Innovation in Motion
TSUBAKI

CAM CLUTCH - FREEWHEEL & MECHANICAL COMPONENTS

CATALOGUE 4 | 2015

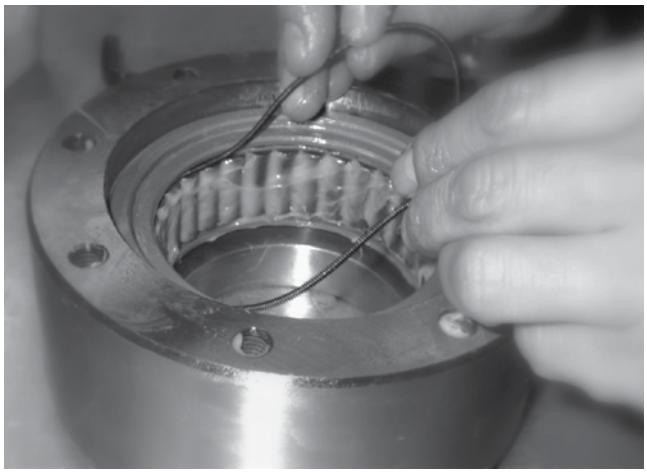
LEADING PRODUCTS AND EXCELLENT SERVICE

Tsubaki E&M is a member of the Industrial Power Transmission division of Tsubakimoto Chain Company in Japan. Through decades of research Tsubaki E&M engineers have developed and improved one way clutches from simple devices into the products they are today; high quality, high precision Cam Clutches designed to prevent reverse rotation and to ensure safety. In addition, Tsubaki E&M is the leading Japanese manufacturer for many types of couplings, overload protection devices, reducers and linear actuators.

Established in the 1960's, the Japanese manufacturing facilities are based in Okayama, Hyogo and Kyoto. Our facilities are the home to a group of highly experienced and dedicated engineers who are focused on developing this specialist product group and driven to delivering the best products possible for a wide variation of customers and applications.

Tsubaki E&M's product program of Cam Clutches is the most extensive available worldwide, covering all the European requirements and is compliant to international standards. From high and low speed overrunning applications to backstopping or high-precision indexing; Tsubakimoto has a Cam Clutch to match the application, even in the toughest operating conditions. Where a customer needs something just that bit more special, there he can rely on the wealth of experience of our engineers to develop a tailor made Cam Clutch from the drawing board up, and suited to specific requirements.

TSUBAKI care does not stop at the design and manufacture stage or even at the receipt of the product by the final customer. For products to fulfil their planned lifecycle TSUBAKI sees the initial installation, ongoing customer maintenance and aftercare support programs as one of the major support functions of a global manufacturer, with the ability to supply the services at a local level when the customer needs it. That is why TSUBAKI supports its customers and products with helpful advice and information through the sales, field engineering and technical support departments. With site surveys, inspection services and a host of support literature to ensure customers can successfully install, maintain and provide an aftercare service for the lifetime of their product.



Tsubakimoto Europe B.V. serves the Pan-European market, Africa and the Middle East. Our headquarters are located in Dordrecht, the Netherlands, serving Power Transmission customers. From the subsidiary office in Nottingham, Tsubaki UK serves the United Kingdom, Ireland and Iceland and from the office in Gilching, Germany customers in Germany, Austria and Switzerland are served. The TSUBAKI Group includes 46 production locations and 63 group companies worldwide. Our production and sales networks are now more developed than ever.

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INTRODUCTION TO TSUBAKI CAM CLUTCH - FREEWHEEL

TSUBAKI offers the most complete and versatile selection of one-way clutches in the global industry. Cam Clutches are precision devices which lock the inner- and outer races, through a wedging action of cams, to transmit torque in one direction of rotation and overrun in the opposite direction. These units are often referred to as freewheels, sprag clutches, overrunning clutches, backstops or one-way clutches, depending upon on the application for which they are used.

Design Features

Full Cam Complement
The full complement of cams provides the maximum number of load transmitting members per given diameter. The result is a higher torque capacity than other clutches.

Cam Design
Precision formed cams, made of special alloy steel assure extra long wear- and fatigue life.

High Quality Components
Outer- and inner races are made of high-quality alloy steel with high surface hardness and core toughness. The races are precision ground, providing excellent concentricity and surface finish to obtain accurate cam rotation.

BB Series
BB Series clutches have 62** ball bearing characteristics and dimensions. This provides easy handling and installation. Ideal for general applications in the light duty industry.

Bore Range: ø 15mm to 40mm
Torque Range: 29 to 260Nm

TSS Series
TSS Series clutches are designed for press fit installation. Outside dimensions are the same as 62** ball bearings. The design provides easy installation, whereas bearing support is compulsory.

Bore Range: ø 8mm to 60mm
Torque Range: 6 to 649Nm

TFS Series
TFS Series clutches are designed for press fit installation. Outside dimensions are the same as 63** ball bearings. TFS Clutches have two vertical key ways on the outer races. The usage of bearing support is compulsory.

Bore Range: ø 12mm to 80mm
Torque Range: 18 to 3924Nm

BSEU Series
BSEU Series clutches (backstops) are commonly used in backstop applications for inclined conveyors and bucket elevators at low r/min.

Bore Range: ø 20mm to 90mm
Torque Range: 216 to 4700Nm

MZEU Series
MZEU Series clutches are pre-lubricated with special grease and require no maintenance. Ideal for all applications. Can be used for overrunning, backstop and indexing applications.

Bore Range: ø 12mm to 150mm
Torque Range: 60 to 33800Nm

BREU Series
BREU Series clutches have cams with a Lift off function generated by centrifugal forces. Commonly they are used as backstops whilst the inner race overruns at high r/min.

Bore Range: ø 30mm to 150mm
Torque Range: 607 to 33908Nm

BR-HT Series
BR-HT Series clutches are High Torque version of existing BR Series. BR-HT is mainly used in backstop application for the inner race high-speed overrunning.

Bore Range: Ø 20mm to 320mm
Torque Range: 105 to 366000Nm

MDEU Series
MDEU Series clutches do not require any bearing support due to a cam/roller construction. They can replace various types of European clutches from the competition. Easy installation for sprockets, pulleys or gears making use of spiralox springs on the outer race. Commonly used in the light and middle duty industries.

Bore Range: ø 15mm to 80mm
Torque Range: 70 to 2300Nm

200 Series
200 Series clutches are designed for shaft mounted installation and pre-lubricated with special grease. Bearing support by means of two bearings is compulsory. Ideal for light-duty industry.

Bore Range: ø 16.5mm to 79.3mm
Torque Range: 39 to 1390Nm

INTRODUCTION TO TSUBAKI CAM CLUTCH - FREEWHEEL

MG Series

MG Series clutches are strictly used for low to medium speed inner race overrunning applications.

Bore Range: ø 19mm to 250mm
Torque Range: 314 to 176400Nm

LD Series

LD Series clutches are pre-lubricated with special grease and are maintenance-free. This type clutch permits easy installation and is ideal for the light-duty industry.

Bore Range: ø 10mm to 30mm
Torque Range: 5 to 49Nm

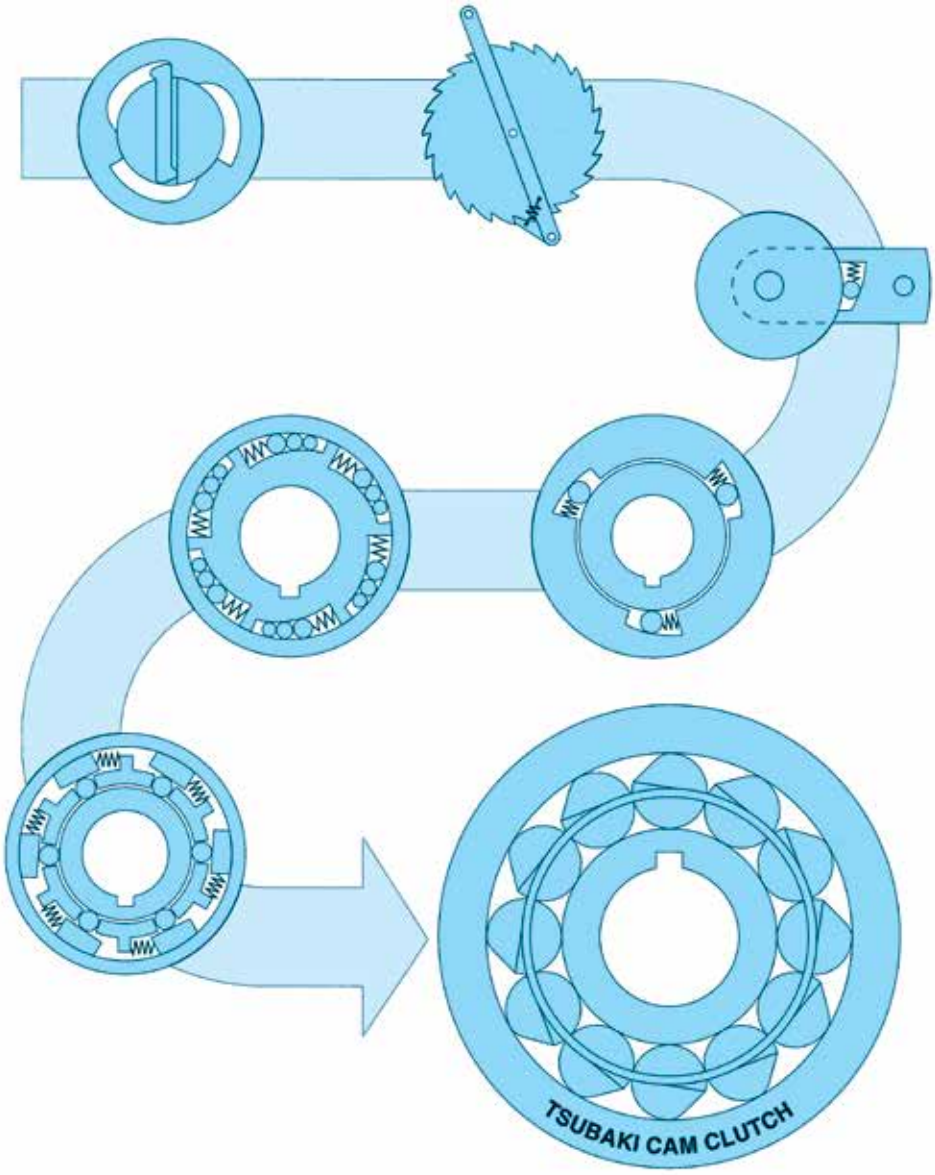
MZ/MZ-G Series

MZ Series clutches have the same features as MG Series, however can be used for any application. MZ-G Series clutches have ground outer races and are designed for "housing" installation. These clutches are pre-lubricated and therefore maintenance is not required.

Bore Range: ø 15mm to 70 mm
Torque Range: 186 to 3040Nm

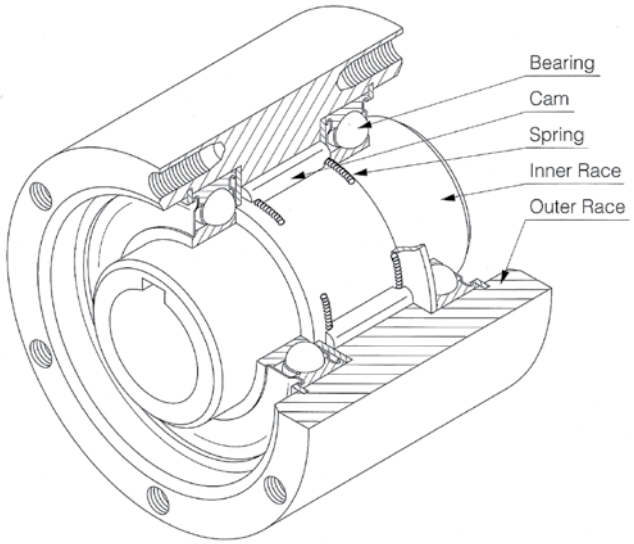
Taking Advantage of Differences in Rotating Direction and Speed

One-way clutches are efficient mechanical devices that utilize differences in axial rotating direction and the speed of rotation to prevent reverse rotation and ensure safety. In order to create a more reliable uni-directional clutch, engineers have spent many years developing and improving clutches, from the simple prop type, to the ratchet type and the roller type, and then culminating to the Cam Clutch, which has become the mainstream. The TSUBAKI Cam Clutch introduced here is a cam-type, one-way clutch that is the leading clutch of today.



INTRODUCTION TO TSUBAKI CAM CLUTCH - FREEWHEEL

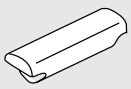
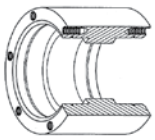
Standard Sprag Type Cam Clutch - Freewheel Construction



The figure shows a representative model from the MZ Series for explaining construction.

Major Component Parts

The major parts of the Cam Clutch are the cams, inner race, outer race, springs and bearings. Each of these parts play an important role in the function of the Cam Clutch. All parts are made of carefully selected materials, have undergone appropriate heat treatment, and have passed strict quality control checks.

Part	Appearance	Function
Cam		A number of cams set regularly in between the inner and outer races function as props or sliders depending on the relative rotating directions of the inner and outer races. This action causes engagement (clutching) and disengagement (overrunning) of the clutch inner and outer races. The cams are the vital component of a Cam Clutch, and they are available in various models and types to suit a variety of applications.
Inner Race Outer Race	 	The inner and outer sliding faces of the races are hardened and precision-ground into a perfectly round cylinder to enable them to withstand the compressive stress generated during engagement with the cam and sliding abrasion when overrunning.
Spring		Compressed springs are set at both ends of the cams to ensure that all of the cams contact the inner and outer races at all times. Thus, the cams are always ready for immediate engagement. This is extremely important so as to ensure that the load is spread evenly across all cams when they engage with the inner and outer races.
Bearing		The bearings maintain concentricity of the inner and outer races and bear the radial load for the engagement of the cams and the inner and outer races. Maintaining concentricity is particularly important to ensure that the load is spread equally and simultaneously over the cams at the time of engagement.

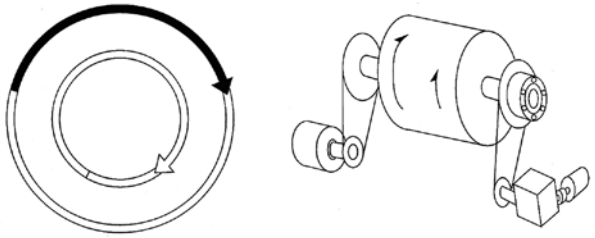
INTRODUCTION TO TSUBAKI CAM CLUTCH - FREEWHEEL

TSUBAKI Cam Clutches are precision devices which lock to transmit torque in one direction of rotation, but overrun (freewheel) in the opposite direction of rotation.
All the series of clutches utilize the same principles of operation. Since clutch applications encompass a variety of load and speed characteristics, TSUBAKI Cam Clutches are manufactured in a range of capacities and styles, which are designed to provide the best functional characteristics for performing in the following three basic modes of operation:

Modes of Operation

1. General overrunning

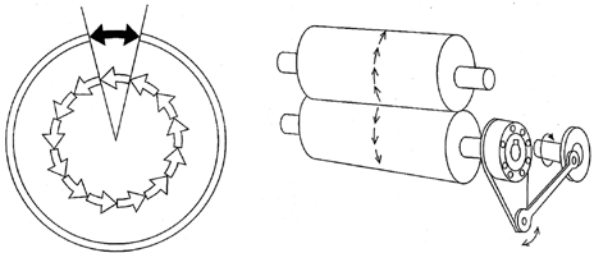
Clutches used in this type of application overrun at either the inner or outer race during the majority of the clutch operating time, and are occasionally called upon to lock up and drive. A typical application is a two-speed drive, where an electric motor and a geared motor are connected to a single driven shaft through one-way clutches. The machine can be driven by either the electric motor or geared motor. When the geared motor drives at low speed, the clutch engages. When the electric motor drives the machine, the clutch overruns. The clutch automatically switches between low speed and high speed.



General overrunning

2. Indexing

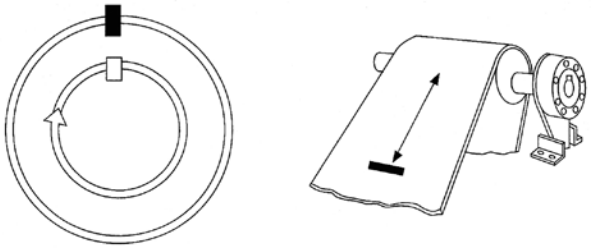
In this mode of operation, reciprocating motion applied to the driving race of the clutch is transformed into unidirectional intermittent motion, at the driven race. For example, on a feeding roller, the clutch is mounted on the roller and a torque arm is connected to the driving race of the clutch. A crank motion mechanism provides reciprocating motion to the driving race. The clutch drives in the forward stroke (index) and overruns on the return stroke, resulting in intermittent unidirectional motion of the feeding roller.



Indexing

3. Backstopping

In backstop applications, the clutches are used to prevent reverse rotation of drive shafts, which may cause damage to machinery and other expensive equipment. With the outer race of the clutch anchored stationary, the inner race can overrun freely in one direction of rotation. Reverse rotation is instantaneously prevented by the automatic engagement of the clutch. Typical backstop applications are in conveyor systems and gear reducers.



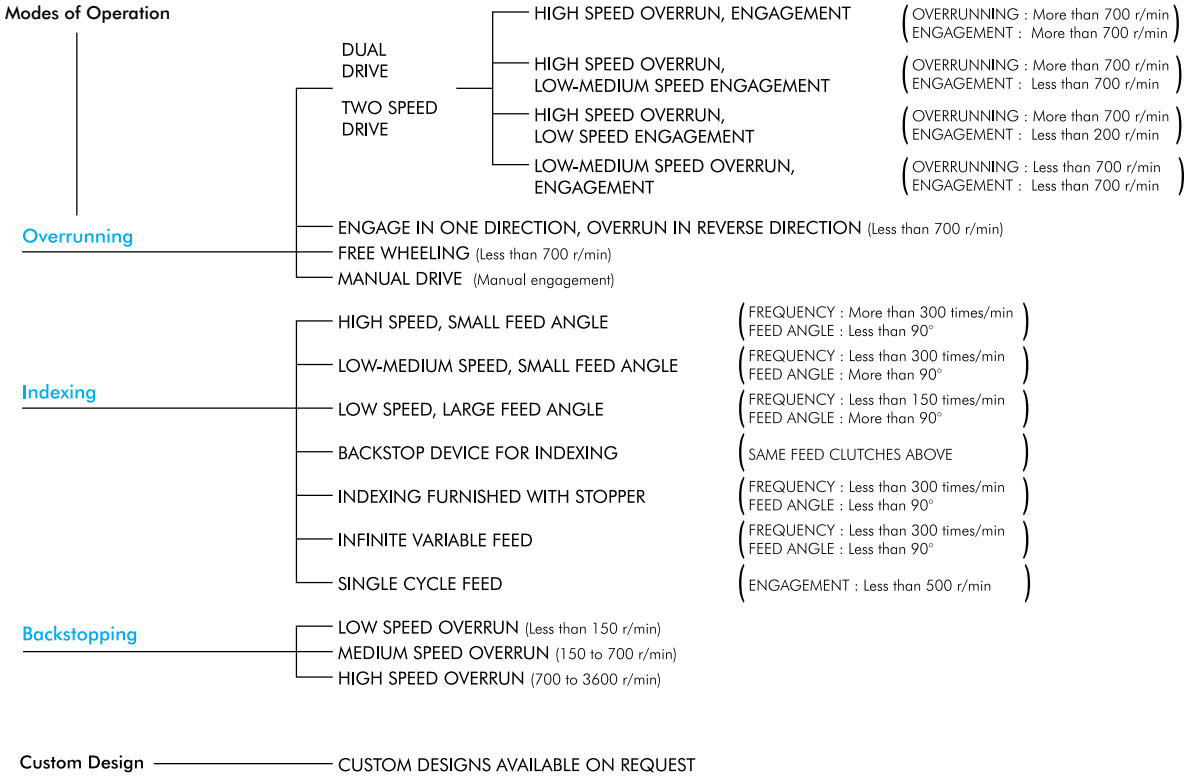
Backstopping

Typical Applications

- Air cleaning plants - Agricultural machines - Bucket elevators - Compressors - Conveyors - Cranes and hoists - Dry cleaning machinery - Duplicator equipment - Fish net machines	- Heat-treatment furnaces - Induced draft fans - Multi-state conveyors - Packaging machinery - Printing machinery - Pumps - Punch presses and feeders - Power plants	- Refinery equipment - Speed reducers - Standby power units - Textile looms - Two-speed grinders - Two-speed shiftovers - Washing machines - Wire winding machinery

INTRODUCTION TO TSUBAKI CAM CLUTCH - FREEWHEEL

Cam Clutch - Freewheel Selection Chart



Series Selection

Overrunning

o: Suitable ⊙: Most Suitable

Application \ Series		BB	TSS	TFS	BSEU	MZEU	BREU	BR-HT	MDEU	200	MG	LD	MZ/MZ-G
Dual Drive	High Speed Overrun, Engage					o							o
	High Speed Overrun, Low Medium Speed Engage					o							⊙
Two Speed Drive	High Speed Overrun, Low Speed Engage					o	⊙						⊙
	Low Medium Speed, Engage	o	o	o	o	⊙			o	o	o	o	⊙
Engage in One-way direction, overrun in reverse direction		o	o	o	o	⊙			o	o	o	o	⊙
Free Wheeling		o	o	o		⊙			o	o	o	o	⊙
Manual Drive		o	o	o		o			o	o		⊙	o

Indexing

High Speed, Small Feed Angle													
Low-Medium Speed, Small Feed Angle	o	o	o		o			o	o	o	o		
Low Speed, Large Feed Angle													
Backstop Device for Indexing	o	o	o		o			o	o	o	o		
Indexing Furnished with Stopper	Please contact TSUBAKI												
Infinite Variable Feed	o	o	o		o			o	o		o		
Single Cycle Feed													

Backstopping

Low Speed Overrun	o	o	o	⊙	o			o	o	o	o		
Medium Speed Overrun	o	o	o		o		o		o	o			
High Speed Overrun	⊙	⊙	⊙		o	⊙	⊙						

Custom Design	Custom Design available on Request

BB Series

BB-1K-K Series

BB-2K-K Series

BB-2GD Series

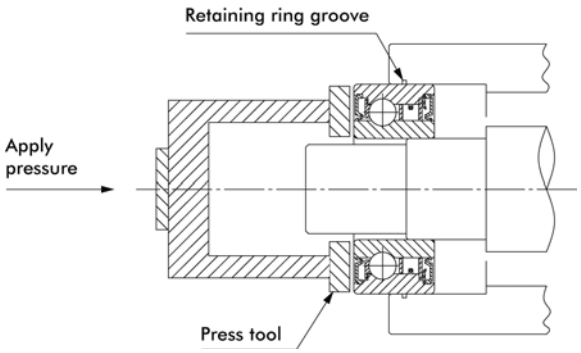
BB-2GD 1K-K Series

General Information of Installation and Usage for BB Series Cam Clutch / One-Way Bearing

1. BB Series Cam Clutches are designed for press fit installation.
2. Keyways except BB25 are manufactured according to DIN6885.3. BB40-1K-K and BB40-2GD 1K-K are manufactured according to DIN6885.1.
3. BB-2K-K Series have keyways on inner- and outer race. Inner race keys for 1K-K and 2K-K Cam Clutches are included.
4. Correct interference dimensions on shaft and housing must be maintained to obtain maximum bearing and clutch performance.
5. Refer to the table on next page for shaft- and housing tolerances.
6. BB-2GD and BB-2GD 1K-K Cam Clutches have special lip seals for the effective protection against dust and splash water.
7. The arrow on the inner race shows the direction of inner race engagement.
8. For installation of the clutch use a press tool with an appropriate diameter to ensure even pressure over the entire surface of inner and outer race.
9. Never use a hammer or apply any other shock load to the clutch.
10. Make sure that the housing has enough strength to withstand the pressure required for the press fit installation of the clutch.
11. Operating temperature range: -30°C to +100°C (Consult Tsubaki for temperatures which exceed this range).

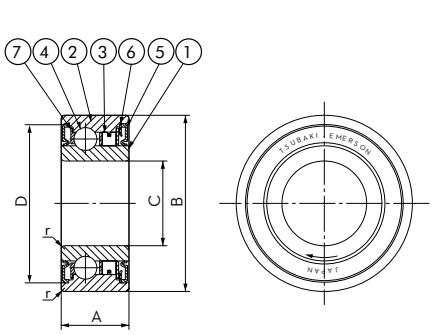
Lubrication

1. BB Series Cam Clutches are pre-lubricated with special grease and do not need any maintenance or additional grease before use.
2. If the clutch is used with an oil lubricant, the oil must be applied on the inside of the clutch as well.
3. Never use oil or any other lubricant containing EP additives.

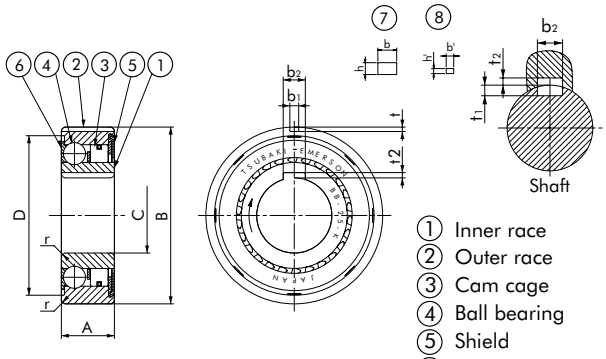


Note:
The indication "K" on the inner race of a clutch is applied for both types 1K as well as 2K

BB SERIES CAM CLUTCH



① Inner race
② Outer race
③ Cam cage
④ Ball bearing
⑤ Seal
⑥ Side plate
⑦ Retainer



① Inner race
② Outer race
③ Cam cage
④ Ball bearing
⑤ Shield
⑥ Retainer
⑦ Key for inner race
⑧ Key for outer race

BB, BB-1K-K, BB-2K-K, BB-2GD, BB-2GD 1K-K

Dimensions in mm

Model	Torque Capacity Nm	Max. Overrunning Speed		Drag Torque Nm		A		B	C	D		r	Bearing Loads		Approx. Mass g/pc	
		Inner Race r/min	Outer Race r/min	BB BB-1K-K BB-2K-K	BB-2GD BB-2GD 1K-K	BB BB-1K-K BB-2K-K	BB-2GD BB-2GD 1K-K			BB BB-1K-K BB-2K-K	BB-2GD BB-2GD 1K-K		C N	Co N	BB BB-1K-K BB-2K-K	BB-2GD BB-2GD 1K-K
BB15	29	3600	2000	0.010	0.040	11	16	35	15	32.6	32.45	0.6	5950	3230	50	70
BB17	43	3500	1900	0.010	0.050	12	17	40	17	36.1	36.45	0.6	7000	3700	80	100
BB20	61	3000	1600	0.014	0.055	14	19	47	20	41.7	42.35	1.0	8500	4900	120	150
BB25	78	2500	1400	0.017	0.055	15	20	52	25	47.1	47.05	1.0	10700	6300	150	200
BB30	140	2000	1100	0.030	0.058	16	21	62	30	56.6	55.60	1.0	11900	7900	230	280
BB35	173	1800	1000	0.034	0.060	17	22	72	35	64.0	64.60	1.1	13500	9700	320	410
BB40	260	1800	900	0.040	0.080	22	27	80	40	71.0	71.60	1.1	14500	11700	400	600

Model		Shaft Diameter	Housing Diameter
BB15	BB15-2GD	15 +0.023 +0.012	35 -0.012 -0.028
BB17	BB17-2GD	17 +0.023 +0.012	40 -0.012 -0.028
BB20	BB20-2GD	20 +0.028 +0.015	47 -0.012 -0.028
BB25	BB25-2GD	25 +0.028 +0.015	52 -0.014 -0.033
BB30	BB30-2GD	30 +0.028 +0.015	62 -0.014 -0.033
BB35	BB35-2GD	35 +0.033 +0.017	72 -0.014 -0.033
BB40	BB40-2GD	40 +0.033 +0.017	80 -0.014 -0.033

Model		Shaft Diameter	Housing Diameter
BB15-1K-K	BB15-2GD 1K-K	15 -0.008 -0.028	35 -0.012 -0.028
BB17-1K-K	BB17-2GD 1K-K	17 -0.008 -0.028	40 -0.012 -0.028
BB20-1K-K	BB20-2GD 1K-K	20 -0.010 -0.031	47 -0.012 -0.028
BB25-1K-K	BB25-2GD 1K-K	25 -0.010 -0.031	52 -0.014 -0.033
BB30-1K-K	BB30-2GD 1K-K	30 -0.010 -0.031	62 -0.014 -0.033
BB35-1K-K	BB35-2GD 1K-K	35 -0.012 -0.037	72 -0.014 -0.033
BB40-1K-K	BB40-2GD 1K-K	40 -0.012 -0.037	80 -0.014 -0.033

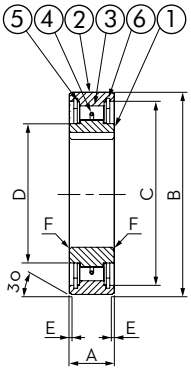
Model	Shaft Diameter	Housing Diameter
BB15-2K-K	15 -0.008 -0.028	35 -0.002 -0.018
BB17-2K-K	17 -0.008 -0.028	40 -0.002 -0.018
BB20-2K-K	20 -0.010 -0.031	47 -0.003 -0.022
BB25-2K-K	25 -0.010 -0.031	52 -0.003 -0.022
BB30-2K-K	30 -0.010 -0.031	62 -0.003 -0.022
BB35-2K-K	35 -0.012 -0.037	72 -0.006 -0.025
BB40-2K-K	40 -0.012 -0.037	80 -0.006 -0.025

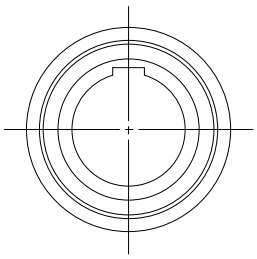
Model		Keyway					Inner Race Key b x h x length	Outer Race Key b' x h' x length
		b_2 js10	t_1	t_2	b_1 js9	t		
BB15-1K-K	BB15-2GD 1K-K	5.0	1.9	1.2	-	-	5 x 3 x 11	-
BB15-2K-K	-				2.0	0.6		2 x 2 x 11
BB17-1K-K	BB17-2GD 1K-K	5.0	1.9	1.2	-	-	5 x 3 x 12	-
BB17-2K-K	-				2.0	1.0		2 x 2 x 12
BB20-1K-K	BB20-2GD 1K-K	6.0	2.5	1.6	-	-	6 x 4 x 14	-
BB20-2K-K	-				3.0	1.5		3 x 3 x 14
BB25-1K-K	BB25-2GD 1K-K	8.0	3.6	1.5	-	-	8 x 5 x 15	-
BB25-2K-K	-				6.0	2.0		6 x 4 x 15
BB30-1K-K	BB30-2GD 1K-K	8.0	3.1	2.0	-	-	8 x 5 x 16	-
BB30-2K-K	-				6.0	2.0		6 x 4 x 16
BB35-1K-K	BB35-2GD 1K-K	10.0	3.7	2.4	-	-	10 x 6 x 17	-
BB35-2K-K	-				8.0	2.5		8 x 5 x 17
BB40-1K-K	BB40-2GD 1K-K	12.0	5.0	3.3	-	-	12 x 8 x 22	-
BB40-2K-K	-				10.0	3.0		10 x 6 x 22

Note:

For BB25-1K-K, BB25-2K-K and BB25-2GD 1K-K the dimension of t2 is 0.5 mm shallower than DIN 6885.3. To use a DIN standard key, process the keyway 0.5 mm deeper on the shaft than according to DIN standard. All other models are dimensionally interchangeable.

TSS SERIES CAM CLUTCH





① Inner race
② Outer race
③ Cam
④ Spring
⑤ Plate
⑥ Snap ring

TSS

Dimensions in mm

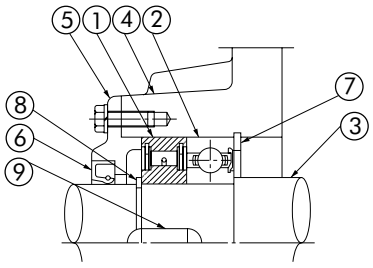
Model	Torque Capacity Nm	Max. Overrunning Speed Inner Race r/min	Max. Overrunning Speed Outer Race r/min	Drag Torque Nm	Bore Size H7	Inner Race Keyway	A	B	C	D	E	F	Approx. Mass g/pc
TSS8	6.7	6000	3000	0.005	8	2 x 1.0	8	24	22.2	11.4	0.6	0.6	14
TSS10	12	4500	2300	0.007	10	3 x 1.4	9	30	27	15.6	0.6	0.6	27
TSS12	17	4000	2000	0.009	12	4 x 1.8	10	32	29.5	18	0.6	0.6	31
TSS15	22	3500	1800	0.01	15	5 x 1.2	11	35	32	20.6	0.6	0.6	39
TSS20	41	2600	1300	0.01	20	6 x 1.6	14	47	40	26.7	0.8	0.8	115
TSS25	56	2200	1100	0.02	25	8 x 2.0	15	52	45	32	0.8	0.8	140
TSS30	105	1800	900	0.03	30	8 x 2.0	16	62	55	40	0.8	1.0	215
TSS35	136	1600	800	0.03	35	10 x 2.4	17	72	63	45	0.8	1.0	300
TSS40	296	1400	700	0.18	40	12 x 2.2	18	80	72	50	0.8	1.0	425
TSS45	347	1300	650	0.21	45	14 x 2.1	19	85	75.5	57	1.2	1.0	495
TSS50	403	1200	600	0.22	50	14 x 2.1	20	90	82	62	1.2	1.0	545
TSS60	649	910	460	0.33	60	18 x 2.3	22	110	100	80	1.2	1.5	950

Installation and Usage

1. TSS Series Cam Clutches are designed for press fit installation. Correct interference dimensions must be maintained to obtain maximum clutch performance. The internal diameter of the housing should meet a H7 tolerance.
2. To avoid any radial force and when installing the clutch, the usage of a type 62** bearing is compulsory, since this clutch type does not have any bearing support.
3. Confirm the direction of rotation before installing.
4. The recommended shaft tolerance is h7 and the key profile should be in accordance with the following standards:
   TSS 8 ~ 12 DIN6885.1
   TSS 15 ~ 60 DIN6885.3
5. Suitable surface pressure of the key should be selected according to your company design standards.

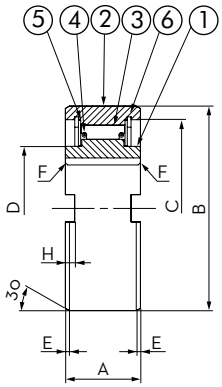
Lubrication

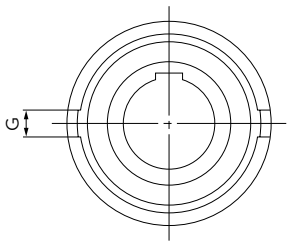
1. Oil lubrication is recommendable.
2. Never use oil or any other lubricant containing EP additives.



① TSS Cam Clutch
② Bearing
③ Shaft
④ Housing
⑤ Cover
⑥ Oil Seal
⑦ Snap ring (Hole)
⑧ Snap ring (Shaft)
⑨ Key

TFS SERIES CAM CLUTCH





① Inner race
② Outer race
③ Cam
④ Spring
⑤ Plate
⑥ Snap ring

TFS

Dimensions in mm

Model	Torque Capacity Nm	Max. Overrunning Speed Inner Race r/min	Max. Overrunning Speed Outer Race r/min	Drag Torque Nm	Bore Size H7	Inner Race Keyway	A	B	C	D	E	F	G	H	Approx. Mass g/pc
TFS12	18	4500	2300	0.04	12	4 x 1.8	13	35	30	18	0.6	0.3	4	1.4	68
TFS15	28	3500	1800	0.06	15	5 x 1.2	18	42	36	22	0.8	0.3	5	1.8	120
TFS17	50	3200	1600	0.11	17	5 x 1.2	19	47	38	22	1.2	0.8	5	2.3	150
TFS20	84	2500	1300	0.18	20	6 x 1.6	21	52	45	27	1.2	0.8	6	2.3	220
TFS25	128	2000	1000	0.19	25	8 x 2.0	24	62	52	35	1.2	0.8	8	2.8	360
TFS30	200	1600	800	0.21	30	8 x 2.0	27	72	62	40	1.8	1.0	10	2.5	530
TFS35	475	1400	700	0.42	35	10 x 2.4	31	80	70	48	1.8	1.0	12	3.5	790
TFS40	607	1300	650	0.46	40	12 x 2.2	33	90	78	54.5	1.8	1.0	12	4.1	1050
TFS45	756	1100	550	0.56	45	14 x 2.1	36	100	85.3	59	1.8	1.0	14	4.6	1370
TFS50	1124	1000	500	0.60	50	14 x 2.1	40	110	92	65	1.8	1.0	14	5.6	1900
TFS60	1975	840	420	0.87	60	18 x 2.3	46	130	110	84	2.6	1.5	18	5.5	3110
TFS70*	2514	750	380	0.91	70	20 x 2.7	51	150	125	91	2.6	1.5	20	6.9	4390
TFS80*	3924	670	340	1.22	80	22 x 3.1	58	170	140	100	2.6	1.5	20	7.5	6440

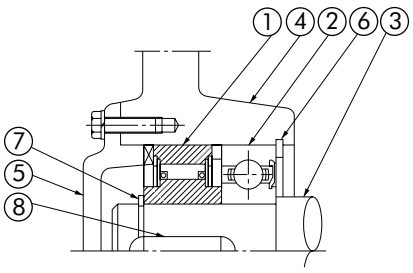
*= Non-stock item

Installation and Usage

1. TSS Series Cam Clutches are designed for press fit installation. Correct interference dimensions must be maintained to obtain maximum clutch performance. The internal diameter of the housing should meet a H7 tolerance. Keyways should be made in the end faces of the clutch for proper installation.
2. To avoid any radial force and when installing the clutch, the usage of a type 63** bearing is compulsory, since this clutch type does not have any bearing support.
3. Confirm the direction of rotation before installing. Clutch rotation is indicated by the arrow shown on the clutch plate.
4. The recommended shaft tolerance is h7 and the key profile should be in accordance with the following standards:
   TFS 12 DIN6885.1
   TFS 15 to 80 DIN6885.3
5. Suitable surface pressure of the key should be selected according to your company design standards.

Lubrication

1. Oil lubrication is recommendable.
2. Never use oil or any other lubricant containing EP additives.



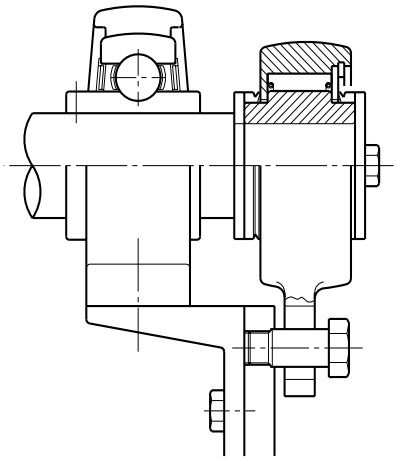
① TFS Cam Clutch
② Bearing
③ Shaft
④ Housing
⑤ Cover
⑥ Snap ring (Hole)
⑦ Snap ring (Shaft)
⑧ Key

General Information

The Tsubaki Backstop Cam Clutch, a one-way clutch with the safest reverse rotation prevention qualities available, is manufactured mainly for installation on the low speed shaft of inclined conveyors or bucket elevators.

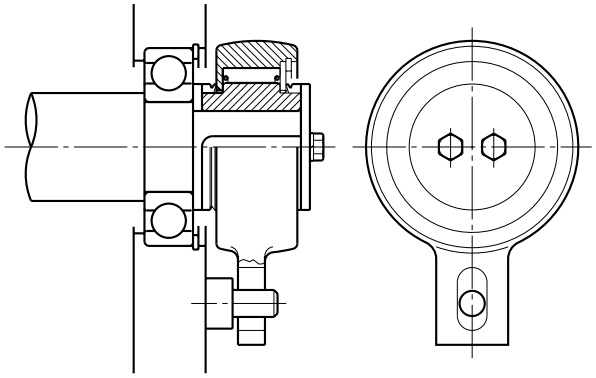
Compared to other one-way clutches (ratchet or roller ramp clutch) similar in size, overheating during times when the motor is idling is significantly lower. This helps maintain superb lubrication qualities thereby improving the wear life of the clutch. Extended fatigue life is also obtainable due to the clutch's large torque capacity.

European style BSEU Series can be used as reverse rotation prevention for an array of conveyor sizes. Applicable shaft sizes range from ø20 ~ ø90mm and torque range from 216 ~ 4700Nm.



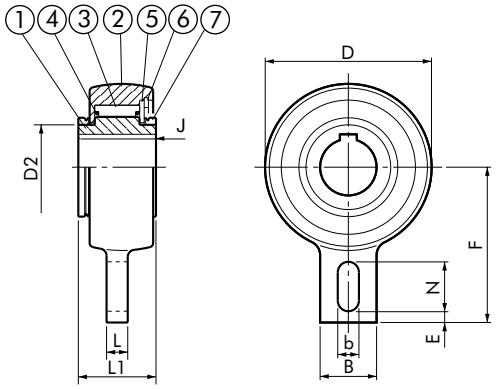
Installation example 1

Other Possible Applications:
BSEU Series Cam Clutches may also be used for low frequency indexing applications. A maximum indexing frequency of no more than 50 cycles/min. and a safety ratio of 2.5 times higher than the working torque are required. Be sure that the stress applied to the torque arm functions at a right angle in relation to the shaft direction. If the stress that is applied to the torque arm is set diagonally, the inner parts of the clutch will entangle causing damage and drastically reduce the operational life of the Cam Clutch.



Installation example 2

BSEU SERIES CAM CLUTCH



1. Inner race
2. Outer race
3. Cam
4. Spring
5. Plate
6. Snap ring
7. V-ring

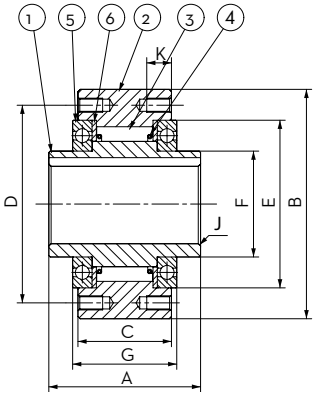
BSEU

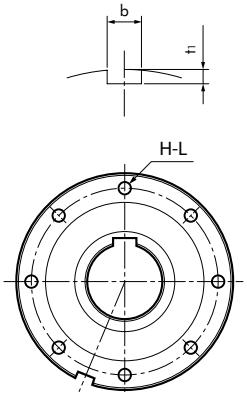
Dimensions in mm

Model	Torque Capacity Nm	Max. Overrun. r/min	Bore Size H7	Inner Race Keyway	D	D2	L1	L	B	F	b	N	E	J	Approx. Mass kg/pc
BSEU25-20	216	500	20	6 x 2.8	83	42	35	12	40	90	15	35	5	1.5	1.00
BSEU25-25	216	500	25	8 x 3.3	83	42	35	12	40	90	15	35	5	1.5	0.95
BSEU40-20	1440	450	20	6 x 2.8	118	60	55	15	40	110	15	35	8	1.5	3.73
BSEU40-25	1440	450	25	8 x 3.3	118	60	55	15	40	110	15	35	8	1.5	3.65
BSEU40-30	1440	450	30	8 x 3.3	118	60	55	15	40	110	15	35	8	1.5	3.56
BSEU40-35	1440	450	35	10 x 3.3	118	60	55	15	40	110	15	35	8	1.5	3.45
BSEU40-40	1440	450	40	12 x 3.3	118	60	55	15	40	110	15	35	8	1.5	3.32
BSEU70-45	3140	350	45	14 x 3.8	165	90	59	20	80	140	18	35	10	1.5	7.44
BSEU70-50	3140	350	50	14 x 3.8	165	90	59	20	80	140	18	35	10	1.5	7.28
BSEU70-55	3140	350	55	16 x 4.3	165	90	59	20	80	140	18	35	10	2.0	7.09
BSEU70-60	3140	350	60	18 x 4.4	165	90	59	20	80	140	18	35	10	2.0	6.88
BSEU70-65	3140	350	65	18 x 4.4	165	90	59	20	80	140	18	35	10	2.0	6.68
BSEU70-70	3140	350	70	20 x 4.9	165	90	59	20	80	140	18	35	10	2.0	6.43
BSEU90-75	4700	250	75	20 x 4.9	190	120	63	20	80	165	20	40	15	2.0	10.10
BSEU90-80	4700	250	80	22 x 5.4	190	120	63	20	80	165	20	40	15	2.0	9.82
BSEU90-85	4700	250	85	22 x 5.4	190	120	63	20	80	165	20	40	15	2.0	9.57
BSEU90-90	4700	250	90	25 x 5.4	190	120	63	20	80	165	20	40	15	2.0	9.23

Installation and Usage

1. We recommend using a shaft tolerance of h7 or h8 for Cam Clutch installation.
2. ISO R773 (DIN6885.1) keyway is standard.
3. Before installation, verify that the direction of rotation of the inner race of the Cam Clutch (shown by the arrow on the inner race) is the same as the direction of rotation of the conveyor shaft.
4. When installing the Cam Clutch on the shaft, apply pressure only on the surface of the inner race with a soft hammer. Never strike the Cam Clutch with a steel hammer or apply unnecessary impact loads.
5. Always use a parallel key for installation onto the shaft and then fix the Cam Clutch with an end plate. Never use a tapered key. Allow for a clearance between the top of the clutch keyway and the top of the key for pressure ventilation. A pressure ventilation hole is provided on the keyway of the clutch's inner race.
6. Use the frame or a pin to eliminate outer race rotation.
7. Set a 0.5 mm degree clearance between the torque arm and the frame (torque arm stopper) or the long slit in the torque arm and the pin. If the torque arm is rigidly mounted, it will apply a load to the Cam Clutch which may damage it.
8. The Cam Clutch is pre-greased with low temperature grease before shipment and is ready for installation and operation. No lubrication maintenance is required. The ambient operational temperature range is -40°C to +50°C. However, the maximum temperature should be determined depending on the number of shaft revolutions. Further, if the number of shaft revolutions is low, a higher ambient operational temperature range is allowable. Consult Tsubaki for more details.





① Inner race
② Outer race
③ Cam
④ Spring
⑤ Bearing
⑥ Side plate

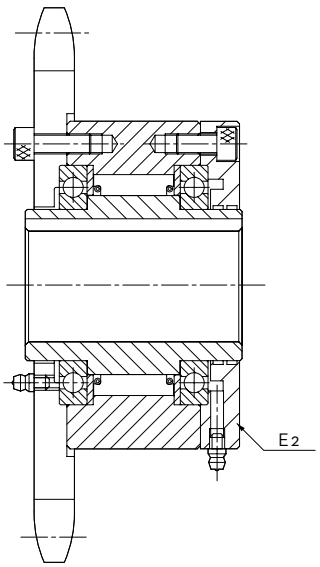
MZEU-K

Dimensions in mm

Model	Torque Capacity Nm	Max. Overrunning Speed Inner Race r/min	Max. Overrunning Speed Outer Race r/min	Drag Torque Nm	Bore Size H7	Inner Race Keyway	A	B h7	C	D	E	F	G	H-L	K	J	Outer Race Keyway b P10	Outer Race Keyway t1	Approx. Mass kg/pc
MZEU12-K	60	2000	1000	0.20	12	4 x 1.8	42	62	20	51	42	20	27	3 - ø5.5	-	0.8	4 x	2.5	0.5
MZEU15-K	100	1800	900	0.20	15	5 x 2.3	52	68	28	56	47	25	32	3 - M5	8	0.8	5 x	3.0	0.8
MZEU20-K	245	1600	700	0.29	20	6 x 2.8	57	75	34	64	55	30	39	4 - M5	8	0.8	6 x	3.5	1.2
MZEU25-K	425	1600	600	0.33	25	8 x 3.3	60	90	35	78	68	40	40	4 - M6	10	0.8	8 x	4.0	1.8
MZEU30-K	735	1500	500	0.39	30	8 x 3.3	68	100	43	87	75	45	48	6 - M6	10	1.0	8 x	4.0	2.6
MZEU35-K	1015	1400	300	0.49	35	10 x 3.3	74	110	45	96	80	50	51	6 - M6	12	1.0	10 x	5.0	3.2
MZEU40-K	1350	1400	300	0.59	40	12 x 3.3	86	125	53	108	90	55	59	6 - M8	14	1.3	12 x	5.0	4.8
MZEU45-K	1620	1400	300	0.69	45	14 x 3.8	86	130	53	112	95	60	59	8 - M8	14	1.3	14 x	5.5	6.2
MZEU50-K	2070	1300	250	0.79	50	14 x 3.8	94	150	64	132	110	70	72	8 - M8	14	1.3	14 x	5.5	8.2
MZEU55-K	2400	1300	250	0.88	55	16 x 4.3	104	160	66	138	115	75	72	8 - M10	16	1.5	16 x	6.0	9.5
MZEU60-K	2950	1200	250	0.98	60	18 x 4.4	114	170	78	150	125	80	89	10 - M10	16	1.5	18 x	7.0	12.3
MZEU70-K	4210	1100	250	1.27	70	20 x 4.9	134	190	95	165	140	90	108	10 - M10	16	1.8	20 x	7.5	18.1
MZEU80-K	5170	800	200	1.38	80	22 x 5.4	144	210	100	185	160	105	108	10 - M10	16	1.8	22 x	9.0	23.1
MZEU90-K	12000	450	150	4.70	90	25 x 5.4	158	230	115	206	180	120	125	10 - M12	20	2.0	25 x	9.0	28.1
MZEU100-K	17600	400	130	5.39	100	28 x 6.4	182	270	120	240	210	140	131	10 - M16	24	2.0	28 x	10.0	46.3
MZEU130-K	24500	320	110	6.76	130	32 x 7.4	212	310	152	278	240	160	168	12 - M16	24	2.5	32 x	11.0	70.2
MZEU150-K	33800	240	80	8.13	150	36 x 8.4	246	400	180	360	310	200	194	12 - M20	32	2.5	36 x	12.0	146.3

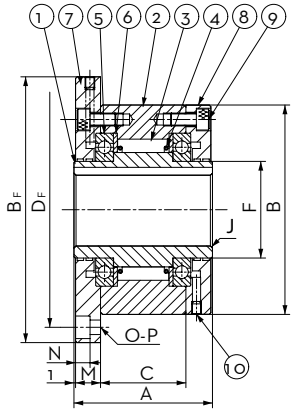
Installation and Usage

1. The sizes MZEU12-K up to MZEU 80-K are supplied pre-greased ex-works and do not need any further lubrication except some light maintenance as shown on page 24, to ensure an appropriate function of the lateral roller bearings.
2. The ambient temperature range is -40°C to +40°C. For higher range temperatures please consult Tsubaki.
3. The sizes MZEU90-K up to MZEU 150-K require oil lubrication.
4. We recommend a shaft tolerance of h7 with a standard key. Our keyways are standardized according to DIN 6885.1.
5. We recommend applying tolerance H7 or H8 to re-work sprockets, pulley, gears or other parts to be fitted. Before installation of the clutch, it's recommended to clean both ends of the outer race and contact surface of the flange(s), torque arm, cover or fitted part.
6. For the sizes MZEU90-K up to MZEU150-K, apply seal adhesive (supplied with each optional part) to prevent oil leakage.
7. Before assembly of the optional or fitted part(s) check the rotation direction of the clutch, indicated by an arrow on the inner race side surface. When installing sprocket, gear, pulley or other items to the clutch, always use bolts to assemble them.
8. Size and quantity are mentioned under H-L in the above mentioned table.
9. By installing any type of optional or fitted part in the opposite way the clutch's direction of rotation can be changed.
10. Fix a grease nipple to each optional or fitted part.
11. When mounting the clutch onto the shaft, apply pressure to the inner race, but **never** to the outer race.
12. For high speed indexing applications (over 50 cycle/min) strong springs are recommendable and can be supplied accordingly.



Installation example 1

MZEU-K SERIES CAM CLUTCH



1. Inner race
2. Outer race
3. Cam
4. Spring
5. Bearing
6. Side plate
7. E1 Flange
8. E2 Flange
9. Socket bolt
10. Set screw

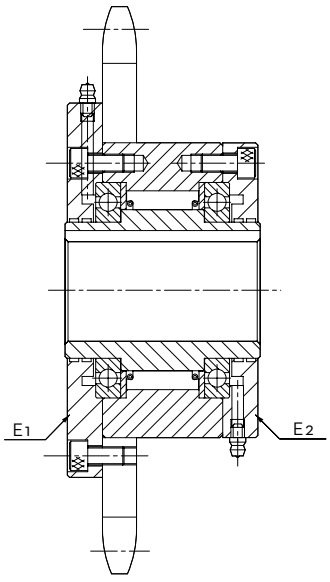
E1 Flange + E2 Flange

Dimensions in mm

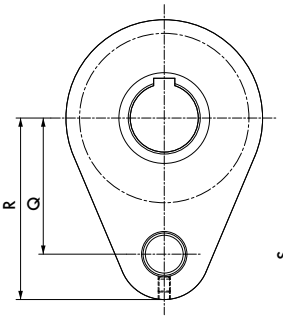
Model	Bore Size H7	Inner Race Keyway	A	B h7	B_F	C	D_F	F	J	M	N	O-P	Approx. Mass kg/pc
MZEU12-K E1+E2	12	4 x 1.8	42	62	85	20	72	20	0.8	10.0	5.7	3 – ø5.5	1.1
MZEU15-K E1+E2	15	5 x 2.3	52	68	92	28	78	25	0.8	11.0	5.7	3 – ø5.5	1.5
MZEU20-K E1+E2	20	6 x 2.8	57	75	98	34	85	30	0.8	10.5	5.7	4 – ø5.5	1.9
MZEU25-K E1+E2	25	8 x 3.3	60	90	118	35	104	40	0.8	11.5	6.8	4 – ø6.6	2.9
MZEU30-K E1+E2	30	8 x 3.3	68	100	128	43	114	45	1.0	11.5	6.8	6 – ø6.6	4.0
MZEU35-K E1+E2	35	10 x 3.3	74	110	140	45	124	50	1.0	13.5	6.8	6 – ø6.6	5.2
MZEU40-K E1+E2	40	12 x 3.3	86	125	160	53	142	55	1.3	15.5	9.0	6 – ø9.0	7.9
MZEU45-K E1+E2	45	14 x 3.8	86	130	165	53	146	60	1.3	15.5	9.0	8 – ø9.0	9.3
MZEU50-K E1+E2	50	14 x 3.8	94	150	185	64	166	70	1.3	14.0	9.0	8 – ø9.0	11.7
MZEU55-K E1+E2	55	16 x 4.3	104	160	204	66	182	75	1.5	18.0	11.0	8 – ø11.0	15.3
MZEU60-K E1+E2	60	18 x 4.4	114	170	214	78	192	80	1.5	17.0	11.0	10 – ø11.0	17.7
MZEU70-K E1+E2	70	20 x 4.9	134	190	234	95	212	90	1.8	18.5	11.0	10 – ø11.0	25.5
MZEU80-K E1+E2	80	22 x 5.4	144	210	254	100	232	105	1.8	21.0	11.0	10 – ø11.0	33.2
MZEU90-K E1+E2	90	25 x 5.4	158	230	278	115	254	120	2.0	20.5	13.0	10 – ø14.0	38.3
MZEU100-K E1+E2	100	28 x 6.4	182	270	335	120	305	140	2.0	30.0	17.5	10 – ø18.0	68.8
MZEU130-K E1+E2	130	32 x 7.4	212	310	380	152	345	160	2.5	29.0	17.5	12 – ø18.0	98.2
MZEU150-K E1+E2	150	36 x 8.4	246	400	485	180	445	200	2.5	32.0	21.5	12 – ø22.0	198.2

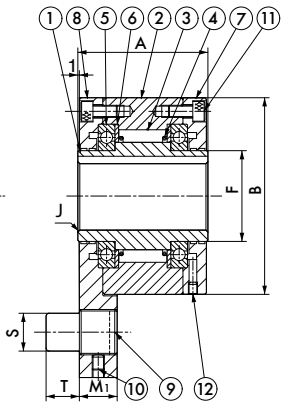
Installation and Usage

1. The Cam Clutch is delivered as a combination of a basic type clutch, an E1 flange and an E2 flange, each one packed and supplied as an individual part set.
   Each flange set comes with a complete flange kit, containing a number of bolts, a grease nipple, a locker set screw and a seal plug.
2. Check the direction of rotation before assembling, then mount both flanges making use of the flange kits.
3. Before mounting the sizes MZEU90-K to MZEU150-K apply the sealing adhesive, which comes along with the part sets, between body (outer race surface) and the optional part, to prevent leakage of oil during operation.
4. When installing sprocket, gear, pulley or other items to the clutch, always use bolts to assemble them. Size and quantity are mentioned under H-L, page 17. Lengths and shape are determined by the thickness of the fitted part.
5. When installing any type of optional or fitted part in the opposite way the direction of the clutch's rotation can be changed.
6. For high speed indexing applications (over 50 cycle/min) strong springs are recommended and can be supplied accordingly.



Installation example 2





1. Inner race
2. Outer race
3. Cam
4. Spring
5. Bearing
6. Side plate
7. E2 Flange
8. E3 Torque arn
9. Pin
10. Set screw
11. Socket bolt
12. Set screw

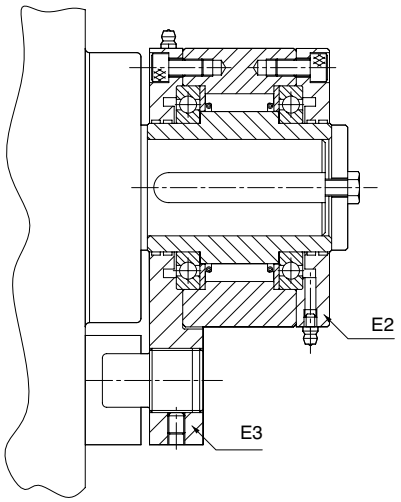
E2 Flange + E3 Torque Arm

Dimensions in mm

Model	Bore Size H7	Inner Race Keyway	A	B h7	F	J	M1	Q	R	S	T	Approx. Mass kg/pc
MZEU12-K E2+E3	12	4 x 1.8	42	62	20	0.8	13.5	44	59	10	10	1.0
MZEU15-K E2+E3	15	5 x 2.3	52	68	25	0.8	13.5	47	62	10	10	1.4
MZEU20-K E2+E3	20	6 x 2.8	57	75	30	0.8	15.0	54	72	12	11	1.8
MZEU25-K E2+E3	25	8 x 3.3	60	90	40	0.8	19.0	62	84	16	14	2.7
MZEU30-K E2+E3	30	8 x 3.3	68	100	45	1.0	19.0	68	92	16	14	4.1
MZEU35-K E2+E3	35	10 x 3.3	74	110	50	1.0	22.0	76	102	20	18	5.1
MZEU40-K E2+E3	40	12 x 3.3	86	125	55	1.3	22.0	85	112	20	18	7.4
MZEU45-K E2+E3	45	14 x 3.8	86	130	60	1.3	25.0	90	120	25	22	9.1
MZEU50-K E2+E3	50	14 x 3.8	94	150	70	1.3	25.0	102	135	25	22	11.6
MZEU55-K E2+E3	55	16 x 4.3	104	160	75	1.5	30.0	108	142	32	25	14.6
MZEU60-K E2+E3	60	18 x 4.4	114	170	80	1.5	30.0	112	145	32	25	17.0
MZEU70-K E2+E3	70	20 x 4.9	134	190	90	1.8	35.0	135	175	38	30	25.4
MZEU80-K E2+E3	80	22 x 5.4	144	210	105	1.8	35.0	145	185	38	30	32.6
MZEU90-K E2+E3	90	25 x 5.4	158	230	120	2.0	45.0	155	205	50	40	38.9
MZEU100-K E2+E3	100	28 x 6.4	182	270	140	2.0	45.0	180	230	50	40	65.2
MZEU130-K E2+E3	130	32 x 7.4	212	310	160	2.5	60.0	205	268	68	55	97.3
MZEU150-K E2+E3	150	36 x 8.4	246	400	200	2.5	60.0	255	325	68	55	191.4

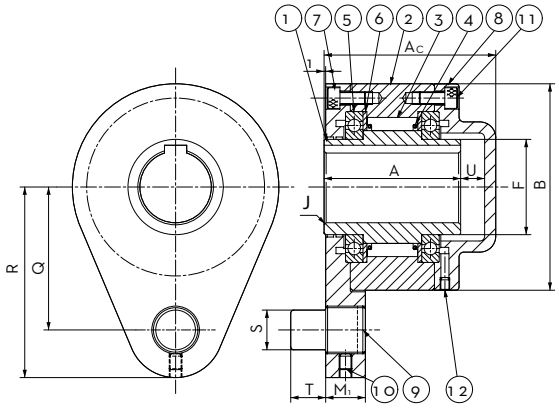
Installation and Usage

1. The Cam Clutch is delivered as a combination of a basic type clutch, an E3 torque arm and an E2 flange, each one packed and supplied as an individual part set. The flange set comes with a complete mounting kit, containing a number of bolts, a grease nipple, a locker set screw and a seal plug. The torque arm comes with an extra pin and set screw.
2. Check the direction of rotation before assembling, then mount both optional parts making use of the flange kits.
3. Before mounting the sizes MZEU90-K to MZEU150-K apply the sealing adhesive, included with the part sets, between body (outer race surface) and the optional part, to prevent leakage of oil during operation.
4. When installing the optional parts in the opposite way the direction of the clutch's rotation can be changed.



Installation example 3

MZEU-K SERIES CAM CLUTCH



1. Inner race
2. Outer race
3. Cam
4. Spring
5. Bearing
6. Side plate
7. E3 Torque arm
8. E4 Cover
9. Pin
10. Set screw
11. Hollow hex bolt
12. Set screw

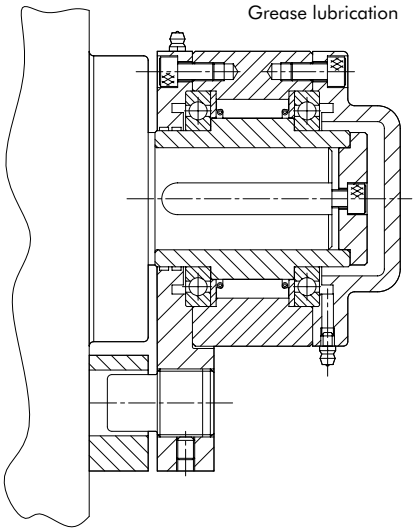
E3 Torque Arm + E4 Cover

Dimensions in mm

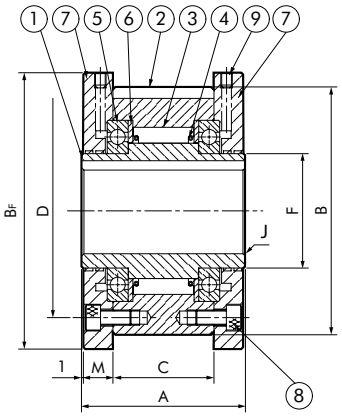
Model	Bore Size H7	Inner Race Keyway	A	Ac	B h7	F	J	M1	Q	R	S	T	U	Approx. Mass kg/pc
MZEU12-K E3+E4	12	4 x 1.8	42	53	62	20	0.8	13.5	44	59	10	10	6	1.0
MZEU15-K E3+E4	15	5 x 2.3	52	68	68	25	0.8	13.5	47	62	10	10	10	1.5
MZEU20-K E3+E4	20	6 x 2.8	57	73	75	30	0.8	15.0	54	72	12	11	10	2.0
MZEU25-K E3+E4	25	8 x 3.3	60	76	90	40	0.8	19.0	62	84	16	14	10	2.9
MZEU30-K E3+E4	30	8 x 3.3	68	84	100	45	1.0	19.0	68	92	16	14	10	4.3
MZEU35-K E3+E4	35	10 x 3.3	74	92	110	50	1.0	22.0	76	102	20	18	12	5.3
MZEU40-K E3+E4	40	12 x 3.3	86	105	125	55	1.3	22.0	85	112	20	18	12	7.8
MZEU45-K E3+E4	45	14 x 3.8	86	108	130	60	1.3	25.0	90	120	25	22	15	9.6
MZEU50-K E3+E4	50	14 x 3.8	94	113	150	70	1.3	25.0	102	135	25	22	12	12.1
MZEU55-K E3+E4	55	16 x 4.3	104	126	160	75	1.5	30.0	108	142	32	25	15	15.2
MZEU60-K E3+E4	60	18 x 4.4	114	137	170	80	1.5	30.0	112	145	32	25	15	17.7
MZEU70-K E3+E4	70	20 x 4.9	134	164.5	190	90	1.8	35.0	135	175	38	30	22.5	26.5
MZEU80-K E3+E4	80	22 x 5.4	144	168	210	105	1.8	35.0	145	185	38	30	16	33.6
MZEU90-K E3+E4	90	25 x 5.4	158	192	230	120	2.0	45.0	155	205	50	40	27	39.0
MZEU100-K E3+E4	100	28 x 6.4	182	217	270	140	2.0	45.0	180	230	50	40	28	67.4
MZEU130-K E3+E4	130	32 x 7.4	212	250	310	160	2.5	60.0	205	268	68	55	30	100.2
MZEU150-K E3+E4	150	36 x 8.4	246	286	400	200	2.5	60.0	255	325	68	55	32	194.8

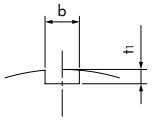
Installation and Usage

1. This version of the MZEU-K Cam Clutch comes as a combination of a basic type clutch, an E3 torque arm and an E4 cover, each one packed and supplied as an individual part set. Each part set is delivered with a flange kit consisting of bolts, grease nipple, locker set screw and seal plug. The E3 kit comes with a an extra pin and set screw.
2. Check the direction of rotation before assembling, then mount both flanges making use of the flange kit.
3. Before mounting the sizes MZEU90-K to MZEU150-K apply the sealing adhesive, included with the part sets, between body (outer race surface) and the optional part, to prevent leakage of oil during operation.
4. For the sizes MZEU12-K up to MZEU80-K assemble the shaft end plate onto the shaft before closing with the E4 cover. Refer to installation example 4.
5. Before mounting the E4 cover on Model MZEU90-K up to MZEU150-K, packing should be fitted between the end surface of the inner race and the surface of the end plate, using sealing, washer and bolt(s). Refer to installation example 4.
6. When installing the optional parts in the opposite way the direction of the clutch's rotation can be changed.



Installation example 4





1. Inner race
2. Outer race
3. Cam
4. Spring
5. Bearing
6. Side plate
7. E5 Flange
8. Hex socket cap bolt
9. Set screw

E5 Flange + E5 Flange

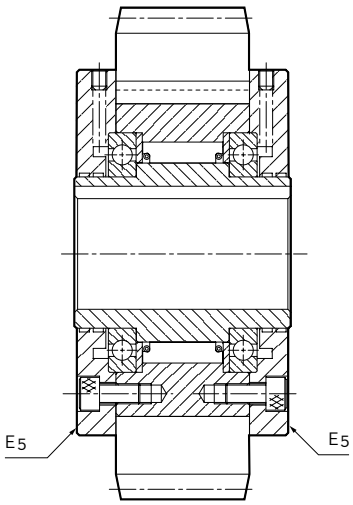
Dimensions in mm

Model	Bore Size H7	Inner Race Keyway	A	B h7	B_F	C	D	F	J	M	Outer Race Keyway b P10	Outer Race Keyway t_1	Approx. Mass kg/pc
MZEU12-K E5+E5	12	4 x 1.8	42	62	70	20	51	20	0.8	10.0	4 x	2.5	0.5
MZEU15-K E5+E5	15	5 x 2.3	52	68	76	28	56	25	0.8	11.0	5 x	3.0	0.8
MZEU20-K E5+E5	20	6 x 2.8	57	75	84	34	64	30	0.8	10.5	6 x	3.5	1.2
MZEU25-K E5+E5	25	8 x 3.3	60	90	99	35	78	40	0.8	11.5	8 x	4.0	1.8
MZEU30-K E5+E5	30	8 x 3.3	68	100	109	43	87	45	1.0	11.5	8 x	4.0	2.6
MZEU35-K E5+E5	35	10 x 3.3	74	110	119	45	96	50	1.0	13.5	10 x	5.0	3.2
MZEU40-K E5+E5	40	12 x 3.3	86	125	135	53	108	55	1.3	15.5	12 x	5.0	4.8
MZEU45-K E5+E5	45	14 x 3.8	86	130	140	53	112	60	1.3	15.5	14 x	5.5	6.2
MZEU50-K E5+E5	50	14 x 3.8	94	150	160	64	132	70	1.3	14.0	14 x	5.5	8.2
MZEU55-K E5+E5	55	16 x 4.3	104	160	170	66	138	75	1.5	18.0	16 x	6.0	9.5
MZEU60-K E5+E5	60	18 x 4.4	114	170	182	78	150	80	1.5	17.0	18 x	7.0	12.3
MZEU70-K E5+E5	70	20 x 4.9	134	190	202	95	165	90	1.8	18.5	20 x	7.5	18.1
MZEU80-K E5+E5	80	22 x 5.4	144	210	222	100	185	105	1.8	21.0	22 x	9.0	23.1
MZEU90-K E5+E5*	90	25 x 5.4	158	230	242	115	206	120	2.0	20.5	25 x	9.0	28.1
MZEU100-K E5+E5*	100	28 x 6.4	182	270	282	120	240	140	2.0	30.0	28 x	10.0	46.3
MZEU130-K E5+E5*	130	32 x 7.4	212	310	322	152	278	160	2.5	29.0	32 x	11.0	70.2
MZEU150-K E5+E5*	150	36 x 8.4	246	400	412	180	360	200	2.5	32.0	36 x	12.0	146.3

*= Non-stock item

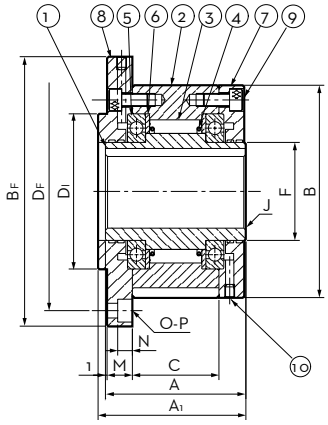
Installation and Usage

1. This version of the MZEU-K Cam Clutch comes as a combination of a basic type clutch, and two E5 flanges, each one packed and supplied as an individual part set. Each part set comes with a complete flange kit, containing a number of bolts, a grease nipple, a locker set screw and a seal plug.
2. Check the direction of rotation before assembling, then mount both flanges making use of the flange kit.
3. Before mounting the sizes MZEU90-K to MZEU150-K apply the sealing adhesive, which comes along with the part sets, between body (outer race surface) and the optional part, to prevent leakage of oil during operation.
4. Insert the Cam Clutch into the appropriate unit (gear, sprocket, pulley etc.). We recommend a tolerance of H7 for the bore size. Fix the key and close the unit with the second E5 flange, making use of the flange kit.
5. MZEU-K clutches with E5 and E5 flanges can be used in both rotation directions.
6. For high speed indexing applications (over 50 cycle/min) strong springs are recommended and can be supplied accordingly.



Installation example 5

MZEU-K SERIES CAM CLUTCH



1. Inner race
2. Outer race
3. Cam
4. Spring
5. Bearing
6. Side plate
7. E2 Flange
8. E7 Flange
9. Hex socket cap bolt
10. Set screw

E2 Flange + E7 Flange

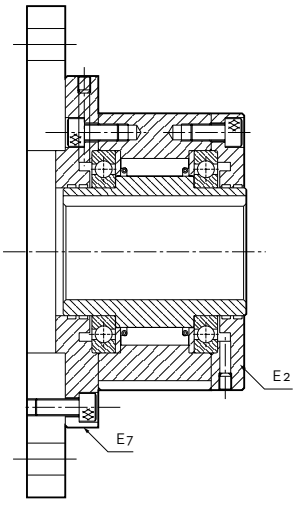
Dimensions in mm

Model	Bore Size H7	Inner Race Keyway	A	A1	B h7	BF	C	D1 h7	DF	F	J	M	N	O-P	Approx. Mass kg/pc
MZEU12-K E2+E7	12	4 x 1.8	42	44	62	85	20	42	72	20	0.8	10.0	5.7	3 - ø5.5	0.5
MZEU15-K E2+E7	15	5 x 2.3	52	54	68	92	28	47	78	25	0.8	11.0	5.7	3 - ø5.5	0.8
MZEU20-K E2+E7	20	6 x 2.8	57	59	75	98	34	55	85	30	0.8	10.5	5.7	4 - ø5.5	1.2
MZEU25-K E2+E7	25	8 x 3.3	60	62	90	118	35	68	104	40	0.8	11.5	6.8	4 - ø6.6	1.8
MZEU30-K E2+E7	30	8 x 3.3	68	70	100	128	43	75	114	45	1.0	11.5	6.8	6 - ø6.6	2.6
MZEU35-K E2+E7	35	10 x 3.3	74	76	110	140	45	80	124	50	1.0	13.0	6.8	6 - ø6.6	3.2
MZEU40-K E2+E7	40	12 x 3.3	86	88	125	160	53	90	142	55	1.3	15.0	9.0	6 - ø9.0	4.8
MZEU45-K E2+E7	45	14 x 3.8	86	88	130	165	53	95	146	60	1.3	15.0	9.0	8 - ø9.0	6.2
MZEU50-K E2+E7	50	14 x 3.8	94	96	150	185	64	110	166	70	1.3	13.0	9.0	8 - ø9.0	8.2
MZEU55-K E2+E7	55	16 x 4.3	104	106	160	204	66	115	182	75	1.5	17.0	11.0	8 - ø11.0	9.5
MZEU60-K E2+E7	60	18 x 4.4	114	116	170	214	78	125	192	80	1.5	16.0	11.0	10 - ø11.0	12.3
MZEU70-K E2+E7	70	20 x 4.9	134	136	190	234	95	140	212	90	1.8	17.5	11.0	10 - ø11.0	18.1
MZEU80-K E2+E7	80	22 x 5.4	144	146	210	254	100	160	232	105	1.8	20.0	11.0	10 - ø11.0	23.1
MZEU90-K E2+E7*	90	25 x 5.4	158	160	230	278	115	180	254	120	2.0	19.0	13.0	10 - ø14.0	28.1
MZEU100-K E2+E7*	100	28 x 6.4	182	184	270	335	120	210	305	140	2.0	28.0	17.5	10 - ø18.0	46.3
MZEU130-K E2+E7*	130	32 x 7.4	212	214	310	380	152	240	345	160	2.5	27.0	17.5	12 - ø18.0	70.2
MZEU150-K E2+E7*	150	36 x 8.4	246	248	400	485	180	310	445	200	2.5	30.0	21.5	12 - ø22.0	146.3

*= Non-stock item

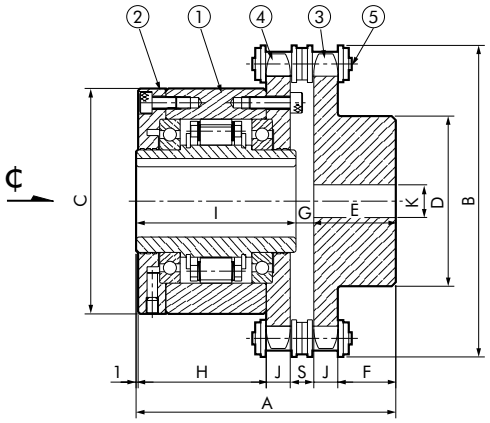
Installation and Usage

1. This version of the MZEU-K Cam Clutch comes as a combination of a basic type clutch, an E2 flange and an E7 flange, each one packed and supplied as an individual part set.
2. Each flange set come with a complete mounting kit, containing a number of bolts, a grease nipple, a locker set screw and a seal plug.
3. Check the direction of rotation before assembling, then mount both flanges making use of the flange kit.
4. Before mounting the sizes MZEU90-K to MZEU150-K apply the sealing adhesive, which comes along with the part sets, between body (outer race surface) and the optional part, to prevent leakage of oil during operation.
5. Always use bolts for installing a sprocket, a gear, pulley or other options to the clutch. Size and quantity of the bolts needed are mentioned under H-L on page 17. Length and shape of the bolts is determined by the thickness of the fitted part.
6. When installing any type of optional or fitted part in the opposite way the direction of the clutch's rotation can be changed.
7. For high speed indexing applications (over 50 cycle/min) strong springs are recommended and can be supplied accordingly.



Installation example 6

Note:
Do not apply a large overhung load to the outer race by using E7 flange to keep the centerline between the inner and outer race.



① MZEU-K Cam Clutch
② E2 Flange
③ Sprocket B
④ Sprocket A
⑤ Roller chain

¢ Specify Specify right hand (RH) or Left hand (LH) drive viewed from this end inner race driving.

Coupling

Dimensions in mm

Model	Torque Capacity Nm	Max.Overrunning Speed		Drag Torque Nm	Bore Size H7	Inner Race Keyway	Bore Diameter Range K		A	B	C h7	D	E	F	G	H	I	J	L	S
		Inner Race r/min	Outer Race r/min				min.	max.												
MZEU12-K-C	60	2000	1000	0.20	12	4×1.8	14	45	70.6	93	62	67	25	17.8	3.6	30.0	42	7.2	1	7.4
MZEU15-K-C	100	1800	900	0.20	15	5×2.3	14	50	79.6	101	68	75	25	17.8	2.6	39.0	52	7.2	1	7.4
MZEU20-K-C	245	1600	700	0.29	20	6×2.8	14	42	85.1	109	75	63	25	17.8	3.1	44.5	57	7.2	1	7.4
MZEU25-K-C	425	1600	600	0.33	25	8×3.3	18	47	93.9	127	90	73	28	19.3	5.9	46.5	60	8.7	1	9.7
MZEU30-K-C	735	1500	500	0.39	30	8×3.3	18	47	101.9	137	100	73	28	19.3	5.9	54.5	68	8.7	1	9.7
MZEU35-K-C	1015	1400	300	0.49	35	10×3.3	18	55	122.7	152	110	83	40	28.3	8.7	58.5	74	11.7	1	11.5
MZEU40-K-C	1350	1400	300	0.59	40	12×3.3	20	55	132.7	164	125	83	40	28.3	6.7	68.5	86	11.7	1	11.5
MZEU45-K-C	1620	1400	300	0.69	45	14×3.8	20	55	132.7	176	130	83	40	28.3	6.7	68.5	86	11.7	1	11.5
MZEU50-K-C	2070	1300	250	0.79	50	14×3.8	20	55	142.2	200	150	83	40	28.3	8.2	78.0	94	11.7	1	11.5
MZEU55-K-C	2400	1300	250	0.88	55	16×4.3	30	75	159.8	219	160	107	45	30.4	10.8	84.0	104	14.6	1	15.2
MZEU60-K-C	2950	1200	250	0.98	60	18×4.4	30	75	170.8	235	170	107	45	30.4	11.8	95.0	114	14.6	1	15.2
MZEU70-K-C	4210	1100	250	1.27	70	20×4.9	30	75	189.3	251	190	107	45	30.4	10.3	113.5	134	14.6	1	15.2
MZEU80-K-C	5170	800	200	1.38	80	22×5.4	30	75	196.8	267	210	107	45	30.4	7.8	121.0	144	14.6	1	15.2

Installation and Usage

1. MZEU-K C Series Cam Clutch couplings make use of MZEU-K Series Cam Clutch and CR type couplings without cover.
2. Mount the Cam Clutch part loosely onto the highspeed shaft.
3. Accurately align both sprockets by checking with a straight edge on the teeth of both sprockets.
4. Check whether the clearance (S) between both sprockets is correct, then wrap the chain around the sprockets and close it properly with the connecting link.
5. Specify right hand (RH) or left hand (LH) as inner race over-running direction from the view of Cam Clutch side(¢) when ordering. See the above drawing.
6. The same lubrication as for Tsubaki roller chain is necessary for the coupling chain.
7. Ensure that the closed side of the spring clip is situated in the same direction as the rotation of the outer race.

MZEU-K SERIES CAM CLUTCH

Lubrication and Maintenance of MZEU-K Series

The basic models MZEU12-K to MZEU80-K are pre-greased and require no further lubrication. However, the lateral bearings need to be greased periodically. See the tables below for the recommended grease and frequency.
The operational temperature range is -40°C to +40°C.

For higher range temperatures please consult Tsubaki. The basic models MZEU90-K to MZEU150-K and optional parts such as flanges, torque arm or cover need to be lubricated with oil at scheduled maintenance. See the tables below for the recommended oil and frequency.

Recommended grease for Cam Clutches MZEU12-K to MZEU80-K

Oil Company	Ambient Temperature	
	-5°C to +40°C	-40°C to +40°C
Esso	-	Beacon 325
Mobil	-	Mobil Temp SHC 100
Shell	Alvania Grease S2	Alvania Grease RA
BP	Energrease LS2	Energrease LT2
Total	Multis 2	Aerogrease 22

Note: Do not use grease containing EP additives when selecting any other brand or make.

Recommended oil for Cam Clutches MZEU90-K to MZEU150-K

Oil Company	Ambient Temperature	
	-10°C to +30°C	+30°C to +50°C
Esso	Teresso 32, Essolub D-3 10W, ATF Dexron	Essolub D-3 30
Mobil	ATF 220, Delvac 1310, DTE Oil light	
Shell	Dexron II, Rimulla CT Oil 10W, Shell Clavus Oil 17, Rotella S Oil 10W	Rimulla CT Oil 20W/20, 30 Rotella S Oil 20W/20, 30
BP	BP Energol THB32	-
Total	Harmony 32	-

Note: Do not use oil containing EP additives when selecting any other brand or make.

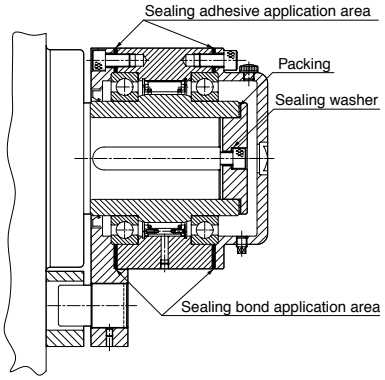
Instructions for Lubrication of MZEU90-K to MZEU150-K

1. Apply a suitable amount of oil before use.
2. As a general rule, the amount of lubricant should be level with the center of the shaft for overrunning or backstopping.
3. The E2 flange has three plugs. The E4 cover has a large plug for adding oil and two small plugs for checking and draining.
4. Place the plugs, so that one is at the top and one is at the bottom. The center one should be level with the center of the shaft.
5. Pour oil into the clutch until it overflows from check plug. After a few minutes, pour in more oil and check that it overflows again.

Maintenance

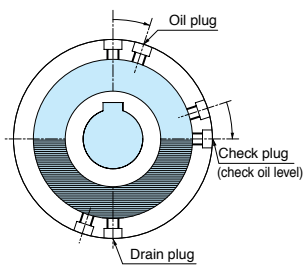
Model	Lubricant	Maintenance
MZEU12-K to MZEU80-K	Grease	Every 3 months by the grease nipple on the flange, the torque arm and/or cover.
MZEU90-K to MZEU150-K	Oil	Replace the oil 10 hours after the first installation. Then refresh the oil every 3 months. For dirty environments we recommend refreshment every month.

Oil lubrication

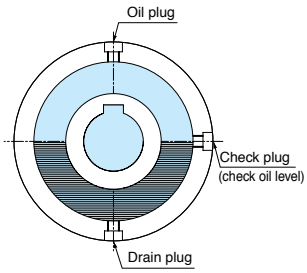


MZEU90-K to MZEU150-K

Oil level



MZEU90-K to MZEU100-K



MZEU130-K to MZEU150-K

General Information Lift-off

BREU Series are modular type Cam Clutches with lift-off style special cams delivered as BREU-K Series with option parts (E1, E2, E5, E7 flanges, E3 Torque arm and E4 cover) which are required as separate parts.

The operational temperature range is -40°C to +40°C.
All models are pre-greased at assembly. Injection of an excessive quantity of grease to the bearings during maintenance will cause problems to the function of the Cam Clutch. It's springs cannot function properly any longer.
Tsubaki recommends a shaft tolerance of h7 with a standard key. The keyways of all Tsubaki Cam Clutches are standardized according to DIN6885.1 Tsubaki recommends an H7 or H8 tolerance for dimensions B and E to rework sprockets, gears, pulleys or other parts to be fitted.

1. Before assembly clean both surfaces of the outer race as well as the surface of the flange, cover, torque arm or other fitted part.
2. Verify the direction of rotation indicated with an arrow before fitting the optional parts.
3. When installing a sprocket, gear or other part, fix them with a hexagonal socket cap bolt.
4. When assembling optional parts in opposite position, the direction of rotation of the Cam Clutch can be changed.
5. Fix grease nipple and set screw to each operational part.
6. When mounting the clutch onto the shaft, apply pressure to the inner race but never to the outer race. Tap the inner race lightly with a soft hammer moving around the race circumference so the Cam Clutch moves slowly and uniformly onto the end of the shaft.
7. Do not use grease that contains EP additives.

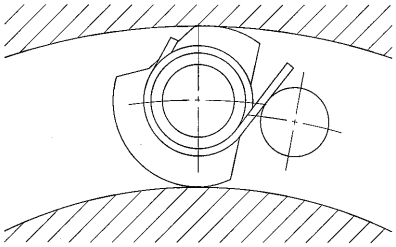


Figure 1: Entire Cam Clutch is stationary

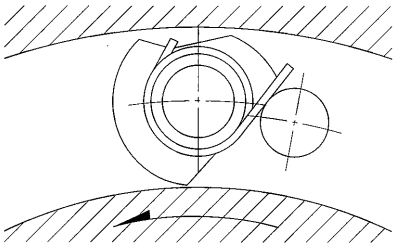


Figure 2: Inner race only turning

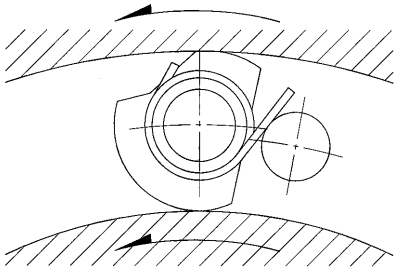
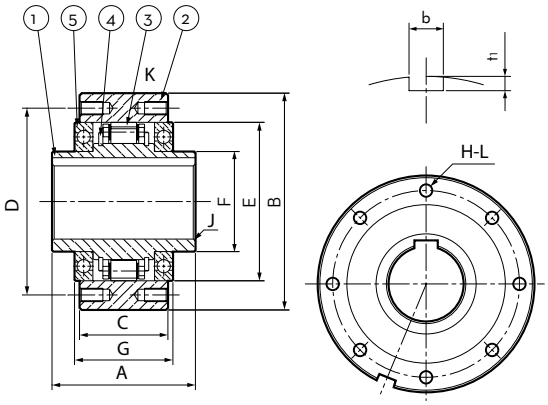


Figure 3: Inner and outterrace locked and turning

BREU-K SERIES CAM CLUTCH



① Inner race
② Outer race
③ Cam cage
④ Snap ring
⑤ Bearing

BREU-K

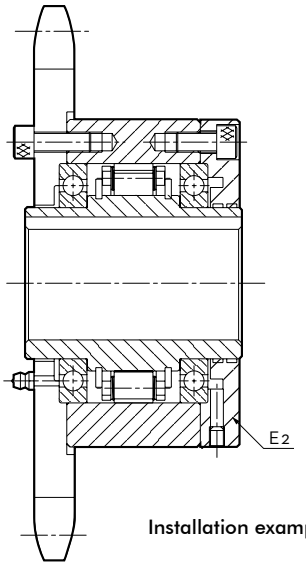
Dimensions in mm

Model	Torque Capacity Nm	Inner Race Overrunning Speed Min. r/min	Inner Race Overrunning Speed Max. r/min	Max. Engagement Speed r/min	Bore Size H7	Inner Race Keyway	A	B h7	C	D	E	F	G	H-L	K	J	Outer Race Keyway b P10	Outer Race Keyway t_1	Approx. Mass kg/pc
BREU30-K	607	880	3600	350	30	8 x 3.3	76	100	51	87	75	45	56	6-M6	10	1.0	8 x	4.0	2.7
BREU35-K	686	780	3600	300	35	10 x 3.3	79	110	50	96	80	50	56	6-M6	12	1.0	10 x	5.0	3.2
BREU40-K	980	720	3600	300	40	12 x 3.3	86	125	53	108	90	55	59	6-M8	14	1.3	12 x	5.0	4.4
BREU45-K	1078	670	3600	280	45	14 x 3.8	86	130	53	112	95	60	59	8-M8	14	1.3	14 x	5.5	4.7
BREU50-K	1715	610	3600	240	50	14 x 3.8	94	150	64	132	110	70	72	8-M8	14	1.3	14 x	5.5	7.6
BREU55-K	1960	580	3600	220	55	16 x 4.3	104	160	66	138	115	75	72	8-M10	16	1.5	16 x	6.0	8.9
BREU60-K	3479	490	3600	200	60	18 x 4.4	120	170	84	150	125	80	95	10-M10	16	1.5	18 x	7.0	12.5
BREU70-K*	4735	480	3600	200	70	20 x 4.9	134	190	95	165	140	90	108	10-M10	16	1.8	20 x	7.5	17.2
BREU80-K*	6517	450	3600	190	80	22 x 5.4	144	210	100	185	160	105	108	10-M10	16	1.8	22 x	9.0	22.4
BREU90-K*	8526	420	3000	180	90	25 x 5.4	158	230	115	206	180	120	125	10-M12	20	2.0	25 x	9.0	30.3
BREU100-K*	14210	460	2500	180	100	28 x 6.4	186	270	124	240	210	140	135	10-M16	24	2.0	28 x	10.0	45.5
BREU130-K*	20384	420	2200	180	130	32 x 7.4	212	310	152	278	240	160	168	12-M16	24	2.5	32 x	11.0	67.0
BREU150-K*	33908	370	1300	180	150	36 x 8.4	246	400	180	360	310	200	194	12-M20	32	2.5	36 x	12.0	145.0

*= Non-stock item

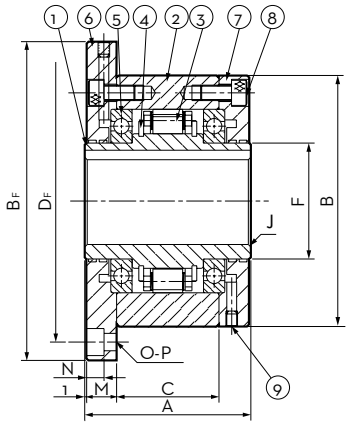
Installation and Usage

1. By installing both parts on the opposite side, the direction of rotation can be changed.
2. When mounting the clutch onto the shaft, apply pressure to the inner race but never to the outer race. Tap the inner race lightly with a soft hammer moving around the race circumference so the Cam Clutch moves slowly and uniformly onto the end of the shaft.
3. All models are pre-greased. The ambient temperature range is -40°C to +40°C. Too much additional grease to both bearing inhibits the basic Cam Clutch function.



Installation example 1

Note:
Current stock items are basic BREU type clutches without keyway on outer race. Please note that Basic BREU type clutches will gradually be replaced by BREU-K type clutches.



1. Inner race
2. Outer race
3. Cam cage
4. Snap ring
5. Bearing
6. E1 Flange
7. E2 Flange
8. Hex socket cap bolt
9. Set screw

E1 Flange + E2 Flange

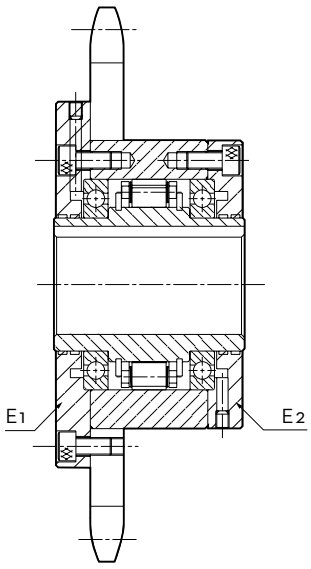
Dimensions in mm

Model	Bore Size H7	Inner Race Keyway	A	B h7	B_F	C	D_F	F	J	M	N	O-P	Approx. Mass kg/pc
BREU30-K E1+E2	30	8 x 3.3	76	100	128	51	114	45	1.0	11.5	6.8	6-ø 6.6	4.1
BREU35-K E1+E2	35	10 x 3.3	79	110	140	50	124	50	1.0	13.5	6.8	6-ø 6.6	5.2
BREU40-K E1+E2	40	12 x 3.3	86	125	160	53	142	55	1.3	15.5	9.0	6-ø 9.0	7.5
BREU45-K E1+E2	45	14 x 3.8	86	130	165	53	146	60	1.3	15.5	9.0	8-ø 9.0	7.9
BREU50-K E1+E2	50	14 x 3.8	94	150	185	64	166	70	1.3	14.0	9.0	8-ø 9.0	11.1
BREU55-K E1+E2	55	16 x 4.3	104	160	204	66	182	75	1.5	18.0	11.0	8-ø11.0	14.7
BREU60-K E1+E2	60	18 x 4.4	120	170	214	84	192	80	1.5	17.0	11.0	10-ø11.0	17.9
BREU70-K E1+E2*	70	20 x 4.9	134	190	234	95	212	90	1.8	18.5	11.0	10-ø11.0	24.5
BREU80-K E1+E2*	80	22 x 5.4	144	210	254	100	232	105	1.8	21.0	11.0	10-ø11.0	32.5
BREU90-K E1+E2*	90	25 x 5.4	158	230	278	115	254	120	2.0	20.5	13.0	10-ø14.0	40.5
BREU100-K E1+E2*	100	28 x 6.4	186	270	335	124	305	140	2.0	30.0	17.5	10-ø18.0	68.0
BREU130-K E1+E2*	130	32 x 7.4	212	310	380	152	345	160	2.5	29.0	17.5	12-ø18.0	95.0
BREU150-K E1+E2*	150	36 x 8.4	246	400	485	180	445	200	2.5	32.0	21.5	12-ø22.0	197.0

*= Non-stock item

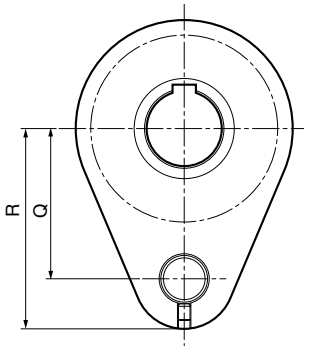
Installation and Usage

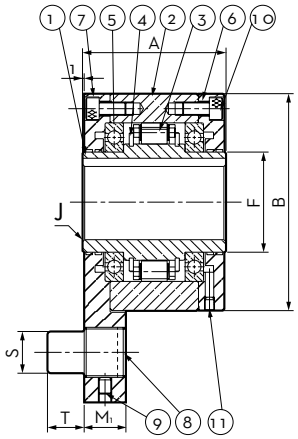
1. By installing E1 flange and E2 flange on the opposite side, the direction of rotation can be changed.
2. When mounting the clutch onto the shaft, apply pressure to the inner race but never to the outer race. Tap the inner race lightly with a soft hammer moving around the race circumference so the Cam Clutch moves slowly and uniformly onto the end of the shaft.
3. All models are pre-greased. The ambient temperature range is -40°C to +40°C.
4. Too much additional greasing of the bearings will cause malfunction of the Cam Clutch mechanism.



Installation example 2

BREU-K SERIES CAM CLUTCH





1. Inner race
2. Outer race
3. Cam cage
4. Snap ring
5. Bearing
6. E2 Flange
7. E3 Torque arm
8. Pin
9. Set screw
10. Hex socket cap bolt
11. Set screw

E2 Flange + E3 Torque arm

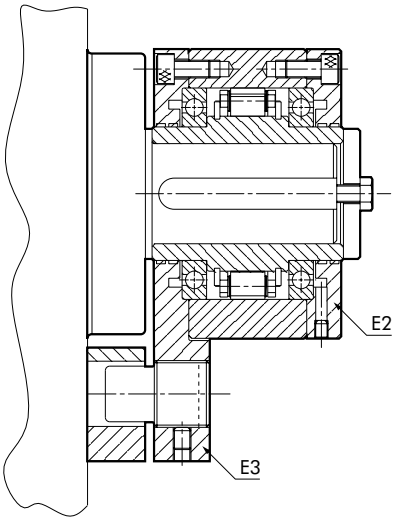
Dimensions are in mm

Model	Bore Size H7	Inner Race Keyway	A	B h7	F	J	M1	Q	R	S	T	Approx. Mass kg/pc
BREU30-K E2+E3	30	8 x 3.3	76	100	45	1.0	19	68	92	16	14	4.2
BREU35-K E2+E3	35	10 x 3.3	79	110	50	1.0	22	76	102	20	18	5.0
BREU40-K E2+E3	40	12 x 3.3	86	125	55	1.3	22	85	112	20	18	7.0
BREU45-K E2+E3	45	14 x 3.8	86	130	60	1.3	25	90	120	25	22	7.7
BREU50-K E2+E3	50	14 x 3.8	94	150	70	1.3	25	102	135	25	22	11.0
BREU55-K E2+E3	55	16 x 4.3	104	160	75	1.5	30	108	142	32	25	14.0
BREU60-K E2+E3	60	18 x 4.4	120	170	80	1.5	30	112	145	32	25	17.2
BREU70-K E2+E3*	70	20 x 4.9	134	190	90	1.8	35	135	175	38	30	24.5
BREU80-K E2+E3*	80	22 x 5.4	144	210	105	1.8	35	145	185	38	30	31.9
BREU90-K E2+E3*	90	25 x 5.4	158	230	120	2.0	45	155	205	50	40	41.1
BREU100-K E2+E3*	100	28 x 6.4	186	270	140	2.0	45	180	230	50	40	65.0
BREU130-K E2+E3*	130	32 x 7.4	212	310	160	2.5	60	205	268	68	55	94.0
BREU150-K E2+E3*	150	36 x 8.4	246	400	200	2.5	60	255	325	68	55	190.0

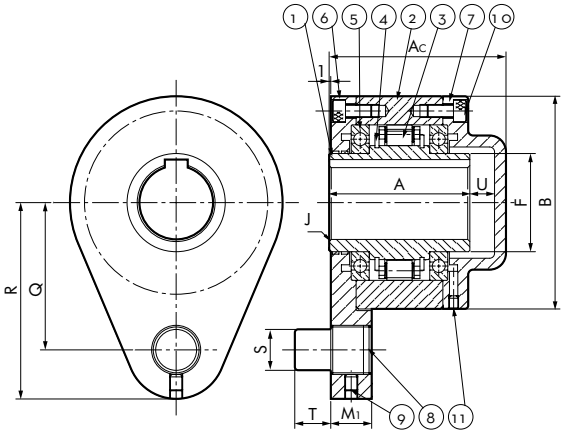
*= Non-stock item

Installation and Usage

1. By installing the E2 flange and E3 torque arm on the opposite side, the direction of rotation can be changed.
2. When mounting the clutch onto the shaft, apply pressure to the inner race but never to the outer race. Tap the inner race lightly with a soft hammer moving around the race circumference so the Cam Clutch moves slowly and uniformly onto the end of the shaft.
3. All models are pre-greased. The ambient temperature range is -40°C to +40°C.
4. Too much additional greasing of the bearings will cause malfunction of the Cam Clutch mechanism.



Installation example 3



1. Inner race
2. Outer race
3. Cam cage
4. Snap ring
5. Bearing
6. E3 Torque arm
7. E4 Cover
8. Pin
9. Set screw
10. Hex socket cap bolt
11. Set screw

E3 Torque arm + E4 Cover

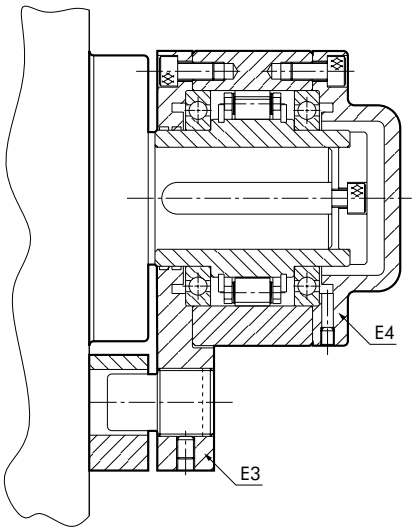
Dimensions in mm

Model	Bore Size H7	Inner Race Keyway	A	Ac	B h7	F	J	M1	Q	R	S	T	U	Approx. Mass kg/pc
BREU30-K E3+E4	30	8 x 3.3	76	92	100	45	1.0	19	68	92	16	14	10	4.5
BREU35-K E3+E4	35	10 x 3.3	79	97	110	50	1.0	22	76	102	20	18	12	5.3
BREU40-K E3+E4	40	12 x 3.3	86	105	125	55	1.3	22	85	112	20	18	12	7.4
BREU45-K E3+E4	45	14 x 3.8	86	108	130	60	1.3	25	90	120	25	22	15	8.1
BREU50-K E3+E4	50	14 x 3.8	94	113	150	70	1.3	25	102	135	25	22	12	11.5
BREU55-K E3+E4	55	16 x 4.3	104	126	160	75	1.5	30	108	142	32	25	15	15.6
BREU60-K E3+E4	60	18 x 4.4	120	143	170	80	1.5	30	112	145	32	25	15	18.0
BREU70-K E3+E4*	70	20 x 4.9	134	164.5	190	90	1.8	35	135	175	38	30	22.5	25.5
BREU80-K E3+E4*	80	22 x 5.4	144	168	210	105	1.8	35	145	185	38	30	16	32.9
BREU90-K E3+E4*	90	25 x 5.4	158	192	230	120	2.0	45	155	205	50	40	27	43.4
BREU100-K E3+E4*	100	28 x 6.4	186	221	270	140	2.0	45	180	230	50	40	28	67.0
BREU130-K E3+E4*	130	32 x 7.4	212	250	310	160	2.5	60	205	268	68	55	30	97.0
BREU150-K E3+E4*	150	36 x 8.4	246	286	400	200	2.5	60	255	325	68	55	32	193.0

*= Non-stock item

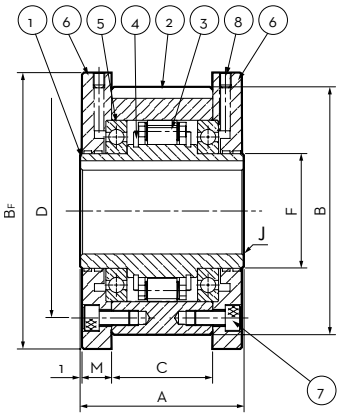
Installation and Usage

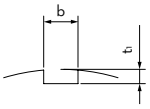
1. By installing the E3 torque arm and the E4 cover in the opposite way, the direction of rotation can be changed.
2. When mounting the clutch onto the shaft, apply pressure to the inner race but never to the outer race. Tap the inner race lightly with a soft hammer moving around the race circumference so the Cam Clutch moves slowly and uniformly onto the end of the shaft.
3. All models are pre-greased.
4. Fix grease nipples to optional parts.
5. The ambient temperature range is -40°C to +40°C.
6. Too much additional greasing of the bearings will cause malfunction of the Cam Clutch mechanism.



Installation example 4

BREU-K SERIES CAM CLUTCH





1. Inner race
2. Outer race
3. Cam cage
4. Snap ring
5. Bearing
6. E5 Flange
7. Hex socket cap bolt
8. Set screw

E5 Flange + E5 Flange

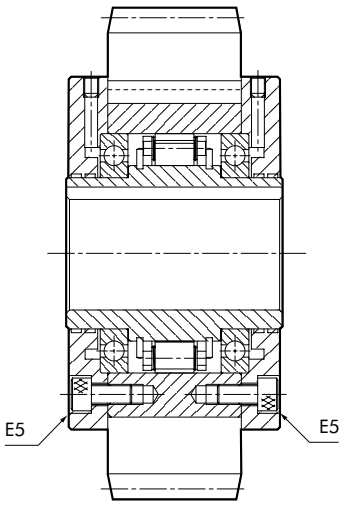
Dimensions in mm

Model	Bore Size H7	Inner Race Keyway	A	B h7	B_F	C	D	F	J	M	Outer Race Keyway b P10	Outer Race Keyway t_1	Approx. Mass kg/pc
BREU30-K E5+E5	30	8 x 3.3	76	100	109	51	87	45	1.0	11.5	8 x	4.0	3.9
BREU35-K E5+E5	35	10 x 3.3	79	110	119	50	96	50	1.0	13.5	10 x	5.0	4.9
BREU40-K E5+E5	40	12 x 3.3	86	125	135	53	108	55	1.3	15.5	12 x	5.0	7.0
BREU45-K E5+E5	45	14 x 3.8	86	130	140	53	112	60	1.3	15.5	14 x	5.5	7.4
BREU50-K E5+E5	50	14 x 3.8	94	150	160	64	132	70	1.3	14.0	14 x	5.5	10.7
BREU55-K E5+E5	55	16 x 4.3	104	160	170	66	138	75	1.5	18.0	16 x	6.0	13.6
BREU60-K E5+E5	60	18 x 4.4	120	170	182	84	150	80	1.5	17.0	18 x	7.0	17.3
BREU70-K E5+E5*	70	20 x 4.9	134	190	202	95	165	90	1.8	18.5	20 x	7.5	23.5
BREU80-K E5+E5*	80	22 x 5.4	144	210	222	100	185	105	1.8	21.0	22 x	9.0	31.3
BREU90-K E5+E5*	90	25 x 5.4	158	230	242	115	206	120	2.0	20.5	25 x	9.0	38.4
BREU100-K E5+E5*	100	28 x 6.4	186	270	282	124	240	140	2.0	30.0	28 x	10.0	63.0
BREU130-K E5+E5*	130	32 x 7.4	212	310	322	152	278	160	2.5	29.0	32 x	11.0	88.0
BREU150-K E5+E5*	150	36 x 8.4	246	400	412	180	360	200	2.5	32.0	36 x	12.0	184.0

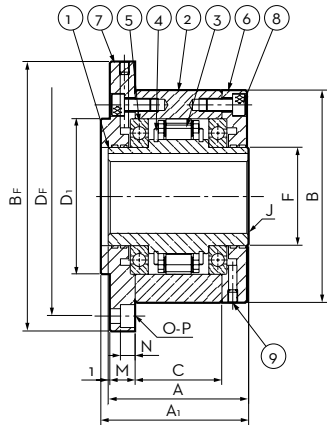
*= Non-stock item

Installation and Usage

1. By turning the Cam Clutch on the opposite side, the direction of rotation can be changed.
2. Fix the grease nipple to the option parts.
3. When mounting the clutch onto the shaft, apply pressure to the inner race but never to the outer race. Tap the inner race lightly with a soft hammer moving around the race circumference so the Cam Clutch moves slowly and uniformly onto the end of the shaft.
4. All models are pre-greased. The ambient temperature range is -40°C to +40°C.
5. Too much additional greasing of the bearings will cause malfunction of the Cam Clutch mechanism.
6. Ensure that the closed side of the spring clip is situated in the same direction as the rotation of the outer race.



Installation example 5



1. Inner race
2. Outer race
3. Cam cage
4. Snap ring
5. Bearing
6. E2 Flange
7. E7 Flange
8. Hex socket cap bolt
9. Set screw

E2 Flange + E7 Flange

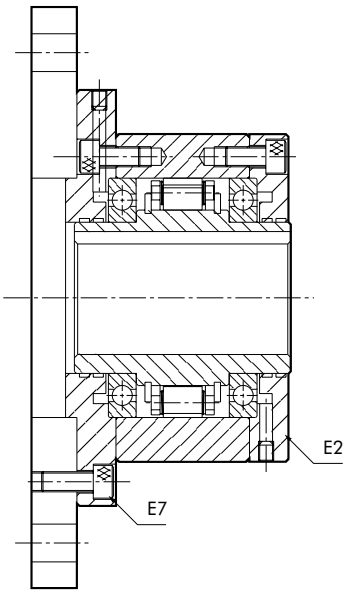
Dimensions in mm

Model	Bore Size H7	Inner Race Keyway	A	A1	B h7	B_F	C	D1 h7	D_F	F	J	M	N	O-P	Approx. Mass kg/pc
BREU30-K E2+E7	30	8 x 3.3	76	78	100	128	51	75	114	45	1.0	11.5	6.8	6- ø6.6	4.2
BREU35-K E2+E7	35	10 x 3.3	79	81	110	140	50	80	124	50	1.0	13.0	6.8	6- ø6.6	5.3
BREU40-K E2+E7	40	12 x 3.3	86	88	125	160	53	90	142	55	1.3	15.0	9.0	6- ø9.0	7.6
BREU45-K E2+E7	45	14 x 3.8	86	88	130	165	53	95	146	60	1.3	15.0	9.0	8- ø9.0	8.0
BREU50-K E2+E7	50	14 x 3.8	94	96	150	185	64	110	166	70	1.3	13.0	9.0	8- ø9.0	11.3
BREU55-K E2+E7	55	16 x 4.3	104	106	160	204	66	115	182	75	1.5	17.0	11.0	8-ø11.0	14.8
BREU60-K E2+E7	60	18 x 4.4	120	122	170	214	84	125	192	80	1.5	16.0	11.0	10-ø11.0	18.2
BREU70-K E2+E7*	70	20 x 4.9	134	136	190	234	95	140	212	90	1.8	17.5	11.0	10-ø11.0	24.8
BREU80-K E2+E7*	80	22 x 5.4	144	146	210	254	100	160	232	105	1.8	20.0	11.0	10-ø11.0	32.9
BREU90-K E2+E7*	90	25 x 5.4	158	160	230	278	115	180	254	120	2.0	19.0	13.0	10-ø14.0	40.8
BEEU100-K E2+E7*	100	28 x 6.4	186	188	270	335	124	210	305	140	2.0	28.0	17.5	10-ø18.0	69.0
BREU130-K E2+E7*	130	32 x 7.4	212	214	310	380	152	240	345	160	2.5	27.0	17.5	12-ø18.0	96.0
BREU150-K E2+E7*	150	36 x 8.4	246	248	400	485	180	310	445	200	2.5	30.0	21.5	12-ø22.0	198.0

*= Non-stock item

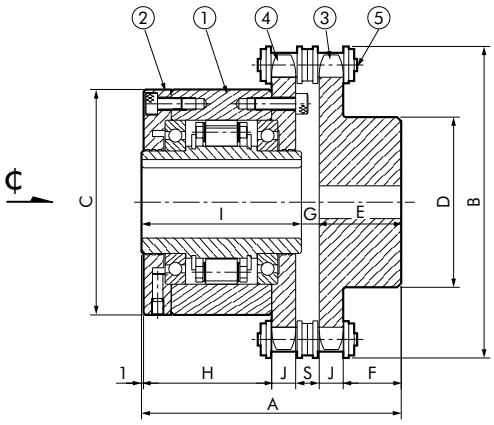
Installation and Usage

1. By installing the E2 flange and E7 flange on the opposite side, the direction of rotation can be changed.
2. Fix the grease nipple to the option parts.
3. When mounting the clutch onto the shaft, apply pressure to the inner race but never to the outer race. Tap the inner race lightly with a soft hammer moving around the race circumference so the Cam Clutch moves slowly and uniformly.
4. All models are pre-greased. The ambient temperature range is -40°C to +40°C.
5. Too much additional greasing of the bearings will cause malfunction of the Cam Clutch mechanism.



Installation example 6

BREU-K SERIES CAM CLUTCH



① BREU-K Cam Clutch
② E2 Flange
③ Sprocket B
④ Sprocket A
⑤ Roller chain

¢ Specify right hand (RH) or Left hand (LH) drive viewed from this end inner race driving.

Coupling

Dimensions in mm

Model	Bore Size H7	Inner Race Keyway	A	B	C h7	D	E	F	G	H	I	J	S	Approx. Mass kg/pc
BREU30-K-C	30	8 x 3.3	109.9	137	100	73	28	19.3	5.9	62.5	76	8.7	9.7	5.9
BREU35-K-C	35	10 x 3.3	127.7	152	110	83	40	28.3	8.7	63.5	79	11.7	11.5	8.5
BREU40-K-C	40	12 x 3.3	132.7	164	125	83	40	28.3	6.7	68.5	86	11.7	11.5	10.5
BREU45-K-C	45	14 x 3.8	132.7	176	130	83	40	28.3	6.7	68.5	86	11.7	11.5	11.2
BREU50-K-C	50	14 x 3.8	142.2	200	150	83	40	28.3	8.2	78.0	94	11.7	11.5	15.6
BREU55-K-C	55	16 x 4.3	159.8	219	160	107	45	30.4	10.8	84.0	104	14.6	15.2	21.8
BREU60-K-C	60	18 x 4.4	176.8	235	170	107	45	30.4	11.8	101.0	120	14.6	15.2	26.4
BREU70-K-C*	70	20 x 4.9	189.3	251	190	107	45	30.4	10.3	113.5	134	14.6	15.2	33.0
BREU80-K-C*	80	22 x 5.4	196.8	267	210	107	45	30.4	7.8	121.0	144	14.6	15.2	41.0

*= Non-stock item

Installation and Usage

1. BREU-K C Series Cam Clutch couplings make use of BREU-K Series Cam Clutch and CR type couplings without cover.
2. Mount the clutch loosely on the high-speed shaft at first.
3. Accurately align both sprockets by checking with a straight edge on the teeth of both sprockets.
4. Check whether the clearance (S) between the two sprockets is correct, then wrap the chain around the sprockets.
5. Specify right hand (RH) or left hand (LH) as inner race over-running direction from the view of Cam Clutch side(¢) when ordering. See the above drawing.
6. The same lubrication as for Tsubaki roller chain is necessary for the coupling chain.
7. Ensure that the closed side of the spring clip is situated in the same direction as the rotation of the outer race.

Lubrication and Maintenance of BREU-K Series

BREU-K Series Cam Clutches need periodic maintenance and lubrication to both bearings providing the maximum performance throughout the Cam Clutch's service life.

The Cam Mechanism DOES NOT require any maintenance therefore never use an excessive quantity of grease, yet lack of prescribed maintenance and lubrication will shorten the Service Life of the Cam Clutch and may cause unnecessary mechanical damage.

Recommended grease for Cam Clutches BREU-K Series

Oil Company	Ambient Temperature	
	-5°C to +40°C	-40°C to +40°C
Esso	-	Beacon 325
Mobil	-	Mobil Temp SHC 100
Shell	Alvania Grease S2	Alvania Grease RA
BP	Energrease LS2	Energrease LT2
Total	Multis 2	Aerogrease 22

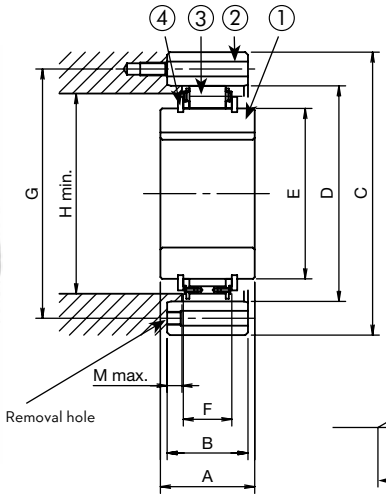
Note: Do not use grease containing EP additives when selecting any other brand or make.

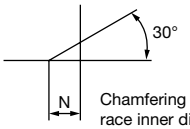
Maintenance

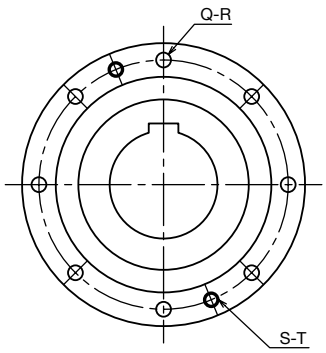
BREU-K Series Cam Clutches are pre-greased at the factory and the integrated bearings should be re-greased every three month after installation. Follow the procedures below.
Remove the setscrew at the flange, torque arm, cover or fitted part. Inject equal amounts of grease into both bearings via the grease nipples. Refer to the grease volume table for the correct amount. Run the Cam Clutch disengaged for 20 to 30 minutes with setscrew removed. Excessive grease in the clutch area will flow out of the tapped holes. Wipe off excessive grease and re-install the set screw.

Model	Each Bearing (g)	Model	Each Bearing (g)
BREU30-K	10	BREU70-K	50
BREU35-K	10	BREU80-K	80
BREU40-K	15	BREU90-K	90
BREU45-K	20	BREU100-K	160
BREU50-K	30	BREU130-K	260
BREU55-K	30	BREU150-K	460
BREU60-K	40		

BR-HT SERIES CAM CLUTCH







① Inner race
② Outer race
③ Cam cage
④ Snap ring

BR-HT

Dimensions in mm

Model	Bore Size H7	Torque Capacity Nm	Inner Race Overrunning Speed r/min Min.	Inner Race Overrunning Speed r/min Max.	Max. Engagement r/min	A	B	C	D H7	E	Mounting Holes PCD G	Mounting Holes Q'ty-Size Q-R	Removal Holes Q'ty-Size S-T	F	Mass kg/pc	H min.	M max.	Chamfer N
BR15HT-R31A	#20	105	880	3,600	550	24	25	85	55	30	70	6-M6	2-M6	17.0	0.8	45	3	1
BR18HT-R38A	#25	155	850	3,600	500	24	25	90	62	37	75	6-M6	2-M6	17.0	0.9	50	3	1
BR20HT-S20B	20	225	850	3,600	400	35	35	90	66	41	78	6-M6	2-M6	25.0	1.3	53	4	1
BR25HT-B46B	25 30	400	800	3,600	380	35	35	95	70	45	82	6-M6	2-M6	25.0	1.4	58	4	1
BR30HT-S30B	30	500	740	3,600	360	35	35	100	75	50	87	6-M6	2-M6	25.0	1.5	64	4	1
BR30HT-R51B	25 30 35 36	500	740	3,600	360	35	35	105	75	50	90	6-M6	2-M6	25.0	1.8	64	4	1
BR35HT-B56B	35 40	600	710	3,600	340	35	35	110	80	55	96	8-M6	2-M6	25.0	1.9	70	4	1
BR38HT-R61A	30 35 40 #45	425	740	3,600	400	25	25	120	85	60	105	6-M8	2-M8	19.0	1.8	74	3	1
BR40HT-S40B	40	850	670	3,600	320	35	35	125	90	65	108	8-M8	2-M8	25.0	2.4	82	4	1
BR40HT-R66B	35 40 45 #48	850	670	3,600	320	35	35	132	90	65	115	8-M8	2-M8	25.0	2.9	82	4	1
BR45HT-S45B	45	950	640	3,600	310	35	35	130	95	70	112	8-M8	2-M8	25.0	2.6	86	4	1
BR48HT-R76B	45 50 55 #60	1,100	620	3,600	300	35	35	140	100	75	125	8-M8	2-M8	25.0	3.3	92	4	1
BR50HT-B86B	40 45 50 55 60 65 #70	1,450	590	3,600	280	40	40	150	110	85	132	8-M8	2-M8	25.0	4.3	103	6.5	1
BR58HT-R101B	55 70 #80	1,800	550	3,600	260	50	50	175	125	100	155	8-M10	2-M10	25.0	6.7	117	11.5	1
BR60HT-B85A	45 50 60 65	2,400	420	3,600	230	60	50	175	125	92	155	8-M10	2-M10	36.0	7.6	110	6	1
BR70HT-B100A	45 50 55 60 70 75 #80	3,150	390	3,600	220	60	50	190	140	107	165	12-M10	2-M10	36.0	9.2	125	6	1.5
BR80HT-S80A	80	5,000	440	3,600	200	70	60	210	160	127	185	12-M10	2-M10	36.0	12	148	11	1.5
BR80HT-B120B	60 65 70 75 80 95	7,000	310	3,600	160	70	60	210	160	127	185	12-M10	2-M10	50.0	13	148	4	1.5
BR90HT-S90A	90	6,000	410	3,000	190	80	70	230	180	147	206	12-M12	2-M12	36.0	16	170	16	2
BR90HT-B140B	65 90 100 110	9,000	300	3,000	150	70	70	245	180	147	218	12-M12	2-M12	50.0	20	170	9	2
BR95HT-S100C	100	20,500	240	2,700	130	90	80	290	210	177	258	12-M16	2-M16	63.0	33	200	7.5	2
BR95HT-R170C	70 85 90 100 120 130	20,500	240	2,700	130	80	80	290	210	177	258	12-M16	2-M16	63.0	35	200	7.5	2
BR98HT-R200C	130 155	27,000	230	2,100	110	80	80	310	240	207	278	12-M16	2-M16	63.0	33	230	7.5	2
BR100HT-S100A	100	11,000	440	2,700	210	90	80	290	210	143	258	12-M16	2-M16	52.6	28	200	11.5	2
BR130HT-S130A	130	16,000	400	2,400	190	80	80	322	240	173	278	12-M16	2-M16	52.6	33	210	11.5	2
BR180HT-S180A	180	32,000	300	1,300	160	90	80	412	310	243	360	12-M20	2-M20	53	56	280	11.5	2
BR180HT-S180C	180	53,000	250	1,300	120	120	120	422	310	243	370	16-M20	2-M20	83	85	280	16.5	2
BR180HT-S180WA	180	64,000	300	1,300	160	160	160	412	310	243	360	12-M20	2-M20	106	107	280	30	2
BR180HT-S180WC	180	106,000	250	1,300	120	240	240	425	310	243	370	16-M20	2-M20	166	174	280	35	2
BR180HT-R240A	185	32,000	220	1,300	110	90	80	400	310	243	360	12-M20	2-M20	53	50	280	11.5	2
BR180HT-R240D	185	64,000	210	1,300	100	120	125	420	310	243	370	16-M24	2-M24	96	84	280	12.5	2
BR180HT-R240WB	185	70,000	220	1,300	110	160	160	412	310	243	360	24-M20	2-M20	140	100	280	8	2
BR180HT-R240WD	185	128,000	210	1,300	100	240	240	425	310	243	370	24-M24	2-M24	192	163	280	22	2
BR190HT-R260A	205	39,000	200	1,300	95	105	80	430	330	263	380	16-M20	2-M20	53	60	300	11.5	2
BR220HT-S220A	220	45,000	280	1,100	140	105	80	470	360	293	410	16-M20	2-M20	53	74	330	11.5	2
BR220HT-S220C	220	70,000	230	1,100	110	120	120	470	360	293	410	24-M20	2-M20	83	100	330	16.5	2
BR220HT-S220WA	220	90,000	280	1,100	140	160	160	480	360	293	410	18-M24	2-M24	106	141	330	25	2
BR220HT-S220WC	220	140,000	230	1,100	110	240	240	490	360	293	410	20-M30	2-M30	166	215	330	35	2
BR220HT-R290B	230	60,000	195	1,100	115	105	80	460	360	293	410	16-M20	2-M20	70	87	330	3	2
BR220HT-R290D	230	92,000	190	1,100	95	120	110	460	360	293	410	16-M20	2-M20	96	146	330	5	2

Dimensions in mm

Model	Bore Size H7	Torque Capacity Nm	Inner Race Overrunning Speed r/min Min.	Inner Race Overrunning Speed r/min Max.	Max. Engagement r/min	A	B	C	D H7	E	Mounting Holes PCD G	Mounting Holes Q'ty-Size Q-R	Removal Holes Q'ty-Size S-T	F	Mass kg/pc	H min.	M max.	Chamfer N
BR220HT-R290WB	230	120,000	195	1,100	115	160	160	480	360	293	410	18-M24	2-M24	140	120	330	8	2
BR220HT-R290WD	230	184,000	190	1,100	95	240	240	490	360	293	425	20-M30	2-M30	192	206	330	22	2
BR230HT-R310B	240	70,000	190	1,100	90	110	125	497	380	313	450	24-M20	2-M20	70	110	350	25.5	3
BR230HT-R310D	240	110,000	185	1,100	80	120	125	497	380	313	450	24-M20	2-M20	96	116	350	12.5	3
BR240HT-S240A	240	54,000	220	1,100	120	105	90	500	390	323	440	16-M20	2-M20	53	91	360	16.5	3
BR240HT-S240C	240	88,000	185	1,100	110	120	120	520	390	323	440	16-M24	2-M24	83	129	360	16.5	3
BR240HT-S240WA	240	108,000	220	1,100	120	180	180	505	390	323	440	24-M24	2-M24	106	161	360	35	3
BR240HT-S240WC	240	176,000	185	1,100	110	240	240	530	390	323	440	24-M30	2-M30	166	249	360	35	3
BR240HT-R320B	250	77,000	190	1,100	115	105	80	490	390	323	440	16-M24	2-M24	70	78	360	3	3
BR240HT-R320D	250	113,000	180	1,100	105	120	120	520	390	323	440	16-M24	2-M24	96	128	360	10	3
BR240HT-R320WB	250	154,000	190	1,100	115	180	180	505	390	323	440	24-M24	2-M24	140	173	360	18	3
BR240HT-R320WD	250	226,000	180	1,100	105	240	240	530	390	323	460	24-M30	2-M30	192	259	360	22	3
BR260HT-S260A	260	66,000	250	1,000	130	105	105	550	430	363	500	16-M24	2-M24	57	122	400	22	3
BR260HT-S260C	260	110,000	190	1,000	100	125	125	580	430	363	500	24-M24	2-M24	87	170	400	17	3
BR260HT-S260WA	260	132,000	250	1,000	130	210	210	550	430	363	500	24-M24	2-M24	114	235	400	46	3
BR260HT-S260WC	260	220,000	190	1,000	100	250	250	580	430	363	500	24-M30	2-M30	174	323	400	36	3
BR260HT-R360D	280	150,000	170	1,000	90	125	120	540	430	363	500	24-M24	2-M24	100	127	400	8	3
BR260HT-R360WB	280	196,000	175	1,000	95	210	210	550	430	363	500	24-M24	2-M24	148	227	400	29	3
BR260HT-R360WD	280	300,000	170	1,000	90	250	250	580	430	363	500	24-M30	2-M30	200	311	400	23	3
BR300HT-S300A	300	82,000	230	1,000	120	105	105	630	480	413	560	24-M24	2-M24	53	163	460	22	3
BR300HT-S300C	300	140,000	200	1,000	95	125	125	630	480	413	560	24-M24	2-M24	83	198	460	17	3
BR300HT-S300WA	300	164,000	230	1,000	120	210	210	630	480	413	560	24-M24	2-M24	106	324	460	46	3
BR300HT-R410D	320	195,000	165	1,000	85	125	120	630	480	413	560	24-M24	2-M24	100	186	460	8	3
BR300HT-R410WB	320	250,000	165	1,000	85	210	210	630	480	413	560	24-M24	2-M24	148	314	460	29	3
BR300HT-R410WD	320	366,000	165	1,000	85	220	220	630	480	413	560	24-M30	2-M30	200	324	460	8	3

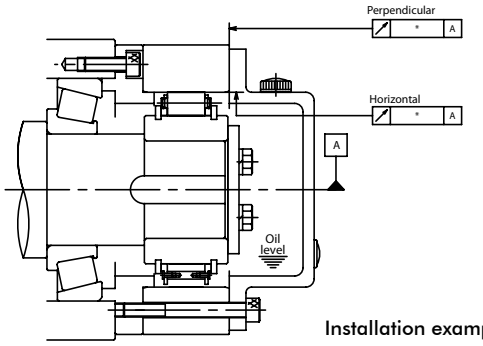
BR60HT~BR300HT: Non-stock item

Notes:

1. The maximum transmissible torque is twice the Torque Capacity.
2. Keyway No Mark on Bore Size: ISOR773/DIN6885.1 #Mark on Bore Size: DIN6885.3
3. Min. overrunning speed of inner race should not be below under continuous operation.
4. Max. engagement speed must not be exceeded when transmitting torque.

Installation and Usage

1. We recommend using shaft tolerances of h6 or h7 for Cam Clutch installation.
2. Use ISO R773/DIN 6885.1 Parallel key or DIN6885.3 Parallel key for models marked# on page 34. Ensure that the key does not move in the keyway. A loose key will damage the Cam Clutch.
3. When installing the Cam Clutch over a shaft, please follow the procedure outlined below. Never strike the clutch with a steel hammer or apply unnecessary impact loads.
   1) Verify Cam Clutch direction of rotation. The arrow on the inner race shows the free running (cam disengaged) direction. Make sure that the direction of cam engagement matches the intended application.
   2) Tap the inner race lightly with a soft hammer moving around the race circumference so the Cam Clutch moves slowly and uniformly onto the end of the shaft. Make sure that the outer race does not become dislodged.
   3) Place an end plate over the inner race and use the mounting bolts to pull the Cam Clutch onto the shaft as shown in Installation Method at right.
   4) Fix the end plate securely.
4. If you are installing the outer race first, check the precision of the fit. The tolerances for outer race mounting are shown in the tables at right. Verify that the correct tolerances can be obtained. Out of spec installation could damage the Cam Clutch.
5. Non-lubricated when shipping please lubricate before use. To lubricate the Cam Clutch, apply lubricant at the outer circumference of the inner race (see Installation example). Avoid over lubrication, as it will cause the Cam Clutch to generate excessive heat.
6. BR-HT Series accept lubricant generally used in gear reducer. It is possible to mount BR-HT directly in gearbox without separate lubrication.
7. When installing a cover or seal support over the outer race, use bolts with a tensile rating of 10.9 or greater. Use a sealing agent or packing material between the mating services to prevent leakage.



Installation example

Parallel Tolerances

Dimensions in mm

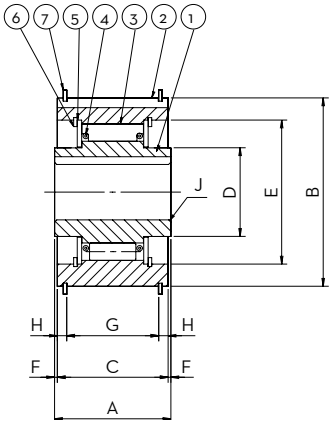
Model	Parallelism
BR15HT to BR58HT	0.10
BR60HT to BR98HT	0.15
BR100HT and above	0.25

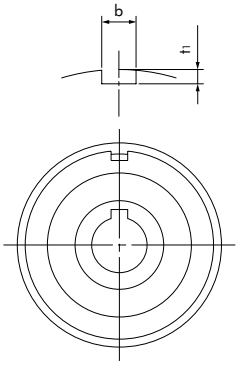
Right Angle Tolerances

Dimensions in mm

Model	Angularity
BR15HT to BR58HT	0.04
BR60HT to BR98HT	0.06
BR100HT and above	0.08

MDEU SERIES CAM CLUTCH





① Inner race
② Outer race
③ Cam, Roller
④ Spring
⑤ Plate
⑥ Spirolox (hole)
⑦ Spirolox (shaft)

MDEU

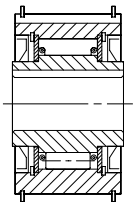
Dimensions in mm

Model	Torque Capacity Nm	Max. Overrunning Speed Inner Race r/min	Max. Indexing cycle/min	Max. Radial Load When Overrunning N	Bore Size H7	Inner Race Keyway	A	B h7	C	D	E	F	G	H	J	Outer Race Keyway b P10	Outer Race Keyway t1	Approx. Mass kg/pc
MDEU15	70	600	100	610	15	5 x 2.3	39	55	37	25	42	1	30	3.5	0.5	5 x 3.0		0.52
MDEU20	150	500	100	910	20	6 x 2.8	42	68	40	32	52	1	33	3.5	0.5	6 x 3.5		0.88
MDEU25	230	450	100	1060	25	8 x 3.3	42	80	40	40	65	1	33	3.5	0.5	8 x 4.0		1.1
MDEU30	390	400	100	1400	30	8 x 3.3	50	90	48	45	72	1	36	6.0	1.0	8 x 4.0		1.7
MDEU35	460	350	100	1500	35	10 x 3.3	50	100	48	50	80	1	36	6.0	1.0	10 x 5.0		2.1
MDEU40	530	350	100	1580	40	12 x 3.3	50	110	48	55	78	1	36	6.0	1.0	12 x 5.0		2.7
MDEU45	690	300	100	1770	45	14 x 3.8	50	120	48	65	88	1	36	6.0	1.0	14 x 5.5		3.2
MDEU50	870	300	100	1880	50	14 x 3.8	50	130	48	70	95	1	36	6.0	1.0	14 x 5.5		3.8
MDEU55	1100	250	100	2850	55	16 x 4.3	60	140	58	80	105	1	46	6.0	1.0	16 x 6.0		5.3
MDEU60	1500	250	100	3060	60	18 ×4.4	60	150	58	90	115	1	46	6.0	1.0	18 x 7.0		6.1
MDEU70	1900	200	100	3470	70	20 x 4.9	60	170	58	100	125	1	46	6.0	1.0	20 x 7.5		7.9
MDEU80	2300	200	100	3600	80	22 x 5.4	60	190	58	110	140	1	46	6.0	1.0	22 x 9.0		9.7

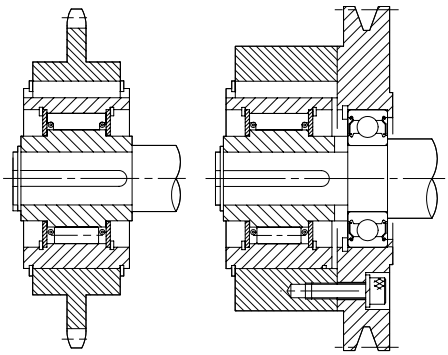
Installation and Usage

1. The tolerance of the sprocket, gear or pulley bore shall be H6 or H7. The recommendable tolerance of shaft is h6 or h7.
2. Usage of parallel keyways between outer race and sprocket, gear or pulley as well as clutch and shaft, is compulsory.
3. When installing the clutch on the shaft, apply pressure only on the inner race.
4. If thrust loads are encountered, other devices which release loads should be applied.
5. When installing a pulley where the radial load is larger than the max. given load of the clutch, we recommend the use of lateral bearings.
6. In arduous environments it is recommended to use MDEU-2GD Series, which have dust seals, in order to prevent contamination. The maximum overrunning speed of 2GD Series is 80% of the standard MDEU Series.

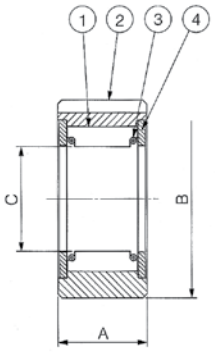
Option

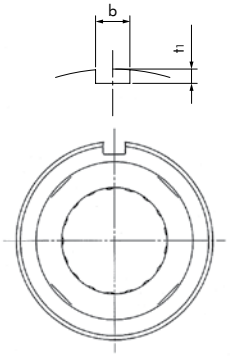


MDEU-2GD



Installation example





① Cam
② Outer race
③ Spring
④ Side plate

Dimensions in mm

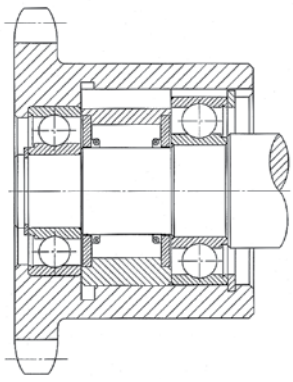
Model	Torque Capacity Nm	Max. Overrunning Speed Inner Race r/min	Max. Overrunning Speed Outer Race r/min	Drag Torque Nm	Max. Indexing cycle/min	A (-0.06 to +0)	B	C (-0.025 to +0)	Outer Race Keyway b P10	Outer Race Keyway t1	Use with JIS Bearing Number	Approx. Mass kg/pc
B 203	39.2	2400	500	0.098	150	25.0	40 $^{-0.014}_{-0.039}$	16.510	4 x 2.5		6203	0.23
B 204	58.8	2400	500	0.098	150	25.0	47 $^{-0.014}_{-0.039}$	18.796	5 x 3.0		6204	0.34
B 205	98	1800	400	0.196	150	25.0	52 $^{-0.017}_{-0.042}$	23.622	5 x 3.0		6205	0.45
B 206	235	1800	350	0.196	150	28.0	62 $^{-0.017}_{-0.042}$	32.766	7 x 4.0		6206	0.68
B 207	372	1800	300	0.196	150	28.0	72 $^{-0.017}_{-0.042}$	42.088	7 x 4.0		6207	0.80
B 208	549	1800	200	0.196	150	32.0	80 $^{-0.017}_{-0.042}$	46.761	10 x 4.5		6208	0.91
B 209	549	1800	200	0.196	150	32.0	85 $^{-0.020}_{-0.045}$	46.761	10 x 4.5		6209	0.95
B 210	784	1200	200	0.294	150	32.0	90 $^{-0.020}_{-0.045}$	56.109	10 x 4.5		6210	1.00
B 211*	784	1200	200	0.294	150	32.0	100 $^{-0.020}_{-0.050}$	56.109	10 x 4.5		6211	1.40
B 212*	1230	1200	180	0.294	150	42.0	110 $^{-0.020}_{-0.050}$	70.029	10 x 4.5		6212	1.80
B 213*	1230	1200	180	0.294	150	42.0	120 $^{-0.020}_{-0.050}$	70.029	10 x 4.5		6213	2.30
B 214*	1390	1000	180	0.392	150	42.0	125 $^{-0.024}_{-0.060}$	79.356	12 x 4.5		6214	2.40

*= Non-stock item

Installation and Usage

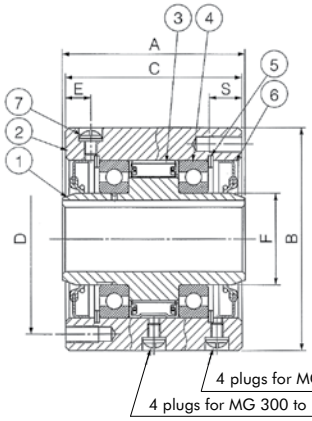
1. 200 Series Cam Clutch is shaft mounted, so the shaft on which the clutch is mounted must be hardened to HRC 56-60 and 1.5 mm case depth after grinding. Grind to 1.5S (16micro-inch) finish. The taper of this shaft should not exceed 0.01 mm per 50 mm.
2. For installation of the clutch, mount the clutch with bearings at both sides or on one side in order to obtain concentricity between the shaft and the clutch outer race and to take up radial or thrust loads which may work on the outer race or the shaft. See the installation example.
3. The clutch should be mounted on the shaft by rotating it in the direction marked by the arrow shown on the clutch plate. Do not apply shock to the clutch by hammering.
4. The clutches have the same outside diameters as the bearings shown in the table above. Bore tolerance of the housing in which the clutch is assembled should be within the range shown in the table.
5. For indexing, oil lubrication is recommended.
6. Concentricity of the housing bore and shaft should be within 0.05 mm.
7. Key profile should be in accordance with JIS B1301-1959.

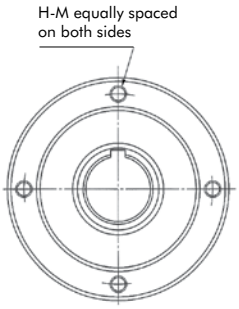
Model	Tolerance of housing bore (mm)
B 203, B 204	+0 to +0.025
B 205, B 206, B 207, B 208	+0 to +0.030
B 210, B 211, B 212, B 213	+0 to +0.035
B 214	+0 to +0.040



Installation example

MG SERIES CAM CLUTCH





① Inner race
② Outer race
③ Cam cage assembly
④ Bearing
⑤ Spirolox
⑥ Oil seal
⑦ Lubrication filler plug

MG

Dimensions in mm

Model	Torque Capacity Nm	Max. Overrunning Speed Inner Race r/min	Max. Overrunning Speed Outer Race r/min	Drag Torque Nm	Bore Size H7	Inner Race Keyway	A	B h7	C	D	E	F	S	H-M No. of Tapped Holes x Size x Pitch	Lubrication Filter Plug Size x Pitch	Oil cc	Approx. Mass kg/pc
MG300	314	2800	900	0.225	19	5 x 2	63	77	60	66	10.4	28.5	13	4 x M 6 x P1.00	M 6 x P1.0	25	1.8
MG400	539	2600	800	0.284	22	5 x 2	70	88	67	73	10.7	31.7	16	4 x M 8 x P1.25	M 6 x P1.0	30	2.7
MG500	1620	2400	800	0.510	31.5	7 x 3	89	108	86	92	12.3	44.4	16	4 x M 8 x P1.25	M 6 x P1.0	50	5.0
MG600	3140	2100	700	0.843	50	12 x 3.5	95	136	92	120	12.8	69.8	16	6 x M 8 x P1.25	M 6 x P1.0	80	8.6
MG700*	5880	1500	500	1.70	70	18 x 6	127	180	124	160	19.8	101.5	20	6 x M10 x P1.5	M 6 x P1.0	135	19.5
MG750*	9510	1800	600	3.43	85	24 x 6	153	200	150	175	75	110	25	8 x M14 x P2.0	M 8 x P1.25	400	37.0
MG800*	17600	1300	475	5.39	110	28 x 7	158	250	155	220	77.5	140	25	8 x M16 x P2.0	M 8 x P1.25	500	46.5
MG900*	24500	1200	400	6.76	135	35 x 9	165	300	160	265	80	170	32	10 x M16 x P2.0	M 8 x P1.25	620	70.5
MG1000*	33800	1200	325	8.13	160	38 x 10	188	370	180	325	90	200	32	12 x M16 x P2.0	M 8 x P1.25	850	108.5
MG1100*	78400	350	-	5.19	185	45 x 14	260	470	250	415	125	260	40	12 x M20 x P2.5	M12 x P1.75	2900	250
MG1200*	95100	300	-	17.6	200	45 x 14	260	500	250	440	125	280	45	12 x M24 x P3.0	M12 x P1.75	3000	280
MG1300*	176400	250	-	18.7	250	56 x 17.5	280	600	260	530	130	340	50	12 x M30 x P3.5	M12 x P1.75	3800	410

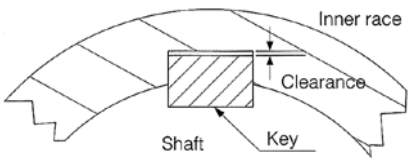
*= Non-stock item

Installation and Usage

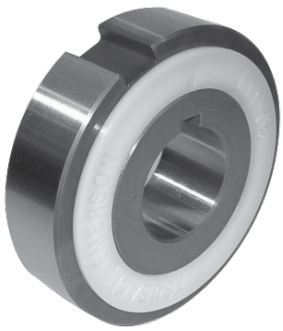
1. MG Series Cam Clutch is used for high speed inner race overrunning applications.
2. For attaching a pulley, a gear, or sprocket to the clutch, insert the clutch into the hub of the device, and screw the bolts (high tension) into the tapped holes on the clutch end. The tolerance bore of the hub should be H6 or H7 or JIS standard.
3. Recommended shaft tolerances are as follows:

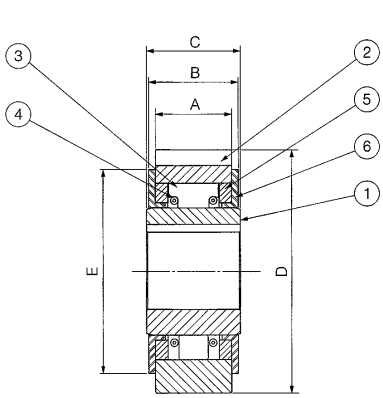
Model	Tolerance of housing bore (mm)
MG300, MG400	+0 to +0.021
MG500, MG600	+0 to +0.025
MG700	+0 to +0.030
MG750, MG800	+0 to +0.035
MG900	+0 to +0.040

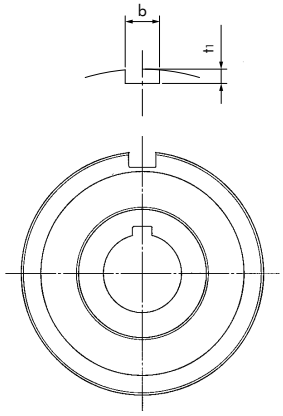
4. The key should be in accordance with JIS B1301-1959. However, for MG750 and above models, a key is attached.
5. Use only a parallel key to secure the clutch. Never use a tapered key.
6. If the clutch receives shock loads or is designed for use at full torque capacity, it is better to use a hardened key and shaft.
7. Allow for a clearance between the top of the clutch keyway and the top of the key for pressure ventilation. In case of MG Series a pressure ventilation hole is provided on the keyway of the clutch inner race.
8. When mounting the clutch on a shaft, apply pressure to the inner race, but never to the outer race.



9. Thrust load should be taken up by other devices, not by the Cam Clutch.
10. When using MG Series at medium and high speeds, pay attention to heating. Longevity is shortened if the temperature of Cam Clutch outer race rises to over 70°C. In this case, use a different model or provide an oil bath or forced lubrication.
11. Oil is not sealed in at the time of shipment. Supply an appropriate amount of oil before use.
12. When placing an order for MG Series Cam Clutch model MG750 and above, please inform TSUBAKI of the overrunning speed you use.







① Inner race
② Outer race
③ Cam, Roller
④ Spring
⑤ Side plate
⑥ Thrust metal

LD

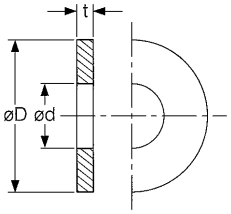
Dimensions in mm

Model	Torque Capacity Nm	Max. Overrunning Speed r/min	Max. Indexing cycle/min	Max. Radial Load When Overrunning N	Drag Torque Nm	Bore Size H7	Inner Race Keyway	A	B	C	D	E	Outer Race Keyway b P10	Outer Race Keyway t1	Approx. Mass kg/pc
LD04	5.88	300	100	200	0.196	10	4 x 1.5	19.5	23.9	24	47 -0.014 -0.039	40	5 x 3		0.25
LD05	9.80	300	100	300	0.294	14	5 x 2	19.5	23.9	24	52 -0.017 -0.042	45	5 x 3		0.30
LD06	19.6	200	100	500	0.294	20	5 x 2	19.5	23.9	24	62 -0.017 -0.042	52	7 x 4		0.40
LD07	29.4	200	100	700	0.392	25	7 x 3	19.5	23.9	24	72 -0.017 -0.042	62	7 x 4		0.55
LD08	49.0	200	100	800	0.490	30	7 x 3	19.5	23.9	24	82 -0.017 -0.042	70	10 x 4.5		0.65

Installation and Usage

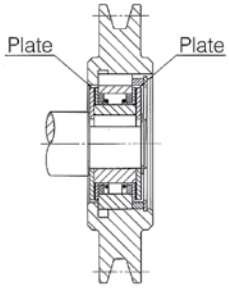
1. LD Series Cam Clutch is prelubricated with special grease and are ready for use. No additional lubricant is required.
2. When installing the clutch on the shaft, press the clutch inner race slightly with a soft hammer to prevent the clutch outer race from slipping away from the inner race.
3. Be sure to attach the plate. This prevents the outer race from slipping away from the inner race. See recommended dimensions of the plate listed on the right.
4. For lubrication, coat the plate and thrust plate with grease.
5. Never apply thrust loads to the clutch. Other devices should be provided to take up thrust loads applied to the clutch.
6. Key should be in accordance with JIS B1301-1959.
7. The bores of the pulley, sprocket, etc., should have a tolerance of H6 or H7.

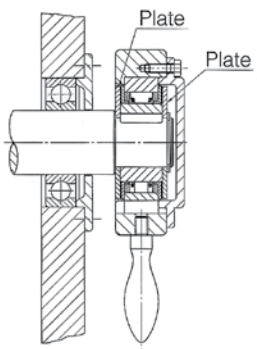
Recommendend Plate Dimensions

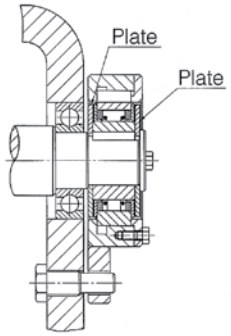


Model	t	ød	øD
LD04	2	10	40
LD05	2	14	45
LD06	3	20	52
LD07	3	25	62
LD08	3	30	70

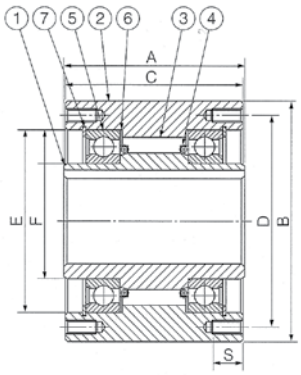
Installation example

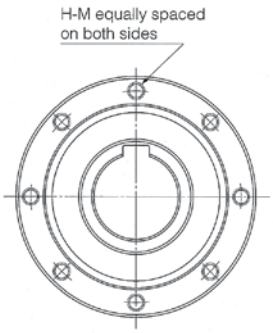






MZ SERIES CAM CLUTCH





① Inner race
② Outer race
③ Cam
④ Spring
⑤ Bearing (ZZ type)
⑥ Side plate
⑦ Spirolox

MZ

Dimensions in mm

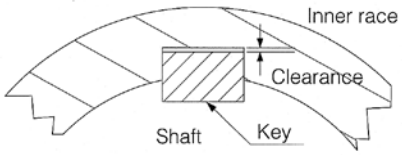
Model	Torque Capacity Nm	Max. Overrunning Speed Inner Race r/min	Max. Overrunning Speed Outer Race r/min	Max. Indexing cycle/min	Drag Torque Nm	Bore Size H7	Inner Race Keyway	A	B	C	D	E M6	F	G	H-M No. of Tapped Holes x Size x Pitch	S	Approx. Mass kg/pc
MZ15*	186	1800	900	150	0.20	15	5 x 2.3	62	68	60	58	47	25	5.5	6 x M5 x P 0.8	10	1.4
MZ17*	215	1700	800	150	0.20	17	5 x 2.3	66	75	64	64	52	28	6.3	6 x M5 x P 0.8	10	1.8
MZ20	323	1600	700	150	0.29	20	6 x 2.8	67	80	65	68	55	30	7.6	6 x M6 x P 1.0	12	2.0
MZ30-22*	735	1500	500	150	0.39	22	6 x 2.8	82	100	80	88	75	45	8.9	6 x M8 x P1.25	16	3.7
MZ30-25*						25	8 x 3.3										
MZ30						30	10 x 3.3										
MZ35	1080	1400	300	150	0.49	35	10 x 3.3	87	110	85	95	80	50	8.7	6 x M8 x P1.25	16	4.8
MZ45-40*	1620	1400	300	150	0.69	40	12 x 3.3	92	125	90	110	95	60	8.4	8 x M8 x P1.25	16	6.2
MZ45						45	14 x 3.8										
MZ60-50*	2110	1200	250	150	0.98	50	14 x 3.8	102	155	100	140	125	80	9.1	8 x M8 x P1.25	16	10.2
MZ60-55*						55	16 x 4.3										
MZ60						60	18 x 4.4										
MZ70-65*	3040	1100	250	150	1.27	65	18 x 4.4	105	175	103	162	145	95	8.6	8 x M8 x P1.25	16	13.2
MZ70						70	20 x 4.9										

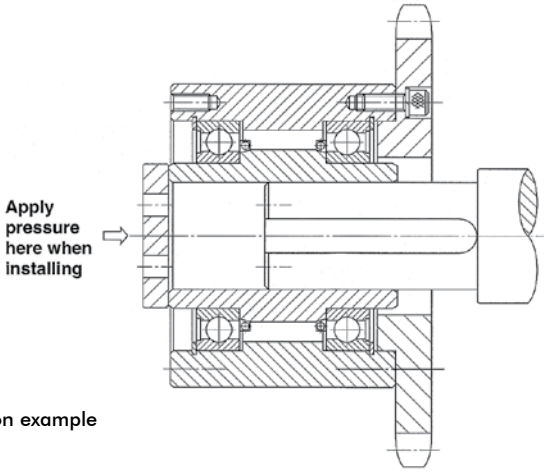
*= Non-stock item

Installation and Usage

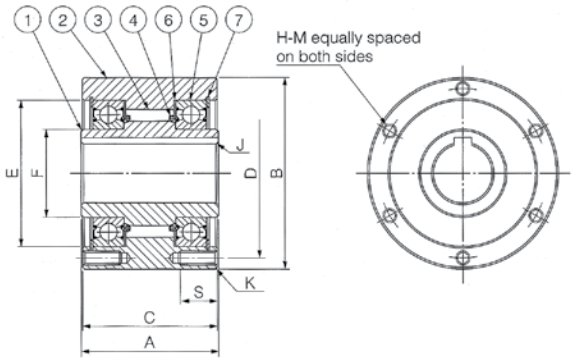
1. MZ Series Cam Clutch is shielded by shield bearings on both ends, packed with a special grease, and are ready for use. No additional lubricant is required.
2. For attaching pulleys, gears or sprockets to the clutches, insert hubs (with f7 tolerance of ISO R773) along the inner surface of the outer race and screw the bolts (high tension) into the tapped holes on the clutch end.
3. Recommended shaft tolerances are shown in the table.
4. External thrust load should be supported by other devices, not by the Cam Clutch.
5. Use only a parallel key to secure the clutch to the shaft. Do not use a tapered Key.
6. When mounting the clutch onto the shaft, apply pressure to the inner race but never to the outer race.
7. For vertical mounting, please consult TSUBAKI.
8. Ambient temperature range is -5°C to +40°C.
9. Key to be used should be in accordance with ISO R773. (DIN 6885.1)

Model	Nominal diameter (mm)	Relative shaft tolerance (mm)
MZ15	15	-0.018 to +0
MZ17	17	-0.018 to +0
MZ20	20	-0.021 to +0
MZ30	30	-0.021 to +0
MZ35	35	-0.025 to +0
MZ45	45	-0.025 to +0
MZ60	60	-0.030 to +0
MZ70	70	-0.030 to +0





Installation example



① Inner race
② Outer race
③ Cam
④ Spring
⑤ Bearing (ZZ type)
⑥ Side plate
⑦ Spirolox

MZ-G

Dimensions in mm

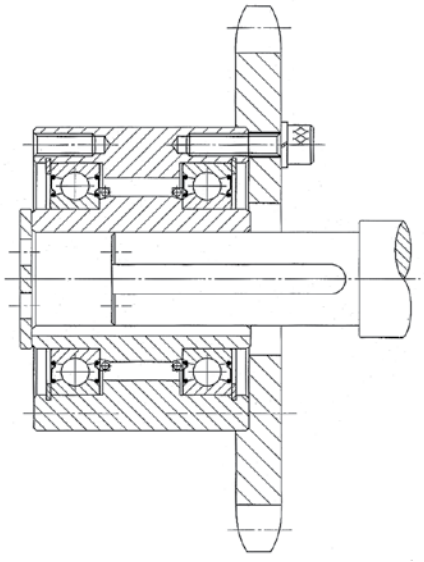
Model	Bore size H7	Inner Race Keyway	J	Inner Race Width A	Outer Race Width C	B h7	F	E	K	D	S	H-M No. of Tapped Holes x Size x Pitch	Approx. Mass kg/pc
MZ15G*	15	5 x 2.3	0.8	55	53	68	25	47	1.3	58	10	6 x M5 x P0.8	1.3
MZ17G*	17	5 x 2.3	0.8	63	61	75	28	52	1.3	64	10	6 x M5 x P0.8	1.7
MZ20G*	20	5 x 2.3	0.8	64	62	80	30	55	1.3	68	12	6 x M6 x P1.0	1.9
MZ30G-22	22	8 x 3.3	1.0	70	68	100	45	75	1.3	88	16	6 x M8 x P1.25	3.2
MZ30G-25*	25	8 x 3.3	1.0										
MZ30G	30	10 x 3.3	1.0										
MZ35G	35	10 x 3.3	1.0	78	76	110	50	80	1.3	95	16	6 x M8 x P1.25	4.4
MZ45G-40*	40	12 x 3.3	1.3	87	85	125	60	95	1.3	110	16	8 x M8 x P1.25	6.2
MZ45G*	45	12 x 3.3	1.3										
MZ60G-50*	50	14 x 3.8	1.5	90	88	155	80	125	1.3	140	16	8 x M8 x P1.25	9.5
MZ60G-55*	55	16 x 4.3	1.5										
MZ60G*	60	18 x 4.4	1.5										
MZ70G-65*	65	18 x 4.4	1.8	105	103	175	95	145	1.3	162	16	8 x M8 x P1.25	13.1
MZ70G*	70	20 x 4.9	1.8										

*= Non-stock item

Capacities

Model	Torque Capacity Nm	Max. Overrunning Speed		Max. Indexing cycle/min	Drag Torque Nm
		Inner Race r/min	Outer Race r/min		
MZ15G*	186	1800	900	150	0.20
MZ17G*	215	1700	800	150	0.20
MZ20G*	323	1600	700	150	0.29
MZ30G-22	735	1500	500	150	0.39
MZ30G-25*					
MZ30G					
MZ35G	1080	1400	300	150	0.49
MZ45G-40*	1620	1400	300	150	0.69
MZ45G*					
MZ60G-50*	2110	1200	250	150	0.98
MZ60G-55*					
MZ60G*					
MZ70G-65*	3040	1100	250	150	1.27
MZ70G*					

*= Non-stock item



Installation example

Installation and Usage

1. When mounting sprockets or gears to the outer race, use the outer race outer dimension (dimension B) to make a centering flange in the gear or sprocket. Then attach firmly with bolts of tensile strength 10.9 or greater to the tapped holes in the outer race.
2. Please refer to MZ Series for usage and other types of installations.

TL SERIES TORQUE LIMITER

The Tsubaki Torque Limiter is a protective device that limits the torque transmitted in a drive system by slipping when the torque demand exceeds a preset value as a result of shock loads, overloads, or machine jams. It automatically reengages when the overload is removed. No resetting is required. Tsubaki Torque Limiters prevent machine damage and eliminate costly downtime.

Tsubaki Torque Limiters utilize spring loaded friction surfaces for their operation and slip torque is preset by adjustment of the spring force by using the adjustment nut or bolts.
Tsubaki Torque Limiters can be used with a sprocket, gear, sheave, or flange plate as the center member clamped between two friction facings.
The Tsubaki Torque Limiter ratings are realistic and consistent with optimum spring loads and face pressures that permit longer slip time, maintain re-engagement at preset torque, and provide long lasting protection. This is an important advantage over the shear-pin mechanism which serves only as a one-shot remedy.

TL200 $^{-1}_{-2}$ TL250 $^{-1}_{-2}$ TL350 $^{-1}_{-2}$

- Single Nut Adjustment
- Lock Washer to prevent the nut from loosening

TL10 $^{-16}_{-24}$ TL14 $^{-10}_{-15}$ TL20 $^{-6}_{-12}$

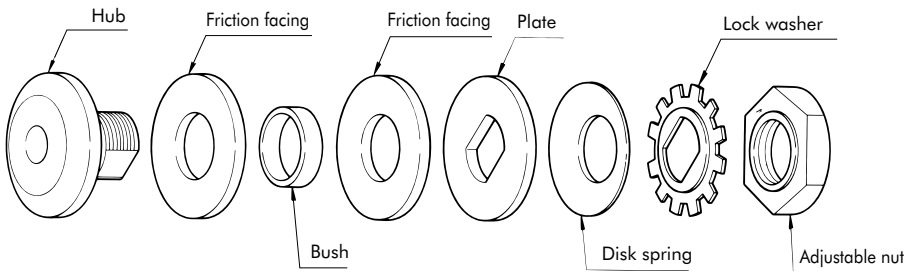
- 5 to 8 Bolt Adjustment
- Each spring backed up by one adjustment bolt
- Each bolt has a hole through its head for wire to prevent loosening

TL500 $^{-1}_{-2}$ TL700 $^{-1}_{-2}$

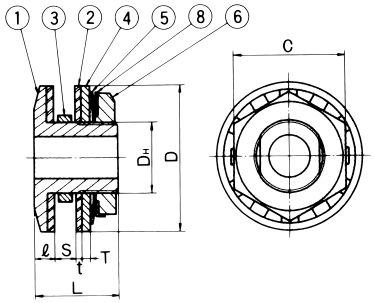
- Three Bolt Adjustment
- Torque preset by the three bolts (an adjustment nut to fix a pilot plate in place)

TL200 $^{-1}_{-2}$ C thru TL20 $^{-6}_{-12}$ C

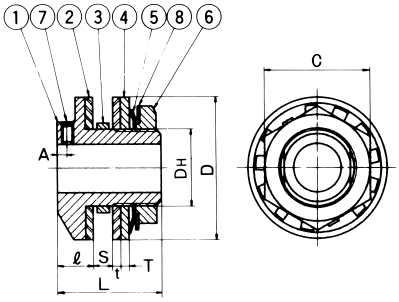
The Torque Limiter Coupling combines overload slip protection with the ability to couple driving and driven shafts. It is an assembly consisting of a Tsubaki Torque Limiter and a Roller Chain Coupling. This construction provides a dependable and easy-to-assemble flexible coupling.



TL200



TL250, TL350



1. Hub
2. Friction facing
3. Bush
4. Plate
5. Disk spring
6. Adjustable nut
7. Hexagon socket head set screw
8. Lock washer

TL200-1L, TL250-1L and TL350-1L have a spacer between the disk spring and the lock washer.

TL

Dimensions in mm

Model	Torque Range Nm	Plain Bore	Max. Bore	Bush Length	O.D. of Bush	Bore for Centre Member	D	D_H	L	ℓ	T	t	S (max.)	A	C	Adjust. Nut Size x Pitch	Set Screw	Approx. Mass kg/pc
TL200-1	2.9 ~ 9.8	7	14	3.8 6.0	30 -0.024 -0.049	30 +0.03 0	50	24	29	6.5	2.6	2.5	7	-	38	M24 x P1.0	-	0.2
TL200-2	6.9 ~ 20																	
TL250-1	6.9 ~ 27	10	22	4.5 6.5	41 -0.010 -0.045	41 +0.05 0	65	35	48	16	4.5	3.2	9	4	50	M35 x P1.5	M5	0.6
TL250-2	14 ~ 54																	
TL350-1	20 ~ 74	17	25	4.5 6.5 9.5	49 -0.025 -0.065	49 +0.05 0	89	42	62	19	4.5	3.2	16	6	63	M42 x P1.5	M6	1.2
TL350-2	34 ~ 149																	

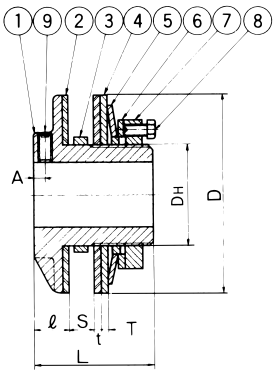
Model Identification

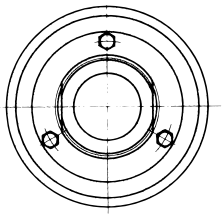
TL 250-1 C

- C — Coupling Type
- 1 — Number of Disc Springs
- 250 — Size
- TL — Torque Limiter

TL SERIES TORQUE LIMITER

TL500, TL700





① Hub
② Friction facing
③ Bush
④ Plate
⑤ Disk spring
⑥ Pilot plate
⑦ Adjustable nut
⑧ Adjustable bolt
⑨ Hexagon socket headcap set screw

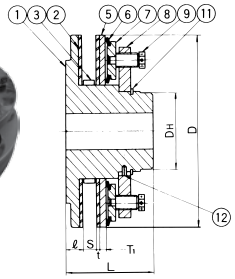
TL

Dimensions in mm

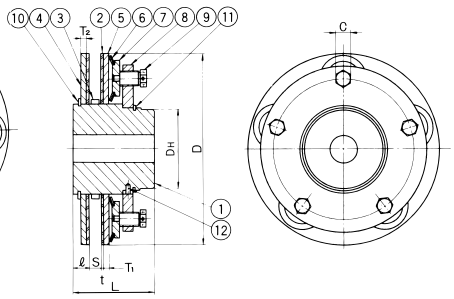
Model	Torque Range Nm	Plain Bore	Max. Bore	Bush Length	O.D. of Bush	Bore for Centre Member	D	D_H	L	ℓ	T	t	S (max.)	A	C	Adjust. Nut Size x Pitch	Adjust. Bolt Holes x Size x Pitch	Set Screw	Approx. Mass kg/pc
TL500-1	47 ~ 210	20	42	6.5	74 -0.05 -0.10	74 +0.05 0	127	65	76	22	6	3.2	16	7	-	M65 x P1.5	3 x M8 x P1.0	M8	3.5
TL500-2	88 ~ 420			9.5															
TL700-1	116 ~ 569	30	64	9.5	105 -0.075 -0.125	105 +0.05 0	178	95	98	24	8	3.2	29	8	-	M95 x P1.5	3 x M10 x P1.25	M10	8.4
TL700-2	223 ~ 1080			12.5															

TL SERIES TORQUE LIMITER

TL10



TL14, TL20



1. Hub
2. Friction facing
3. Bush
4. Plate (A)
5. Plate (B)
6. Disk spring
7. Spring retainer
8. Pilot plate
9. Adjustable bolt
10. Snap ring for shaft
11. Spirolox
12. Spring pin

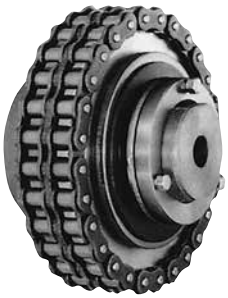
TL

Dimensions in mm

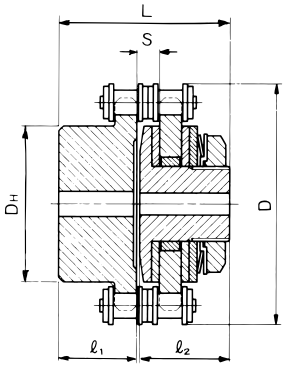
Model	Torque Range Nm	Plain Bore	Max. Bore	Bush Length	O.D. of Bush	Bore for Centre Member	D	D_H	L	ℓ	T_1	T_2	t	S (max.)	C	Adjust. Bolt Holes x Size x Pitch	Approx. Mass kg/pc
TL10-16*	392 ~ 1247	30	72	12.5 15.5 19.5	135 $^{-0.085}_{-0.125}$	135 $^{+0.07}_{0}$	254	100	115	23	15	-	4.0	24	19	8 x M18 x P1.5	21
TL10-24*	588 ~ 1860																
TL14-10*	882 ~ 2666	40	100	15.5 19.5 23.5	183 $^{-0.07}_{-0.12}$	183 $^{+0.07}_{0}$	356	145	150	31	13	13	4.0	29	27	5 x M26 x P1.5	52
TL14-15*	1960 ~ 3920																
TL20-6*	2450 ~ 4900	50	130	15.5 19.5 23.5	226 $^{-0.07}_{-0.12}$	226 $^{+0.07}_{0}$	508	185	175	36	15	18	4.0	31	36	6 x M32 x P1.5	117
TL20-12*	4606 ~ 9310																

*= Non-stock item

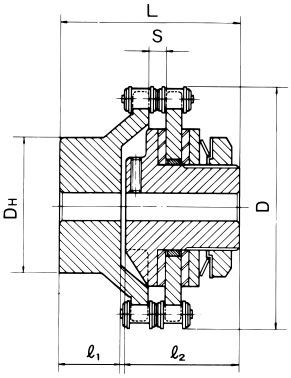
TL SERIES TORQUE LIMITER



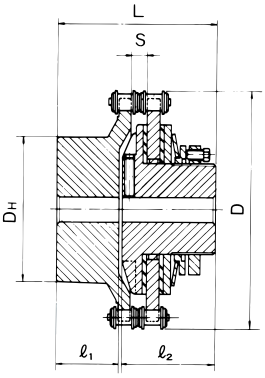
TL200-C



TL250-C, TL350-C



TL500-C, TL700-C



Coupling

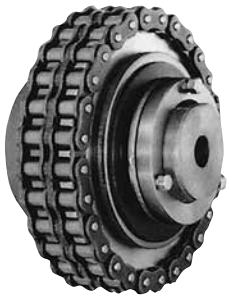
Dimensions in mm

Size	Torque Range Nm	Max. Running Speed r/min	Plain Bore		Max. Bore		Sprocket	D	D_H	L	ℓ1	ℓ2	S	Approx. Mass
			Coupling Side	TL Side	Coupling Side	TL Side								kg/pc
TL200-1C	2.9 ~ 9.8	1200	8	7	31	14	RS40-16T	76	50	55	24	29	7.5	1.0
TL200-2C	6.9 ~ 20													
TL250-1C	6.9 ~ 27	1000	13	10	38	22	RS40-22T	102	56	76	25	48	7.4	1.9
TL250-2C	14 ~ 54													
TL350-1C	20 ~ 74	800	13	17	45	25	RS50-24T	137	72	103	37	62	9.7	4.2
TL350-2C	34 ~ 149													
TL500-1C	47 ~ 210	500	18	20	65	42	RS60-28T	188	105	120	40	76	11.6	10.0
TL500-2C	88 ~ 420													
TL700-1C	116 ~ 569	400	23	30	90	64	RS80-28T	251	150	168	66	98	15.3	26.0
TL700-2C	223 ~ 1080													

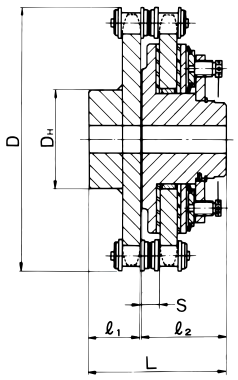
Note:

When the Torque Limiter Coupling is running at max. speed, the chain and sprocket should be lubricated with MoS2 or grease and covered.

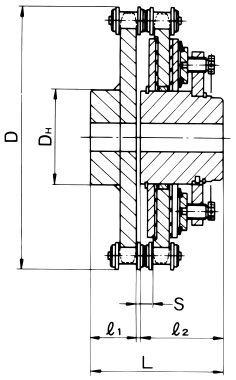
Please contact Tsubaki when a higher speed is required than those listed above.



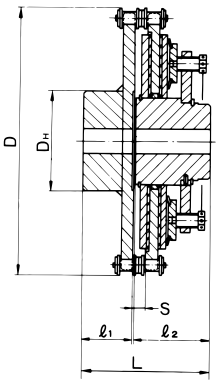
TL10-C



TL14-C



TL20-C



Coupling

Dimensions in mm

Size	Torque Range Nm	Max. Running Speed r/min	Plain Bore		Max. Bore		Sprocket	D	D_H	L	$\ell 1$	$\ell 2$	S	Approx. Mass kg/pc
			Coupling Side	TL Side	Coupling Side	TL Side								
TL10-16C*	392 ~ 1274	300	33	30	95	72	RS140-22T	355	137	189	71	115	26.2	66
TL10-24C*	588 ~ 1860													
TL14-10C*	882 ~ 2666	200	38	40	118	100	RS160-26T	470	167	235	80	150	30.1	140
TL14-15C*	1960 ~ 3920													
TL20-6C*	2450 ~ 4900	140	43	50	150	130	RS160-36T	631	237	300	120	175	30.1	285
TL20-12C*	4606 ~ 9310													

*= Non-stock item

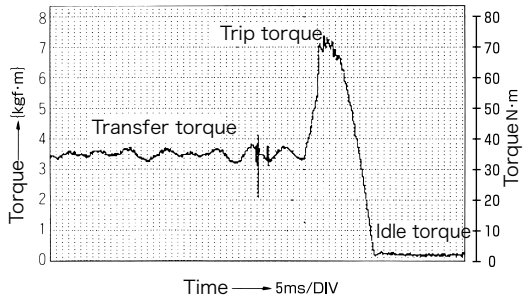
Note:
When the Torque Limiter Coupling is running at max. speed, the chain and sprocket should be lubricated with MoS2 or grease and covered.
Please contact Tsubaki when a higher speed is required than those listed above.

TGM SERIES SHOCK GUARD

Shock Guard TGM Series are safety devices for the protection of machine equipment from overload. The Shock Guard TGM Series has many advantages compared to other safety devices such as share pin type, friction type, ball type, roller type etc.

High Precision Trip Torque

Accuracy of consecutive repeated trip torque fluctuations is within ±5%. One (1) high precision cam follower pressurizes tightly from the radial direction in the precisely machined pocket. A highly rigid and stable load rate rectangular spring is used. Trip movement is a rolling movement, so even a repeat trip produces almost no torque variation.

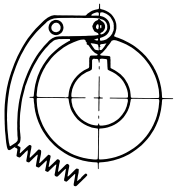


Sealed Construction

Covered in a special aluminum alloy casing, the TGM Series is sealed, so it is almost impossible for dust, oil or water to penetrate it. Therefore, it does not affect trip torque precision, making it an ideal overload protection device.

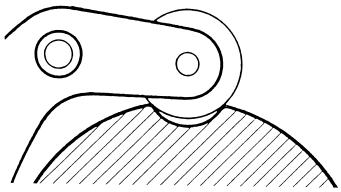
Single Position

The cam follower and pocket engage together, so there is no phase shift between the drive and the driven sides.



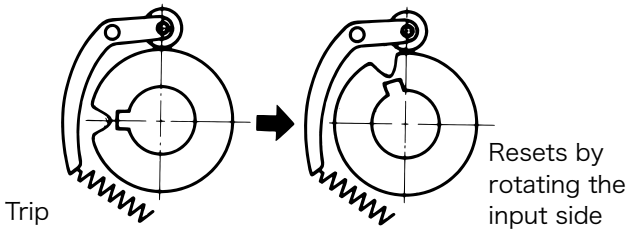
No Backlash

There is no backlash since the engagement of cam follower and pocket involves 2 contact points.



Automatic Reset

Once the cause of overload is removed, the Shock Guard automatically moves back to its original position by rotating the input side a little (at less than 50r/min), or by inching the motor.



Long Life

The TGM Series is able to withstand more than 100.000 trips. Due to strong materials, thermal processing and precision machining, the cam follower and pocket can withstand even severe repeat trips and not collapse. During trip, the idling part uses a heavy-duty needle bearing, so there is almost no friction.

LS Detecting Plate for Overload Detector

When the Shock Guard trips the LS detecting plate slides in the axial direction, so it is easy to actuate the limit switch, shut off the power or set off the alarm. When tripping it can be used whether it stops on the camshaft side or the housing (Torque Guard case) side. The LS detecting plate can be mounted on all models.

Easy Operation

The camshaft and case can be used on either the drive or driven sides. As well, it can be used in either direction of rotation. For the drive member, you can choose between using a chain, pulley or gear. Assembling with a coupling is also possible.

Variable Torque Setting

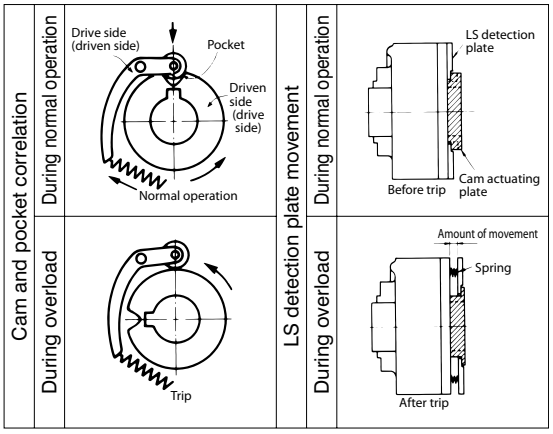
By simply turning the adjusting screw with a hexagonal Allen Wrench, precise torque can be set. The adjusting nut is on the outer surface of the Torque Guard, so torque setting can be done easily.

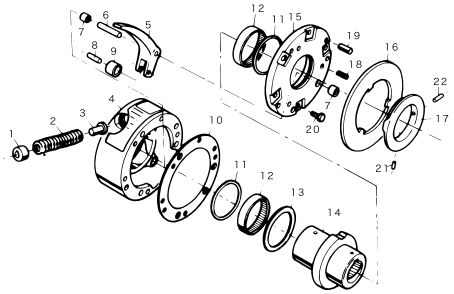
Maintenance Free

The Shock Guard TGM Series is packed in high quality grease before shipment, so greasing is not necessary.

Installation and Usage

1. The cam follower transmits torque by engaging with the camshaft pocket in a radial direction. When the machine is overloaded, the cam follower pops out of the pocket, and completely separates from the overload.
2. The cam follower pocket is precision machined and heat treated, so it is able to maintain high torque precision for extended periods of time.
3. The cam follower and pocket are non-backlash, with a 2-point contact system.
4. Using the leverage of one rectangular coil spring pressurizing the cam follower, it is possible 'to give high precision pressure.
5. Torque level is infinitely adjustable by the torque control screw.
6. Due to overload, the idling during trip is received by 5 needle bearings, so there is no slide, and idling friction torque is minute.
7. Because the housing and cover are made from a solution treated aluminum, it has a light but strong construction.
8. Due to its sealed construction, it is highly difficult for dust, water or oil to penetrate the TGM Series.
9. If the Shock Guard trips because of overload, the LS detecting plate slides in the axis direction, so by operating the limit switch, overload detection is easy.

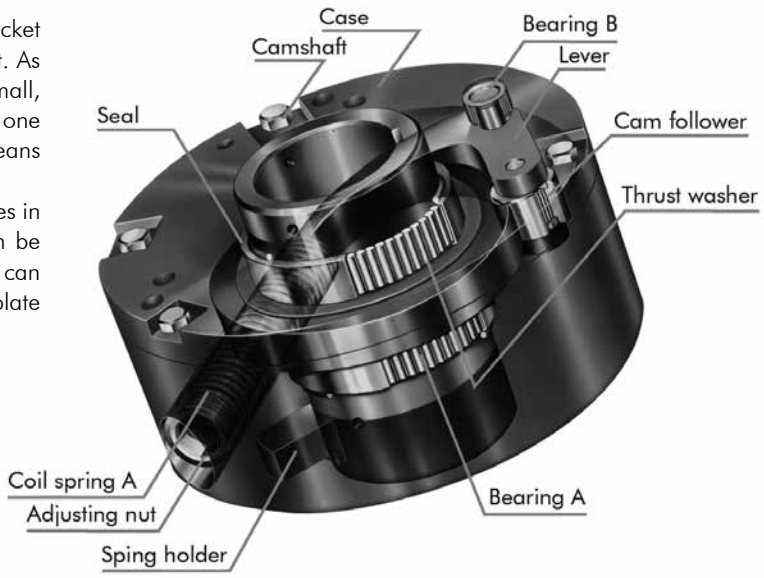




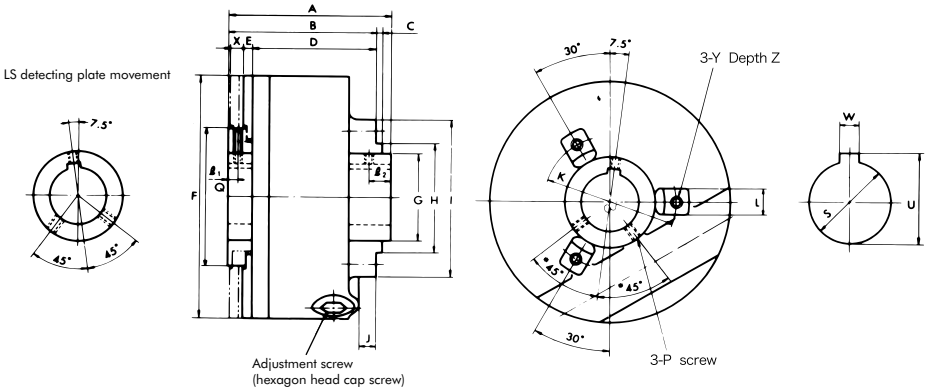
1 Adjusting screw
2 Coil spring A
3 Spring seat
4 Case
5 Lever
6 Fulcrum pin
7 Bearing B
8 Roller pin
9 Cam follower
10 Gasket
11 Seal
12 Bearing A
13 Thrust washer
14 Cam shaft
15 Cover
16 LS detecting pl
17 Cam actuation
18 Coil spring B
19 Spring pin
20 Hexagonal bolt

Principle

1. Torque is transmitted by the engagement of the cam follower and the pocket with a 2 point contact system.
   The method to pressurize the cam follower to the cam pocket is to hold it by one rectangular coil spring in a radial direction. Therefore there is no backlash, allowing it to function as a high trip torque precision overload protection device. Reset is carried out using an automatic reset system, so as the cam follower settles into its pocket position, operation resumes. As it is a two-point contact, there is no phase shift from the original position.
2. When overloaded, the cam follower comes out of its pocket and starts rolling on the outer diameter of the camshaft. As there is no slide section, the idling friction torque is small, making it a highly durable device. As well, the simple one position engagement construction of the TGM Series means its high trip torque precision does not diminish.
3. When the Shock Guard trips, the LS detecting plate slides in the axis direction. From this point, the limit switch can be actuated and the power can be turned off. The alarm can also be sounded. For each one trip, the LS detecting plate slides three times.



TGM SERIES SHOCK GUARD



TGM

Dimensions in mm

Model	Torque Range Nm	Max. Running Speed r/min	Bore Size H7	Approx Mass kg/pc
TGM3	1.5 ~ 3.7	600	14	0.6
TGM6	2.5 ~ 6.4	600	14	0.6
TGM20	6.4 ~ 20	500	20	1.1
TGM60	20 ~ 69	300	30	2.5
TGM200	68 ~ 225	200	50	5.4
TGM400*	225 ~ 451	150	60	17.2
TGM800*	451 ~ 902	150	60	17.2

Model	A	B	C	D	E	F	G	H	i	J	K	L	M	P	Q	ℓ1	ℓ2	S H7	U	W	X	Y	Z
TGM3	60	57	2	48	3	80	22	30	50	3	40	8	5	M4	40	4	6	14	16.3	5	4	M4	8
TGM6	60	57	2	48	3	80	22	30	50	3	40	8	5	M4	40	4	6	14	16.3	5	4	M4	8
TGM20	70	66	3	57	3	100	30	40	60	4	50	10	6	M4	50	4	7	20	22.8	6	4	M5	10
TGM60	89	81	3	68	5	133	47.6	60	86	7	73	14	12	M5	76	6	12	30	33.3	8	6	M6	13
TGM200	110	100	3	85	5	178	69.9	82	133	14	114	20	12	M6	105	7	14	50	53.8	14	6	M10	19
TGM400*	157	147	9	131	5	273	88.9	114	190	17	165	28	17	M8	124	7	16	60	64.4	18	8	M12	28
TGM800*	157	147	9	131	5	273	88.9	114	190	17	165	28	17	M8	124	7	16	60	64.4	18	8	M12	28

*= Non-stock item

Torque Setting

Pre-torque setting is available in accordance with your requirements before delivery. The scattering of setting torque is within ±5%. Setting torque is stamped on the name plate.

Model Identification

TGM60 D30-2.5 WS

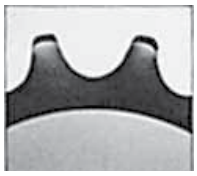
- WS — Weak Spring
- 2.5 — Setting torque (kgf·m)
- D30 — Bore diameter
- TGM60 — Shock Guard

Note:
The dimensions of keyway are as per JIS 1301-1976. At delivery, the Shock Guard has pre-setting at Minimum torque

The Tsubaki Roller Chain Coupling is a flexible coupling of amazingly simple construction. It consists of the combination of one coupling chain and a pair of coupling sprockets. This coupling can be used over a wide range of applications. It is flexible and strong, and surpasses all others with its unique qualities.

Compact and Powerful
Torque is apportioned over the whole roller chain and all sprocket teeth, and is held at a point close to the outer diameter of the sprockets. This construction and the superior qualities of the Tsubaki roller chain combine to make a compact and light weight coupling.

Excellent Durability
The roller chain in designed for strength for use in couplings. The sprocket is precisely machined and it provides special flexibility because of the induction hardened teeth which are specially shaped.

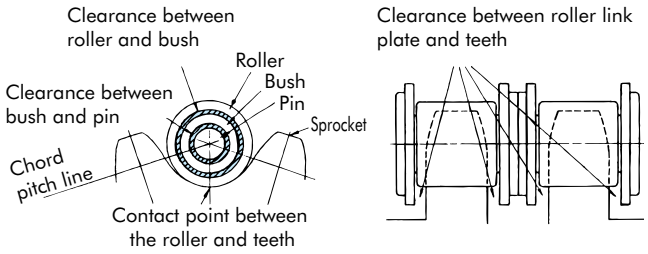


Safe and Smart
The case which revolves with the body of the coupling looks smart, and unlike other couplings, there are no projecting bolt heads to hamper safety.

Wide Choice
16 types are available from stock with standard pilot bore which can transmit from 0.1 kW to in excess of 1.600 kW.

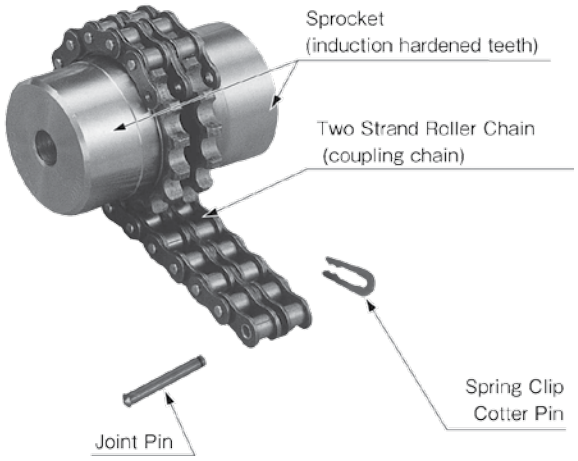
Simple Installation
Connecting and disconnecting of both shafts is very simple, using only the connecting pin which can be freely inserted and removed.

Easy Alignment
Shafts to be coupled should be aligned as accurately as possible along a straight line. Unfortunately however, this usually proves quite difficult. The chain coupling provides necessary flexibility because the chain and sprocket produce a clearance, as shown in the diagram below. As well as protecting the bearings from over-heating and abrasion, it safeguards the machine in use.



(a) Clearance in teeth direction (b) Clearance in axis direction

Construction



CR SERIES ROLLER CHAIN COUPLING

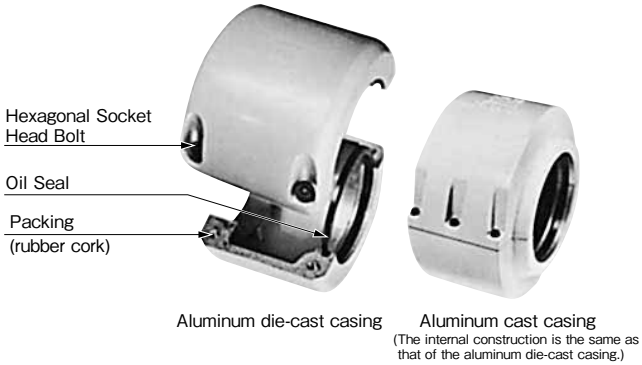
Case Construction

The standard case performs as part of the coupling. The cases of the small size couplings are made of die-cast zinc and those of the large size are made of cast aluminum alloy. The split type construction enables easy inspection and installation. The contact area with the coupling sprocket hub is precisely machined to support the hub and to prevent misalignment. The other end of the case has trapezoidal grooves where oil seal seats protect against oil leakage and the sprocket hub is freely supported in such a way it will not detract from the coupling's flexibility. The split joining portions of the coupling are sealed shut with bolts after inserting the packing.

Coupling life is notably increased due to prevention of lubricant spattering and the entrance of dust particles at the time of case installation. This means effective lubrication. The case, while protecting the unit from corrosion, prevents danger and makes for a fine appearance.

In the following cases, be sure to install the case:

1. When using at high revolution speeds consult Tsubaki.
2. When using in abrasive conditions caused by dust etc.
3. When using in corrosive conditions caused by humidity.
4. When starting and stopping frequency is particularly high or vibration is great (please consult with Tsubaki).



Aluminum die-cast casing

Aluminum cast casing
(The internal construction is the same as that of the aluminum die-cast casing.)

Lubrication

The following three lubrication systems are recommended when using Roller Chain Couplings. Choice depends on operating speed. (refer to Kilowatt Ratings Table)
Lubrication system I: Apply grease regularly once per month
Lubrication system II: Apply grease regularly once per week, or install the case filled with grease
Lubrication system III: Install the case filled with grease
For System III, it is especially important to use high grade grease because of the tendency of the grease to stick to the inner surface of the case due to centrifugal force, resulting in poor lubrication. The following types of grease are recommended:

Oil Company	Grease Name
Mobil	Mobil Plex EP No. 1 or 2
Shell	Alvania EP No. 1 or 2
ESSO	Lithin EP No. 1 or 2

Grease Change Interval for Lubrication System III

Operating Conditions	Grease Change Interval	
	First Change	Change Interval after first change
1/2 and over of max. r/min of catalogue rating	1000 hrs.	2000 hrs.
less than 1/2 of max. r/min	2000 hrs.	4000 hrs.

Grease filling amount is shown in the table below. If these amounts are followed, there will be slight leakage at the beginning of operations, however, momentarily this stabilizes and there will be almost no leakage after this.

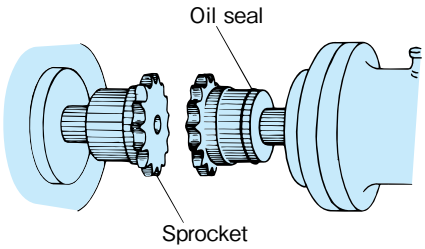
Model	Filling Amount (kg)	Model	Filling Amount (kg)
CR3812	0.04	CR6022	0.40
CR4012	0.07	CR8018	0.6
CR4014	0.08	CR8022	0.8
CR4016	0.10	CR10020	1.4
CR5014	0.12	CR12018	2.6
CR5016	0.14	CR12022	3.4
CR5018	0.20	CR16018	6.6
CR6018	0.32	CR16022	8.0

Kilowatt Ratings Table

Model	Bore Diameter Max.	Max. Allowable Transmission Torque at Below 50 r/min	Revolution Speed (r/min)																								
			1	5	10	25	50	100	200	300	400	500	600	800	1000	1200	1500	1800	2000	2500	3000	3600	4000	4800	5200	6000
CR3812H	16	99.9	0.01	0.05	0.11	0.26	0.52	0.79	1.21	1.58	1.89	2.26	2.58	3.19	3.88	4.41	5.35	6.25	6.73	8.12	9.44	11.0	12.0	14.0	14.8	16.7
CR4012H	22	217	0.02	0.11	0.22	0.58	1.15	1.73	2.63	3.46	4.15	4.96	5.67	7.01	8.53	9.68	11.6	13.7	14.8	17.9	20.7	24.1	26.3	30.8		
CR4014H	28	295	0.03	0.16	0.32	0.79	1.58	2.36	3.59	4.72	5.66	6.77	7.72	9.56	11.64	13.21	15.8	18.7	20.2	24.4	28.3	32.9	35.9	42.1		
CR4016H	32	386	0.04	0.21	0.41	1.03	2.06	3.09	4.69	6.17	7.41	8.85	10.1	12.5	15.3	17.3	21.0	24.4	26.3	31.9	37.0	43.0	46.9	54.9		
CR5014H	35	562	0.06	0.30	0.60	1.50	3.00	4.48	6.80	8.95	10.7	12.8	14.7	18.1	22.1	25.1	30.0	35.4	38.3	46.2	53.6	62.4				
CR5016H	40	735	0.08	0.39	0.78	1.95	3.91	5.86	8.92	11.7	14.1	16.8	19.2	23.8	28.9	32.9	39.9	46.4	50.0	60.6	70.4	81.6				
CR5018H	45	931	0.10	0.50	0.99	2.48	4.95	7.43	11.3	14.9	17.8	21.3	24.4	30.1	36.6	41.6	50.5	58.8	63.4	76.8	89.2					
CR6018H	56	1750	0.18	0.93	1.87	4.67	9.33	14.0	21.3	28.0	33.6	40.1	45.9	56.8	69.1	78.4	95.2	111	120	145						
CR6022H	71	2370	0.25	1.25	2.51	6.31	12.5	18.8	28.6	37.7	45.3	54.1	61.9	76.5	93.1	105	128	149	161	195						
CR8018H	80	3880	0.41	2.07	4.14	10.3	20.7	31.0	47.2	62.1	74.5	89.0	101	126	153	174	211	246	265							
CR8022H	100	5580	0.59	2.96	5.93	14.8	29.6	44.5	67.2	89.0	106	127	146	180	219	249	302	352	379							
CR10020H	110	8780	0.93	4.66	9.33	23.3	46.6	70.0	106	140	168	200	229	283	345	392	476	554								
CR12018H	125	13200	1.40	7.02	14.0	35.1	70.2	105	160	210	252	302	345	426	519	590	716									
CR12022H	140	17100	1.81	9.07	18.1	45.3	90.7	136	206	272	326	390	446	551	671	762										
CR16018H	160	28600	3.03	15.1	30.3	75.8	151	227	345	455	546	652	746	922	1122											
CR16022H	200	41700	4.43	22.1	44.3	110	221	333	506	665	799	954	1090	1350	1640											
CR20018H	205	57000	6.06	30.3	60.6	151	303	454	691	909	1090	1300	1490	1840												
CR20022H	260	71900	7.63	38.2	76.3	191	382	572	871	1140	1370	1640	1880													
CR24022H	310	129000	13.7	68.8	137	344	688	1030	1570	2060	2470	2960	3380													
CR24026H	380	157000	16.7	83.7	167	418	837	1250	1900	2510	3010	3600														
CR32022H	430	255000	27.2	136	272	680	1360	2040	2850	4080	4900															
CR40020H	470	494000	52.6	263	526	1310	2630	3940	5990	7890	9470															
CR40024H	590	602000	64.0	320	640	1600	3200	4800	7300	9600																
CR40028H	700	717000	76.2	380	762	1900	3800	5700	8690	11400																
Lubrication Type			I		II			III																		

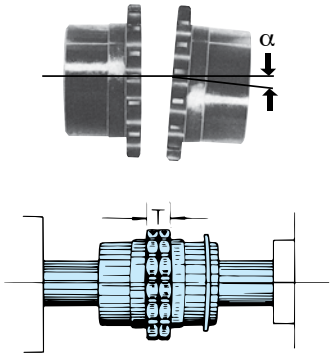
Installation

1. Place the oil seal on either the left or right sprocket.

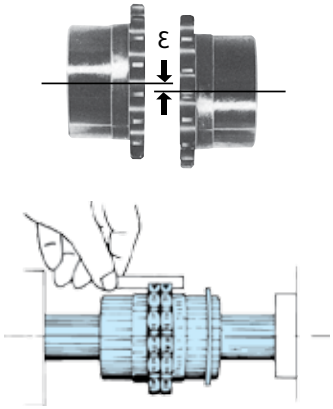


2. Bring the sprocket faces close together and correct the angular and parallel misalignment.

Adjust the angular mis-alignment (α) so that the width of the teeth surface T is the same around the circumference of the sprockets. Allowable angular misalignment (α) is 1°.



Place a straight edge at the bottom of corresponding teeth of the two sprockets and adjust so that parallel misalignment is minimized. Allowable parallel misalignment (ε) is 2% of the chain pitch.



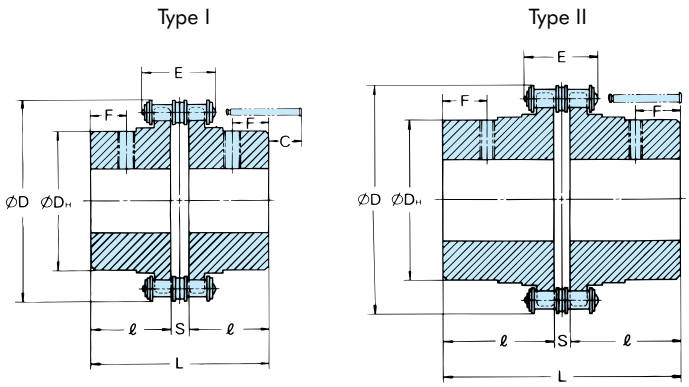
In the case where sprocket r/min is 1/3 or more of the maximum r/min, the allowable angular and parallel misalignments are 0.5° and 1% of the chain pitch

3. Measure the distance "S" between the sprocket faces and firmly fasten the set bolt (referring to the dimensions table).
4. Lubricate the chain with grease then wrap the chain around both sprockets and fix with the connecting pin.

Note:

1. During high speed operations or conditions of large vibration, please use locking cement when fastening the bolts.
2. Ambient temperature range is -10°C to 60°C. If used outside this temperature range, please consult with Tsubaki.

CR SERIES ROLLER CHAIN COUPLING



CR

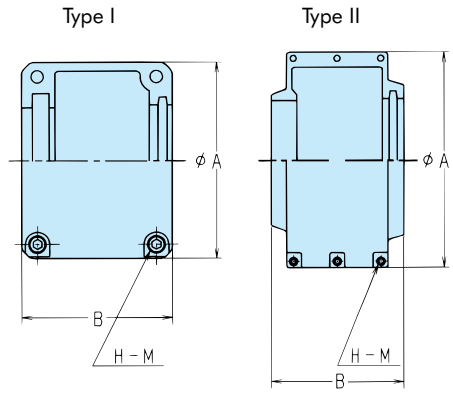
Dimensions in mm

Model	Type	Pilot Bore	Bore Diameter Min.	Bore Diameter Max.	Chain Pitch	Chain Max. Width	D	D_H	L	ℓ	S	C	F	Approx. Mass kg/pc
CR3812H	I	8	9.5	16	9.525	24.0	45	25	64.9	30	4.9	4	14	0.3
CR4012H		9	11	22	12.70	33.1	61	35	79.4	36	7.4	10	16	0.8
CR4014H		9	11	28			69	43	79.4	36		10	16	1.1
CR4016H		13	16	32			77	50	87.4	40		6	20	1.6
CR5014H		13	16	35	15.875	41.0	86	53	99.7	45	9.7	12	21	2.2
CR5016H			18	40			96	60						2.8
CR5018H			18	45			107	70						3.6
CR6018H		18	22	56	19.05	51.1	128	85	123.5	56	11.5	15	26	6.5
CR6022H			28	71			152	110						10.3
CR8018H		23	32	80	25.40	65.3	170	115	141.2	63	15.2	30	26	13.8
CR8022H		28	40	100			203	140	157.2	71		22	34	21.7
CR10020H		33	45	110	31.75	81.9	233	160	178.8	80	18.8	30	36	32.6
CR12018H		43	50	125	38.10	102.7	256	170	202.7	90	22.7	50	36	43.9
CR12022H		53	56	140			304	210	222.7	100		40	46	69.0
CR16018H		58	63	160	50.80	131.7	341	224	254.1	112	30.1	68	42	96.3
CR16022H		73	80	200			405	280	310.1	140		40	70	166.8
CR20018H*	II	85	88	205	63.50	160.6	426	294	519.5	241	37.5	-	100	294.4
CR20022H*		95	98	260			507	374						461.6
CR24022H*		117	120	310	76.20	197.3	608	420	751.1	353	45.1	-	150	871.4
CR24026H*		147	150	380			705	520						1276.4
CR32022H*		197	200	430	101.60	263.0	806	570	860.1	400	60.1	-	200	1791.2
CR40020H*		247	250	470	127.0	332.3	932	640	1099.6	512	75.6	-	250	2862.5
CR40024H*		297	300	590			1093	800						4294.6
CR40028H*		347	350	700			1255	960						6019.4

*= Non-stock item

Notes:

1. Dimension "C" shows the space that must be left to allow insertion and removal of the joint pin.
2. Dimension "F" is the recommended place where the customer should make a tapped hole for a set screw.
3. Finished bore with keyway and/or set screw hole is available upon request at additional cost.
4. The items in regular typeface are made-to-order and the dimension "D_H" is only a guide.



Dimensions in mm

Model	Type	A	B	H-M	Oil Seal	Case Material	Approx. Mass kg/pc
CR3812K	I	59	61	4-M 5	Special Type ZF36 ZF38 ZF46	Aluminium Die-Cast	0.19
CR4012K		75	75	4-M 6			0.33
CR4014K		84					0.38
CR4016K		92					0.41
CR5014K		101	85				0.50
CR5016K		111					0.58
CR5018K		122					0.66
CR6018K		142	106	4-M 8			0.96
CR6022K		167					1.3
CR8018K		186	130				2.0
CR8022K		220					2.5
CR10020K		250	148				3.7
CR12018K	II	307	181	△4-M10			3.3
CR12022K		357					3.9
CR16018K		406	250	6-M10	ZF48	Aluminum Alloy	14.7
CR16022K		472			ZF60		17.2
CR20018K*		496	280		Special Type		22.2
CR20022K*		578					26.6

*= Non-stock item

Note:

1. Place orders of casing with the casing model numbers specified.
2. The ZF type oil seal is made by Japan Oil Seal
3. The item marked with a △ has 4 bolts and not 6 as indicated in the drawing.

GENERAL TERMS AND CONDITIONS OF SALE TSUBAKIMOTO EUROPE B.V.

1. General

In these general terms and conditions 'Tsubaki' shall mean Tsubakimoto Europe B.V.

2. Applicability

2.1 The applicability of the general terms and conditions used by the customer is hereby expressly excluded.

2.2 These general terms and conditions are applicable to all legal relationships in which Tsubaki acts as a seller and/or supplier or as a potential seller and/or supplier of products and/or services.

2.3 Deviations from the provisions in these general terms and conditions shall be permitted only in writing. No rights in relation to agreements that are concluded later may be derived from such deviations.

3. Conclusion of the agreement / Measurements & Weight

3.1 If the customer issues an order, the agreement shall have been concluded if Tsubaki accepts the order in writing or electronically or makes a start with its implementation.

3.2 Drawings, measurements and weights that are shown or provided on the website of Tsubaki or otherwise, shall only be used as indications. The product and/or service to be provided under the agreement need not correspond with the drawing, measurement and weight.

4. Prices / Delivery conditions

4.1 Prices are exclusive of VAT.

4.2 Prices are ex warehouse, unless otherwise agreed in writing.

4.3 Prices are as per Tsubaki described standard unit or packaging only.

4.4 In addition to the price, the customer shall fully pay, unless otherwise agreed in writing, any and all, local taxes, duties, excises, licence fees and other charges levied, assessed or imposed upon Tsubaki due to the manufacture, sale, purchase, export or delivery of the products.

4.5 The customer shall also pay the cost by which such manufacture is increased by reason of any law, ordinance or regulation adopted or promulgated by any government or governmental subdivision, department or agency, or other source, after the date hereof, but prior to the completion and delivery hereunder.

4.6 Changes in labour costs, cost prices of raw materials or materials and/or exchange rate movements related to the performance agreed on, shall entitle Tsubaki to pass on these costs to the customer.

5. Delivery/delivery times

5.1 The delivery period indicated by Tsubaki starts as from the moment that all data, drawings and the like necessary for the performance of the agreement have been received by Tsubaki in its entirety.

5.2 Delivery times agreed with Tsubaki are indicative and shall not constitute deadlines.

5.3 Failure to deliver within the indicated delivery period does not entitle the customer to additional or substitute damages, nor to the customer's non-fulfilment, withholding or postponement of any of its own obligations arising from the agreement.

5.4 If the customer requests Tsubaki to make changes in the performance of the agreement (including, but not limited to, changes in the design or construction of products), or otherwise delay or interrupt the progress of the work under the agreement, the customer shall fully reimburse Tsubaki for any and all additional expenses arising there from.

5.5 Tsubaki shall be entitled to perform its due obligation(s) in stages or in parts. Each partial delivery shall be deemed an independent delivery with respect to the applicability of these general terms and conditions.

6. Returned products

6.1 No products shall be acceptable for return without prior written consent of Tsubaki.

6.2 Special or made-to-order products are not returnable.

6.3 The customer shall prepay freight on all returns, and each return is subject to inspection and acceptance by Tsubaki to assure that the products are in a "re-sellable" condition.

6.4 The customer shall pay a maximum of 10% (ten percent) of the price for handling and restocking costs charge with regard to all authorized returns.

7. Payment

7.1 Payment of Tsubaki's invoices shall ultimately take place within 30 (thirty) days after the invoice date in the manner described by Tsubaki, provided however that Tsubaki may at all times request for payment in advance. Payment shall take place effectively in the currency agreed on and without deduction, set-of, discount and/or deferment.

7.2 In case of overdue payment, all payment obligations of the customer, regardless of whether Tsubaki has already issued an invoice in the matter and of whether Tsubaki has duly performed its obligations, shall be immediately due and payable and the customer shall owe an interest of 1.5% (one and a half percent) per month or per part of a month on the amount due.

7.3 Extra-judicial collection costs shall be charged to the customer in accordance with the collection rates of the Netherlands Bar Association.

7.4 Payment by or on behalf of the customer shall extend to payment of the following charges incurred, in the following order: extra-judicial collection costs, the legal costs, the interest due, and after that the unpaid capital sums according to the order of receipt, regardless of other instructions of the customer.

7.5 The customer can only object to the invoice within the term of payment.

8. Intellectual Property Rights and know-how

8.1 All documentation, sales leaflets, pictures, drawings etc., provided by Tsubaki to the customer, shall at all times remain the exclusive property of Tsubaki.

8.2 The customer shall not be entitled to use the documents referred to in paragraph 1 for any purpose other than for the use of the products to which they relate.

8.3 The customer shall not be entitled to use the documents referred to in paragraph 1 or to duplicate and/or make public to third parties data included therein or in any other way made known to the customer without express prior written consent of Tsubaki.

8.4 In the event of any violation of what has been stipulated under paragraph 2 and/or 3, the customer shall pay Tsubaki an immediately payable fine of EUR 10,000 (ten thousand euros) for each violation, regardless of any other of Tsubaki's rights to performance, dissolution, compensation, etc.

9. Retention of title

9.1 All products that are delivered or are to be delivered by Tsubaki remain the property of Tsubaki until Tsubaki is fully paid with regard to:

A. all performances due by the customer for all products that are delivered or are to be delivered in accordance with the agreement, and;

B. all claims that are the result of the customer's failing in the performance of such agreement(s); the customer shall not be allowed to claim its right of retention concerning costs of custody and to deduct these costs with the performances required by the customer.

9.2 If the customer creates a new product from or partly from products referred to in paragraph 1, this product belongs to Tsubaki and the customer shall consider Tsubaki its owner, until the customer has fully performed all of its obligations referred to in paragraph 1.

9.3 If any product belongs to Tsubaki in accordance with paragraph 1 and/or 2, the customer can have exclusive possession of this product or product within the framework of its normal business operations.

9.4 If the customer is in default in the performance of its obligations referred to in paragraph 1, Tsubaki shall be entitled to recover all the products from their location, at the expense of the customer. The customer hereby irrevocably grants authority to Tsubaki to enter the area used by or for the customer.

10. Security

10.1 If there are valid grounds to expect that the customer shall not perform its obligations, the customer shall be obliged, at the first request of Tsubaki, to immediately furnish adequate security in the form requested by Tsubaki (including complete payment in cash before or on delivery) without prejudice to customer's obligations under the agreement. If and to the extent that the customer has not fully performed its obligations, Tsubaki shall be entitled to suspend performance of its obligations.

10.2 If the customer takes no action on the request referred to in paragraph 1 within 14 (fourteen) days after having received a written warning to that effect, all its obligations shall be immediately due and payable.

11. Guarantee

11.1 With regard to the assembly carried out by Tsubaki, the following guarantee is provided: For 6 (six) months, Tsubaki shall repair faults in the assembly, free of charge, at the discretion of Tsubaki.

11.2 If and to the extent Tsubaki can claim guarantee with respect to its own suppliers, Tsubaki shall provide the following guarantee on products obtained from them: For 6 (six) months, Tsubaki shall supply alternative products, free of charge, if the products supplied exhibit manufacturing defects or defects in the material, at the discretion of Tsubaki.

11.3 The customer can only make a non-recurring claim under the guarantee mentioned in paragraphs 1 and 2 if the customer has performed all its obligations towards Tsubaki.

11.4 Defects which are the result of normal wear, improper use or improper or incorrect maintenance or which occur after changes or repair carried out by or on behalf of the customer, shall not be part of the guarantee.

11.5 Minor differences, which means 10% (ten percent) or less with regard to amounts, measures, weights, numbers and other such data provided, are not considered defects.

12. Complaints / obligation to examine / limitation period

12.1 On delivery, the customer has the obligation to examine whether the products are in conformity with the agreement. If this is not the case, the customer cannot make a claim regarding non-conformity if the customer does not notify Tsubaki in writing in a well-founded manner as soon as possible, but in any event within 8 (eight) days after delivery or after detection of non-conformity was reasonably possible.

12.2 Any and all of the customer's claims and defences based on facts that support the view that the product delivered is not in conformity with the agreement, shall expire 6 (six) months after delivery.

13. Dissolution and release

13.1 If the customer does not perform or incorrectly performs any of its obligations arising from the agreement (such as overdue payment), if the customer is placed under guardianship, involuntary liquidation, suspension of payment or closure or winding up of its company, and also in the case of prejudgment or executory attachment against the customer or if an offer or agreement with regard to an extra-judicial debt settlement with the customer has been made, Tsubaki shall be entitled, at its option, without any obligation for compensation and without prejudice to its other rights, to dissolve the agreement in whole or in part, or to suspend the further execution of the agreement. In these cases, Tsubaki shall be also entitled to claim immediate compensation of the amount due.

13.2 If the proper performance by Tsubaki is partially or completely impossible, whether temporarily or permanently, due to one or more circumstances which cannot be held accountable to Tsubaki, including the circumstances mentioned in the paragraph 14.6, Tsubaki, at its option, shall be entitled to suspend its performance or to dissolve the agreement.

13.3 If the customer is not willing to cooperate with the delivery after Tsubaki has given the customer 14 (fourteen) days to do so, Tsubaki will be released from its obligations, without prejudice to the obligations of the customer.

14. Compensation

14.1 Tsubaki shall only be liable for damages suffered by the customer which can be attributed to gross negligence or intention by Tsubaki to the amount that Tsubaki is insured in accordance with an insurance commonly used in this line of industry and which is actually paid out with respect thereto. The aggregate compensation payable by Tsubaki shall not exceed EUR 500.000 (five hundred thousand euros) per event, whereby a series of related events shall be considered as one event.

GENERAL TERMS AND CONDITIONS OF SALE TSUBAKIMOTO EUROPE B.V.

14.2 Tsubaki shall never be liable to pay any compensation other than personal injury or property damage.

14.3 Tsubaki shall never be liable for loss of income, profit or revenue, loss due to shutdown or delay in business activities, production losses, loss of operating hours and/or wages paid in vain, extra costs incurred due to external purchasing, loss due to restoration of lost information, missed savings or agreements, discounts or penalties.

14.4 Tsubaki stipulates all legal and contractual defences, which it can invoke to fend off its own liability towards the customer, also on behalf of its employees and non-employees for whose acts it is liable in accordance with the law.

14.5 Tsubaki shall not be liable with regard to products supplied by Tsubaki which originate from third parties if and to the extent that the applicable third party has excluded its liability.

14.6 Under no circumstance shall Tsubaki be held liable for the following circumstances: actions, except gross negligence or intention, of persons used by Tsubaki for the realisation of the agreement; unsuitability of products which Tsubaki uses for the realisation of the agreement; exercising one or more rights by a third party vis-à-vis the customer in the case of a failure in the performance by the customer of an agreement between the customer and the third party concerning products supplied by Tsubaki; industrial action, lockout of workers, illness, bans on import, export and/or transport, problems with transport, failure to comply with the obligations by suppliers, production failure, natural and/or nuclear disasters, and war and/or threat of war.

14.7 The customer shall indemnify Tsubaki against all claims from any third party, in whatever form, with regard to damage and/or loss, which any third party may have suffered due to products of Tsubaki.

14.8 Everything stipulated in this article shall be without prejudice to Tsubaki's liability pursuant to mandatory provisions of law.

15. Amendment of general terms and conditions

15.1 Tsubaki has the right to amend these general terms and conditions from time to time. Amendments apply also with regard to agreements already concluded. Amendments shall be notified in advance in writing or electronically to the customer and shall enter into effect 30 (thirty) days after this notification or on such date as specified in the notification.

15.2 In the event the customer fails, with respect to the amended general terms and conditions, to give written notice that it does not accept these amended general terms and conditions prior to the day on which the aforementioned terms enter into effect, such as is indicated here above, the customer shall be deemed to have accepted these amended general terms and conditions.

16. Conversion

If and to the extent that any provision in these general terms and conditions cannot be invoked on grounds of reasonableness and fairness or its unreasonably onerous nature, the provision shall be given a meaning that corresponds as much as possible to its content and purpose, making it thereby possible to invoke this provision.

17. Assignment

17.1 Tsubaki is entitled to assign one or more of its obligations or its entire legal relationship with the customer to a third party without consent of the customer. Tsubaki shall inform the customer of this transfer in writing.

17.2 The customer is only entitled to assign one or more of its obligations or its entire legal relationship with Tsubaki to a third party upon Tsubaki's express prior written consent.

18. Applicable law / competent court

18.1 All legal relationships between Tsubaki and the customer shall be governed by the laws of the Netherlands, without taking into account the principles of conflict of laws.

18.2 The applicability of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded.

18.3 All disputes which may arise between Tsubaki and the customer that fall under the jurisdiction of a district court, shall only be submitted to the court in the judicial district in which Tsubaki has its registered office, unless Tsubaki as a plaintiff or an applicant opts for the competent court in which the customer has its registered office or address for service.

19. Dutch text prevails

If and insofar as there is a discrepancy between the general terms and conditions in the Dutch language and those in the English language, those in the Dutch language shall prevail.

These conditions were filed at the Chamber of Commerce and Industry in Rotterdam.

Warning!

Use with care to prevent injury
Comply with the following to avoid serious personal injury

1. Guards must be provided on all power transmission and conveyor applications in accordance with provisions of ANSI/ASME B 15.1 1992 and ANSI/ASME B 20.1 1993 or other applicable standards. When revisions of these standards are published, the updated edition shall apply.
2. Always lock out power switch before installing, removing, lubricating or servicing a system that uses Cam Clutch products.
3. If the Cam Clutch is used for repeated starting and stopping, make sure the strength of the supports for the Cam Clutch are sufficient.
4. The capacity of your Cam Clutch may be effected by the accuracy of its set up, the amount of pressure exerted on it, wear on other parts in your system, or wear life of the Cam Clutch itself. Check the Cam Clutch at regular intervals and observe any necessary safety precautions.
5. When connecting or disconnecting Cam Clutch products, eye protection is required. Wear safety glasses, protective clothing, gloves and safety shoes.

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NOTE: in accordance with the policy of Tsubakimoto Europe B.V. to consistently improve its products, the specifications in this catalogue are subject to change without notice.

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