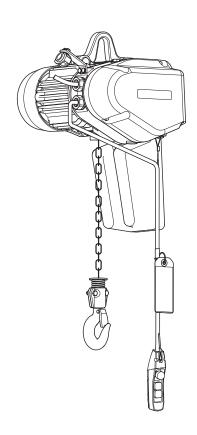


# EQ Series Electric Chain Hoist (125kg to 1t) for Single speed model

# **Owner's Manual**

Suspended Type (hoist only): EQ

Manual Trolley Type: EQSP



#### To Customer

- Thank you for purchasing KITO Electric Hoist (EQ).
- Operators and maintenance engineers are requested to read this manual.

  After reading, please keep this manual at hand for future use.
- This product is designed considering the environment protection. The product contains none of six hazardous substances specified by European RoHS Directives nor asbestos.

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# Introduction

This electric hoist EQ is designed and manufactured for the purpose to lift and lower a load within a normal work environment. The manual trolley is designed and manufactured for the purpose to move the lifted load laterally with the combination with the electric hoist.

Movement of a load in a 3D direction such as up/down, forward/backward and right/left is also enabled by combining with a crane.

This Owner's Manual is intended for those operating the KITO electric hoist EQ and maintenance engineers (\* pesonnel with expertise).

Other than this manual, Disassembly/Reassembly Manual is also available for the maintenance engineers. Assign the maintenance engineers and use these materials for inspection and repair. Please contact the nearest distributor or KITO for these materials.

\* A person who has a thorough knowledge of the structure and rolls concerning Electric chain block and is recognized as an expert by an entity.

# Disclaimer

- KITO shall not be liable for any damage incurred thereof due to natural disaster such as fire, earth quake
  and thunderbolt, conduct by third party, accident, willful conduct or negligence by customer, erroneous use
  and other use exceeding the operational condition.
- KITO shall not be liable for any incidental damage due to the use or non-use of the product such as the loss
  of business profit, suspension of business and damage of the lifted load.
- KITO shall not be liable for any damage arising from negligence of the contents in the Owner's Manual and the use of the product exceeding the scope of its specification.
- KITO shall not be liable for any damage arising from the malfunction due to the combination of the product with other devices in which KITO is not concerned.
- KITO shall not be liable to supply the spare parts for the product for which it has passed for 15 years since the discontinue of the product.

#### ■ Restriction on Use

- The product described herein is not designed or manufactured for transporting people. Do not use the product for that purpose.
- The product described herein is designed for the materials handling work such as lifting/lowering and traveling the load under ordinary operational condition. Do not use the product for the work other than materials handling work.
- Do not assemble the product into machinery not for materials handling, as a part of it.

# Operators

- Read carefully this Owner's Manual and the instruction manuals of related products, fully understand their contents, and the use and operate the product.
- Be sure to ware the proper clothing and protective equipment when using and operating the product.

#### Laws and Standards

Carry out installation, inspections, operations, maintenance management in accordance with the laws and standards of the country and region where the product is used.

An application before installation or a test before beginning usage may be required. Furthermore, the tester may be required to have specific qualifications. Be sure to check the laws and standards of the corresponding country and region before using the product.

# **Safety Precautions**

Improper use of electric chain hoist causes danger such as drop of lifted load. Read this Owner's Manual carefully before installation, operation and maintenance. Use the product after understanding the product knowledge, safety information and precautions.

This Owner's Manual classifies the safety information and precautions into three categories of "DANGER" "WARNING" and "CAUTION".

Also read the instruction manual of the device associated with electric chain hoist, and follow the described contents.

#### **Description of Signal Words**



#### **DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



#### **WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



#### **CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Further, the event described in CAUTION may result in serious accident depending on the situation. All three categories describe important contents. Please follow the instruction.

After reading, please keep this manual at hand for future use by the user.

#### **Description of Safety Symbols**



Means "Prohibited" or "You must not do".

Prohibited action is shown in the circle or described near the circle.

This Owner's Manual uses  $\bigcirc$  as the general prohibition.



Means "Mandatory Action" or "You must do".

Required action is shown in the circle or described near the circle.

This Owner's Manual uses 

as the general instruction.

# General Matters on Handling and Control

#### **DANGER**



- This product shall not be disassembled and repaird by personnel other than maintenance engineers.
   Other than this manual, Disassembly/Assembly Manual and Parts List are provided for the maintenance engineers.
   Perform the disassembling and repair by the maintenance engineer in accordance with these materials for maintenance.
- Do not modify the product and its accessories.

Failure to comply with these instructions may result in death or serious injury.



- Understand the contents of the Owner's Manual sufficiently. Then operate the Electric chain hoist.
- · Warning label is affixed to each part of the product. Follow the instruction described in the warning label.

#### **A** CAUTION



• Do not drag or drop the product when carrying.

Otherwise it causes damage or flaw of the electric chain hoist, bodily injury or loss of property due to the drop of the lifted load.



• When discarding the product, disassemble it not to be used and discard in accordance with the ordinances of local government or the rules specified by the business entity.

Ask the local government or the relevant section for the details.

Refer to "Disassembly/Assembly Manual" for disassembling, or contact KITO.

(This product uses oil. We prepare MSDS (Materials Safety Data Sheet) for the oil. Contact KITO for it.)

- · Carry out daily inspection by user.
- Carry out inspection (monthly, annual) by maintenance engineer.
- Keep the record of the inspection.

Failure to comply with these instructions causes bodily injury or loss of property.

# Chapter 1

# **Handling the Product**

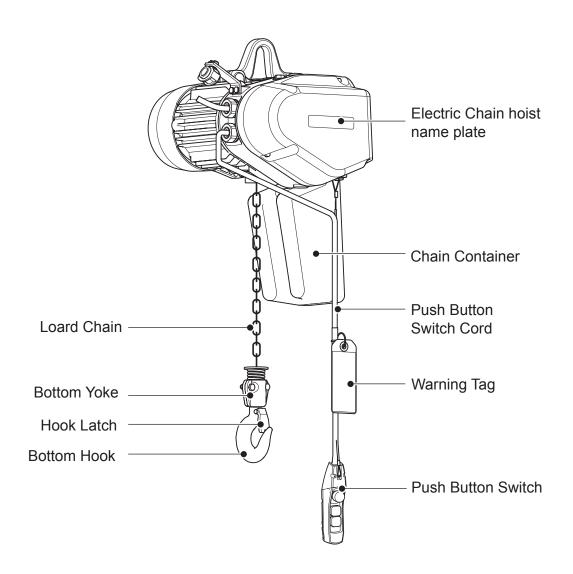
This chapter describes mainly how to use, assemble and install, and the check after installation. It also describes the daily inspection items before use.

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# **Type and Names of Each Part**

# ■Suspended Type (EQ)

• Electric chain hoist dedicated for elevation



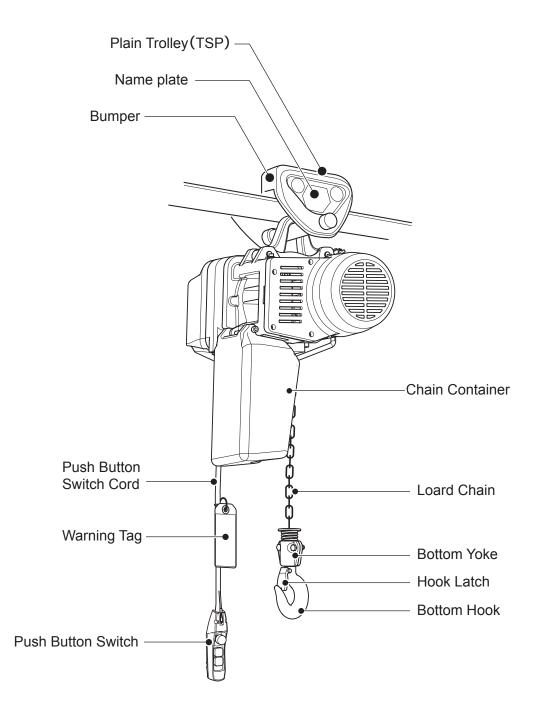
#### **MANGER**



• Warning labels are affixed to each part other than above. Be sure to follow the instructions in the label. Failure to comply with the contents of the label may result in death or serious injury.

# ■ Manual Trolley Type (EQSP)

• The electric chain hoist equipped with the plain trolley (TSP) enabling lateral motion by moving the load manually. For light work.



#### **⚠ DANGER**



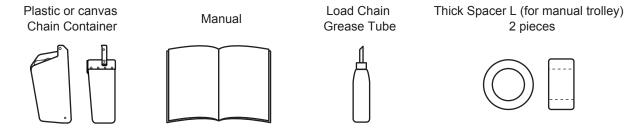
• Warning labels are affixed to each part other than above. Be sure to follow the instructions in the label. Failure to comply with the contents of the label can result in serious bodily injury or death.

# **Opening the Package**

# ■Checking the Product

- Make sure that the indication on the package and the product coincide with your order.
- Make sure that the product is not deformed and damaged due to the accident during transportation.

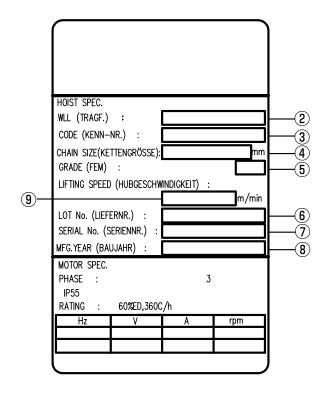
#### ■ Parts packaged with the Electric Chain Hoist



# Nameplate and Product Model

#### ■ Nameplate Indication of Electric Chain Hoist





① 🖂 · · · · Capacity Ex. 1 t

The maximum mass of the load that can be imposed on the product. The mass of the hook is excluded.

- ② WLL Ex. 1t
- ③ CODE...Product model Ex. EQ010S A code to indicate the model No. of the product, capacity and lifting speed.
- ④ CHAIN SIZE...Load Chain size Ex. DAT-7.1×19.9mm The alphabet and the figures indicate the JIS grade, wire diameter and chain pitch respectively.
- ⑤ GRADE(FEM)...Ex. M5 The grade of an electric chain hoist specified by ISO standard. A guidepost of durability.

#### 6 LOT No.

Manufacture No. to identify the time of manufacture and the quantity of a production unit.

SERIAL No.

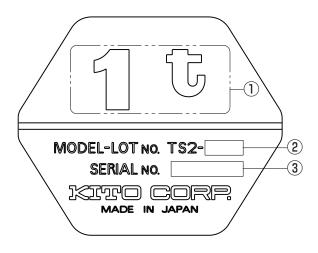
Serial No. to indicate the manufacturing sequence of the product.

- 8 MFG. YEAR...Manufacture year

#### ■ Code of EQ

Capacity	Body Size	CODE
125kg		EQ001S
250kg	EQ-C	EQ003S
500kg		EQ005S
1t	EQ-D	EQ010S

#### ■ Nameplate Indication of Manual Trolley



- ① \[ \text{The maximum mass of the load that can be imposed on the product.} \]
  The mass of the hook is excluded.
- ② LOT No.

  Manufacture No. to identify the time of manufacture and the production lot.
- ③ SERIAL No. Serial number to indicate the manufacturing sequence of the product.

# ■Checking the Marks

#### **↑** DANGER



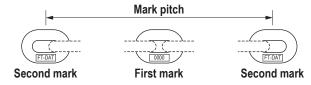
Mandatory

Be sure to check that the Load Chain has "FT-DAT" mark on it and the chain size is appropriate for the EQ
model you are using. (See the following table.) The Load Chain of other models (such as model ES or ER) or
different rating cannot be used.

Use of the Load Chain of other model or other rating may result in death or serious injury due to the drop of the lifted load.

Code of EQ	Load Chain size : diameter (mm)	Mark pitch
EQ001S		
EQ003S	5.6	20 Links
EQ005S		
EQ010S	7.1	20 Links

The mark (FT-DAT) to indicate the model of the Load Chain is indicated on it at an equal spacing. Make sure that the Load Chain is of a chain size (wire diameter) appropriate for EQ referring to the table in the left.



Front side : FT-DAT Back side : H-23

Front side : Original Lot No. of the

Load Chain (4 digits)

Back side: KITO

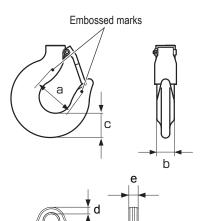
# ■ Recording the Product No.

- Fill in the table in the right with product's Lot No., Serial No. (described in the product nameplate), date of purchase and the name of the sales shop where you purchased the product.
  - \* When requesting repair or ordering a chain hoist part, please inform us of these pieces of information together.

Item	Electric chain hoist	Manual trolley
Lot No.	EQ-	TS2-
Serial No.		
Date of purchase		
Name of the sales shop		

# ■ Recording the Initial Value

 When opening the package, fill in the table in the right with the opening dimension "a" between embossed marks on the Bottom Hook, the width of the hook "b", the thickness of the hook "c", the thickness of the Suspension Eye "d", and the width "e". (These values are used for checking. See P54 for the inspection criteria.)



Dimensions when the package was opened

Bottom Hook  Suspension Eye	Dimension a	mm
	Dimension b	mm
	Dimension c	mm
	Dimension d	mm
	Dimension e	mm

#### Chapter 1 Handling the Product

# **Product Specification and Operational Environment**

The operational environment of the electric chain hoist is as follows:

#### ■Standard Specification

:EQ series (100 % of the capacity): Single speed model — 60 % ED (360 rev/h) :ISO-M5 or M4, FEM-2 or ASME-H4

Intermittent ratings Grade \* 1 Protection :Hoist IP55, Push button IP65

Operation... ..Push button switch operation / 3-Push Button Switch set for hoist only and Manual trolley type

Power supply method ...... Power supply through cabtyre cable

......Body: KITO Metalic gray, Controller Cover and Fan Cover: KITO Yellow (Equivalent to Munsell 7.2 YR 6.5/14.5) :EQ, single speed model 80dB or less (A scale: measured at 1 m away from the Electric chain hoist)

Noise level

Braking capacity :150% of the capacity or more

...Power Cable length 5 m/10 m (Standard) Other.....

Product category	Motor Insulation	Voltage range	Operating
1 roduct outogory	Class	50Hz	Voltage
400V Class	В	415V	AC24V

#### **NOTE**

- · Operate the electric chain hoist with the rated voltage.
- · Do not use the electric chain hoist exceeding the intermittent ratings.

#### \* Grade 1

	Code		GRADE	
Capacity	Cinalo anood	ISO	ASME	FEM
	Single speed	Single speed	Single speed	Single speed
125kg	EQ001S	M5	H4	2m
250kg	EQ003S	CIVI	Π4	2111
500kg	EQ005S	MA	H4	1 A m
1t	EQ010S	M4	П4	1Am

Loading		Total operating hours (hour)							
status	800	1600	3200	6300	12500	25000			
Light	_	_	_	M4	M5	_			
Medium	_	_	M4	M5	_	_			
Heavy	_	M4	M5	_	_	_			
Ultra heavy	M4	M5	_	_	_	_			

\* Rate of loading

A case where the capacity is rarely applied. Usually the

hoist is used with a light load.

Medium: A case where the capacity is applied considerably frequently. Usually the hoist is used with a medium load. A case where the capacity is applied considerably

frequently. Usually the hoist is used with a heavy load.

Ultra heavy: A case where the capacity is applied constantly.

#### ASME HST

		Operation time ratings at K=0.65				
Hoist duty class	Typical areas of application		distributed periods	Infrequent work periods		
		Max. on time, min / hr	Max. No. starts / hr	Max. on time from cold start, min	Max. No. of starts	
H2	Light machine shop fabricating, service,and maintenance; loads and utilization randomly distributed; capacitys infrequently handled.	7.6 (12.5%)	75	15	100	
НЗ	General machine shop fabricating, assembly, storage, and warehousing; loads and utilization randomly distributed.	15 (25%)	150	30	200	
H4	High volume handing in steel warehouses, machine shops, fabricationg plants and mills, and foundries; manual or automatic cycling operations in heat treating and plating; loads at or near capacity frequently handled.	30 (50%)	300	30	300	

**FEM**Comparison of ISO rating and FEM rating

Ī	1 Dm	1 Cm	1 Bm	1 Am	2 m	3 m	4 m	5 m
I	M1	M2	M3	M4	M5	M6	M7	M8

0			F	Rating	of the	e ope	rating	hours	3	
Condition	Rate of	V0.06	V0.02	V0.25	V0.5	V1	V2	V3	V4	V5
ition		T0	T1	T2	T3	T4	T5	T6	T7	T8
of the	loading		Avera	ge op	eratin	g hou	ırs pei	day	(hour)	
ē		≤0.12	≤0.25	≤0.5	≤1	≤2	≤4	≤8	≤16	>16
1 L1	K≤0.50	-	-	1Dm	1Cm	1Bm	1Am	2m	3m	4m
2 L2	0.50 <k≤0.50< td=""><td>-</td><td>1Dm</td><td>1Cm</td><td>1Bm</td><td>1Am</td><td>2m</td><td>3m</td><td>4m</td><td>5m</td></k≤0.50<>	-	1Dm	1Cm	1Bm	1Am	2m	3m	4m	5m
3 L3	0.63 <k≤0.80< td=""><td>1Dm</td><td>1Cm</td><td>1Bm</td><td>1Am</td><td>2m</td><td>3m</td><td>4m</td><td>5m</td><td>-</td></k≤0.80<>	1Dm	1Cm	1Bm	1Am	2m	3m	4m	5m	-
4 L4	0.80 <k≤1.00< td=""><td>1Cm</td><td>1Bm</td><td>1Am</td><td>2m</td><td>3m</td><td>4m</td><td>5m</td><td>-</td><td>-</td></k≤1.00<>	1Cm	1Bm	1Am	2m	3m	4m	5m	-	-

Rating code is FEM9.551

(Design rules of hoisting equipment for every series: classification rating of internal structure)

Rating opera	iting	Average operating hours per day (hour)	Total operating hours
V0.06 T0		≤0.12	200
V0.12	T1	≤0.25	400
V0.25	T2	≤0.5	800
V0.5 T3		≤1	1,600
V1	T4	≤2	3,200
V2	T5	≤4	6,300
V3	T6	≤8	12,500
V4	T7	≤16	25,000
V5	T8	>16	50,000

# Operational Environment

Ambient temperature : -20°C — +40°C

Gradient of rail : No gradient in travel rail (for the hoist with trolley)

Ambient humidity : 85 % or less (no condensation)

Explosion-proof construction: Not applicable to the work environment with explosive gases or explosive vapor Non-conforming environment: A place with organic solvent or volatile powder, and a place with a plenty of powder

and dust of general substances

: A place with considerable amount of acids and salts

#### **NOTE**

As a general rule, use the product indoors. When installing the electric chain hoist outdoors or to the place where the hoist is exposed to direct rain, wind and snow, shade the hoist with roof to protect it from rain, wind and snow.

# **How to Use**

KITO EQ type electric chain block has a product that can travel and traverse by combining with a trolley and a crane. Their push button switches for operation differ in the size and the operating method. Check the product model of the hoist and use it properly.

#### **⚠** DANGER



- Do not use the Hook without a Hook Latch or damaged Hook.
- . Do not use the Load Chain with heavy elongation, abrasion or deformation.
- . Do not cut, extend, or weld the Load Chain.
- Do not use the Load Chain with the Bottom Hook without smooth motion.
- Do not use the Load Chain when its brake does not function securely even without load, or when the stopping distance is too long.
- Do not use the product if it moves oppositely to the direction indicated on the push button switch.

Failure to comply with these instructions may result in death or serious injury.



Carry out daily inspection before operation.

(When any abnormality was found during inspection, turn off the power, indicate "FAILURE" and ask the maintenance engineer for repair.)

- · Check the slinging devices for no abnormality.
- The diameter of the Suspension Shaft hooked by Suspension Eye should be thinner than 31mm or less. Failure to comply with these instructions may result in death or serious injury.

#### **⚠** CAUTION



Do not use the product with an illegible nameplate or warning label affixed to the body size.

Failure to this instruction may result in the injury or the property damage.



- When using the product for the first time, affix the labels indicating East, West, North and South on the push button switches.
- Check the contents of the work and make sure that the electric chain hoist has proper performance for the load and lift.
- Check the contents of the work and operate the electric chain hoist at a place enabling to look out the operating area without hindrance.
- When looking out the operating area is difficult, arrange the monitor near the place for safety.
- Operate the electric chain hoist at a place with firm foothold without danger of falling, stumbling, slipping or over turning.
- · Before moving the load, warn all the surrounding people.
- Even if the crane or the electric chain hoist is permanently installed and used for the same purpose repeatedly, check the contents of the work and make sure that the work does not exceed the capacity on each occasion.
- Appoint the maintenance engineer or competent personnel among the qualified personnel for operation of cranes and electric chain hoists. Indicate the name of the personnel on a place with legibility.
- The maintenance engineers shall check the result of daily inspection.
- When informed of abnormality of the electric chain hoist, the maintenance engineers shall take immediately any necessary measures such as prohibition of use and repair.
- . When carrying out inspection and repair, secure the environment for safe work without electric shock and falling.

Failure to comply with these instructions may result in bodily injury or property damage.

# ■ Daily Inspection of Electric Chain Hoist (EQ)

#### **M** DANGER



Carry out daily inspection before use.

(When any abnormality was found during inspection, turn off the power, indicate "FAILURE" and ask the maintenance engineer for repair.)

Neglecting to carry out daily inspection may result in death or serious injury.

#### ■ Appearance

Item	Check method	Criteria	When failed
Indication of Nameplates and Labels	Check visually.	No peel off. Indication can be seen clearly.	Carry out cleaning, repair or replace with new nameplate or label. When replacing with a new nameplate or label is required, please inform KITO of the description in "Recording of the Product No." (P13 ) such as Lot No. and Serial No.
Deformation and damage of main unit and each part	• Check visually.	No apparent deformation, damage, flaw and crack	Replace the parts with deformation, damage, flaw or crack.
Loosened or fallen off bolts, nuts and split pins	Check visually or using tools.	Bolts, nuts and split pins are fastened securely.      DANGER     Even fallen off of a bolt causes for the body size to drop. Be sure to check.  Fallen off of a bolt may result in death or serious injury.	Fasten bolts, nuts and split pins securely.

# ■ Load Chain

Item	Check method	Criteria	When failed
Elongation of Pitch	Check visually	No apparent elongation	Refer to Load Chain (P61) of Chapter 2, Frequent inspection.
Abrasion of Wire Diameter	Check visually	No apparent abrasion	Refer to Load Chain (P61) of Chapter 2, Frequent inspection.
Deformation, Flaw, Entanglement	Check visually     Flaw Crack     Check visually for no foreign matter such as attached sputter.	No deep notch No deformation such as twist No attached sputter No entanglement No crack	Replace the Load Chain.
Rust, Corrosion	Check visually	No apparent rust and corrosion	Replace the Load Chain.
Lubrication	Check visually	To be oiled adequately	Apply oil.
Mark	Check visually	Check the mark pitch and the indication. (Refer to "Checking the Marks" (P15).)	Replace the Load Chain.

# ■ Suspension Eye and Bottom Hook

Item	Check method	Criteria	When failed
Opening of the Hook	Check visually	No apparent opening of the Hook	Carry out the inspection item of Suspension Eye and Bottom Hook (P62) of Frequent inspection.
Abrasion	Check visually	No apparent abrasion	Carry out the inspection item of Suspension Eye and Bottom Hook (P62) of Frequent inspection.
Deformation, Flaw, Corrosion	Check visually	No apparent deformation, flaw and corrosion	Carry out the inspection item of Suspension Eye and Bottom Hook (P62) of Frequent inspection.
Hook Latch	Check visually and check     the movement of the Hook     Latch.	The Hook Latch is mounted securely inside the Hook opening. No deformation. The Hook Latch moves smoothly.  DANGER  Do not use the Hook without the Hook Latch.  Use of the Hook without the Hook Latch may result in death or serious injury.	Replace the Hook Latch.
Hook movement (Rotation)	Check visually and rotate the Hook by hand.  Neck	<ul> <li>No apparent gap between the Bottom Yoke and the shank (at the neck).</li> <li>The Bottom Yoke rotates in both directions equally.</li> <li>The Bottom Yoke rotates smoothly.</li> </ul>	Replace the Hook.
Bottom Yoke	Check visually	No loosened bolt or nut	Attach the Bottom Hook to the Load Chain securely.

# ■ Peripheral parts of the main unit

Item	Check method	Criteria	When failed
Chain Spring	Check visually	No apparent shrinkage or compression	Carry out the inspection item of Chain Spring (P69) of Periodic inspection.
Cushion Rubber	• Check visually  Cushion Rubber  Stopper	No apparent shrinkage or compression     No peal off, crack of deformation of rubber  Rubber Steel plate	Replace the Cusion Rubber.

# ■ Push Button Switch

Item	Check method	Criteria	When failed
Switch set	Check visually	No deformation, damage and no loosened screw     Label indication of the push button switch can be seen clearly.	Clean and repair the label or replace with a new label. Affix the label securely.

# **■** Function and Performance

• Check the following item with no load.

Item	Check method	Criteria	When failed		
Operational Check	Press the push button and check each operation.	<ul> <li>The Load Chain can be wound smoothly.</li> <li>The Electric chain hoist moves in the same direction as that of the push button operation.</li> <li>When the operation is stopped, the motor stops immediately.</li> <li>When the Emergency Stop Button is pressed, all hoist motions stop.</li> <li>When operating other push button while the Emergency Stop Button is pressed, the hoist does not start operation.</li> <li>When canceling the Emergency Stop Button, the hoist operates normally.</li> </ul>	Refer to Chapter 3 "Guidance on Troubleshooting" (P86).		
Brake	Press the push button and check the operation of the Brake.	When stopping the operation, the Brake is applied immediately and the Bottom Hook shall stop immediately.  (Guideline: The travel of the Load Chain is within 2 to 3 links.)	Carry out the inspection in accordance with the items in Chapter 2 "Periodic inspection" Electromagnetic Brake (P71).		
Limit Switch	Press the push button and check the operation of the Limit Switch.	When the hoist is operated to the upper or lower limit, the motor automatically stops.	Replace the Limit Switch.  Disassemble the actuator of the Limit Switch to clean.		
Check for no Abnormal Sound	Press the push button and check the operation.      NOTE  Sound is also an important	No abnormal sounds and vibrations	Replace the abnormal part. Apply oil on the Load Chain.		
	check point. Always be careful for the noise of the electric chain hoist.	No popping sound from the Load Chain.	Check the Load Chain. (Refer to P18 .)		

# ■ Daily Inspection of Manual Trolley (EQSP)

#### ■ Appearance

Item	Check method	Criteria	When failed
Indication of Nameplates and Labels	Check visually	No peel off. Indication can be seen clearly.	Clean and repair the label or replace with a new label.
Deformation and damage of each part	Check visually	<ul> <li>No apparent deformation and corrosion</li> <li>No apparent deformation on the Frame</li> </ul>	Replace the deformed or damaged part.
Loosened or fallen off bolts, nuts and split pins	Check visually or using tools.	Bolts, nuts and split pins are fastened securely.      DANGER     Even a drop off of a split pin may cause of drop of the main unit. Be sure to check it.  Drop off of split pin may result in death or serious injury.	Fasten bolts, nuts and split pins securely.

#### **■** Function and Performance

• Check the following item with no load.

Item	Check method	Criteria	When failed
Operational Check	Check the traveling motion of the electric chain hoist by moving it manually.	To travel smoothly. No meandering and vibration.	Carry out Chapter 2 "Periodic inspection".

# ■ How to Operate the Push Button Switches

#### **CAUTION**



- Do not hang the Push Button Switch Cord on other object, or pull the cord strongly.
- Do not use the Push Button Switch if its button does not operate smoothly.
- Do not bundle or tie the cord for the adjustment of its length.

Failure to comply with this instruction causes bodily injury or loss of property.

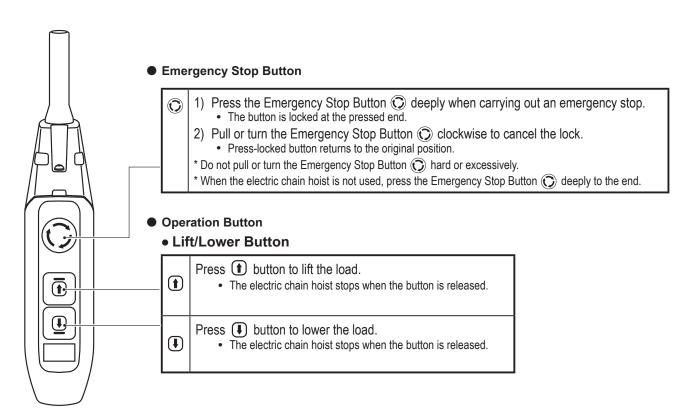


- When taking hand off the Push Button Switch after operation, do not throw it. Be careful not to hit other worker with the Push Button Switch.
- When starting operation of the hoist after stopping the hoist by pushing the Emergency Stop Button, be sure to confirm there are no hazards around the workplace before releasing the lock of the Emergency Stop Button and starting operation.

Failure to comply with this instruction causes bodily injury or loss of property.

#### ■ 3-Push Button Switch Set

3-Push Button Switch Set is equipped with a lock type emergency stop button and lift/lower push buttons.



# Operation

#### ■ General

#### **⚠ DANGER**



Do not operate the electric chain hoist in an environment with flammable or explosive gas.
 The electric chain hoist is not designed as explosion proof specification.

- Do not use the electric chain hoist exceeding the ratings (intermittent rating) of the lifting motor and the maximum start-up frequency.
- Do not use the electric chain hoist by the voltage other than the rated voltage.
- Do not use the Emergency Stop Button for ordinary stop operation.
- . Do not expose the Load Chain to sparks from welding.
- Do not contact welding rods or electrodes with the Load Chain.
- . Do not use the Load Chain as the earth for welding work. (Fig. A)

Failure to comply with these instructions may result in death or serious injury.







· Follow the operating environment and conditions for the electric chain hoist.

Failure to comply with this instruction may result in death or serious injury.

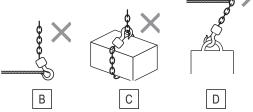
#### ■ Slinging

#### **⚠** DANGER



- Do not apply a load to the tip of the Bottom Hook or the Hook Latch. (Fig. B)
- Do not bind a load with the Load Chain directly. (Fig. C)
- Do not operate the Load Chain while it is in contact with any sharp edges. (Fig. D)

Failure to comply with these instructions may result in death or serious injury.





- Use the sling appropriate for the weight and shape of a load.
   Inappropriate slinging may result in danger such as drop of a lifted load.
- Carry out the slinging with equal load on slinging devices for stable lifting of a load.
- Attach the slinging devices securely to a load.
- Attach the slinging devices to the Bottom Hook correctly.

#### ■ Lifting / Lowering

#### **↑** DANGER

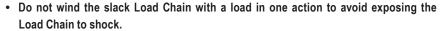


• Do not lift more than the capacity. (Fig. E)
The capacity is indicated in the nameplate.

- Do not operate the electric chain hoist exceeding the lifting height.
- Do not dare to lift the structure or any other object supposed to be difficult to lift.
- · Do not lift a load at no-load side of the Load Chain.
- Do not stop the electric chain hoist with the limit switch (over winding prevention device).
- Do not use the electric chain hoist when the Friction Clutch (overload prevention device) is operated to stop winding.
- · Do not lift or lower excessively.
  - Do not remove the Chain Spring to operate the limit switch by hitting the body size with the Bottom Hook. If such stop operation is repeated, it may result in breaking of the Load Chain
  - Do not hit the body size with the End Stopper of the Load Chain to cause the operation
    of the Friction Clutch. If such operation is repeated, it may result in breaking of the Load
    Chain.







Stop lifting when the Load Chain is stretched tight. Then lift slowly.

Do not carry out reverse operation while lifting/lowering a load.
 When reversing the motion, stop the electric chain hoist and then reverse the motion.

- · Do not carry out excessively frequent inching.
- · Do not carry out plugging.

When reversing the motion, stop the electric chain hoist and then reverse the motion.

- When lifting off a load from a pallet, lift the load to avoid exposing to shock, such as the load falling. (Fig. G)
- Do not cause the load to come into contact with the Load Chain.
- Do not rotate a lifted load. Use the device for rotation.
- · Do not carry out the welding or cutting work on a lifted load.
- Do not repair or disassemble a lifted load.

When repairing or disassembling an electric chain hoist, ensure that the product is placed down on the floor and that only maintenance engineers maintain the electric chain hoist.

- Do not enter beneath a lifted load.
- Do not hit the Chain Container with a load or slinging devices.

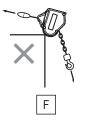
  Otherwise the Load Chain in the Chain Container falls out of the bucket to cause injury.
- Do not leave from the operating position while a load is lifted. Watch the lifted load.

Failure to comply with these instructions may result in death or serious injury.



- When the limit switch (over winding prevention device) is operated, stop the lifting work immediately and lower the load.
- Move the electric chain hoist right above the load and then lift the load. (Do not lift the load in an inclined direction.) (Fig. H)









#### **CAUTION**



• Do not use the Friction Clutch to measure the weight of a load.

The use of the Friction Clutch other than intended purpose may result in injury or property damage.



- When carrying a lifted load using a lifting magnet or a vacuum chuck, lower the height of the lifted load as low as possible.
- When lifting a load with two electric chain hoists, use the electric chain hoist with the rated lifting capacity of a single hoist exceeding the load.
- When lifting a load with two electric chain hoists, use the electric chain hoists of the same model and capacity and operate the respective electric chain hoist to keep the load lifted or lowered horizontal.

Failure to comply with this instruction causes bodily injury or loss of property.

#### ■ Traverse / Travel

#### **⚠** DANGER



- Do not operate the electric chain hoist underneath the load or transport a load over people. (Fig. I)
- Do not operate the electric chain hoist when any person is in the area where the lifted load moves.
- Do not allow people to enter into the area where a lifted load moves.
- Do not ride on a lifted load and do not use the electric chain hoist to support, lift, or transport people. (Fig. J)
- Do not strike the stopper or the structure by the main unit or the trolley.
- Do not operate or move the electric chain hoist while going backward with a load kept lifted.
   Operate the electric chain hoist while looking forward from the back of a load and going ahead.

Failure to comply with these instructions may result in death or serious injury.

#### **CAUTION**



• Do not impede the lifted load with other structure or wiring.

Failure to comply with this instruction causes bodily injury or loss of property.



• If the Load Chain and the hand chain of the geared trolley are entangled, stop the operation immediately and reset the entangled chains.

Failure to comply with this instruction causes bodily injury or loss of property.

#### ■ In Abnormality or Failure

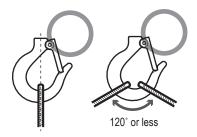
#### **⚠ DANGER**



- · If the electric chain hoist is damaged or abnormal noise or vibration occurs, stop the operation immediately.
- If the electric chain hoist moves in the direction opposite to the indication on the Push Button Switch, stop the operation immediately.
- When the twist, entanglement, crack, deformation, attachment of foreign matters or abnormal engagement of the Load Chain and the Gear is observed, stop the operation immediately.
- When any abnormality is observed during the operation, indicate "FAILURE" and contact with the maintenance engineers.
- When the power is interrupted, secure safety and contact with the maintenance engineers.



# ■How to Sling the Load Properly



Sling the load at the extended line of the hook shaft.

Do not carry out dangerous hooking as shown below.



Improper hooking position of the lifted load or the sling



Angle exceeding 120°
Angle too wide



Unable closing of the Hook Latch



Hooking of the load at the tip of the Hook

# ■How to Suppress the Swinging of a Load

#### **↑** DANGER



Do not move the electric chain hoist with a load hung at one side of the Crane Saddle.

Otherwise the load swings and hits a person or object or drops to result in death or serious injury.

- Swinging of a load makes it difficult and dangerous to move the trolley. The basics of operation are not to make a load swing. To do that keep the following instructions.
- Do not lift a load in an inclined direction.
- Start slowly when traveling the load.
- Do not lift suddenly.

Even if you keep the above instructions, the lifted load may swing at the start and the stop of the electric chain hoist. Following operation can reduce the swing of the lifted load.

#### ■Precautions After Work

#### **CAUTION**



• Do not store the electric chain hoist at a state of over lifting or over lowering.

Failure to comply with these instructions causes bodily injury or loss of property.



- · Store the electric chain hoist with power off.
- Indicate "FAILURE" on the electric chain hoist that needs repair not to be used.
- · Wipe off dust and waterdrop, apply oil at the neck of the Hook and the Load Chain and store the hoist.
- Remove the stain, attached foreign matter and waterdrop from the parts such as the Limit Switch and the Chain Container that is scratched by the Load Chain and stored it.
- When the electric chain hoist is installed outdoor, cover it with rain cover or roof after application of rust proof process.

Failure to comply with these instructions causes bodily injury or loss of property.

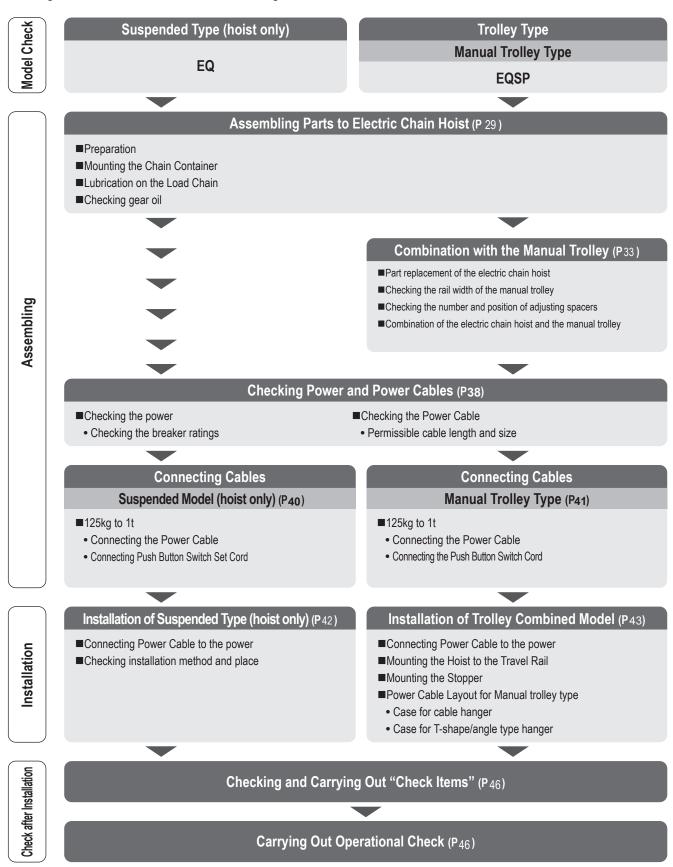
#### **NOTE**

- Clean the push button switches always not to allow the dust, sands and oil attach.
- When storing the electric chain hoist for a long period, it is effective to prevent rusting to operate it at a certain period without load.
- When putting the electric chain hoist on a floor, remove the Chain Container.
   Otherwise the Chain Container may deform or be damaged.
- . When not using the electric chain hoist, wind up the Bottom Hook to the height not to hinder persons passing by or other work.
- Decide the place to store the electric chain hoist in advance. It is recommended to hang the push button cable on the pillar.

#### Chapter 1 Handling the Product

# Work Flow of Assembling and Installation

The contents of the work to assemble and install the product by the maintenance engineers and installer are described from this page and after. To eliminate the redo work and for effective assembling and installation, please check the following work flow first and then start assembling and installation work.



# **Assembling**

#### **⚠** DANGER



 Only maintenance engineers or the personnel with expertise are allowed to assemble and disassemble the electric chain hoist.

Assembling or disassembling of the electric chain hoist may result in death or serious injury.

# ■ Assembling Parts to Electric Chain Hoist

#### ■ Preparation for Assembling

- Hang the electric chain hoist body size to facilitate the mounting of the Chain Container.
- Check that the stopper and the cushion rubber are mounted at the link third from the no load side of the Load Chain (the end without the Bottom Hook).

#### **■** Mounting the Chain Container

The Chain Container is made of plastic. (Canvas container is available as an option.)

#### **A DANGER**



• The each type of Chain Container has the capacity to store the specific amount of the Load Chain. Use correct capacity of the Chain Container.

When storing the Load Chain of which amount exceeds the capacity of the Chain Container, it may result in death or serious injury due to the flow over of the Load Chain from the Chain Container or defective operation of the electric chain hoist.

Improper combination of the Chain Container and the electric chain hoist is very dangerous because of the possibility of drop of the Chain Container.

The seal to indicate the capacity and lifting height is attached on the Chain Container. Check it before use.

• If the Chain Container is not assembled correctly, it may result in death or serious injury due to a drop of the Chain Container or Load Chain, and malfunction of the Electric Chain Hoist.

Refer to the assembling instruction on the page 32 and assemble the Chain Container correctly.

Failure to comply with these instructions causes bodily injury or loss of property.

#### **↑** CAUTION

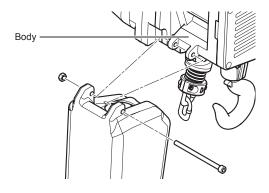


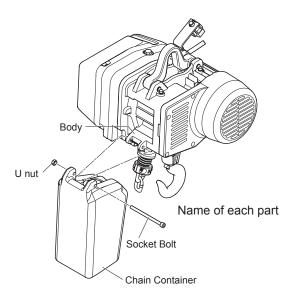
• When storing the Load Chain into the Chain Container, put the chain end with no-load side first and then store the rest of the Load Chain.

Failure to comply with these instructions causes bodily injury or loss of property.

#### Assembling the Chain Container

1) Pass a Socket Bolt through all holes of the Chain Container, the Body and the Chain Container, in this order to mount the Chain Container.

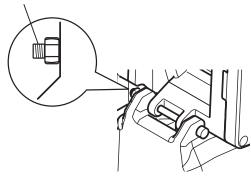


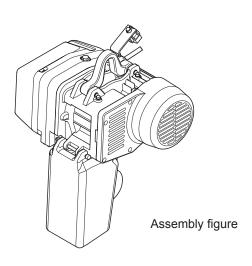


# 2) Screw the U nut into the Scoket bolt and tighten it securely.

 The Socket Bolt must protrude from the end face of the nut by three threads or more.







#### ■ Oiling the Load Chain

#### **↑** DANGER

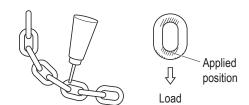


• Be sure to apply lubricant on the Load Chain. Do not carry out oiling work in the place near the fire or arc.

Otherwise it will result in fire.

- Remove dust and waterdrops attached on the Load Chain and then apply lubricant. Application of lubricant influences on the life of the Load Chain considerably. Apply the lubricant sufficiently. Use the following genuine lubricant.
  - Epinoc Grease AP (N)0 (Nippon Oil Corporation)
  - Consistency No.0 (Industrial general lithium grease)
- Release all loads from the Load Chain and apply the lubricant all over the Load Chain.

After application of the lubricant lift/lower the electric chain hoist without load to spread the lubricant on the Load Chain.



#### ■ Gear Oil

Inside of the Gear Case is filled with gear oil at the shipping. The level of the oil filled with specified amount comes to the height of the inspection hole. Check the oil level visually.

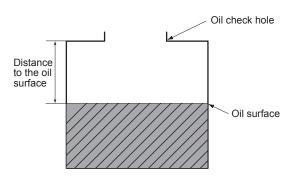
#### **M** DANGER

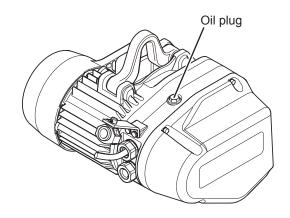


· Use genuine gear oil.

Use of the gear oil other than the genuine oil (including mixed use) will result in death or serious injury due to the drop of the lifted load.

- Cheking the Gear Oil Amount
  - 1) Remove the Oil Plug on the upper Main Body
  - Insert the check bar from the Oil check hole to check the oil level.
     (The normal distance between the hole and the oil level is between 107 to 111 mm for the body size D, and 101 to 105 mm for the body size C.)





# ■Combination with the Trolley

\* You do not have to read the contents below if you use the hoist as Hook Suspension Model. Go to "Checking Power and Power Cable" (P38).

#### **M** DANGER

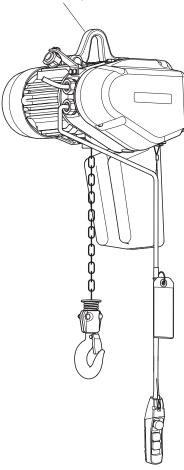


- Adjust the rail width during assembling and install.
- Be careful for the Power Cable and Push Button Switch Set Cord are not pulled off or entangled within the area of traveling area.

Failure to comply with these instructions may result in death or serious injury.

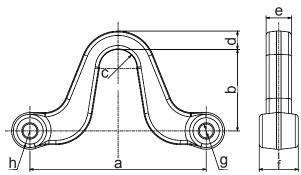
Hoist itself, or combination with KITO EQ trolley or a trolley for some light cranes.

#### Suspension Eye



Part name	Usage	Part code 125kg to 500kg	Part code 1t
Suspension Eye	Hoist itself, or combination with KITO EQ trolley or a trolley for some light cranes.	EQ1Cl9001	EQ1DI9001

#### ■ Dimensions of Suspension Eye



Code	Part code	а	b	С	d	е	f	g	h
001S, 003S, 005S	EQ1Cl9001	139.6	67.5	16.5	8	16	33	Ø12.2	16
010S	EQ1DI9001	153.6	71	16.5	12.3	22	34	~	

### ■ Combination with the Manual Trolley

# ■ Checking the Number of the Assembled Adjusting Spacers and Their Positions (for Manual Trolley)

When installing a trolley to the beam, the length of the Suspension Shaft (width between frames) must be adjusted in accordance with the rail width. Wrong number of wrong position of Spacers may result in the drop of the electric chain hoist. Insert the correct number of Spacers with correct ratings and for rail width at the correct position, referring to the following table.

125kg - 500kg (Unit: piece)

Capacity Parts	Rail width (in)	2	25/16	21/2 25/8	27/8 215/16	3	31/4	39/16	37/8	315/16	4	43/16	45/16	47/16	411/16 43/4	415/16	5	
	name	Rail width (mm)	50	58	64 66	73 74	75 76	82	90 91	98	100	102	106	110	113	119 120	125	127
	Thin	Inner	2+3	3+4	0+1	1+2	2+2	3+3	0+1	1+2	2+2	2+3	1+1	1+2	2+2	3+3	0+0	0+1
	spacer	Outer	4	2	8	6	5	3	8	6	5	4	7	6	5	3	9	8
125kg	Thick	Inner	0+0	0+0	1+1	1+1	1+1	1+1	2+2	2+2	2+2	2+2	0+0	0+0	0+0	0+0	1+1	1+1
250kg	spacer	Outer	4	4	2	2	2	2	0	0	0	0	7	7	7	7	5	5
490kg 500kg	Thick	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
Jooks	spacer L	Outer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixing spacer	Inner	-	-	-	-	-	-	-	-	-	-	1+1	1+1	1+1	1+1	1+1	1+1	

1t (Unit: piece)

Capacity (Plain	Parts	Rail width (in)	2	25/16	21/2 25/8	27/8 215/16	3	31/4	39/16	37/8	315/16	4	43/16	45/16	47/16	411/16 43/4	415/16	5
trolley)	name	Rail width (mm)	50	58	64 66	73 74	75 76	82	90 91	98	100	102	106	110	113	119 120	125	127
	Thin	Inner	-	3+3	0+0	1+1	1+2	2+3	0+0	1+1	1+2	2+2	2+3	3+3	3+4	0+1	1+2	2+2
	spacer	Outer	-	2	8	6	5	3	8	6	5	4	3	2	1	7	5	4
	Thick	Inner	-	0+0	1+1	1+1	1+1	1+1	2+2	2+2	2+2	2+2	2+2	2+2	2+2	3+3	3+3	3+3
1t	spacer	Outer	-	6	4	4	4	4	2	2	2	2	2	2	2	0	0	0
	Thick	Inner	-	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
	spacer L	Outer	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fixing spacer	Inner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

125kg - 500kg (Unit: piece)

Capacity	Plain	Rail width (in)	53/16	55/16	53/8	55/8	57/8 515/16	6	61/8	65/16	67/16	611/16	67/8	7	71/16 71/8	71/4 75/16	77/8	8
trolley)		Rail width (mm)	131	135	137	143	149 150	153	155	160	163	170	175	178	180 181	184 185	200	203
	Thin	Inner	1+1	1+2	2+2	3+3	0+0	0+1	1+1	1+2	2+2	3+3	0+0	0+1	1+1	1+2	4+4	4+5
	spacer	Outer	7	6	5	3	9	8	7	6	5	3	9	8	7	6	1	0
125kg	Thick	Inner	1+1	1+1	1+1	1+1	2+2	2+2	2+2	2+2	2+2	2+2	3+3	3+3	3+3	3+3	3+3	3+3
250kg	spacer	Outer	5	5	5	5	3	3	3	3	3	3	1	1	1	1	1	1
490kg 500kg	Thick	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
J	spacer L	Outer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fixing spacer	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1

1t																(l	Unit: p	oiece)
Capacity (Plain	Parts	Rail width (in)	53/16	55/16	53/8	55/8	57/8 515/16	6	61/8	65/16	67/16	611/16	67/8	7	71/16 71/8	71/4 75/16	77/8	8
trolley) name		Rail width (mm)	131	135	137	143	149 150	153	155	160	163	170	175	178	180 181	184 185	200	203
	Thin	Inner	1+1	1+2	2+2	3+3	0+0	0+1	1+1	1+2	2+2	3+3	0+0	0+1	1+1	1+2	4+4	4+5
	spacer	Outer	7	6	5	3	9	8	7	6	5	3	9	8	7	6	1	0
	Thick	Inner	0+0	0+0	0+0	0+0	1+1	1+1	1+1	1+1	1+1	1+1	2+2	2+2	2+2	2+2	2+2	2+2
1t	spacer	Outer	5	5	5	5	3	3	3	3	3	3	1	1	1	1	1	1
	Thick	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
	spacer L	Outer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fixing	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1

125kg - 500kg (Unit: piece)

Capacity (Plain	Parts	Rail width (in)	87/16	811/16	9	91/8	97/8	10	101/8	101/4	103/8	101/2	11	111/8	11 1/4	113/8	115/8	113/4
trolley)	name	Rail width (mm)	215	220	229	232	250	254	257	260	264	267	279	283	286	289	295	298
	Thin	Inner	2+3	3+3	4+5	1+1	0+0	0+1	1+1	1+2	2+2	2+3	4+5	1+1	1+2	2+2	3+3	3+4
	spacer	Outer	4	3	0	7	9	8	7	6	5	4	0	7	6	5	3	2
125kg	Thick	Inner	0+0	0+0	0+0	1+1	2+2	2+2	2+2	2+2	2+2	2+2	2+2	3+3	3+3	3+3	3+3	3+3
250kg	spacer	Outer	7	7	7	5	3	3	3	3	3	3	3	1	1	1	1	1
490kg 500kg	Thick	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
June	spacer L	Outer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fixing spacer	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1

1t (Unit: piece)

Capacity	Parts	Rail width (in)	87/16	811/16	9	91/8	97/8	10	101/8	101/4	103/8	101/2	11	111/8	11 1/4	113/8	115/8	113/4
(Plain trolley)	name	Rail width (mm)	215	220	229	232	250	254	257	260	264	267	279	283	286	289	295	298
	Thin	Inner	2+3	3+3	4+5	1+1	0+0	0+1	1+1	1+2	2+2	2+3	4+5	1+1	1+2	2+2	3+3	3+4
spacer	Outer	4	3	0	7	9	8	7	6	5	4	0	7	6	5	3	2	
	Thick	Inner	0+0	0+0	0+0	1+1	2+2	2+2	2+2	2+2	2+2	2+2	2+2	3+3	3+3	3+3	3+3	3+3
1t	spacer	Outer	7	7	7	5	3	3	3	3	3	3	3	1	1	1	1	1
	Thick	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
	spacer L	Outer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fixing spacer	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1

125kg - 500kg (Unit: piece)

Capacity	Parts	Rail width (In)	1113/16	117/8	12
(Plain trolley)	name	Rail width (mm)	300	302	305
	Thin	Inner	4+4	4+5	1+5
	spacer	Outer	1	0	3
125kg	Thick	Inner	3+3	3+3	4+3
250kg	spacer	Outer	1	1	0
490kg 500kg	Thick	Inner	1+1	1+1	1+1
	spacer L	Outer	0	0	0
	Fixing spacer	Inner	1+1	1+1	1+1

1t (Unit: piece)

Capacity (Plain	Parts	Rail width (in)	1113/16	117/8	12
trolley)	name	Rail width (mm)	300	302	305
	Thin	Inner	4+4	4+5	1+5
	spacer	Outer	1	0	3
	Thick	Inner	3+3	3+3	4+3
1t	spacer	Outer	1	1	0
	Thick	Inner	1+1	1+1	1+1
	spacer L	Outer	0	0	0
	Fixing spacer	Inner	1+1	1+1	1+1

\* Description for spacers; For example, "0+1"

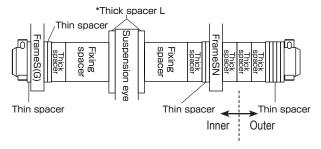
0: the number of spacers on the frame G side.
1: the number of spacers on the frame S side.

Rail width of 50-102 (mm) [125kg -500kg]: Normal suspension shaft 58-127 (mm) [1t] Rail width of 103-305 (mm) [125kg -500kg]: Wide-frange suspension 128-305 (mm) [1t] shaft (optional)

- (A) indicates standard range.
- ® indicates W20 range, as option.
- © indicates W30 range, as option.

(t) (in)	4	1	5	6	7	8	
0.5				(D	<i>y</i>		$\bigcirc$
1							

#### For I beam

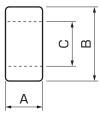


<sup>\*</sup> When connecting with manual trolley, use the Thick spacer L provided in the package.

# ■ Length of Adjusting Spacer

(Unit: mm)

F	т	125kg, 250kg, 490kg, 500kg	1t
	A	3.2	3.2
Thin spacer	В	31	35
	С	22.5	25.5
	A	12.5	12.5
Thick spacer	В	29.4	34
	С	23	27.6
	A	5.5	3.2
Thick spacer L	В	42.7	54
	С	22.7	26
Fiving appear	A	31.5	43
Fixing spacer	В	29.4	34
(200)	С	23	27.6
Fiving anger	A	81.5	80.5
	Fixing spacer B		34
(300)	С	23	27.6
Suspension s	shaft diameter	22	25



Thin spacer/Thick spacer/Thick spacer L/

Fixing spacer

#### ■ Combination of the Electric Chain Hoist and the Manual Trolley

#### **⚠ DANGER**

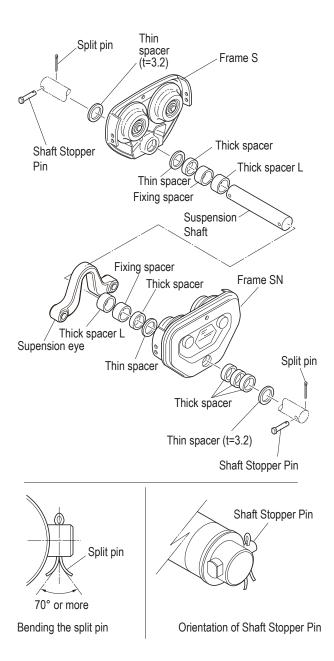


• Use new split pins. After insertion, bend the pin securely at its both ends.

Use of old split pins may result in death or serious injury due to drop.

#### • 125kg to 1t

- 1) After setting the Suspension Shaft with Spacers, insert it into Frame S and fix it with a Shaft Stopper Pin and a Split Pin.
  - Insert the Shaft Stopper Pin in the direction that the split pin comes to the right when viewed from the side of the Frame S.
  - Open the both ends of the Split Pin by 70° or more.
- 2) Set the Suspension Shaft with a Thick Spacer, Fixing Spacer, etc.
- 3) Passes it through the string the Suspension Eye.
- 4) Set the Suspension Shaft with another Thick Spacer and Fixing Spacer. Then insert the Suspension Shaft into the Frame SN.
  - Adjust the Spacers in accordance with the rail width. (Refer to "Checking the Number of the Assembled Adjusting Spacers and Their Positions" (P33) for the number of Spacers.)
- 5) Set the Suspension Shaft with a Thick Spacer. Fix it with a Shaft Stopper Pin and a split pin.
  - Insert the Shaft Stopper Pin in the direction that the split pin comes to the right when viewed from the front side of the Frame SN.
  - Open the both ends of the Split Pin by 70° or more.



# ■Checking Power and Power Cable

#### **■** Checking the Power

#### **DANGER**



- · Check that the rating of the breaker satisfies the specification required by the electric chain hoist.
- Check that the source voltage satisfies the rated voltage of the electric chain hoist.

Failure to comply with this instruction may result in death or serious injury.

Hook Suspended Type: EQ Manual trolley type: EQSP

Code	Minimum Wire size (mm²)	Capacitiy of fuse and circuit breaker (A)  400V Class  Single speed  50Hz  415V
EQ001S		
EQ003S	1.05	5
EQ005S	1.25	
EQ010S		10

#### **■** Checking the Power Cable

#### **A** CAUTION



• Do not use the cable other than the cable attached to the main unit or optional Power Cable.

Failure to comply with this instruction causes bodily injury or loss of property.



• Satisfy the maximum permissible length and core cross section of the Power Cable.

Failure to comply with this instruction causes bodily injury or loss of property.

Refer to the following table for the permissible length and the size of the standard Power Cable.

When using the cable of the size other than those described in the table, decide the cable length using the following formula.

Permissible length (m) =  $\frac{1000}{30.8} \times \frac{\text{Cross section of one core (mm}^2) \times \text{Rated voltage (V)} \times 0.02}{\text{Rated current (A)}}$ 

Suspended Type: EQ Manual Trolley Type: EQSP

		Permissible length (m)		
		400V Class		
EQ	Minimum wire size (mm²)	Single speed		
	( )	50Hz		
		415V		
EQ001S		110		
EQ003S	1.25	(176)		
EQ005S	(2)	93 (149)		
EQ010S		56 (89)		

Note: Values in parenthesis shows the one size longer cable than normal.

# **■**Connecting Cables

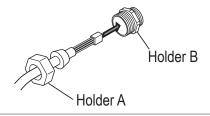
#### NOTE

- When clamping a connector, do not use tools. Be sure to clamp it by hand.
   Excessive tightening of a connector may result in the damage or breakage f plastic thread part.
- To prevent wire breakage and unintentional removal of a connector, tie the protection wire attached to the Push Button Switch Cord to the main unit of the electric chain hoist or the trolley.
  - Be sure to tie the cord with the body size or the trolley to prevent the wire breakage and removal of connector when the cord is pulled strongly.
- . Be sure to turn off the power when carrying out the repair work of wire breakage or removal of the connector.

#### ■ Suspended model (hoist only)

#### ■125kg to 1t

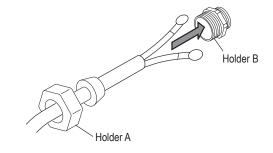
- Connecting the Power Cable
  - 1) Insert the Power Cable Holder A to the Holder B and tighten it securely.
  - 2) Fix the Power Cable using cable holder with a slack.
  - Connect the Power Cable to the Contactor terminals.
    - Refer to the connection diagram on the Controller cover and connect wires correctly
- Connecting the Push Button Switch Cord
  - 1) Insert the Push Button Cord Holder A to the Holder B and tighten it securely

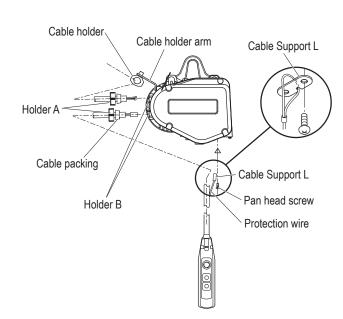


2) Pass the Cable Support L into the ring at the end of the Protection Wire. Put the Protection Wire in the notch of the Cable Support L.

Then fix the Cable Support L to the body size (at the bottom face of the Gear Case).

- 3) Insert the Push Button Connector (white) to the connector (white) of the Contactor.
  - Refer to the connection diagram on the Controller cover and connect wires correctly

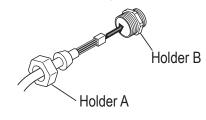


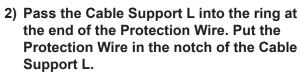


## ■ Manual Trolley Type

#### ■125kg to 1t

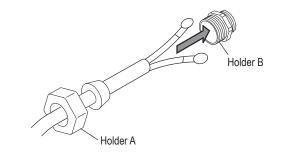
- Connecting the Power Cable
  - 1) Insert the Power Cable Holder A to the Holder B and tighten it securely.
  - 2) Fix the Power Cable using cable holder with a slack.
  - 3) Connect the Power Cable to the Contactor terminals.
    - Refer to the connection diagram on the Controller cover and connect wires correctly
- Connecting the Push Button Switch Cord
  - 1) Insert the Push Button Cord Holder A to the Holder B and tighten it securely

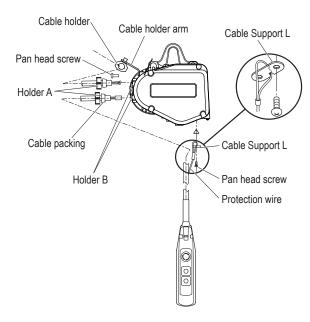




Then fix the Cable Support L to the body size (at the bottom face of the Gear Case).

 Insert the Push Button Connector (white) to the connector (white) of the Contactor.





# Installation

#### **↑** DANGER



- Do not install the electric chain hoist at a place exposed to rain or water always or the place different from the Operational Environment (P15).
- Do not install the electric chain hoist in the motion space of other trolley or any other moving equipment (facility).
- . Do not use the electric chain hoist contacting with other object, or being fixed.

Failure to comply with these instructions may result in death or serious injury.



 Installation (removal) of the electric chain hoist must be carried out by special installer or by personnel with expertise.

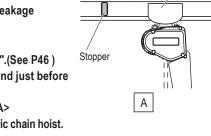
Consult with the sales shop or KITO for installation, or consign the installation work to special installer or personnel with expertise.

- . When installing or removing the electric chain hoist, follow the instructions in Owner's Manual.
- Carry out the work for grounding (earthing) and installation of earth leakage breaker.

These work must be carried out by an electric work specialist.

- When the installation is completed, carry out "Check after Installation".(See P46)
- Connect the power after all installation works have been completed and just before the oparation check.
- Mount the stopper at the both ends of the travel rail for trolley. <Fig. A>
- Make sure that the strength of the structure is sufficient to install the electric chain hoist.
- · Carry out the installation work after securing the stable hoothold.
- Before building the electric chain host into part of your own travel device without using the standard trolley, contact us for information on precautions.

Failure to comply with these instructions may result in death or serious injury.



Travel rail

Trolley

#### **CAUTION**



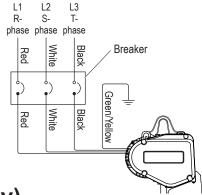
· Connect the Power Cable to the power of rated voltage.

Failure to comply with this instruction causes bodily injury or loss of property.

# ■Connecting Power and Power Cable

When connecting the Power Cable to the power, connect the cable in accordance with the following instructions.

- Connect the electric chain hoist to the power through a breaker.
- Connect the electric chain hoist in the correct phase.
- Earth wire is a green colored covered cable with yellow line. Carry out Class D earthing work.
- Use correct breaker and Power Cable referring to Checking Power and Power Cable (P38) for the breaker capacity, Power Cable length and its size.



# ■Installing the Suspended Type (hoist only)

■ Checking Installation Method and Place

#### **DANGER**

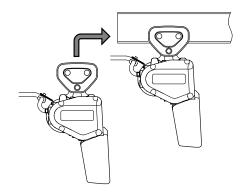


- When using an electric chain hoist suspended (as a single unit), make sure that the Suspension Eye is installed and hooked securely.
- Install the electric chain hoist so that the Suspension Eye itself can swing freely. (Make sure not to restrain the Suspension Eye when in use.)
- Do not install and use the electric chain hoist upside down.
- The diameter of the Suspension Shaft hooked by Suspension Eye should be thinner than 31mm or less. Refer to the Suspension Eye dimension (P32).

Failure to comply with these instructions may result in death or serious injury.

# ■Installing the Trolley Combined Model

- Mounting the Hoist to the Travel Rail
  - 1) Make sure that the dimensions of the Trolley Frame satisfy the size of the rail to which the trolley is installed.
  - 2) Make sure that the rail is set to a level.
  - 3) Install the electric chain hoist combined with the trolley to the rail from its one end



• When the gap between the rail end and the wall of the housing is scarce

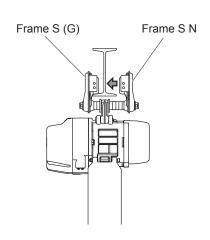
#### **CAUTION**



Securely support the electric chain hoist Mode EQ not to tilt.

Failure to comply with this instruction causes bodily injury or loss of property.

- 1) Set the wheel at Frame S (G) side of the Trolley Frame on the running face of the Travel Rail. Then push the Frame SN into the Frame S (G).
- 2) Insert the Shaft Stopper Pin into the Hole of the Suspension Shaft. Then mount a split pin securely.

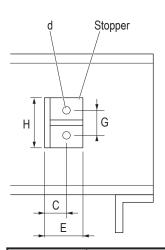


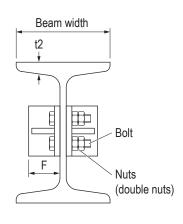
#### **■** Mounting the Stopper

Be sure to mount the stoppers at the both ends of the rail to prevent drop.

Decide the mounting position in accordance to the size of the wheel.

When the customer wants to make the stopper by oneself, refer to the following figures.





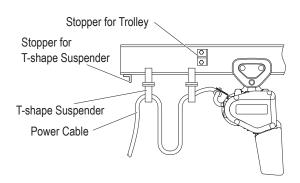
(Unit: mm)

Capacity	~1t						
Beam width	100	125	150	175			
Material dimensions	L-50x50x6	L-50x50x6	L-65x65x8	L-75x75x9			
Н	80	80	80	80			
E	50	50	65	75			
F	40	50	65	75			
G	50	50	50	50			
С	30	30	35	40			
d	φ14	φ14	φ14	φ14			
Bolt size	M12x50x50	M12x55x55	M12x55x55	M12x60x60			

#### When using T-shape Suspender

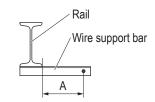
Install the additional stopper for T-shape Suspender at the end of one rail.

\*Not to install a cable hanger pusher to a manual trolley.

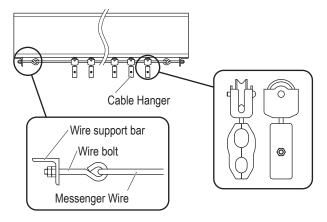


#### ■ Power Cable Layout for Manual trolley type

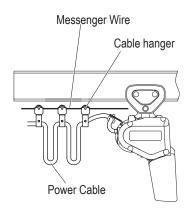
- In the standard specification the Suspender is provided. T-shape Suspender and angle type Suspender are also available as optional parts. T-shape Suspender can be applicable to curved rail, however, the application method differs depending on the condition such as radius of curvature. In such case, contact KITO.
- 1) Mount the wire support bar at the both ends of the rail.



- 2) Tie the Messenger Wire passed through the Cable Hanger to the Wire Support Bar with two Wire Bolts.
  - The recommended mounting interval of the Cable Hangers is 1.5 m to 2 m.
  - Use steel wire of 3 to 6 mm in diameter for the Messenger Wire.



3) Fix the Power Cable to the Cable Hanger.



# **Check after Installation**

Wrong assembling or installation causes death or serious injury. To prevent such danger check the following.

#### ■ Check items

Make sure that the following are satisfied:

- · No bolt, nut nor split pin is lost. Tightening and assembling are completed.
- Protection Wire for Push Button Switch Cord is securely tied to accept and endure the force instead of Push Button Switch Cord when the Push Button Switch Set is drawn.
- The Power Cable is fixed to the Cable Support.
- · Source voltage is the rated voltage
- · Grounding Wire (earth wire) is connected securely.

#### • When using with a Trolley

Check the following:

- · The electric chain hoist and the trolley are combined correctly.
- The stoppers for trolley are securely mounted to Travel Rail where the Trolley travels.
- The surface of Travel Rail is not attached with paint or oil. (The surface of the Travel Rail must be basis metal. Do not paint.) There is no obstacle for the trolley to travel. The Travel Rail is set to a level.

#### ■ Operational Check

Carry out the operational check in accordance with Daily inspection (P.17).

# Chapter 2

# Inspection

This chapter describes frequent inspection items and periodic inspection items. Refer to Chapter 1 for the "Handling the Product". Inspection is the first step of safety. Carry out daily inspection, frequent inspection and periodic check.

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#### Reference Daily inspection is described in Chapter 1 "How to Use the Product". Refer to the following daily inspection items and their relevant pages. ■ Daily Inspection of Electric Chain Hoist (EQ) **Appearance** Indication of Nameplates and Labels ............ 17 Deformation and damage of main unit and each part ... 17 Loosened or fallen off bolts, nuts and split pins ... 17 **Load Chain** Mark ...... 18 | Suspension Eye / Bottom Hook Opening of the Hook ...... 19 Hook Latch ..... Peripheral parts of the body size **Function and Performance** ■ Daily Inspection of Manual Trolley (EQSP) **Appearance** Indication of Nameplates and Labels ............ 22 Deformation and damage of each part ....... 22 Loosened or fallen off bolts, nuts and split pins ... 22 **Function and Performance**

\_\_\_\_\_\_

# **Safety Precautions**

# ■General Matters related to Inspection

#### **⚠ DANGER**



• Do not use the part exceeding the service limit or criteria and the parts other than genuine part for KITO electric chain hoist.

Even if the part is genuine KITO part, it cannot be used for other model. Refer to Disassembly/Assembly Manual (Annex) for the correct use of the part.

- Do not adjust or disassemble the Brake or Friction Clutch.
- · Do not adjust the set nut.
- Do not carry out the inspection of electric chain hoist with a lifted load.
- Do not use the electric chain hoist removing the chain spring and the stopper.
- Turn off the main power when carrying out the inspection.

Failure to comply with these instructions may result in death or serious injury.



- Be sure to carry out the frequent and periodic inspection.
- Periodic inspaction of the electric chain block must be performed by maintenance engineer.
- · When oiling the Friction Clutch, use KITO genuine oil (manufacturer specified oil).
- · When using oils such as gear oil and grease, avoid places with fire or sparks.
- Put the electric chain hoist on the floor or work bench when performing the repair and disassembling of the electric chain hoist.
- Even if each component of the electric chain hoist does not exceed the service limit, replace the part exceeding the total operating hours derived from the grade indicated on the electric chain hoist and the load factor.
- Do not use the electric chain hoist when any abnormality was observed during the inspection. Indicate "FAILURE" on the hoist and contact with maintenance engineer or KITO for repair.
- After completion of the inspection (frequent, periodic), perform the functional check and make sure that the electric chain hoist operates correctly.
- · When performing the functional check, be sure to perform the capacity test after no load test.

Failure to comply with these instructions may result in death or serious injury.

#### **A** CAUTION



- Indicate "CHECKING" when performing the inspection.
   When a crane is operated erroneously during the inspection, it may result in the accident such as fall-off of parts and tools and downfall.
- Wear protection equipment such as protection goggles and gloves depending on the work contents.
   Otherwise it may result in the injury due to scattered oil or sharp edge of a part.
- Pay attention to work method, work procedure and work posture.
   If the product or the part is heavy, your hand is caught or your waist is hurt.

Especially be careful for the work on an unstable scaffold such as the work at high lifted place using stepladder.

- Wear helmet and safety belt when carrying the high lift work. Otherwise it may result in injury or downfall accident.
- Remove the oil attached to the product or spilt on the floor.
   Otherwise it may result in injury due to drop of the product or overturning.
- Keep the work area clean when disassembling the product.
   Assembling or mixing the part other than genuine part may result in the damage of the product or the accident due to defective operation.

#### NOTE

- When performing the frequent inspection, carry out the daily inspection at the same time.
- When performing the periodic inspection, carry out the frequent inspection and the daily inspection at the same time.
- When detecting any abnormality during inspection due to erroneous use, instruct the operator and user for correct use of the electric chain hoist.
  - Ex. (1) The flaw on the Chain Guide hit with the Chain (Cause: lifting incline)
    - (2) The deformation of the Chain Spring (Cause: excessive use of the limit switch)

# **Frequent Inspection**

# ■General Matters on Frequent Inspection

#### **M** DANGER



After completion of the frequent inspection, perform the functional check and make sure that the electric chain hoist operates correctly.

Neglecting to perform the functional check may result in death or serious injury.

#### **NOTE**

When performing the frequent inspection, carry out the daily inspection at the same time.

• Check the electric chain hoist as installed, standing on the floor.

# ■Electric Chain Hoist (EQ) Frequent Inspection

#### ■ Load Chain

- Check the Load Chain after removing the stain on the chain.
- Use the needle head caliper (point caliper) to measure the sum of pitches and wire diameter.
- Apply oil on the Load Chain after inspection.
- Application of lubricant influences on the life of the Load Chain considerably. Use the KITO genuine lubricant or equivalent (industrial lithium grease: consistency No.0)
- Release all loads from the Load Chain. Apply the lubricant to the linking portion of the Load Chain that engages the Load Sheave and the linking portion of the Load Chain.
- After application of the lubricant, lift/lower the electric chain hoist without load to spread the lubricant on the Load Chain.

Item	Check method	Criteria	When failed
Elongation of Pitch	Measure the elongation of pitch with point caliper. (Measure the sum of pitches of 5 links)  Sum of pitches of 5 links	NOTE  Check the engaging point of the Load Sheave especially carefully.  • The limit value of the following "Sum of pitches of five links" must not be exceeded.	Replace the Load Chain.
Abrasion of wire diameter	Measure the wire diameter  (d) with point caliper.  d	The limit value of the following "Wire diameter of the Load Chain" must not be exceeded.      NOTE  When the abrasion of the Load Chain is observed, be sure to check the abrasion of the Load Sheave also. (Refer to "Periodic Inspection", "Load Sheave" (P65).)	Replace the Load Chain.

#### Load Chain Pitch and Wire Diameter for Each Capacity

		Lond Chain	Sum of 5 L	inks (mm)	Load Chain diameter (mm)		
Code	Capacity	Load Chain diameter (mm)	Do not exce	eed the limit	Do not fall under the limit		
			Standard	Limit	Limit		
EQ001S	125kg						
EQ003S	250kg	ф5.6	79	81.5	5.1		
EQ005S	500kg						
EQ010S	1t	φ7.1	100	103	6.4		

# ■ Suspension Eye, Bottom Hook

léa ma	Chaol	, ma a t la a a	ı				· wito wio			V	Nhon fo	اممان
item	Check method				Criteria					V	writeri raileu	
Item  Opening and Abrasion of the Hook Abrasion of the Suspension eye	• Check wisually and measure with vernier caliper.  Embossed mark  e e			Check visually and measure with vernier caliper.      Compare the dimensions of a, b and c with those at purchasing. Check that they are within the criteria.      The use of the Hooks with these dimensions exceeding the criteria may result in bodily injury or property damage.      Measured value (mm)  Limit value					Vhen fa	ook and		
		d d		Gı	values. F include t uidelines	Dim on Eye Dim Dim Dim on Eye Dim	aware that ecause o ok and S	nominal st	lues	cceed 5%		
						ttom Hook	1				sion Eye	
	Code	Capacity	Dimension a Standa		<del></del>	on b (mm)		ion c (mm) Limit value		ion d (mm) Limit value	-	ion e (mm) Limit value
	EQ001S EQ003S EQ005S	125kg 250kg 500kg	45.0		17.5	16.6	23.5	22.3	8.0	7.6	16.0	15.2
	EQ010S	1t	50.0		22.5	21.4	31.0	29.5	12.3	11.7	22.0	20.9
Deformation, Flaw, Corrosion	Check visu	ally.		•	No deep No loose No consi	cut ened bolt o iderable co	r not, or orrosion	nd or twist their fall of atter such		Repla	ice the H	ook.

# ■ Peripheral parts of the Body size

• Use check stand to check the electric chain hoist from the close point.

Item	Check method	Criteria	When failed
Chain Container	• Check visually.	To be mounted to the body size securely No damage, tear, abrasion or deformation Check no foreign matter inside the Chain Container.  * Especially be careful when the electric chain hoist is used outdoor. Make sure that the lift of the Load Chain is smaller than the capacity of the Chain Container.  Danger  Do not use the torn Chain Container.  Prohibited Otherwise it may result in death or serious injury due to drop of the Load Chain.  Use the Chain Container with the capacity larger than the lift of the Load Chain.  Mandatory Otherwise it may result in death or serious injury due to drop of the Load Chain.	Replace the Chain Container. Discard the foreign matter in the Chain Container.  Replace the Chain Container with the adequate Chain Container referring to "Mounting the Chain Container"(P34).
		Otherwise it may result in death or serious injury due to drop of the Load Chain.	

# **■** Electromagnetic Brake

Item	Check method	Criteria	When failed
Abrasion of Brake Pad	Measure the abrasion.	Refer to the guidelines of brake inspection (P68)	Refer to the guidelines of brake inspection (P68)

# ■ Push Button Switch

Item	Check method	Criteria	When failed
Push Button Switch Body size	Check visually and by operation.	No damage, deformation and loosened bolt.  Push Button Switches can be operated smoothly.  Emergency Stop Button can be operated and cancelled.	Replace the Push Button Switch.
Push Button Switch Cord	• Check visually.  Body  Protection Wire	Push Button Switch Cord is securely connected. The Protection Wire is tied with the body size so that Push Button Switch Cord is not strained directly even if the Push Button Switch is pulled.	Tie the Push Button Switch Cord and the Protection Wire to the body size properly.
Push Button Switch Cord		To have no damage	Replace the Push Button Switch Cord.

# ■ Power Supply

Item	Check method	Criteria	When failed
Power Cable	Check visually.	<ul> <li>Power Cable to have enough length.</li> <li>To have no damage</li> <li>To be connected securely</li> </ul>	Replace the Power Cable.
Cable Hanger  Messenger Wire  Cable hange Power Cabl		To have no damage  To move smoothly  To be mounted at equal interval  Appropriate interval 1.5 m	Re-mount the Cable Hangers for no hindrance to cable motion.
Messenger Wire	Check visually.	To have no sag	Remove the sag.

#### **■** Function and Performance

• Check the following item with no load.

Item	Check method	Criteria	When failed
Abnormal Noise	Check the noise of gear, motor and the Load Chain during operation with no load.	<ul> <li>To sound no irregular rotating noise</li> <li>To sound no howling of motor and scraping sound of the Brake</li> <li>To sound no abnormal noise</li> </ul>	Replace the abnormal part.
	Sound is also an important check point. Always be careful for the noise of the electric chain hoist.	To sound no popping sound from the Load Chain	Check the Load Chain. (Refer to P53.)

# ■ Manual Trolley (TSP) Frequent Inspection

# **■** Appearance

Item	Check method	Criteria	When failed
Combination	Shake the manual trolley to check.	The electric chain block shakes lightly to right and left.	Combine the electric chain hoist and the manual trolley securely.
Travel Rail	Check visually.	To have no considerable deformation and damage	Check items in accordance with "Travel Rail" described in Chapter 2 "Periodic Inspection". (P78)
Oiling (to the gears of wheel)	Check visually.	To be oiled adequately	Apply oil to gears.

# **Periodic Inspection**

# ■General Matters on Periodic Inspection

#### **M** DANGER



- Put the electric chain hoist on the floor or work bench when inspecting the electric chain hoist.
- After completion of the periodic inspection, perform the functional check and make sure that the electric chain hoist operates correctly. · Wear insulating gloves when measuring voltage.

  - · When measuring the electric characteristics (insulation resistance, but except voltage measurement), turn off the

Failure to comply above instructions may result in death or serious injury.

#### **NOTE**

When performing the periodic inspection, carry out the daily inspection at the same time.

• Disassemble the electric chain hoist and check that it is assembled correctly without abnormal parts.

# ■Electric Chain Hoist (EQ) Periodic Inspection

# ■ Suspension Eye, Bottom Hook

Item	Check method	Criteria	When failed
Operating hours	Refer to guidelines for parts replacement (P68)	Refer to guidelines for parts replacement (P68)	Replace the Suspension Eye and Bottom Hook.

## ■ Peripheral parts of the Body size

Item	Check method	Criteria	When failed
Chain Guide	• Check visually.  Chain Guide	To have no apparent abrasion, deformation and damage  To have no flaw due to hitting by the Load Chain  CAUTION  The flaw due to hitting is caused by wrong use such as lifting a load in an inclined direction. If the abrasion is observed on the Chain Guide, the Load Chain may be worn also. Refer to the item of Load Chain Abrasion and check the abrasion.  Neglecting the check of the Load Chain abrasion may result in bodily injury or property damage.	Replace the Chain Guide.

Item	Check method		Criteri	a		When failed
Chain Spring	Check visually and measure the dimensions.  Dimensional standard	(deformation of the control of the c	<b>⚠ CAUT</b>	ation of the sed by excess Clutch and ate the election of the second control of the seco	e Chain ssive use the Limit tric chain	Replace the Chain Spring.
	Simonsional standard		of Chain Sprin of the limit valu Capacity	Length of C	ity (Do	
		Code	Сарасцу	Standard	Limit value	
		EQ005S	500kg	29	26.5	
		EQ010S	1t	26.5	24	
Stopper	• Check visually.  Stopper		er must be atta		-	Attach the Stopper at the third link.
Limit Switch Cover	Check visually.	To have note that the second	o deformation, o stain  Limit Switch Co	0	abrasion	Replace the Limit Switch Cover. Disassemble the Limit Switch Cover and clean it.

# Oil

Item	Check method	Criteria	When failed
Oil Leakage	Check visually.	To have no leakage of gear oil from packings, oil seals or oil plugs.	Replace the Packing and the Oil Seal.
Oil amount and stain	Check the oil level from the oil check hole. (The position of the oil check hole depends on the model. See P36.)  Oil plugs	Gear oil is filled sufficiently (The distance between the hole and the oil level is between 107 to 111mm for the body size D, and 101 to 105 mm for the body size C.)  Distance to the oil surface  • Gear oil has viscosity but not stained. • Refer to "IGuidelines and Precautions on Gear Oil Change Cyclel" for the replacement of oil. (P68)	Replace the Oil.

# **■** Electromagnetic Brake

Item	Check method	Criteria	When failed
Brake	Lift and lower the electric chain hoist for 20 to 30 cm with a capacity and then stop it.  Within 1% of Lifting distance  2~3 Link	When stopping the operation, the Brake must be applied immediately and the motor must stop.     Elevating: Stop distance must be 1 % or less of the lifting distance.	Disassemble the Brake to check whether the brake is assembled correctly without abnormal part.

# **■** Driving Mechanism

Item	Check method	Criteria	When failed
Bearing	Check for any strange noises.	Sounds no strange noise during lifting/ lowering operation with no load.     The operating hours must not exceed the guidelines for replacement. (Refer to Guidelines on Bearing Replacement (P69 ).)	Replace the Bearing.
Load Gear, Gear 2, Gear 3, Motor Shaft	Check for any strange noises.	<ul> <li>To have no apparent abrasion</li> <li>To have no damage</li> <li>Operating hours not to exceed the guidelines for replacement (Refer to "Guidelines on Gear Parts Replacement" (P69).)</li> </ul>	<ul> <li>Replace the Gear.</li> <li>Replace the Motor Shaft.</li> <li>Replace the oil at the same time.</li> </ul>
Friction Clutch	Check for any strange noises.	Sounds no strange noise during lifting/ lowering operation with no load.      DANGER     Do not adjust or disassemble the Friction Clutch.     Adjusting and disassembling the Prohibited Friction Clutch may result in death or serious injury.      Operating hours not to exceed the guidelines for replacement (Refer to "Guidelines on Gear Parts Replacement" (P69).)	Replace the Friction Clutch.
Abrasion and flaw of the Load Sheave	Check for any popping sounds.     Check the thickness using a slied gauge.  Wom portion Thickness at purchasing	To have no apparent abrasion, deformation and damage To have neither abrasion of the sheave pocket nor the run-on flaw on the crest.  NOTE  If the abrasion is observed on the Load Sheave, the Load Chain may be worn also. Refer to the item of Load Chain Abrasion and check the abrasion.  Service limit of the Load Sheave (Do not fall under the limit)  Model Capacity Thickness(mm) Standard Limit  EQ001S 125kg EQ003S 250kg 3.4 2.3 EQ005S 500kg EQ010S 1t 5 3.3	Replace the Load Sheave.

# **■** Electrical Equipment

Item	Check method	Criteria	When failed
Electrical Parts	Remove the Controller Cover and check the electrical parts visually.	To have no damaged or burnt part. To have no loosened bolt. Electrical parts must be mounted securely.	Replace the damaged or burnt electrical part. Mount the electrical part securely.
Wiring		Wiring must be fixed to the Electrical Parts securely.     Connectors must be inserted securely.	Connect wirings securely.
		To have no wire breakage and burning	Replace the wiring with new wiring, referring to Chapter 3 Guidance on Troubleshooting. (P86)
Contamination and attachment of foreign matter		To have not waterdrop or foreign matter.	Remove the foreign matter.

### **■** Electric Characteristics Measurement

Item	Check method	Criteria	When failed
Source Voltage	Measure the voltage with a circuit tester.	The source voltage of the rated voltage 342 - 440V at the receiving terminal must be supplied when operating with the capacity.  DANGER  Be careful of electric shock when	Supply proper voltage.
		measuring the voltage.  Electric shock may result in death or serious injury.	
Insulation Resistance	Measure the insulation resistance with megger.     (Resistance between energized and nonenergized parts ··· Each phase of R(L1), S(L2) and T(L3) and the earth wire)	<ul> <li>Insulation resistance must be 5 MΩ or higher.</li> <li>DANGER</li> <li>Turn off the power when measuring the insulation resistance.</li> <li>Measuring the insulation resistance without turning off the power may result in death or serious injury.</li> </ul>	Replace the Body size.

Item	Check method	Criteria	When failed
Grounding Resistance	Measure the grounding resistance with earth-	<ul> <li>Grounding resistance 100Ω or less</li> </ul> <b>DANGER</b>	Make a grounding correctly.
	resistance meter.	Turn off the power when measuring the grounding resistance.  Measuring the grounding resistance without turning off the power may result in death or serious injury due to electric shock.	

#### **■** Function and Performance

#### **⚠ DANGER**



After completion of the inspection of each part, perform the operational check for correct operation.
 Neglecting to perform the operational check may result in death or serious injury.

• Perform the following inspections with capacity.

Item	Check method	Criteria	When failed
Operational Check	Perform the daily inspection items with capacity. (Refer to Daily inspection Items. (P19 ))	• Be sure to perform the capacity test after completion of the no-load test.  Mandatory  Performing the capacity test without prior no-load test may result in death or serious injury.  • Refer to "Daily inspection Items". (P19)	Disassemble the electric chain hoist to check whether it is assembled correctly and has no abnormal part.
Brake	Operate the electric chain hoist with a capacity and then stop it.	When stopping the operation, the Brake must be applied immediately and the motor must stop.  Up/Down: Stop distance must be 1 % or less of the traveling distance for one minute.	Disassemble the Brake to check whether it is assembled correctly and has no abnormal part.

# ■ Manual Trolley (TSP) Periodic Inspection

# **■** Body size Components

Item	Check method	Criteria	When failed
Wheel	Check visually.     Measure dimension D with vernier caliper.	To have no considerable deformation and damage Abrasion Limit of Wheel (Do not fall under the limit.)	Replace the Wheel.
	<ul> <li>Φ D 0.5~3t</li> <li>Measure the outer diameter with vernier caliper.</li> </ul>	Capacity         Beam         D (mm)           Standard         Limit           125kg, 250kg, 500kg         H-beam I-beam         60         No groove on the standard No groov	
Lifting Shaft	Check visually. Measure the shaft diameter with vernier caliper.  Shaft diameter	<ul> <li>To have no considerable deformation and abrasion</li> <li>The shaft with obvious deformation reaches at the service limit.</li> <li>Abrasion limit of the shaft and the hole is 5 % of its diameter respectively.</li> </ul>	Replace the Lifting Shaft.
Suspension Eye	Check visually and measure with vernier caliper.  e  d  d	Measured value (mm)  Suspension Eye  Dimension d Dimension e  Abrasion not to exce	Replace the Suspension Eye.  ed 5%
		Following tables shows the nominal standard values. Please be aware that these values include tolerance because of forging. Guidelines on the Hook and Suspension Eye (refer to P69) or its criteria  Suspension Eye  Output  Description:	
		Code         Capacity         Dimension d (mm)         Dim	

### ■ Travel Rail

Item	Check method	Criteria	When failed
Rail Surface	Check visually.	To have no attachment of paint, oil and foreign matter. To have no dust and powder due to abrasion	Clean the Travel Rail.

Item	Check method	Criteria	When failed
Deformation and Abrasion	Check the deformation and abrasion visually and measure them with vernier caliper.      H-beam  H-beam  H-beam	<ul> <li>To have no deformation of beam flange such as twist and shear drop</li> <li>To have no exceeding abrasion of rail surface</li> <li>Service limit of B: up to 95 % of the dimension at purchasing</li> <li>Service limit of t up to 90 % of the dimension at purchasing</li> </ul>	Replace or repair the Travel Rail.
Rail Mounting Bolt	Check visually.	To have no loosened bolt or fall-off	Tighten the bolts securely.
Stopper	Check visually.  Stopper  Stopper	The stoppers must be mounted at the both ends of the Travel Rail securely.	Tighten the Stoppers.

#### **■** Function and Performance

#### **⚠ DANGER**



• After completion of the inspection of each part, perform the operational check for correct operation.

Neglecting to perform the operational check may result in death or serious injury.

• Perform the following inspections with capacity.

Item	Check method	Criteria	When failed
Operational Check	Perform the daily inspection items with capacity. (Refer to Daily inspection Items. (P25 ))	• Be sure to perform the capacity test after completion of the no-load test.  Performing the capacity test without prior no-load test may result in death or serious injury.  • Refer to "Daily Inspection Items". (P25)	Disassemble the electric chain hoist to check whether it is assembled correctly and has no abnormal part.
Abnormal Noise	To make the electric chain hoist travel with a capacity	To have no irregular rotating sound	Disassemble the electric chain hoist to check whether it is assembled correctly and has no abnormal part.

# **Guidelines for Parts Replacement**

The guidelines for operating time and replacement time of each part are shown below.

Operating hours of the estimated timing for parts replacement

Check the number of the average operating hours per day (hour) and days. Based on that data, calculate the total operating hours of the estimated timing for parts replacement by using the formula below.

(Average operating hours per day) x (Operating days) = Total operating hours

# Guidelines and Precautions on Gear Oil Change Cycle

Change the gear oil in accordance with the rate of loading and the operating hours.

• Change the oil at every five years even if the operating hours do not reach at the following hours.

Rate of	Operating hour for gear oil change loading	Every 120 hours	Every 240 hours	Every 360 hours
Light	A case where the capacity is rarely applied. Usually the hoist is used with a light load.			0
Medium	A case where the capacity is applied considerably frequently.  Usually the hoist is used with a medium load.		0	
Heavy	A case where the capacity is applied considerably frequently. Usually the hoist is used with a heavy load.	0		
Ultra heavy	A case where the capacity is applied constantly.	0		

#### **A** CAUTION



Use of wrong gear oil may result in the drop of the lifted load. Be sure to use the designated gear oil.

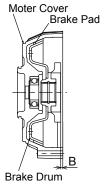
Gear oil kind and amount for main unit

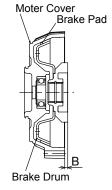
Code	Amount gear oil(ml)	Oil
EQ001S, EQ003S, EQ005S	510	KITO genuine product
EQ010S	840	KITO genuine product

# ■Guidelines for Checking Brake

- At the annual inspection, check the dimension of B and execute the counteraction in the table below depending on the condition.
- When 10 years passed since the start of use, replace the brake drum, motor cover, brake spring and pull rotor spring no matter what condition the B dimension is.

Condition of B dimension	Action
When it reaches the critical limit	Replace the brake drum, motor cover, brake spring and pull rotor spring.
l .	From that time on, check the B condition every monthly inspection till it reaches to the critical limit.
When it reaches near end of the standard rather than the intermediate point between standard and critical limit.	Check the B condition every monthly inspection.





#### Abrasion of Brake pad when using Brake

Code	Capaciy	Cnood	B dimens	sion (mm)	Criteria
Code	Сарасту	Speed	Standard	Critical Limit	
EQ001S EQ003S EQ005S	125kg, 250kg, 500kg	Single	3	4.1	Not to exceed
EQ010S	1t	Single	4	2.9	Not to fall below

# ■ Guidelines on Gear Parts Replacement (Load Gear, Friction clutch with Gear 2, Gear 3)

Operating hours to replace parts Body size grade	Every 400 hours	Every 800 hours	Every 1600 hours
M4, 1Am	-	Parts replacement	-
M5, 2m	-	-	Parts replacement

# ■Guidelines on Motor Shaft (with Rotor) Replacement

Operating hours to replace Body size grade parts	Every 200 hours	Every 400 hours	Every 800 hours	Every 1600 hours
M4, 1Am	-	Apply grease on spline	Parts replacement	-
M5, 2m	-	Apply grease on spline	ı	Parts replacement

<sup>\*</sup> Grease needs to be applied on spline part every 400, 800 and 1200 hours.

# Guidelines on Bearing Replacement

Operating hours to replace parts Body size grade	Every 400 hours	Every 800 hours	Every 1600 hours
M4, 1Am	_	Parts replacement	-
M5, 2m	_	-	Parts replacement

# ■Guidelines on Hook, Yoke and Suspension Eye Replacement

Replace the Hook, Yoke and Suspension Eye in accordance with the rate of loading and the number of start in the following table.

Rate of	Operating hours to replace parts loading	Every 2700 hours*	Every 4050 hours*	Every 5400 hours*
Light	A case where the capacity is rarely applied. Usually the hoist is used with a light load.			0
Medium	A case where the capacity is applied considerably frequently. Usually the hoist is used with a medium load.		0	
Heavy	A case where the capacity is applied considerably frequently. Usually the hoist is used with a heavy load.	0		
Ultra heavy	A case where the capacity is applied constantly.	0		

<sup>\*</sup>Take the intermittent rating (60%ED) of hoist as 360 starts/hour, calculate the operating hours of the timing for replacement.

When the number of start reaches over 360 per hour (frequent inching when start/stop hoist), replace the parts even if the operating hours do not reach at the following hours.

# Chapter 3

# **Troubleshooting**

This chapter describes the main failure cause and inspection items based on the fault conditions. The repair work (and maintenance work as well) of the electric chain hoist is accompanied with disassembling/assembling work. Refer to the separate "Disassembling/Assembling Manual" for the correct work.

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# **Guidance on Troubleshooting**

# **■**Guidance on Troubleshooting

Following table is the summary of the main failure causes based on the failure conditions and their inspection items. Refer to the page of each item for the check method, treatment and the details of countermeasure.

Conditions			Main fault contents	Check item	Reference page
Electric chain	Sounds no brake operating sound  Sounds no Electromagnetic contactor operating sound	Electromagnetic contactor operating	Improper source voltage	Power	75
hoist does not			Breakage or burning of control circuit Faulty electrical part	Circuit breaker	75
operate without load				Power Cable	76
loud				Internal wiring	78
			Electromagnetic Contactor	79	
				Transformer	79
				Fuse	80
				Upper/Lower Limit Switch	80
				Push Button Switch	81
				E-OLL board	78
		Sounds contactor Electromagnetic operating sound	Breakage or burning of power circuit Faulty motor or brake Faulty electrical part	Motor	77
				Brake	78
				Internal wiring	78
				Electromagnetic Contactor (melted contact points)	79
			E-OLL board	78	
	Sounds brake operating sound		Breakage of driving part Sticking of Bearing	Gears and Joints	
				Bearing	88
Electric chain hoist operates	Does not operate with a load (Motor sounds howling)		Overload (Clutch activated)	Friction Clutch	82
without load	Operates slowly with a load		Voltage drop	Power Cable	76
	Electric chain hoist operates in low speed mode, but does not operate in high speed mode or operates slowly.		Low source voltage	Power	75
			Voltage drop	Power Cable	76
	Does not operate in lowering or in low speed mode.		Faulty Braking Resistor	Braking Resistor	97
Operates differently from	Operates differently from the indication of the Push Button Switch (operates in the opposite direction)		Negative phase connection of motor lead wires	Motor	77
the indication			Wrong connection	Internal wiring	78
of the Push Button Switch.				Push Button Switch	96
Dutton Switch.	Does not operate when operating any one of the Push Button Switch		Breakage of control circuit	Internal wiring	78
				Push Button Switch	81
			Faulty electrical part	Upper/Lower Limit Switch	80
Does not stop normally	Too long (or short) stopping distance		Abrasion of brake lining	Brake	78
	Does not stop at the upper/lower limit.		Negative phase connection of motor lead wires	Power Cable	76
			Wrong connection	Internal wiring	78
				Push Button Switch	81

	Condition	S	Main fault contents	Check item	Reference page
Abnormal	Popping sound		Abrasion of the Load Chain	Load Chain	85
noise			Abrasion of the Load Sheave	Load Sheave	87
	Sounds strange ope	rating sound	Abrasion or breakage of Gear	Gears	87
			Deterioration of Bearing	Bearing	88
	Brake noise	Sounds when applied (scraping noise)	Dragging	Brake	78
		Sounds when released	Abrasion of brake lining	Brake	78
	Sounds at curved ra	il (friction noise)	Mechanical interference of the rail and the wheel	Traveling motion of the Trolley	88 89
Unable to trave	el		Slipping wheel	Traveling motion of the	88
			Inclined rail	Trolley	89
			Pulling a load in an inclined direction (floating wheel)		
			Defective gear engagement		
			Locking of brake		
			Defective engagement of		
			the Hand Wheel and the Hand Chain		
Serpentine mo			Mechanical interference	Traveling motion of the	88
Sounds strang	e noise		of the rail and the wheel	Trolley	89
			Wrong adjustment of spacer		
			Uneven abrasion of the wheel		
			Deformation of the wheel		
			Deterioration of Bearing		
			Deformation and abrasion of the rail		
			Deterioration of the Bearing		
			Abrasion of the Brake Pad		
Hook and thos	e related to Hook		Deformation	Hook	83
			Solomadon	11001	84
Load Chain an	d those related to Load	Chain	Abrasion, elongation, twist	Load Chain	85
Electric shock Switch	when touching the bod	y size and Push Button	Improper grounding, breakage of earth wire	Electric shock	82

## **Safety Precautions**

#### ■ General Matters on Failure Cause and Countermeasure

#### **⚠ DANGER**



• Do not disassemble or repair the electric chain hoist by the personnel other than maintenance engineer.

"Disassembling/Assembling Manual" and "Parts List" are provided separately for the maintenance. Disassembling and repair must be performed by the maintenance engineer in accordance with these materials for maintenance.

Failure to comply with this content may result in death or serious injury.



- When replacing the part, be sure to use the genuine part for KITO electric chain hoist EQ, EQSP. Even if the part is the KITO genuine part, the part for different model may not be used. Use the correct part in accordance with separate "Disassembling/Assembling Manual".
- When any abnormality is observed during the repair (maintenance) of the electric chain hoist, survey the cause by the maintenance engineer and carry out the repair.
- · Be sure to keep the following when repairing the electric chain hoist:
  - · Be sure to turn off the power.
  - · Be sure to indicate "CHECKING".
  - · Carry out the repair without lifting a load.
- Be sure to pay attention to the change of the operating sound of electric chain hoist and trolley.
   The change of operating sound is an important factor to judge the failure.

Failure to comply with this content may result in death or serious injury.

# **Troubleshooting**

## Power

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric chain hoist does not operate.	Improper source voltage	Measure the voltage of each phase at power receiving terminal.  If the source voltage is improper, check the power receiving facility.	Faulty power receiving facility	Check the power receiving facility regularly.
		<b>⚠ DANGER</b>		
		careful about electric shock when king the power.		
	NA. 1.4.	ss power check may result in death or injury due to electric shock.		

## Circuit breaker (Distribution panel)

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric chain hoist does not operate.	Breaker was tripped due to short circuit.	Replace or repair the short-circuited part.	Cable breakage, burning of electrical parts	Refer to each item of Power Cable, Motor and Internal Wiring, Transformer and Electromagnetic Contactor.
	Breaker was tripped due to insufficient breaker capacity.	Check the breaker capacity. Replace it if the capacity is insufficient.	Wrong selection of breaker capacity	Use the breaker with proper capacity. (See P44 .)
	Breaker was tripped due to over current.	Check the cause of over current and take the necessary countermeasure. (Refer to each item of Power Cable, Motor, Brake and Internal Wiring, Transformer and Electromagnetic Contactor.	Over voltage, low voltage, over load	Refer to each item of Power Cable, Motor, and Internal Wiring Transformer and Electromagnetic Contactor.

## Power Cable

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric chain hoist does not operate.	Wire breakage (more than two wires)	Check the conduction, flaw, crimping of terminals and soldering of plug. When any deficiency was observed,	Excessive force applied on the cable	Support the cable with Cable Support Arm securely.
		repair or replace the cable.	Non use of shake proof cable	Use shake proof cable to the moving part.
		Twist of wire	Twist of wire	Layout the wires without twisting.
			Cable was impeded by other facility.	Fix the cable not to be impeded by other facility.
	Wire burning (more than two wires)	• • • • • • • • • • • • • • • • • • • •	Temperature rise due to insufficient cable capacity	Use the cable with proper capacity. (See P44 .)
			Cables are bundled.	Do not bundle wires.
	Insufficient insertion of plug	Insert the connector plug to the end of the receptacle. Tighten the coupling ring securely.	Insufficient insertion at the installation	Fix the connector plug to the receptacle securely.
			Loosening of the fixing thread due to impact or vibration	Use the electric chain hoist avoiding the large impact.
Slow start or unable to start	Insufficient cable capacity	Check the cable size for adequacy. Replace with the proper cable if the cable capacity is insufficient.	Voltage drop due to insufficient cable capacity	Use the cable with proper capacity. (See P44 .)
Electric chain hoist operates but unable to lift a load. (single phase status)	Breakage or burning of one wire only	Refer to the breakage and burning of above items.		

## Motor

Symptom	Cause	Remedy	Main factor	Countermeasure
Motor does not operate.	Motor coil burning (two or more phases)	o or more phase. Replace the motor when the	Over current due to over voltage or low voltage	Operate the electric chain hoist at the rated voltage.
			Over current due to over load	Operate the electric chain hoist with a load less than the capacity.
			Operation exceeding intermittent rating	Check the intermittent rating. Operate the electric chain hoist within these ratings.
			Excessive inching or plugging operation (consecutive impression of start rush current)	Do not perform excessive operation.
			Over current due to brake dragging	Refer to the items of Brake.
	Lead wire breakage (more than two lead wires)	Measure the coil resistance of each phase. Replace the motor when the resistance of all phases are infinity.	Lead wire damaged at assembling	Assemble with care.
			Vibration, impact	Use the electric chain hoist avoiding the impact.
Electric chain hoist operates but unable to lift a load. (single phase status)	Motor coil burning (only one phase)	Measure the coil resistance of each phase. Replace the motor when the resistance of all phases are infinity.	Layer short due to poor insulation of coil (between phases)	Be careful about the intrusion of foreign matter into the motor when assembling.
	Lead wire breakage (only in one lead wire)	Measure the coil resistance of each phase. Replace the motor when the resistance of all phases are infinity.	Lead wire damaged at assembling	Be careful not to have the lead wire caught when assembling.
			Vibration, impact	Use the electric chain hoist avoiding the impact.

## Brake

Symptom	Cause	Remedy	Main factor	Countermeasure
Stops after traveling over 4 to 5 links after the operation is stopped. (Guideline: The travel of the Load Chain is within 2 to 3 links.)	Abrasion of brake lining	Check the manner of operation (excessive inching or frequent use). Carry out the inspection and use it correctly.	Excessive inching Frequent use	Check the electric chain hoist regularly. Use it correctly in accordance with the manual.
The load slides down when stopped	Defective function of the Friction	Check the place to use and friction function. Carry out the inspection and use it correctly.	Abrasion from habitual use for a long time Change in mechanical characteristics from leaving it for a long time	Use it correctly in accordance with the manual Pay attention to the place to use and the storage place.

## Internal wiring

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric chain hoist does not operate.	Breakage of wire	Check the wire. Repair the wire if broken.	Vibration, impact	Use the electric chain hoist avoiding the impact.
		1	Lead wire damaged at assembling	Be careful not to have the lead wire caught when assembling.
		Check the terminal. Repair the terminal if it is broken.	Improper crimping	Use the proper crimping tool.
	Wrong wiring	Check the wiring in accordance with the wiring diagram. Correct the wiring if it is wrong.	Wrong wiring at assembling	Correct the wiring in accordance with the wiring diagram.
	Loosened terminal screw (results in heat generation to burn)	Tighten the loosened screws.	Insufficient tightening at assembling	Tighten screws securely.
			Vibration, impact	Use the electric chain hoist avoiding the impact.
	Incomplete connection of plug, connector and insertion terminal	Connect plug, connector and insertion terminal correctly if they are not connected securely. Tighten the lock ring of the connector plug securely.	Incomplete connection at assembling	Connect plug, connector and insertion terminal securely.

## E-OLL

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric chain hoist does not operate.	Overload	Overload limiter of E-OLL triggered and stops. When the cause is overload limiter, LED on the E-OLL board blinks. Hold the lower button for over the second and be able to operate. When released, LED on the E-OLL turns lighting.	Overload	Ambient temperature is below freezing when using less than rated capacity, operate no-load.
	E-OLL board breakage	Stops due to the failure detection. When the cause is malfunction, LED on the E-OLL board blinks. Recovered by turning on/off, LED on the E-OLL turns lighting. In case not recovered and keep blinking, replace the board.	Board breakage Abnormal input signal	Replace E-OLL board which use within the product specification.

#### Transformer

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric chain hoist does not operate.	Burnout or breakage of transformer coil	Measure the resistance of transformer coil. If it is infinity, replace the transformer.	Over voltage	Operate the electric chain hoist with the rated voltage.
(Electromagnetic Contactor does not operate.)			Excessive inching or plugging operation (consecutive impression of start rush current)	Do not perform excessive operation.
			Over current due to defective operation of Electromagnetic contactor	Refer to the items of Electromagnetic Contactor.
			Vibration, impact	Use the electric chain hoist avoiding the impact.
	Breakage of lead wire	Check the lead wires of the transformer. Repair or replace the transformer if the lead wire has no conduction.	Vibration, impact	Use the electric chain hoist avoiding the impact.

## Electromagnetic Contactor, Relay

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric chain hoist does not stop	Electromagnetic Contact point welding, or fusing	int the conduction.  fusing When the contact point is welded or fused, replace the contactor.	Excessive inching or plugging operation (consecutive impression of start rush current)	Do not perform excessive operation.
		check the contact point visually.		Operate the electric chain hoist with the rated voltage.
			Over current due to over load	Use the electric chain hoist with a load less than the capacity.
Electric chain hoist does not operate.	Burnout or breakage of relay coil or contactor coil	Measure the resistance of relay coil or contactor coil. If it is infinity, replace the relay or the contactor.	Excessive inching or plugging operation (consecutive impression of start rush current)	Do not perform excessive operation.
			Over voltage	Operate the electric chain hoist with the rated voltage.
			Chattering due to low voltage (consecutive impression of start rush current)	Operate the electric chain hoist with the rated voltage.
	Damaged moving parts	Operate the Electromagnetic contactor by its manual operation part. Replace the contactor if it does not move smoothly. Check the miniature relay visually if it does not have damaged part.	Vibration, impact	Use the electric chain hoist avoiding the impact.

#### Fuse

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric chain hoist does not operate. (Electromagnetic	Check the conduction of the fuse. When no conduction, check the cause and then replace the fuse.	control circuit, burnout related to the	Refer to the items related to the electrical part in failure.	
Contactor does not operate.)			Over current due to defective operation of Electromagnetic contactor	Refer to the items of Electromagnetic Contactor.

## Upper/Lower Limit Switch

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric chain hoist does not operate. (Electromagnetic Contactor does not operate.)	Contact point fusing	Actuate the limit switch manually to check the conduction of the contact points.  Replace the limit switch as a whole when no conduction.	Habitual use of the limit switch	Not used regularly
	Breakage	Check the wiring. Repair or replace the limit switch as a whole if the limit switch has no conduction.	Vibration, impact	Use the electric chain hoist avoiding the impact.
	Moving part rusted shut (defective return action of the moving part)	Check the moving part of the limit switch such as actuator lever is not stiff. If it is stiff, remove the rust or replace the stiff part.	Leaving the electric chain hoist for a long time at the upper/lower limit.	Do not leave the electric chain hoist at the upper/lower limit.
Electric chain hoist does not stop at the upper/lower limit.	Contact point welding	Actuate the limit switch manually to check the conduction of the contact points.  Replace the limit switch as a whole when it does not turn off.	Habitual use of the limit switch	Do not use the limit switch habitually.
	Moving part rusted shut	Check the moving part of the limit switch is not stiff. If it is stiff, remove the rust or replace the stiff part.	No use for a long time, use in an environment with rich moisture	Check the electric chain hoist regularly.
	Wrong wiring	Check the wiring in accordance with the wiring diagram. Perform the wiring correctly.  If the wiring of the limit switch is correct, the cause is in the negative phase connection. Change two wires of the power line.	Wrong wiring	Correct the wiring in accordance with the wiring diagram.

## Push Button Switch

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric chain hoist does not operate.	Emergency Stop button is pressed to its end and locked.	When the Emergency Stop button is pressed and locked, pull the button forward or turn it clockwise to release the lock.  Emergency Stop button	Forgot releasing the Emergency Stop button	Read "How to Operate the Push Button Switches" (P26 ) and use the electric chain hoist.
	Faulty switch unit	Check the conduction of the contact points. Replace the Push Button Switch if it has no conduction.	Vibration, impact	Use the electric chain hoist avoiding the impact.
	Breakage inside the switch	Check that the Push Button Switch cord is connected with the switch unit correctly. Repair the cord if it has no conduction.	Vibration, impact	Use the electric chain hoist avoiding the impact.
	Loosened screw to fix the casing	Tighten the screw if loosened	Vibration, impact	Use the electric chain hoist avoiding the impact.
	Wire breakage of Push Button Switch Cord	Check the conduction of the Push Button Switch Cord. If it has no conduction, replace the cable, or the Push Button Switch Cord as a set.	Damage of cable cover	Operate the electric chain hoist not to impede with other facility.
			External force applied on the cable due to improper tying of the protection wire	Tie the protection wire securely. (See "Connecting Cables" (P46 ).)
The electric chain hoist does not operate as indicated.	Wrong wiring	Check the wiring in accordance with the wiring diagram. Perform the wiring correctly.  If the wiring of the Push Button Switch is correct, the cause is in the negative phase connection. Change two wires of the power line.	Wrong wiring	Correct the wiring in accordance with the wiring diagram.
	Wrong affixing of N-E-S-W label	Affix the label in the correct direction.	Affixing the label in an improper direction	Affix the label correctly.
Electric chain hoist does not stop even if the Push Button is released.	Defective return action of the switch unit	Replace the Push Button Switch if it does not operate smoothly.	Vibration, impact	Use the electric chain hoist avoiding the impact.

#### Electric shock

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric shock when touching the	Improper grounding	exceeds 100 $\Omega$ , perform grounding work in accordance with the relevant laws and regulations.	Defective grounding work	Perform the grounding work securely.
body size and Push Button Switch			Contact failure of the grounding wire	Connect the grounding wire securely without loosened screw
			Breakage of grounding wire	Layout the grounding wire to avoid the stress applied on it. (See the item of Power Cable and Push Button Switch.)
	Attachment of waterdrop	Remove the waterdrop, dry the electric chain hoist and then use it.	Operation by wet hand	Do not operate the electric chain hoist by wet hand.

#### **Friction Clutch**

## **M** DANGER



• Do not adjust/disassemble the Friction Clutch.

Adjusting or disassembling the Friction Clutch may result in death or serious injury.

Symptom	Cause	Remedy	Main factor	Countermeasure		
Unable to lift a load, or the load lowers after stop.	Clutch is activated (normal)	Lighten the load less than the rated load and use the electric chain hoist.	Over load	Use the electric chain hoist with a load less than the rated load.		
	Abrasion of Clutch Disk	Replace the Friction Clutch.	Too many use of the Friction Clutch	Avoid the over load.		
			Approaching service life limit	Do not use the body size exceeding the service limit.		
	Change in mechanical characteristics of	echanical t		Use KITO genuine oil.		
	the Friction Clutch	<u> </u>				
		• Use KITO genuine gear oil Use of the oil other than KITO due to the drop of a lifted load	genuine oil may result in	death or serious injury		
			Leaving the electric chain hoist for a long time without use	Pay attention to the place to use and the storage place.		
	Temperature rise inside the gear box	Resume the operation after cool down. When it is still unable to lift a load, replace the Friction Clutch.	Use in a hot environment, or excessively frequent use	Avoid the use in a hot environment or excessively frequent use.		

# Hook

Symptom	Cause	Remedy	Main factor	Countermeasure
Widened Hook opening	Deformation of the Hook	Replace the Hook if the deformation exceeds the criteria. (See P62.)	Over load	Use the electric chain hoist with a load less than the capacity.
			Earth lifting	Do not carry out earth lifting. Be careful not to impede the Hook with protruding object during lifting.
			Slinging a load at the tip of the Hook.  Lateral pulling of the Hook	Sling a load at the center of the Hook
			Improper slinging	Angle formed by two slings must be 120 degrees or less.  120 degrees or less
			Use of the sling with a size improper to the Hook	Use the proper sling.
Twisted hanging of the Hook			Use of the Hook with the Load Chain wound on a load	Do not wind the Load Chain directly on a load.
Hook unable to swivel smoothly at the neck	Rusting shut or corrosion of Bearing	Swivel the Hook at the neck by hand. If it is difficult to swivel smoothly, overhaul or replace the Bearing.	Insufficient grease application, corrosion due to environment of use	Apply grease regularly. Use the sling to avoid the dipping of the Hook into chemicals.
	Damaged Bearing		Intrusion of dust	Be careful about the intrusion of foreign matter into the neck.

## Hook (continued)

Symptom	Cause	Remedy	Main factor	Countermeasure
Hook Latch has come off	Deformation of the Hook	Replace the Hook if the deformation exceeds the criteria. (See P70.)	Over load	Use the electric chain hoist with a load less than the capacity.
			Earth lifting	Do not carry out earth lifting. Be careful not to impede the Hook with protruding object during lifting.
			Use of the sling with a size improper to the Hook	Use the proper sling.
	Deformation and come-off of the Hook Latch	Replace the Hook Latch if it has come off or is deformed.	Sling put on the Hook Latch	Do not put the sling on the Hook Latch.
Hook bent at the neck (shank)	Deformation or damage of the Hook at its neck	Replace the Hook bent at the neck.	Lifting a load at the tip of the Hook  Lateral pulling of the Hook	Sling a load at the center of the Hook
Hook unable to swivel smoothly at the neck	Rusting shut or corrsion of Bearing	Swivel the Hook at the neck by hand. If it is difficult to swivel smoothly, overhaul or replace the Bearing.	Insufficient grease application, corrosion due to environment of use	Apply grease regulary. Use the sling to avoid the dipping of the Hook into chemicals.
	Damaged Bearing		Intrusion of dust	Be careful about the intrusion of foreign matter into the neck.

## Load Chain

Symptom	Cause	Remedy	Main factor	Countermeasure
Twisted Load Chain	Load Chain is twisted inside the main body of the electric chain hoist.	Remove the Chain Guide and the Load Chain, and then reassemble them.	Improper assembling	Assemble the electric chain hoist correctly. (See Disassembling/ Assembling Manual)
Sudden activation of the Friction Clutch when lowering	Knot of the Load Chain due to entanglement in the Chain Container	Check the capacity of the Chain Container (with the nameplate on the Chain Container). If insufficient, replace the Chain Container with a larger capacity.	Insufficient capacity of the Chain Container	When installing the electric chain hoist, check the lift and the capacity of the Chain Container, and assemble them correctly.
Sounds the popping sound	Abrasion of the Load Chain links	Measure the abrasion of wire diameter. Replace the Load Chain if it reaches at the abrasion limit. (See P78)	Long hour operation without grease	Apply lubricant regularly. (See P31 )  Grease application portion  Load
			Excessive inching operation	Do not perform excessive operation.
			Over load	Use the electric chain hoist with a load less than the capacity.
			Pulling a load in an inclined direction	Do not pull a load in an inclined direction.
			Abrasion of Load Sheave	Refer to the item of Load Sheave.
	Elongation of pitch	Measure the sum of pitches of 5 links. Replace the Load Chain if this value exceeds the limit value. (See P78)	Over load	Use the electric chain hoist with a load less than the capacity.

## Load Chain (continued)

Symptom	Cause	Remedy	Main factor	Countermeasure
Irregular noise	Flaw and deformation of the Load Chain surface	Replace the Load Chain with apparent flaw or deformation.	Use of the Load Chain without canceling capsized state	When using multi fall model hoist, check that the Hook is not capsized before use.
			Use of the Load Chain as twisted	Assemble the electric chain hoist correctly. (See Disassembling/ Assembling Manual)
	Hit flaw on the Load Chain surface		Hit with other object strongly	Use the electric chain hoist carefully paying attention not to impede with other object.
Surface losing lust and discolored	Rusting and corrosion	Remove rust and apply oil. Replace the Load Chain if the rust and corrosion is apparent.	Run-out of oil	Apply lubricant regularly. (See P31 )  Grease application portion  Load
			Use of electric chain hoist exposed to rain	Store the electric chain hoist indoor or under the roof when not using.
			Influence of sea water and chemicals	Contact KITO for the use in special environment in advance. Use the electric chain hoist correctly within the scope guaranteed by the manufacturer.
Breakage of the Load Chain	Expiry of the service life	Check the Load Chain and replace it if exceeded the criteria. (See P78)	Mechanical service life expiry	Handle the Load Chain correctly and perform the appropriate control including daily inspection and inspection.

## Load Sheave

Symptom	Cause	Remedy	Main factor	Countermeasure
Sounds popping sound	Abrasion of sheave pocket or flaw by the Load Chain out	Measure the thickness of the crest. Replace the Sheave if the thickness is less than the criteria. (See P73)	Long hour operation without grease, expiry of service life	Apply lubricant regularly. (See P31)
	of mesh with the Sheave		Excessive inching operation	Do not perform excessive operation.
	Worn part		Over load	Use the electric chain hoist with a load less than the capacity.
			Pulling a load in an inclined direction	Do not pull a load in an inclined direction.

## Chain Guide

Symptom	Cause	Remedy	Main factor	Countermeasure
Swinging of a load became larger than when purchasing	Abrasion of cross guide	·	Pulling a load in an inclined direction	Do not pull a load in an inclined direction.

## Gears

Symptom	Cause	Remedy	Main factor	Countermeasure
Unable to lift a load.	Abrasion, Damage	Replace gear or joint if it is worn apparently or damaged	Long hour operation without oil	Keep the oil change cycle. (See P82)
			<u> </u>	NGER
			• Use KIT	O genuine gear oil.
			Mandatory genuine oil	e oil other than KITO may result in death or ury due to the drop of d.
Irregular motion	Partial abrasion or damage		Too many use of the Friction Clutch	Avoid the over load.
			Habitual use of Upper/ Lower Limit Switch	Do not use Upper/ Lower Limit Switch habitually.

## Bearing

Symptom	Cause	Remedy	Main factor	Countermeasure
Unable to lift a load.	Sticking, Breakage	Replace the bearing.	Use under hot environment or excessively frequent use	Avoid using under hot environment or excessively frequent use
Strange noise	Deterioration	Replace the bearing.	Use under hot environment or excessively frequent use	Avoid using under hot environment or excessively frequent use

## Traveling motion of the Trolley

Symptom	Cause	Remedy	Main factor	Countermeasure
Unable to travel due to slipping of wheel	Inclination of Travel Rail	Make sure that rail gradient is within 1 degree.	Improper installation of Travel Rail	Install the Travel Rail correctly.
Unable to travel due to slipping of wheel, or unable to travel in uniform motion	Oil attachment on running surface of the rail	Wipe off the attached foreign matter of the rail.	Use under the environment likely to attach foreign matter	Clean the Travel Rail regularly.
Sounds abrasion sound when running on a curved rail	Friction resistance between wheel and rail	Apply small amount of grease on the rail surface where noise generates.		
Unable to travel on the curved rail				
curved raii	Interference of the trolley and the curved rail	Make sure that the rail curvature is larger than the minimum turning radius. (See P33 -P36)	Use of the curved rail of curvature less than minimum turning radius	Do not use the curved rail of curvature less than minimum turning radius
Unable to travel due to wheel floating	Pulling a load in an inclined direction (floating wheel)	_	Operating method	Use the electric chain hoist correctly.
Wheel unable to rotate	Defective gear engagement	Remove the stain and foreign matter on the wheel and the gear.	Ambient conditions, environment	Check regularly.
Serpentine motion Strange noise	Wrong adjustment of spacer	Check the number of spacers and their assembled positions.	Incomplete checking	Assemble correctly.
	Uneven abrasion of the wheel	Check the abrasion of the wheel.	Traveling on curved rail or unevenness of running surface	Check regularly.
	Deformation of wheel	Check the distortion of wheel and damage of running surface.	Excessively frequent collision with stopper or unevenness of running surface	Replace the wheel Use the electric chain hoist correctly.
	Deterioration of wheel bearing	Check if rolling noise sounds when the wheel is rotating.	Expiry of service life	Replace the wheel bearing.
	Deformation and abrasion of the rail	Check the abrasion and deformation of the rail.	Over load or expiry of service life	Replace the rail. Use the electric chain hoist correctly.

## Traveling motion of the Trolley (continued)

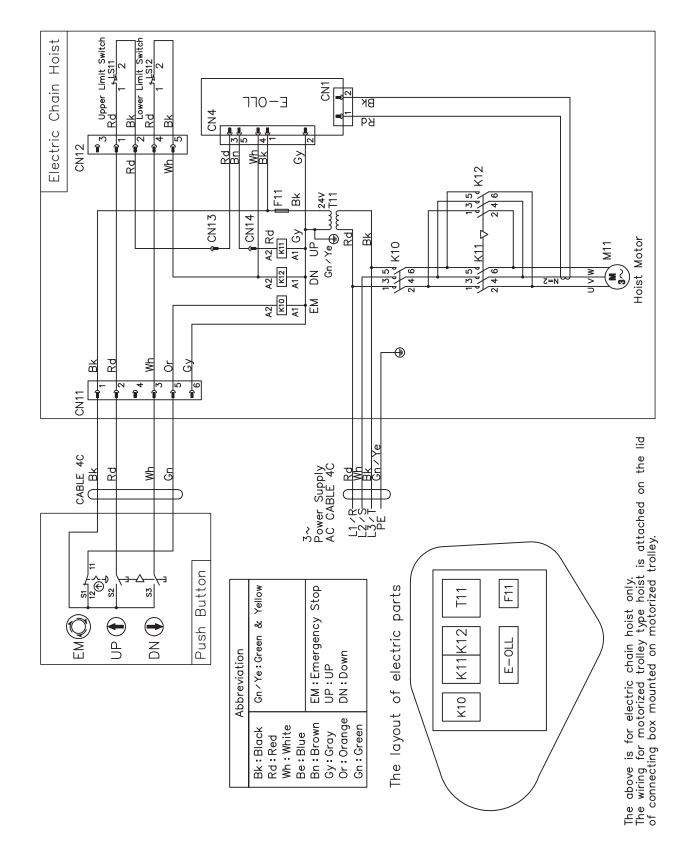
Symptom	Cause	Remedy	Main factor	Countermeasure
Unable to pull the Hand Chain	Defective engagement of the Hand Wheel and the Hand Chain	Engage the Hand Chain with the Hand Wheel correctly.		Replace the Hand Chain with abrasion or deformation.

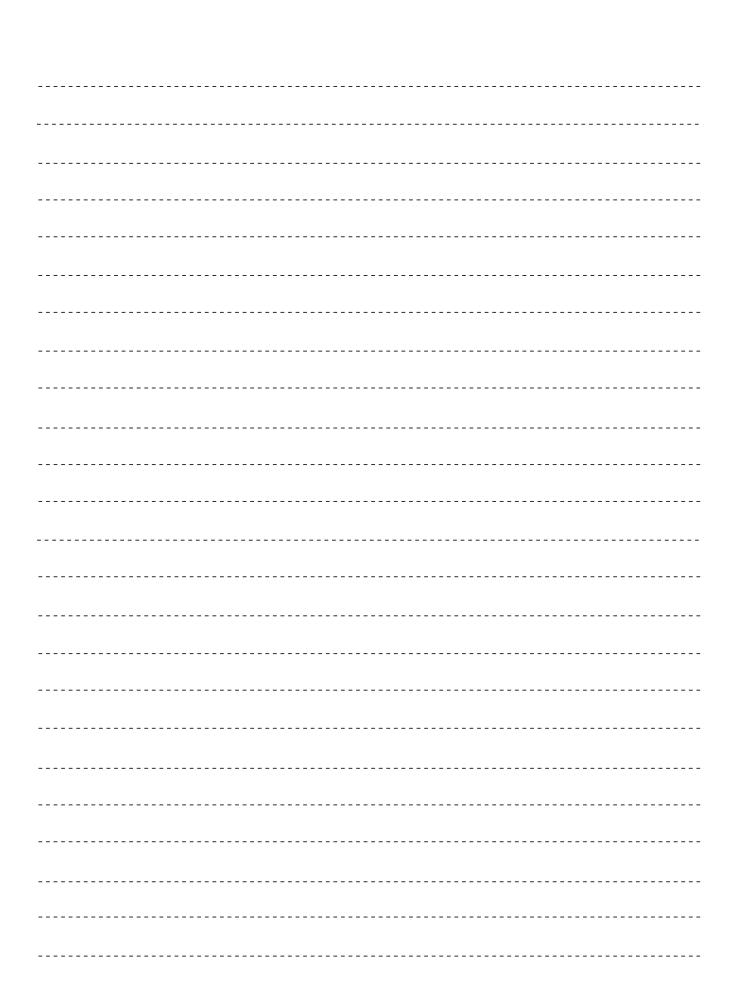
# **Appendix**

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# **Wiring Diagram**

## **■EQ** Wiring Diagram





# **Parts List**

## ■Body, gear case, motor

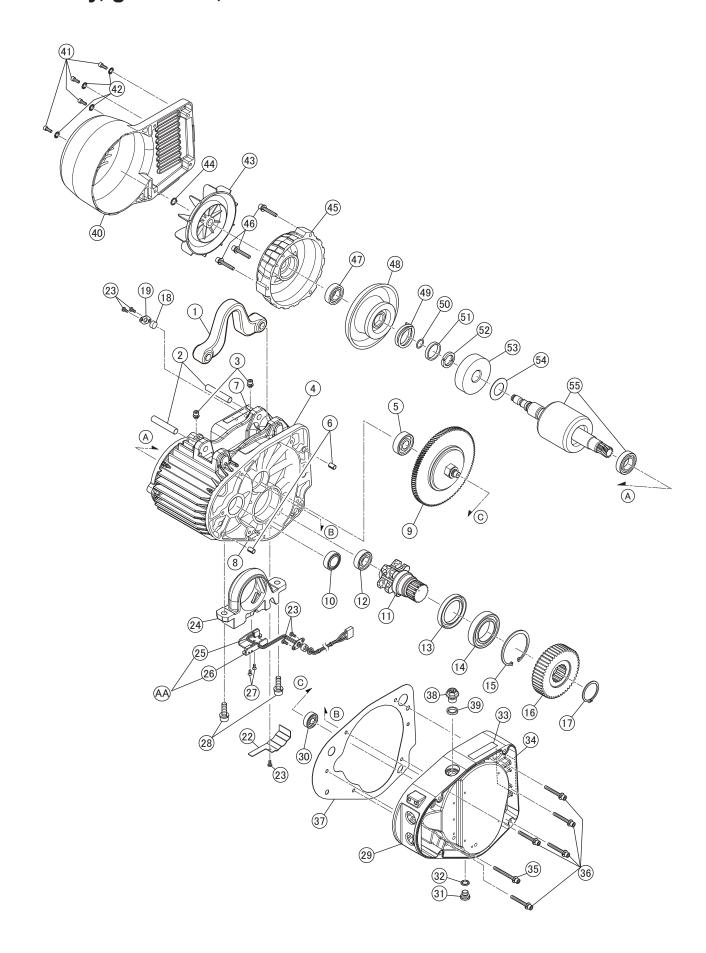
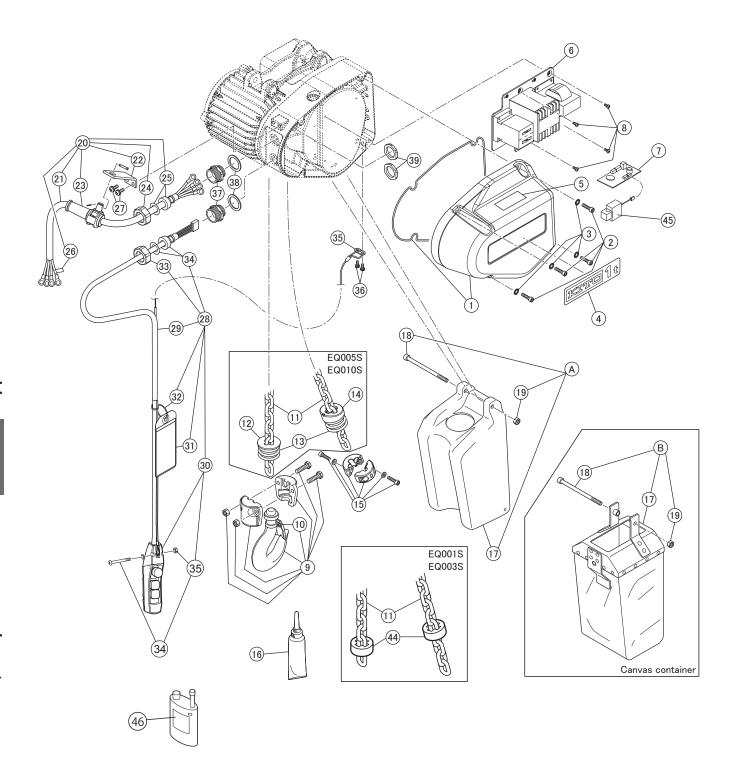


Figure	Part		Que	Part Code				
ıre#	Part Number	Part Name	Quantity per unit	EQ001S	EQ003S	EQ005S	EQ010S	Remark
1	001	Suspension Eye	1	EQ1CI9001	←	←	EQ1DI9001	For KITO EQ trolley connection
2	121	Top pin	2	EQ1CI9121	←	←	EQ1DI9121	
3	033	Machine screw socket bolt	2	J1BG1-0601010	←	←	←	For Top pin
5	238	Ball bearing	1	J1GR000-06202	←	←	J1GR0A0-06303	
6	137	Set pin S	2	E6SE005S9120	←	←	←	
7	820	Warning sticker HW	1	ER2CI9807	<b>←</b>	←	<b>←</b>	
8	960	Name plate side E	1	ER1BS9960	←	<b>←</b>	←	
9	1223	Friction clutch complete set	1	EQ1CG1223	EQ1CF1223	EQ1CI1223	EQ1DI1223	F M 1 1 6
10	244	Oil seal	1	EQ1CI9244	←	<b>←</b>	EQ1DI9244	For Motor shaft
11	241 242	Load sheave	1 1	EQ1CI9241 J1GR0C0-06005	<u>←</u>	← ←	EQ1DI9241	For Load sheave
13	242	Ball bearing Oil seal	1	EQ1CI9245	<u>←</u>	<b>←</b>	EQ1DI9245	For Load sheave
14	243	Ball bearing	1	J1GR030-06007	<u>←</u>	<u>←</u>		For Load sheave
15	207	Snap ring	1	JISR000-00062	<u>←</u>	<u>←</u>		For Bearing (load side)
16	240	Load gear	1	EQ1CG9240	EQ1CF9240	EQ1CI9240	EQ1DI9240	To Bearing (lead side)
17	208	Snap ring	1	JISS000-00034	<u> </u>	<u> </u>	JISS000-00040	For Load gear
18	187	Packing	1	EQ1DI9187	<u>.</u> ←	· ←	EQ1DI9187	1 or Load god.
19	153	Cable holder	1	EQ1DI9153	←	<b>←</b>	←	
22	151	Limit switch cord cover	1	EQ1CI9151	←	←	EQ1DI9151	
23	152	Machine screw with spring washer	5	J1AP2-4001010	<b>←</b>	←	<b>←</b>	For Limit switch cord cover, Cable holder
24	331	Chain guide	1	EQ1CI9331	←	←	EQ1DI9331	
25	1333	Limit switch assembly	1	EQ1CI1333	←	←	EQ1DI1333	
27	335	Machine screw	2	J1AL2-4001010	←	←	←	
28	165	Machine screw socket bolt	2	J1BG1-0802525	←	←	J1BG1-1003030	For Chain guide
29	110	Gear case	1	EQ1CI9110	←	←	EQ1DI9110	
30	239	Ball bearing	1	J1GR0A0-06200	<b>←</b>	<b>←</b>	J1GR0A0-06201	
31	133	Oil plug	1	E5FE003S9111	←	←	E5FE003S9111	
32	136	Plug packing	1	E2YS005-9109	<b>←</b>	<b>←</b>	<b>←</b>	
33 34	810 815	Name plate OF Name plate SP	1	ER2CS9849	←	←	<b>←</b>	
35	167	Machine screw socket bolt	1	J1BG1-0603030	<u>←</u>	← ←	<u>←</u> ←	For Gear case
36	162	Machine screw socket bolt	5	J1BG1-0605050	<del>-</del>	<u>←</u>	<del>-</del>	For Gear case
37	116	Packing G	1	EQ1CI9116	<u>`</u>	· ←	EQ1DI9116	1 of Geal case
38	135	Oil plug B	1	ER1BS9135	<u>·</u>	<u> </u>	<u> </u>	
39	173	Eyebolt packing	1	E2YS005-9116	←	←	<b>←</b>	
40	107	Fan cover	1	EQ1CI9107	←	←	EQ1DI9107	
41	164	Socket bolt	4	J1BE1-0501414	←	←	←	For Fan cover
42	225	Toothed lock washer	4	J1WH012-10050	←	←	←	For Fan cover
43	108	Fan	1	ER2BS9108	←	←	ER2CS9108	
44	323	Snap ring	1	J1SS000-00013	←	←	←	
45	106	Motor cover	1	EQ1CI9106	←	←	EQ1DI9106	
46	163	Machine screw socket bolt	3	J1BG1-0605050	←	←		For Motor cover
47	209	Ball bearing	1	J1GR0C0-06203	←	←	J1GR060-06004	
48	5212	Brake drum assembly	1	EQ1CI5212	<b>←</b>	← 	EQ1DI5212	
49	214	Brake spring	1	EQ1CF9214	←	EQ1CI9214	EQ1DI9214	
50	324	O ring	1	J10P011-00125	<b>←</b>	<b>←</b>	J10P011-00160	
51	318	Collar	1	E5FE003S9506	←	←	E5FE005S9506	
52	317	Thrust disc	2	E5FE003S9505	<b>←</b>	<b>←</b>	E5FE005S9505	
53	503	Pull rotor	1	E5FE003S9503	<b>←</b>	<b>←</b>	E5FE005S9503	
54	316	Coned disc spring	1	E5FE003S9504 EQ1CF55022	<u>←</u>	← EQ1Cl55022	E5FE005S9504 EQ1DI55021	For LOT No. EQ1A
55	5502	Motor shaft with rotor	1	EQ1CF55022 EQ1CF55023	<u>←</u>	EQ1Cl55022 EQ1Cl55023	EQ1DI55021	For LOT No. EQ1C
*1 1	oguiro	every time	-					

<sup>\*1.</sup> Inquire every time.

# ■Electric, component and chain



Part Number Figure #		Part Name	ည	Part Code				
			Quantity per unit	EQ001S	EQ003S	EQ005S	EQ010S	Remark
1	2104			EQ1CI2104	←	←	EQ1DI2104	
2	161	Socket bolt	4	J1BE1-0602525	←	←	←	For Controller cover
3	224	Toothed lock washer	4	J1WH012-10060	←	←	←	For Controller cover
4	800	Name plate B	1	EQ1BUQ01I9A3	EQ1BUQ03I9A3	EQ1BUQ05I9A3	EQ1BUQ10I9A3	
5	935	Warning sticker E	1	ER2CS9937	←	←	←	
6	1441	Plate complete set	1	EQ1BPY10S5A2	←	←	←	
7	519	E-OLL board	1	ECP91KB80	←	←	←	
8	196	Machine screw with spring washer	4	J1AP2-4001212	←	←	←	
9	1011	Bottom hook complete set	1	EQ1CG1011	EQ1CF1011	EQ1CI1011	EQ1DI1011	
10	1002	Hook latch assembly	1	ER2CS1002	←	←	ER2DS1002	
11	874	Load chain	1	KAZN056W0000	←	←	KAZN071W0000	
12	054	Limiting plate	1	×	×	EQ1CI9054	EQ1DI9054	
13	051	Chain spring	2	×	x	EQ1CI9051	EQ1DI9051	
14	055	Spring guide	1	×	×	EQ1CI9055	EQ1DI9055	
15	1041	Stopper assembly	2	ER1CS1041	←	←	ER1DS1041	
16	1951	Lubricant tube assembly	1	ER2CS1951	←	←	←	
A	1401	Chain container P complete set	1	EQ1CI1401	←	←	EQ1DI1401	Plastic container
17	401	Chain container P	1	EQ1CI9401	←	←	EQ1DI9401	
18	166	Socket bolt	1	J1BE1-0809028	←	←	J1BE1-0812028	For chain container
19	226	Lever nut	1	C2BA100-9074	←	←	<b>←</b>	For chain container
(B)	1405	Chain container (15) complete set	1	EQ1CI1405	←	←	×	Canvas container
17	5405	Chain container (15) assembly	1	EQ1CI5405	←	←	×	
18	166	Socket bolt	1	J1BE1-0809028	<b>←</b>	←	×	For chain container
19	226	Lever nut	1	C2BA100-9074	←	←	×	For chain container
		Power supply cable assembly		ZLZB11CQ1000	←	←	<b>←</b>	
20	1521		1	ZLZB11AQ1000	<b>←</b>	<b>←</b>	<b>←</b>	Cable one size larger than the standard size
				Z2CU401-0000	←	←	←	
21	521	Cable	1	Z2CU402-0000	←	<b>←</b>	<b>←</b>	Cable one size larger than the standard size
22	541	Cable support arm	1	ER1BS9541	←	←	<b>←</b>	
		Cable support 12 assembly		E7AX003S2822	←	←	←	
23	1542	Cable support 14 assembly	1	E4YS005-2822	<b>←</b>	<b>←</b>	<b>←</b>	Cable one size larger than the standard size
24	569	Holder A	1	ECP5924AA	←	<b>←</b>	<b>←</b>	
				ECP6912AA	←	←	←	
25	574	Cable packing	1	ECP6914AA	<b>←</b>	<b>←</b>	<b>←</b>	Cable one size larger than the standard size
26	823	Name plate G	1	E6LE010S9806	←	<b>←</b>	<b>←</b>	
27	542	Machine screw with spring washer	2	J1AP2-6001616	←	←	<b>←</b>	For Cable support arm
28	1557	Push button cord EH complete set	1	ZBS0025W1000	←	<b>←</b>	<b>←</b>	
29	557	Cable	1	Z3CR401-0000	←	←	<b>←</b>	
30	1561	3 push button switch assembly	1	SWDB100AA	←	←	<b>←</b>	
47	626	Machine screw with spring washer	1	J1AP2-4002608	<b>←</b>	<b>←</b>	<b>←</b>	
48	627	Nut	1	J1NA004-10040	←	←	<b>←</b>	
31	565	Warning tag PB	1	SWD9013AB				
32	566	Tag holder	1	E7SE003S9787	← ←	← ←	<b>←</b>	
33	569	Holder A	1	ECP5924AA			<b>←</b>	
34	574	Cable packing	1	ECP5924AA ECP6912AA	← ←	← ←	<b>← ←</b>	
35	535	Cable packing  Cord support (wire stopper)	1	ER1BS9534				
36	536		2	J1AP2-5001212	<b>←</b>	<b>←</b>	<b>←</b>	For Cord support
		Machine screw with spring washer			<b>←</b>	<b>←</b>	<b>←</b>	For Cord support
37 38	891 892	Holder B Holder packing	2	ECP5924AB ECP5924AQ	← ←	← ←	<u>←</u>	
39	892	· · ·		ECP5924AQ ECP5924AD			<b>←</b>	
44		Holder nut Cushion rubber	2	ER1CS9053	<b>←</b>	<b>←</b>	<b>←</b>	
44	053		2		<b>←</b>	×	×	
45	510 855	Current sensor Oil pot F	1	ECP94SN101 ER1BS1855	<b>←</b>	<b>←</b>	← ER1CS1855	
40	000	l Oil bot i	'	LIVIDO 1000	←	←	LIX1031000	

## **WARRANTY**

KITO Corporation ("KITO") extends the following warranty to the original purchaser ("Purchaser") of new products manufactured by KITO (KITO's Products).

- 1) KITO warrants that KITO's Products, when shipped, shall be free from defects in workmanship and/or materials under normal use and service and KITO shall, at the election of KITO, repair or replace free of charge any parts or items which are proven to have said defects, provided that all claims for defects under this warranty shall be made in writing immediately upon discovery and, if there is anything within a warranty period stated by your dealer from whom you purchased the products from the date of purchase of KITO's Products by Purchaser and provided, further, that defective parts or items shall be kept for examination by KITO or its authorized agents or returned to KITO's factory or authorized service center upon request by KITO.
- 2) KITO does not warrant components of products provided by other manufacturers. However to the extent possible, KITO will assign to Purchaser applicable warranties of such other manufacturers.
- 3) Except for the repair or replacement mentioned in (1) above which is KITO's sole liability and purchaser's exclusive remedy under this warranty, KITO shall not be responsible for any other claims arising out of the purchase and use of KITO's Products, regardless of whether Purchaser's claims are based on breach of contract, tort or other theories, including claims for any damages whether direct, incidental or consequential.
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- 5) KITO shall not be responsible for any loss or damage caused by transportation, prolonged or improper storage or normal wear and tear of KITO's Products for loss of operating time.
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