TSUBAKI EMERSON CAM CLUTCH

BB-TSS-TFS-BR SERIES

BEARING TYPE CAM CLUTCH

BB series

BB-1K series

BB-2K series

BB-2GD series

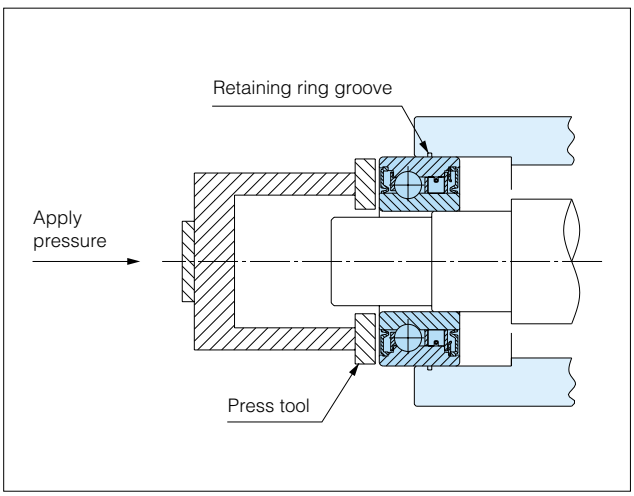
BB-2GD 1K series

General information of Installation and usage for Bearing type Cam Clutch

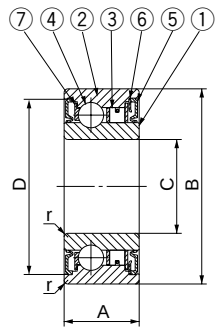
1. Bearing type Cam Clutch series are designed for press fit installation.
2. BB-1K and BB-2GD 1K series have a keyway on the inner race. Keyways, except size 25 are manufactured by DIN 6885. 3, BB40-1K and BB40-2GD 1K is manufactured by DIN 6885. 1.
3. BB-2K series has a keyway on both the inner and outer race.
4. Correct interference dimensions at the shaft and the housing must be maintained to obtain maximum bearing and clutch performance.
5. Refer to the table in next page for tolerance of the shaft and housing for each series.
6. BB-2GD and BB-2GD 1K series have special lip seals for the effective protection against dust.
7. The arrow on the inner race shows the direction of inner race engaging.
8. To install the clutch, use a press tool of the appropriate diameter to apply even pressure over the entire face of the inner and outer race.
9. Do not hammer or apply other shock to the clutch.
10. Make sure the housing has enough strength to withstand the pressure required for the press fitting installation of the Clutch.
11. Operating temperature range: –30°C to +100°C (Consult us for the temperature that exceeds this range).

Lubrication

1. Since grease is already applied before delivery, there is no need to apply and grease before use.
2. If the clutch is used with an oil lubricant, the oil lubrication should be applied inside the unit always.
3. Do not use greases or lubricants with EP additives.

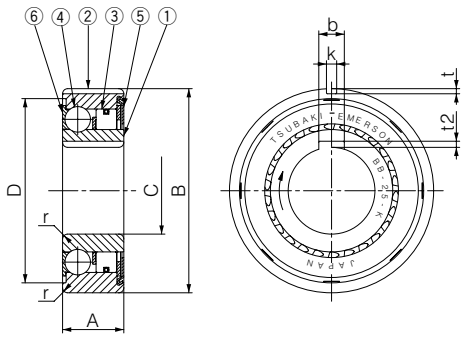


BEARING TYPE CAM CLUTCH BB, BB-1K, BB-2K, BB-2GD, BB-2GD 1K



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

This drawing shows BB-2GD series.



① Inner race
② Outer race
③ Cam cage
④ Ball bearing
⑤ Dust seal
⑥ Retainer

This drawing shows BB-2K series.

Dimensions and Capacities

Dimensions in mm

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

Note: Model No. marked on the inner race is only “K” for both “1K” and “2K”. (Example: the mark “BB17-K” for both BB17-1K and BB17-2K)

Tolerance for Shaft and Housing

Dimensions in mm

Model		Shaft Dia.	Housing Dia.
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 Dia.	Housing Dia.
BB15-1K	**BB15-2GD 1K**	$15^{-0.008}_{-0.028}$	$35^{-0.012}_{-0.028}$
BB17-1K	**BB17-2GD 1K**	$17^{-0.008}_{-0.028}$	$40^{-0.012}_{-0.028}$
BB20-1K	**BB20-2GD 1K**	$20^{-0.010}_{-0.031}$	$47^{-0.012}_{-0.028}$
BB25-1K	**BB25-2GD 1K**	$25^{-0.010}_{-0.031}$	$52^{-0.014}_{-0.033}$
BB30-1K	**BB30-2GD 1K**	$30^{-0.010}_{-0.031}$	$62^{-0.014}_{-0.033}$
BB35-1K	**BB35-2GD 1K**	$35^{-0.012}_{-0.037}$	$72^{-0.014}_{-0.033}$
BB40-1K	**BB40-2GD 1K**	$40^{-0.012}_{-0.037}$	$80^{-0.014}_{-0.033}$

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

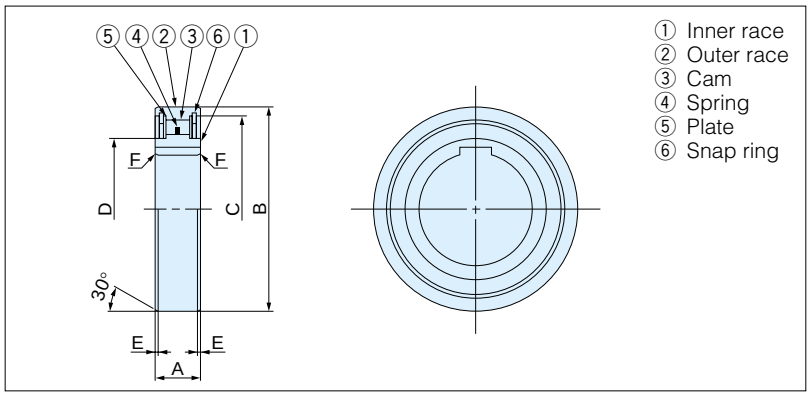
Dimensions of keyways

Dimensions in mm

Model		b js10	t1	t2	k js9	t
BB15-1K	BB15-2GD 1K	5.0	1.9	1.2	—	—
BB15-2K	—				2.0	0.6
BB17-1K	BB17-2GD 1K	5.0	1.9	1.2	—	—
BB17-2K	—				2.0	1.0
BB20-1K	BB20-2GD 1K	6.0	2.5	1.6	—	—
BB20-2K	—				3.0	1.5
BB25-1K	BB25-2GD 1K	8.0	3.6	1.5	—	—
BB25-2K	—				6.0	2.0
BB30-1K	BB30-2GD 1K	8.0	3.1	2.0	—	—
BB30-2K	—				6.0	2.0
BB35-1K	BB35-2GD 1K	10.0	3.7	2.4	—	—
BB35-2K	—				8.0	2.5
BB40-1K	BB40-2GD 1K	12.0	5.0	3.3	—	—
BB40-2K	—				10.0	3.0

Note: The dimension of t2 for BB25-1K, BB25-2K and BB25-2GD 1K is 0.5 mm shallow compare to DIN 6885. 3.
Process the keyway on the shaft 0.5 mm deeply to use DIN standard key.
All other models are dimensionally interchangeable with competitors.

TSS SERIES CAM CLUTCH



Dimensions and Capacities

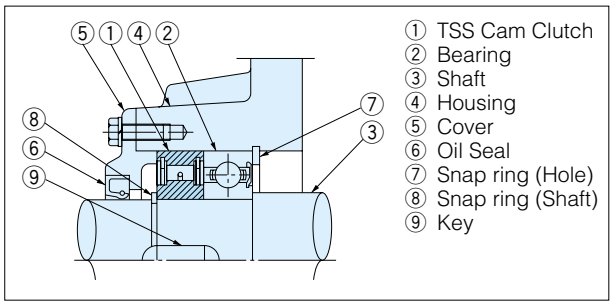
Dimensions in mm

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

TSS-Series

Installation and Usage

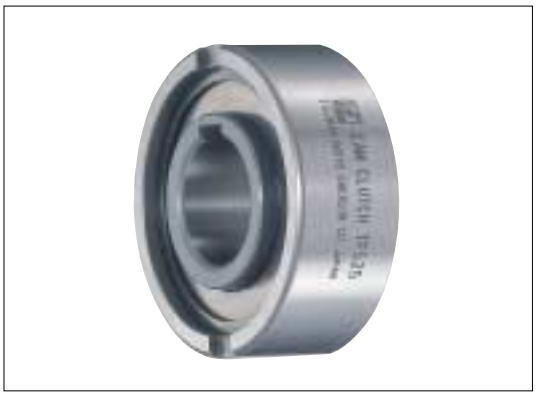
1. The TSS Series Cam Clutch is designed for press fit installation.
   Correct interference dimensions must be maintained to obtain maximum clutch performance.
   The internal diameter of the housing should meet the H7 tolerance. Refer to item 3 in the installation and usage of BB Series Cam Clutches for information on the installation method.
2. Make sure the housing has enough strength to withstand the pressure required for the press fitting installation of the clutch.
3. When installing the clutch, mount it with a type 62 bearing to avoid radial force, since this clutch does not have any bearings inside.
4. Confirm the direction of rotation before installation.
5. The recommended shaft tolerance is H7, and the key profile should be in accordance with the following standard.
   TSS 8 ~ 12·····DIN 6885. 1
   TSS 15 ~ 60·····DIN 6885. 3
6. Suitable surface pressure of the key should be selected according to your company design standards.

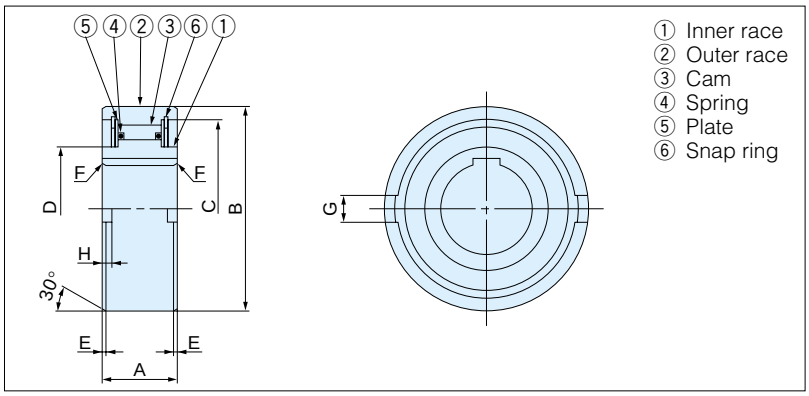


Lubrication

1. Oil lubrication is recommended.
2. Do not use greases or lubricants with EP additives.

TFS SERIES CAM CLUTCH





Dimensions and Capacities

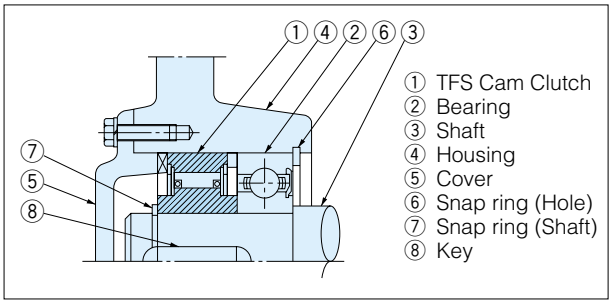
Dimensions in mm

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

TFS-Series

Installation and Usage

1. The outer race of the TFS Series Cam Clutch is designed for press fit installation to the housing. Correct interference dimensions of the outer race must be maintained to obtain maximum clutch performance. The internal diameter of the housing should meet the H7 tolerance. Keyways should be made in the end faces of the clutch for proper installation. Refer to item 3 in the installation and usage of BB Series Cam Clutches for information on the installation method. If the tolerance of the internal diameter of the housing is K6, keyways are not required on the end faces of the clutch.
2. Make sure the housing has enough strength to withstand the pressure required for the press fitting installation of the clutch.
3. When installing the clutch, mount it with a type 63 bearing to avoid radial force, since this clutch does not have any bearings inside.
4. The clutch should be mounted on the shaft by rotating it in the direction marked by the arrow shown on the clutch plate.
5. The recommended shaft tolerate is H7, and the key profile should be in accordance with the following standard.
   TFS 12 ·····DIN 6885. 1
   TFS 15 ~ 80·····DIN 6885. 3
6. Suitable surface pressure of the key should be selected according to your company design standards.

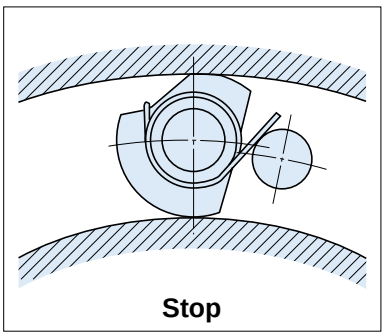


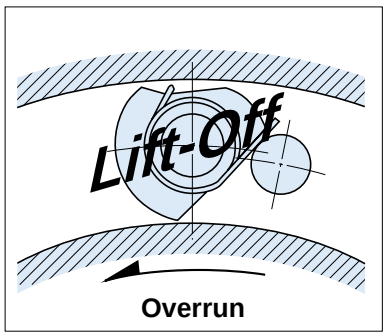
Lubrication

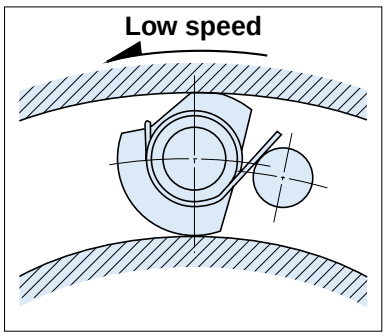
1. Oil lubrication is recommended.
2. Do not use greases or lubricants with EP additives.

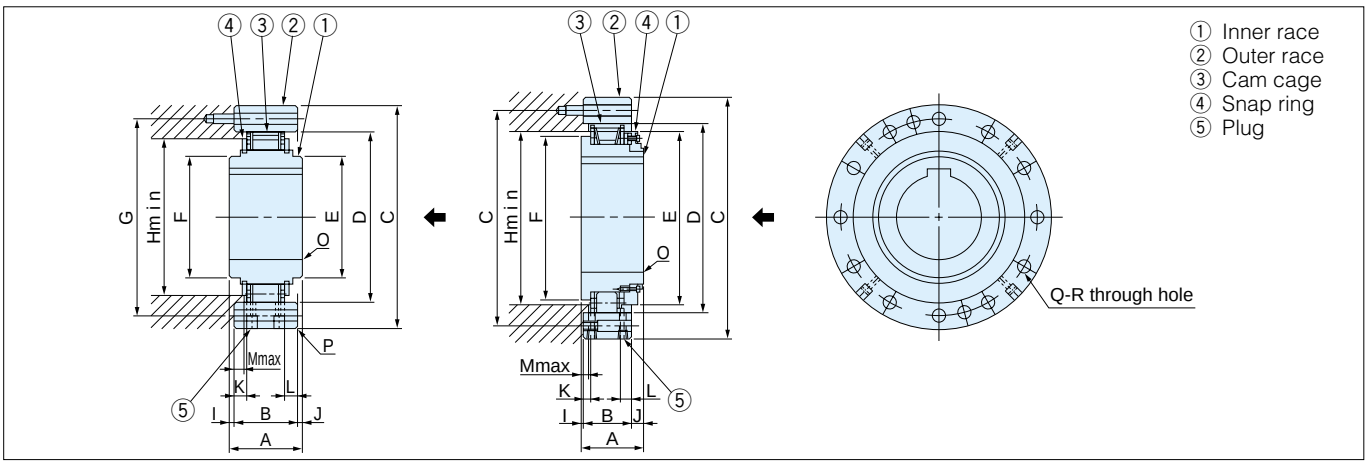
BR SERIES CAM CLUTCH

The cam of BR series Cam Clutch is designed to lift off and no contact with inner and outer race when it overruns. This is due to centrifugal force and is the reason this type of Cam Clutch is known as a lift off type. These Cam Clutches are suitable for “Overrunning: high speed inner race/low speed engaged outer race” or “Backstopping-high speed inner race overrunning”. Both an Open type, that is installed directly onto a motor or inside a reducer and a Package type, that is installed on the outside, are available. Detail information is available in each individual Cam Clutch catalogue.









Dimensions (Open Type)

Dimensions in mm

Model	Bore Size	Keyway	O	A	B	C	D	E	F	G	Q-R	Hmin	I	J	K	L	Mmax
	H7					h7	H7										
BR 20	20	6× 2.8	0.5	35	35	90	66	40.7	40.7	78	6- 6.6	53	0	0	5	5	4
BR 25	25	8× 3.3	0.5	35	35	95	70	44.7	44.7	82	6- 6.6	58	0	0	5	5	4
BR 30	30	8× 3.3	1.0	35	35	100	75	49.7	49.7	87	6- 6.6	64	0	0	5	5	4
BR 35	35	10× 3.3	1.0	35	35	110	80	54.7	54.7	96	8- 6.6	70	0	0	5	5	4
BR 40	40	12× 3.3	1.0	35	35	125	90	64.7	64.7	108	8- 9.0	81	0	0	5	5	4
BR 45	45	14× 3.8	1.0	35	35	130	95	69.7	69.7	112	8- 9.0	86	0	0	5	5	4
BR 50	50	14× 3.8	1.0	40	40	150	110	84.7	84.7	132	8- 9.0	103	0	0	7.5	7.5	6.5
BR 60	60	18× 4.4	1.5	50	50	175	125	80	80	155	8-11.0	110	5	5	7	7	6
BR 70	70	20× 4.9	1.5	60	50	190	140	95	95	165	12-11.0	125	5	5	7	7	6
BR 80	80	22× 5.4	1.5	70	60	210	160	115	115	185	12-11.0	148	5	5	12	12	11
BR 90	90	25× 5.4	1.5	80	70	230	180	135	135	206	12-13.5	170	5	5	17	17	16
BR100	100	28× 6.4	1.5	90	80	270	210	143	143	240	12-17.5	180	5	5	13.7	13.7	12
BR130	130	32× 7.4	2.0	90	80	310	240	173	173	278	12-17.5	210	5	5	13.7	13.7	12
BR150	150	36× 8.4	2.0	90	80	400	310	243	243	360	12-17.5	280	5	5	13.7	13.7	12
BR180	180	45×10.4	2.0	105	80	400	310	290	270	360	12-17.5	280	5	20	11.5	15.9	14
BR190	190	45×10.4	2.0	105	80	420	330	310	280	380	16-17.5	300	5	20	12.5	8.9	7.5
BR220	220	50×11.4	2.0	105	80	460	360	340	320	410	18-17.5	330	5	20	12.5	10.9	9
BR240	240	56×12.4	2.0	105	80	490	390	370	350	440	18-17.5	360	5	20	12.5	10.9	9

BR SERIES CAM CLUTCH

Capacities

Model	Torque Capacity	Overrunning Speed		Max. Engagement Speed
		Min.	Max.	
	N·m	r/min	r/min	r/min
BR 20	328	880	3600	350
BR 25	480	880	3600	350
BR 30	607	880	3600	350
BR 35	686	740	3600	300
BR 40	980	720	3600	300
BR 45	1078	670	3600	280
BR 50	1715	610	3600	240
BR 60	3479	490	3600	200
BR 70	4735	480	3600	200
BR 80	6517	450	3600	190
BR 90	8526	420	3000	180
BR100	14210	460	2700	200
BR130	20384	420	2400	180
BR150	33908	370	1300	160
BR180	33908	370	3500	160
BR190	41160	340	3000	140
BR220	51058	330	3000	140
BR240	62034	310	3000	130

Special shape cam for BR series

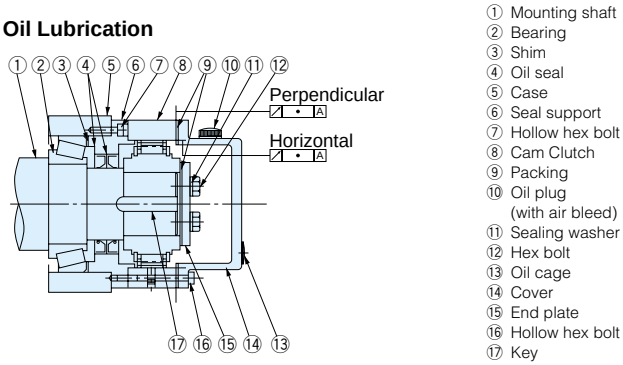
Installation and Usage

1. Shaft tolerance of h6 or h7 is recommended. And also use a parallel key.
2. When installing Cam Clutch on a shaft, follow the procedure outlined below. Never strike the clutch with steel hammer or apply unnecessary impact loads.
   - ① Verify Cam Clutch free running direction. The arrow on the inner race shows the free running direction. Make sure that the direction of cam engagement matches the intended application.
   - ② Tap the inner face lightly with a soft hammer moving around the race circumference so the Cam Clutch moves slowly and uniformly on the end of 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 the diagram at right.
   - ④ Tighten the end plate securely.

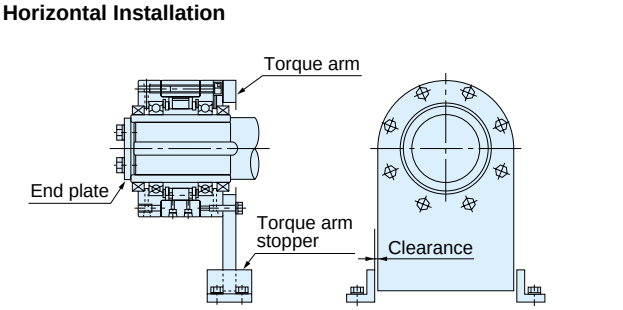
Lubrication

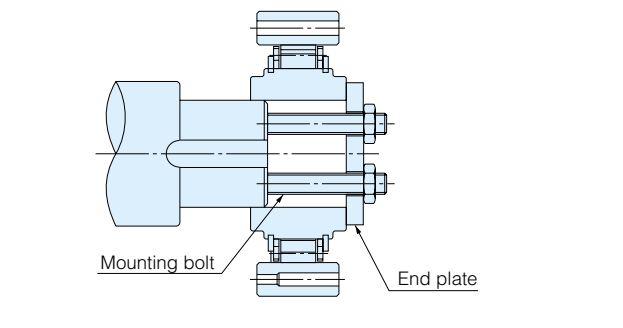
Do not use any EP additives in the oil or grease except Backstopping application that is not frequent engagement.

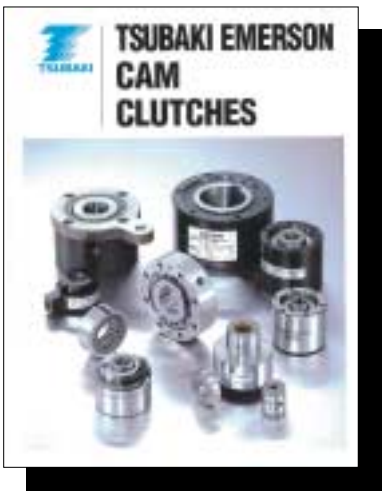
Installation Example (Open Type)

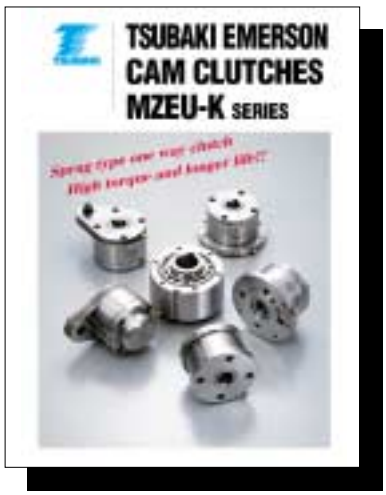


Installation Example (Package Type)









Tsubaki has developed various series of cam clutches to meet any industrial demands. Except for the series mentioned in this brochures you may need additional technical solutions to comply with your specific application. E.g. such as mentioned in the above leaflets. Please do not hesitate to contact us for advice or further documentation. Our well trained professional engineer and sales staff are ready for further assistance.

⚠ WARNING

USE 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 take 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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