

BS Series Cam Clutches



Model BS160HS-BS450HS Grease Lubricated

Installation & Maintenance



Thank you for buying Cam Clutch 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.
- Safety precautions in this manual are classified into two categories: "WARNING" and "CAUTION". These are defined as follows:

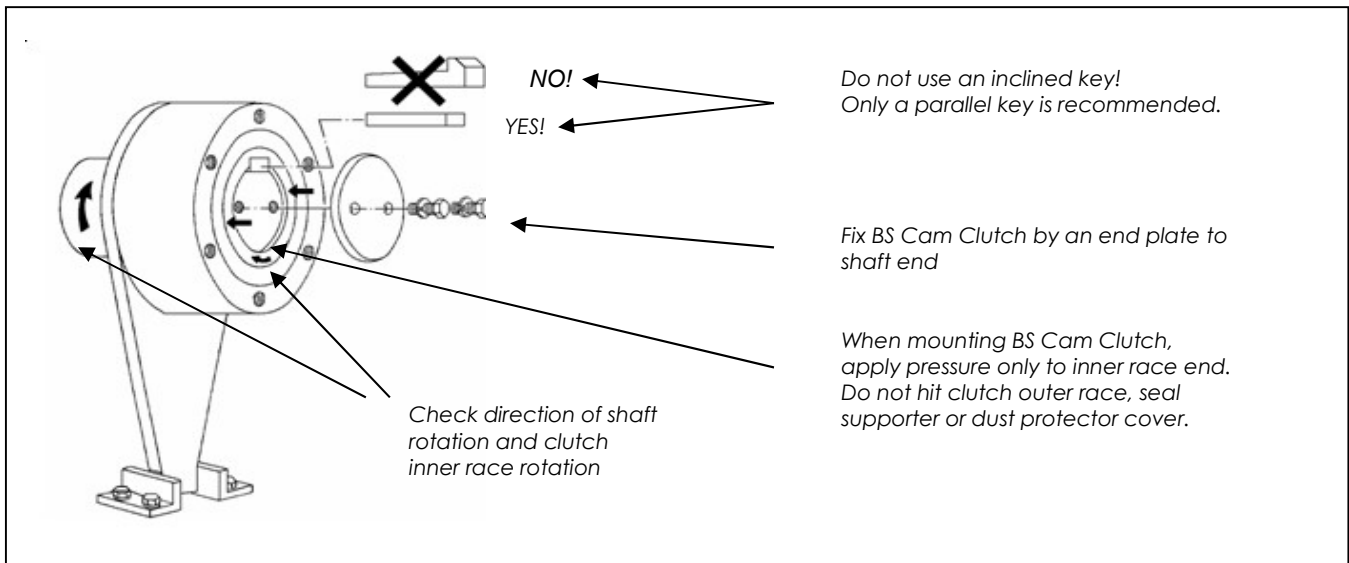
 WARNING	Death or serious injury may result from misusing the product without following the instructions.
 CAUTION	Minor or moderate injury, as well as damage to the product may result from misusing the product without following the instructions.

Notice that although categorized under "CAUTION", subjects discussed may lead to serious results depending on the situation.

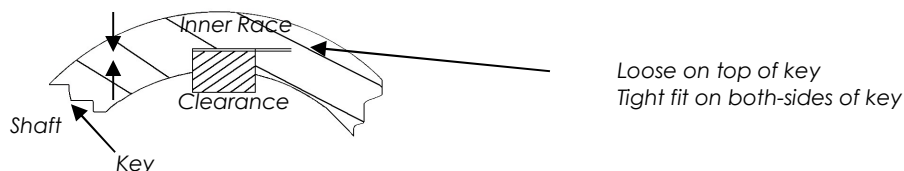
 WARNING
<ul style="list-style-type: none"> • Make sure turning forces are not applied to Cam Clutch or turning shaft of the equipment when conducting inspection or maintenance. • Pay special attention to the back stopping application to prevent accidents. • Frequent starting and stopping will apply excessive force on the mounting. Verify mounting strength. • Inaccurate installation and mounting, various load conditions, wear and tear of parts, and life expectancy can all affect the performance of a Cam Clutch. Inspect and maintain periodically and install a safety device on your equipment. • Comply with Ordinance on Labor Safety and Hygiene 2-1-1 general standards.
 CAUTION
<ul style="list-style-type: none"> • To ensure safety and optimal performance, carefully read this instruction manual in its entirety. • Confirm rotational direction prior to installing.

INSTALLATION

Clutch-Shaft



1. Before installation, check if the direction of shaft rotation is the same as the inner race of BS cam clutch, which is shown by an arrow mark on the inner race end.
2. Attach the torque arm on BS backstop using bolts. Use high-tensile bolts (Not less than 10.9). Refer to 'Page 3: Installation of Torque Arm'.
3. Recommended fit of bore to shaft is H8 (Clutch Bore) to h8 (Shaft) or H7 to h7 (Refer to Table below). Interference fit and shrink fit are prohibited for clutch fixing.
4. When mounting the BS cam clutch, apply pressure only to a clutch inner race. When tapping the inner race, use a soft hammer in order to avoid damage on the clutch inner race end. Do not hit the clutch outer race, seal supporter or dust protective cover with hammer.
5. Only a parallel key is recommended for clutch fixing. Do not use a tapered key. And there must be clearance between clutch keyway and key top.
6. Shaft is best machined with 'lead in' of $-0.1\text{mm} \times 15\%$ of the backstop width to facilitate the backstop being mounted with the keyway protruding into the 'lead in' for easy alignment.
7. Check key will slide through the backstop keyway and corner radius is clear for fitment.
8. In order to suppress the temperature rise of BS backstops and to extend the lubricant life, installation of a protective cover against direct sunlight is recommended.



Nominal Bore Dia. (mm)		Tolerance for Shaft (mm)		Tolerance for Clutch Bore (mm)	
		h7	h8	H7	H8
Above	30 up to 50	0 ~ -0.025	0 ~ -0.039	+0.025 ~ 0	+0.039 ~ 0
	50 ~ 80	0 ~ -0.030	0 ~ -0.046	+0.030 ~ 0	+0.046 ~ 0
	80 ~ 120	0 ~ -0.035	0 ~ -0.054	+0.035 ~ 0	+0.054 ~ 0
	120 ~ 180	0 ~ -0.040	0 ~ -0.063	+0.040 ~ 0	+0.063 ~ 0
	180 ~ 250	0 ~ -0.046	0 ~ -0.072	+0.046 ~ 0	+0.072 ~ 0
	250 ~ 315	0 ~ -0.052	0 ~ -0.081	+0.052 ~ 0	+0.081 ~ 0
	315 ~ 400	0 ~ -0.057	0 ~ -0.089	+0.057 ~ 0	+0.089 ~ 0
	400 ~ 500	0 ~ -0.063	0 ~ -0.097	+0.063 ~ 0	+0.097 ~ 0

INSTALLATION

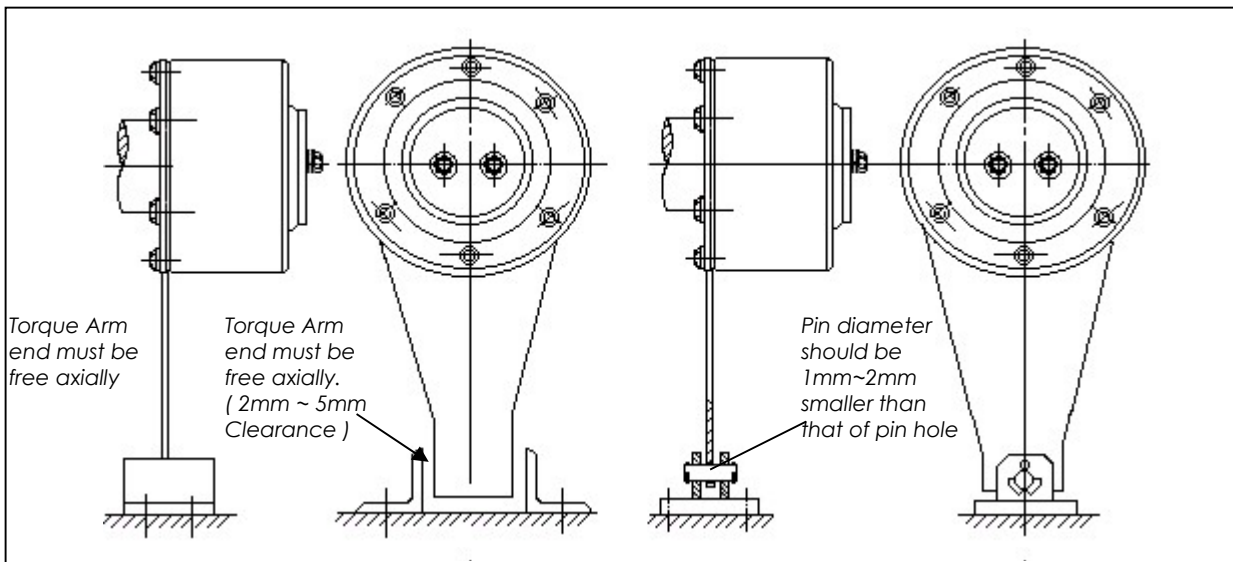
Torque Arm

Torque Arm Fixing

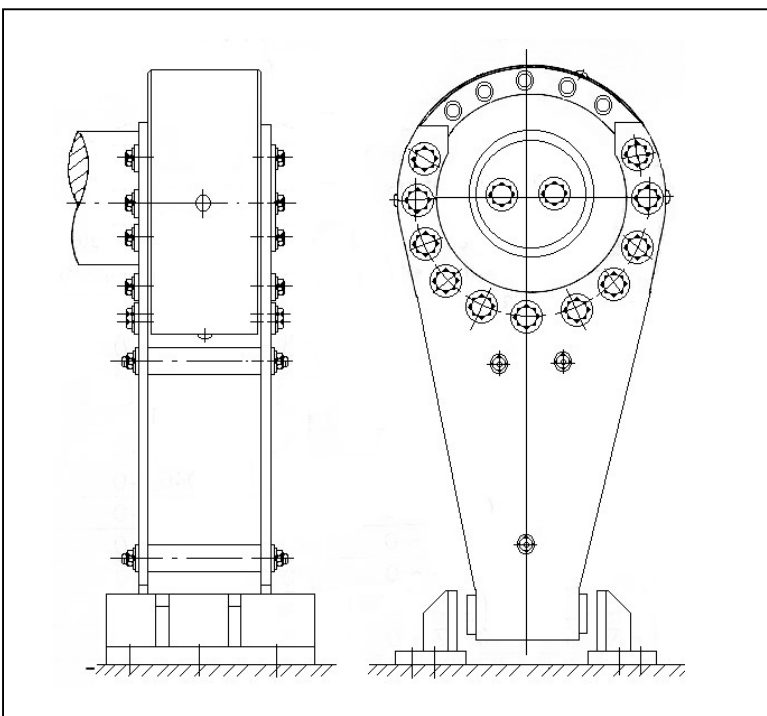
The end of torque arm shall be restrained to prevent rotation either by a pin or by a set of angle iron. (See illustration below). But the torque arm shall be free axially and radially in order to prevent the clutch from any load induced by misalignment and distortion.

For fixing by a pin, pin diameter should be smaller by 1 ~ 2 mm than that of pin hole on the torque arm end. Restraining brackets of torque arm shall be bolted rather than welded to the conveyor frame in order to install the torque arm correctly, and allow 2-5mm clearance between torque arm and restraining bracket.

For BS160HS through BS200HS



For BS220HS through BS450HS



Installation Notes:

1. Before mounting a torque arm onto the BS Backstop outer race, clean off contact-area of the torque arm and clutch outer race. Foreign particles, rust or oil should be cleared in order to get tight fixing of the torque arm to the BS backstop using bolts.
2. High-tensile bolts (Not less than 10.9) are recommended for torque arm fixing, and screw all bolts tightly to recommended torque for each size.

LUBRICATION & Maintenance

Check Items for Installation

Before delivery all clutches are carefully inspected to confirm temperature rise of the clutch is correct. Make sure the cam clutch is installed under an environment which the ambient temperature is less than 40°C. Check if the clutch is lubricated properly and/or installed correctly by monitoring the cam clutch running temperature, normally it would not exceed 130°C.

Noise Check

During operation if noise is heard by a noise-accentuator stick as continuous rumbling sound, this is normal and of no concern. If an abnormal variation in sound is heard the following points could be the cause:-

- (a) Installation problem with torque arm.
- (b) Extreme wear caused by poor lubrication.
- (c) Dust or metal pieces contaminating the oil.
- (d) Damage to inner race by extreme pressure at key fixing.
- (e) Internal dislodged by PRESSING AGAINST outer race

BS160HS-BS450HS – Grease lubrication

Grease is packed in the clutch before shipment but requires periodic maintenance as specified below.

Maintenance

- Periodic change of grease is necessary after 7,500 to 10,000 hours of operation. The actual operation time between changes should be decided after considering the operating conditions. Inject new grease after draining and cleaning inside of the BS Cam Clutch. The detailed procedure is described on the next page. When the grease is to be changed, be sure to drain and clean the inside of the BS Cam Clutch beforehand.
- Grease sampling should be taken @ regular 12 month intervals depending on environmental & contamination conditions. Additional grease replacement might be needed during sampling if excessive liquid is removed, replace at least 50% more by volume than lost. Removal of breather will provide access to fill the CORRECT grease type.
- **Approximate Amount of Grease Required**

Size	BS160HS	BS200HS	BS220HS	BS250HS	BS270HS	BS300HS	BS350HS	BS425HS	BS450HS
Grease	230gf	310gf	1300gf	1700gf	2000gf	3600gf	4100gf	6900gf	7200gf

- **Recommended Grease for ambient temperature range -10°C ~ +40°C**

Grease supplier	Product name
Kyodo Yushi	Emalube M

Note: Emalube M is available from Tsubaki and is **NOT** able to be mixed with other greases.

- **Air Breather Positions**

Size

Position of Air Breather (Hour Hand)

BS160HS to BS220HS

12:00 O'clock

BS250HS to BS350HS

22.5 degree from 12:00 O'clock

BS425HS to BS450HS

20 degree from 12:00 O'clock

Cleaning

- Remove the Torque Arm and wipe off dust around plugs.
- Remove two plugs one on the top, another on the bottom of the clutch.
- **Rotate the shaft** and pour cleaning oil (Kerosene) into the top plug in order to drain mixture of old grease and poured cleaning oil through the bottom plug.
- Quantity of cleaning oil necessary is : one charge about 1 litre for BS160HS to BS220HS
one charge about 3 litres for BS250HS to BS350HS
one charge about 6 litres for BS425HS to BS450HS

Important : After draining of the mixture of oil and old grease, stop the shaft rotation, otherwise damage could result.

- Attach the bottom plug and remove the side (level) plug. Pour cleaning oil again until the oil flows out from the side (level) plug.

Necessary quantity of cleaning oil as per chart.

Size	BS160HS	BS200HS	BS220HS	BS250HS	BS270HS	BS300HS	BS350HS	BS425HS	BS450HS
Litres	0.4	0.5	1.2	3.0	3.6	6.1	7.1	7.5	8.0

- Attach the side plug and **rotate the shaft** for 10 minutes (this is to drain old, remaining grease inside). **Stop the rotation of the shaft** and drain the contents.
- Repeat this procedure more than two times until all grease is completely removed.

Note: During shaft rotating, be sure to keep pouring oil. Before stopping oil supply, stop rotation of the shaft. If the clutch is rotated without lubricant, it may cause dry contact in the clutch.

Grease Injection

- Remove two plugs – one on top, another on bottom. Attach a grease nipple (thread size PT ¼ for BS160HS – BS450HS) on the top hole of the clutch.
- Inject grease by a grease gun until the grease comes out from the bottom plug hole.

Approximate amount of grease to be used is shown on previous page.

During this procedure **the shaft shall be stationary**, until recommended quantity is injected.

Remove the grease nipple and replace the original top and bottom plugs. Tighten all plugs of the clutch.

- After completion of grease change, rotate the shaft for 2 hours for test run in order to get good lubricating condition, **during this test run do not apply hold back torque on the clutch.**

Grease Purging for Dust Prevention

Only when the environment around the BS Cam Clutch is very dusty, grease change is necessary. It should be sufficient to inject grease until old grease flows out from under the grease plate, depending on environmental service condition.

Tsubakimoto Chain Co.: hereinafter referred to as "Seller"

Customer: hereinafter referred to as "Buyer"

Goods sold or supplied by Seller to Buyer: hereinafter referred to as "Goods"

1. Warranty period without charge

18 months effective the date of shipment or 12 months effective the first use of Goods, including installation of Goods to Buyer's equipment or machines - whichever comes first.

2. Warranty coverage

Should any damage or problem with the Goods arise within the warranty period, given that the Goods were operated and maintained under instructions provided in the manual, Seller would repair and replace at no charge once the Goods are returned to Seller. The following are excluded from the warranty.

- 1) Any costs related to removing Goods from the Buyer's equipment or machines to repair or replace parts.
- 2) Costs to transport Buyer's equipment or machines to the Buyer's repair shop.
- 3) Costs to reimburse any profit loss due to any repair or damage and consequential losses caused by the Buyer.

3. Warranty with charge

Seller will charge any investigation and repair of Goods caused by:

- 1) Improper installation by failing to follow the instruction manual.
- 2) Insufficient maintenance or improper operation by the Buyer.
- 3) Incorrect installation of Goods to other equipment or machines.
- 4) Any modifications or alterations of Goods by the Buyer.
- 5) Any repair by engineers other than the Seller or those designated by the Seller.
- 6) Operation in an inappropriate environment not specified in the manual.
- 7) Force Majeure or forces beyond the Seller's control such as natural disasters and injustice done by a third party.
- 8) Secondary damage or problem incurred by the Buyer's equipment or machines.
- 9) Defected parts supplied, or specified by the Buyer.
- 10) Incorrect wiring or parameter setting by the Buyer.
- 11) The end of life cycle of the Goods under normal usage.
- 12) Loss or damage not liable to the Seller.

4. Dispatch Service

Service to dispatch a Seller's engineer to investigate, adjust or trial test Seller's Goods is at the Buyer's expense.

5. Disclaimer

- 1) In our constant efforts to improve, Tsubakimoto Chain Co. may change the contents of this document without notice.
- 2) Considerable effort has been made to ensure that the contents of this document are free from errors. However, Tsubakimoto Chain Co. makes no warranties with respect to the accuracy of information described herein. In the mean time, we would appreciate comments or reports on any inaccuracies or omissions found in this document to help us make timely amendments as necessary. Your cooperation is greatly appreciated.



TSUBAKIMOTO CHAIN CO.

1-1, Kohtari-Kuresumi, Nagaokakyo

Kyoto 617- 0833, Japan

Website: <http://tsubakimoto.com/>

Global Associated Partners:

U.S. Tsubaki Power Transmission, LLC

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