



# 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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# SAMBO CLUTCH

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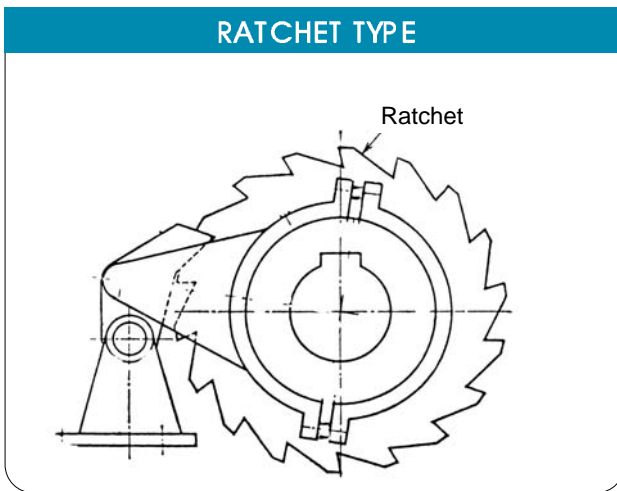
## CHANGE PROCESS & CHARACTERS

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

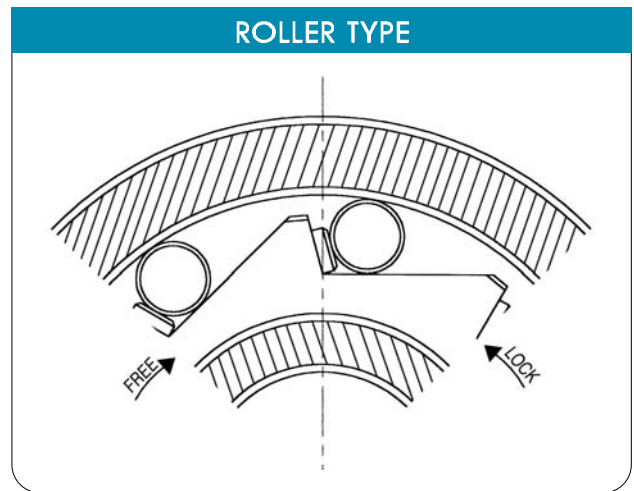
#### RATCHET TYPE



**Good point** Can see the operation of clutches.

**Bad point** High noise, lower durableness

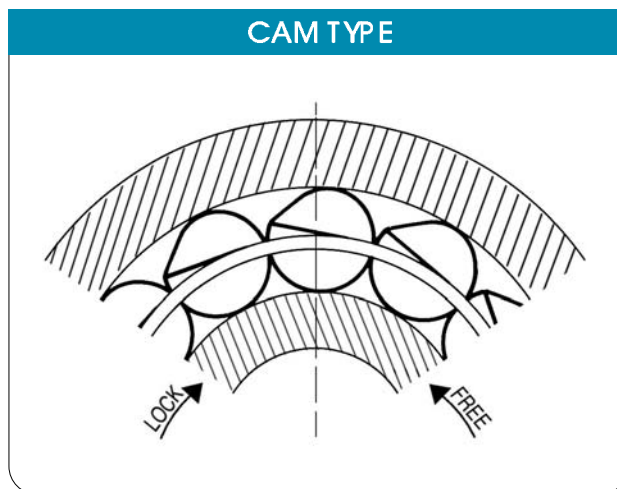
#### ROLLER TYPE



**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.

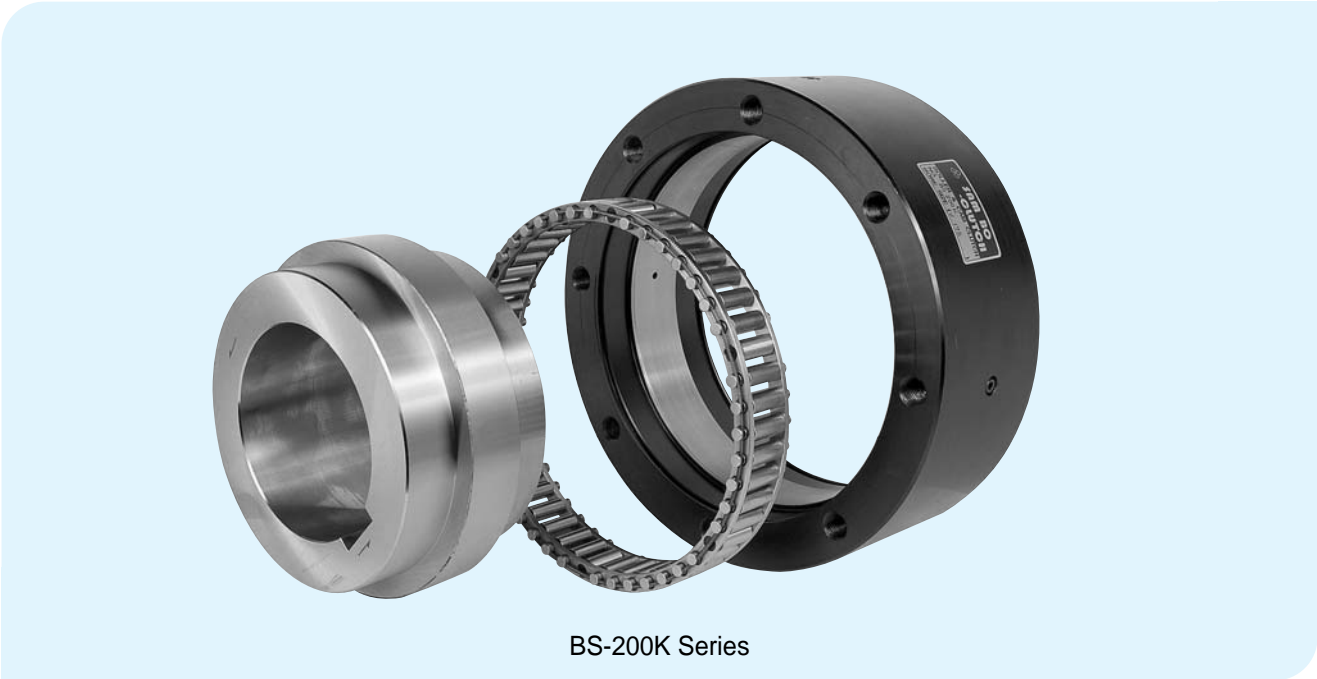
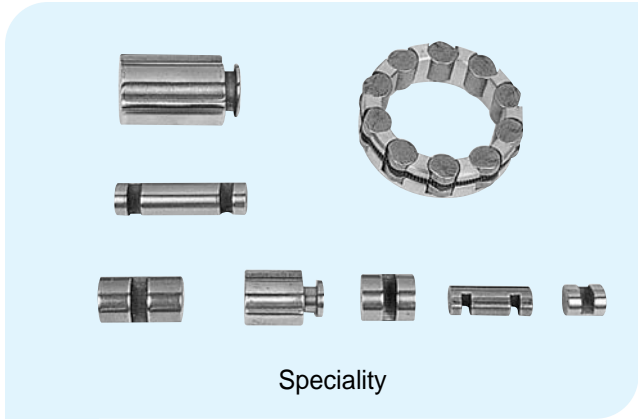
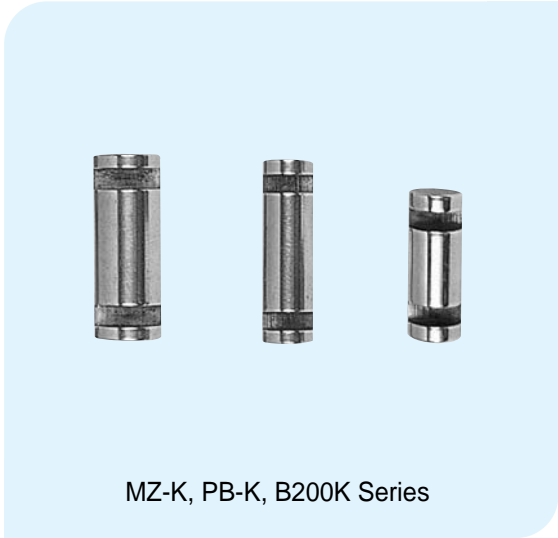
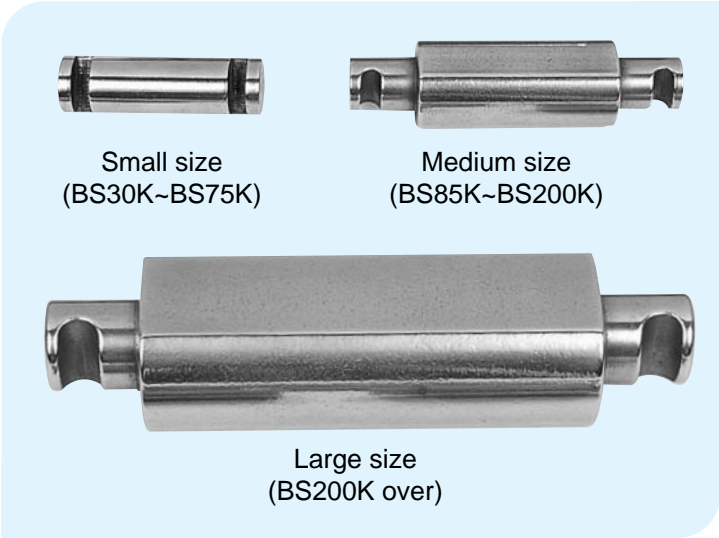
Cam clutches has many more load bearing points because constantly changing contact point on both races. These has high precision without any back lash and silent operation.



## PRODUITS OF SAM BO CLUTCH



# CAMS OF SAMBO CLUTCH



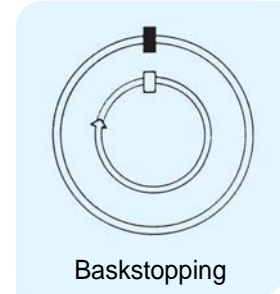


# APPLICATION

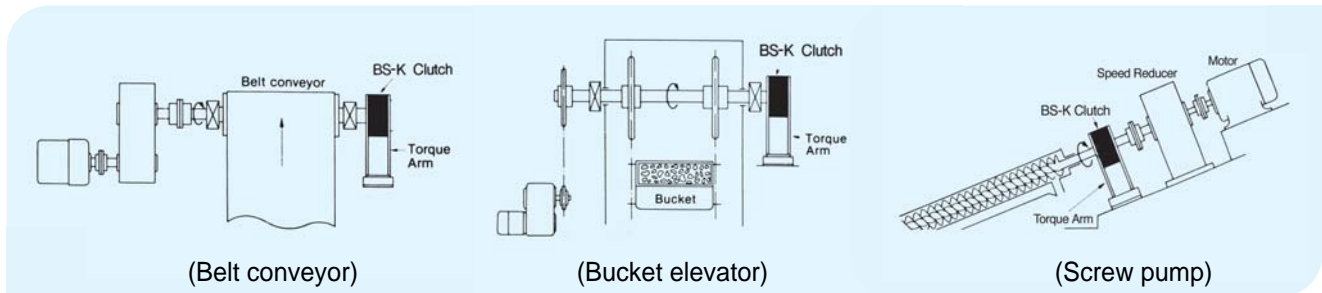
## 1. BACKSTOPPING

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.



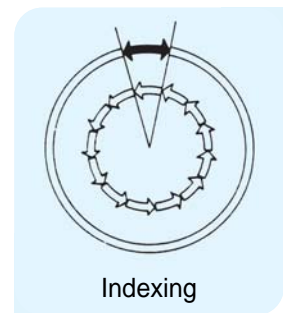
### Applications



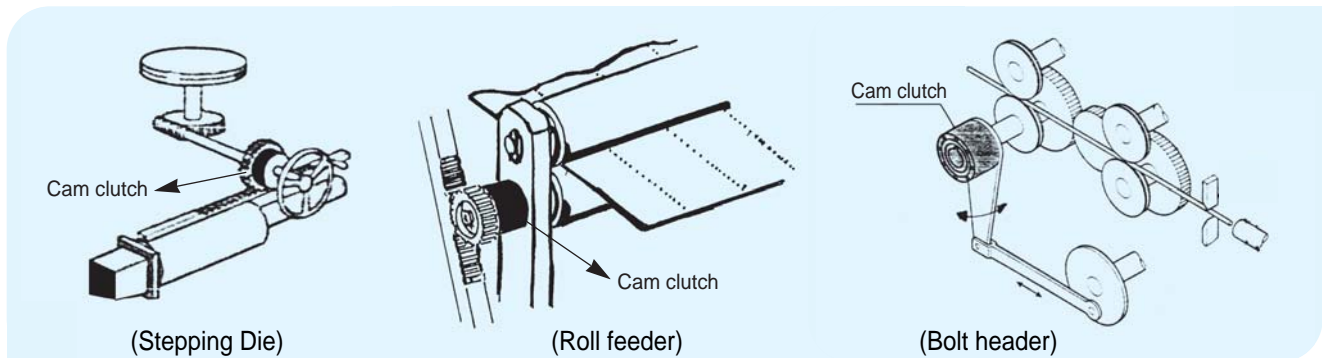
## 2. INDEXING

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



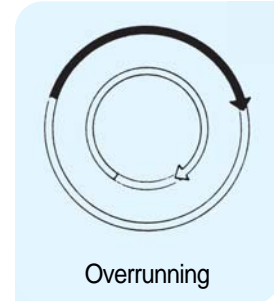


### 3. OVERRUNNING

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

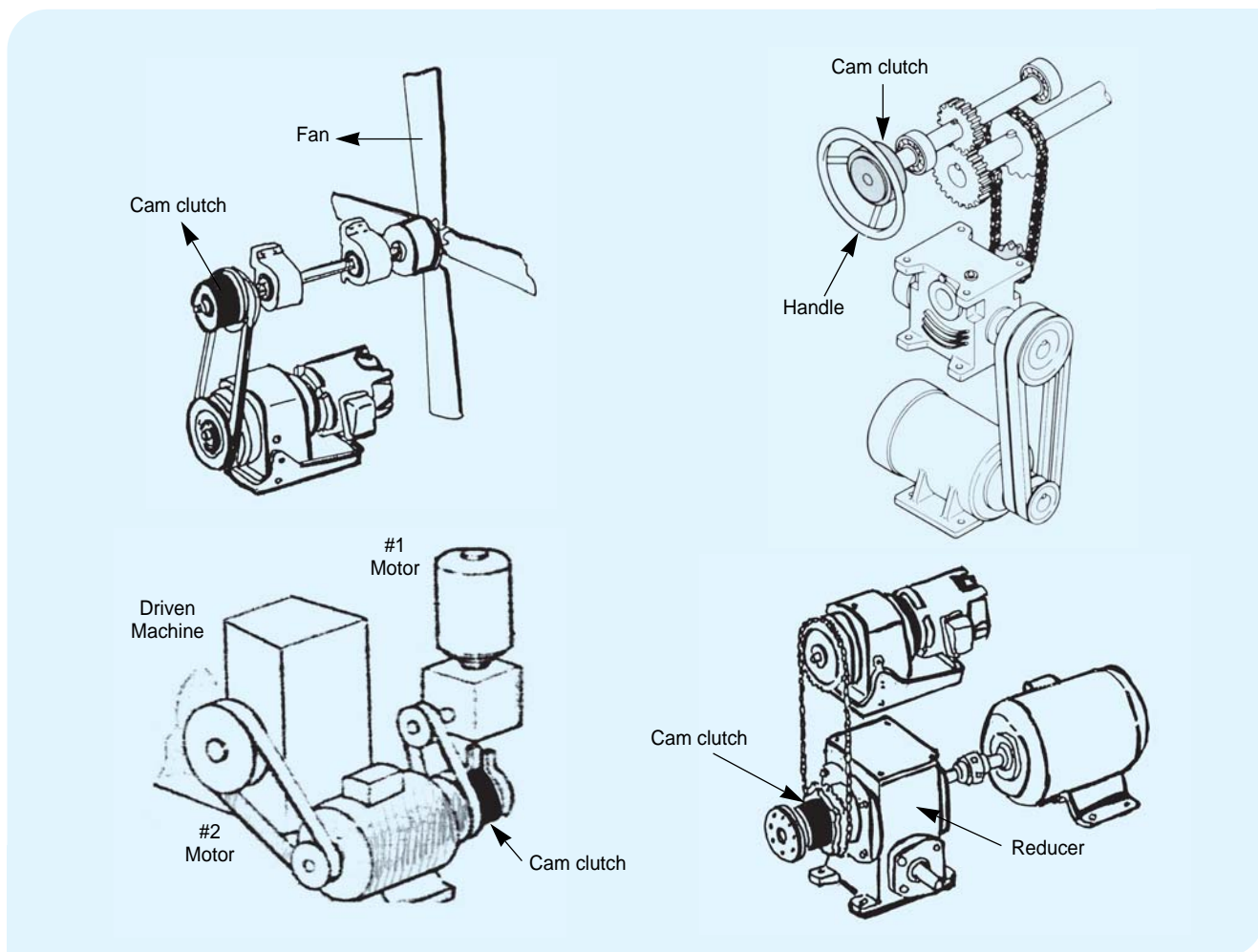
**Application EX. :**

- (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)

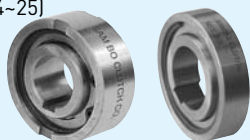


Outer race is easy to mounting gear, pulleys, sprockets.. etc.  
(Grease Lubrication)

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)

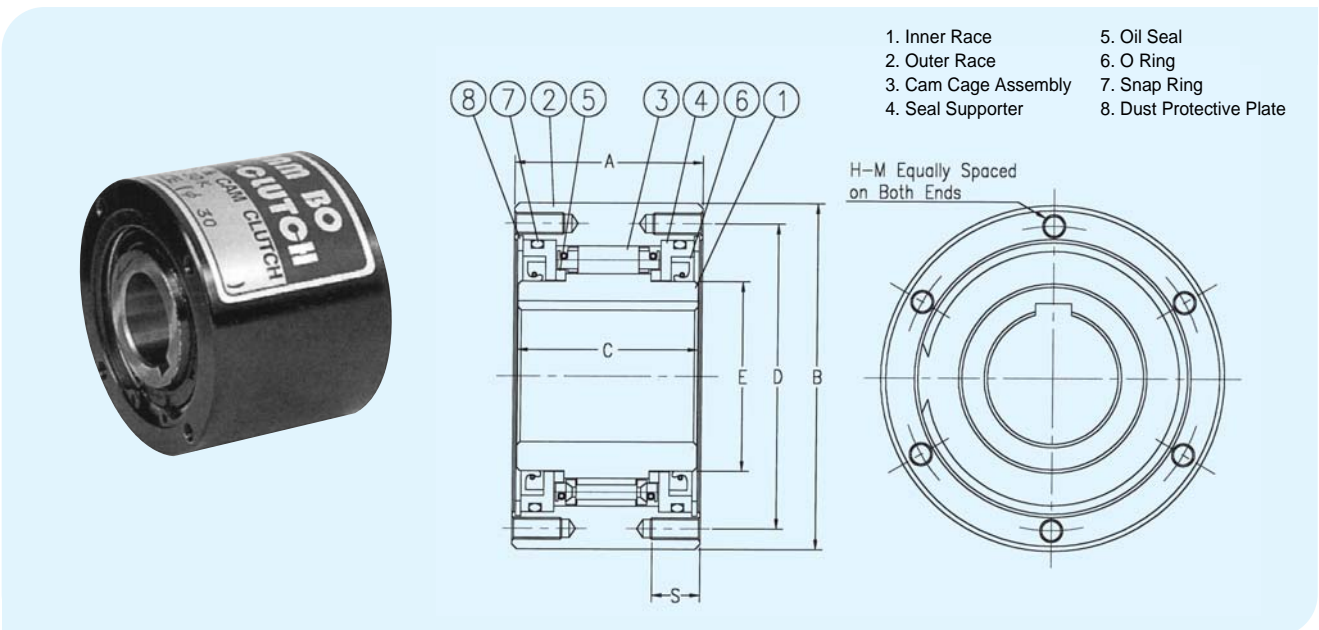
**GFR-K Series** : (PAGE: 34 ~ 35)



# 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

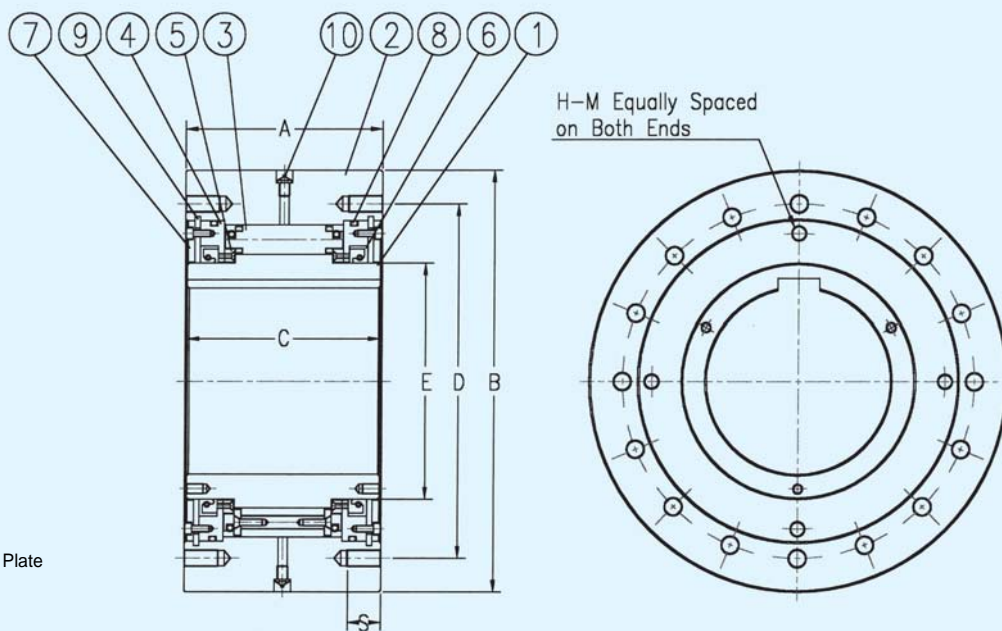
1. For the only backstop application in slant conveyors and bucket elevators.
2. Pre-lubricated with grease and no lubrication maintenance required.

- ※ 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

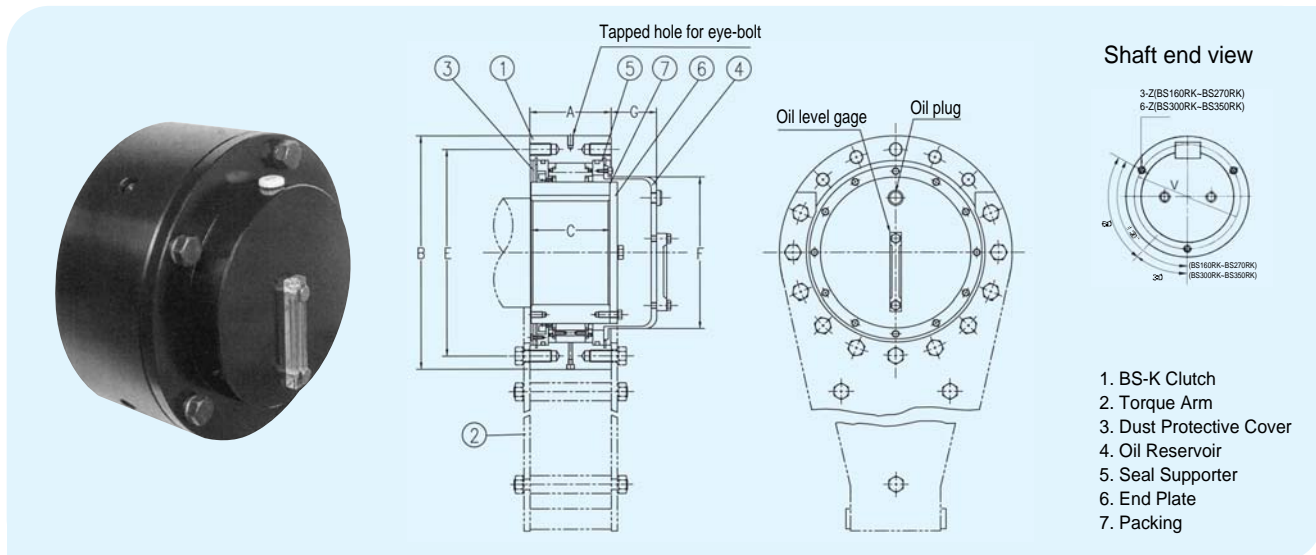
Grease lubrication and lubrication maintenance is necessary.

- ※ 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 50 $\varnothing$ x 10              | 1,300            | 95           |
| BS 200RK  | 3,800              | 100~200         | 110                           | 150             | 430 | 145 | 380 | 310 | 60  | 235 | M12 | M20 x 50 $\varnothing$ x 8               | 1,900            | 155          |
| BS 220RK  | 5,000              | 150~220         | 105                           | 235             | 500 | 230 | 420 | 300 | 95  | 255 | M12 | M20 x 55 $\varnothing$ x 22              | 3,400            | 310          |
| BS 250RK  | 9,000              | 180~250         | 90                            | 295             | 600 | 290 | 530 | 355 | 125 | 290 | M14 | M24 x 55 $\varnothing$ x 22              | 8,200            | 637          |
| BS 270RK  | 12,500             | 200~270         | 80                            | 295             | 650 | 290 | 370 | 395 | 130 | 320 | M14 | M24 x 55 $\varnothing$ x 22              | 10,000           | 660          |
| BS 300RK  | 18,000             | 230~300         | 80                            | 295             | 780 | 290 | 690 | 495 | 130 | 380 | M14 | M30 x 70 $\varnothing$ x 22              | 15,000           | 1,050        |
| BS 350RK  | 32,000             | 250~350         | 75                            | 320             | 930 | 360 | 815 | 565 | 135 | 442 | M16 | M36 x 85 $\varnothing$ x 22              | 18,000           | 1,710        |

\* Bolts for oil Reservoir : • BS 160RK (M20 x 50  $\varnothing$  x 10)  
• BS 200RK (M22 x 50  $\varnothing$  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

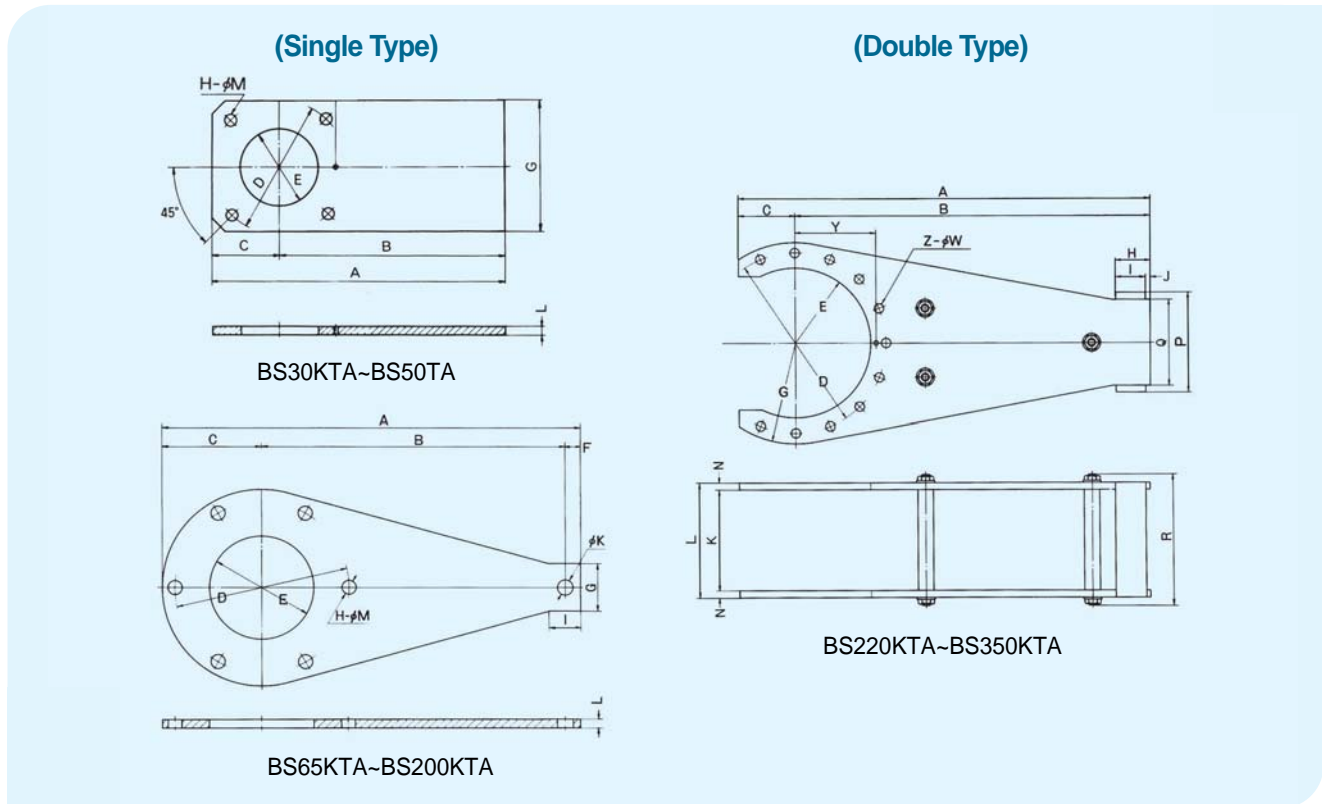
1. Check the direction of shaft rotation is the same as that of clutch.
2. Locate one of plugs of outer race at the bottom for a drain.
3. Apply preasure only to a clutch inner race. and do not press the clutch outer race or the seal supporter.
4. Attach the end plate with the packing to the shaft by 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  | K $\Phi$ | L  | H-M $\Phi$ | 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-W $\Phi$ | 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                |

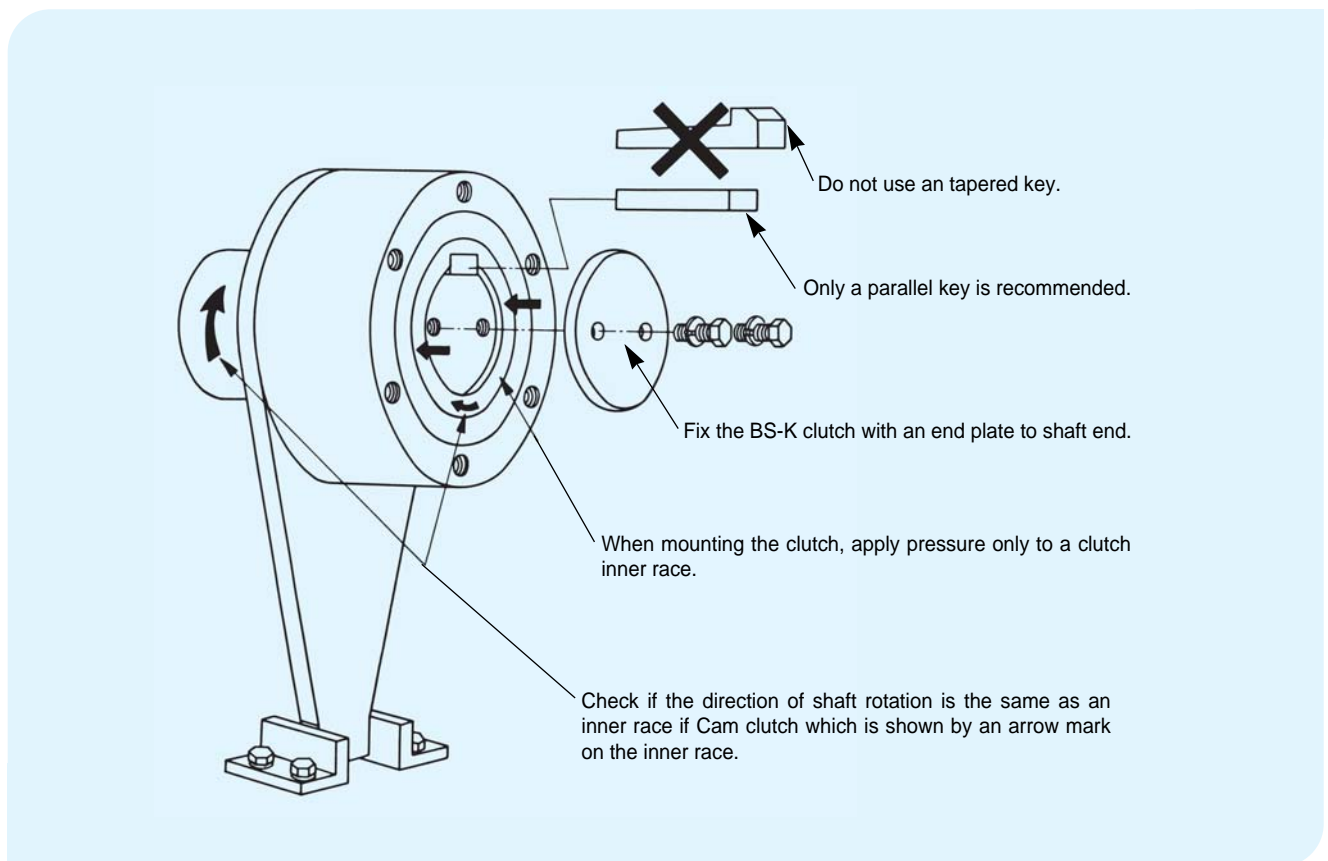
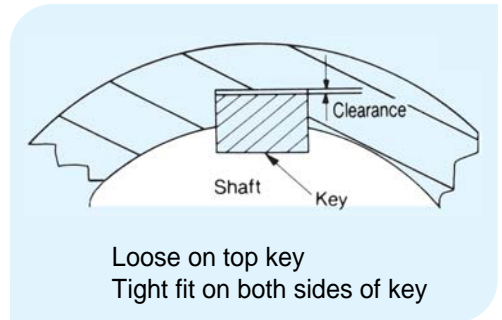


## INSTALLATION

### 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

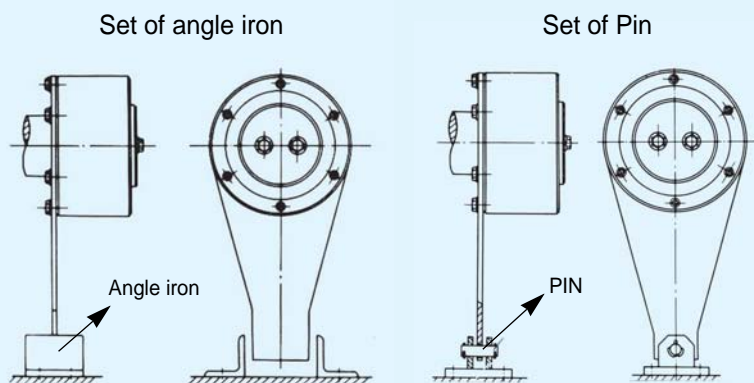
1. Before mounting a torque arm onto a clutch outer race, clean off contact-area of a torque arm and a clutch outer race.
2. High tension bolts (over 11T in Jis standard) are recommended for torque arm fixing , and screw all bolts tightly.
3. The end of torque arm shall be restrained to prevent rotation 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.

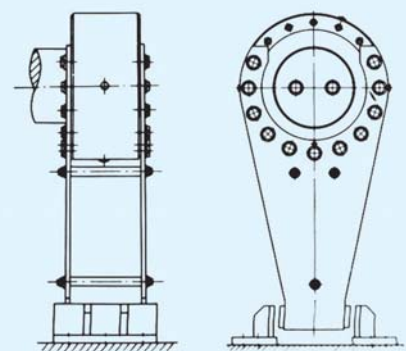
\*BS 30K-BS 200K & BS 160RK-BS 200RK : Use a single torque arm

\*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

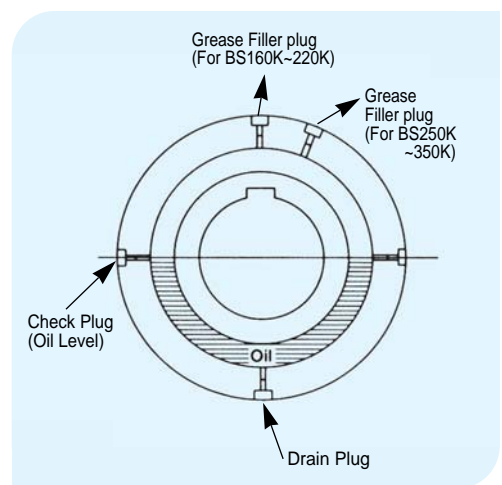
#### PRE-LUBRICATED WITH GREASE TYPE

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.)

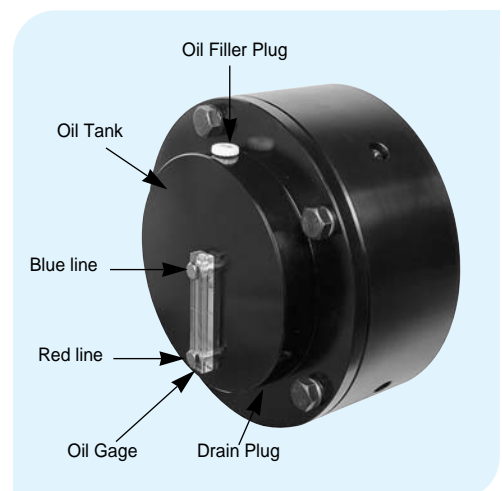


### ● BS 160RK-BS 350RK

#### 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.

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

(2) Calculate power to move load horizontally

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

(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)

**L<sub>o</sub>**=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

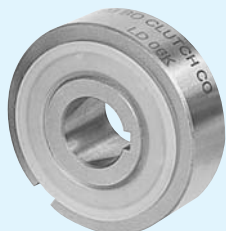
**kw** : Electric Power

**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

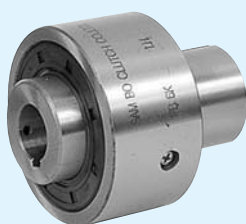


NFS-K



NSS-K

Drive  
↑  
Inner Race  
↓  
Free



PB-K Series



B200K

■R.H (Right Hand rotation shown)

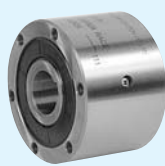
## BACKSTOPPING / OVERRUNNING / INDEXING (FOR HEAVY LOAD)



MZ-K



MG-K



PNC-K



BSD-K



GFR-K

Drive  
↑  
Inner Race  
↓  
Free



MZ-CK Series

Free  
↑  
Inner Race  
↓  
Lock



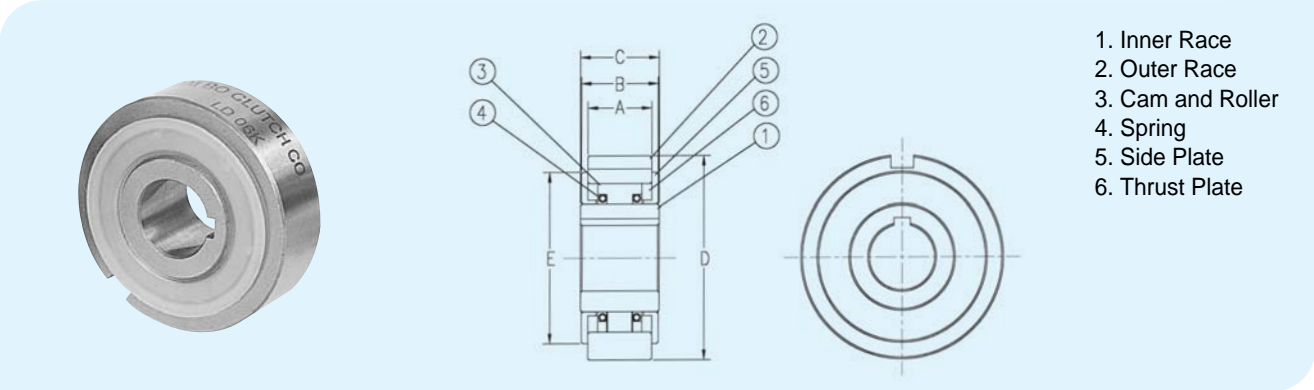
MG-RK Series

■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



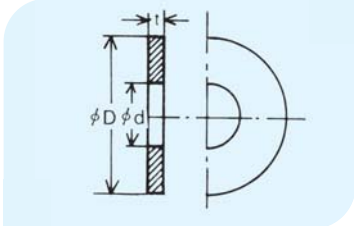
**Specification**

| 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 | -0.014<br>-0.039 | 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 | -0.017<br>-0.042 | 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 | -0.017<br>-0.042 | 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 | -0.017<br>-0.042 | 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 | -0.017<br>-0.042 | 70                | 10 x 4.5     | 0.64 |

**Character**

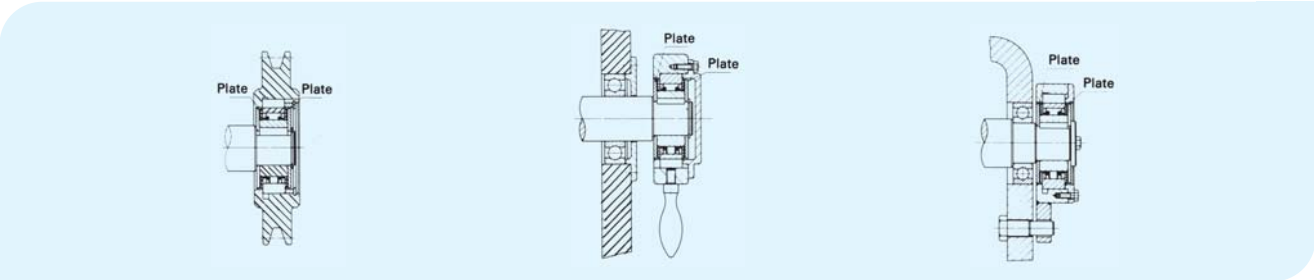
1. Be sure to attach the plate, this prevents the outer race from slipping away from the inner race.
2. Never apply thrust loads to the clutch.
3. The bores of the pulley, sprocket, etc., should have a tolerance of H6 or H7.

**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**

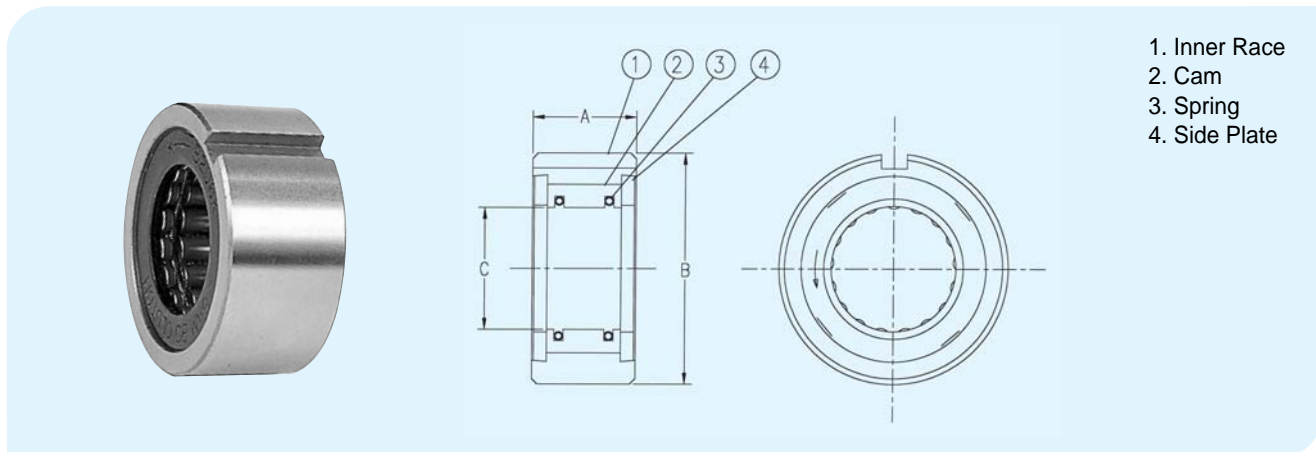


BACKSTOPPING / OVERRUNNING / INDEXING (FOR LIGHT LOAD)



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

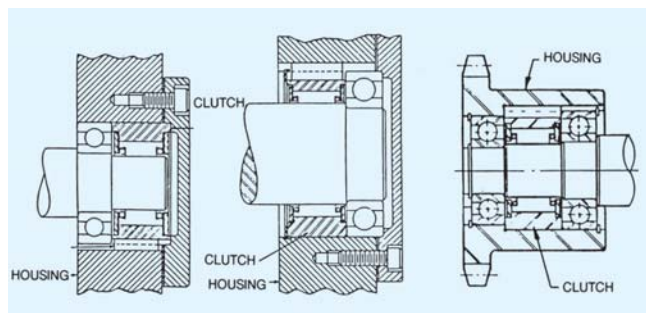
## Character

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

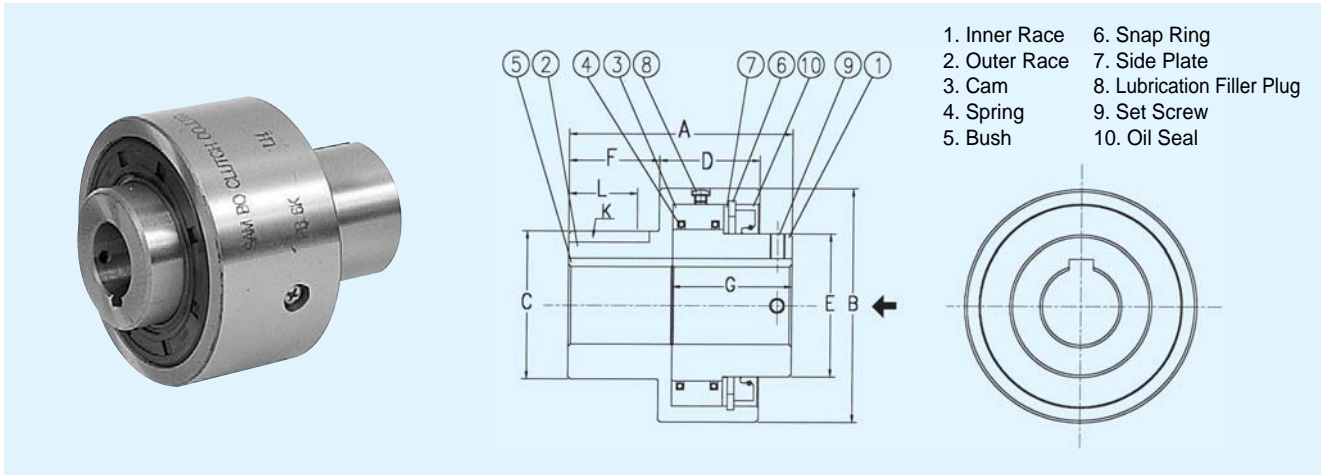
| Model                      | Tolerance of housing bore |
|----------------------------|---------------------------|
| B203K, B204K               | 0 to +0.025               |
| B205K, B206K, B207K, B208K | 0 to +0.030               |
| B210K, B211K, B212K, B213K | 0 to +0.035               |
| B214K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

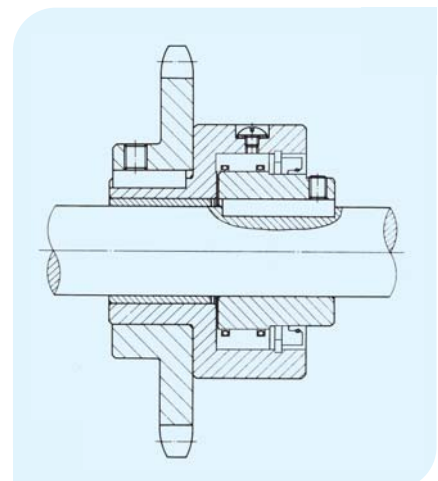
## Character

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     |

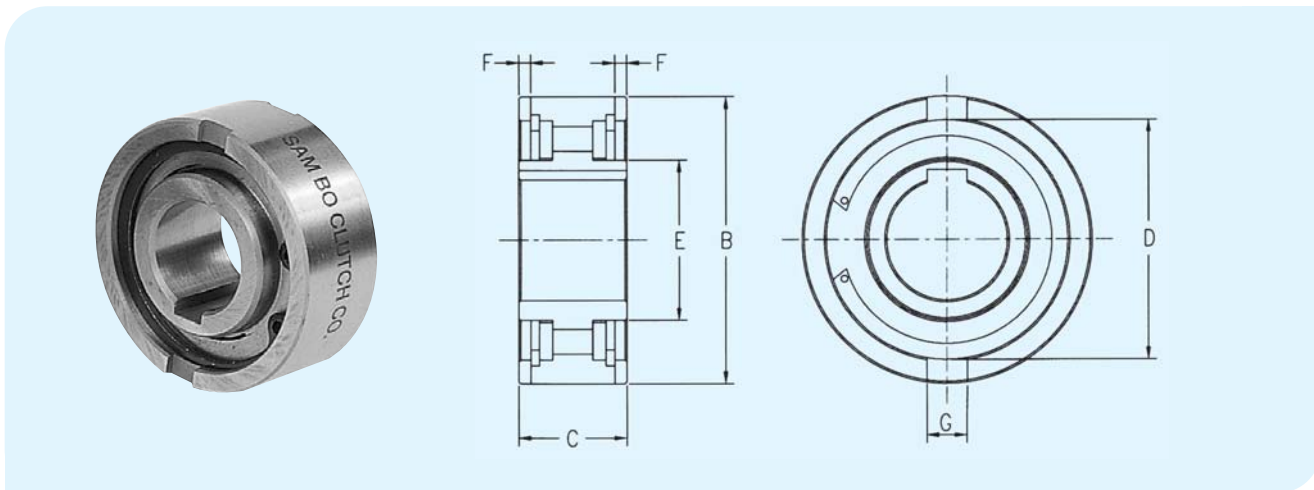
### Application





# NFS-K Series

FOR INNER RACE HIGH SPEED, GENERAL PURPOSE



## Specification

Dimensions-mm

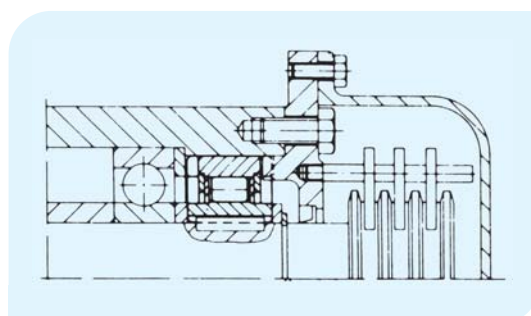
| Model   | Torque Capacity<br>kgf·m | Max. Overrunning<br>(rpm) |            | Stock Bore Size |          | B<br>(n6) | C  | D   | E   | F   | G  | Weight<br>(kgf) |
|---------|--------------------------|---------------------------|------------|-----------------|----------|-----------|----|-----|-----|-----|----|-----------------|
|         |                          | 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)

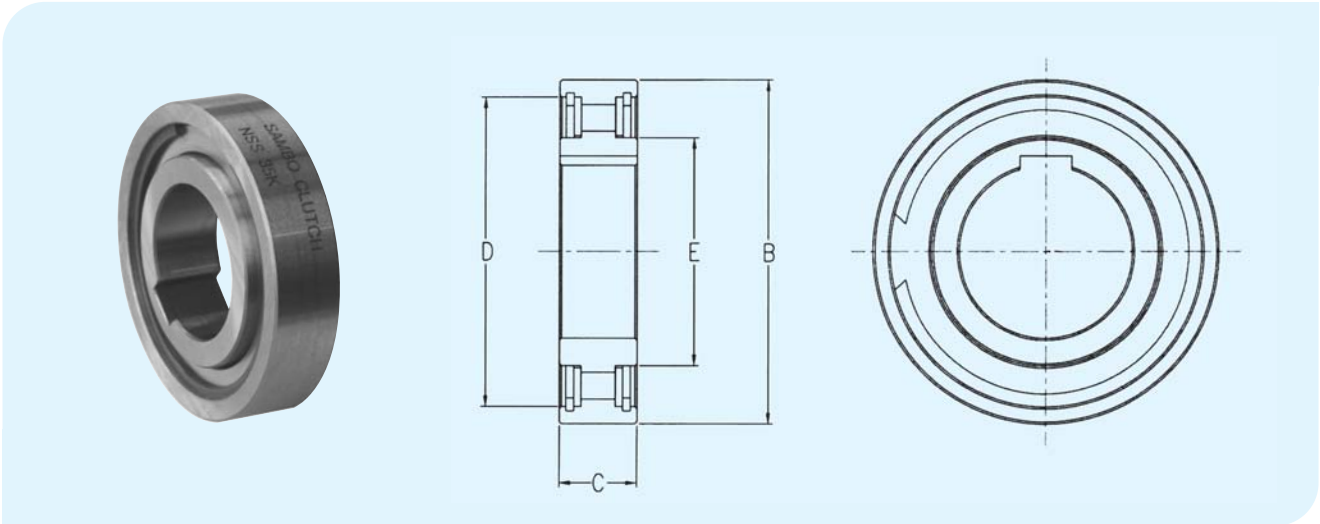
## Application





# NSS-K Series

FOR INNER RACE HIGH SPEED, GENERAL PURPOSE



## Specification

Dimensions-mm

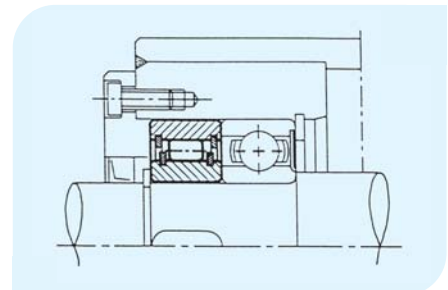
| Model   | Torque Capacity<br>kgf·m | Max. Overrunning<br>(rpm) |            | Stock Bore Size |          | B<br>(r6) | C  | D   | E  | Weight<br>(kgf) |
|---------|--------------------------|---------------------------|------------|-----------------|----------|-----------|----|-----|----|-----------------|
|         |                          | Inner Race                | 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

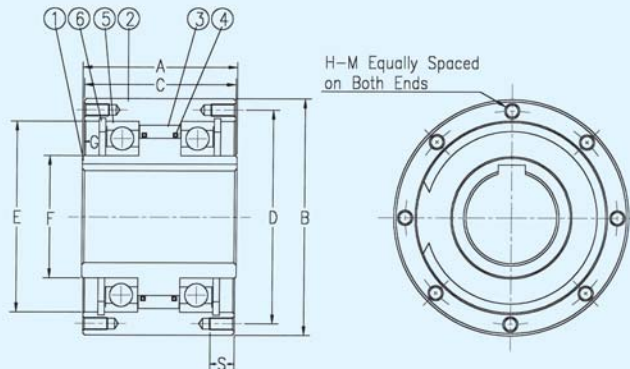
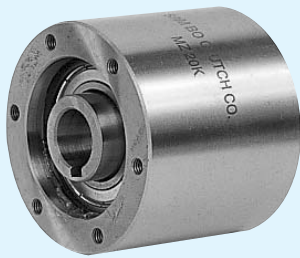




# BACKSTOPPING / OVERRUNNING / INDEXING (FOR HEAVY LOAD)

## 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         |

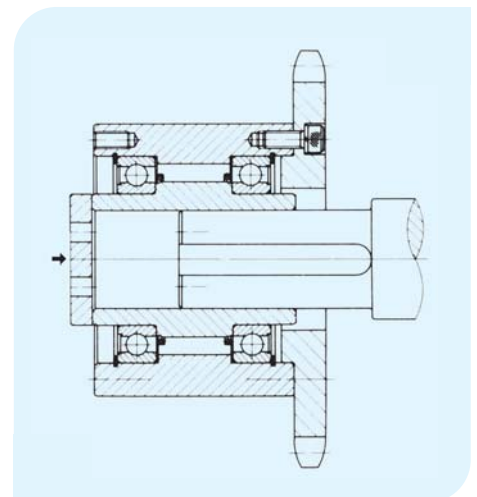
### Character

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°C

#### Shaft Tolerance

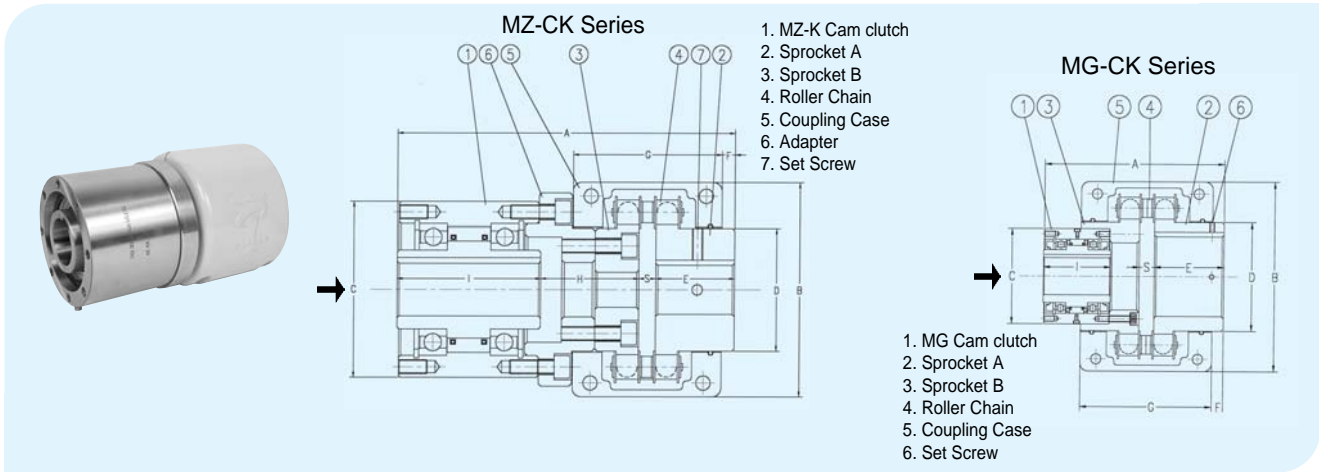
| Model  | Shaft Tolerance |
|--------|-----------------|
| MZ 20K | 0 to -0.021     |
| MZ 30K | 0 to -0.021     |
| MZ 45K | 0 to -0.025     |
| MZ 60K | 0 to -0.030     |
| MZ 70K | 0 to -0.030     |

#### 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          |

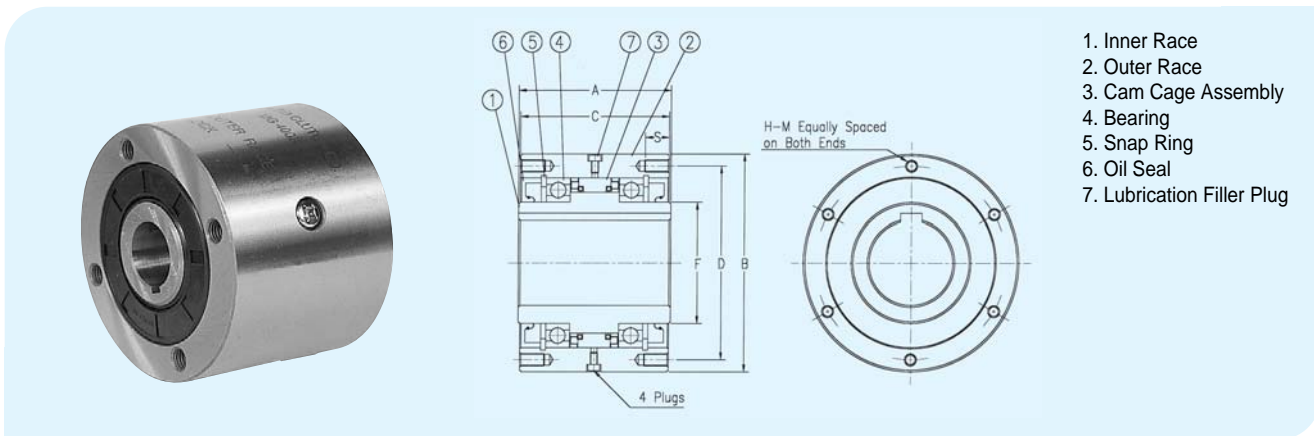
## Character of MZ-CK, MG-CK Series

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<br>MI 300K               | 32                  | 0.023<br>0.031                   | 2,800<br>50            | 900<br>-          | -<br>300                   | 19              | 5 x 2    | 63  | 77     | 60  | 66  | 30  | 13 | 4 x M6 x 1.0                          | M6 x 1.0                             | 25<br>50            | 1.7         |
| MG 400K<br>MI 400K               | 55                  | 0.029<br>0.038                   | 2,600<br>50            | 800<br>-          | -<br>300                   | 22              | 5 x 2    | 70  | 88     | 67  | 73  | 35  | 16 | 4 x M8 x 1.25                         | M6 x 1.0                             | 30<br>60            | 2.4         |
| MG 500K<br>MI 500K               | 165                 | 0.052<br>0.069                   | 2,400<br>50            | 800<br>-          | -<br>300                   | 31.5            | 7 x 3    | 89  | 108    | 86  | 92  | 50  | 16 | 4 x M8 x 1.25                         | M6 x 1.0                             | 50<br>100           | 4.5         |
| MG 600K<br>MI 600K               | 320                 | 0.086<br>0.158                   | 2,100<br>30            | 700<br>-          | -<br>300                   | 50              | 12 x 3.5 | 95  | 136    | 92  | 120 | 75  | 16 | 6 x M8 x 1.25                         | M6 x 1.0                             | 80<br>160           | 7.5         |
| MG 700K<br>MI 700K               | 600                 | 0.173<br>0.268                   | 1,500<br>30            | 500<br>-          | -<br>300                   | 70              | 18 x 6   | 127 | 180    | 124 | 160 | 100 | 20 | 6 x M10 x 1.5                         | M6 x 1.0                             | 135<br>260          | 17.5        |
| MG 750K<br>MI 750K<br>MR 750K    | 970                 | 0.35<br>0.42<br>-                | 1,400<br>30<br>575     | 500<br>-<br>2,600 | -<br>300<br>-              | 85              | 24 x 6   | 153 | 200    | 150 | 175 | 110 | 25 | 8 x M14 x 2.0                         | M8 x 1.25                            | 400<br>800<br>400   | 35.7        |
| MG 800K<br>MI 800K<br>MR 800K    | 1,800               | 0.55<br>0.85<br>-                | 1,300<br>20<br>475     | 475<br>-<br>2,100 | -<br>300<br>-              | 110             | 28 x 7   | 158 | 250    | 155 | 220 | 140 | 25 | 8 x M16 x 2.0                         | M8 x 1.25                            | 500<br>1000<br>500  | 40.0        |
| MG 900K<br>MI 900K<br>MR 900K    | 2,500               | 0.69<br>0.96<br>-                | 1,200<br>20<br>475     | 400<br>-<br>1,850 | -<br>300<br>-              | 135             | 35 x 9   | 165 | 300    | 160 | 265 | 170 | 32 | 10 x M16 x 2.0                        | M8 x 1.25                            | 620<br>1,240<br>620 | 70.5        |
| MG 1000K<br>MI 1000K<br>MR 1000K | 3,450               | 0.83<br>1.30<br>-                | 1,200<br>20<br>325     | 325<br>-<br>1,600 | -<br>300<br>-              | 160             | 38 x 10  | 188 | 370    | 180 | 325 | 200 | 32 | 12 x M16 x 2.0                        | M8 x 1.25                            | 850<br>1,700<br>850 | 108.5       |

## Character

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

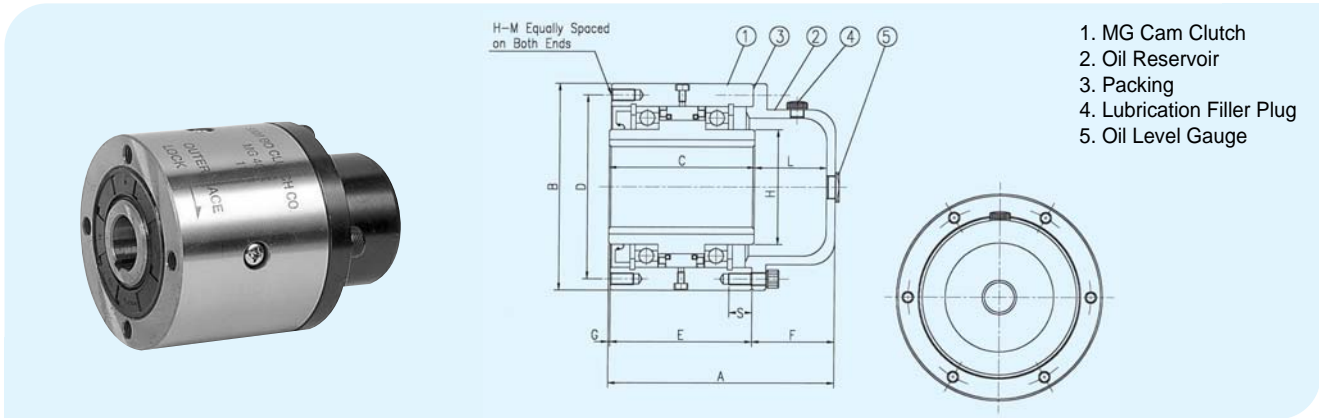
- MG-K Series** : For high speed of inner race with overrunning applications.
- MI-K Series** : For indexing applications.
- MR-K Series** : For high speed of outer race with overrunning applications.

### 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

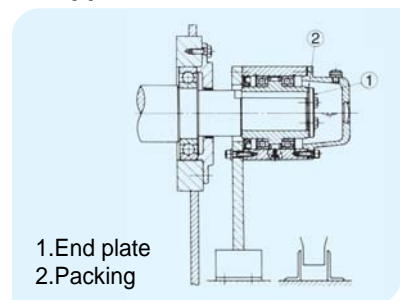
Dimensions-mm

| 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        |

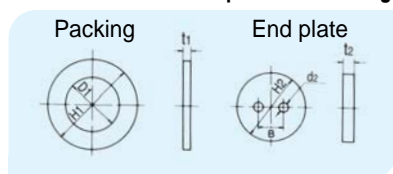
## Character

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

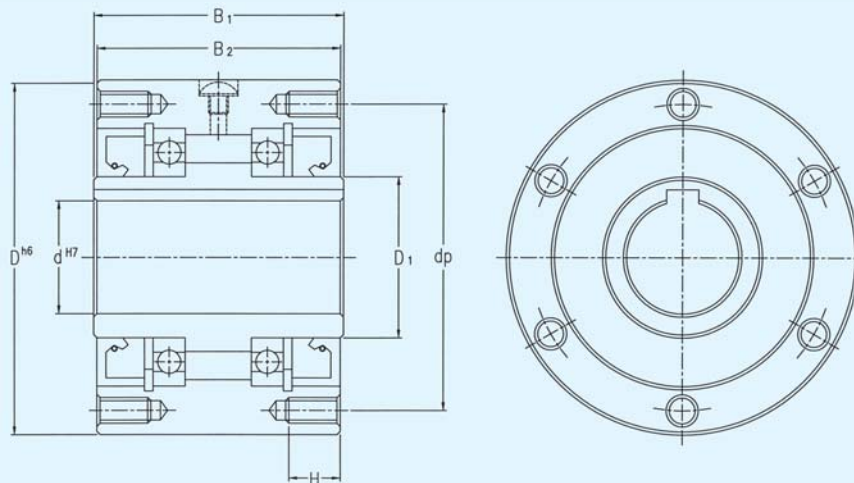


| Model     | Packing        |                |                | End Plate      |                |     |                |           |
|-----------|----------------|----------------|----------------|----------------|----------------|-----|----------------|-----------|
|           | H <sub>1</sub> | D <sub>1</sub> | t <sub>1</sub> | H <sub>2</sub> | t <sub>2</sub> | B   | d <sub>2</sub> | 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 <sub>1</sub> | B <sub>2</sub> | dp  | D <sub>1</sub> | 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

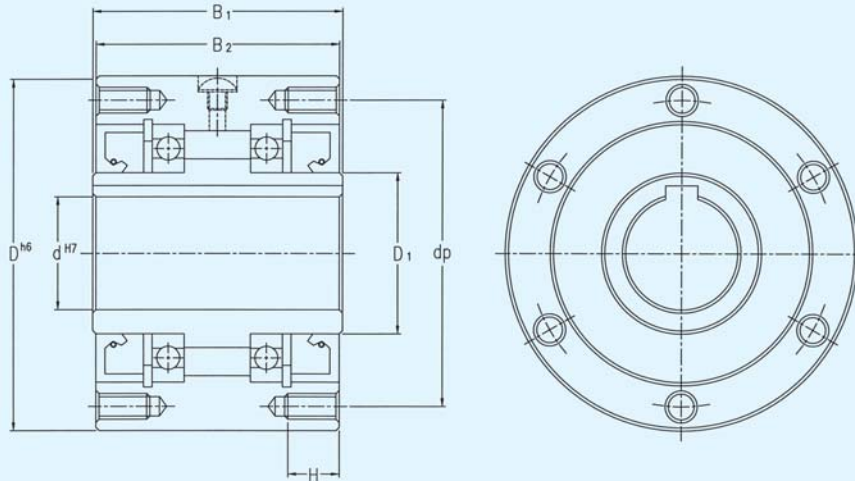
1. Precision clutches comprised ball bearing.
2. For high speed inner race overrunning application.(oil lubrication)

※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 <sub>1</sub> | B <sub>2</sub> | dp  | D <sub>1</sub> | 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          |

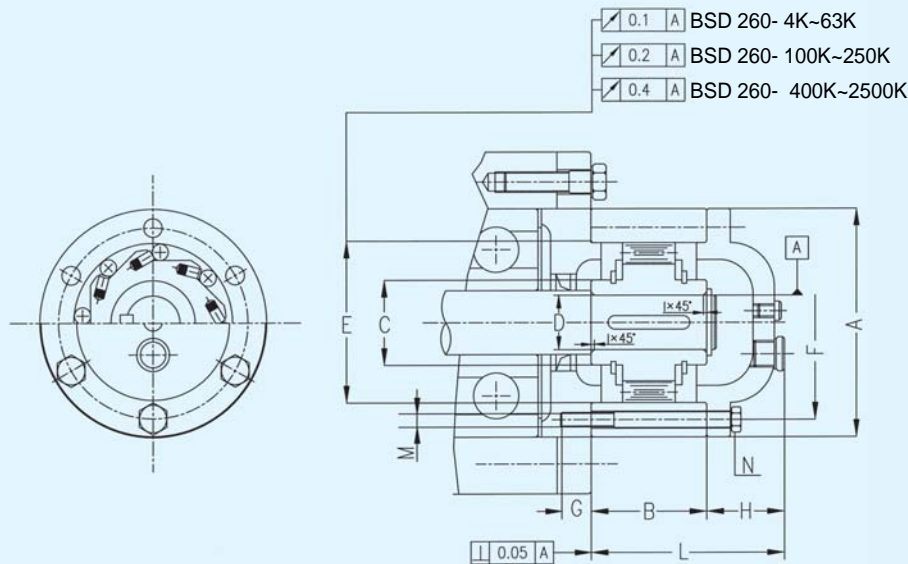
## Character

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 <sup>3</sup> ) | 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          |

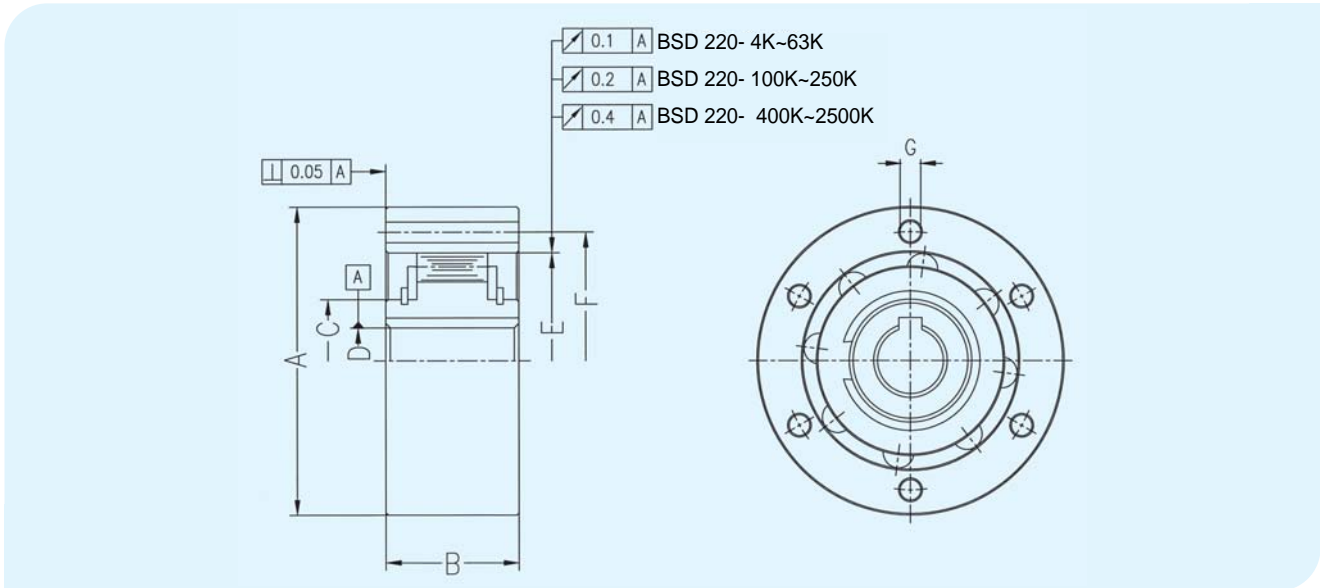
## Character

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)

BACKSTOPPING / OVERRUNNING / INDEXING (FOR HEAVY LOAD)



# 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- $\phi$ 5.5      | 0.8          |
| -6.3K  | 54                  | 2,400                  | 4,800      | 20              | 20        | 80  | 30  | 55  | 68  | 38  | 4- $\phi$ 5.5      | 1.1          |
| -10K   | 90                  | 1,700                  | 3,500      | 25              | 25        | 95  | 40  | 68  | 82  | 42  | 6- $\phi$ 5.5      | 1.6          |
| -16K   | 100                 | 1,400                  | 3,000      | 28              | 30        | 105 | 45  | 75  | 90  | 42  | 6- $\phi$ 6.6      | 2.6          |
| -25K   | 220                 | 1,250                  | 2,500      | 35              | 40        | 125 | 55  | 90  | 107 | 52  | 6- $\phi$ 6.6      | 3.4          |
| -40K   | 240                 | 1,100                  | 2,000      | 40              | 45        | 135 | 60  | 95  | 115 | 52  | 6- $\phi$ 9        | 4            |
| -63K   | 340                 | 960                    | 1,700      | 45              | 50        | 150 | 70  | 110 | 130 | 60  | 6- $\phi$ 11       | 5.6          |
| -100K  | 640                 | 840                    | 1,500      | 55              | 60        | 180 | 85  | 130 | 155 | 74  | 6- $\phi$ 11       | 11           |
| -160K  | 880                 | 745                    | 1,300      | 70              | 75        | 210 | 100 | 150 | 180 | 76  | 6- $\phi$ 14       | 14           |
| -250K  | 1,520               | 635                    | 1,150      | 80              | 90        | 245 | 120 | 180 | 214 | 85  | 8- $\phi$ 14       | 25           |
| -400K  | 2,160               | 550                    | 1,000      | 95              | 100       | 280 | 140 | 210 | 245 | 100 | 8- $\phi$ 18       | 35           |
| -630K  | 3,720               | 480                    | 900        | 110             | 130       | 320 | 160 | 240 | 280 | 115 | 8- $\phi$ 22       | 55           |
| -1000K | 6,400               | 420                    | 800        | 130             | 140       | 370 | 180 | 280 | 325 | 140 | 8- $\phi$ 22       | 83           |
| -1600K | 9,200               | 360                    | 700        | 140             | 150       | 410 | 200 | 310 | 360 | 160 | 8- $\phi$ 26       | 121          |
| -2500K | 13,000              | 320                    | 650        | 160             | 160       | 460 | 220 | 340 | 400 | 180 | 8- $\phi$ 33       | 180          |
| -4000K | 22,200              | 150                    | 200        | 210             | 210       | 560 | 300 | 440 | 500 | 180 | 12- $\phi$ 33      | 265          |
| -6300K | 37,000              | 100                    | 150        | 230             | 230       | 680 | 330 | 520 | 605 | 230 | 16- $\phi$ 33      | 395          |

## Character

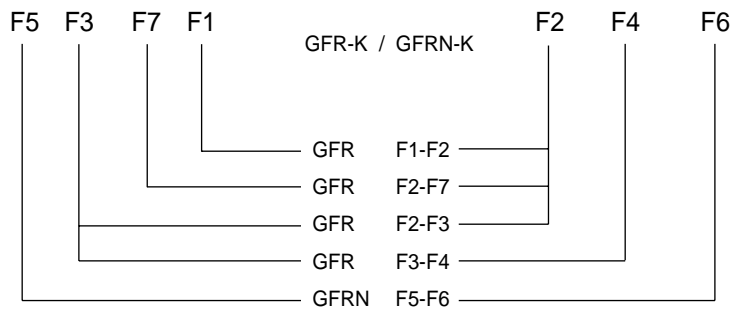
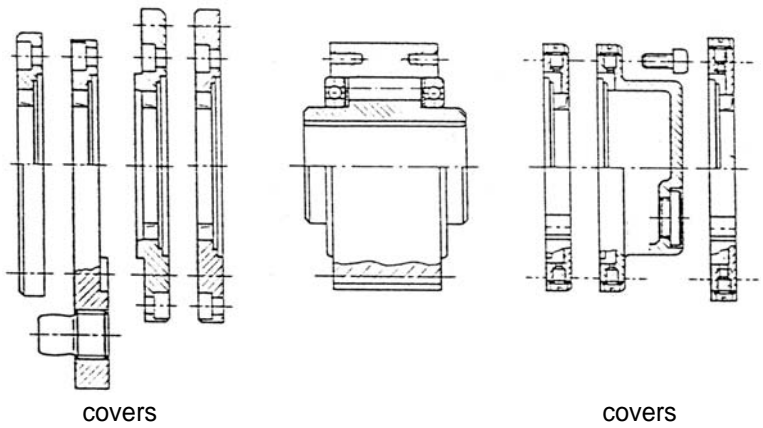
1. Oil lubrication
2. BSD 220-K Series can be used for backstopping in a gear reducer.
3. Please use standard bore if possible.
4. The key way is in accordance with DIN 6885 Sheet 1.  
(Refer to page 39)



# GFR-K, GFRN-K Series

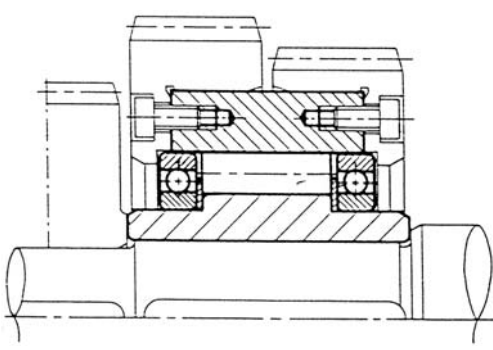


## Cover and Coupling Combinations

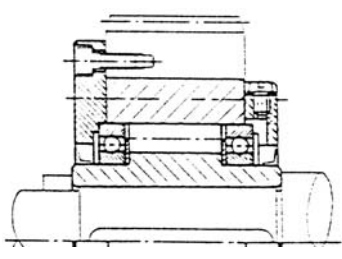


※Please consult SamBo Clutch for dimension of cover.

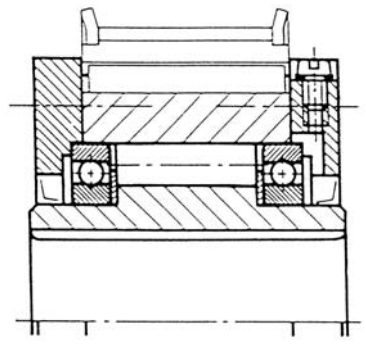
## Applications



GFR-K in a transmission



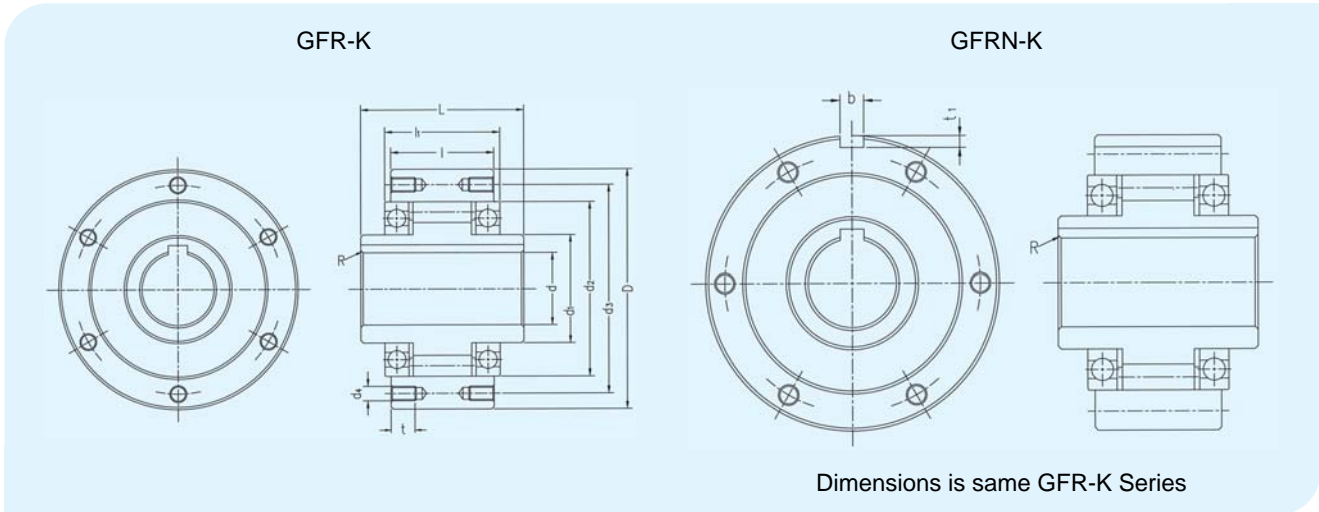
GFR-K F1-F2K with Gear



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 <sub>1</sub> | d <sub>2</sub> | d <sub>3</sub> | Outer Race |                |     | L   | ℓ   | ℓ <sub>1</sub> | r   | No. of Tapped Holes x Dia x Pitch N x d <sub>4</sub> x t | Weight (kgf) |
|-----------|---------------------|------------------------|------------|-----------------|----------------|----------------|----------------|------------|----------------|-----|-----|-----|----------------|-----|--|--------------|
|           |                     | Inner Race             | Outer Race |                 |                |                |                | D (h7)     | Key Way        |     |     |     |                |     |  |              |
|           |                     |                        |            | b               |                |                |                |            | t <sub>1</sub> |     |     |     |                |     |  |              |
| GRF 12-K  | 2.5                 | 3120                   | 4720       | 12              | 20             | 42             | 51             | 62         | 4              | 2.5 | 40  | 20  | 27             | 0.5 | 3 x φ5.5   | 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.

BACKSTOPPING / OVERRUNNING / INDEXING (FOR HEAVY LOAD)



## 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

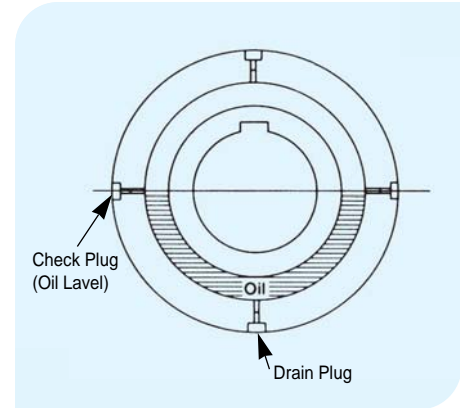
| Maker     | Overrunning application   |   | Indexing application  |
|-----------|---|---|-----------------------|
|           | In low speed or temperature<br>-10°C to 30°C applications                   | In high speed or temperature<br>30°C to 50°C applications |                       |
| Shell Oil | Dexron II<br>Rimulla CT Oil 10W<br>Shell Clavus Oil 17<br>Rotella S Oil 10W | Rimulla CT Oil 20W/20,30<br>Rotella S Oil 20W/20,30       | Shell Clavus Oil 15   |
| Mobil Oil | ATF 220<br>Delvas 1310<br>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.           |

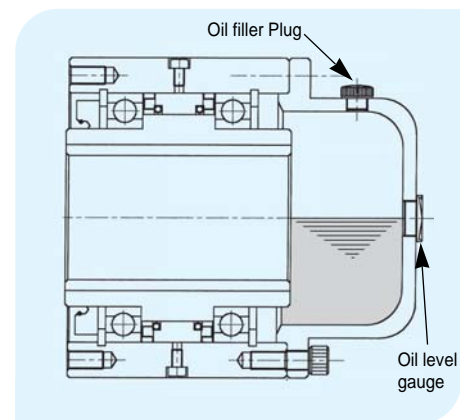
● **MG-K, MI-K, PNC-K, PHC-K Series**

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

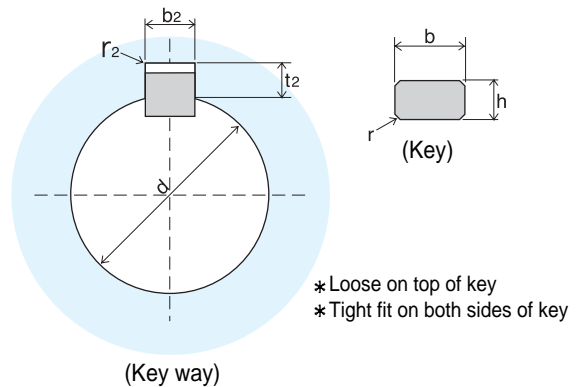
\*BS 30K ~ BS 110K Clutch Bore tolerance : H7 (JIS B 0401~1965)  
 \*RS 135K ~ BS 350K Clutch Bore tolerance : H8 (JIS B 0401~1965)

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

### JIS B0401-1965

| Bore Range (mm) | H7 Tolerance | H8 Tolerance |
|-----------------|--------------|--------------|
| 30 ~ 50         | +0.025<br>0  | +0.039<br>0  |
| 50 ~ 80         | +0.030<br>0  | +0.046<br>0  |
| 80 ~ 120        | +0.035<br>0  | +0.054<br>0  |
| 120 ~ 180       | +0.040<br>0  | +0.063<br>0  |
| 180 ~ 250       | +0.046<br>0  | +0.072<br>0  |
| 250 ~ 315       | +0.052<br>0  | +0.081<br>0  |
| 315 ~ 400       | +0.057<br>0  | +0.089<br>0  |
| 400 ~ 450       | +0.063<br>0  | +0.097<br>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<br>-0.0022 | 8         | 0<br>-0.058 | 0.8               | 10        | +0.061<br>+0.025 | 3.5       | +0.200<br>0 | 0.6     |
| 12 × 8       | Above 40 to 45   | 12            | 0<br>-0.027  | 8         | 0<br>-0.058 | 0.8               | 12        | +0.075<br>+0.032 | 3.5       | 0           | 0.6     |
| 15 × 10      | Above 50 to 60   | 15            | 0<br>-0.027  | 10        | 0<br>-0.058 | 0.8               | 15        | +0.075<br>+0.032 | 5         | +0.300      | 1.0     |
| 18 × 12      | Above 60 to 70   | 18            | 0<br>-0.033  | 12        | 0<br>-0.058 | 0.8               | 18        | +0.075<br>+0.032 | 6         | +0.300      | 1.0     |
| 20 × 13      | Above 70 to 80   | 20            | 0<br>-0.033  | 13        | 0<br>-0.058 | 1.2               | 20        | 0.092<br>0.040   | 6         | 0           | 1.0     |
| 24 × 16      | Above 80 to 95   | 24            | 0<br>-0.033  | 16        | 0<br>-0.039 | 1.2               | 24        | 0.092<br>0.040   | 8         | 0           | 1.0     |
| 28 × 18      | Above 95 to 110  | 28            | 0<br>-0.033  | 18        | 0<br>-0.039 | 1.2               | 28        | 0.092<br>0.040   | 9         | 0           | 1.0     |
| 32 × 20      | Above 110 to 125 | 32            | 0<br>-0.033  | 20        | 0<br>-0.039 | 1.2               | 32        | 0.092<br>0.040   | 10        | 0           | 1.0     |
| 35 × 22      | Above 125 to 140 | 35            | 0<br>-0.033  | 22        | 0<br>-0.039 | 1.2               | 35        | 0.092<br>0.040   | 11        | 0           | 1.0     |
| 38 × 24      | Above 140 to 160 | 38            | 0<br>-0.039  | 24        | 0<br>-0.084 | 2                 | 38        | +0.112           | 12        | +0.400<br>0 | 1.6     |
| 42 × 26      | Above 160 to 180 | 42            | 0<br>-0.039  | 26        | 0<br>-0.084 | 2                 | 42        | +0.050           | 13        | +0.400<br>0 | 1.6     |
| 45 × 28      | Above 180 to 200 | 45            | 0<br>-0.039  | 28        | 0<br>-0.084 | 2                 | 45        | +0.050           | 14        | +0.400<br>0 | 1.6     |
| 50 × 31.5    | Above 200 to 224 | 50            | 0<br>-0.039  | 31.5      | 0<br>-0.084 | 2                 | 50        | +0.050           | 15.5      | +0.400<br>0 | 1.6     |
| 56 × 35.5    | Above 224 to 250 | 56            | 0<br>-0.039  | 35.5      | 0<br>-0.084 | 2                 | 56        | +0.050           | 17.5      | +0.400<br>0 | 1.6     |
| 63 × 40      | Above 250 to 280 | 63            | 0<br>-0.046  | 40        | 0<br>-0.100 | 3                 | 63        | +0.0134          | 20        | +0.400<br>0 | 2.5     |
| 71 × 45      | Above 280 to 315 | 70            | 0<br>-0.046  | 45        | 0<br>-0.100 | 3                 | 71        | +0.060           | 22.5      | +0.400<br>0 | 2.5     |
| 80 × 50      | Above 315 to 355 | 80            | 0<br>-0.046  | 50        | 0<br>-0.100 | 3                 | 80        | +0.060           | 25        | +0.400<br>0 | 2.5     |
| 90 × 56      | Above 355 to 400 | 90            | 0<br>-0.054  | 56        | 0<br>-0.120 | 3                 | 90        | +0.159           | 28        | +0.400<br>0 | 2       |
| 100 × 63     | Above 400 to 450 | 100           | 0<br>-0.054  | 63        | 0<br>-0.120 | 3                 | 100       | +0.072           | 31.5      | +0.400<br>0 | 2       |

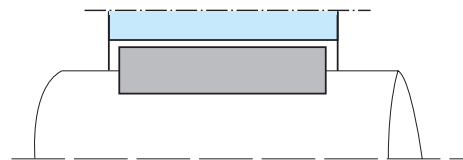
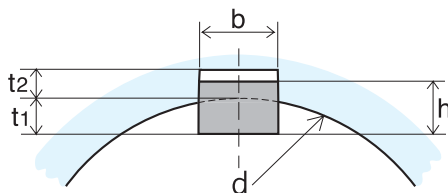
**JIS STANDARD PARELLED KEY & KEYWAY CLASS**

**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       |      |
| 10 x 8         | Above 30 to 38   | 10            |        | 8         | 0       |                   | 10        |         | 3.3       |      |
| 12 x 8         | Above 38 to 44   | 12            |        | 8         | -0.090  | 0.40              | 12        |         | 3.3       |      |
| 14 x 9         | Above 44 to 50   | 14            | 0      | 9         |         | ~                 | 14        | ±0.0215 | 3.8       |      |
| 16 x 10        | Above 50 to 58   | 16            | -0.043 | 10        |         | 0.60              | 16        |         | 4.3       | +0.2 |
| 18 x 11        | Above 58 to 65   | 18            |        | 11        |         |                   | 18        |         | 4.4       | 0    |
| 20 x 12        | Above 65 to 75   | 20            |        | 12        |         |                   | 20        |         | 4.9       |      |
| 22 x 14        | Above 75 to 85   | 22            | 0      | 14        | 0       | 0.60              | 22        | ±0.0260 | 5.4       |      |
| 25 x 14        | Above 85 to 95   | 25            | -0.052 | 14        | -0.110  | ~                 | 25        |         | 5.4       |      |
| 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       |      |
| 36 x 20        | Above 130 to 150 | 36            | 0      | 20        |         |                   | 36        |         | 8.4       |      |
| 40 x 22        | Above 150 to 170 | 40            | -0.062 | 22        | 0       | 1.00              | 40        | ±0.0310 | 9.4       |      |
| 45 x 25        | Above 170 to 200 | 45            |        | 25        | -0.0130 | ~                 | 45        |         | 10.4      |      |
| 50 x 28        | Above 200 to 230 | 50            |        | 28        |         | 1.20              | 50        |         | 11.4      |      |
| 56 x 32        | Above 230 to 260 | 56            |        | 32        |         |                   | 56        |         | 12.4      | +0.3 |
| 63 x 32        | Above 260 to 290 | 63            | 0      | 32        |         | ~                 | 63        | ±0.0370 | 12.4      | 0    |
| 70 x 36        | Above 290 to 330 | 70            | -0.074 | 36        | 0       | 2.00              | 70        |         | 14.4      |      |
| 80 x 40        | Above 330 to 380 | 80            |        | 40        | -0.160  |                   | 80        |         | 15.4      |      |
| 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      |      |

**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 :  $\mu\text{m}$

| Bore Range (mm) |       | Dimensions : $\mu\text{m}$ |          |           |           |           |            |            |           |            |           |           |            |             |             |              |              |              |                 |      |      |     |     |
|-----------------|-------|----------------------------|----------|-----------|-----------|-----------|------------|------------|-----------|------------|-----------|-----------|------------|-------------|-------------|--------------|--------------|--------------|-----------------|------|------|-----|-----|
| Above           | Up to | g6                         | h5       | h6        | h9        | h10       | js5        | js6        | j5        | j6         | k5        | k6        | m5         | m6          | n6          | p6           | r6           | r7           | Bore Range (mm) |      | IT5  | IT7 |     |
|                 |       |                            |          |           |           |           |            |            |           |            |           |           |            |             |             |              |              | Above        | Up to           |      |      |     |     |
| 3               | 6     | -4<br>-12                  | 0<br>-5  | 0<br>-8   | 0<br>-30  | 0<br>-48  | $\pm 2.5$  | $\pm 4$    | +3<br>-2  | +6<br>-2   | +6<br>+1  | +9<br>+1  | +9<br>+4   | +12<br>+4   | +16<br>+8   | +20<br>+12   | +23<br>+15   | +27<br>+15   | +27<br>+15      | 3    | 6    | 5   | 12  |
| 6               | 10    | -                          | 0<br>-6  | 0<br>-9   | 0<br>-36  | 0<br>-58  | $\pm 3$    | $\pm 4.5$  | +4<br>-2  | +7<br>-2   | +7<br>+1  | +10<br>+1 | +12<br>+6  | +15<br>+6   | +19<br>+10  | +24<br>+15   | +28<br>+19   | +34<br>+19   | +34<br>+19      | 6    | 10   | 6   | 15  |
| 10              | 18    | -6<br>-17                  | 0<br>-8  | 0<br>-11  | 0<br>-43  | 0<br>-70  | $\pm 4$    | $\pm 5.5$  | +5<br>-3  | +8<br>-3   | +9<br>+1  | +12<br>+1 | +15<br>+7  | +18<br>+7   | +23<br>+12  | +29<br>+18   | +34<br>+23   | +41<br>+23   | +41<br>+23      | 10   | 18   | 8   | 18  |
| 18              | 30    | -7<br>-20                  | 0<br>-9  | 0<br>-13  | 0<br>-52  | 0<br>-84  | $\pm 4.5$  | $\pm 6.5$  | +5<br>-4  | +9<br>-4   | +11<br>+2 | +15<br>+2 | +17<br>+8  | +21<br>+8   | +28<br>+15  | +35<br>+22   | +41<br>+28   | +49<br>+28   | +49<br>+28      | 18   | 30   | 9   | 21  |
| 30              | 50    | -9<br>-25                  | 0<br>-11 | 0<br>-16  | 0<br>-62  | 0<br>-100 | $\pm 5.5$  | $\pm 8$    | +6<br>-5  | +11<br>-5  | +13<br>+2 | +18<br>+2 | +20<br>+9  | +25<br>+9   | +33<br>+17  | +42<br>+26   | +50<br>+34   | +59<br>+34   | +59<br>+34      | 30   | 50   | 11  | 25  |
| 50              | 80    | -10<br>-29                 | 0<br>-13 | 0<br>-19  | 0<br>-74  | 0<br>-120 | $\pm 6.5$  | $\pm 9.5$  | +6<br>-7  | +12<br>-7  | +15<br>+2 | +21<br>+2 | +24<br>+11 | +30<br>+11  | +39<br>+20  | +51<br>+32   | +62<br>+43   | +73<br>+43   | +73<br>+43      | 50   | 80   | 13  | 30  |
| 80              | 120   | -12<br>-34                 | 0<br>-15 | 0<br>-22  | 0<br>-87  | 0<br>-140 | $\pm 7.5$  | $\pm 11$   | +6<br>-9  | +13<br>-9  | +18<br>+3 | +25<br>+3 | +28<br>+13 | +35<br>+13  | +45<br>+23  | +59<br>+37   | +73<br>+54   | +86<br>+54   | +86<br>+54      | 80   | 120  | 15  | 35  |
| 120             | 180   | -14<br>-39                 | 0<br>-18 | 0<br>-25  | 0<br>-100 | 0<br>-160 | $\pm 9$    | $\pm 12.5$ | +7<br>-11 | +14<br>-11 | +21<br>+3 | +28<br>+3 | +33<br>+15 | +40<br>+15  | +52<br>+27  | +68<br>+43   | +88<br>+68   | +103<br>+68  | +103<br>+68     | 120  | 180  | 18  | 40  |
| 180             | 250   | -15<br>-44                 | 0<br>-20 | 0<br>-29  | 0<br>-115 | 0<br>-185 | $\pm 10$   | $\pm 14.5$ | +7<br>-13 | +16<br>-13 | +24<br>+4 | +33<br>+4 | +37<br>+17 | +46<br>+17  | +60<br>+31  | +79<br>+50   | +108<br>+80  | +126<br>+80  | +126<br>+80     | 180  | 250  | 20  | 46  |
| 250             | 315   | -17<br>-49                 | 0<br>-23 | 0<br>-32  | 0<br>-130 | 0<br>-210 | $\pm 11.5$ | $\pm 16$   | +7<br>-16 | +16<br>-16 | +27<br>+4 | +36<br>+4 | +43<br>+20 | +52<br>+20  | +66<br>+34  | +88<br>+66   | +126<br>+94  | +146<br>+94  | +146<br>+94     | 250  | 315  | 23  | 52  |
| 315             | 400   | -18<br>-54                 | 0<br>-25 | 0<br>-36  | 0<br>-140 | 0<br>-230 | $\pm 12.5$ | $\pm 18$   | +7<br>-18 | +18<br>-18 | +29<br>+4 | +40<br>+4 | +46<br>+21 | +57<br>+21  | +73<br>+37  | +98<br>+62   | +144<br>+108 | +165<br>+108 | +165<br>+108    | 315  | 400  | 25  | 57  |
| 400             | 500   | -20<br>-60                 | 0<br>-27 | 0<br>-40  | 0<br>-155 | 0<br>-250 | $\pm 13.5$ | $\pm 20$   | +7<br>-20 | +20<br>-20 | +32<br>+5 | +45<br>+5 | +50<br>+23 | +63<br>+23  | +80<br>+40  | +108<br>+68  | +148<br>+108 | +189<br>+114 | +189<br>+114    | 400  | 500  | 27  | 63  |
| 500             | 630   | -22<br>-66                 | 0<br>-44 | 0<br>-57  | 0<br>-175 | 0<br>-280 | -          | $\pm 22$   | -         | -          | -         | +44<br>0  | -          | +70<br>+26  | +88<br>+44  | +122<br>+78  | +184<br>+155 | +220<br>+155 | +220<br>+155    | 500  | 630  | -   | 70  |
| 630             | 800   | -24<br>-74                 | 0<br>-50 | 0<br>-70  | 0<br>-200 | 0<br>-320 | -          | $\pm 25$   | -         | -          | -         | +60<br>0  | -          | +80<br>+30  | +100<br>+50 | +138<br>+88  | +225<br>+175 | +255<br>+175 | +255<br>+175    | 630  | 800  | -   | 80  |
| 800             | 1000  | -26<br>-82                 | 0<br>-56 | 0<br>-80  | 0<br>-230 | 0<br>-360 | -          | $\pm 28$   | -         | -          | -         | +66<br>0  | -          | +90<br>+34  | +112<br>+56 | +156<br>+100 | +266<br>+210 | +300<br>+210 | +300<br>+210    | 800  | 1000 | -   | 90  |
| 1000            | 1250  | -28<br>-94                 | 0<br>-66 | 0<br>-90  | 0<br>-260 | 0<br>-420 | -          | $\pm 33$   | -         | -          | -         | +66<br>0  | -          | +106<br>+40 | +132<br>+66 | +186<br>+120 | +316<br>+250 | +355<br>+250 | +355<br>+250    | 1000 | 1250 | -   | 105 |
| 1250            | 1600  | -30<br>-108                | 0<br>-78 | 0<br>-100 | 0<br>-310 | 0<br>-500 | -          | $\pm 39$   | -         | -          | -         | +78<br>0  | -          | +126<br>+48 | +156<br>+78 | +218<br>+140 | +378<br>+300 | +425<br>+300 | +425<br>+300    | 1250 | 1600 | -   | 125 |
| 1600            | 2000  | -32<br>-124                | 0<br>-92 | 0<br>-100 | 0<br>-370 | 0<br>-600 | -          | $\pm 46$   | -         | -          | -         | +92<br>0  | -          | +150<br>+58 | +184<br>+92 | +262<br>+170 | +462<br>+370 | +520<br>+370 | +520<br>+370    | 1600 | 2000 | -   | 150 |



# TOLERANCE OF HOUSING

Dimensions :  $\mu$  m

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

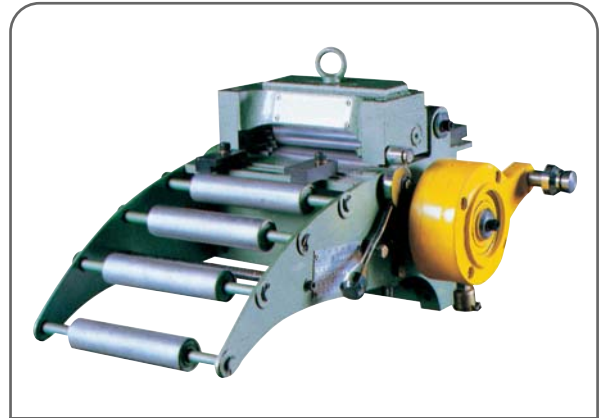
| Load cycle/ minute | Degrees/ Load cycle    | Service factor(s.f) |
|--------------------|------------------------|---------------------|
| Less than 150      | $\theta < 90^\circ$    | 1.56–2              |
| More than 150      | $\theta < 90^\circ$    | 2–3                 |
| Less than 150     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

■ **Backstopping** : Refer to 19 page

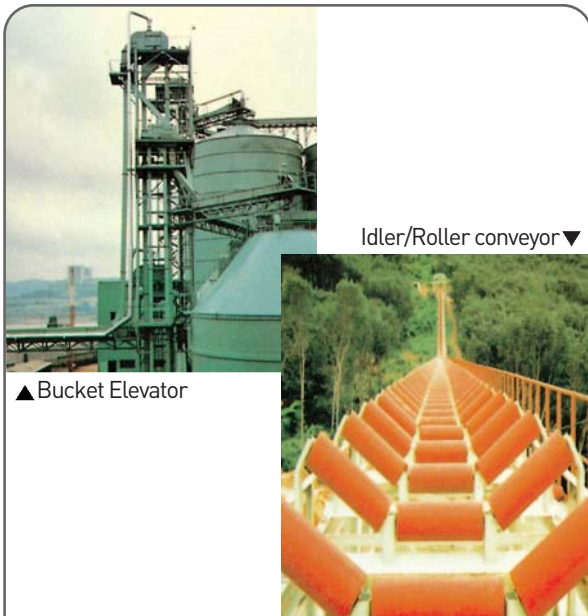
## Application example



**Combine**  
(Applied model : B200K Series)



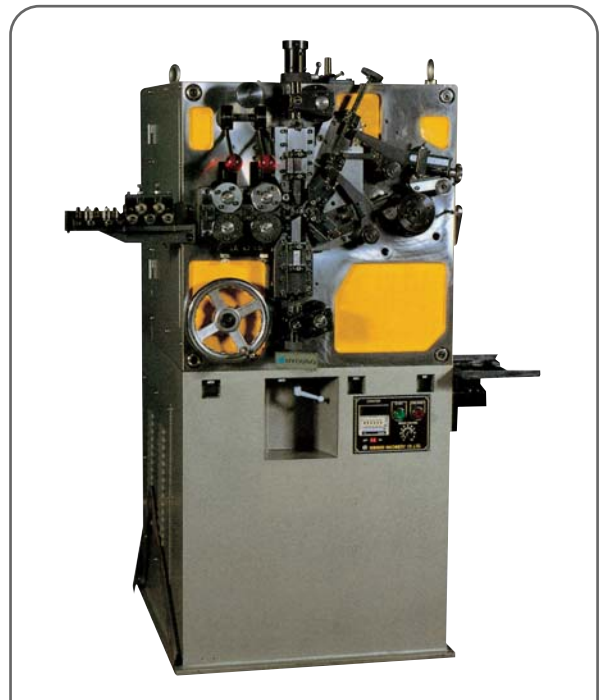
**Roll Feeder**  
(Applied model : MI-K Series)



▲ Bucket Elevator

▼ Idler/Roller conveyor

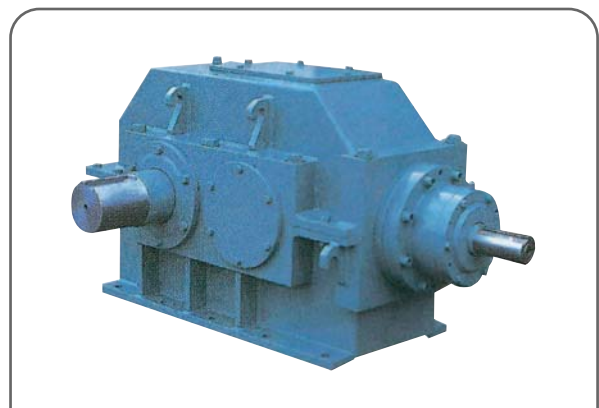
(Applied model : BS-K Series)



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



**Cable Reel**  
(Applied model : Special type)



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



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<http://sbclutch.com>