



SAMBO CLUTCH

CAM CLUTCH

BACKSTOPPING
OVERRUNNING
INDEXING



SAMBO CLUTCH

Instruction of Sam Bo Clutch

Sam Bo Clutch is a professional manufacture and marketing company of cam clutches only from 1990.

Sam Bo Clutch developed the cam on 1992 in Korean individually, started various kind of cam clutch.

We became the best clutch maker in Korea owing to our continuous R&D and marketing activity.

We will do our best to became best clutch maker in world market.

Brief History

- 1990 Sam Bo Industry co. founded
- 1992 Cam develop. exhibit to korea machinery fair (COEX)
- 1993 Commenced BS-K Series
- 1994 Started quantity production of MZ-K, MG-K, MI-K Series
- 1995 Started quantity production of NFS-K, NSS-K, B200K, PB-K Series
Saudi Arabia SPCC cement PJT(project) participation
Indonesia Suralaya power plant PJT participation
- 1996 Firm name changed to Sambo Clutches Co., Ltd
Malaysia Negeri Sembilan cement PJT participation
Indonesia Suralaya power plant PJT participation
- 1997 Deliver to POSCO by contract all item.
Indonesia Bosowa cement PJT participation
Maraysia Perak PJT participation
- 1998 Started quantity production of B200K Series for Tong Yang Mulsan combine
Register with the KEPCO(a public company).
Indonesia Banjarmasin power plant PJT participation
Export BS-K, MG-K series to Taiwan directly
- 1999 Started quantity production of B200K Series for Dai Dong Industrial combine
Export MI-K Series to Chaina directly
- 2000 Indonesia Pasir coal PJT participation
Bangladesh Scancem cement PJT participation
- 2003 Export BS-K Series to Taiwan Power Co. in Taiwan
Export BS-K Series to Thailand directly
- 2004 Export MI-K, NFS-K Series to Japan directly
Export NFS-K & B200K Series to Brasil, China directly

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◆ MZ-K Series	
◆ MG-K, MI-K, MR-K Series	
◆ MG-RK Series	
◆ MZ-CK, MG-CK Series	
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◆ PNC-K Series	
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SAMBO CLUTCH



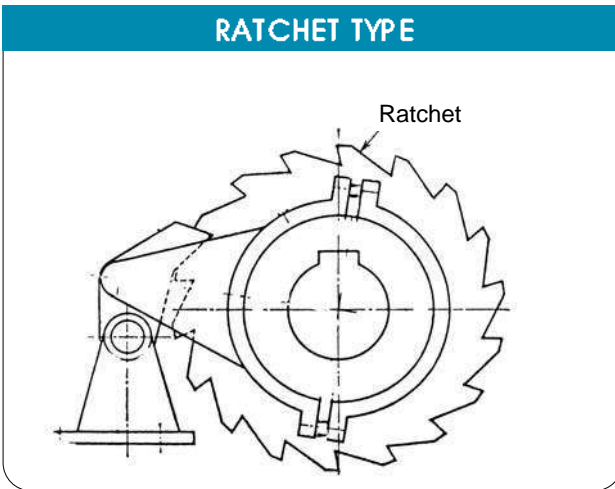
CHANGE PROCESS & CHARACTERS

CAM CLUTH(One way clutch) can overrun freely in one direction of rotation. Reverse rotation is instantaneously prevented by the automatic engagement of the clutch (also called a backstop clutch or an one way clutch). A change for the better of clutches are as belows.



A KIND & CHARACTER

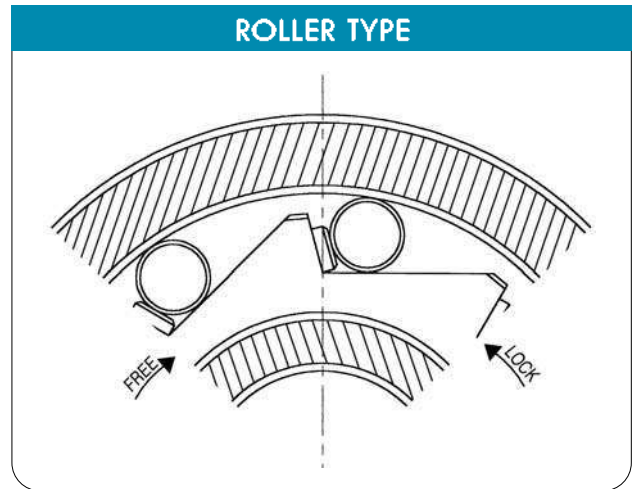
RATCHET TYPE



Good point Can see the operation of clutches.

Bad point High noise, lower durableness

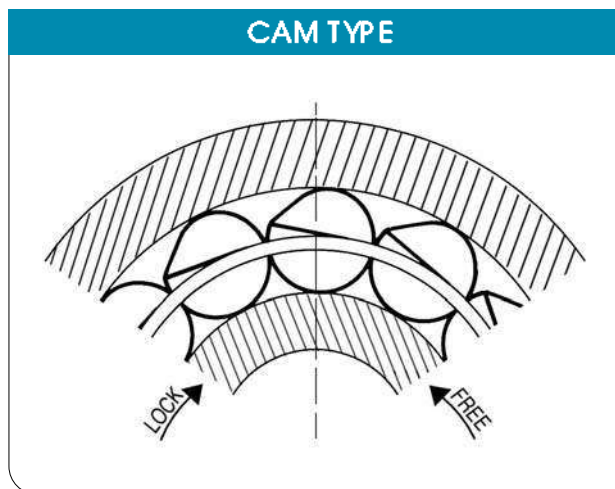
ROLLER TYPE



Good point Easy to manufacture

Bad point Machinery low efficiency at high speed operation.

CAM TYPE



Good point Profitable at high speed and back rash protection.

Bad point Required high precision.

SAM BO CAM CLUTCH

Cams of Sam Bo clutches was developed individually on 1992 year in Korea. Have been developed suitably for precision machinery and industrial machinery for the while.

High performance, long time life and high torque load will assure the high precision in your driving system.



ADVANTAGES

1. MAX. LOAD & GREATER TORQUE CAPA.

The full complement of cams made special alloy steel provides the maximum number of load transmitting members per given diameter. Result-greater torque capacity than the other roller clutches.

2. LONG LIFE PERFORMANCE

In the roller clutch abrasion of the inner raceway always occur at the same point on each of the roller clutch lands. But the dimpling of cam clutches is distributed around the inner raceway, not concentrated. Therefore, this is assure the long wear resistance and offer long life performance.

3. HIGH PRECISION (NO BACKLASH), SILENT OPERATION.

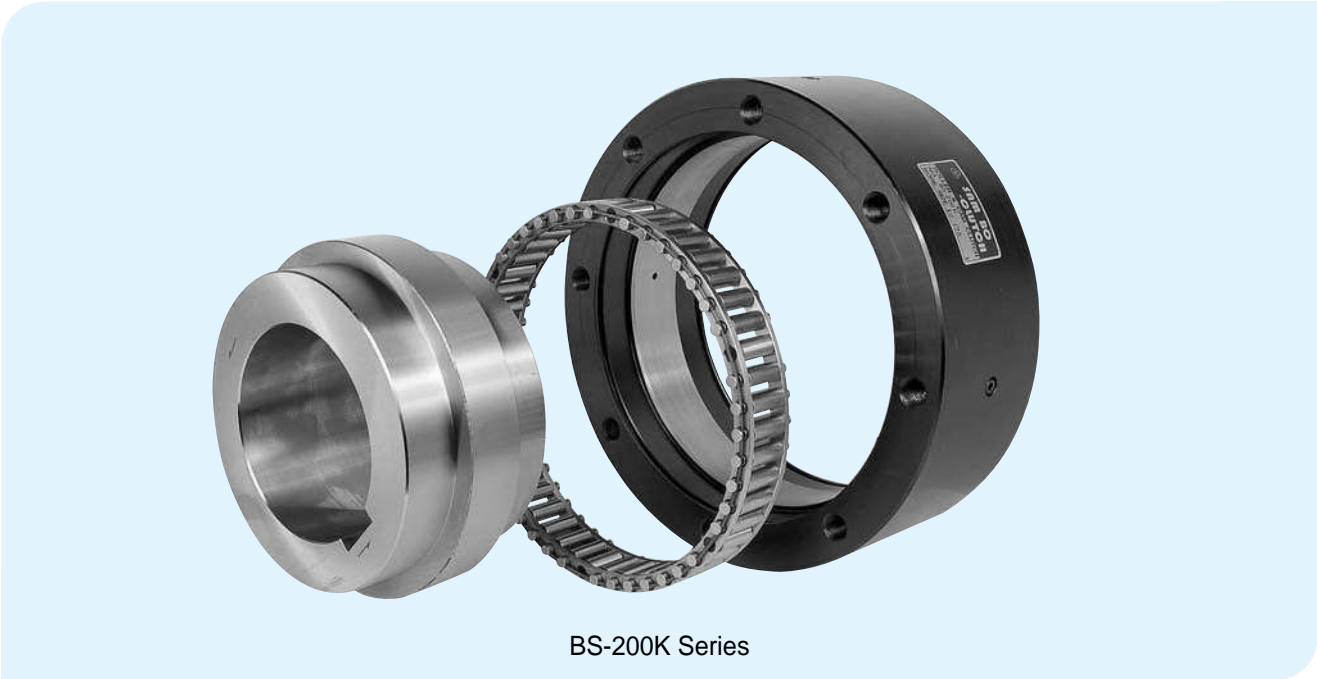
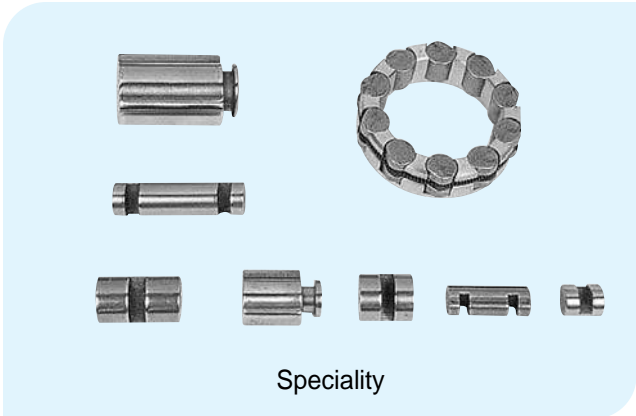
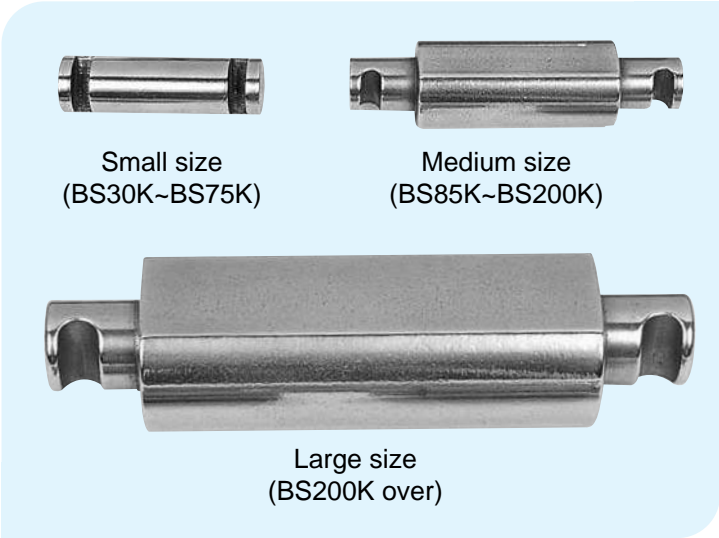
Cam clutches has many more load bearing points because constantly changing contact point on both races. These has high precision without any back lash and silent operation.



PRODUITS OF SAM BO CLUTCH



CAMS OF SAMBO CLUTCH





APPLICATION

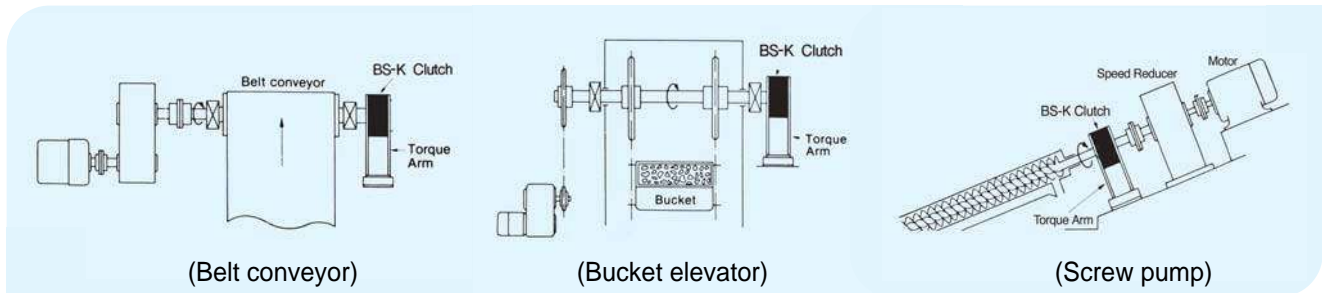
1. BACKSTOPPING

In Backstop applications, the clutch outer race is always stationary. The inner race of the clutch can overrun freely in one direction of rotation. Reverse rotation is instantaneously prevented by the automatic engagement of the cam in the clutch.

Application : Conveyor, Bucket Elevator, Lifter, Motor Wintch, Crane.



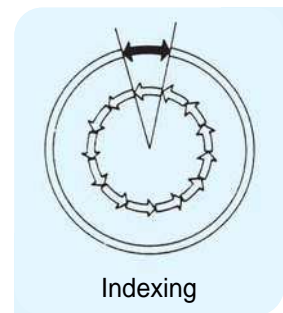
Applications



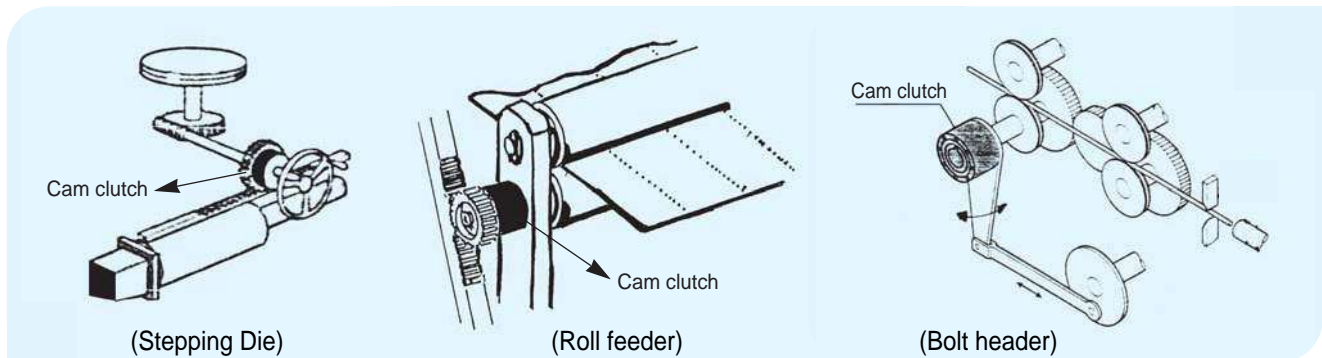
2. INDEXING

In this mode of operation, reciprocating motion by rack & pinion gear and cylinder is imparted to the driving race of the clutch. Then, this motion is transmitted to the driven race in one directional intermittent motion.

Application : Cutting Machines, Press, Auto.-Puncher, Quilting Machines, Packing Machines.
- (Transfer the material in the same stroked)



Applications





3. OVERRUNNING

The output can rotate faster than the input is continue to rotate if the input is stopped.

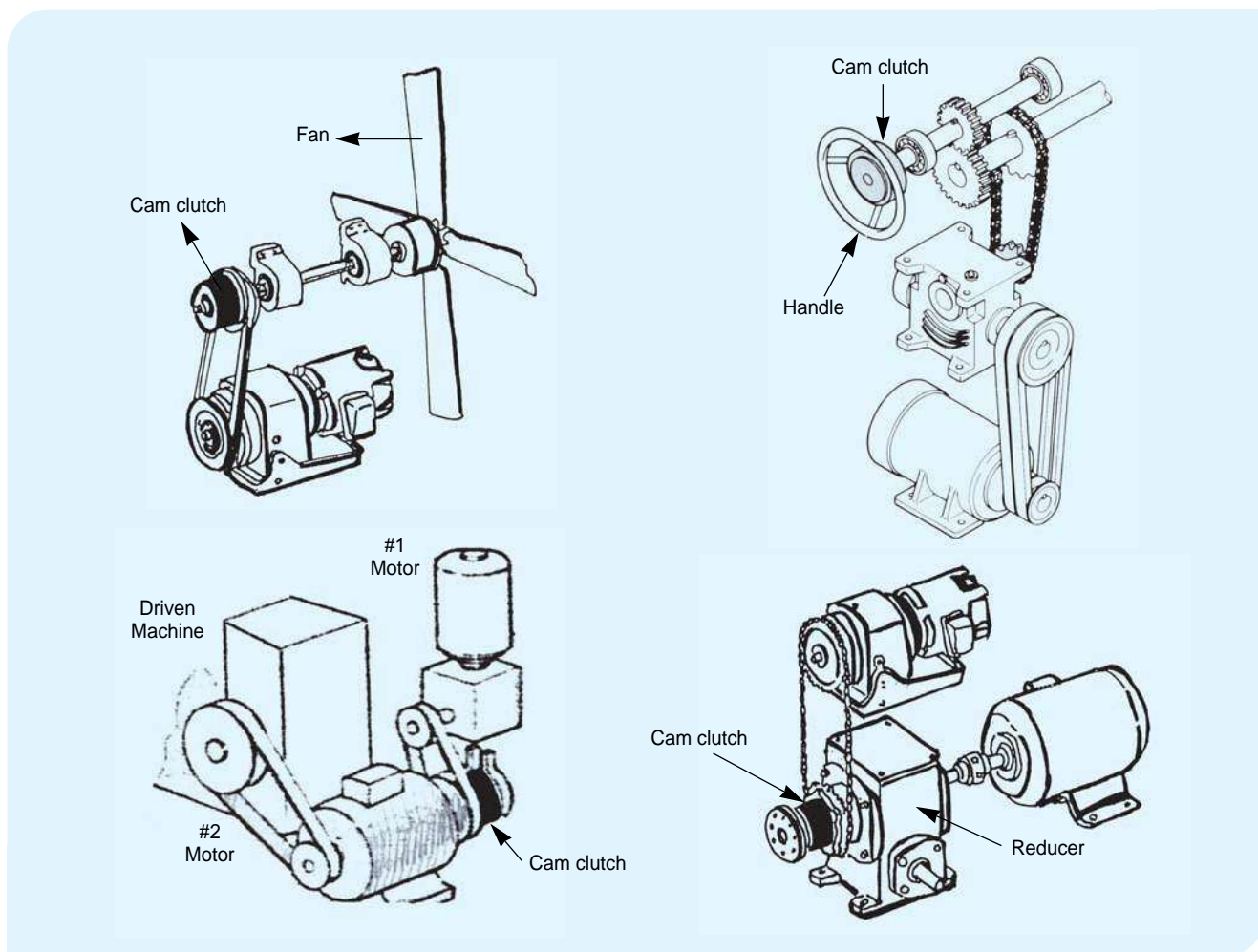
Application EX. :

- (1) If a large motor or turbine has to be run up to speed by a slow speed starter motor, the use of a clutches enables the starter motor to be shut down.
- (2) If a clutches is interposed in a drive between a gear box and a large machine or fan, the clutch prevents any backdrive or damage to the gearbox in the event of power failure.



Application : Large Blower(Fan), Calender, Kiln, Heavy Industry Machinery, Crusher, Mill, Textile Machines, Printers, Agricultural Machinery.

Applications





CONTENTS OF CAM CLUTCHES



FOR THE ONLY BACKSTOPPING (HIGH TORQUE, LOW SPEED)

BS-K

Series
(PAGE:12~13)



For backstopping application only (Grease Lubrication)

Torque range : 30~32,000 kgf.m
Bore range : \varnothing 20~ \varnothing 350

BS-RK

Series
(PAGE:14)



For backstop application only (Oil Lubrication)

BS-RK series is with oil reservoirs, over running speed is high than BS-K series
Torque range : 2,500~32,000 kgf.m
Bore range : \varnothing 100~ \varnothing 350



FOR THE BACKSTOPPING, OVERRUNNING, INDEXING (LOW-MEDIUM SPEED, LIGHT LOAD)

LD-K

Series
(PAGE:21)

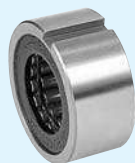


Suitable for the low speed, Light load(Grease Lubrication)

Torque range : 0.6~5 kgf.m
Bore range : \varnothing 10~ \varnothing 30

B200K

Series
(PAGE:22)



B200K series are supported by bearing and shaft mounted directly.

Torque range : 4~142 kgf.m
Bore range : \varnothing 16.5~ \varnothing 79.3

PB-K

Series
(PAGE:23)

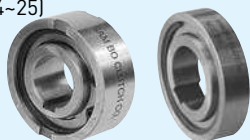


Outer race is easy to mounting gear, pulleys, sprockets.. etc.
(Grease Lubrication)

Torque range : 3~215 kgf.m
Bore range : \varnothing 10~ \varnothing 45

NFS-K, NSS-K Series

(PAGE:24~25)



Clutches have same diameters as metric ball bearing, require bearing support.(Grease Lubrication)

Torque range : 1.3~142 kgf.m
Bore range : \varnothing 8~ \varnothing 60



FOR THE BACKSTOPPING, OVERRUNNING, INDEXING (HIGH SPEED, HEAVY LOAD)

MZ-K

Series
(PAGE:26)



For general purpose (Pre-lubricated with a grease)

Torque range : 33~3,100 kgf.m
Bore range : \varnothing 20~ \varnothing 70

MZ-CK
MG-CK

Series
(PAGE:27)



This series are clutch with couplings utilizing MZ-K, MG-K series

Torque & Bore range : MZ-K, MG-K Series
Bore range of coupling : \varnothing 40~ \varnothing 80 (MZ-K)
Bore range of coupling : \varnothing 56~ \varnothing 285 (MG-K)

MG-K
MI-K
MR-K

Series
(PAGE:28)



For high speed, precision, general purpose (Oil Lubrication)

Torque range : 32~18,000 kgf.m
Bore range : \varnothing 19~ \varnothing 250

MG-RK

Series
(PAGE:29)



For backstopping application with high speed (Oil Lubrication)

This series consist of MG-K series and oil reservoir type
Torque range : 32~18,000 kgf.m
Bore range : \varnothing 19~ \varnothing 250

OTHER

Series

PNC-K Series

BSD-K Series

GFR-K Series



PNC-K, PHC-K Series : (PAGE: 30 ~ 31)

BSD-K Series : (PAGE: 32 ~ 33)

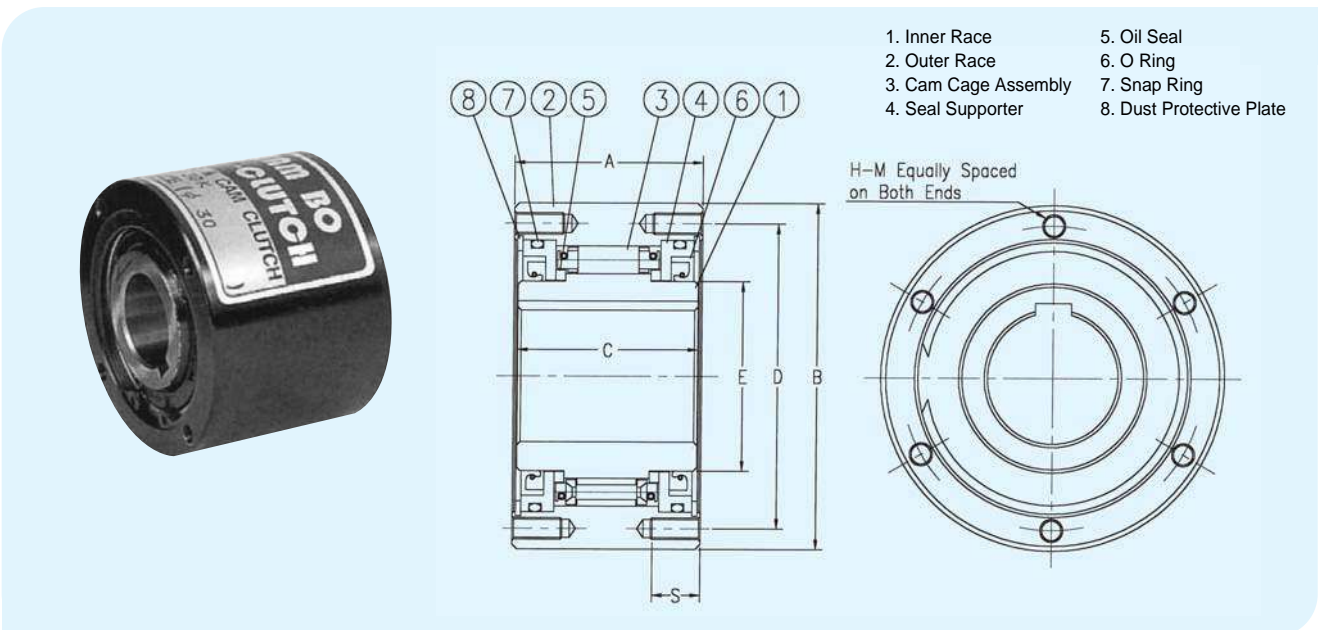
GFR-K Series : (PAGE: 34 ~ 35)



FOR BACKSTOP APPLICATION ONLY

BS-K Series

FOR BACKSTOP APPLICATION



Specification

Dimensions-mm

Model	Max Torque (kgf-m)	Stock Bore Size	Normal Overrunning Drag (kgf-m)	Max. Overrunning (rpm) Inner Race	A	B	C	D	E	S	H-M No. of Tapped Holes x Dia x Pitch	Grease Filler Hole	Q'ty of Grease (gf)	Weight (kgf)
BS 30K	30	20~30	0.06	200	64	90	64	80	45	10	4 x M6 x 1.0	-	-	2.1
BS 50K	80	30~50	0.1	200	67	125	67	110	70	12	4 x M8 x 1.25	-	-	4.0
BS 65K	160	40~65	0.4	150	90	160	85	140	90	20	6 x M10 x 1.5	-	-	11.5
BS 75K	250	50~75	0.6	150	90	170	85	150	100	20	6 x M10 x 1.5	-	-	13.5
BS 85K	600	60~85	0.8	150	115	210	110	185	115	30	6 x M12 x 1.75	-	-	24.7
BS 95K	800	70~95	1.0	150	115	230	110	200	130	30	6 x M14 x 2.0	-	-	29.4
BS 110K	1,100	80~110	1.5	150	115	270	110	220	150	30	6 x M16 x 2.0	-	-	34.2
BS 135K	1,600	90~135	2.0	100	135	320	130	280	180	30	8 x M16 x 2.0	-	-	68.0

Character

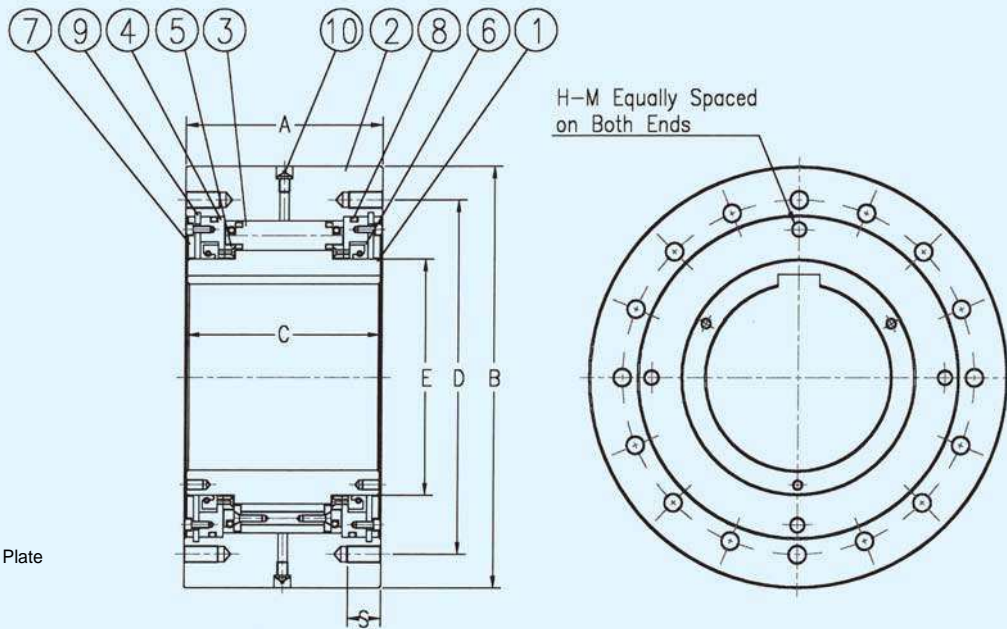
1. For the only backstop application in slant conveyors and bucket elevators.
2. Pre-lubricated with grease and no lubrication maintenance required.

- ※ Specify the Bore & keyway dimension when ordering (Refer to page 38~39)
- ※ Refer to page 16 for installation

FOR BACKSTOP APPLICATION ONLY

BS-K Series

FOR BACKSTOP APPLICATION



- 1. Inner Race
- 2. Outer Race
- 3. Cam & Cage
- 4. Seal Supporter
- 5. Thrust Metal
- 6. Oil Seal
- 7. Dust Protective Plate
- 8. O Ring
- 9. Snap Ring
- 10. Oil filler Hole

Specification

Dimensions-mm

Model	Max Torque (kgf-m)	Stock Bore Size	Normal Overrunning Drag (kgf-m)	Max. Overrunning (rpm) Inner Race	A	B	C	D	E	S	H-M No. of Tapped Holes x Dia x Pitch	Grease Filler Hole	Q'ty of Grease (gf)	Weight (kgf)
BS 160K	2,500	100~160	3.5	100	135	360	130	315	210	40	10 x M20 x 2.5	PT 1/4	300	85.6
BS 200K	3,800	110~200	4.5	100	150	430	145	380	260	40	8 x M22 x 2.5	PT 1/4	380	140.0
BS 220K	5,000	150~220	7.5	80	235	500	230	420	280	40	16 x M20 x 2.5	PT 1/4	1,100	263.5
BS 250K	9,000	180~250	9.5	50	295	600	290	530	340	50	16 x M24 x 3.0	PT 1/4	3,200	580.0
BS 270K	12,500	200~270	9.5	50	295	650	290	575	370	50	16 x M24 x 3.0	PT 1/4	3,600	620
BS 300K	18,000	230~300	11.0	50	295	780	290	690	470	60	16 x M30 x 3.5	PT 1/4	4,500	850
BS 350K	32,000	250~350	16.0	50	320	930	360	815	535	70	16 x M36 x 4.0	PT 1/4	5,200	1,605

Character

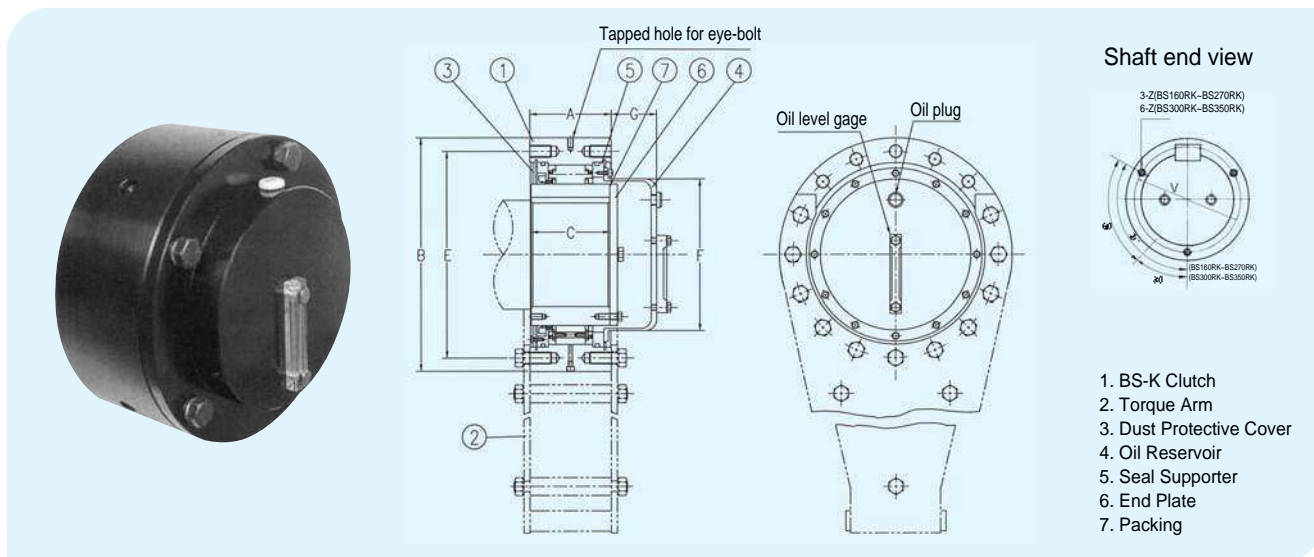
Grease lubrication and lubrication maintenance is necessary.

- ※ Refer to page 18 for lubrication & maintenance
- ※ Specify the Bore & key way dimension when ordering (Refer to page 38~39)



BS-RK Series

OIL RESERVOIR TYPE



Specification

Dimensions-mm

Model No.	Max Torque (kgf-m)	Stock Bore Size	Inner Race Max. Overrun (rpm)	Dimensions (mm)								Bolts for Torque arm size x length x pcs	Q'ty of Oil (cc)	Weight (kgf)
				A	B	C	E	F	G	V	Z			
BS 160RK	2,500	100~160	110	135	360	130	315	255	60	190	M10	M20 x 50φ x 10	1,300	95
BS 200RK	3,800	100~200	110	150	430	145	380	310	60	235	M12	M20 x 50φ x 8	1,900	155
BS 220RK	5,000	150~220	105	235	500	230	420	300	95	255	M12	M20 x 55φ x 22	3,400	310
BS 250RK	9,000	180~250	90	295	600	290	530	355	125	290	M14	M24 x 55φ x 22	8,200	637
BS 270RK	12,500	200~270	80	295	650	290	370	395	130	320	M14	M24 x 55φ x 22	10,000	660
BS 300RK	18,000	230~300	80	295	780	290	690	495	130	380	M14	M30 x 70φ x 22	15,000	1,050
BS 350RK	32,000	250~350	75	320	930	360	815	565	135	442	M16	M36 x 85φ x 22	18,000	1,710

* Bolts for oil Reservoir : • BS 160RK (M20 x 50φ x 10)
• BS 200RK (M22 x 50φ x 8)

Character

1. BS-RK series are used in backstop applications.
2. Overrunning speed of BS-RK series with oil reservoirs is higher than BS-K series.
3. Specify direction of inner race drive (right hand (R.H) or left hand (L.H)) viewed from direction of arrow mark when ordering (refer the above drawing).

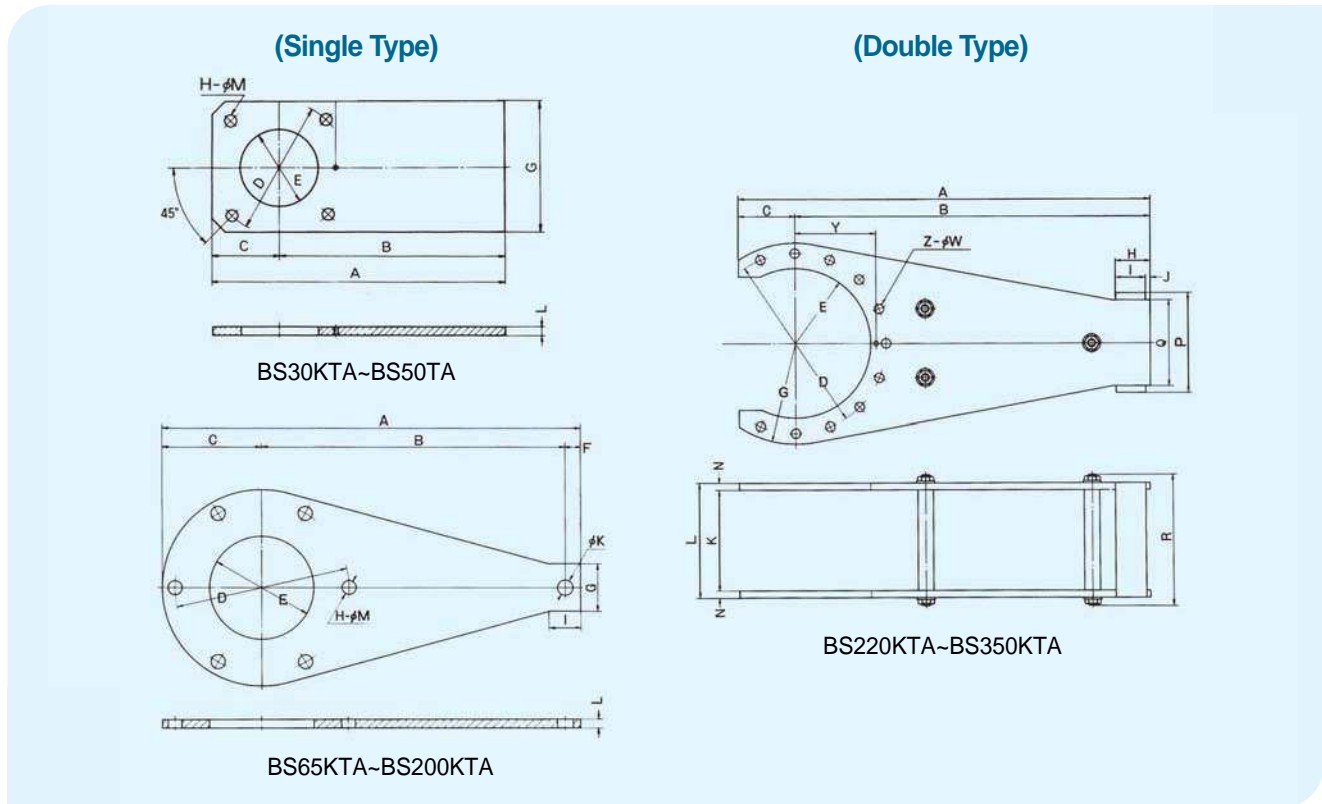
Installation

1. Check the direction of shaft rotation is the same as that of clutch.
2. Locate one of plugs of outer race at the bottom for a drain.
3. Apply preasure only to a clutch inner race. and do not press the clutch outer race or the seal supporter.
4. Attach the end plate with the packing to the shaft by the bolts with the seal washer apply sealing paste in order to prevent leak of the oil.

* Refer to page 38~39 page for bore tolerance and keyway

TORQUE ARM (OPTION)

Torque Arm is at your option (For BS-K, BS-RK series)



Dimension (Single Type)

Dimensions-mm

Torque Arm No.	A	B	C	D	E	F	G	I	KΦ	L	H-MΦ	Approx. Weight(kg)
BS 30KTA	168	130	38	80	55	-	75	-	-	6	4-6.6	0.5
BS 50KTA	230	180	50	110	80	-	100	-	-	6	4-9	0.8
BS 65KTA	306	210	80	140	90	16	50	30	13.5	6	6-11	1.7
BS 75KTA	354	250	85	150	100	19	65	35	16.5	6	6-11	2.3
BS 85KTA	434	300	105	185	115	29	95	45	20.5	9	6-14	5.0
BS 95KTA	497	350	115	200	130	32	105	55	20.5	9	6-16	6.2
BS 110KTA	560	385	135	220	140	40	110	60	26	12	6-18	10.5
BS 135KTA	666	470	160	280	180	36	120	65	26	12	8-18	14.8
BS 160KTA	792	580	180	315	260	32	120	65	31	19	10-22	27.4
BS 200KTA	838	580	215	380	310	43	130	70	41	19	8-24	34.2

Dimension (Double Type)

Dimensions-mm

Torque Arm No.	A	B	C	D	E	G	H	I	J	K	L	N	P	Q	R	Z-WΦ	Approx. Weight(kg)
BS 220KTA	950	820	130	420	176	235	80	70	10	235	259	12	238	200	311	11-22	58
BS 250KTA	1170	1000	170	530	214	300	100	90	10	295	319	12	288	250	375	11-26	95
BS 270KTA	1270	1100	170	575	235	325	110	100	10	295	319	12	298	260	375	11-26	110
BS 300KTA	1480	1300	180	690	285	390	135	120	15	295	333	19	356	300	395	11-32	200
BS 350KTA	1850	1600	250	815	328	465	135	120	15	320	385	19	414	350	430	11-39	330

FOR BACKSTOP APPLICATION ONLY

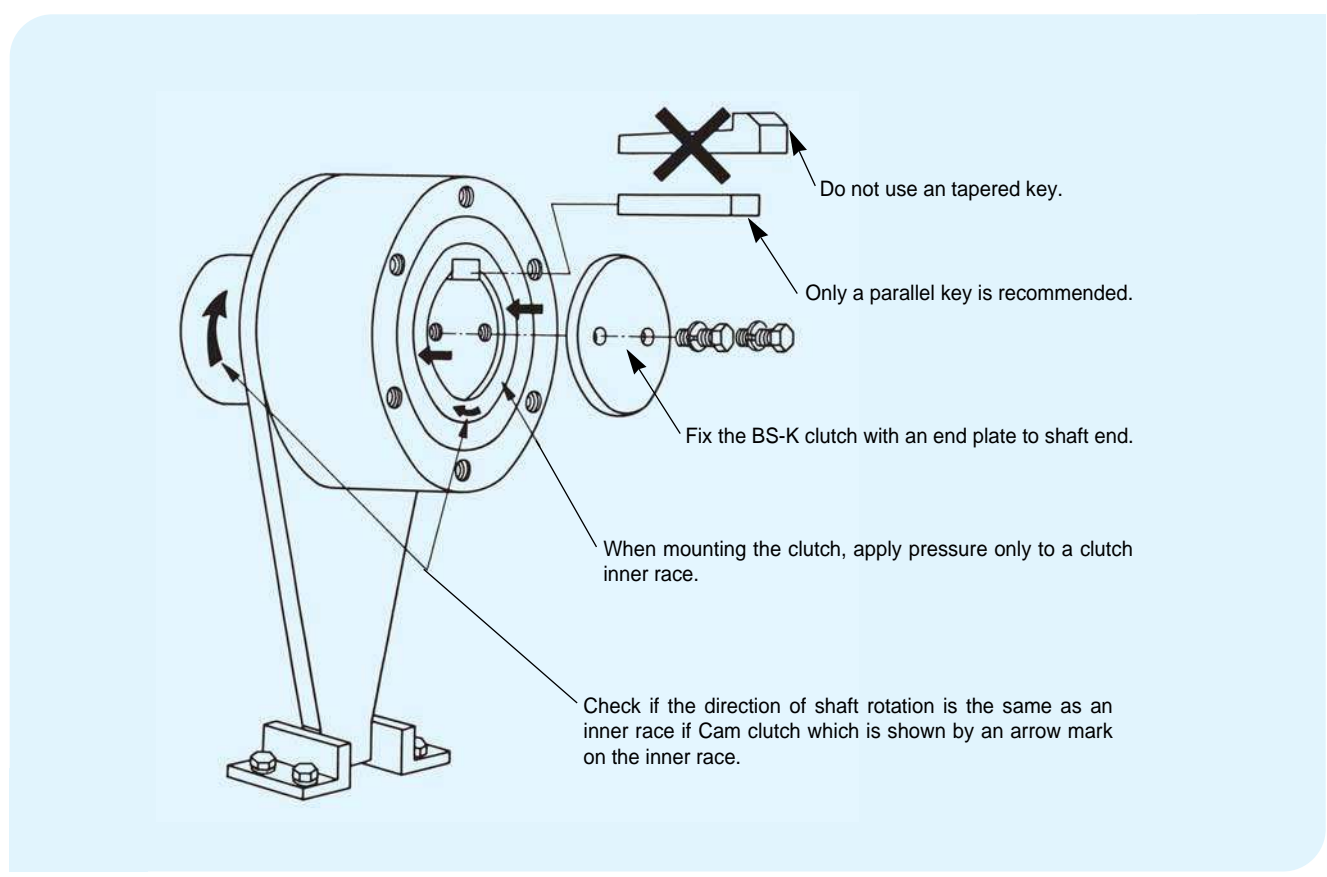
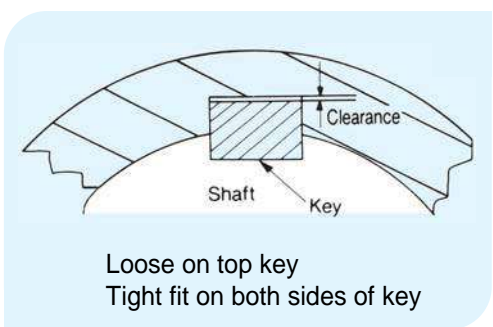


INSTALLATION

Installation of BS-K series

Installation procedure

1. Before installation, check if the direction of shaft rotation is the same as an inner race of cam clutch which is shown by an arrow mark on the inner race.
2. Recommended fit of bore to shaft is H8 (clutch bore) to h8 (shaft) or H7 to h7.
Interference fit and shrinkage fit are prohibited for clutch fixing.
3. When mounting the cam clutch, apply pressure only to a clutch inner race with soft hammer (Do not hit a clutch outer race, a seal supporter nor a dust protective cover.)
4. Only a parallel key is recommendable for clutch fixing. Do not use an inclined key. And there shall be clearance between clutch keyway and key ceiling. (refer the side drawing)
5. Fix clutch with an end plate to shaft end. (refer the below drawing)





INSTALLATION

Installation of torque arm (BS-K series)

● Installation procedure of torque arm

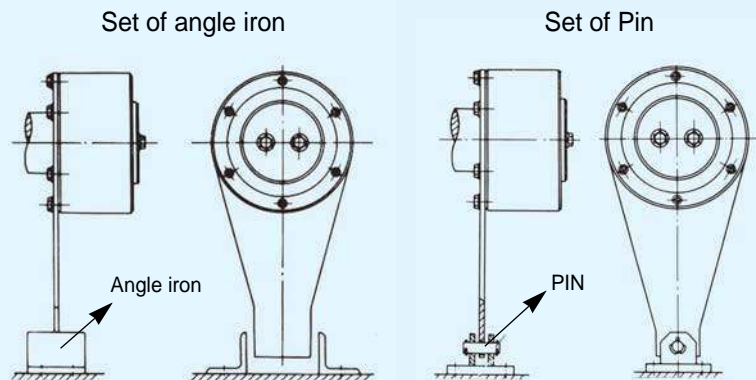
1. Before mounting a torque arm onto a clutch outer race, clean off contact-area of a torque arm and a clutch outer race.
2. High tension bolts (over 11T in Jis standard) are recommended for torque arm fixing , and screw all bolts tightly.
3. The end of torque arm shall be restrained to prevent rotation either by a pin or a set of angle iron. (refer the below drawing)
 - For fixing by a pin, pin diameter should be smaller by 1-2mm than that of pin holl on the torque arm end.

Note : The torque arm should be free axially in order to prevent the clutch from any load induced by misalliance and distortion.
 - The end of torque arm shall not be welded.

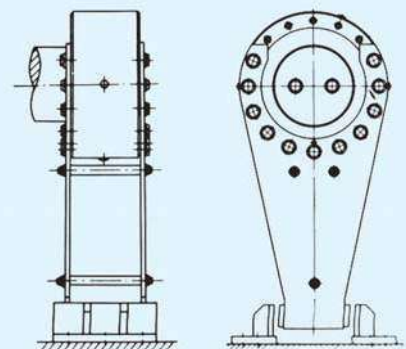
*BS 30K-BS 200K & BS 160RK-BS 200RK : Use a single torque arm

*BS 220K-BS 350K & BS 220RK-BS 350RK : Use a double torque arm

BS 30K-BS 200K



BS 220K-BS 350K



NOTE : Torque Arm end must be axially free.



LUBRICATION & MAINTENANCE

● BS30K- BS135K

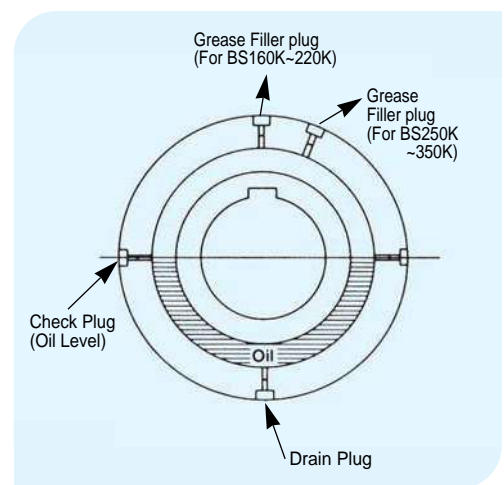
PRE-LUBRICATED WITH GREASE TYPE

No lubrication maintenance is required. (Special grease for very low temperatures must be used in surroundings below -10°C.)

● BS160K-BS350K

GREASE LUBRICATED TYPE

1. Use four plugs on the clutch outer race for grease fill, level check and drain. (locate one of the plugs at the top as grease filler then, the other plugs are for grease level checking and grease draining)
2. Detach plugs for grease level check. and pour grease through grease filler hole (top) until grease flows out from level check hole (middle). then attach the plugs and screw tightly.
3. Grease shall be added at 3 months intervals after initial grease fill and change whole grease at six months intervals. (after draining old grease, clean inside of the clutch and fill the clutch with new grease.)

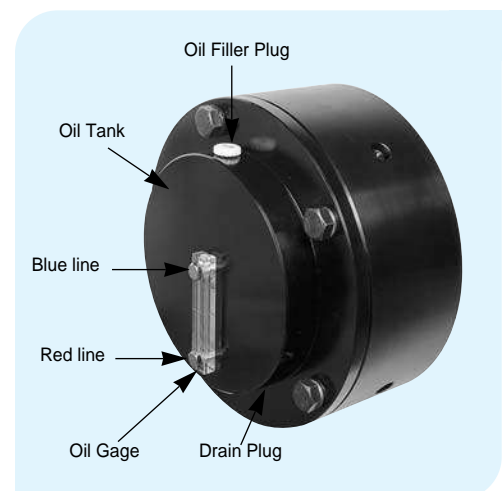


● BS 160RK-BS 350RK

OIL-LUBRICATED OIL RESERVOIR TYPE

1. Detach the oil plug installed on the oil reservoir and pour oil into the oil reservoir up to the blue line of the oil level gage.
 - oil level : Blue line on the oil gage show level for oil fill, Red line shows the lowest level of oil during operation
2. Periodical check is necessary to maintain proper oil level, that is, oil is above the red line of the oil gage. Whole oil shall be changed once a year to receive the fine long life service of the cam clutch.

※ Recommended Grease & Oil : Ref. 36 page



SELECTION

● Calculate procedure of torque

■ For the belt conveyor

(1) Calculate power to move empty.

$$p1 = 0.06 \times f \times w \times v \times \frac{L + L_0}{367} \text{ (kw)}$$

(2) Calculate power to move load horizontally

$$p2 = f \times qt \times \frac{L + L_0}{367} \text{ (kw)}$$

(3) Calculate power to move load vertically

$$p3 = \frac{h \times qt}{367} \text{ (kw)}$$

(4) Calculate backstop power

$$pr = p3 - 0.7(p1 + p2) \text{ (kw)}$$

(5) Calculate backstop torque

$$T = \frac{974 \times pr}{n} \times s.f \text{ (kg.m)}$$

(6) Select the proper clutch which satisfies the calculated torque.

■ For the bucket elevator

(1) Calculate backstop torque

$$T = \frac{(h+d) \times qt \times d \times 1000}{120 \times V} \times s.f$$

(2) Select the proper clutch which satisfies the calculated torque.

※ Informal data

$$T = \frac{716 \times H}{n} \times s.f \text{ (kgf.m)}$$

$$T = \frac{974 \times kw}{n} \times s.f \text{ (kgf.m)}$$

■ Note

f=Friction Coefficient of Rollers:0.03(normally used)

w=Weight of moving parts of conveyor on no-load condition (kg/m)

Width of Belt (mm)	400	450	500	600	750	900	1050	1200	1400
weight (kg/m)	22.4	28	30	35.5	53	63	80	90	112

v=Velocity of conveyor (m/min.)

qt=Max. load (tons/hour)

h=Total lift (m)

L =Horizontal distance between head pulley and tail pulley (m)

L₀=Modificant coefficient for **L** : 499m (Normally used)

n=Shaft revolution per minute where BS-K clutch is mounted (rpm)

d=Pitch circle dia of head sprocket (m)

H : Horse power

kw : Electric Power

s.f=Service factor

Service condition	Service factor
Less than several time a day	1.5 - 2.0
More than several time a day	2.0 - 2.5



BACKSTOPPING / OVERRUNNING / INDEXING (FOR LIGHT LOAD)



LD-K



NFS-K



NSS-K

Drive
↑
Inner Race
↓
Free



PB-K Series



B200K

■R.H (Right Hand rotation shown)

BACKSTOPPING / OVERRUNNING / INDEXING (FOR HEAVY LOAD)



MZ-K



MG-K



PNC-K



BSD-K



GFR-K

Drive
↑
Inner Race
↓
Free



MZ-CK Series

Free
↑
Inner Race
↓
Lock



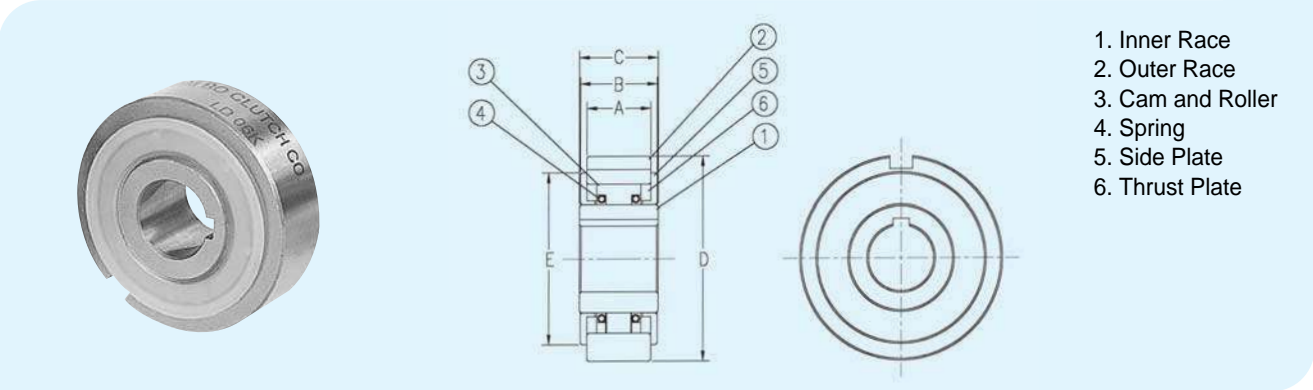
MG-RK Series

■R.H (Right Hand rotation shown)

■R.H (Right Hand rotation shown)

BACKSTOPPING / OVERRUNNING / INDEXING (FOR LIGHT LOAD)

LD-K Series
FOR LIGHT DUTY AT LOW SPEED



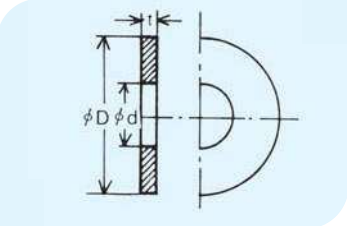
Specification

Model	Max Torque (kgf-m)	Nominal Overrunning Drag (kgf-m)	Max. Overrunning (rpm) Inner Race	Max. Indexing (cycle/min)	(kgf)	Stock Bore Size		A	B	C	D	E	Outer Race Keyway	Weight (kgf)	
LD 04K	0.6	0.02	300	100	20	10	4 x 1.5	19.5	23.9	24	47	$\begin{matrix} -0.014 \\ -0.039 \end{matrix}$	40	5 x 3	0.24
LD 05K	1.0	0.03	300	100	30	14	5 x 2	19.5	23.9	24	52	$\begin{matrix} -0.017 \\ -0.042 \end{matrix}$	45	5 x 3	0.28
LD 06K	2.0	0.03	200	100	50	20	5 x 2	19.5	23.9	24	62	$\begin{matrix} -0.017 \\ -0.042 \end{matrix}$	52	7 x 4	0.40
LD 07K	3.0	0.04	200	100	70	25	7 x 3	19.5	23.9	24	72	$\begin{matrix} -0.017 \\ -0.042 \end{matrix}$	62	7 x 4	0.53
LD 08K	5.0	0.05	200	100	80	30	7 x 3	19.5	23.9	24	80	$\begin{matrix} -0.017 \\ -0.042 \end{matrix}$	70	10 x 4.5	0.64

Character

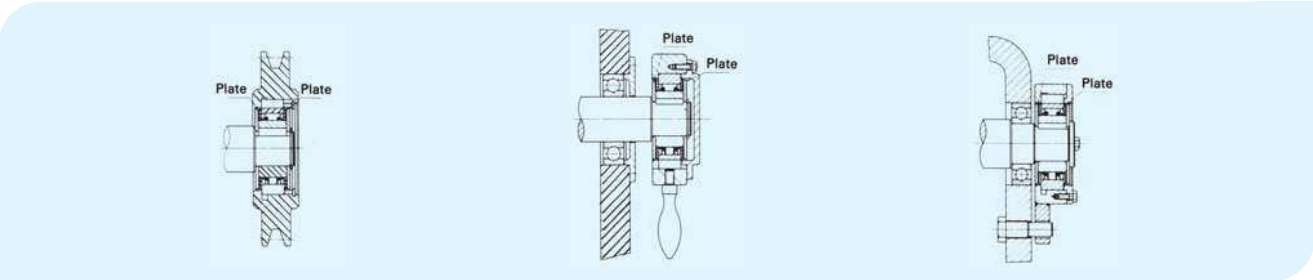
1. Be sure to attach the plate, this prevents the outer race from slipping away from the inner race.
2. Never apply thrust loads to the clutch.
3. The bores of the pulley, sprocket, etc., should have a tolerance of H6 or H7.

Plate Dimensions



Model	t	dΦ	DΦ
LD 04K	2	10	40
LD 05K	2	14	45
LD 06K	3	20	52
LD 07K	3	25	62
LD 08K	3	30	70

Application

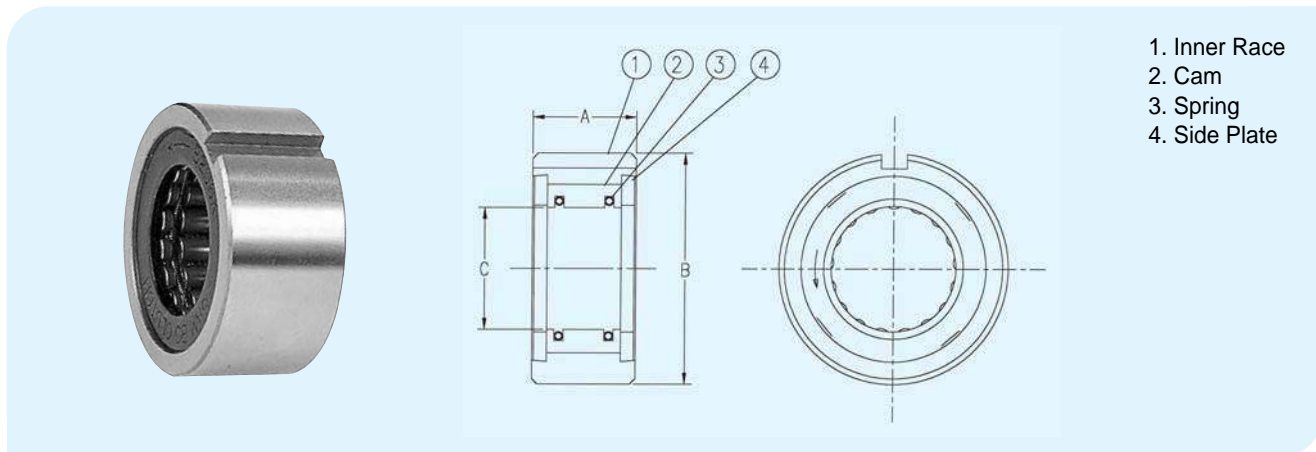


BACKSTOPPING / OVERRUNNING / INDEXING (FOR LIGHT LOAD)



B200K Series

SHAFT MOUNTED TYPE



1. Inner Race
2. Cam
3. Spring
4. Side Plate

Specification

Dimensions-mm

Model	Max Torque (kgf-m)	Nominal Overrunning Drag (kgf-m)	Max. Overrunning (rpm)		Max. Indexing (cycle/min)	A +0 -0.06	B	Shaft Dia +0 C -0.025	Keyway	Bearing Number	Weight (kgf)
B203K	4	0.01	2,400	500	150	25.0	40 -0.014 -0.039	16.510	4 x 2.5	6203	0.16
B204K	6	0.01	2,400	500	150	25.0	47 -0.014 -0.039	18.796	5 x 3	6204	0.25
B205K	10	0.02	1,800	400	150	25.0	52 -0.017 -0.042	23.622	5 x 3	6205	0.29
B206K	24	0.02	1,800	350	150	28.0	62 -0.017 -0.042	32.766	7 x 4	6206	0.42
B207K	38	0.02	1,800	300	150	28.0	72 -0.017 -0.042	42.088	7 x 4	6207	0.50
B208K	56	0.02	1,800	200	150	32.0	80 -0.017 -0.042	46.761	10 x 4.5	6208	0.73
B209K	56	0.02	1,800	200	150	32.0	85 -0.020 -0.045	46.761	10 x 4.5	6209	0.89
B210K	80	0.03	1,200	200	150	32.0	90 -0.020 -0.045	56.109	10 x 4.5	6210	0.87
B211K	80	0.03	1,200	200	150	32.0	100 -0.020 -0.050	56.109	10 x 4.5	6211	1.24
B212K	125	0.03	1,200	180	150	42.0	110 -0.020 -0.050	70.029	10 x 4.5	6212	1.56
B213K	125	0.03	1,200	180	150	42.0	120 -0.020 -0.050	70.029	10 x 4.5	6213	2.07
B214K	142	0.04	1,000	180	150	42.0	125 -0.024 -0.060	79.356	12 x 4.5	6214	2.05

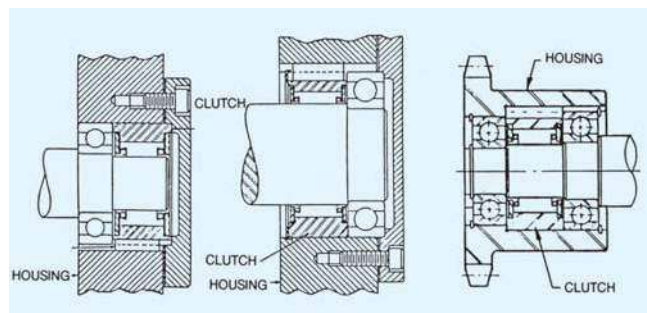
Character

1. 200K Series are shaft mounted directly.
2. Clutch have the same O.D as the ball bearing.
For installation of clutch, shaft must be supported by bearings. (refer the side drawing)

Tolerance of housing bore

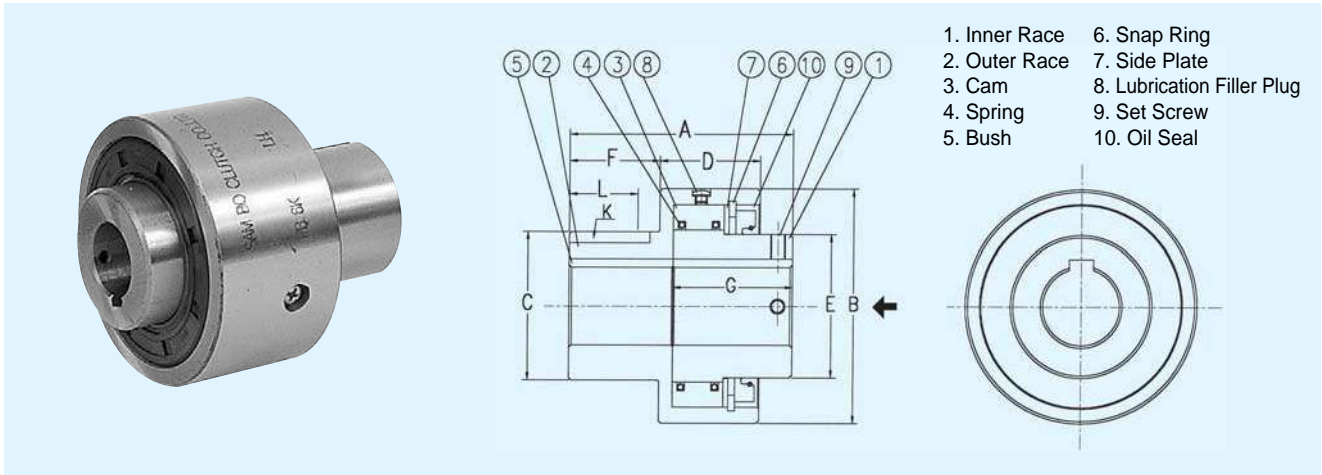
Model	Tolerance of housing bore
B203K, B204K	0 to +0.025
B205K, B206K, B207K, B208K	0 to +0.030
B210K, B211K, B212K, B213K	0 to +0.035
B214K	0 to +0.040

Application



PB-K Series

FOR GENERAL PURPOSES



Specification

Dimensions-mm

Model	Max. Torque (kgf-m)	Nominal Overrunning Drag (kgf-m)	Max. Overrunning (rpm)		Max. Indexing (cycle /min)	Stock Bore Size		A	B	C (h6)	D	E	F	G	Outer Race Keyway		Weight (kgf)	Lubrication Filler Plug Dia x Pitch
			Inner Race	Outer Race		Dia (J7)	Key Way								K	L		
PB 3K	3	0.02	1,800	900	150	10	4 x 1.5	50	50	23	22	25	21	25.7	4 x 2.5	16	0.23	M6 x 1.0
PB 5K	15	0.02	1,800	900	150	16	5 x 2.0	70	60	32	32	35	25	38.8	5 x 3.0	20	0.58	M6 x 1.0
PB 6K	39	0.02	1,500	800	150	20	5 x 2.0	82	73	38	38	37	33	41.0	5 x 3.0	27	1.1	M6 x 1.0
PB 8K	58	0.03	1,200	650	150	25	7 x 3.0	85	83	45	40	45	33	42.0	7 x 4.0	27	1.6	M6 x 1.0
PB 10K	86	0.04	1,000	400	150	31.5	10 x 3.5	92	95	60	41	58	37	44.0	10 x 4.5	28	2.5	M6 x 1.0
PB 12K	156	0.04	800	300	150	40	10 x 3.5	100	113	65	50	66	37	52.6	10 x 4.5	29	3.7	M6 x 1.0
PB 14K	215	0.06	700	300	150	45	12 x 3.5	112	133	75	54	76	41	57.3	12 x 4.5	30	6.0	M6 x 1.0

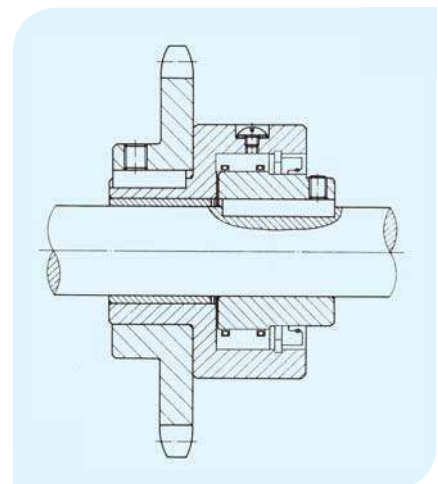
Character

1. PB-K Series clutches feature precision formed cams which provide highest torque capacities with excellent wear life.
2. Do not use the PB clutch as a coupling
3. Specify right(R.H) or left hand (L.H) inner race drive(not free) viewed from direction of arrow mark when ordering.
4. Model PB5K~PB14K Series have 3 pcs of filler except PB-3K which has one only.
5. These units can be operated in ambient temperature of -6°C~55°C

Shaft Tolerance

Model	Shaft Tolerance
PB3K, PB4K, PB6K, PB8K	0 to -0.013
PB10K, PB12K, PB14K	0 to -0.016

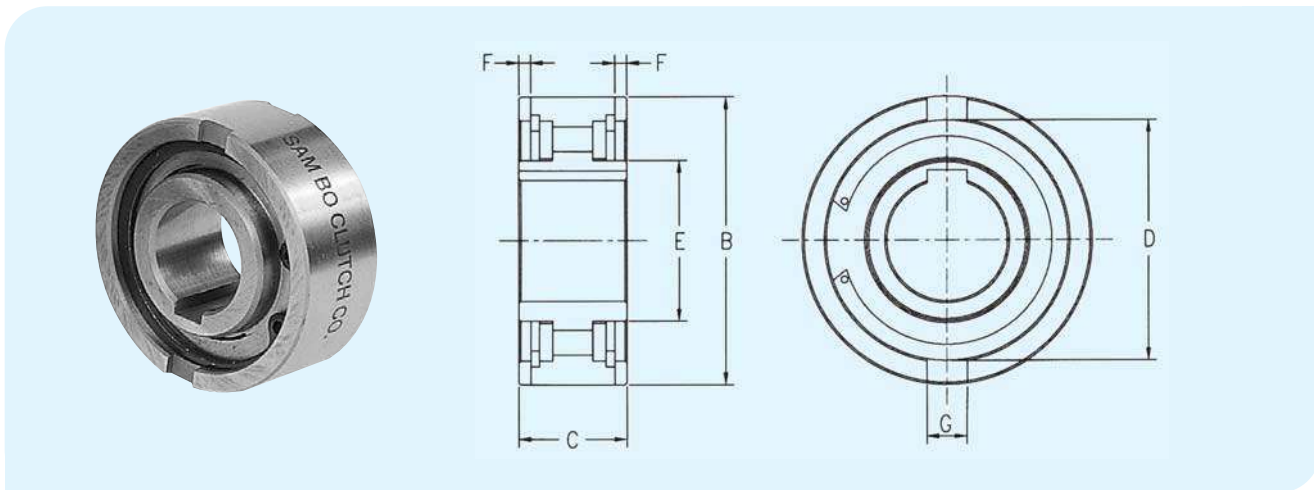
Application





NFS-K Series

FOR INNER RACE HIGH SPEED, GENERAL PURPOSE



Specification

Dimensions-mm

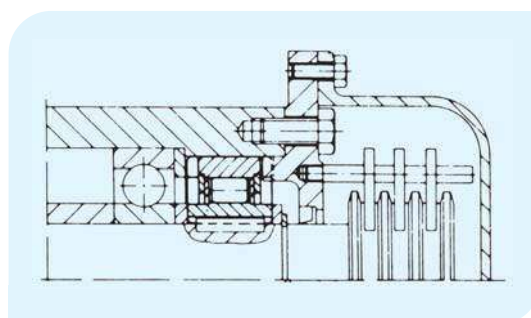
Model	Torque Capacity kgf·m	Max. Overrunning (rpm)		Stock Bore Size		B (n6)	C	D	E	F	G	Weight (kgf)
		Inner Race	Outer Race	Dia(H7)	Key Way							
NFS-15K	2.9	3,500	1,800	15	5 x 1.2	42	18	36	22	1.8	5	0.13
NFS-17K	5.1	3,200	1,600	17	5 x 1.2	47	19	37	23	2.3	5	0.18
NFS-20K	8.6	2,500	1,300	20	6 x 1.6	52	21	45	29	2.3	6	0.22
NFS-25K	13.1	2,000	1,000	25	8 x 2.0	62	24	52	35	2.8	8	0.37
NFS-30K	20.4	1,600	800	30	8 x 2.0	72	27	60	40	2.5	10	0.55
NFS-35K	48.5	1,400	700	35	10 x 2.4	80	31	70	48	3.5	12	0.73
NFS-40K	62.0	1,300	650	40	12 x 2.2	90	33	78	55	4.1	12	1.02
NFS-45K	77.1	1,100	550	45	14 x 2.1	100	36	85	59	4.6	14	1.36
NFS-50K	114.7	1,000	500	50	14 x 2.1	110	40	92	65	5.6	14	1.82
NFS-60K	201.5	840	420	60	18 x 2.3	130	46	110	80	5.5	18	2.96
NFS-70K	256.5	750	380	70	20 x 2.7	150	51	125	90	6.9	20	4.26
NFS-80K	402.3	670	340	80	22 x 3.1	170	58	140	105	7.5	20	6.25

Character

1. NFS-K Series is Cam type clutch
2. Clutches have same diameters as metric medium series ball bearing.
3. Clutches require bearing support to assure concentricity between inner and outer race.
4. Clutches must be lubricated before putting in service.

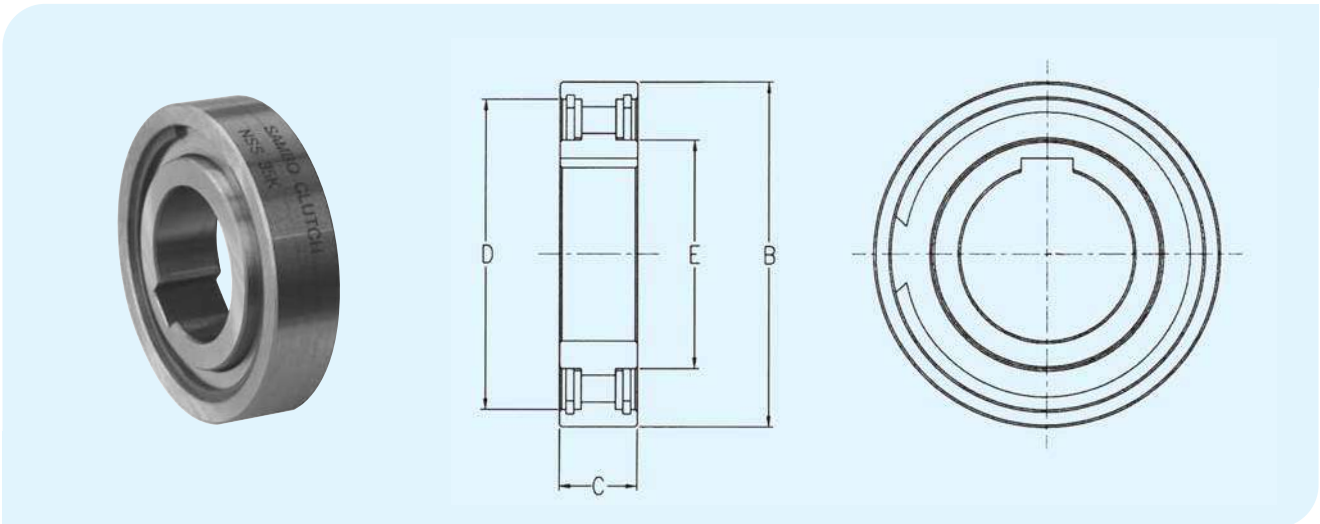
※The key way is in accordance with DIN 6885 sheet 3. (Refer to page 39)

Application



NSS-K Series

FOR INNER RACE HIGH SPEED, GENERAL PURPOSE



Specification

Dimensions-mm

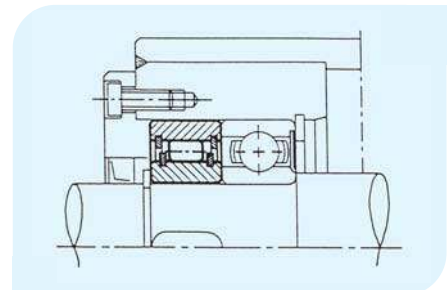
Model	Torque Capacity kgf·m	Max. Overrunning (rpm)		Stock Bore Size		B (r6)	C	D	E	Weight (kgf)
		Inner Racee	Outer Race	Dia(H7)	Key Way					
NSS-20K	4.2	2,600	1,300	20	6 x 1.6	47	14	40	26	0.12
NSS-25K	5.7	2,200	1,100	25	8 x 2.0	52	15	45	32	0.15
NSS-30K	10.7	1,800	900	30	8 x 2.0	62	16	55	42	0.23
NSS-35K	13.9	1,600	800	35	10 x 2.4	72	17	62	48	0.33
NSS-40K	30.2	1,400	700	40	12 x 2.2	80	18	72	53	0.40
NSS-45K	35.4	1,300	650	45	14 x 2.1	85	19	75	57	0.47
NSS-50K	41.1	1,200	600	50	14 x 2.1	90	20	80	62	0.53
NSS-60K	66.2	910	460	60	18 x 2.3	110	22	100	78	0.91

Character

1. NSS-K Series is Cam type clutch
2. Clutches have same diameters as metric medium series ball bearing.
3. Clutches require bearing support to assure concentricity between inner and outer race.
4. Clutches must be lubricated before putting in service.
5. Excellent for applications where space is restricted.

※The key way is in accordance with DIN 6885 sheet 3.(Refer to page 39)

Application

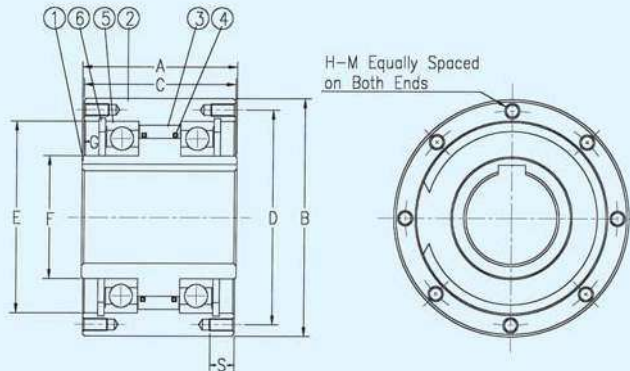




BACKSTOPPING / OVERRUNNING / INDEXING (FOR HEAVY LOAD)

MZ-K Series

FOR GENERAL PURPOSES



1. Inner Race
2. Outer Race
3. Cam
4. Spring
5. Shield Bearing
6. Snap Ring

Specification

Dimensions-mm

Model	Max. Torque (kgf-m)	Nominal Overrunning Drag (kgf-m)	Max. Overrunning (rpm)		Max. Indexing (cycle /min)	Stock Bore Size		A	B (h6)	C	D	E (M6)	F	G	H-M No. of Tapped Holes x Dia x Pitch	S	Weight (kgf)
			Inner Race	Outer Race		Dia (H7)	Key Way										
MZ 20K	33	0.03	1,600	700	150	20	6 x 2.8	67	80	65	68	55	30	7.6	6 x M6 x 1.0	13	2.0
MZ 30K	75	0.04	1,500	500	150	30	10 x 3.3	82	100	80	88	75	45	8.9	6 x M8 x 1.25	16	3.6
MZ 45K	165	0.07	1,400	300	150	45	14 x 3.8	92	125	90	110	95	60	8.4	8 x M8 x 1.25	16	6.0
MZ 60K	215	0.10	1,200	250	150	60	18 x 4.4	102	155	100	140	125	80	9.1	8 x M8 x 1.25	16	9.9
MZ 70K	310	0.13	1,100	250	150	70	20 x 4.9	105	175	103	162	145	95	8.6	8 x M8 x 1.25	20	12.9

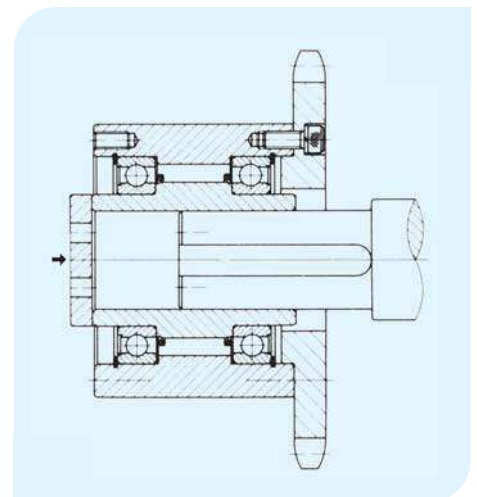
Character

1. MZ-K Series are shielded by bearings on both ends, packed with a grease.
2. High tension bolts are recommended for pulleys, gears or sprockets fixing to the outer race of cam clutch. (refer the drawing)
3. Fix Clutch by an end plate to shaft end. (refer the side drawing)
4. Ambient temperature range is -5°C to $+40^{\circ}\text{C}$

Shaft Tolerance

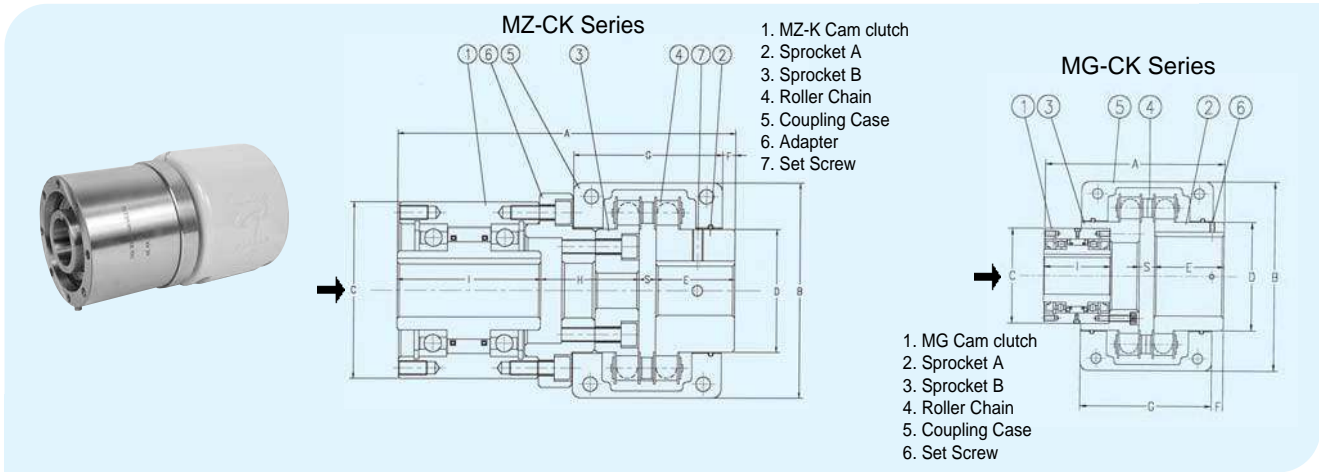
Model	Shaft Tolerance
MZ 20K	0 to -0.021
MZ 30K	0 to -0.021
MZ 45K	0 to -0.025
MZ 60K	0 to -0.030
MZ 70K	0 to -0.030

Application



MZ-CK, MG-CK Series

CAM CLUTCH WITH COUPLING



Specification / MZ-CK Series

Model	Max. Torque (kgf-m)	Nominal Overrunning Drag (kgf-m)	Max. Overrunning (rpm)		Clutch Side Stock Bore Size		Coupling Side Stock Bore Size		A	B	C (h7)	D	E	F	G	H	I	S	Weight (kgf)
			Inner Racee	Outer Race	Dia (J7)	Key Way	Min.	Max.											
MZ 20CK	33	0.03	1,600	700	20	6 x 2.8	15	40	174	111	80	60	45	7.35	85	52.3	67	9.7	6.1
MZ 30CK	75	0.04	1,500	500	30	10 x 3.3	15	45	194	122	100	70	45	7.35	85	57.3	82	9.7	9.4
MZ 45CK	165	0.07	1,400	300	45	14 x 3.8	20	56	226	142	125	85	56	8.7	106	66.5	92	11.5	15.8
MZ 60CK	215	0.1	1,200	250	60	18 x 4.4	20	75	236	167	155	110	56	8.7	106	66.5	102	11.5	24.5
MZ 70CK	310	0.13	1,100	250	70	20 x 4.9	25	80	260	186	175	115	63	5.6	130	76.8	105	15.2	32.6

Specification / MG-CK Series

Model	Max. Torque (kgf-m)	Nominal Overrunning Drag (kgf-m)	Max. Overrunning (rpm)		Clutch Side Stock Bore Size		Coupling Side Stock Bore Size		A	B	C (h7)	D	E	F	G	S	I	Weight (kgf)
			Inner Racee	Outer Race	Dia (H7)	Key Way	Min.	Max.										
MG 300CK	32	0.023	2,800	900	19	5 x 2	20	56	155	142	77	85	56	8.7	106	11.5	63	8.5
MG 400CK	55	0.029	2,600	800	22	5 x 2	20	75	160	167	88	110	56	8.7	106	11.5	70	13.5
MG 500CK	165	0.052	2,400	800	31.5	7 x 3	30	100	195	220	108	140	71	13.55	130	15.2	89	28
MG 600CK	320	0.086	2,100	700	50	12 x 3.5	45	125	250	307	136	170	90	24.8	181	22.7	95	52
MG 700CK	600	0.173	1,500	500	70	18 x 6	55	150	275	357	180	210	100	24.8	181	22.7	127	80
MG 750CK	970	0.35	1,400	500	85	24 x 6	60	160	340	406	200	224	112	2.1	250	30.1	153	147
MG 800CK	1,800	0.55	1,300	475	110	28 x 7	75	200	370	472	250	280	140	30	250	30.1	158	182
MG 900CK	2,500	0.69	1,200	400	135	35 x 9	98	260	496	578	300	374	241	121.7	280	37.5	165	420
MG 1000CK	3,450	0.83	1,200	325	160	38 x 10	108	285	510	-	370	408	241	-	-	37.5	188	470

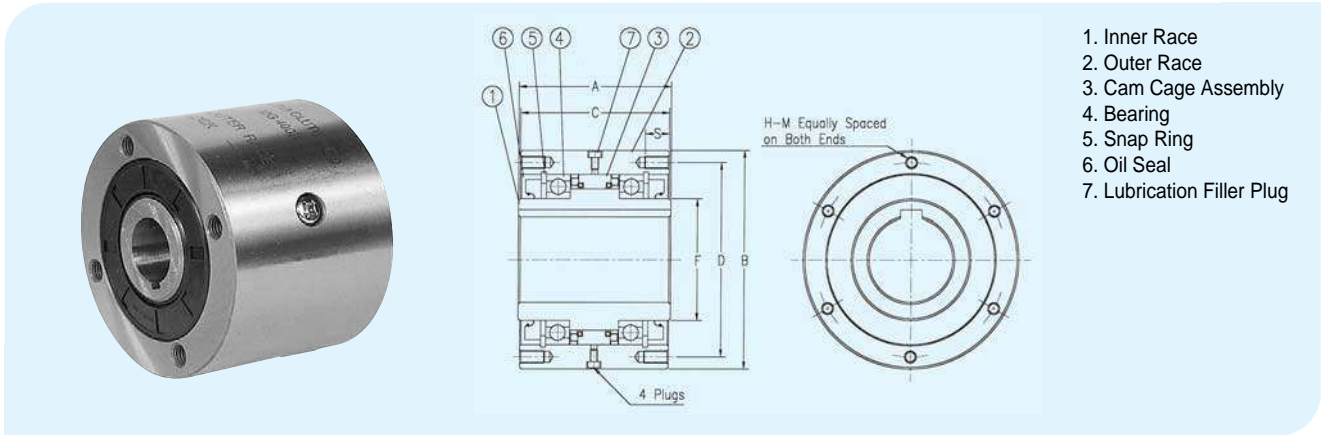
Character of MZ-CK, MG-CK Series

1. MZ-CK Series & MG-CK Series are clutch coupling utilizing MZ-K, MG-K Series clutches.
2. Specify right hand (R.H) or left hand (L.H) inner race drive viewed from direction of arrow mark when ordering (Refer the above drawing)
3. Accurately align both sprockets



MG-K, MI-K, MR-K Series

FOR HIGH SPEED, GENERAL PURPOSES



1. Inner Race
2. Outer Race
3. Cam Cage Assembly
4. Bearing
5. Snap Ring
6. Oil Seal
7. Lubrication Filler Plug

Specification

Dimensions-mm

Model	Max. Torque (kgf-m)	Nominal Overrunning Drag (kgf-m)	Max. Overrunning (rpm)		Max. Indexing (cycle /min)	Stock Bore Size		A	B (h7)	C	D	F	S	H-M No. of Tapped Holes x Dia x Pitch	Lubrication filler Plug Dia. x Pitch	Oil (CC)	Weight (kg)
			Inner Race	Outer Race		Dia (H7)	Key Way										
MG 300K MI 300K	32	0.023 0.031	2,800 50	900 -	- 300	19	5 x 2	63	77	60	66	30	13	4 x M6 x 1.0	M6 x 1.0	25 50	1.7
MG 400K MI 400K	55	0.029 0.038	2,600 50	800 -	- 300	22	5 x 2	70	88	67	73	35	16	4 x M8 x 1.25	M6 x 1.0	30 60	2.4
MG 500K MI 500K	165	0.052 0.069	2,400 50	800 -	- 300	31.5	7 x 3	89	108	86	92	50	16	4 x M8 x 1.25	M6 x 1.0	50 100	4.5
MG 600K MI 600K	320	0.086 0.158	2,100 30	700 -	- 300	50	12 x 3.5	95	136	92	120	75	16	6 x M8 x 1.25	M6 x 1.0	80 160	7.5
MG 700K MI 700K	600	0.173 0.268	1,500 30	500 -	- 300	70	18 x 6	127	180	124	160	100	20	6 x M10 x 1.5	M6 x 1.0	135 260	17.5
MG 750K MI 750K MR 750K	970	0.35 0.42 -	1,400 30 575	500 - 2,600	- 300 -	85	24 x 6	153	200	150	175	110	25	8 x M14 x 2.0	M8 x 1.25	400 800 400	35.7
MG 800K MI 800K MR 800K	1,800	0.55 0.85 -	1,300 20 475	475 - 2,100	- 300 -	110	28 x 7	158	250	155	220	140	25	8 x M16 x 2.0	M8 x 1.25	500 1000 500	40.0
MG 900K MI 900K MR 900K	2,500	0.69 0.96 -	1,200 20 475	400 - 1,850	- 300 -	135	35 x 9	165	300	160	265	170	32	10 x M16 x 2.0	M8 x 1.25	620 1,240 620	70.5
MG 1000K MI 1000K MR 1000K	3,450	0.83 1.30 -	1,200 20 325	325 - 1,600	- 300 -	160	38 x 10	188	370	180	325	200	32	12 x M16 x 2.0	M8 x 1.25	850 1,700 850	108.5

Character

This series are precision clutches comprised ball bearing.(oil lubrication)

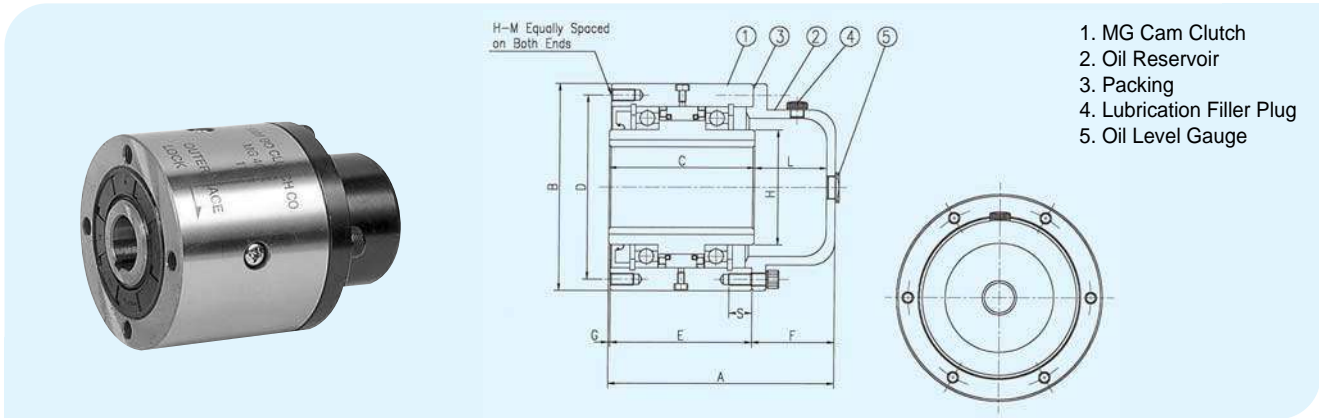
- MG-K Series** : For high speed of inner race with overrunning applications.
- MI-K Series** : For indexing applications.
- MR-K Series** : For high speed of outer race with overrunning applications.

Shaft Tolerance

Model	Shaft Tolerance	Model	Shaft Tolerance
MG, MI-300K & 400K	+0 to -0.021	MG, MI-500K & 600K	+0 to -0.025
MG, MI-700K	+ 0 to -0.030	MG, MI, MR-750K & 800K	+0 to -0.035
MG, MI, MR-900K & 1000K	+0 to -0.040		

MG-RK Series

OIL RESERVOIR TYPE



Specification

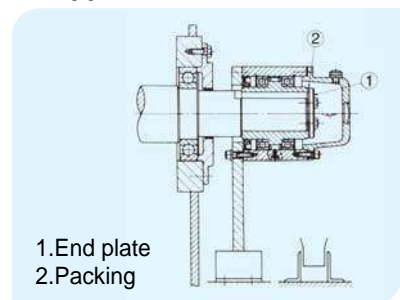
Dimensions-mm

Model	Max. Torque (kgf-m)	Nominal Overrunning Drag (kgf-m)	Max. Overrunning (rpm) Inner Race	Stock Bore Size		A	B	C	D	E (M6)	F	G	H	H-M No. of Tapped Holes x Dia x Pitch	S	Weight (kgf)
				Dia (H7)	Key Way											
MG 300RK	32	0.016	2,800	19	5 x 2	115	77	63	66	60	53.5	1.5	28.5	4 x M6 x 1.0	13	2.0
MG 400RK	55	0.02	2,600	22	5 x 2	122	88	70	73	67	53.5	1.5	31.7	4 x M8 x 1.25	16	3.0
MG 500RK	165	0.036	2,400	31.5	7 x 3	154	108	89	92	86	66.5	1.5	44.4	4 x M8 x 1.25	16	5.5
MG 600RK	320	0.06	2,100	50	12 x 3.5	165	136	95	120	92	71.5	1.5	69.8	6 x M8 x 1.25	20	9.5
MG 700RK	600	0.121	1,500	70	18 x 6	207	180	127	160	124	81.5	1.5	101.5	6 x M10 x 1.5	20	21.0
MG 750RK	970	0.28	1,400	85	24 x 6	280	200	153	175	150	128.5	1.5	110	8 x M14 x 2.0	25	40.3
MG 800RK	1,800	0.44	1,300	110	28 x 7	298.5	250	158	220	155	142	1.5	140	8 x M16 x 2.0	25	50.6
MG 900RK	2,500	0.55	1,200	135	35 x 9	314.5	300	165	265	160	152	2.5	170	10 x M16 x 2.0	32	77.6
MG 1000RK	3,450	0.66	1,200	160	38 x 10	341	370	188	325	180	157	4.0	200	12 x M16 x 2.0	32	116.6

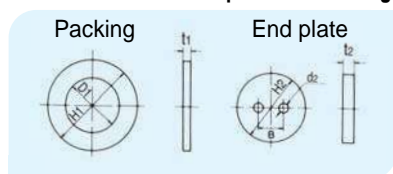
Character

1. MG-RK Series consist of MG-K Series and oil reservoir type.
2. For high speed of inner race, backstopping application with outer race is stationary.
3. Specify direction of inner race drive(right hand (R.H)or left hand (L.H)) viewed from direction of arrow mark when ordering. (refer the above drawing)
4. When attaching the oil lubricating clutches, be sure to put packing and position one of the plugs of outer race under neath for a drain.
5. Prevent oil leakage from the shaft end by using an end plate with packing. (refer the below drawing)

Application



Dimensions for End plate and Packing

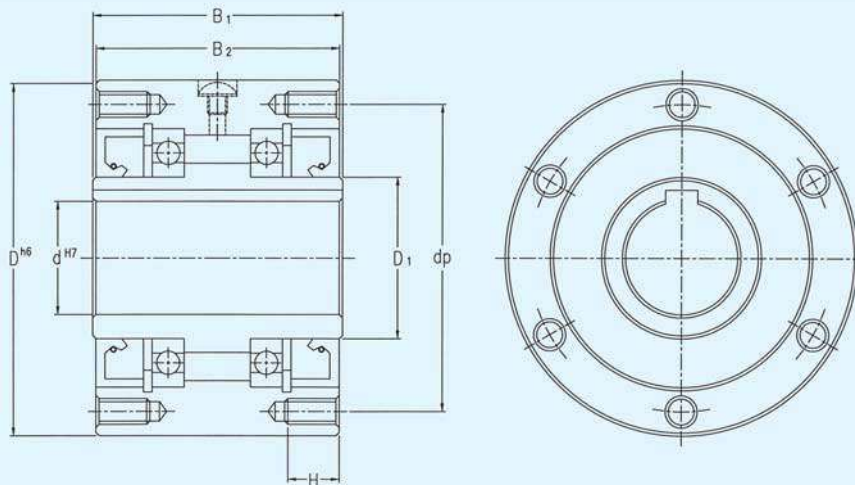


Model	Packing			End Plate				
	H ₁	D ₁	t ₁	H ₂	t ₂	B	d ₂	Bolt size
MG 300RK	28	19	1.5	28	4	11	5.5	M 5
MG 400RK	31	22	1.5	31	4	13	6.6	M 6
MG 500RK	44	31.5	1.5	44	6	20	9	M 8
MG 600RK	69	50	1.5	69	8	30	11	M 10
MG 700RK	101	70	1.5	101	8	40	14	M 12
MG 750RK	110	85	1.5	110	10	50	18	M 16
MG 800RK	140	110	1.5	140	10	70	18	M 16
MG 900RK	170	135	1.5	170	10	80	18	M 16
MG 1000RK	200	160	1.5	200	10	100	18	M 16



PNC-K Series

FOR HIGH SPEED, OVERRUNNING



Specification

Dimensions-mm

Model	Max. Torque (kgf-m)	Max. Overrunning (rpm)		Stock Bore Size		D	B ₁	B ₂	dp	D ₁	No. of Tapped Holes Dia x Pitch N-M x H	Oil (CC)	Weight (kgf)
		Outer Race	Inner Race	Dia(d)	Key Way								
PNC 15K	14.2	1,500	2,100	15	5 x 2.3	68	55	53	58	25	6-M5 x 10	12	1.2
PNC 17K	19.4	1,400	2,000	17	5 x 2.3	75	63	61	64	28	6-M5 x 10	18	1.6
PNC 20K	33	1,300	1,900	20	5 x 2.3	80	64	62	68	30	6-M6 x 12	22	1.9
PNC 22K	56.5	1,100	1,600	22	8 x 3.3	100	70	68	88	45	6-M8 x 16	38	3.2
PNC 25K	56.5	1,100	1,600	25	8 x 3.3	100	70	68	88	45	6-M8 x 16	38	3.2
PNC 30K	56.5	1,100	1,600	30	10 x 3.3	100	70	68	88	45	6-M8 x 16	38	3
PNC 35K	72.5	1,100	1,500	35	10 x 3.3	110	78	76	95	50	6-M8 x 16	44	4.2
PNC 40K	154	1,000	1,400	40	12 x 3.3	125	87	85	110	60	8-M8 x 16	59	6.1
PNC 45K	154	1,000	1,400	45	12 x 3.3	125	87	85	110	60	8-M8 x 16	59	5.9
PNC 50K	161	900	1,200	50	14 x 3.8	155	90	88	140	80	8-M8 x 16	120	9.3
PNC 55K	161	900	1,200	55	16 x 4.3	155	90	88	140	80	8-M8 x 16	120	9
PNC 60K	161	900	1,200	60	18 x 4.4	155	90	88	140	80	8-M8 x 16	120	8.8
PNC 65K	204	800	1,100	65	18 x 4.4	175	105	102	162	95	8-M8 x 16	180	13
PNC 70K	204	800	1,100	70	20 x 4.9	175	105	102	162	95	8-M8 x 16	180	12
PNC 75K	585	700	1,000	75	20 x 4.9	195	115	112	175	105	10-M12 x 24	110	20
PNC 80K	585	700	1,000	80	22 x 5.4	195	115	112	175	105	10-M12 x 24	110	19
PNC 85K	800	650	850	85	22 x 5.4	230	123	120	208	125	10-M16 x 32	190	30
PNC 90K	800	650	850	90	22 x 5.4	230	123	120	208	125	10-M16 x 32	190	29
PNC 95K	800	650	850	95	25 x 5.4	230	123	120	208	125	10-M16 x 32	190	29
PNC 100K	1160	600	700	100	28 x 6.4	270	159	155	242	145	10-M16 x 32	300	53
PNC 105K	1160	600	700	105	28 x 6.4	270	159	155	242	145	10-M16 x 32	300	52
PNC 110K	1160	600	700	110	28 x 6.4	270	159	155	242	145	10-M16 x 32	300	51
PNC 120K	1590	550	550	120	32 x 7.4	330	167	163	298	185	10-M20 x 40	410	85
PNC 130K	1590	550	550	130	32 x 7.4	330	167	163	298	185	10-M20 x 40	410	82
PNC 135K	1590	550	550	135	36 x 8.4	330	167	163	298	185	10-M20 x 40	410	81
PNC 140K	1590	550	550	140	36 x 8.4	330	167	163	298	185	10-M20 x 40	410	79
PNC 150K	2080	500	500	150	36 x 8.4	375	182	178	342	215	10-M22 x 44	540	115
PNC 160K	2080	500	500	160	40 x 9.4	375	182	178	342	215	10-M22 x 44	540	112
PNC 170K	2650	450	450	170	40 x 9.4	375	182	178	342	235	10-M22 x 44	540	108
PNC 180K	2650	450	450	180	45 x 10.4	375	182	178	342	235	10-M22 x 44	540	104
PNC 190K	3050	400	400	190	45 x 10.4	400	182	178	364	255	10-M24 x 48	540	120
PNC 200K	3050	400	400	200	45 x 10.4	400	182	178	364	255	10-M24 x 48	540	115

Character

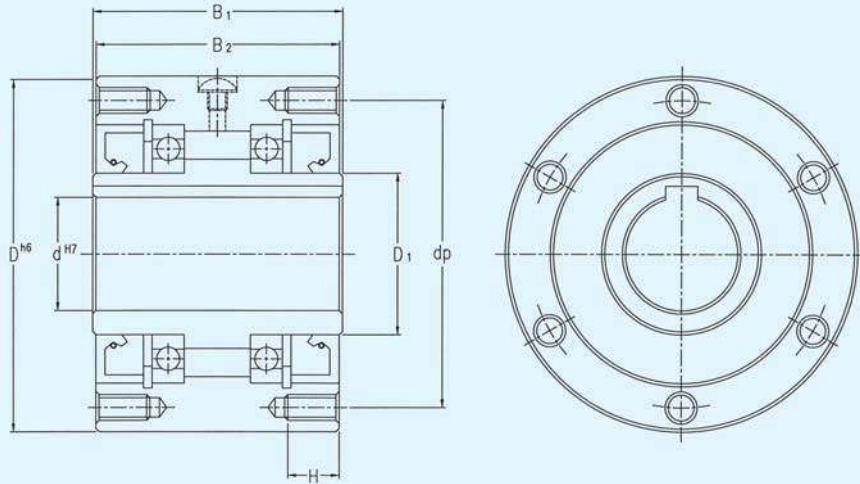
1. Precision clutches comprised ball bearing.
2. For high speed inner race overrunning application.(oil lubrication)

※Ref. PNC-XK : For Indexing applications

Dimension of PNC-XK Series is the same PNC-K Series

PHC-K Series

FOR HIGH SPEED, HEAVY LOAD, OVERRUNNING



Specification

Model	Max. Torque (kgf-m)	Max. Overrunning (rpm)		Stock Bore Size		D	B ₁	B ₂	dp	D ₁	No. of Tapped Holes Dia x Pitch N-M x H	Oil (CC)	Weight (kgf)
		Outer Race	Inner Race	Dia(d)	Key Way								
PHC 15K	23.8	1,500	2,100	15	5 x 2.3	68	61	59	58	25	6-M5 x 10	13	1.3
PHC 17K	31.5	1,400	1,900	17	5 x 2.3	80	64	62	68	30	6-M6 x 12	20	1.9
PHC 20K	54.5	1,300	1,800	20	5 x 2.3	90	76	74	76	35	6-M8 x 16	28	2.9
PHC 22K	68	1,100	1,700	22	8 x 3.3	95	77	75	82	40	6-M8 x 16	38	3.2
PHC 25K	68	1,100	1,700	25	8 x 3.3	95	77	75	82	40	6-M8 x 16	38	3.2
PHC 30K	107	1,100	1,500	30	10 x 3.3	110	82	80	95	50	6-M8 x 16	45	4.6
PHC 35K	107	1,100	1,500	35	10 x 3.3	110	82	80	95	50	6-M8 x 16	45	4.4
PHC 40K	196	950	1,300	40	12 x 3.3	135	95	93	119	65	8-M10 x 20	71	8
PHC 45K	196	950	1,300	45	12 x 3.3	135	95	93	119	65	8-M10 x 20	71	7.7
PHC 50K	310	900	1,200	50	14 x 3.8	150	100	98	134	75	8-M10 x 20	100	11
PHC 55K	310	900	1,200	55	16 x 4.3	150	100	98	134	75	8-M10 x 20	100	9.6
PHC 60K	450	800	1,100	60	18 x 4.4	185	110	108	164	90	8-M12 x 24	180	17
PHC 65K	450	800	1,100	65	18 x 4.4	185	110	108	164	90	8-M12 x 24	180	17
PHC 70K	585	700	1,000	70	20 x 4.4	195	110	108	175	100	10-M12 x 24	190	18
PHC 75K	950	650	700	75	20 x 5.4	220	169	166	197	105	10-M14 x 28	240	39
PHC 80K	1,130	650	700	80	22 x 5.4	220	169	166	197	105	10-M14 x 28	240	38
PHC 85K	1,250	550	550	85	22 x 5.4	255	187	184	230	125	10-M16 x 32	370	58
PHC 90K	1,320	550	550	90	25 x 5.4	255	187	184	230	125	10-M16 x 32	370	58
PHC 95K	1,400	550	550	95	25 x 5.4	255	187	184	230	125	10-M16 x 32	370	55
PHC 100K	2,090	450	450	100	28 x 6.4	290	195	191	260	145	10-M20 x 40	490	76
PHC 105K	2,320	450	450	105	28 x 6.4	290	195	191	260	145	10-M20 x 40	490	75
PHC 110K	2,320	450	450	110	28 x 6.4	290	195	191	260	145	10-M20 x 40	490	73
PHC 120K	3,000	360	360	120	32 x 7.4	335	204	200	300	185	10-M22 x 44	490	109
PHC 130K	3,180	360	360	130	32 x 7.4	335	204	200	300	185	10-M22 x 44	490	106
PHC 135K	3,180	360	360	135	36 x 8.4	335	204	200	300	185	10-M22 x 44	490	104
PHC 140K	3,180	360	360	140	36 x 8.4	335	204	200	300	185	10-M22 x 44	490	102
PHC 150K	4,160	300	300	150	36 x 8.4	380	219	215	344	215	10-M24 x 48	630	146
PHC 160K	4,160	300	300	160	40 x 9.4	380	219	215	344	215	10-M24 x 48	630	142
PHC 170K	5,300	270	270	170	40 x 9.4	400	219	215	364	235	10-M24 x 48	630	157
PHC 180K	5,300	270	270	180	45 x 10.4	400	219	215	364	235	10-M24 x 48	690	152
PHC 190K	6,100	250	250	190	45 x 10.4	440	235	231	403	255	10-M24 x 48	990	701
PHC 200K	6,100	250	250	200	45 x 10.4	440	235	231	403	255	10-M24 x 48	990	196

Character

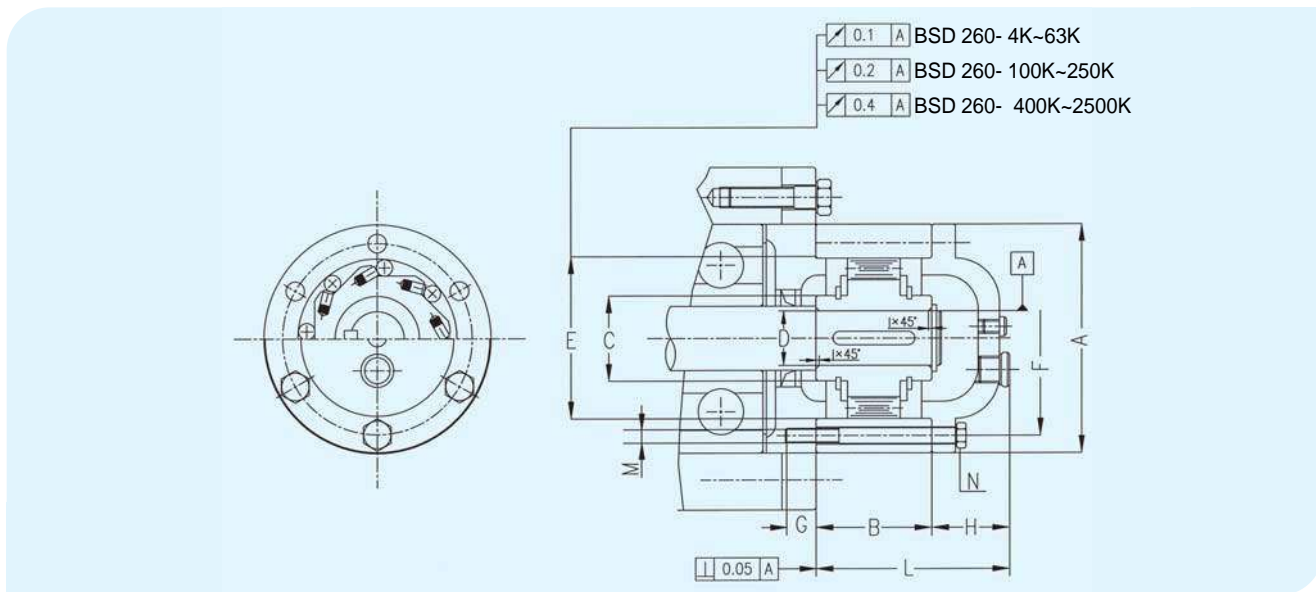
1. Precision clutches comprised ball bearing.
2. For heavy load, inner race overrunning application.(oil lubrication)

※Ref. PHC-XK : For Indexing applications

Dimension of PHC-XK Series is the same PHC-K Series



BSD 260-K Series



Specification

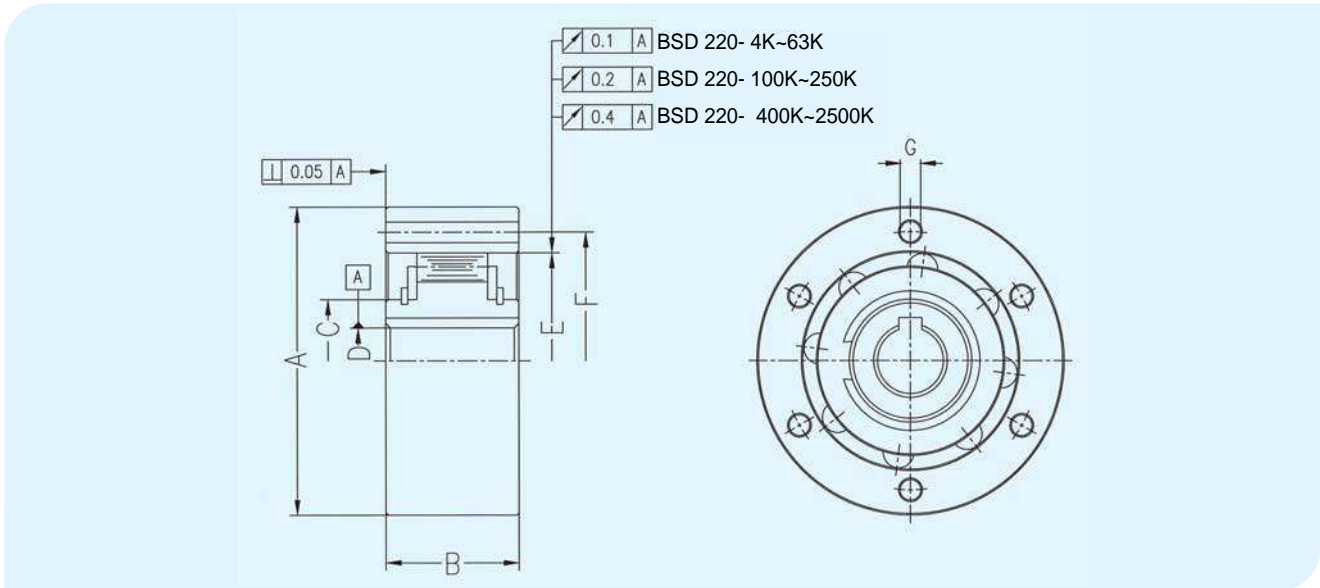
Dimensions-mm

Model	Max. Torque (kgf-m)	Max. Overrunning (rpm)	Stock Bore Size		A	C	E	F	B	G	H	I	L	No. of Holes (N-M)	Oil (cm ³)	Weight (kgf)
			Standard Bore	Max. Bore												
BSD 260 -4K	26	3,800	16	16	67	25	47	56	34	10	19	1	53	4-M5	10	1.1
-6.3K	54	2,550	20	20	80	30	55	68	38	11	24	1	62	4-M5	12	1.5
-10K	90	2,400	25	25	95	40	68	82	42	12	31	1	73	6-M5	17	2.2
-16K	100	2,200	28	30	105	45	75	90	42	12	32	1	74	6-M6	22	3.1
-25K	220	2,000	35	40	125	55	90	107	52	12	33	1	85	6-M6	35	4.2
-40K	240	1,750	40	45	135	60	95	115	52	14	37	1	89	6-M8	45	5.4
-63K	340	1,450	45	50	150	70	110	130	60	16	42	1	102	6-M10	65	7.4
-100K	640	1,200	55	60	180	85	130	155	74	22	50	1	124	6-M10	125	13.1
-160K	880	1,000	70	75	210	100	150	180	76	26	54	1	130	6-M12	170	18
-250K	1,520	850	80	90	245	120	180	214	85	28	65	1	150	8-M12	290	30
-400K	2,160	720	95	100	280	140	210	245	100	29	71	1.5	171	8-M16	440	44
-630K	3,720	650	110	130	320	160	240	280	115	33	90	1.5	205	8-M20	610	74
-1000K	6,400	560	130	140	370	180	280	325	140	38	94	1.5	234	8-M20	780	117
-1600K	9,200	480	140	150	410	200	310	360	160	38	108	2	268	8-M24	850	167
-2500K	13,000	400	160	160	460	220	340	400	180	45	109	2	289	8-M30	1,300	250

Character

1. Oil lubrication
2. BSD 260-K Series can be used for backstopping with gear reducer.
3. Please use standard bore if possible.
4. The key way is in accordance with DIN 6885 sheet 1.
(Refer to page 39)

BSD 220-K Series



Specification

Dimensions-mm

Model	Max. Torque (kgf-m)	Max. Overrunning (rpm)		Stock Bore Size		A	C	E	F	B	No. of Holes (N-G)	Weight (kgf)
		Inner Race	Outer Race	Standard Bore	Max. Bore							
-4K	26	3,800	7,000	16	16	67	25	47	56	34	4- ϕ 5.5	0.8
-6.3K	54	2,400	4,800	20	20	80	30	55	68	38	4- ϕ 5.5	1.1
-10K	90	1,700	3,500	25	25	95	40	68	82	42	6- ϕ 5.5	1.6
-16K	100	1,400	3,000	28	30	105	45	75	90	42	6- ϕ 6.6	2.6
-25K	220	1,250	2,500	35	40	125	55	90	107	52	6- ϕ 6.6	3.4
-40K	240	1,100	2,000	40	45	135	60	95	115	52	6- ϕ 9	4
-63K	340	960	1,700	45	50	150	70	110	130	60	6- ϕ 11	5.6
-100K	640	840	1,500	55	60	180	85	130	155	74	6- ϕ 11	11
-160K	880	745	1,300	70	75	210	100	150	180	76	6- ϕ 14	14
-250K	1,520	635	1,150	80	90	245	120	180	214	85	8- ϕ 14	25
-400K	2,160	550	1,000	95	100	280	140	210	245	100	8- ϕ 18	35
-630K	3,720	480	900	110	130	320	160	240	280	115	8- ϕ 22	55
-1000K	6,400	420	800	130	140	370	180	280	325	140	8- ϕ 22	83
-1600K	9,200	360	700	140	150	410	200	310	360	160	8- ϕ 26	121
-2500K	13,000	320	650	160	160	460	220	340	400	180	8- ϕ 33	180
-4000K	22,200	150	200	210	210	560	300	440	500	180	12- ϕ 33	265
-6300K	37,000	100	150	230	230	680	330	520	605	230	16- ϕ 33	395

Character

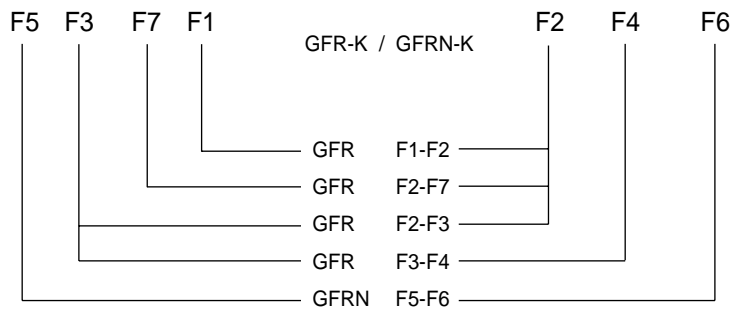
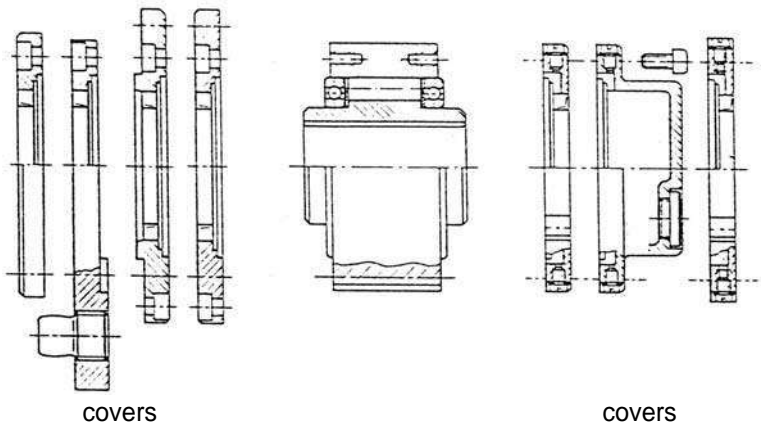
1. Oil lubrication
2. BSD 220-K Series can be used for backstopping in a gear reducer.
3. Please use standard bore if possible.
4. The key way is in accordance with DIN 6885 Sheet 1.
(Refer to page 39)



GFR-K, GFRN-K Series

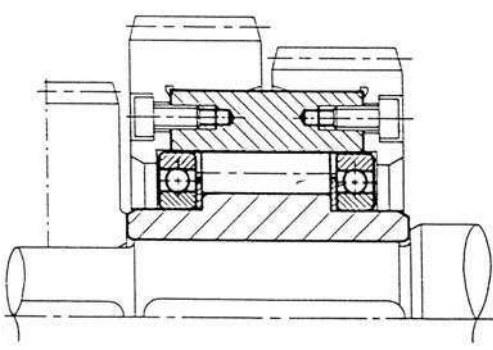


Cover and Coupling Combinations

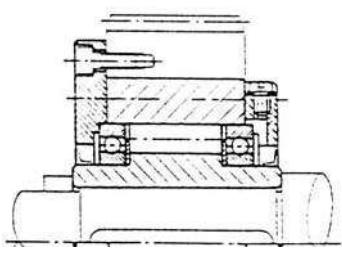


※Please consult SamBo Clutch for dimension of cover.

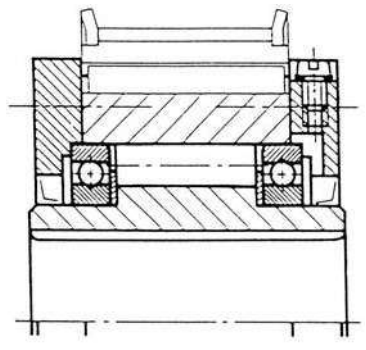
Applications



GFR-K in a transmission



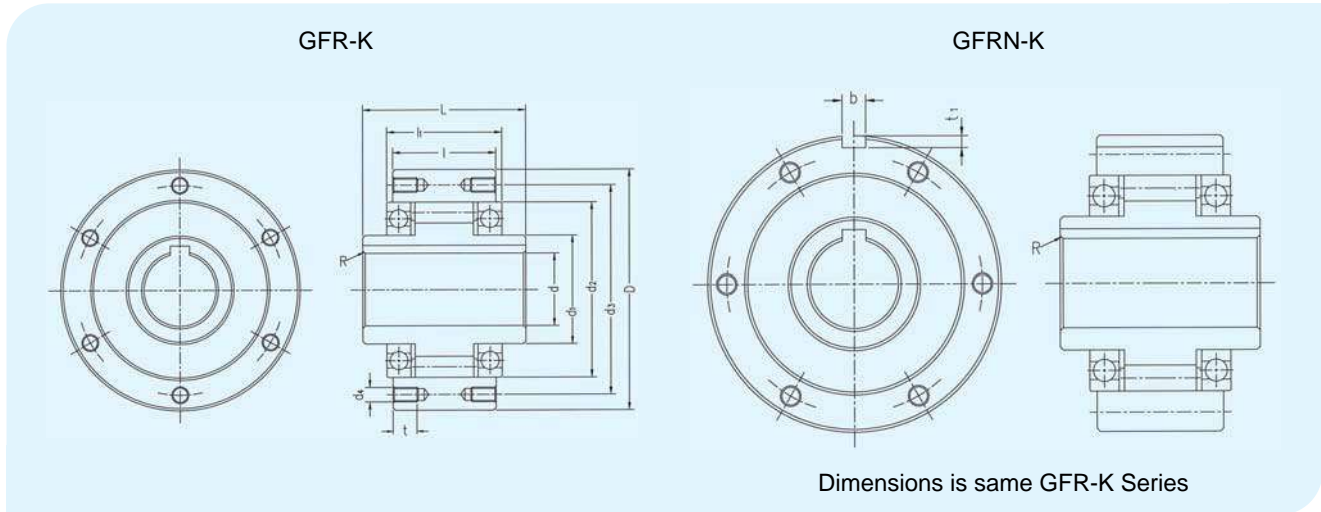
GFR-K F1-F2K with Gear



GFRN-K F5-F6K with Pulley

BACKSTOPPING / OVERRUNNING / INDEXING (FOR HEAVY LOAD)

GFR-K, GFRN-K Series



Specification

Dimensions-mm

Model	Max. Torque (kgf-m)	Max. Overrunning (rpm)		Stock Bore Size d(H7)	d ₁	d ₂	d ₃	Outer Race			L	ℓ	ℓ ₁	r	No. of Tapped Holes x Dia x Pitch N x d ₄ x t	Weight (kgf)
		Inner Race	Outer Race					D (h7)	Key Way							
				b					t ₁							
GRF 12-K	2.5	3120	4720	12	20	42	51	62	4	2.5	40	20	27	0.5	3 x ϕ 5.5	0.5
GRF 15-K	4	2800	4400	15	25	47	56	68	5	3	52	28	32	0.8	3 x M5 x 8	0.8
GRF 20-K	8	2080	4080	20	30	55	64	75	6	3.5	57	34	39	0.8	4 x M5 x 8	1
GRF 25-K	12	1600	3100	25	40	68	78	90	8	4	60	35	40	1	4 x M6 x 10	1.5
GRF 30-K	22	1280	2780	30	45	75	87	100	8	4	68	43	48	1.5	6 x M6 x 10	2.2
GRF 35-K	28	1170	2620	35	50	80	96	110	10	5	74	45	51	1.5	6 x M6 x 12	3.1
GRF 40-K	46	850	2300	40	55	90	108	125	12	5	86	53	59	1.5	6 x M8 x 14	4.6
GRF 45-K	65	740	2140	45	60	95	112	130	14	5.5	86	53	59	1.5	8 x M8 x 14	5.0
GRF 50-K	100	580	1930	50	70	110	132	150	14	5.5	94	64	72	1.5	8 x M8 x 14	7.9
GRF 55-K	125	550	1800	55	75	115	138	160	16	6	104	66	72	2	8 x M10 x 16	10.4
GRF 60-K	180	530	1700	60	80	125	150	170	18	7	114	78	89	2	10 x M10 x 16	13.5
GRF 70-K	250	500	1600	70	90	140	165	190	20	7.5	134	95	108	2	10 x M10 x 16	17.4
GRF 80-K	400	450	1400	80	105	160	185	210	22	9	144	100	108	2	10 x M10 x 16	23.7
GRF 90-K	675	380	1250	90	120	180	206	230	25	9	158	115	125	2.5	10 x M12 x 20	37.1
GRF 100-K	890	350	1100	100	140	210	240	270	28	10	182	120	131	2.5	10 x M16 x 24	55.3
GRF 130-K	1380	250	950	130	160	240	278	310	32	11	212	152	168	3	12 x M16 x 24	85.0
GRF 150-K	2300	180	750	150	200	310	360	400	36	12	246	180	194	3.5	12 x M20 x 32	180.0

Character

1. Oil lubrication.
2. The key way is in accordance with DIN 6885 sheet 1. (Refer to page 39)
3. GFR-K, GFRN-K Series can be combined with the various covers.
4. Outer race is easy to mounting transmissions, pulleys, gear.. etc.



LUBRICATION & MAINTENANCE

Maintenance of each Series

Series		Lubrication	Maintenance
MZ-K, LD-K		Pre-lubricated with grease	No lubrication maintenance required
B200K, PB-K, NFS-K		Grease lubrication	Change the grease every six months
MG, MI, MR, PNC, PHC, GFR, BSD-K		Oil lubrication	Add oil every 100hours, change every 3 months
MG-RK		Oil lubrication	Add oil every 300hrs, change every 3months
BS-K	30~135	Pre-lubricated with grease	No lubrication maintenance required
	160~350	Grease lubrication	Change grease two times a year
BS-RK	160R~350R	Oil lubrication	Change oil once a year

※Ref. : Clean inside of clutch when change oil or grease.

Recommended Oil

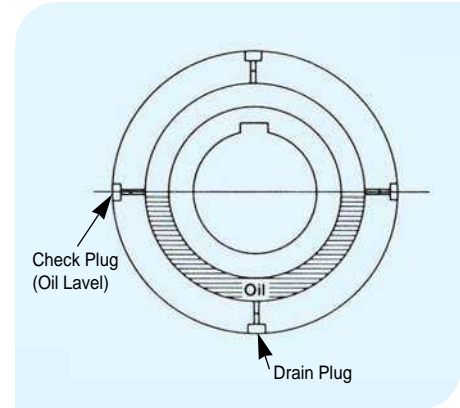
Maker	Overrunning application		Indexing application
	In low speed or temperature -10℃ to 30℃ applications	In high speed or temperature 30℃ to 50℃ applications	
Shell Oil	Dexron II Rimulla CT Oil 10W Shell Clavus Oil 17 Rotella S Oil 10W	Rimulla CT Oil 20W/20,30 Rotella S Oil 20W/20,30	Shell Clavus Oil 15
Mobil Oil	ATF 220 Delvas 1310 DTE Oil Light	Delvac 1330	Gargoyle Arctic Light

Recommended Grease

Maker	BS-K Series	B200, PB, LD, NFS, MZ-K Series
Shell Oil	Alvania Grease No.1	Alvania Grease No.2
Mobil Oil	Mobilux Grease No.1	Mobilux Grease No.2.

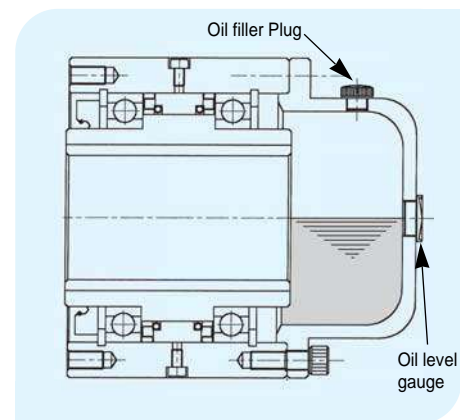
● **MG-K, MI-K, PNC-K, PHC-K Series**

1. Use four plugs on the clutch outer race for oil fill, level check and drain. (locate one of the plug at the top as oil filler, the other plugs are for oil level checking and oil draining)
2. Detach oil level check plug and pour oil through oil filler hole(top) until oil flows out from level check hole(middle). then attach the plugs and screw tightly.
3. Oil shall be added at 100 hrs intervals after initial oil fill and change whole oil at three months intervals.(After draining old oil, clean inside of the clutch and fill the clutch with new oil.)



● **MG-RK Series**

1. Detach the oil plug installed on top of the oil reservoir and pour oil into the oil reservoir up to the blue line of the oil level gage.
 - Oil level : blue line on the oil gage show level for oil fill, Red line shows the lowest level of oil during operation
2. Periodical check is necessary to maintain proper oil level, that is , oil is above the red line of the oil gage.
Whole oil shall be changed at 3 month to receive the fine long life service of the cam clutch.



● **BS-K, BS-RK Series**

Refer to page 18



BORE TOLERANCE & KEY WAY CLASS



BORE TOLERANCE OF JIS STANDARD

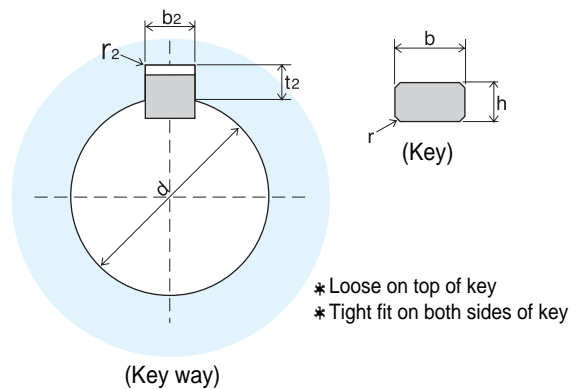
*** BS 30K ~ BS 110K Clutch Bore tolerance : H7 (JIS B 0401~1965)**
*** RS 135K ~ BS 350K Clutch Bore tolerance : H8 (JIS B 0401~1965)**

The keyway is in accordance with JIS standard class || Parallel keys.

JIS B0401-1965

Bore Range (mm)	H7 Tolerance	H8 Tolerance
30 ~ 50	+0.025 0	+0.039 0
50 ~ 80	+0.030 0	+0.046 0
80 ~ 120	+0.035 0	+0.054 0
120 ~ 180	+0.040 0	+0.063 0
180 ~ 250	+0.046 0	+0.072 0
250 ~ 315	+0.052 0	+0.081 0
315 ~ 400	+0.057 0	+0.089 0
400 ~ 450	+0.063 0	+0.097 0

key way and key dimension



JIS STANDARD PARELLEL KEY & KEYWAY, CLASS

JIS B1301-1959 / KSB 1311-77

Dimensions-mm

Standard Key	Range of Dia.	Key Dimension					Key way Dimension				
		Tolerance		Tolerance		chamber	Tolerance		Tolerance		chamber
b × h	d(mm)	b	(h8)	h	(h10)	r	b2	(E9)	t2	r2	
10 × 8	Above 30 to 40	10	0 -0.0022	8	0 -0.058	0.8	10	+0.061 +0.025	3.5	+0.200 0	0.6
12 × 8	Above 40 to 45	12	0 -0.027	8			12	+0.075 +0.032	3.5	+0.300	
15 × 10	Above 50 to 60	15		10			15		5		
18 × 12	Above 60 to 70	18	0 -0.033	12	0 -0.039	1.2	18	0.092 0.040	6	0	
20 × 13	Above 70 to 80	20		13			20		6		
24 × 16	Above 80 to 95	24		16			24		8		
28 × 18	Above 95 to 110	28		18			28		9		
32 × 20	Above 110 to 125	32	0 -0.084	20	0 -0.100	2	32	+0.112 +0.050	10	+0.400 0	
35 × 22	Above 125 to 140	35		22			35		11		
38 × 24	Above 140 to 160	38		24			38		12		
42 × 26	Above 160 to 180	42		26			42		13		
45 × 28	Above 180 to 200	45		28			45		14		
50 × 31.5	Above 200 to 224	50	0 -0.046	31.5	0 -0.120	3	50	+0.0134 +0.060	15.5	+0.400 0	
56 × 35.5	Above 224 to 250	56		35.5			56		17.5		
63 × 40	Above 250 to 280	63		40			63		20		
71 × 45	Above 280 to 315	70	0 -0.054	45	0 -0.120	3	71	+0.159 +0.072	22.5	+0.400 0	
80 × 50	Above 315 to 355	80		50			80		25		
90 × 56	Above 355 to 400	90	0 -0.054	56	0 -0.120	3	90	+0.159 +0.072	28	+0.400 0	2
100 × 63	Above 400 to 450	100	0 -0.054	63	0 -0.120	3	100	+0.159 +0.072	31.5	+0.400 0	

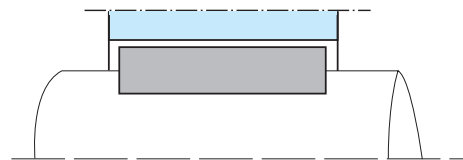
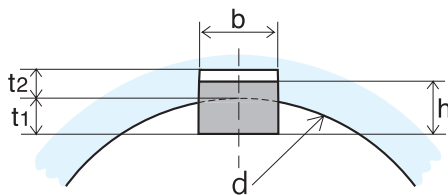
JIS STANDARD PARELLED KEY & KEYWAY CLASS

JIS B1301-1976 / KSB 1311-84

Dimensions-mm

Key Dimmension	Bore Range	Key Dimension				Key way Dimension				
		Tolerance		Tolerance		chamber	Tolerance		Tolerance	
b x h	d(mm)	b	(h8)	h	(h10)	r	b2	(E9)	t2	r2
5 x 5	Above 12 to 17	5	0	5	0		5		2.3	+0.1
6 x 6	Above 17 to 22	6	-0.039	6	-0.030	0.25	6	±0.0150	2.8	0
7 x 7	Above 20 to 25	7	0	7	0	~	7		3.0	~
8 x 7	Above 22 to 30	8	-0.036	7	-0.036	0.40	8	±0.0180	3.3	0.16
10 x 8	Above 30 to 38	10		8	0		10		3.3	~
12 x 8	Above 38 to 44	12		8	-0.090		12		3.3	0.25
14 x 9	Above 44 to 50	14	0	9		0.40	14	±0.0215	3.8	~
16 x 10	Above 50 to 58	16	-0.043	10		0.60	16		4.3	0.40
18 x 11	Above 58 to 65	18		11			18		4.4	~
20 x 12	Above 65 to 75	20		12	0		20		4.9	0.40
22 x 14	Above 75 to 85	22	0	14	-0.110	0.60	22	±0.0260	5.4	~
25 x 14	Above 85 to 95	25	-0.052	14		~	25		5.4	0.60
28 x 16	Above 95 to 110	28		16		0.80	28		6.4	~
32 x 18	Above 110 to 130	32		18			32		7.4	0.70
36 x 20	Above 130 to 150	36	0	20	0	1.00	36	±0.0310	8.4	~
40 x 22	Above 150 to 170	40	-0.062	22	-0.0130	~	40		9.4	1.00
45 x 25	Above 170 to 200	45		25		1.20	45		10.4	~
50 x 28	Above 200 to 230	50		28			50		11.4	0.70
56 x 32	Above 230 to 260	56		32		1.60	56		12.4	~
63 x 32	Above 260 to 290	63	0	32	0	~	63	±0.0370	12.4	1.60
70 x 36	Above 290 to 330	70	-0.074	36		2.00	70		14.4	~
80 x 40	Above 330 to 380	80		40	-0.160		80		15.4	2.00
95 x 45	Above 380 to 440	90	0	45		2.50	90		17.4	~
100 x 50	Above 440 to 500	100	-0.087	50		3.00	100	±0.0435	19.5	2.50

DIN STANDARD PARELLED KEY & KEYWAY CLASS



Bore Range	DIN 6885, sheet 1				DIN 6885, sheet 3				
	d(mm)	b JS10	h	t1	t2	b JS10	h	t1	t2
From 6 to 8		2 ±0.020	2	1.2+0.1	1 +0.3				
From 8 to 10		3 ±0.020	3	1.8+0.1	1.4+0.3				
From 10 to 12		4 ±0.024	4	2.5+0.1	1.8+0.3				
From 12 to 17		5 ±0.024	5	3 +0.1	2.3+0.3	5 ±0.024	3	1.9+0.1	1.2+0.3
From 17 to 22		6 ±0.024	6	3.5+0.1	2.8+0.3	6 ±0.024	4	2.5+0.1	1.6+0.3
From 22 to 30		8 ±0.029	7	4 +0.2	3.3+0.4	8 ±0.029	5	3.1+0.1	2 +0.3
From 30 to 38		10 ±0.029	8	5 +0.2	3.3+0.4	10 ±0.029	6	3.7+0.2	2.4+0.3
From 38 to 44		12 ±0.035	8	5 +0.2	3.3+0.4	12 ±0.035	6	3.9+0.2	2.2+0.3
From 44 to 50		14 ±0.035	9	5.5+0.2	3.8+0.4	14 ±0.035	6	4 +0.2	2.1+0.3
From 50 to 58		16 ±0.035	10	6 +0.2	4.3+0.4	16 ±0.035	7	4.7+0.2	2.4+0.3
From 58 to 65		18 ±0.035	11	7 +0.2	4.4+0.4	18 ±0.035	7	4.8+0.2	2.3+0.3
From 65 to 75		20 ±0.042	12	7.5+0.2	4.9+0.4	20 ±0.042	8	5.4+0.2	2.7+0.3
From 75 to 85		22 ±0.042	14	9 +0.2	5.4+0.4	22 ±0.042	9	6 +0.2	3.1+0.4
From 85 to 95		25 ±0.042	14	9 +0.2	5.4+0.4	25 ±0.042	9	6.2+0.2	2.9+0.4
From 95 to 110		28 ±0.042	16	10 +0.2	6.4+0.4	28 ±0.042	10	6.9+0.2	3.2+0.4
From 110 to 130		32 ±0.050	18	11 +0.2	7.4+0.4	32 ±0.050	11	7.6+0.2	3.5+0.4
From 130 to 150		36 ±0.050	20	12 +0.3	8.4+0.4	36 ±0.050	11	8.3+0.2	3.8+0.4

BORE TOLERANCE & KEY WAY CLASS



TOLERANCE OF SHAFT

Dimensions : μm

Bore Range (mm)	Up to	Bore Range (mm)														IT5	IT7					
		g6	h5	h6	h9	h10	js5	js6	j5	j6	k5	k6	m5	m6	n6			p6	r6	r7	Up to	Above
3	6	-4	0	0	0	0	± 2.5	± 4	+3	+6	+6	+9	+9	+12	+16	+20	+23	+27	3	6	5	12
	10	-12	-5	-8	-30	-48	± 2.5	± 4	-2	-2	-2	+1	+1	+4	+8	+12	+15	+15	+15	6	10	6
6	10	-	0	0	0	0	± 3	± 4.5	+4	+7	+7	+7	+10	+15	+19	+24	+28	+34	6	10	6	15
	18	-6	0	0	0	0	± 4	± 5.5	+5	+8	+8	+9	+12	+18	+23	+29	+34	+41	10	18	8	18
18	30	-17	-8	-11	-43	-70	± 4	± 5.5	+5	+9	+9	+11	+11	+17	+21	+28	+35	+41	18	30	9	21
	50	-20	-9	-13	-62	-84	± 4.5	± 6.5	+6	+12	+12	+13	+18	+25	+33	+42	+50	+59	30	50	11	25
50	80	-9	0	0	0	0	± 5.5	± 8	+6	+11	+13	+2	+2	+9	+17	+26	+34	+41	50	80	13	30
	120	-25	-11	-16	-62	-100	± 6.5	± 9.5	+6	+12	+15	+21	+21	+30	+39	+51	+61	+71	65	80	13	30
80	120	-10	0	0	0	0	± 7.5	± 11	+6	+12	+15	+2	+2	+11	+20	+32	+43	+51	80	120	15	35
	180	-12	0	0	0	0	± 7.5	± 11	+6	+13	+18	+3	+3	+13	+23	+37	+48	+54	100	120	15	35
120	180	-14	0	0	0	0	± 9	± 12.5	+7	+14	+21	+28	+33	+40	+52	+68	+88	+103	120	140	18	40
	250	-39	-18	-25	-100	-160	± 9	± 12.5	+7	+14	+21	+3	+3	+15	+27	+43	+65	+86	140	160	18	40
180	250	-15	0	0	0	0	± 10	± 14.5	+7	+16	+24	+28	+33	+46	+60	+79	+106	+123	180	200	20	46
	315	-44	-20	-29	-115	-185	± 10	± 14.5	+7	+16	+24	+4	+4	+17	+31	+50	+84	+108	200	225	20	46
250	315	-17	0	0	0	0	± 11.5	± 16	+7	+16	+27	+36	+43	+52	+66	+88	+126	+146	250	280	23	52
	400	-49	-23	-32	-130	-210	± 11.5	± 16	+7	+16	+27	+4	+4	+20	+34	+66	+94	+130	280	315	23	52
315	400	-18	0	0	0	0	± 12.5	± 18	+7	+18	+29	+40	+46	+57	+73	+98	+144	+165	315	355	25	57
	500	-54	-25	-36	-140	-230	± 12.5	± 18	+7	+18	+4	+4	+21	+21	+37	+62	+98	+150	355	400	25	57
400	500	-20	0	0	0	0	± 13.5	± 20	+7	+20	+32	+45	+50	+63	+80	+108	+166	+189	400	450	27	63
	630	-60	-27	-40	-155	-250	± 13.5	± 20	+7	+20	+5	+5	+23	+23	+40	+68	+126	+172	450	500	27	63
500	630	-22	-	-	0	0	-	± 22	-	-	-	-	-	+70	+88	+122	+184	+220	500	560	-	70
	800	-66	-	-44	-175	-280	-	± 22	-	-	-	0	0	+26	+44	+78	+159	+225	560	630	-	70
630	800	-24	-	-	0	0	-	± 25	-	-	-	-	-	+80	+100	+138	+225	+255	630	710	-	80
	1000	-74	-	-50	-200	-320	-	± 25	-	-	-	-	-	+30	+50	+88	+185	+285	710	800	-	80
800	1000	-26	-	-	0	0	-	± 28	-	-	-	-	-	+90	+112	+156	+266	+300	800	900	-	90
	1250	-82	-	-56	-230	-360	-	± 28	-	-	-	-	-	+34	+56	+100	+276	+310	900	1,000	-	90
1000	1250	-28	-	-	0	0	-	± 33	-	-	-	-	-	+106	+132	+186	+316	+355	1,000	1,120	-	105
	1600	-94	-	-66	-260	-420	-	± 33	-	-	-	-	-	+40	+66	+120	+326	+385	1,120	1,250	-	105
1250	1600	-30	-	-	0	0	-	± 39	-	-	-	-	-	+126	+156	+218	+378	+425	1,250	1,400	-	125
	2000	-108	-	-78	-310	-500	-	± 39	-	-	-	-	-	+48	+78	+140	+408	+455	1,400	1,600	-	125
1600	2000	-32	-	-	0	0	-	± 46	-	-	-	-	-	+150	+184	+262	+462	+520	1,600	1,800	-	150
		-124	-	-92	-370	-600	-	± 46	-	-	-	-	-	+58	+92	+170	+370	+400	1,800	2,000	-	150

TOLERANCE OF HOUSING

Dimensions : μm

Bore Range (mm)		Bore Range (mm)																	
Above	Up to	G7	H6	H7	H8	J6	J7	J56	J57	K6	K7	M6	M7	N6	N7	P6	P7	Above	Up to
10	18	+24 +6	+11 0	+18 0	+27 0	+6 -5	+10 -8	± 5.5	± 9	+2 -9	+6 -12	+4 -15	0 -18	-9 -20	-5 -23	-15 -26	-11 -29	10	18
18	30	+28 +7	+13 0	+21 0	+33 0	+8 -5	+12 -9	± 6.5	± 10	+2 -11	+6 -15	-4 -17	0 -21	-11 -24	-7 -28	-18 -31	-14 -35	18	30
30	50	+34 +9	+16 0	+25 0	+39 0	+10 -6	+14 -11	± 8	± 12	+3 -13	+7 -18	-4 -20	0 -25	-12 -28	-8 -33	-21 -37	-17 -42	30	50
50	80	+40 +10	+19 0	+30 0	+46 0	+13 -6	+18 -12	± 9.5	± 15	+4 -15	+9 -21	-5 -24	0 -30	-14 -33	-9 -39	-26 -45	-21 -51	50	80
80	120	+47 +12	+22 0	+35 0	+54 0	+16 -6	+22 -13	± 11	± 17	+4 -18	+10 -25	-6 -28	0 -35	-16 -38	-10 -45	-30 -52	-24 -59	80	120
120	180	+54 +14	+25 0	+40 0	+63 0	+18 -7	+26 -14	± 12.5	± 20	+4 -21	+12 -28	-8 -33	0 -40	-20 -45	-12 -52	-36 -61	-28 -68	120	180
180	250	+61 +15	+29 0	+46 0	+72 0	+22 -7	+30 -16	± 14.5	± 23	+5 -24	+13 -33	-8 -37	0 -46	-22 -51	-14 -60	-41 -70	-33 -79	180	250
250	315	+69 +17	+32 0	+52 0	+81 0	+25 -7	+36 -16	± 16	± 26	+5 -27	+16 -36	-9 -41	0 -52	-25 -57	-14 -66	-47 -79	-36 -88	250	315
315	400	+75 +18	+36 0	+57 0	+89 0	+29 -7	+39 -18	± 18	± 28	+7 -29	+17 -40	-10 -46	0 -57	-26 -62	-16 -73	-51 -87	-41 -98	315	400
400	500	+83 +20	+40 0	+63 0	+97 0	+33 -7	+43 -20	± 20	± 31	+8 -32	+18 -45	-10 -50	0 -63	-27 -67	-17 -80	-55 -95	-45 -108	400	500
500	630	+92 +22	+44 0	+70 0	+110 0	-	-	± 22	± 35	0 -44	0 -70	-26 -70	-26 -96	-44 -88	-44 -114	-78 -122	-78 -148	500	630
630	800	+104 +24	+50 0	+80 0	+125 0	-	-	± 25	± 40	0 -50	0 -80	-30 -80	-30 -110	-50 -100	-50 -130	-88 -138	-88 -168	630	800
800	1000	+116 +26	+56 0	+90 0	+140 0	-	-	± 28	± 45	0 -56	0 -90	-34 -90	-34 -124	-56 -112	-56 -146	-100 -156	-100 -190	800	1000
1000	1250	+133 +28	+66 0	+105 0	+165 0	-	-	± 33	± 52	0 -66	0 -105	-40 -106	-40 -145	-66 -132	-66 -171	-120 -186	-120 -225	1000	1250
1250	1600	+155 +30	+78 0	+125 0	+195 0	-	-	± 39	± 62	0 -78	0 -125	-48 -126	-48 -173	-78 -156	-78 -203	-140 -218	-140 -265	1250	1600
1600	2000	+182 +32	+92 0	+150 0	+230 0	-	-	± 46	± 75	0 -92	0 -150	-58 -150	-58 -208	-92 -184	-92 -242	-170 -262	-170 -320	1600	2000
2000	2500	+209 +34	+110 0	+175 0	+280 0	-	-	± 55	± 87	0 -110	0 -175	-68 -178	-68 -243	-110 -220	-110 -285	-195 -305	-195 -370	2000	2500



SELECTION



SELECTION PROCEDURE

1. Calculate the torque of the Cam clutch

$$T = \frac{716 \times \text{HP}}{\text{RPM}}$$

2. Determine the mode operation (Overrunning, Indexing, Backstopping)
3. Determine the service factor (refer the below table)
4. Calculate the design torque (Torque x Service Factor)
5. Bore Size
6. Determine the max. overrunning speed and cycle time of operation
7. Select clutch by :
 - a. Design torque
 - b. Bore size
 - c. Mode operation
 - d. Max. overrunning speed
8. Specify the name of model & bore size
9. Specify direction of inner race drive
(Oil reservoir & Clutch type)

* Please consult SamBo Clutch for proper selection.

Service factor(s.f)

Overrunning

Type of load	Service factor(s.f)
No shock load(gradually applied)	1.25
Minor shock load(suddenly applied)	1.75–2.5
Heavy shock load(suddenly applied)	2.5–3.5
Severe shock load	5-6

Indexing

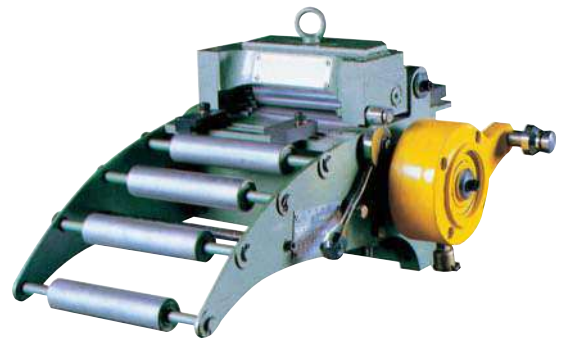
Load cycle/ minute	Degrees/ Load cycle	Service factor(s.f)
Less than 150	$\theta < 90^\circ$	1.56–2
More than 150	$\theta < 90^\circ$	2–3
Less than 150	$\theta \geq 90^\circ$	2–3
More than 150	$\theta \geq 90^\circ$	3–4

- Backstopping : Refer to 19 page

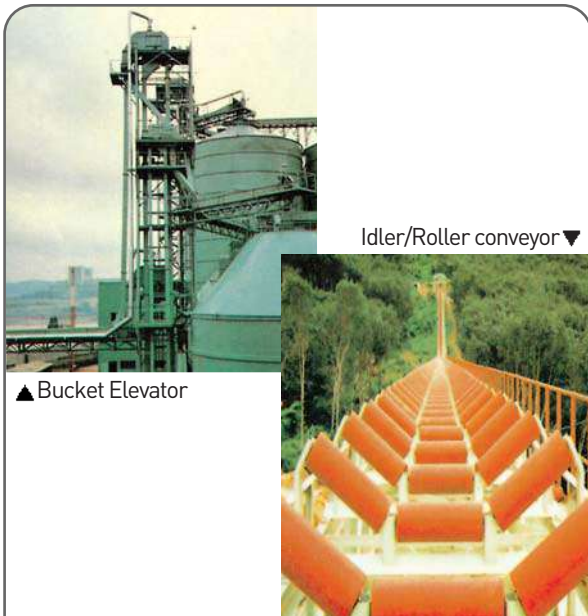
Application example



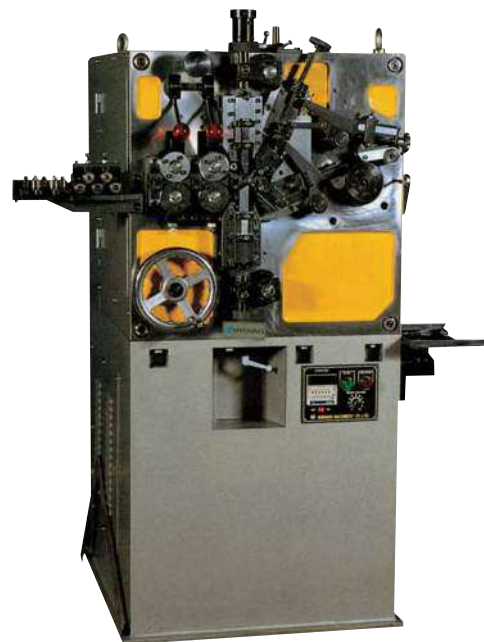
Combine
(Applied model : B200K Series)



Roll Feeder
(Applied model : MI-K Series)



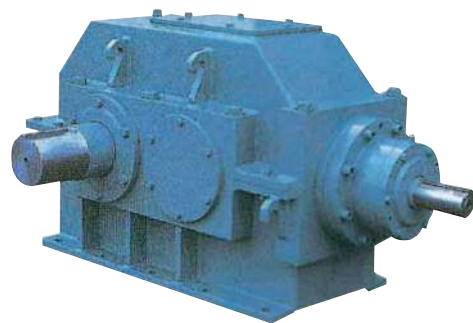
(Applied model : BS-K Series)



Spring Coiling Machine
(Applied model : MI-K Series)



Cable Reel
(Applied model : Special type)



Gear Reducer
(Applied model : MG-RK, BSD Series)



SAMBO CLUTCH CO., LTD.

675-5, Shiheung 3-Dong, Kumcheon-Gu, Seoul, 153-851, Korea

TEL: 82-2-893-9727 FAX: 82-2-805-0881

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