

BS Series Cam Clutches

Model BS85F-BS465F Grease Lubricated

Installation & Maintenance

Thank you for choosing Tsubaki 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:

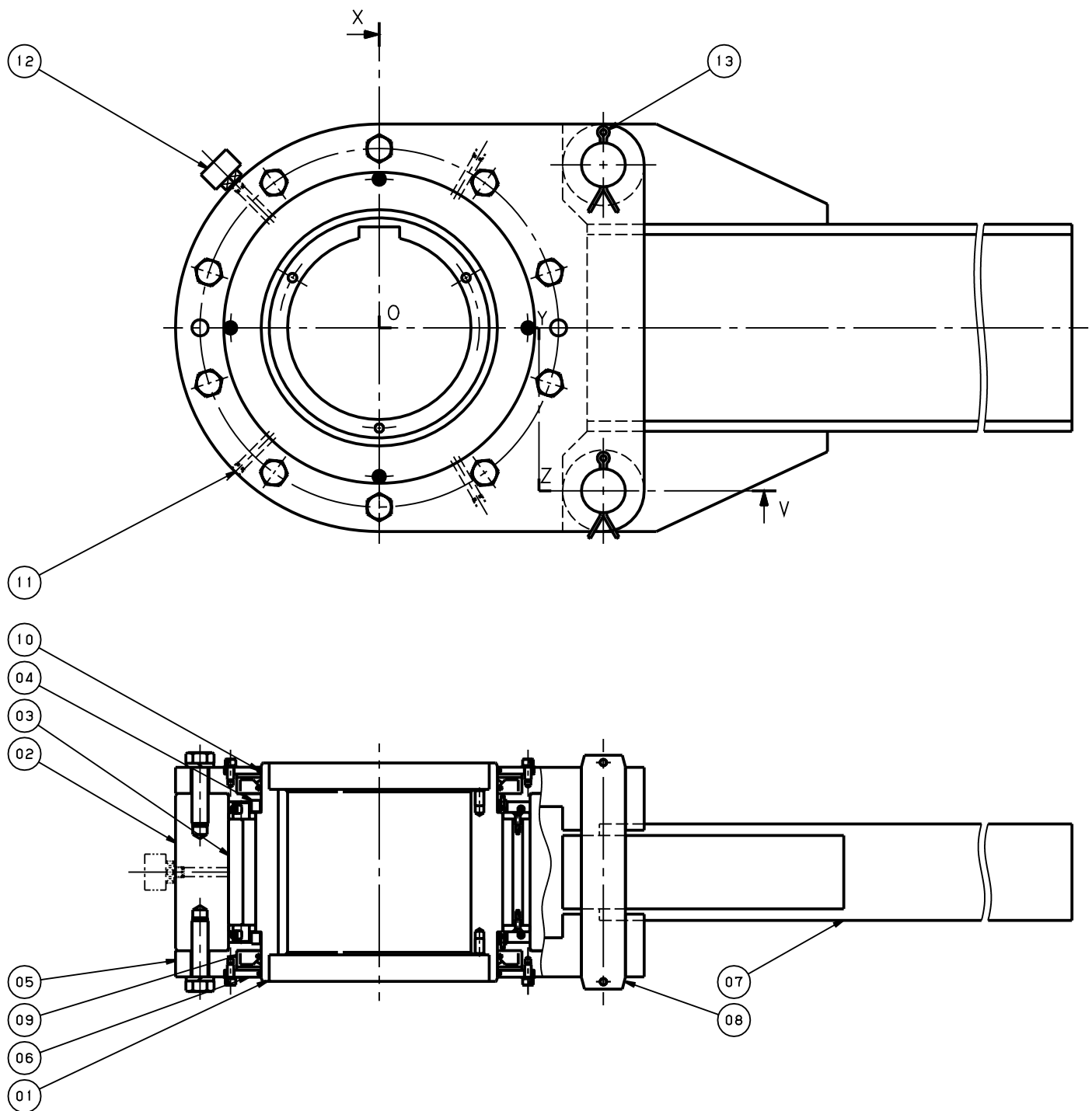
 WARNING	Death or serious injury may result from misusing the product without following the instructions.
 CAUTION	Minor or moderate injury, as well as damage to the product may result from misusing the product without following the instructions.

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

 WARNING
• Before installation on to the shaft, check the operational rotation direction of the shaft and make sure that it is the same as the overrunning direction of the BS Cam Clutch. • 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
• To ensure safety and optimal performance, carefully read this instruction manual in its entirety.

CONSTRUCTIONS

BS-F

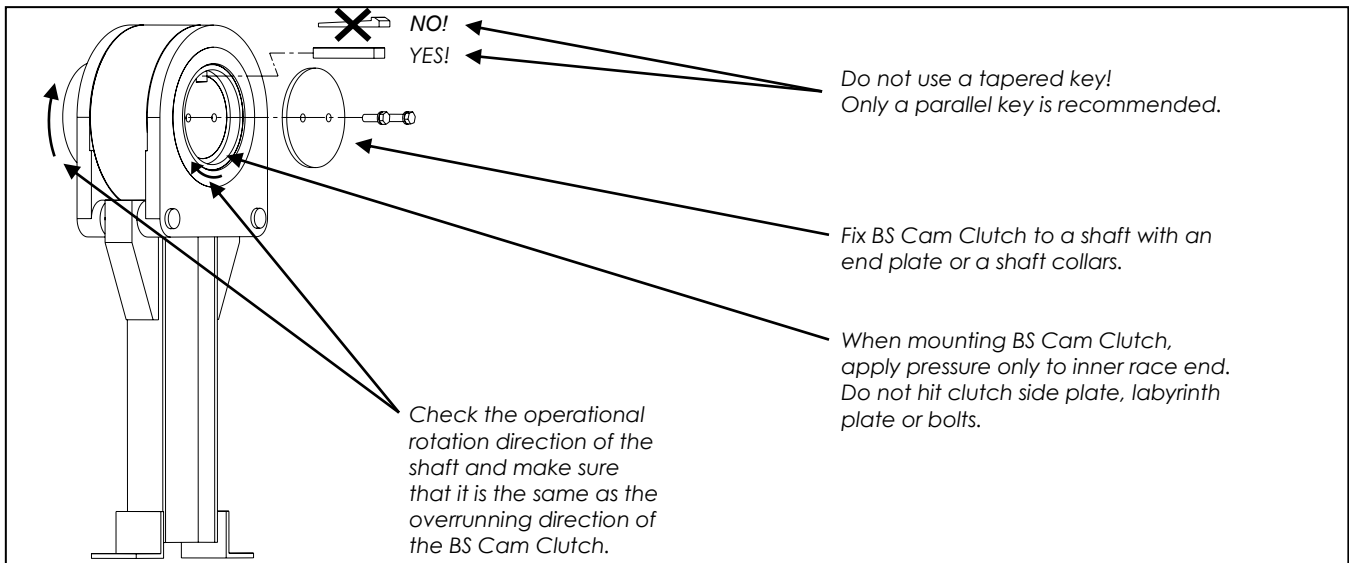


Parts name

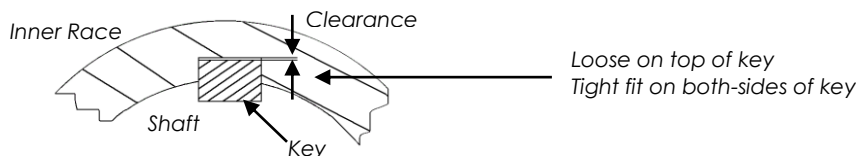
- | | | | | |
|--------------|-------------------|--------------|------------------|--------------|
| ① Inner race | ④ Thrust bearing | ⑦ Torque arm | ⑩ Labyrinth ring | ⑬ Cotter pin |
| ② Outer race | ⑤ Side plate | ⑧ Pin | ⑪ Socket plug | |
| ③ Cam cage | ⑥ Labyrinth plate | ⑨ Oil seal | ⑫ Air breather | |

INSTALLATION

Clutch-Shaft



1. Before installation on to the shaft, check the operational rotation direction of the shaft and make sure that it is the same as the overrunning direction of the BS Cam Clutch.
2. Securely install the torque arm to the BS Cam Clutch using furnished torque arm pins and cotter pins. Refer to 'Page 4: 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 side plate, labyrinth plate or bolts 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. The key should be in accordance with ISO R773 (DIN 6885.1) or ANSI B17, 1-1967 (R 1998).
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

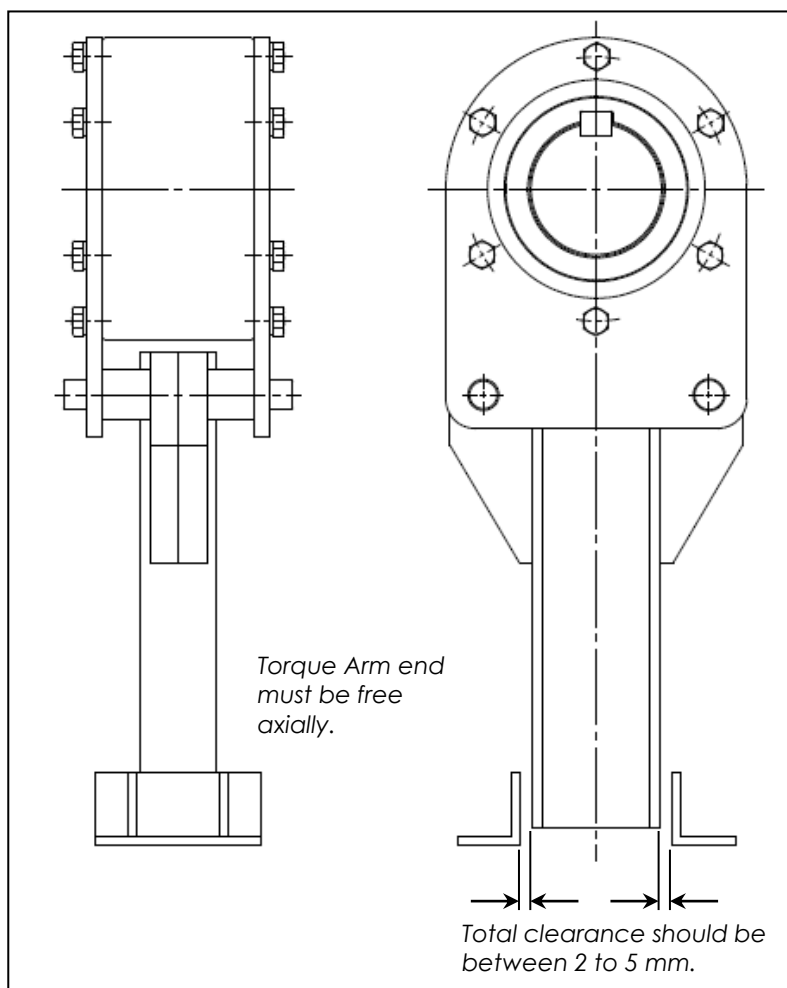
INSTALLATION

Torque Arm

Torque Arm Fixing

The end of torque arm shall be restrained to prevent rotation 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.

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.



LUBRICATION & Maintenance

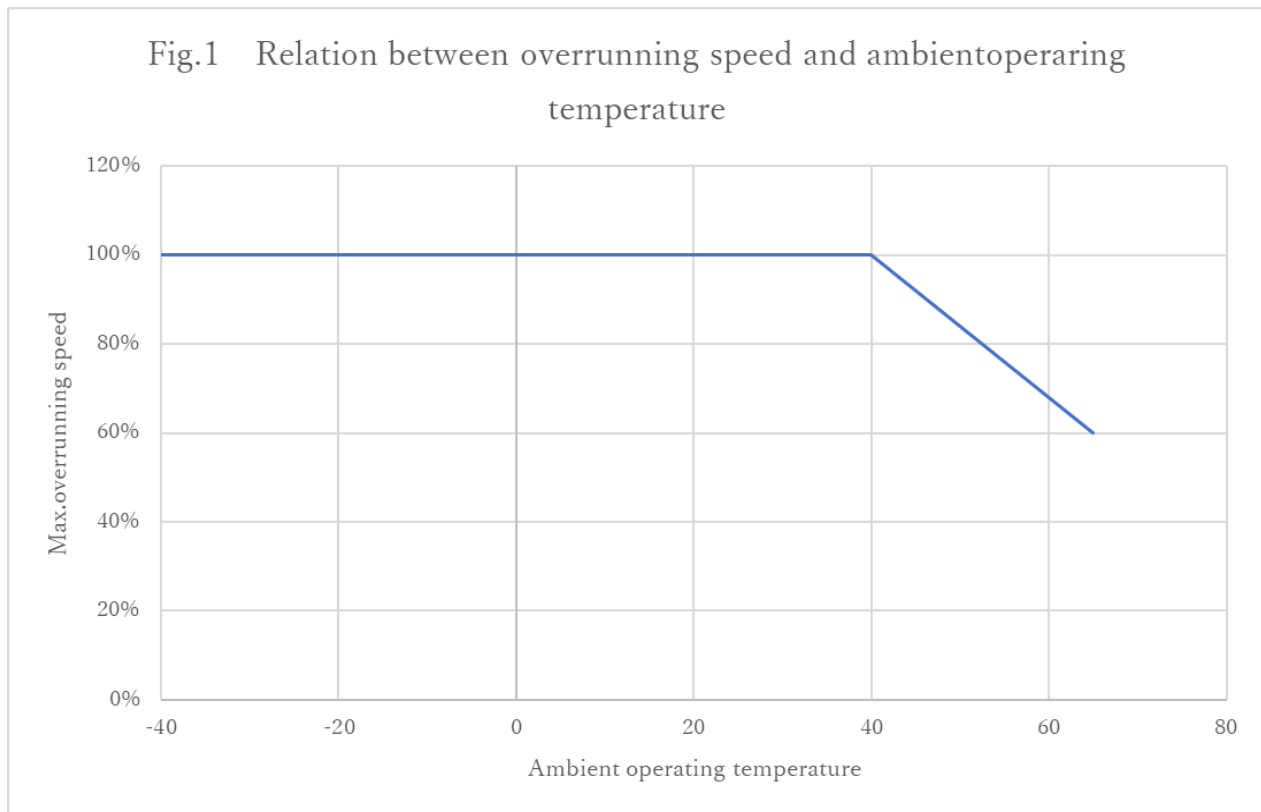
Check Items for Installation

Make sure the Cam Clutch is installed under an environment which the ambient temperature is within the range of -40°C to 65 °C.

Please refer to the fig.1 for max overrunning speeds with ambient temperatures between 40 °C and 65 °C.

Check if the clutch is lubricated properly and/or installed correctly by monitoring the Cam Clutch running temperature, normally it would not exceed 100°C.

Note: BS-F operating temperatures may surge at maximum overrunning speed. An adequate cooling device is required if BS-F operating temperatures exceed 100°C due to the heat emission of the driven equipment.



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 grease.
- (d) Damage to inner race by extreme pressure at key fixing.
- (e) Internal dislodged by PRESSING AGAINST outer race

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 at 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	BS85F	BS95F	BS115F	BS140F	BS165F	BS200F
g	65	75	105	150	160	190

Size	BS225F	BS250F	BS270F	BS300F	BS360F	BS425F	BS465F
kg	1.3	1.4	1.6	1.8	1.9	3.5	4.4

- **Recommended Grease for ambient temperature range -40°C ~ +65°C**

Grease supplier	Product name
Exxon Mobil	Beacon 325
	Mobilgrease 33

Note: Do not use grease that contains EP additives.

- **Air Breather Positions**

45 degree or less from 12:00 O'clock

Cleaning

- 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 BS85F to BS225F
one charge about 3 litres for BS250F to BS360F
one charge about 6 litres for BS425F to BS465F

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	BS85F	BS95F	BS115F	BS140F	BS165F	BS200F
Litres	0.1	0.1	0.2	0.3	0.3	0.4

Size	BS225F	BS250F	BS270F	BS300F	BS360F	BS425F	BS465F
Litres	1.3	2.9	3.3	4.2	4.8	5.6	7.0

- 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 1/4) on the top hole of the clutch.
- Inject grease by a grease gun.

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.**

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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
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 - 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.



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