

BS Series, BS-HS Series, BS-R series Cam Clutch

Installation and Maintenance Instruction

**BS30, BS50, BS65, BS75, BS85, BS95, BS110, BS135, BS160, BS200
BS220, BS250, BS270, BS300, BS350, BS425, BS450**

BS160HS, BS200HS, BS220HS, BS250HS, BS270HS, BS300HS, BS350HS, BS425HS, BS450HS

**BS65R, BS75R, BS85R, BS95R, BS110R, BS135R, BS160R, BS200R
BS220R, BS250R, BS270R, BS300R, BS350R, BS425R, BS450R**

Thank you for choosing Tsubaki E&M products.

Before installing or working on the product, check label for correct size and make sure you have the complete set of parts. If any parts are missing, contact your distributor immediately.

This manual should be considered an essential part of the unit and remain with the unit when redistributed.

SAFETY

- Your Cam Clutch is a high quality, sophisticated unit which should be handled by experienced engineers only.
- For safety purposes, make sure this manual is easily accessible by the user at all times.
- To ensure safety and optimal performance, carefully read this instruction manual in its entirety.



WARNING

Death or serious injury may result from misuse, improper installation and/or improper maintenance of this product. Please refer to the detailed instructions provided in this manual for installation and maintenance specifications.

WARNING

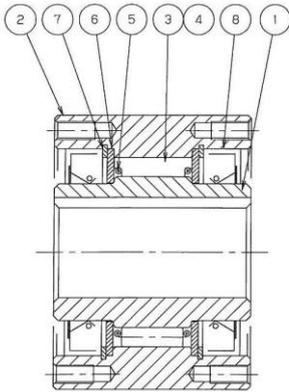
USE CARE TO PREVENT INJURY COMPLY WITH THE FOLLOWING TO AVOID SERIOUS PERSONAL INJURY:

1. Guards must be provided on all chain and sprocket installations in accordance with provisions of ANSI/ASME B15.1 - 2000 "Safety Standards for Mechanical Power Transmission Apparatus," and ANSI/ASME B20.1 - 2012 "Safety Standards for Conveyors and Related Equipment," or other applicable safety standards. When revisions of these standards are published, the updated edition shall apply.
2. Always lock out the power switch before installing, removing, lubricating or servicing a system which uses PTUC product.
3. When connecting or disconnecting PTUC products, eye protection is required. Wear safety glasses, protective clothing, gloves and safety shoes.
4. Improper installation or mounting, as well as operating conditions and maintenance, can affect the performance of a cam clutch. The cam clutch should be inspected regularly.

"PTUC is used by U.S. Tsubaki to designate "Power Transmission Unit Components."
PTUC products include Cam Clutch DISCO, POWER-LOCK[®], Shock Relay, Gearmotor, HF Drive, Shock Damper, Power cylinder[™], Couplings, SCR variable speed motor and other like products manufactured by/for Tsubaki.

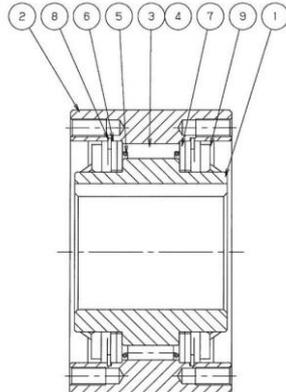
Constructions

BS30 to BS50



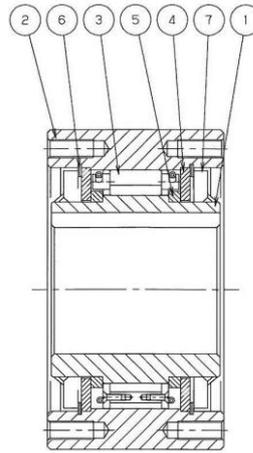
- ① Inner race
- ② Outer race
- ③ Cam
- ④ Roller
- ⑤ Spring
- ⑥ Plate
- ⑦ Snap ring
- ⑧ Oil seal

BS65 to BS75



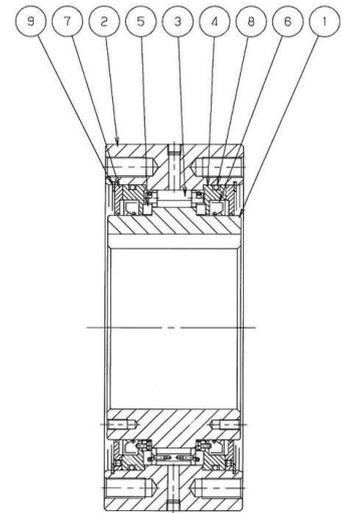
- ① Inner race
- ② Outer race
- ③ Cam
- ④ Roller
- ⑤ Spring
- ⑥ Plate
- ⑦ Thrust metal
- ⑧ Snap ring
- ⑨ Oil seal

BS85 to BS135



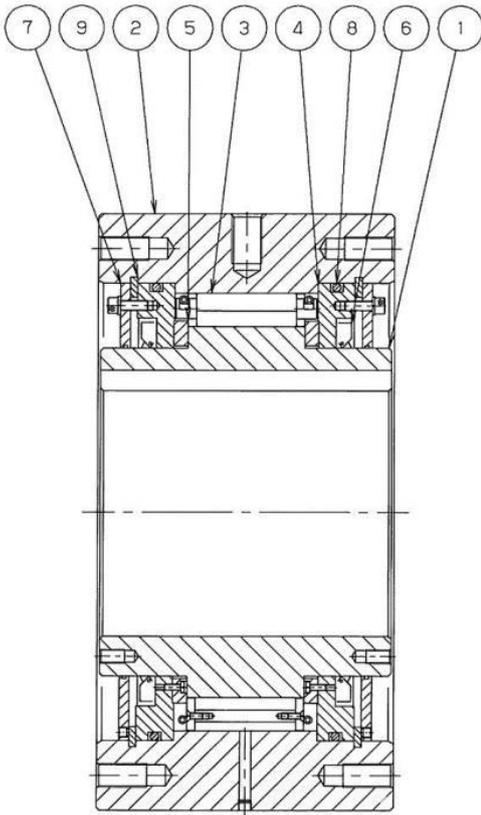
- ① Inner race
- ② Outer race
- ③ Cam cage
- ④ Plate
- ⑤ Thrust metal
- ⑥ Snap ring
- ⑦ Oil Seal

BS160 to BS200



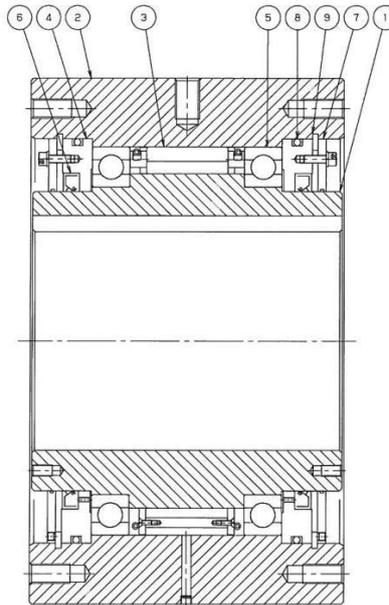
- ① Inner race
- ② Outer race
- ③ Cam cage
- ④ Seal supporter
- ⑤ Thrust metal
- ⑥ Oil seal
- ⑦ Grease fitting
- ⑧ O-ring
- ⑨ Snap ring

BS250 to BS450



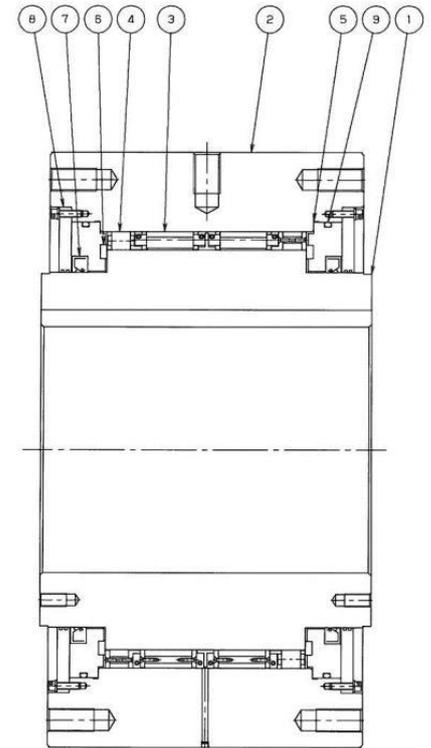
- ① Inner race
- ② Outer race
- ③ Cam cage
- ④ Seal supporter
- ⑤ Thrust metal
- ⑥ Oil seal
- ⑦ Grease fitting
- ⑧ O-ring
- ⑨ Snap ring

BS160HS to BS270 HS



- ① Inner race
- ② Outer race
- ③ Cam cage
- ④ Seal supporter
- ⑤ Bearing
- ⑥ Oil seal
- ⑦ Grease fitting
- ⑧ O-ring
- ⑨ Snap ring

BS300HS to BS450HS*



- ① Inner race
- ② Outer race
- ③ Cam cage
- ④ Roller cage
- ⑤ Seal Supporter
- ⑥ Thrust Bearing
- ⑦ Oil seal
- ⑧ Grease fitting
- ⑨ O-ring

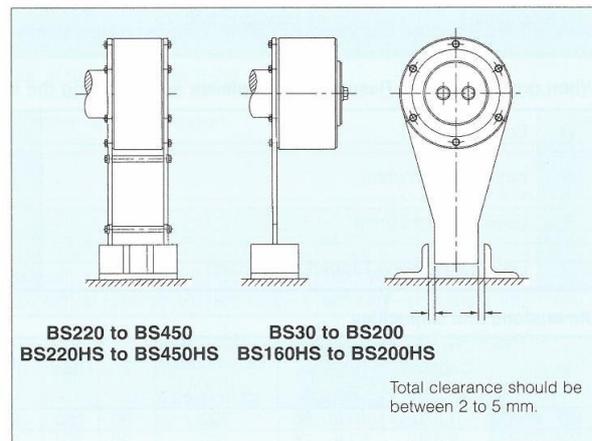
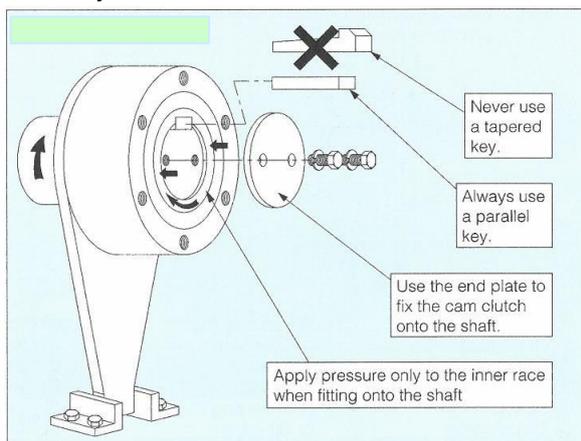
*This drawing shows the construction of BS425HS and BS450HS which has 2 lines Cam cages. There is the single line of Cam cage in BS300HS and BS350HS.

Installation and Usage

1. Recommended shaft tolerance is shown below.

Clutch Bore	Shaft Fit Guide
0 to 1.20 inches dia. 0 to 30mm dia.	Line fit to .0008 inches loose (0.020mm)
1.20 to 2.00 inches dia. 30mm to 50mm dia.	Line fit to .0010 inches loose (0.025mm)
2.00 to 3.15 inches dia. 50mm to 80mm dia.	Line fit to .0012 inches loose (0.030mm)
3.15 to 4.70 inches dia. 80mm to 120mm dia.	Line fit to .0014 inches loose (0.036mm)
4.70 to 7.10 inches dia. 120mm to 180mm dia.	Line fit to .0016 inches loose (0.041mm)
7.10 to 9.85 inches dia. 180mm to 250mm dia.	Line fit to .0018 inches loose (0.046mm)
9.85 to 12.40 inches dia. 250mm to 315mm dia.	Line fit to .0020 inches loose (0.051mm)
12.40 to 15.70 inches dia. 315mm to 400mm dia.	Line fit to .0023 inches loose (0.058mm)
15.70 to 17.72 inches dia. 400mm to 450mm dia.	Line fit to .0025 inches loose (0.064mm)

2. Before installation, verify that the direction of inner race rotation (shown by the arrow on the end face of inner race) is same as the shaft rotating direction of conveyor
3. Securely install the torque arm to Cam Clutch using bolts with a strength class of 10.9 grade or higher. Make sure the surface of torque arm that contacts the end face of outer race is flat and free of dust in order to get enough frictional force.
4. Apply pressure only on the end face of inner race when installing the BS Cam Clutch onto the shaft. Do not hit the inner race directly with a hammer or apply pressure on the outer race, oil seal, or grease fitting.
5. Always use a parallel key for installation onto the shaft and then fix the BS Cam Clutch to the shaft with the end plate. Never use a tapered key, otherwise the BS Cam Clutch will be damaged. The key should be in accordance with ANSI B17, 1-1967 (R 1998).
6. When installing models BS160HS or BS160 and above (grease lubrication types), place one the four socket plugs underneath the Cam Clutch. This will allow for easy drainage of the grease during maintenance.
7. The end tip of torque arm will swing to some extent while the conveyor is operating. Support the torque arm end tip only in the direction of rotation, but be sure to allow it a certain amount of free movement axially. (Refer to installation diagram). The Cam Clutch sustains damage if the torque arm end tip is fixed securely.
8. A single torque arm is sufficient for models BS30 to BS200, BS160HS and BS200HS. One torque arm on each side is required for models BS220HS to BS450HS and BS220 to BS450. It is recommended to use the standardized torque arm and safety cover for the BS Cam Clutch.

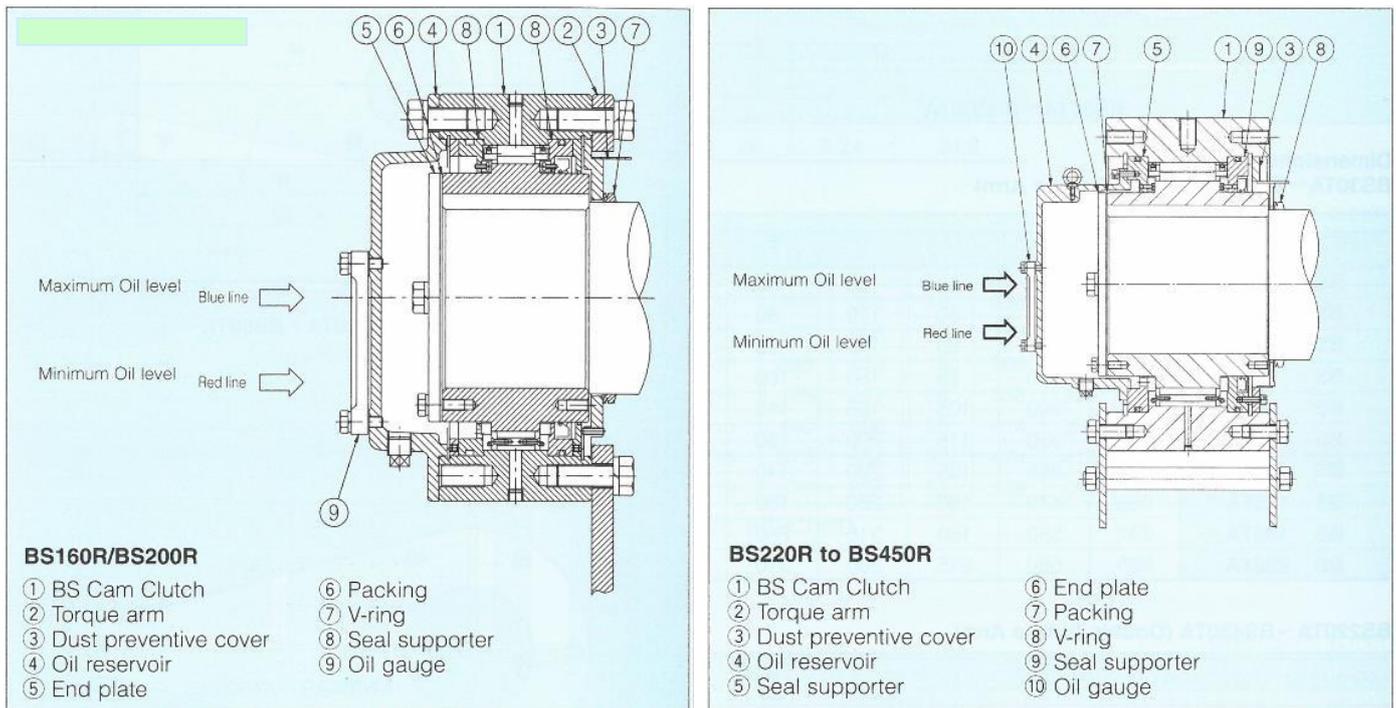


■ BS-R Series Installation Procedures

Pre-Installation

1. The oil reservoir and the end plate are fixed to the BS Cam Clutch temporarily when packed to prevent dust from entering during transportation. Carefully remove them from the clutch and prevent the dust from penetrating into the clutch.
2. For models BS160R to BS450R, apply grease in the space between the dust cover and the seal supporter. (The grease prevents the dust from entering.)
3. Attach the dust cover to the clutch.

4. Check whether the rotational direction of the conveyor shaft corresponds to that of the BS Cam Clutch viewed from the oil reservoir (the overrunning direction is shown as an arrow on the end face of the inner race).
5. Securely install the torque arm to the BS Cam Clutch using bolts with a strength class of 10.9 grade or higher. Make sure the surface of the torque arm which contacts the end face of the outer race is flat and free of dust, to ensure enough friction force is achieved.



Installation

1. Pre-insert the V-ring (except models from BS65R to BS135R) into the conveyor shaft in the correct direction.
2. Securely install the BS Cam Clutch onto the shaft. Apply pressure only on the end face of the inner race when inserting the BS Cam Clutch onto the shaft. Do not hit the inner race directly with a hammer or apply pressure on the outer race.
3. Apply the sealant supplied, to the end face of the inner race and packing, and fix the BS Cam Clutch unit to the conveyor shaft with the end plate. At same time, use the seal washer on each bolt to prevent oil leakage.
4. After cleaning the inside of the oil reservoir, apply the sealant on the mating face of the oil reservoir. Place the oil Level gauge vertically (red line is bottom, and blue is top), for model BS65R to BS200R; install the oil reservoir to the end face of the outer race with the bolts, while for models from BS220R and above; install the oil reservoir to the seal supporter using the bolts. Carefully prevent dust from penetrating the Cam Clutch or oil reservoir.
5. Press the pre-inserted V-ring entirely so that the face of the dust cover contacts closely.

■ Lubrication and Maintenance*

Series	Lubricant	Maintenance
BS	30 to 135	Grease. Pre-lubricated with grease. No lubrication maintenance required unless specified.
	160 to 350	Grease. Pre-lubricated with grease. Drain and clean inside of the Cam Clutch and inject new grease once a year.
	425, 450	Oil. Drain and clean inside of the Cam Clutch and inject new oil every 3 months.
BS-R	65R to 450R	Oil. Periodically check the oil level on the oil gauge. Drain and clean inside of the Cam Clutch and inject new oil once a year.
BS-HS	160HS to 450HS	Grease. Pre-lubricated with grease. Drain and clean inside of the Cam Clutch and inject new grease once or twice a year.

Oil lubricated Cam Clutches do not ship pre-lubricated. Inject the appropriate oil before use.

* Actual maintenance may vary depending on usage and operating conditions.

Recommended Grease for BS30 to BS350, BS160HS to BS450HS

Brand	BS Series Cam Clutch	BS-HS Series
Shell	Alvania Grease S1, Sunlight Grease 1 Aeroshell No.7, Aeroshell No.22	-----
Fiske Bros.	Lubriplate Low-Temp, Aero Lubriplate	-----
Kyodo Yushi	Multemp PS No.1	Emalube M
Petro-Canada	PRECISION Synthetic	PRECISION Synthetic

Notes: 1. Do not use grease that contains EP additives.

2. The ambient operating temperature range of the grease listed above is +20F (-5C) and +104F (+40C).

Please consult Tsubaki if operating outside of this range.

Drain the grease and clean the inside of BS and BS-HS Series Cam Clutch (Except BS425&450)

Discharge the grease

1. Wipe off the dust around the plug area on the outer race.
2. Remove the upper plug and loosen both side plugs.
3. Pour the proper amount of cleaning oil into the Cam Clutch with the weak pressure by using equipment like the "TSUBAKI maintenance kit". The quantity of cleaning oil for each model is shown in the table below.

Amount of cleaning oil for BS Series Cam Clutch

Size	BS160	BS200	BS220	BS250	BS270	BS300	BS335	BS350
OZ (Liters)	33.3 (1.0)	33.3 (1.0)	33.3 (1.0)	100 (3.0)	100 (3.0)	100 (3.0)	100 (3.0)	100 (3.0)

Amount of cleaning oil for BS-HS Series Cam Clutch

Size	BS160HS	BS200HS	BS220HS	BS250HS	BS270HS	BS300HS	BS350HS	BS425HS	BS450HS
OZ (Liters)	33.3 (1.0)	33.3 (1.0)	33.3 (1.0)	100 (3.0)	100 (3.0)	100 (3.0)	100 (3.0)	200 (6.0)	200 (6.0)

4. Fix the upper plug and tighten the side plugs and then keep operation the conveyor for two or three hours.

Re-clean

1. Remove the bottom plug, loosen the top plug and take oil out
2. Pour the cleaning oil with weak pressure from upper hole.
3. Cleaning process is complete when the oil discharge is transparency.

Re-charge the new grease

1. Attach the grease nipple to upper tap hole and loosen the one of side plug.
2. Charge the new grease with the grease gun. The amount of grease for each model is shown at next page.
3. Tighten the side plug and replace grease nipple with a plug.

Amount of grease for BS Series

Size	BS160	BS200	BS220	BS250	BS270	BS300	BS335	BS350
Lbs (kg)	0.26 (0.12)	0.31 (0.14)	1.76 (0.8)	2.43 (1.1)	2.65 (1.2)	2.87 (1.3)	3.09 (1.4)	3.31 (1.5)

Amount of grease for BS-HS Series

Size	BS160HS	BS200HS	BS220HS	BS250HS	BS270HS	BS300HS	BS350HS	BS425HS	BS450HS
Lbs (kg)	0.51 (0.23)	0.68 (0.31)	2.87 (1.3)	3.75 (1.7)	4.41 (2.0)	7.94 (3.6)	9.04 (4.1)	15.2 (6.9)	15.9 (7.2)

Recommended oil for BS425, BS450, BS65R to BS450R

Ambient temperature in Backstopping Applications	
+14 F to +86 F (-10 °C to +30 °C)	+86 F to +122 F (+30 °C to +50 °C)
Any Automatic Transmission Fluid (ATF) Shell Turbo Oil T32, Turbo Oil 68, Rimulla D oil 10W Exxon Mobil DTE Oil Light, Multipurpose ATF, Delvac Hydraulic 10W, ATF220 Teresso 32, Teresstic Oil 68, DTE Heavy Medium Texaco Regal Oil R&O 68, Chevron GST Oil 68 BP Rnergol THB32, Gulf Harmony 32	Exxon Mobil Delvac 1330, Essolube XT1 10W-30 Shell Rimulla D Oil 20W/20, Rimura D Oil 30 White Parrot Super S-3-20W-20, 30

Notes: Do not use oil that contains EP Additives.

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