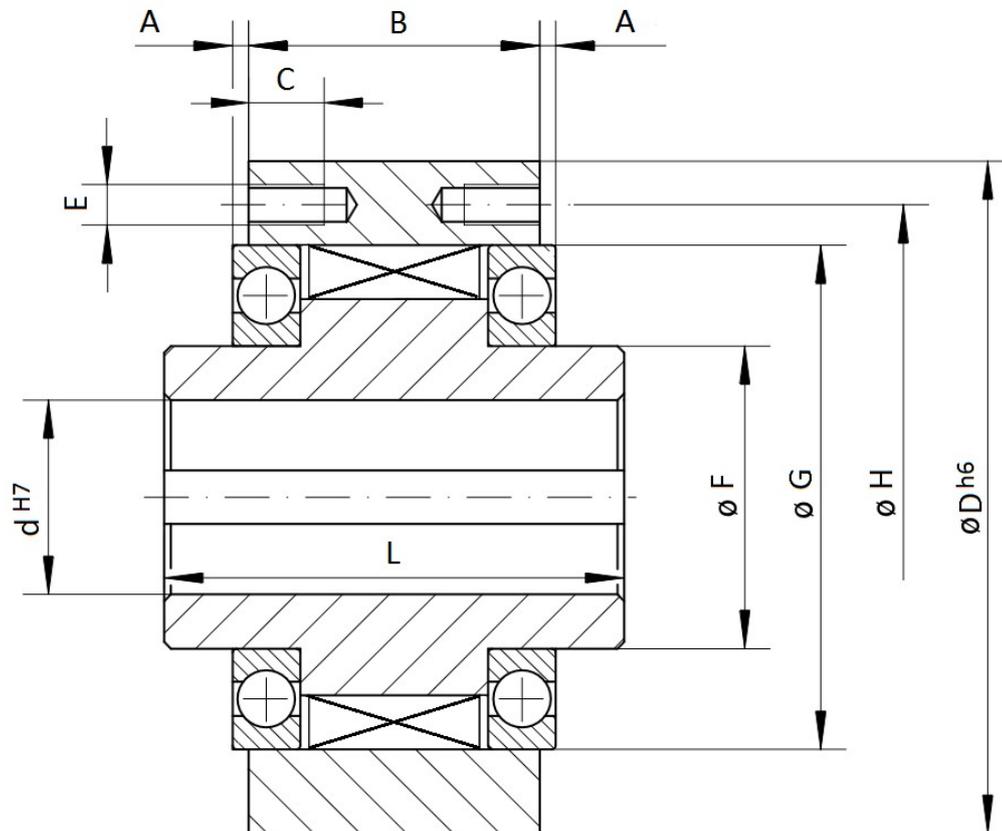
Rotating direction: please check it before assembling.

If we do not have the desired direction just put the lever on the opposite side.

**We keep the right to make modifications for product improvements.**

## ATGFR TYPE FREEWHEEL

Our Free Wheels type ATGFR can be supplied with different types of covers according to needs



d H7 mm	Torque Nm	B mm	C mm	D h7 mm	E mm	F mm	G	H mm	L mm	T mm	Z
20	200	34	2,4	75	30	55	M5	8	57	64	4
25	450	35	2,4	90	40	68	M6	10	60	78	4
30	480	43	2,4	100	45	75	M6	10	68	87	6
35	700	45	2,9	110	50	80	M6	12	74	96	6
40	700	53	2,9	125	55	90	M8	14	86	108	6
45	2000	53	2,9	130	60	98	M8	14	86	112	8
50	2000	64	3,9	150	70	110	M8	14	94	132	8
55	2000	66	2,9	160	75	115	M10	16	104	138	8
60	3000	78	5,4	170	80	125	M10	16	114	150	10
70	3000	95	6,4	190	90	140	M10	16	134	165	10
80	4000	100	3,9	210	105	160	M10	16	144	185	10
90	10000	115	4,9	230	120	180	M12	20	158	206	10
100	10000	120	5,4	270	140	210	M16	24	182	240	10
130	15000	152	7,9	310	160	240	M16	24	212	278	12
150	26000	180	6,9	400	200	310	M20	32	246	360	12

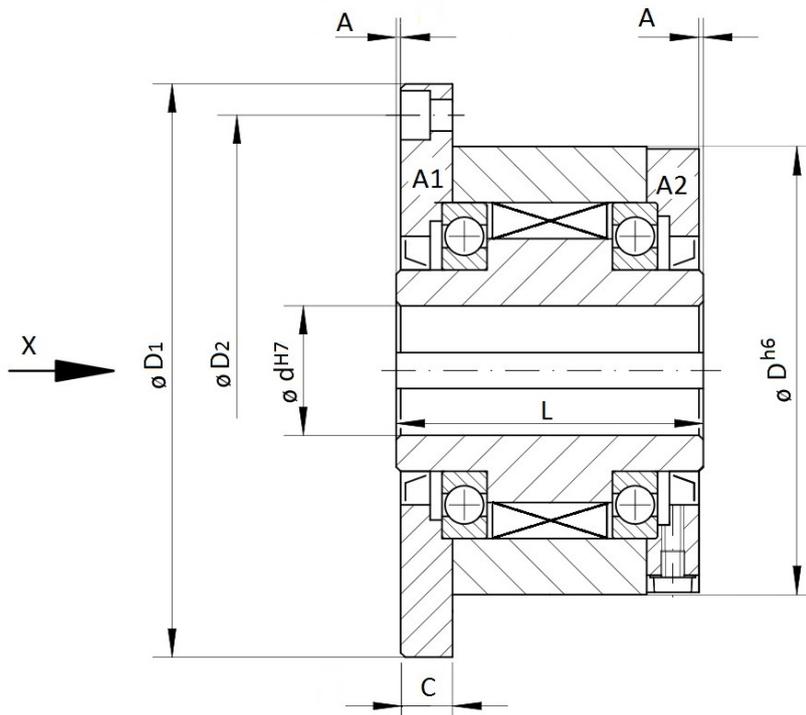
Keyway according to DIN 6885 page 1

Safety coefficient: 2.

"Z" = number of threaded holes G, over the primitive diameter T

**We keep the right to make modifications for product improvements.**

## ATGFR A1 A2 TYPE FREEWHEEL



Z = Number of clamping screws;

B = Diameter hole on the primitive diameter  $D_2$

dH7 mm	Torque Nm	A mm	D h7 mm	E mm	A mm	B	L mm	N mm	T mm	Z
20	200	98	75	30	1	5,5	57	10,5	85	4
25	450	118	90	40	1	6,6	60	11,5	104	4
30	480	128	100	45	1	6,6	68	11,5	114	6
35	700	140	110	50	1	6,6	74	13,5	124	6
40	700	160	125	55	1	6,6	86	15,5	142	6
45	2000	165	130	60	1	9	86	15,5	146	8
50	2000	185	150	70	1	9	94	14	166	8
55	2000	204	160	75	1	9	104	18	182	8
60	3000	214	170	80	1	11	114	17	192	10
70	3000	234	190	90	1	11	134	18,5	212	10
80	4000	254	210	105	1	11	144	21	232	10
90	10000	278	230	120	1	14	158	20,5	254	10
100	10000	335	270	140	1	18	182	30	305	10
130	15000	380	310	160	1	18	212	29	345	12
150	26000	485	400	200	1	22	246	32	445	12

Keyway according to DIN 6885 page 1

Safety coefficient= 2

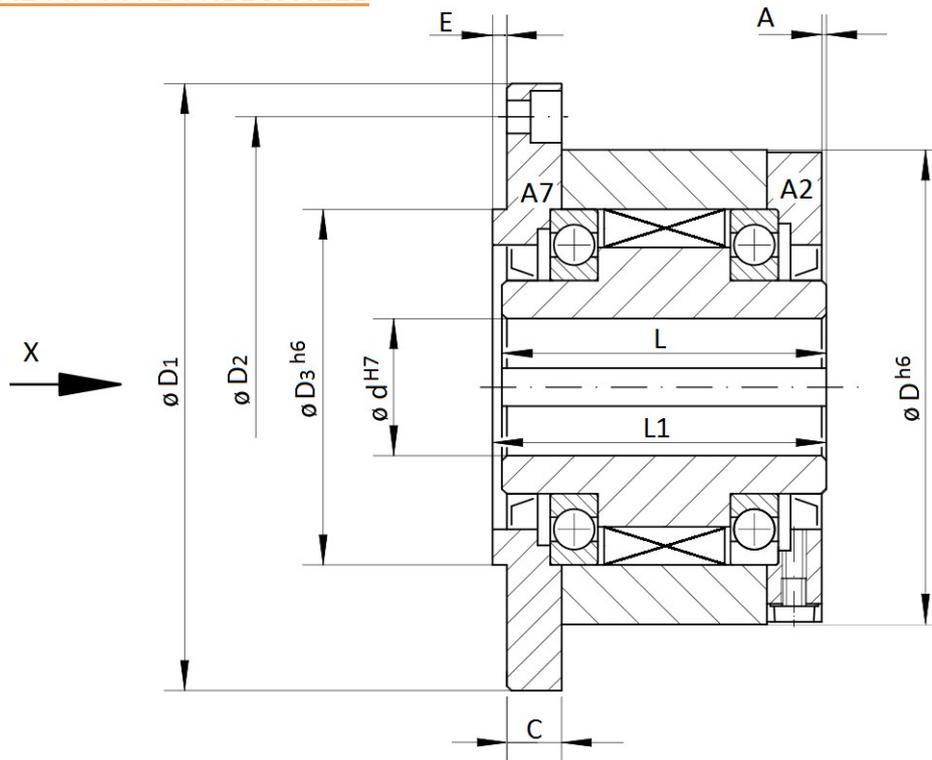
When ordering, please specify the sense of the rotation seen from X:

"D"= the inside ring rotates freely clockwise

"I"= the inside ring rotates freely anticlockwise

**We keep the right to make modifications for product improvements.**

## ATGFR A2 A7 TYPE FREEWHEEL



Z= Number of clamping screws;

B = Diameter hole on the primitive diameter  $D_2$

dH7 mm	Par Nm	D1 mm	D h6 mm	K mm	A mm	B	K mm	L mm	L <sub>1</sub> mm	N mm	C mm	D <sub>3</sub> h6 mm	D <sub>2</sub> mm	Z
20	200	98	75	30	1	5,5	3	57	59	10,5	10,5	55	85	4
25	450	118	90	40	1	6,6	3	60	62	11,5	11,5	68	104	4
30	480	128	100	45	1	6,6	3	68	70	11,5	11,5	75	114	6
35	700	140	110	50	1	6,6	3,5	74	76	13,5	13	80	124	6
40	700	160	125	55	1	6,6	3,5	86	88	15,5	15	90	142	6
45	2000	165	130	60	1	9	3,5	86	88	15,5	15	95	146	8
50	2000	185	150	70	1	9	4	94	96	14	13	110	166	8
55	2000	204	160	75	1	9	4	104	106	18	17	115	182	8
60	3000	214	170	80	1	11	4	114	116	17	16	125	192	10
70	3000	234	190	90	1	11	4	134	136	18,5	17,5	140	212	10
80	4000	254	210	105	1	11	4	144	146	21	20	160	232	10
90	10000	278	230	120	1	14	4,5	158	160	20,5	19	180	254	10
100	10000	335	270	140	1	18	5	182	184	30	28	210	305	10
130	15000	380	310	160	1	18	5	212	214	29	27	240	345	12
150	26000	485	400	200	1	22	5	246	248	32	30	310	445	12

Keyway according to DIN 6885 page 1

Safety coefficient= 2

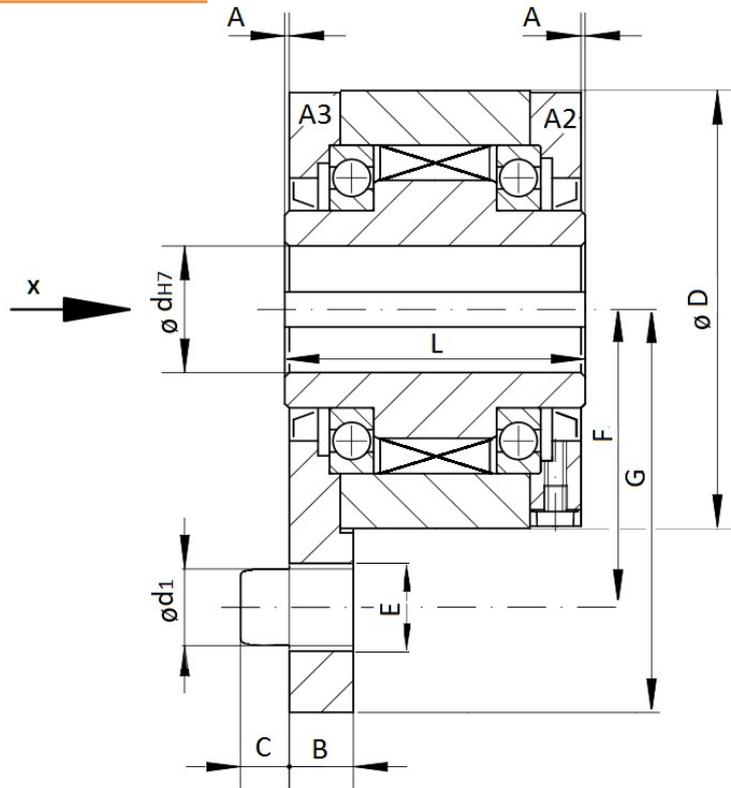
When ordering, please specify the sense of the rotation seen from X:

“D”= the inside ring rotates freely clockwise

“I”= the inside ring rotates freely anticlockwise

**We keep the right to make modifications for product improvements.**

## ATGFR A2 A3 TYPE FREEWHEEL



	Par Nm	G mm	D mm	A mm	L mm	F mm	B mm	C mm	d1 mm	E mm
<b>20</b>	200	72	75	1	57	54	15	11	12	M 16 x 1,5
<b>25</b>	450	84	90	1	60	62	18	14	16	M 20 x 2
<b>30</b>	480	92	100	1	68	68	22	14	16	M 20 x 2
<b>35</b>	700	102	110	1	74	76	22	18	20	M 24 x 2
<b>40</b>	700	112	125	1	86	85	22	18	20	M 24 x 2
<b>45</b>	2000	120	130	1	86	90	26	22	25	M 30 x 2
<b>50</b>	2000	135	150	1	94	102	30	22	25	M 30 x 2
<b>55</b>	2000	142	160	1	104	108	30	25	32	M 35 x 2
<b>60</b>	3000	145	170	1	114	112	35	25	32	M 35 x 2
<b>70</b>	3000	175	190	1	134	135	35	30	38	M 42 x 2
<b>80</b>	4000	185	210	1	144	145	45	30	38	M 42 x 2
<b>90</b>	10000	205	230	1	158	155	45	40	50	M 55 x 2
<b>100</b>	10000	230	270	1	182	180	45	40	50	M 55 x 2
<b>130</b>	15000	268	310	1	212	205	60	55	68	M 72 x 2
<b>150</b>	26000	325	400	1	246	255	60	55	68	M 72 x 2

Keyway according to DIN 6885 page 1

Safety coefficient= 2

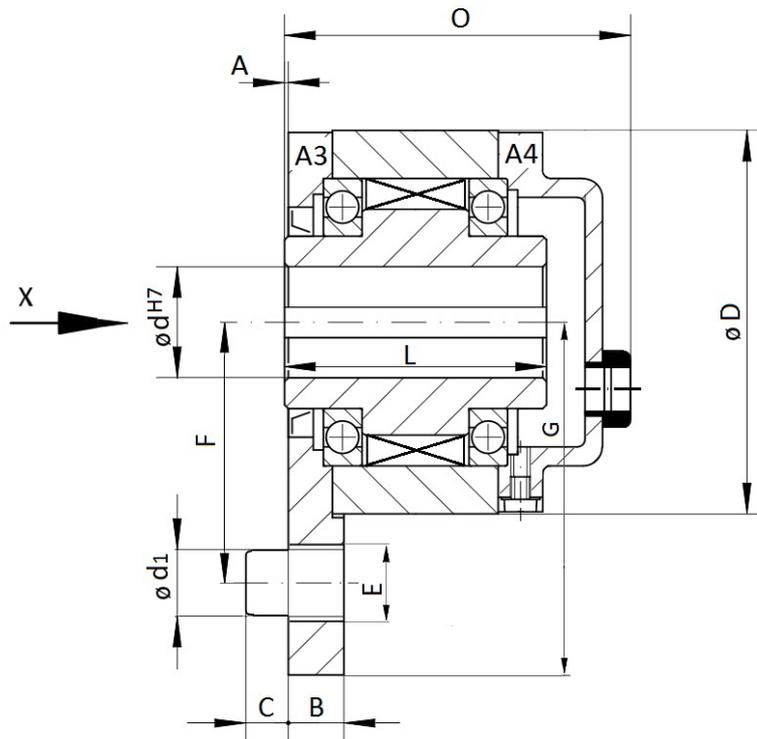
When ordering, please specify the sense of the rotation seen from X:

“D”= the inside ring rotates freely clockwise

“I”= the inside ring rotates freely anticlockwise

**We keep the right to make modifications for product improvements.**

## ATGFR A3 A4 TYPE FREEWHEEL



dH7 mm	Par Nm	G mm	D mm	A mm	L mm	O mm	F mm	B mm	C mm	d1 mm	E mm
20	200	72	75	1	57	82	54	15	11	12	M 16 x 1,5
25	450	84	90	1	60	85	62	18	14	16	M 20 x 2
30	480	92	100	1	68	95	68	22	14	16	M 20 x 2
35	700	102	110	1	74	102	76	22	18	20	M 24 x 2
40	700	112	125	1	86	115	85	26	18	20	M 24 x 2
45	2000	120	130	1	86	115	90	26	22	25	M 30 x 2
50	2000	135	150	1	94	123	102	30	22	25	M 30 x 2
55	2000	142	160	1	104	138	108	30	25	32	M 35 x 2
60	3000	145	170	1	114	147	112	35	25	32	M 35 x 2
70	3000	175	190	1	134	168	135	35	30	38	M 42 x 2
80	4000	185	210	1	144	178	145	45	30	38	M 42 x 2
90	10000	205	230	1	158	192	155	45	40	50	M 55 x 2
100	10000	230	270	1	182	217	180	45	40	50	M 55 x 2
130	15000	268	310	1	212	250	205	60	55	68	M 72 x 2
150	26000	325	400	1	246	286	255	60	55	68	M 72 x 2

Keyway according to DIN 6885 page 1

Safety coefficient= 2

When ordering, please specify the sense of the rotation seen from X:

“D”= the inside ring rotates freely clockwise

“I”= the inside ring rotates freely anticlockwise

**We keep the right to make modifications for product improvements.**

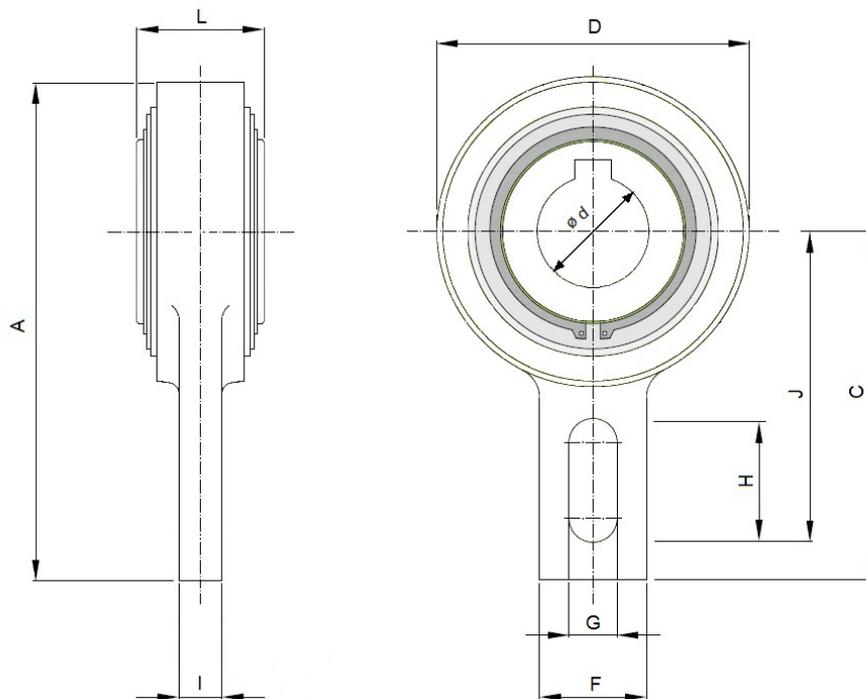
## ATR TYPE FREEWHEEL

The **ATR** Freewheel is designed to be used as intermittent advance or non-return units.

They are equipped with permanent lubrication sealed by bronze bushings, therefore not requiring maintenance.

When fitting them, it is important the fastening pin leaves the handle free in the axel direction, so the friction rings are not deteriorated. Leave at least 1 mm. each side of level G.

Upon request, we can supply other handles that better meet your needs.



Size	d H7 (Standard) mm	Torque Nm	Max. Speed rpm	A mm	D mm	I mm	L mm	C mm	J mm	GB11 mm	H mm	F mm
<b>ATR 75</b>	20 25 30 35	840	350	162	100	15	48	112	102	18	37	40
<b>ATR 90</b>	40 45 50 55	1960	250	187	125	15	52	125	115	18	40	60
<b>ATR 125</b>	60 70 80	3600	200	250	170	25	65	165	150	22	55	70
<b>ATR 145</b>	90 100	4800	200	325	220	25	70	215	200	40	70	80
<b>ATR 180</b>	100 120 130	6000	200	355	250	30	70	230	215	40	70	100

Keyway according to DIN 6885 page 1

Safety coefficient= 2

**We keep the right to make modifications for product improvements.**



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### **BNI, BNII, BNIII TYPE FREEWHEEL**

These **RULISA** freewheels have been designed to work in gearboxes, gears, etc. where the true running of the tracks is guaranteed in the assembling, through bearings able support the radial and axial loads required.

**BNII type** has the same diameter dimensions' as the 6.300 bearing series.

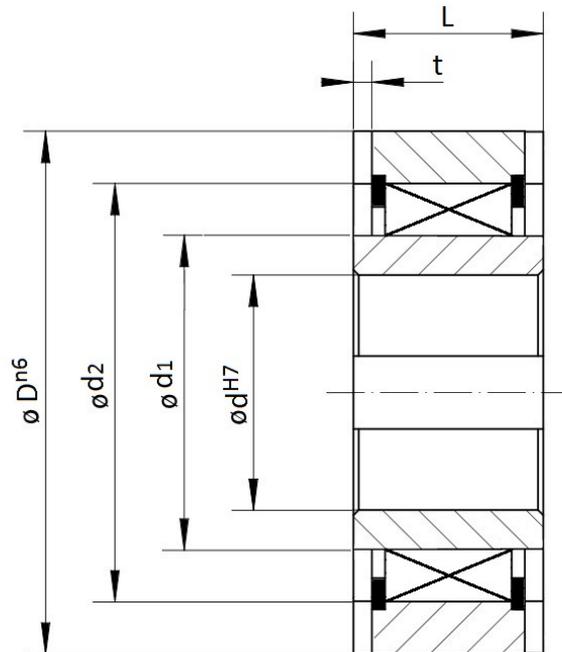
**BNIII type** has the same dimensions' and adjusting manner as the 6.200 bearing series.

They can be used as backstop elements, as indexing elements or as overrunning clutches. For performance quality in where a larger service life is required, the use of "S" Titanium carbonitride treatment or the use of centrifugal elevation is advisable.

For assembly purposes, **BNI and BNII** type freewheels have keyways in the lateral side only. Please specify the inner ring free rotating direction keeping the outer ring fixed on the key side.

If the rotating direction is changed by mistake, please release one of the circlips, turn the freewheel cage down and assemble it again; thus the rotating direction will be modified.

### TYPE BNI



BNI								
dH7 mm	Torque Nm	Max Speed rpm	$\varnothing D_{n6}$ mm	$\varnothing d_1$ mm	$\varnothing d_2$ mm	L mm	t mm	b H <sub>11</sub> mm
8	20	6.000	37	20	26	20	3	6
10	-	-	-	-	-	-	-	-
12	20	6.000	37	20	26	20	3	6
15	60	5.000	47	30	36	20	3,5	7
17	-	-	-	-	-	-	-	-
20	90	3.500	62	35	42	36	3,5	8
25	300	2.100	80	44	62	32	4	8
30	300	2.100	90	44	62	32	5	12
35	700	1.700	100	57	75	40	5	10
40	700	1.700	120	57	75	40	7	15
45	1.400	1.200	120	72	90	50	6	12
50	1.400	1.200	130	72	90	50	8,5	17
55	1.900	800	140	82	100	50	7	14
60	1.900	800	150	82	100	50	9	18
70	2.800	600	170	107	125	50	8	16
80	6.000	600	190	107	125	80	9	18
90	8.000	500	215	127	145	85	11,5	24
100	11.500	500	260	127	145	115	14,5	28
130	15.000	300	300	162	180	120	17	32

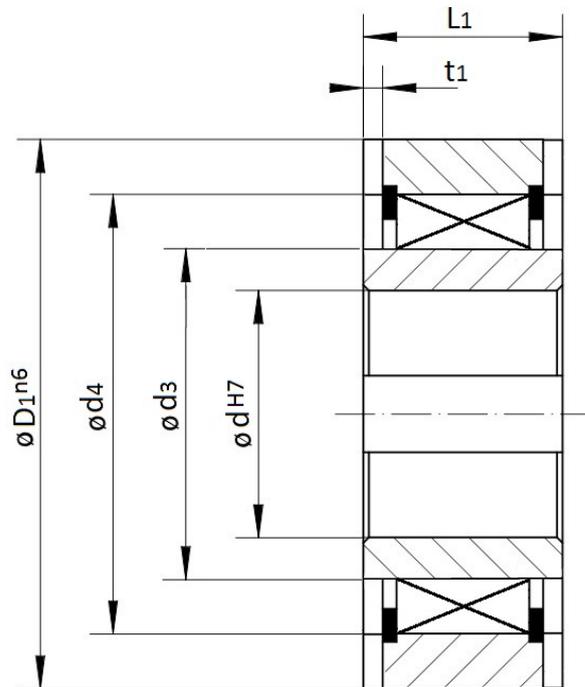
Keyway according to DIN 6885 page 1

Safety coefficient: 2.

bH<sub>11</sub>= lateral keyway width.

**We keep the right to make modifications for product improvements.**

### TYPE BNII



BNII								
dH7 mm	Torque Nm	Max Speed rpm	ØD <sub>1n6</sub> mm	Ø d <sub>3</sub> mm	Ø d <sub>4</sub> mm	L <sub>1</sub> mm	t <sub>1</sub> mm	b <sub>1</sub> H <sub>11</sub> mm
8	20	6.000	35	20	26	16	1,3	4
10	-	-	-	-	-	-	-	-
12	20	6.000	35	16	22	16	1,3	4
15	50	5.000	42	25	32	20	1,3	5
17	65	4.000	47	30	37	20	2	5
20	85	3.500	52	35	42	21	2,5	6
25	85	3.500	62	35	42	24	3,5	8
30	250	2.100	72	44	62	27	3,5	10
35	400	2.000	80	50	68	31	3,5	12
40	500	1.700	90	57	75	33	3,5	12
45	700	1.700	100	57	75	36	3,5	14
50	1.200	1.200	110	72	90	40	4,5	14
55	-	-	-	-	-	-	-	-
60	1.500	800	130	82	100	46	5,5	18
70	2.200	600	150	107	125	51	6,5	20
80	2.500	600	170	107	125	58	7,5	20
90	3.000	500	190	127	145	58	11,5	24
100	4.000	300	215	162	180	65	14,5	28
130	8.000	300	280	162	180	95	17	32

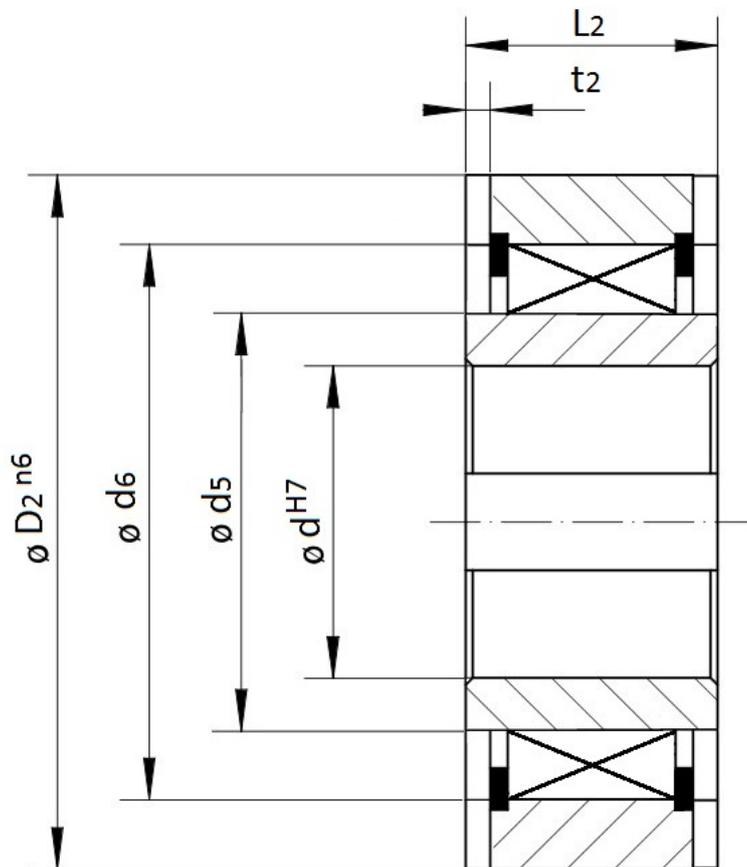
Keyway according to DIN 6885 page 1

Safety coefficient: 2.

bH<sub>11</sub>= lateral keyway width.

**We keep the right to make modifications for product improvements.**

## TYPE BNIII



BNIII						
dH7 mm	PAR Nm	Vel.Max rpm	Ø D2n6 mm	Ø d5 mm	Ø d6 mm	L2 mm
40	400	2.000	80	50	68	18
45	480	1.700	85	57	75	19
50	480	1.700	90	57	75	20
55	-	-	-	-	-	-
60	700	1.200	110	72	90	22
70	1.000	800	125	82	100	24
80	1.500	600	140	107	125	26
90	2.800	500	160	127	145	30
100	2.800	500	180	127	145	34
130	-	-	-	-	-	-

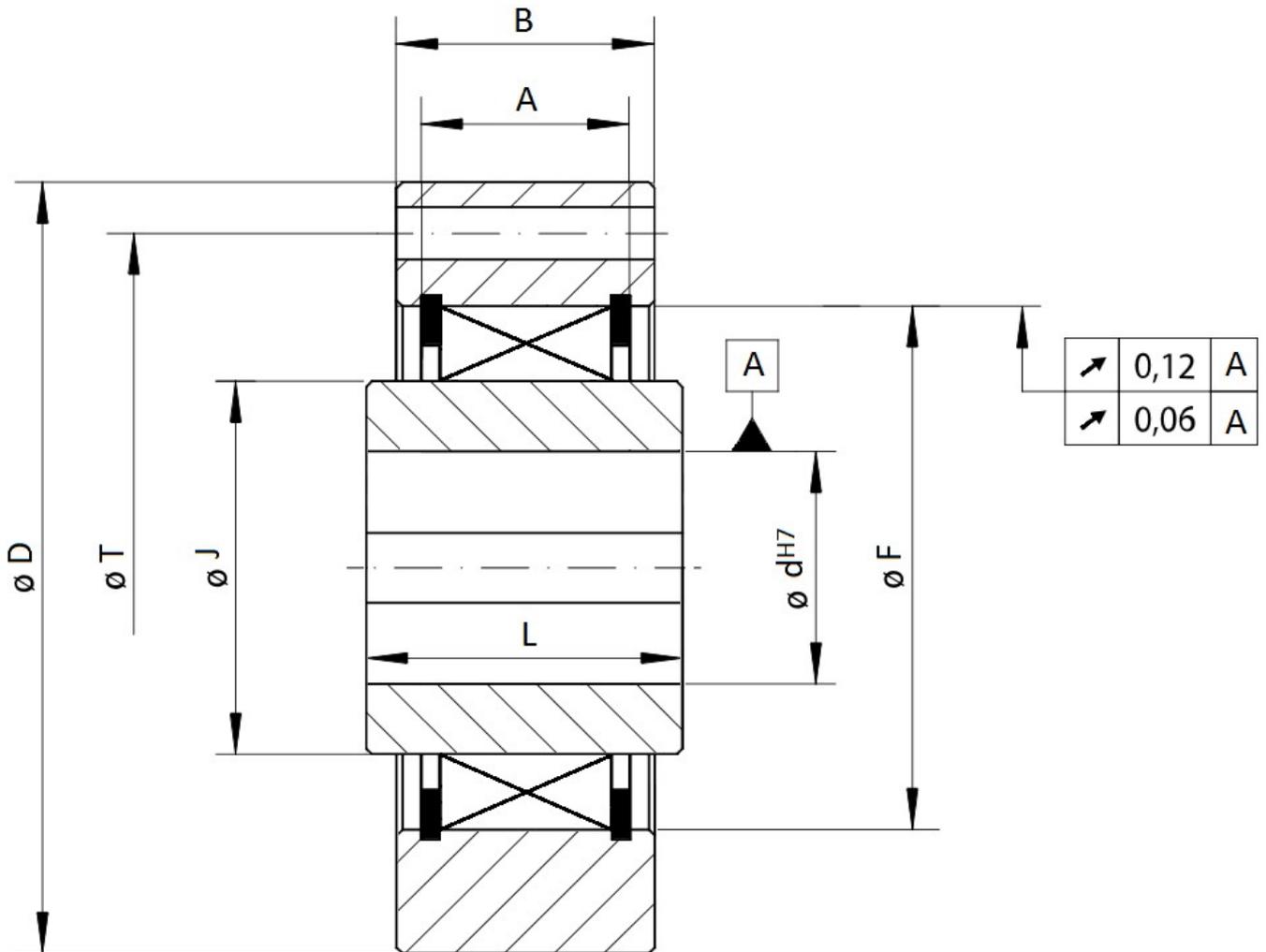
Keyway according to DIN 6885 page 1

Safety coefficient: 2.

bH<sub>11</sub>= lateral keyway width.

**We keep the right to make modifications for product improvements.**

## AFON TYPE FREEWHEEL



Size	dH7 Stand. Max.		Torque Nm	Max. Speed rpm	Max. Ext Speed Elevation rpm	A mm	B mm	D mm	F mm	J mm	G	L mm	P mm	T mm	Z
	Mm	Mm													
AFON 37	20	25*	220	2500	2900	18,5	25	85	55	37	M6	35	0,5	70	6
AFON 44	25	32*	315	2100	2250	18,5	25	95	62	44	M6	35	0,5	80	8
AFON 57	30	42*	700	1700	2000	23,5	60	110	75	57	M8	45	0,5	95	8
AFON 72	40	55*	1400	1200	1550	29,5	38	132	90	72	M8	60	1	115	12
AFON 82	55	65*	2000	800	1450	31	40	145	100	82	M10	60	1	125	12
AFON 107	70	85*	3000	600	1300	33	45	170	125	107	M10	65	1	150	12
AFON 127	90	100*	4000	500	1200	58	68	200	145	127	M12	75	1	180	12

Keyway according to DIN 6885 page 3; other according to page 1

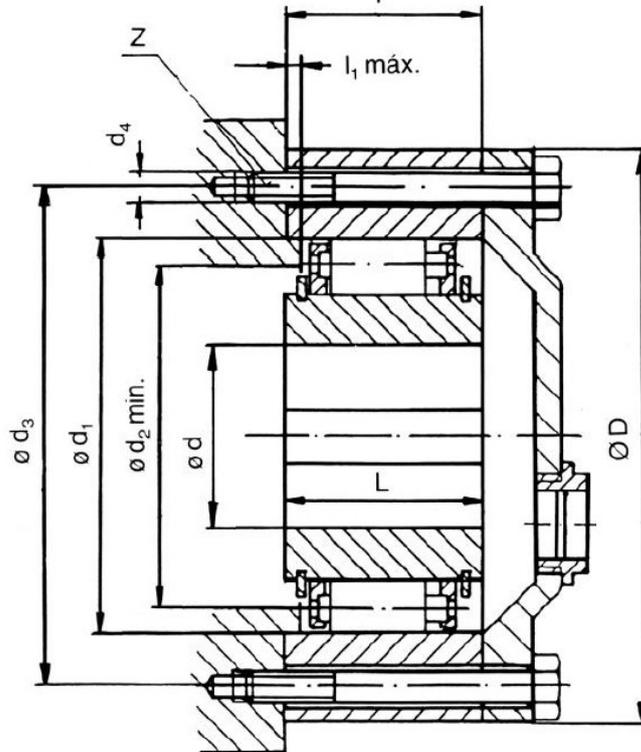
Safety coefficient: 2.

We keep the right to make modifications for product improvements.

## RUEDA LIBRE TIPO BTI

**BTI RULISA** centrifugal elevation of freewheels are designed to work in gearboxes where the true running of the tracks is guaranteed by its closeness to a bearing.

The design has been made to easily fix the outer ring to the high rotating inner ring to the shaft.



Z = number of screws

Size	Torque Nm	Elev. speed rpm	dH7		D mm	L mm	I mm	l <sub>1</sub> max mm	Ø d <sub>1</sub> H7 mm	Ø d <sub>2</sub> mm	Ø d <sub>3</sub> mm	Z	d <sub>4</sub>
			min. mm	max. mm									
<b>BTI 90</b>	720	660	30	35	125	40	35	2	90	65	108	8	M8
<b>BTI 110</b>	1.500	580	40	50	150	45	40	4	110	90	132	8	M8
<b>BTI 125</b>	2.000	430	50	60	175	60	55	4	125	105	155	8	M10
<b>BTI 140</b>	2.600	400	60	75	190	60	55	4	140	125	165	12	M10
<b>BTI 160</b>	4.600	320	75	95	210	75	70	4	160	45	185	12	M10
<b>BTI 180</b>	5.800	300	95	110	230	75	70	5	180	165	206	12	M12
<b>BTI 210</b>	11.200	245	110	130	270	95	90	7	210	195	240	12	M16
<b>BTI 240</b>	21.000	230	130	155	310	95	90	7	240	225	278	12	M16
<b>BTI 310</b>	31.200	200	155	215	400	100	95	7	310	295	360	12	M20
<b>BTI 340</b>	37.200	190	200	240	440	100	95	7	340	325	390	12	M20
<b>BTI 360</b>	40.200	180	200	250	460	100	95	6	360	345	410	16	M20
<b>BTI 400</b>	54.000	175	200	260	520	105	100	6	400	385	460	16	M24

Keyway according to DIN 6885 page 1

Torque moments listed are nominal.

Maximum driving torques 2 times the nominal torque moment. The outer ring is supplied with ejector holes.

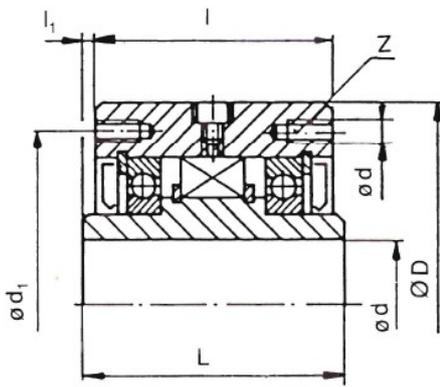
Lateral covers can be delivered on request.

**We keep the right to make modifications for product improvements.**

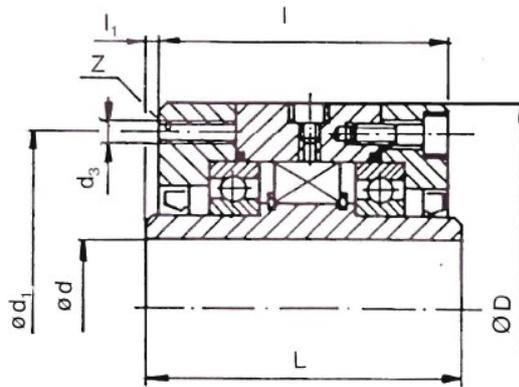
## AI – ARI TYPE FREEWHEEL (WITH FLANGE)

These freewheel series of centrifugal elevation are supplied oil-bath sealed and with bearings in order to work outdoors as automatic units.

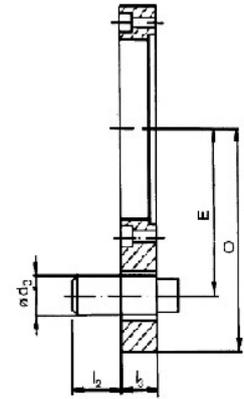
Other types compensating couplings or clamping lateral plates can be delivered upon request.



Up to AI 125



FROM AI-140



FLANGE FOR ARI

Size	Torque Nm	Elev. speed rpm	D h7 mm	d H7 mm	d <sub>1</sub> mm	l mm	l <sub>1</sub> max mm	Z	d <sub>2</sub>	d <sub>3</sub> mm	l <sub>2</sub> mm	l <sub>3</sub> mm	E mm	O mm
AI 90	550	660	125	35	108	95	2,5	6	M 8	20	18	15	100	112
AI 110	1.100	580	150	50	132	90	2,5	8	M 8	25	22	15	120	135
AI 125	1.500	430	175	60	150	117	1,5	10	M 10	32	25	18	140	145
AI 140	2.000	400	190	70	165	117	1,5	10	M 10	38	30	18	150	175
AI 160	3.500	320	210	80	185	146	2	10	M 10	38	30	18	170	185
AI 180	4.400	300	230	90	206	146	2	10	M 12	50	40	19	180	205
AI 210	8.600	245	270	100	240	170	2,5	10	M 16	50	40	30	200	230
AI 240	16.000	230	310	130	278	175	2,5	12	M 16	70	55	30	200	270
AI 310	30.000	200	400	150	360	200	5	12	M 20	70	55	30	225	325
AI 340	35.000	190	440	170	400	240	5	16	M 20	70	55	40	380	360
AI 360	40.000	180	460	180	415	220	5	18	M 20	80	60	45	100	425
AI 400	45.000	175	520	200	470	245	5	18	M 22	100	60	50	450	525

Keyway according to DIN 6885 page 1.

Torque: Nominal torques. Max. driving torques 2 times the nominal torque

**We keep the right to make modifications for product improvements.**

## CAGES FOR FREEWHEELS WITH SPRAGS.

### **MANUFACTURING**

JM cages are manufactured with bearing chrome steel of top quality in order to support a high elasticity and, at the same time, great strength and toughness. Every backstop element has an independent ring which guarantees at all times a constant contact with the tracks, outstandingly improving its running at those applications in which it must work as driving element at high frequency.

### **WAYS OF EXTENDING FREEWHEEL LIFE**

Wear and tear on backstop elements is mainly produced by friction when they are in free turn. The following processes have been studied in order to extend service life

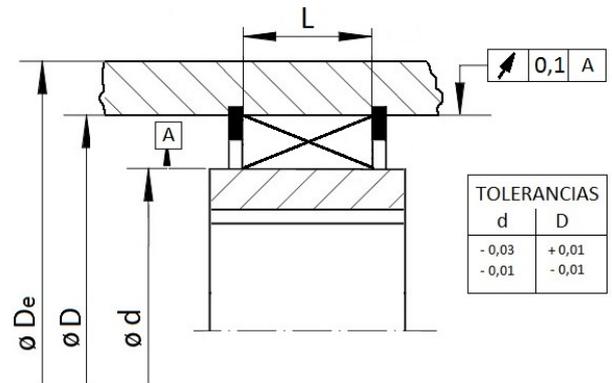
**S TREATMENT:** in the backstop elements surface which gives them a self-saving coat of great hardness and strength to wear and tear, like hard metals, and which extends service life from 4 up to 20 times. Please, when requesting, add the letter "S" to the cage reference. We keep in researching new coatings that allow for a higher durability and speed.

**E ELEVATION:** outer by means of centrifugal force of the backstop element with a quick outer ring turn in the free direction. Thus there is no contact and, therefore, it achieves no wear during the free rotary motion.

Please speak to our engineers about working speeds during the assembly as an overrunning clutch. Please add the letter E on the request. All series with same dimensions and prices can be delivered.

### **ASSEMBLY**

JM RULISA cages are reversible, that is, the customer can assemble it on one side or on the other in order to have clockwise or counterclockwise free turn. The tracks in which they are assembled must have a 62 2Rc hardness, grinded with no tapering to the specified tolerances and they must have a 1,5-2 mm hardening depth, in order to achieve maximum life



Size	D mm	d mm	De mm	Max. speed rpm	<b>L</b> mm	Torque Nm	<b>L</b> mm	Torque Nm	<b>L</b> mm	Torque Nm	<b>L</b> mm	Torque Nm	External elev. Speed rpm
JM 55.1	55	37	75	2.500	<b>14,5</b>	120	<b>18,5</b>	170	<b>23,5</b>	240	25	240	2.900
JM 55.2	55	37	75	2.500	<b>14,5</b>	240	<b>18,5</b>	340	<b>23,5</b>	480	25	480	2.900
JM 56.2	56	38		2.500	<b>17</b>	300							2.900
JM 62.1	62	44	90	2.100	<b>14,5</b>	210	<b>18,5</b>	295	<b>23,5</b>	420	25	420	2.250
JM 62.2	62	44	90	2.100	<b>14,5</b>	420	<b>18,5</b>	590	<b>23,5</b>	840	25	840	2.250
JM 68.2	68	50		1.900	<b>14</b>	540							2.200
JM 75.1	75	57	100	1.700	<b>14,5</b>	290	<b>18,5</b>	420	<b>23,5</b>	580	25	580	2.000
JM 75.2	75	57	100	1.700	<b>14,5</b>	580	<b>18,5</b>	840	<b>23,5</b>	1.160	25	1.160	2.000
JM 83.2	83	65		1.400	<b>14</b>	720							1.700
JM 90.1	90	72	125	1.200	<b>14,5</b>	420	<b>18,5</b>	700	<b>23,5</b>	980	25	980	1.550
JM 90.2	90	72	125	1.200	<b>14,5</b>	840	<b>18,5</b>	1.400	<b>23,5</b>	1.960	25	1.960	1.550
JM 98.2	98	80		800	<b>14,5</b>	1.100							1.450
JM 100.1	100	82	150	800	<b>14,5</b>	600	<b>18,5</b>	870	<b>23,5</b>	1.200	<b>25</b>	1.200	1.450
JM 100.2	100	82	150	800	<b>14,5</b>	1.200	<b>18,5</b>	1.740	<b>23,5</b>	2.400	<b>25</b>	2.400	1.450
JM 125.1	125	107	175	600	<b>14,5</b>	900	<b>18,5</b>	1.300	<b>23,5</b>	1.800	<b>25</b>	1.800	1.300
JM 125.2	125	107	175	600	<b>14,5</b>	1.800	<b>18,5</b>	2.600	<b>23,5</b>	3.600	<b>25</b>	3.600	1.300
JM 145.1	145	127	220	500	<b>14,5</b>	1.200	<b>18,5</b>	1.730	<b>23,5</b>	2.400	<b>25</b>	2.400	1.200
JM 145.2	145	127	220	500	<b>14,5</b>	2.400	<b>18,5</b>	3.460	<b>23,5</b>	4.800	<b>25</b>	4.800	1.200
JM 180.1	180	162	250	300	<b>14,5</b>	1.500	<b>18,5</b>	2.160	<b>23,5</b>	3.000	<b>25</b>	3.000	950
JM 180.2	180	162	250	300	<b>14,5</b>	3.000	<b>18,5</b>	4.320	<b>23,5</b>	6.000	<b>25</b>	6.000	950

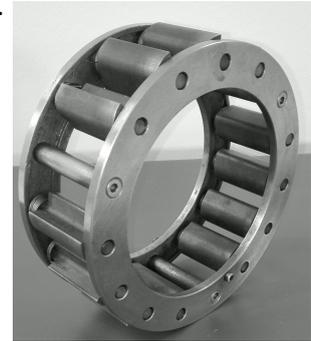
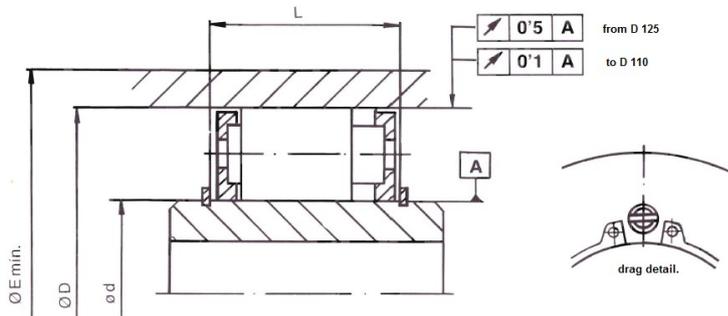
Safety coefficient 2. – Cages with half backstop elements can be delivered on request. Different dimensions and torque moments that best suit our customer's requirements are also available with short-delivery times.

Please choose preferably the bold type cages.

**We keep the right to make modifications for product improvements.**

## ECI CAGES

Centrifugal elevation cages by means of a quick turn of the inner ring or shaft.



Size	Nº elem.	Torque Nm	Elevation rpm	Ød0 mm-0,05	Ø D +0,05 mm 0	Ø E min mm	L mm
ECI 090	6	550	660	50	90	125	25
ECI 100	9	1.100	580	70	110	150	25
ECI 125	12	1.500	430	85	125	175	40
ECI 140	12	2.000	400	100	140	190	40
ECI 160	15	3.500	320	120	160	210	50
ECI 180	18	4.400	300	140	180	230	50
ECI 210	21	8.600	245	170	210	270	65
ECI 240	24	16.00	230	200	240	310	65
ECI 310	33	26.000	200	270	310	400	65
ECI 340	36	31.000	190	300	340	440	65
ECI 360	39	33.500	180	320	360	460	65
ECI 400	45	45.000	175	360	400	500	65

The tracks where the cage is assembled must be perfectly true running. For ease of assembly, place the cage in the inner ring shaft, inserting the hold down screws between the circlip openings; if necessary, use the ejector threaded lateral holes for assembly.

Check the element rotating direction before starting the assembly.

The raceway must have a hardening and grinding coat depth of 1,5 to 2 mm; core resistance of at least 800N; RA medium roughness=0,006 mm; and 0,003 mm in 10 mm tapering.

If is advisable to make a chamber in the rings for ease of mounting.

### LUBRICATION

If the element has been designed to work in a free system with the elements already elevated, it does not need lubrication except a thin oil coat when assembling.

If a high number of performances is expected or if the elements are causing friction in free turn below the centrifugal elevating speed; then a proper lubrication with an hydraulic type oil of 4° to 6° Engler at 20° C, is required. The oil change is advisable, in the first assembly, after 100 hours' work and, later on every 2000 hours along with thorough check of the plug washers.

If the assembly works as an automatic overrunning clutch between two independent drives, when the rotating speed is reduced in order for the assembly to be dragged with the lowest speed element, the customer has to bear in mind that the speed must be smaller than 40 % of the driving speed by centrifugal force, in order to guarantee all the backstop elements contact and their readiness to block.

Please speak to our or engineers about other cage dimensions, other driving torques or other elevation speeds depending on the spring pressure against the backstop elements.

**We keep the right to make modifications for product improvements.**

