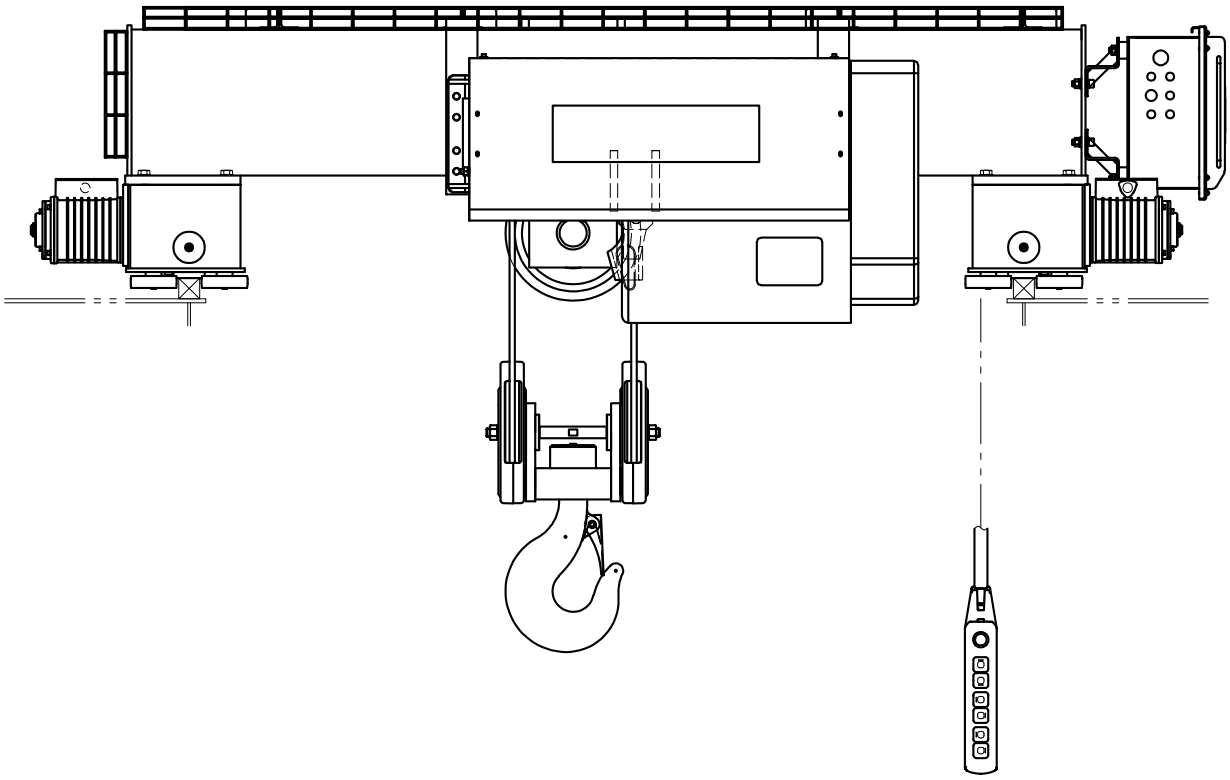
RY Series Wire Rope Hoist (10t)

Owner's Manual

Double Girder Type: RYW



To Customer

- Thank you for purchasing RY Series Wire Rope Hoist.
- Operators and maintenance engineers are requested to read this manual.
- After reading, please keep this manual at hand for future use.

Table of Contents

Introduction

This product is designed and manufactured to lift and lower a load within a normal work environment and to move the lifted load laterally in combination with the traversing device. Movement of a load in a 3D direction such as up/down, forward/backward and right/left is also enabled by combining with a traveling device.

This Owner's Manual is intended for those operating the hoist and maintenance engineers (* personnel with expertise).
Other than this manual, Disassembly/Reassembly Manual is also available for the maintenance engineers who are responsible for the hoist management such as regular inspections and repairs. Please contact the nearest distributor or Kito for these materials.

* A personnel who is proficient in the structure and working principle of the wire rope hoist and is certified as having adequate knowledge of the product.

■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 traversing 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 this Owner's Manual and the instruction manuals of related products carefully to fully understand their contents before using and operating the product.
- Be sure to wear the proper clothing and protective equipment when using and operating the product.
- Hoists and cranes must be operated by a person who is proficient in the use of them.

■ 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 the hoist may cause serious accidents resulting in death or severe injury 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 the hoist (option, crane, etc.), and follow the described contents.

Description of Signal Words

⚠ **DANGER**	Indicates an imminently hazardous situation which, if not avoided, will result in death or severe injury.
⚠ **WARNING**	Indicates a potentially hazardous situation which, if not avoided, could result in death or severe 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 of these items describe important matters. Please follow the instruction.
After reading, please keep this manual at hand for future use by the user.

Description of Safety Symbols


Prohibited

⃠ means "Prohibited" or "You must not do".
Prohibited action is shown in the circle or described near the circle with words and figures.
This Owner's Manual uses ⃠ as the general prohibition.


Mandatory

❗ means "Mandatory Action" or "You must do".
Required action is shown in the circle or described near the circle with words and figures.
This Owner's Manual uses ❗ as the general instruction.

■General Matters on Handling and Control

⚠ WARNING


Prohibited

- **This product shall not be disassembled and repaired by personnel other than maintenance engineers.**
  Failure to comply with this instruction may limit the normal functions and performance of the hoist, as well as causing the hoist to malfunction or break down, triggering a serious accident.
  Other than this manual, Disassembly/Assembly Manual is provided for the maintenance engineers. Perform the disassembling and repair of the hoist by the maintenance engineer in accordance with the Disassembly/Assembly Manual, or contact Kito.
- **Do not modify the product and its accessories.**
  Failure to comply with this instruction may limit the normal functions and performance of the product due to alteration, as well as causing the product to malfunction or break down, triggering a serious accident. Altered products are not included in the warranty.


Mandatory

- **Understand the contents of the Owner's Manual sufficiently.**
- **Warning label is affixed to each part of the product. Follow the instruction described in the warning label.**
  Failure to comply with this instruction may seriously affect physical health of the user, as well as causing an unexpected serious accident.
- **Operation, maintenance, repair, and inspection of the hoist must be done by a person who is 18 years old and above and is mentally and physically well.**
- **Any person under the influence of alcohol or prohibited drugs, or has taken medicine with sleep inducing effects must not install, operate or inspect the hoist.**
  Failure to comply with this instruction may cause a serious accident due to incorrect operation.
- **Use corrected/inspected inspection tools, measuring devices, and other tools.**
  Failure to comply with this instruction will cause unreliable inspection, checkup, and disassembly/assembly of the hoist, and may limit the normal functions and performance of the hoist, as well as triggering a serious accident.

⚠ CAUTION


Prohibited

- **Do not drag or drop the product when carrying.**
  The hoist may be broken or damaged, and prevent normal operation.


Mandatory

- **When discarding the product, disassemble it so that it cannot 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 SDS (Safety Data Sheet) for the oil. Contact Kito for it.)
- **The user of the hoist must conduct a daily inspection before use. Regular inspections must be done (frequent and periodic) by maintenance engineers or else Kito must be contacted.**
  Failure to conduct inspections may limit the normal functions and performance of the hoist and the safe use of the hoist, triggering a serious accident.
- **Keep the regular inspection records.**
  With inspection records, you can easily grasp the condition of the hoist such as its functions and performance, as well as the replacement cycle of the parts to maintain the hoist, which can be used in the maintenance plan of the hoist.

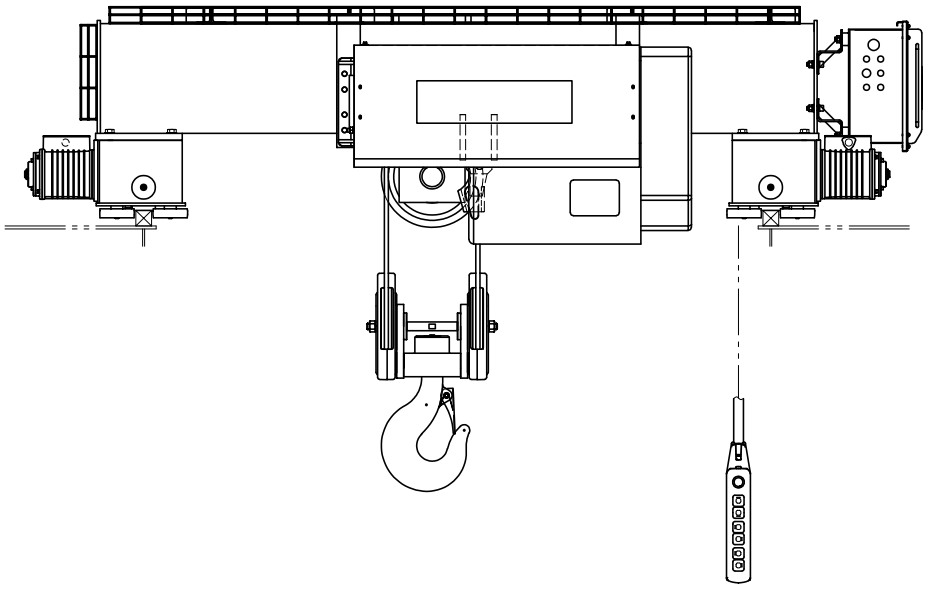
Chapter 1

Handling the Product

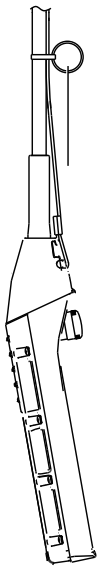
1-1 Opening the Package

■1-1-1 Checking the Product

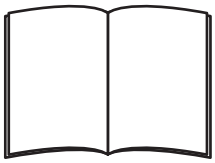
- Make sure that the indication on the package and the product in the package coincide with your order.
- Make sure the Type marked on the package label or main unit nameplate coincides your order.
- The following items are contained in the package:



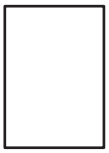
(1) Wire Rope Hoist main unit



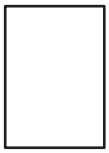
(2) Push Button Switch Cord Complete Set



(3) Owner's Manual



(4) Parts List



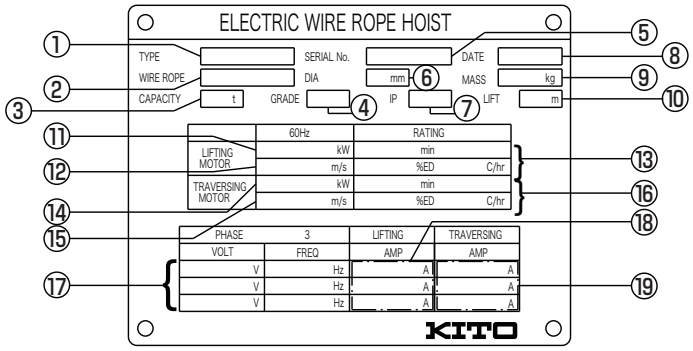
(5) Test Report

* The Test Report (5) will be included in the package if you request it when placing an order.

- Make sure that the product is not deformed and damaged due to vibration or collapse of the package during transportation.

1-2 Nameplates and Product Type

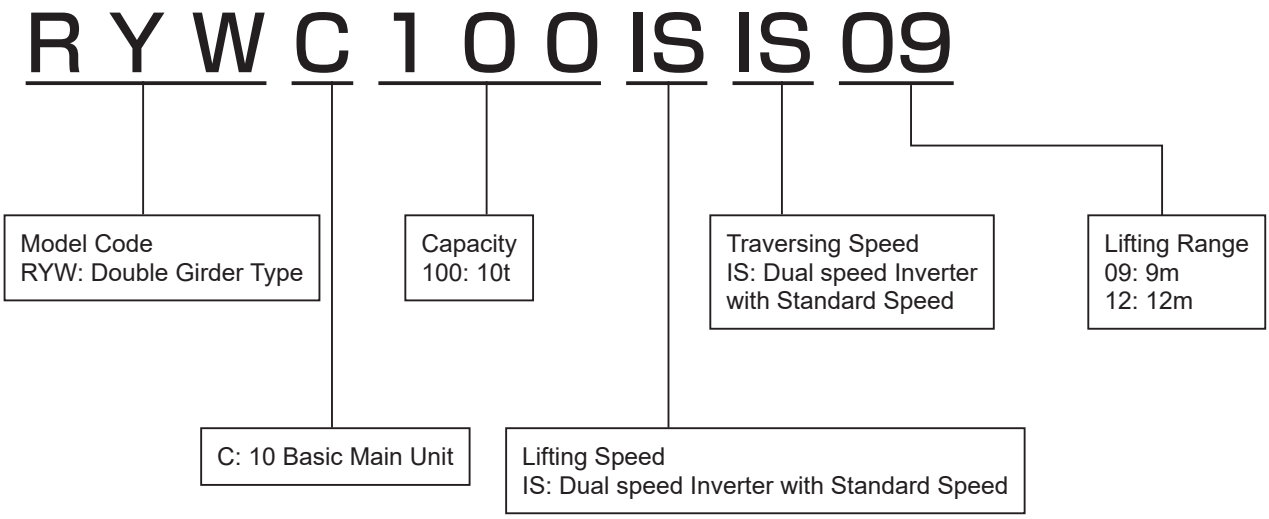
■1-2-1 Nameplate Indication



NOTE) Illustration is only a sample. Displayed contents (values) on the actual nameplate may differ.

①	TYPE	The type of the product (Product code)	⑪	The output power of the lifting motor
②	WIRE ROPE	The structure of the wire rope	⑫	The lifting speed of the product
③	CAPACITY	The rated load of the product. The capacity is the maximum mass that can be loaded on the product, indicating the mass of a load without the weight of the hook block.	⑬	The rating of the lifting motor
④	GRADE	The grade (classification) of the wire rope hoist specified by ISO or JIS standard	⑭	The output power of the traversing motor
⑤	SERIAL No.	The serial number of the product	⑮	The traversing speed of the product
⑥	DIA	The diameter of the wire rope	⑯	The rating of the traversing motor
⑦	IP	The international protection code of the product	⑰	The source voltage of the product
⑧	DATE	The month and year of manufacture of the product	⑱	The rated current of the lifting motor
⑨	MASS	The weight of the product	⑲	The rated current of the traversing motor
⑩	LIFT	The lifting range by which the product can lift the load		

■1-2-2 Explanation on Product Type



1-3 Recording Initial Values

■1-3-1 Recording the Product No.

Fill in the table below with product type, serial No., date of purchase and the name of the sales shop where you purchased the product, described in the product nameplate.

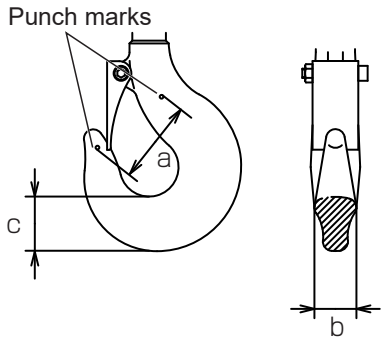
* When requesting repair or ordering a consumable part, please inform us of the information above together.

Item	Product information
Product type	
Serial No.	
Date of purchase	
Name of the sales shop	

■1-3-2 Recording the Hook Dimensions

When opening the package, fill in the table below with the dimension “a” between punch marks on the hook, the width of the hook “b” and the thickness of the hook “c”. (These values are used for inspecting.)

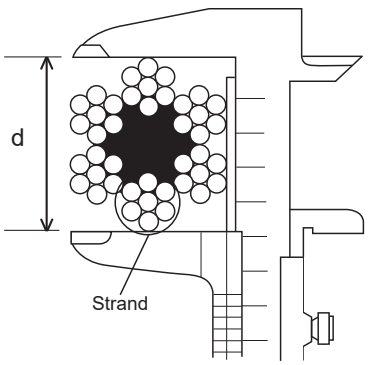
Dimensional position	Measured value
a	(mm)
b	(mm)
c	(mm)



■1-3-3 Checking and Recording Wire Rope Diameters

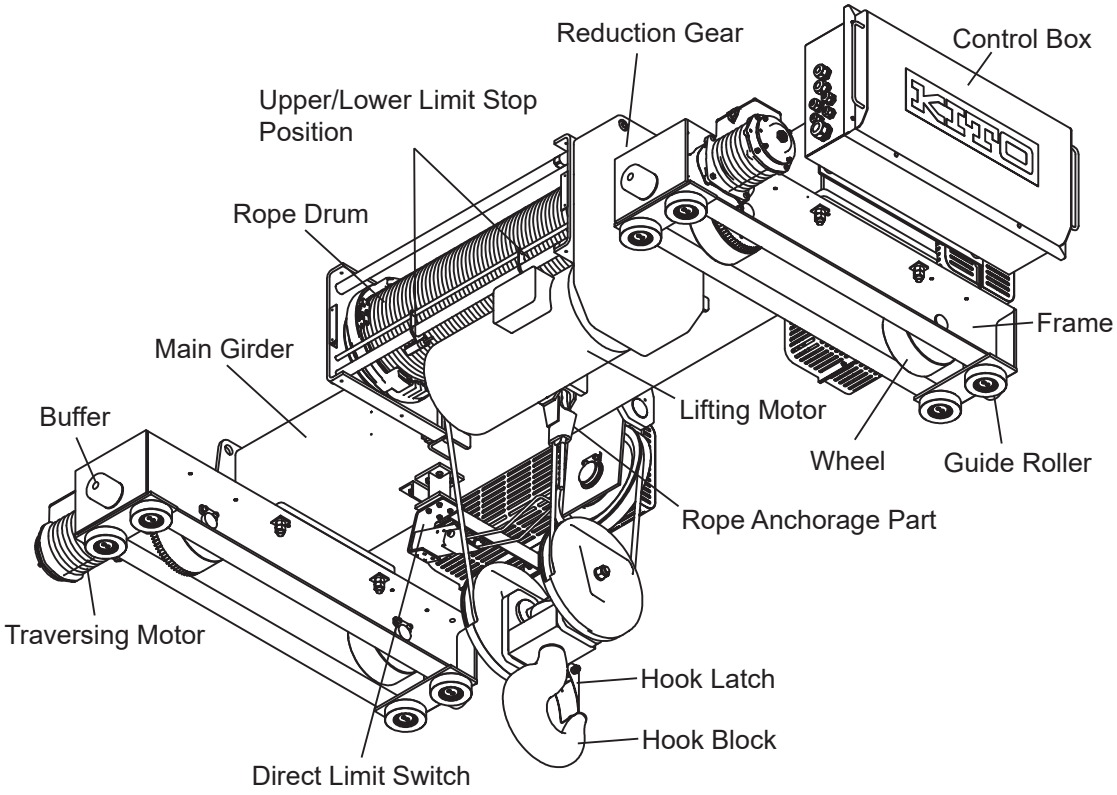
For maintenance and management, fill in the table below with the wire rope diameters (average of measured values at three points) when opening the package. (These values are used for inspecting.)

Capacity	Wire rope		
	Configuration	d: Standard diameter	Measured value (Average of three points)
10t	IWRC 6 x P·WS (31)	13	



1-4 Names of Each Product Part

■1-4-1 Double Girder Type



1-5 Product Specification and Operational Environment

The major specification and operational environment of the wire rope hoist are as follows.

■1-5-1 Standard Specification

Product Type		Double Girder
Capacity		10t
Wire Rope	**Structure Code**	IWRC 6 x P·WS (31)
	Size (mm)	φ13
Speed	**Lifting**	Standard speed: 0.100 to 0.017 m/s (6-1 m/min) * Provided with the light-load high-speed function*1
	Traversing	Traversing: 0.400 to 0.067 m/s (24-4 m/min)
Motor	**Intermittent ratings (%ED)**	Lifting: 60 (40/20), Traversing: 30 (20/10)
	Insulation Class	Lifting: F type, Traversing: B type
Protection	**Main Unit**	IP44
	Push Button Switch	IP65
Operation		7-Push Button Switch Operation (with an emergency stop function)
Power Supply Method		Power supply through cabtyre cable
Color		Yellow: KITO Yellow
		Gray: KITO metallic gray
Noise Level		90 dB (A) or less
Lifting Braking Capacity		150% of the capacity or more

*1 The light-load high-speed function is used to lift up and down a load which is less than 25% of the capacity at a speed that is 1.5 times faster than that in the table above. Please refer to the Inverter Manual when this function is required to be turned off.

■1-5-2 Operational Environment

Installation site: Indoors

Traverse rail: Square steel (no gradient)

Ambient temperature: –20°C to +40°C

Humidity: 90%RH or less (no condensation)

Operational atmosphere: Under standard environment

A place with no oil mist, corrosive gases, inflammable gases, explosive gases, volatile gases, and vapor

Do not use the product in a place exposed to organic solvent or direct sunlight, or a place with a plenty of powder and dust or considerable amount of acids and salts.

* If you need to use the product in a special environment, please consult with Kito.

NOTE

When installing the product in a place exposed to the weather, such as a place directly subject to wind, rain, or snow, or an outdoor area, prepare a shelter with roofs. When not use, store the product so that it prevails against wind, rain, and snow.

1-6 Assembling Parts and Preparing for Installation

⚠ WARNING

Prohibited

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

Failure to comply with this instruction may make it impossible to properly perform inspection/checking and disassembling/assembling of the hoist, and may not only result in failure to obtain normal function and performance of the hoist, but also lead to serious accidents.

■1-6-1 Checking Power and Power Cable

■Checking the Power

⚠ WARNING

Mandatory

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

Failure to comply with these instructions may cause serious accidents resulting in death or severe injury.

Capacity	Product code	Breaker capacity		
		400V class		
		380V 50Hz•60Hz	415V 50Hz	440V 60Hz
10t	RYWC100ISIS09/12	40		

■Checking the Power Cable

⚠ WARNING

Prohibited

- **Do not use the cable other than the power cable attached to the main unit or than a cable of proper size.**

Failure to comply with this instruction may lead to serious accidents such as fire due to failure of the hoist.

Mandatory

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

Failure to comply with this instruction may lead to serious accidents such as fire due to failure of the hoist.

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.

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

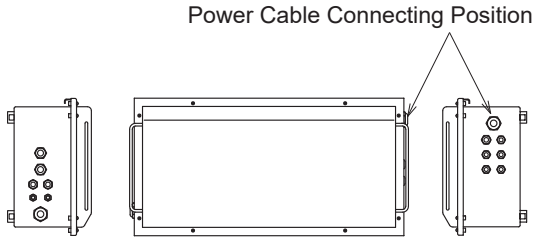
Capacity	Product code	Permissible cable length (m)			
		400V class			
		Cable size (mm^2)	380V	415V	440V
10t	RYWC100ISIS09/12	3.5 (5.5)	29 (46)	32 (51)	34 (54)

■1-6-2 Assembling Parts

After opening the package of the product, the Power Cable and the Push Button Switch Cord must be assembled to the hoist. Follow the procedure described below to assemble them properly.

■Connecting Power Cable

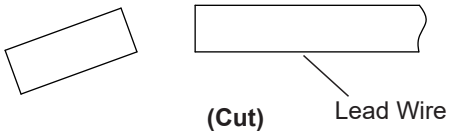
1) Identify the Power Cable connecting position on the side face of the Control Box.



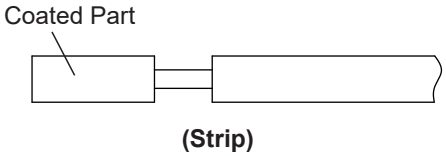
2) Process the lead wire of the Power Cable to be wired.
(When using your own power cable, process the end of the lead wire.)

・Processing the end of power line

1) Cut the tip of the lead wire (4 wires).

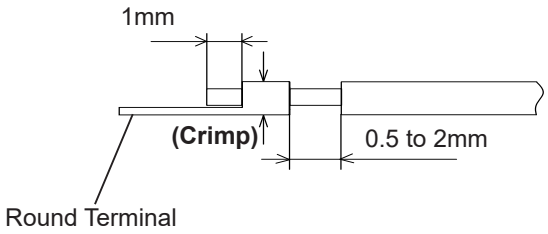


2) Using the special tool, strip the coat.



3) Cover the part that is stripped of the coat in 2) with a terminal for lead wire (round terminal) listed in the table below.

4) Using the special tool, connect the round terminal to the cable by crimping.

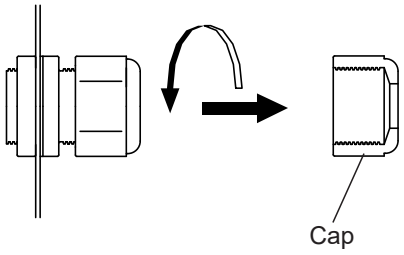


		10t
		Standard speed
Cable size (mm^2)		400V class
		3.5sq
Terminal manufacturer		Made in Japan: J.S.T. MFG. Co., Ltd.
Power line	Terminal type number	3.5-R5
Earth wire	Terminal type number	3.5-6
Cable strip length (mm)		1000

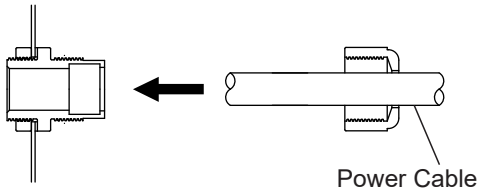
- **Wiring and fixing the cable using the cable gland**

1) Open the cover of the Control Box.

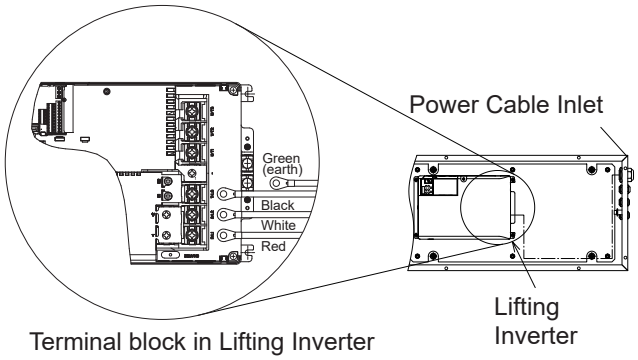
2) Remove the Cable Gland attached to the Control Box or the Power Cable, and fix the nut and the Main Unit to the Control Box. If the Cable Gland is attached to the Control Box, remove the Cap.



3) Insert the Power Cable into the Cap.



4) Wire the power line (3 wires) attached with the terminals and the earth wire by crimping at the ends of the lead wires, as shown in the drawing.



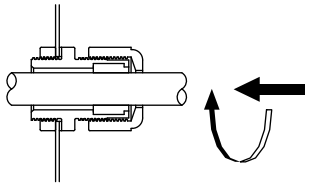
⚠ CAUTION

Mandatory

- **The connecting position of the lead wires differs depending on the model. Check the wiring diagram, and attach the terminal to an appropriate position by checking the connection diagram.**

Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.

5) Tighten the Cap to fix the Power Cable.



6) Pull the Power Cable to check that it does not come off.

7) Close the cover of the Control Box, and lock it with a pan head screw.

Assembling Parts and Preparing for Installation (Continued)

⚠ CAUTION

Mandatory

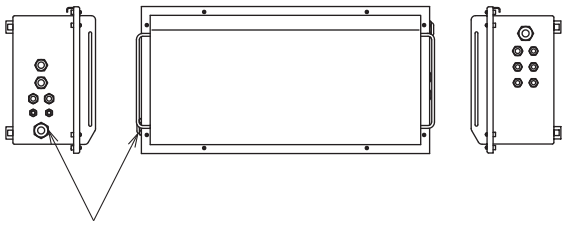
- **The connecting position of the lead wires differs depending on the model. Check the wiring diagram, and attach the terminal to an appropriate position by checking the connection diagram.**

Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.

■Connecting Push Button Switch Cord

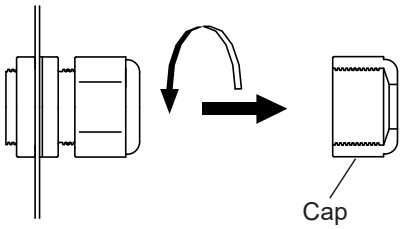
Connect the Push Button Switch Cord to the side face of the Control Box.
(It may be already connected at the time of shipping. If not connected, or when replacing parts, perform connection, referring to the following procedure.)

1) Identify the connecting position of the Push Button Switch Cord on the side face of the Control Box.

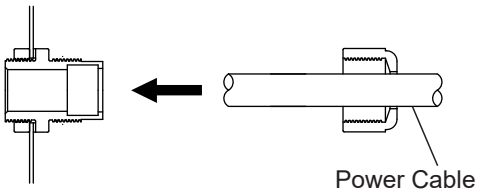


Connecting Position of Push Button Switch Cord

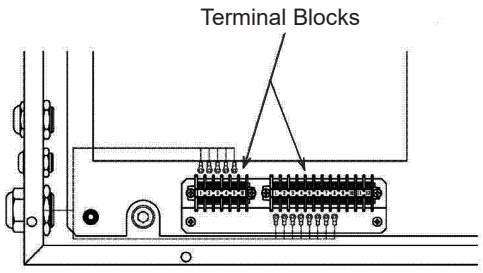
2) Remove the Cap of the Cable Gland attached to the Control Box.



3) Pass the Push Button Switch Cord through the Cap and tighten the Cap.



4) Crimp the terminal to the lead wire end, and wire them to the two terminal blocks as shown in the figure on the right, referring to the wiring diagram on page 109.



5) Pull the Push Button Switch Cord to check that it does not come off.

6) Close the cover of the Control Box, and lock it with a pan head screw.

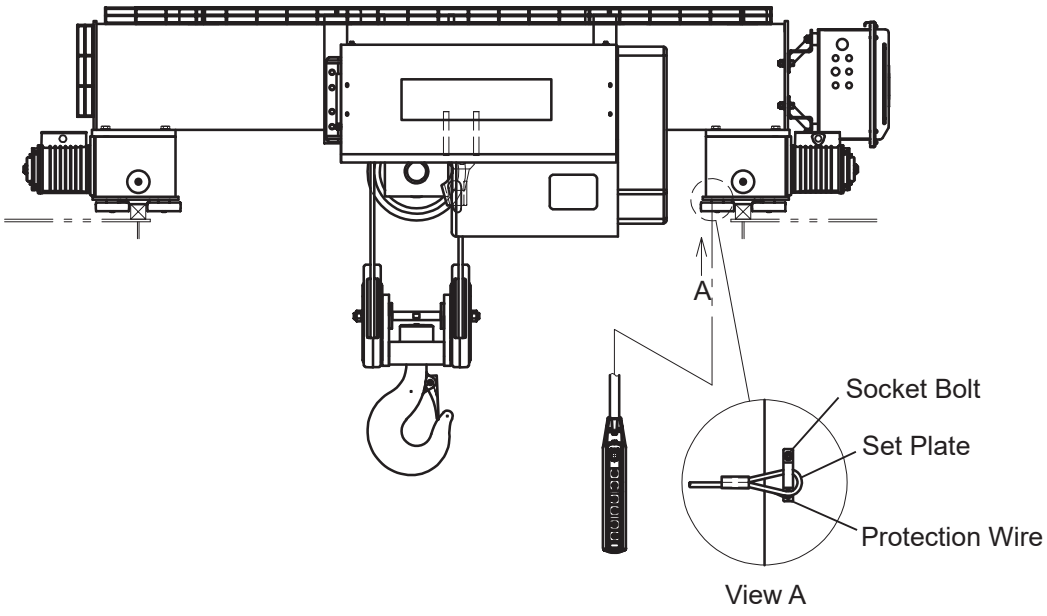
⚠ CAUTION

Mandatory

- **The connecting position of the lead wires differs depending on the model. Check the wiring diagram, and attach the terminal to an appropriate position by checking the connection diagram.**

Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.

7) Fix the Protection Wire (Push Button Switch Wire).
- ・Pass the Protection Wire through the Set Plate.
- ・Fix the Set Plate to the bottom surface of the Frame with the Socket Bolt.
  Tightening torque: 2 N•m



■1-6-3 Checking Quantity of Oil in Reduction Gear

Inside of the Gear Case is filled with Oil at the shipping. There is no need to check before installation, but if the Oil is found to be insufficient at a regular inspection, please add the Oil.

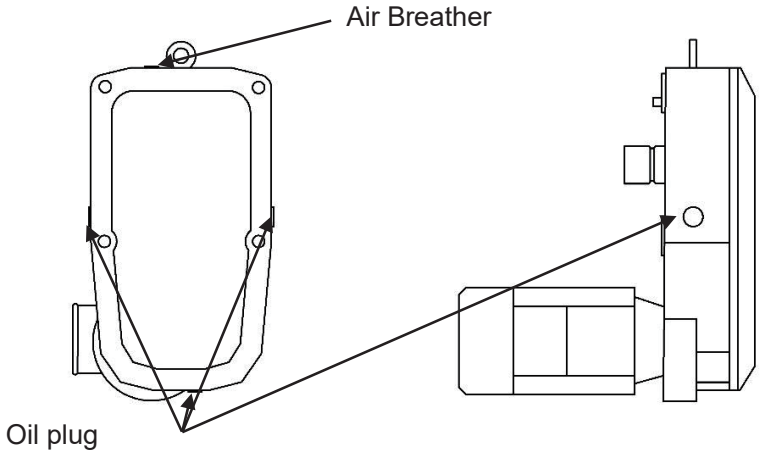
⚠ WARNING

Mandatory

- **Use genuine Oil for the reduction gear.**

Use of the Oil other than the genuine Oil (including mixed use) may result in reduction in durability, causing serious accidents resulting in death or severe injury such as drop of the lifted load.

Oil for the reduction gear
Nameplate: ENEOS BONNOC M260 or
KITO HOIST OIL FC
Specified quantity: 5,000ml



■1-6-4 Oiling the Wire Rope

⚠ CAUTION

Prohibited

- **Do not carry out the grease applying work in the place near fire or sparks.**

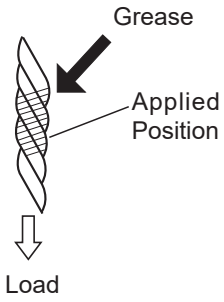
Otherwise, it will result in fire.

Mandatory

- **Be sure to apply grease to the Wire Rope.**

Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.

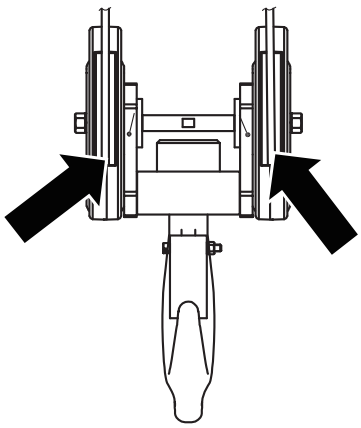
Application of grease greatly influences on the life of the Wire Rope. Apply appropriate amount of grease (so that no lumps of grease remain on the surface) to the Wire Rope.



1) Remove foreign matter, rust, and water droplets attached to the Wire Rope.

2) Apply appropriate amount of grease to the Wire Rope.
   - Use exclusive grease for the wire rope.
   - Apply the grease particularly to the part frequently meshes with the Hook Sheave and the part repeatedly passing through the Rope Guide.

3) After applying the grease, lift/lower the hoist under no-load condition to spread the grease on the Wire Rope.



■1-6-5 Adjusting Traverse Brake

⚠ WARNING

Prohibited

- **Do not set the brake torque to a value beyond the setting range.**

Failure to comply with this instruction may cause a rapid stop or large slip, leading to serious accidents.

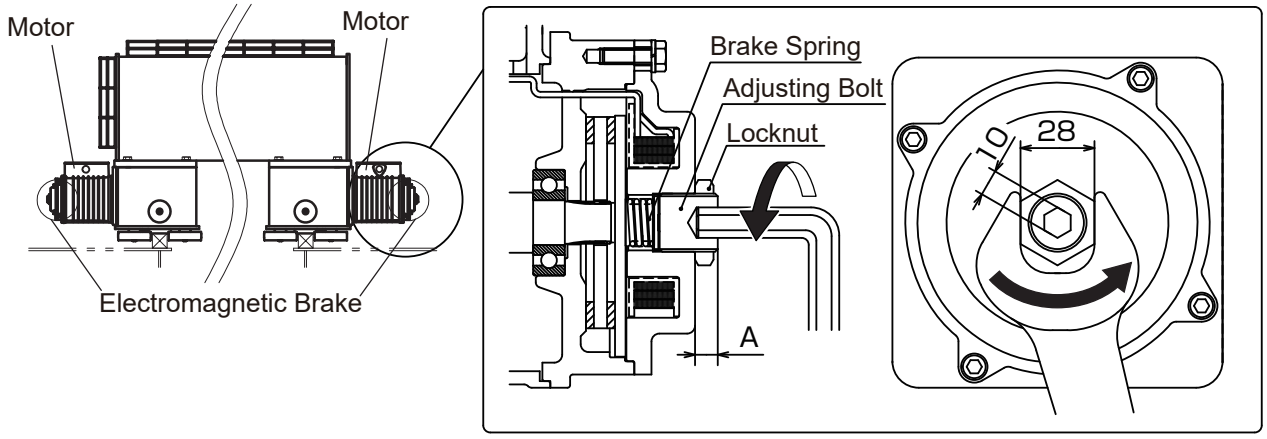
Mandatory

- **Check that the locknut is not loose after changing or adjusting the brake torque.**

Failure to comply with this instruction may cause the hoist to overrun, leading to serious accidents.

The Traverse Brake is set and adjusted at shipment so that an optimal brake force is obtained. The brake torque can be changed in accordance with the user's status of use.

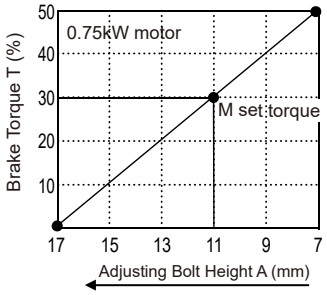
The brake torque can be changed by changing the projection amount (Dimension A) of the Adjusting Bolt on the back of the traversing motor.



1) Loosen the locknut with a spanner (28).

2) Loosen the Adjusting Bolt with a hexagonal wrench (10). Then, find in the right table the Dimension A corresponding to the brake torque to be set, and adjust the projection amount of the Adjusting Bolt to the Dimension A.

3) Tighten the locknut to lock the Adjusting Bolt, while holding the Adjusting Bolt to prevent it from rotating.



Default Settings of Brake Torque

Traversing motor output (kW)	Brake torque T (%)	Adjusting bolt height A (mm)
0.4	30	11

1-7 Installation

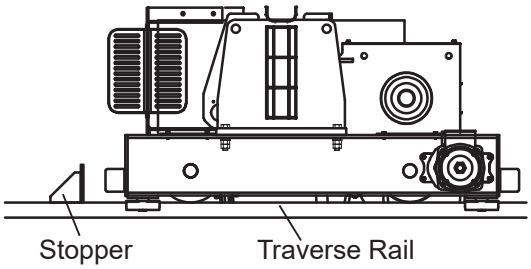
⚠ WARNING

Prohibited

- **Installation (removal) of the hoist must be carried out by special installer or by personnel with expertise.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
  Consult with the sales shop or Kito for installation, or consign the installation work to special installer or personnel with expertise.
- **Do not install the hoist at a place constantly exposed to rain or water or in the environment different from "■1-5-2 Operational Environment" (P12).**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not install the hoist in the motion space of other hoists or any other moving equipment (facilities).**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not install the product at a place where the Main Unit of the hoist interferes with something or is made immovable.**
  Failure to comply with this instruction may cause physical damage to equipment and machines including the hoist.

Mandatory

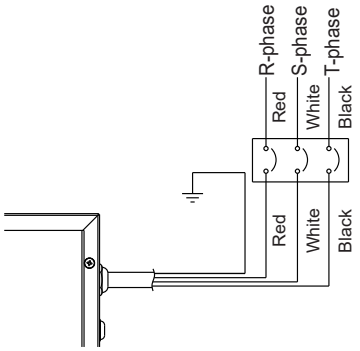
- **When installing or removing the hoist, follow the instructions in Owner's Manual.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction of the hoist and may lead to serious accidents.
- **Carry out the work for grounding (earthing) and installation of earth leakage breaker.**
  Failure to comply with this instruction can lead to electric leak, which may seriously affect the health of a human body.
  Both works must be done by a certified electrical worker.
- **When the installation is completed, carry out "■1-9-3 Check after Installation" (P31).**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction of the hoist and may lead to serious accidents.
- **Connect the power after all installation works have been completed and just before the operation check. There is a danger of electric shock when accidentally touching a current-carrying part.**
  Failure to comply with this instruction can lead to electric shock, which may seriously affect the health of a human body.
- **Mount the stopper at the both ends of the traverse rail for trolley. <Figure below>**
  Failure to comply with this instruction may cause the hoist to go off the rail or overrun, leading to serious accidents.
- **Do not use the hoist by building it into a part of your own traversing device without using the Kito's standard traversing device.**
- **Ensure the strength of the structure to which the product is installed so that the hoist can operate without trouble when a load of 125% of its capacity is suspended.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also lead to serious accidents such as drop of the load.
- **Connect the Power Cable to the power of rated voltage.**
  Failure to comply with this instruction may lead to serious accidents such as fire due to failure of the hoist.



■Connecting Power and Power Cable

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

- Connect the hoist to the power through a breaker.
- Connect the cable in accordance with the phases.
- Carry out earthing work to ground the earth wire.
- Use the correct breaker and Power Cable referring to "■1-6-1 Checking Power and Power Cable" (P13) for the breaker capacity, Power Cable length and its size.



■1-7-1 Checking Installation Place

⚠ WARNING

Mandatory

- **Make sure that the strength of the structure is sufficient to install the hoist.**
  Failure to comply with this instruction may cause physical damage to equipment and machines including the hoist.
- **Carry out the installation work after securing the stable foothold.**
  Failure to comply with this instruction can seriously affect the health of user's body, and may lead to unexpected serious accidents.

■Notice before installation

Due to vibration or other impacts during transportation of the product, the rope wound on the Rope Drum may be loosened in some cases. If the product is used as it is, the Wire Rope may float away from of the groove of the Rope Drum and correct winding cannot be performed, resulting in damage to the Rope Guide, Wire Rope, Rope Drum and other parts.
When opening the package, check for slack of the Wire Rope, and if there is, remove the slack before installing the product.

●Procedure to remove slack of the Wire Rope

1) Manually pull the load side of the Wire Rope wound on the Rope Drum to remove slack and confirm that the Wire Rope is settled in the groove of the Rope Drum.
2) If slack still remains, move the loosened part of the Wire Rope toward the Rope Guide side so as to gradually remove the slack. When the slack reaches the Rope Guide, pull the Wire Rope to completely remove the slack.
3) If slack cannot be removed by the steps above, detach the Rope Guide and remove the slack and entanglement of the Wire Rope.
   * For the procedure of installation and removal of the Rope Guide, refer to the "■2-3-9 Wire Rope Replacement Procedure" (P71).

■1-7-2 Installing Hoist on Rail

■Where to Install

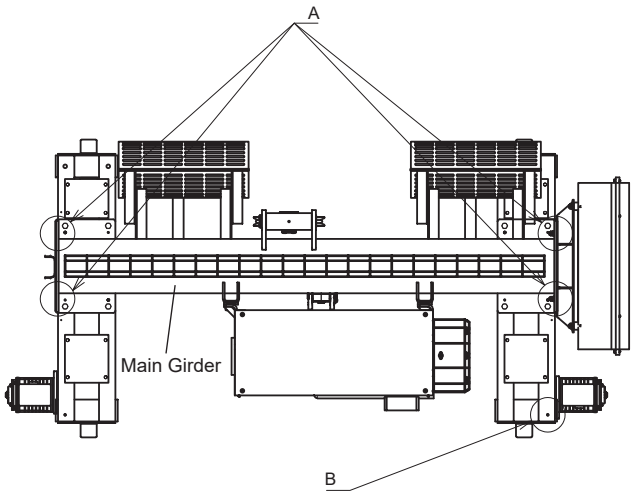
⚠ WARNING

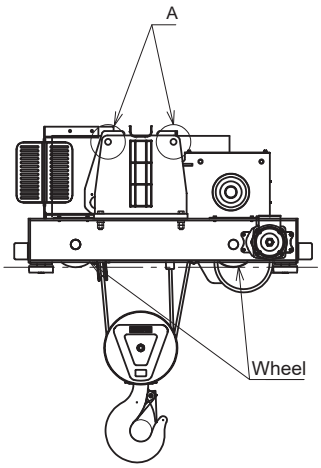
Mandatory

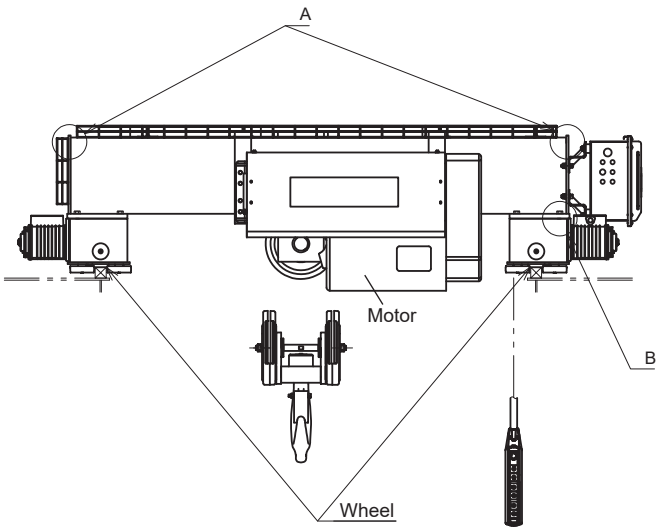
- **Make sure that the structure on which to install the hoist has a sufficient strength.**
  Failure to comply with this instruction may cause physical damage to equipment and machines including the hoist.
- **Carry out the installation work after securing the stable foothold.**
  Failure to comply with this instruction can seriously affect the health of user's body, and may lead to unexpected serious accidents.
- **Depending on the size and shape of the Traverse Rail, reinforcement may be necessary for the rail. Be sure to select a rail having a sufficient strength.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the hoist or the lifted load.

■Installing Hoist on Rail

1) Hook the slings/fittings, etc. onto the 4 lifting points (A) of the main girder.
2) Attach eyebolts into M12 threaded holes (B) in the frame.
3) The hoist tends to tilt toward the motor when lifting. Hook auxiliary slings onto the eyebolts of B.
4) So as to keep a balance, adjust the length of totally 5 slings of A and B before lifting the hoist.
5) Position the hoist so that its wheels (4 of them) will be placed on the traverse rail (square rail: □50).
6) Remove the slings and eyebolts.







Lifting Points of Trolley Frame

■Mounting the Stopper

⚠ WARNING

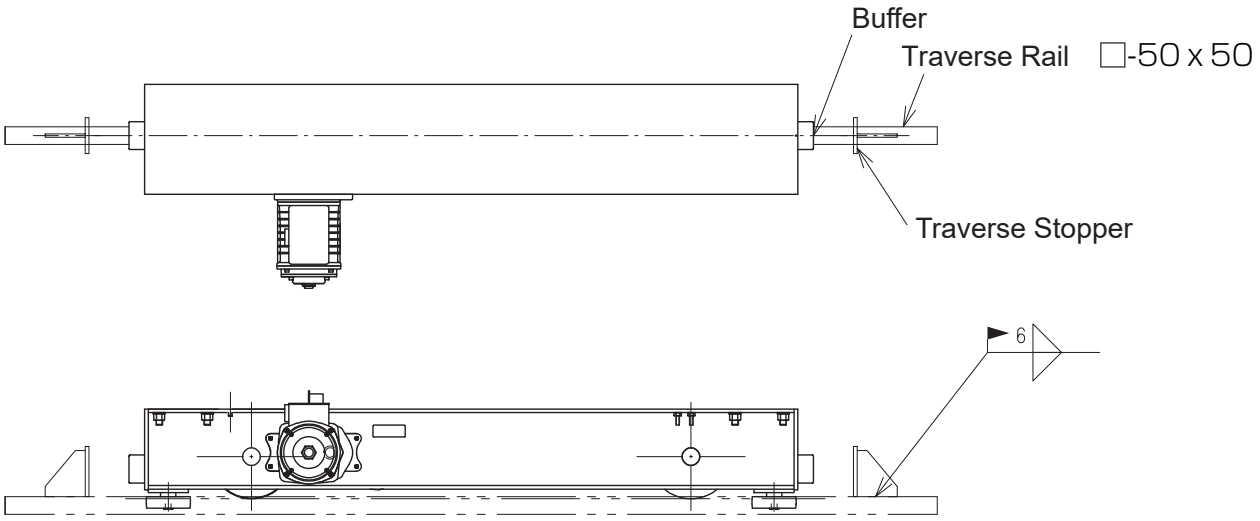
Prohibited

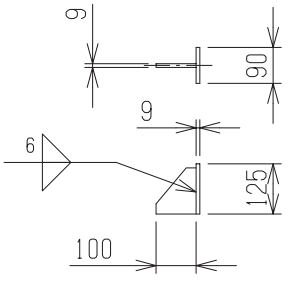
- **Be sure to mount the stoppers at the both ends of the rail to prevent drop.**
- **Be sure to avoid constantly stopping the hoist by bumping it against the stopper. It is recommended to attach shock attenuating material such as rubber on the stopper surface.**

Failure to comply with these instructions may cause the hoist to go off the rail or overrun, leading to serious accidents.

●Stopper Mounting Positions

Referring to the figures below for mounting positions, mount the stoppers in appropriate positions.





The height of the traverse stopper shall be 125 mm or more.

Detail of Stopper

<Memo>

1-8 Setting Upper/Lower Limit Stop Device

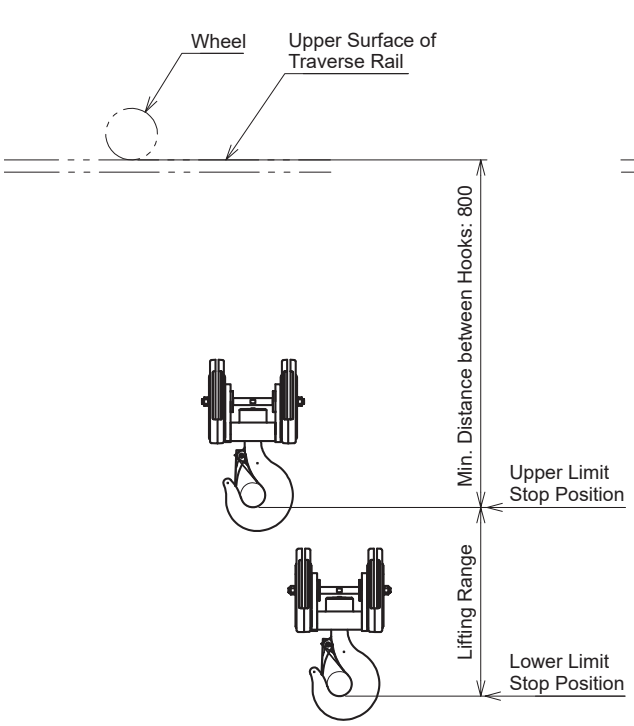
The Upper/Lower Limit Stop Device can automatically stop the Hook Block at preset locations (at two upper-limit and lower-limit points) without requiring a positioning operation (such as inching) by push button.

■Factory Settings

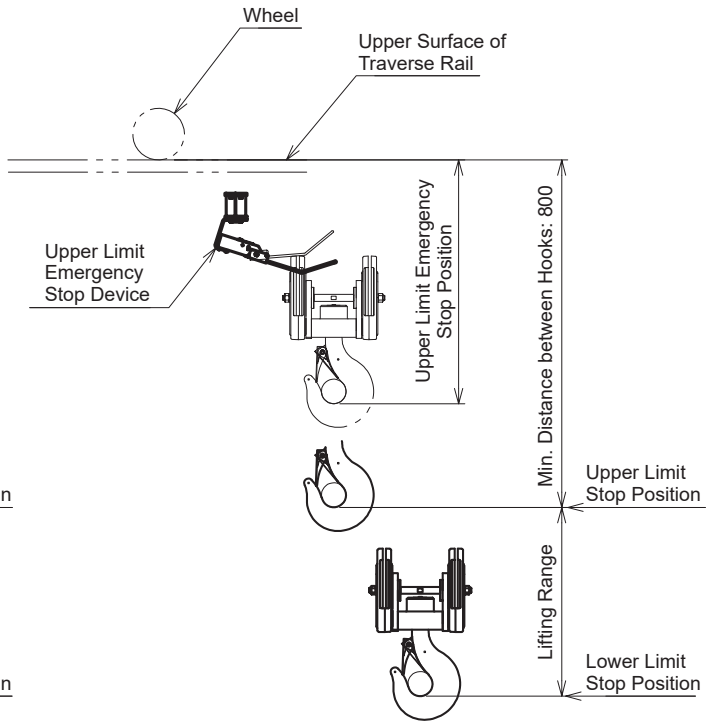
The factory set positions of the Upper/Lower Limit Stop Device are as shown below.
After installing the product, set and adjust the position of the Upper/Lower Limit Stop Device in accordance with the user's conditions of use as required.

Initial setting value	
Upper Limit Stop Position	Stop Position at Min. Distance between Hooks
Lower Limit Stop Position	Below Upper Limit Stop Position by lifting range

Without Upper Limit Emergency Stop



With Upper Limit Emergency Stop



■Adjustment method

⚠ WARNING

Prohibited

- **Do not adjust the Upper/Lower Limit Stop Device with wet hands.**
  Failure to comply with this instruction can lead to electric shock, which may seriously affect the health of a human body.

Prohibited

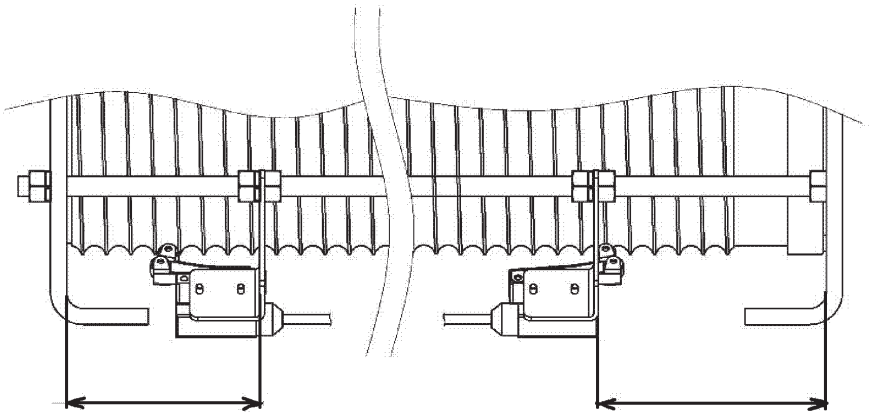
- **Do not set the Upper Limit Stop Position of the Hook Block to a position higher than the lever of the Upper Limit Emergency Stop Device or the position of dimension C.**
- **Do not set the Lower Limit Stop Position of the Hook Block to a position below the standard lifting range (9m, or 12m).**

Mandatory

- **The Upper/Lower Limit Stop Device is used to limit the moving range of lifted load. Do not use the hoist in such a way that the Upper/Lower Limit Stop Device is always activated.**
- **When you replace the rope, the Hook Block may shift from the preset stop position. If that happens, readjust the stop position.**
- **The Upper/Lower Limit Stop Device may stop the Hook Block at locations shifted from the preset stop positions, due to difference in the weight of the lifted load or aging of the brake. Readjust the position regularly.**
  Failure to comply with these instructions may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction of the hoist and may lead to serious accidents.

Follow the procedures described below to adjust the device.

1) Loosen the nut attached to the limit switch bolt, and adjust the position of the switch mounting brackets. Moving the switch brackets by 14.9mm (1 pitch of the Rope Drum) moves the Upper Limit Stop Position (or Lower Limit Stop Position) by 198mm (1 role of the Rope Drum).
2) Adjust the upper and lower switch brackets with the following procedure.
   Upper side: Attach the bracket so that the distance from the end surface of the Drum Frame B to the left end surface of the upper switch bracket is not less than 135mm.
   Lower side: Attach the bracket so that the distance from the end surface of the Drum Frame A to the right end surface of the lower switch bracket is not less than 114mm.



Do not set a position higher than the lever of the Upper Limit Emergency Stop Device.
Upper/Lower Limit Stop Device

3) After moving the upper and lower switch brackets, fasten the switch brackets securely with nuts (tightening torque: 32 N•m).

1-9 Adjusting Overload Limiter (OLL)

The Overload Limiter is adjusted at the time of shipping to be activated when the load is in the range of 110% to 125% of the capacity. Change the parameters of the inverter to deactivate the Overload Limiter for the load (overload) test.

⚠ WARNING

Mandatory

- **When you change parameters or carry out maintenance of the inverter, make sure to read this manual and follow the instructions.**
- **When changing parameters or carrying out maintenance for the inverter is needed, ensure that it is performed by a person who have been certified by the organization that he/she has expertise and enough knowledge on structure and characteristics of the hoist and inverter, or contact the nearest service shop or our customer center.**
- **After operation, the Control Box may have become hot. Be sure to wait about 30 minutes after the operation before performing maintenance for electrical components in the Control Box.**
- **Perform electro-static discharge (ESD) before handling the inverter.**
- **Wait five minutes or more after shutting off the power before performing maintenance for peripheral devices other than the inverter.**

Failure to comply with these instructions may lead to an electrical shock, burn, malfunction, failure, or damage to the inverter, and may cause serious accidents resulting in death or severe injury.

Prohibited

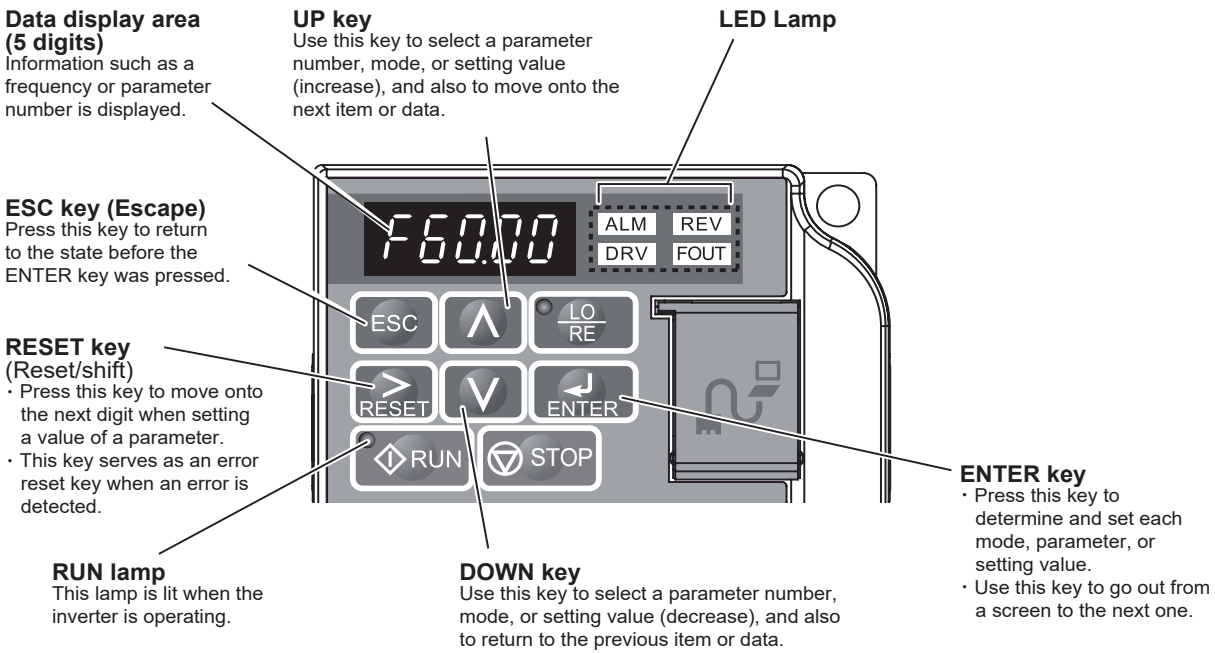
- **Change of parameters and maintenance of the inverter are performed with the power turned on. Do not remove the cover of the inverter or touch the circuit board and electrical component near the inverter.**
- **The inverter is designed especially for a Kito product. Do not use any inverter other than Kito's genuine inverters.**
- **Do not modify the inverter.**
- **Do not change the wiring.**
- **Do not perform the withstand voltage test and insulation resistance measurement (mega measurement) with the inverter being connected.**
- **Do not turn off the power during operation.**
- **Do not connect the power supply to the output side of the inverter.**

Failure to comply with these instructions may lead to an electrical shock, burn, malfunction, failure, or damage to the inverter, and may cause serious accidents resulting in death or severe injury.

■1-9-1 Explanation on Inverter

For setting or monitoring parameters of the inverter, what are displayed on the LED operator and how to operate it will be described.

■Name and Function of Each Part



■Checking Display

In a normal condition, display on the LED operator when the power is on is as follows:

No	Name	Details
Normal state		Monitor concerning the frequency instruction is displayed in the data display area. DRV will be lit.
Abnormal state	 (e.g.) Low voltage of the main circuit	The display depends on details of the error. Refer to the attached “Inverter Manual”, and take a countermeasure. ALM and DRV will be lit.

■Characters on Digital Display and Corresponding Description in This Manual

Characters displayed on the LED operator are shown below. In this manual, lighting or blinking of the digital characters are described in the following way.

Lighting	Blinking
	

■1-9-2 Disabling/Adjusting the OLL Operation

Before carrying out an overload test (with the load at 125% of the capacity), adjust the inverter and disable the OLL to make sure it does not get activated during the test.

⚠ WARNING

Prohibited

- **Do not perform regular operations in test mode.**
  (Be sure to switch to drive mode after the load test is finished.)

Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury due to an operational error, failure, or inverter damage.

By switching from drive to test mode in an inverter, you can disable the OLL and carry out an overload test (with the load at 125% of the capacity).
Follow the procedure described below to configure the settings correctly.

LED display

1) Turn the power on.

Default screen

2) Press ∧ until the setup mode screen appears.

3) Press ENTER to display the parameter setting screen.

Parameter setting screen

4) Press ∧ or ∨ until the low-speed activation parameter S1-38 or the high-speed activation parameter S1-41 is displayed. (The figure on the right shows display for S1-38: low-speed.)
(* Be sure to set both the low- and high-speed parameters.)

5) Pressing ENTER displays the current setting values as shown in the following table.

(The highest digit will blink.)

Capacity	Product code	Default settings	
		400V class	
		S1-38	S1-41
		Low speed	High speed
10t	RYWC100ISIS09/12	88	104

(* Be sure to reset the values to these default values after the load test is finished.)

6) Press RESET to move the blinking digit to a digit that is needed to be changed.

7) Press ∧ or ∨ to change each parameter value according to the following table.

Capacity	Product code	Set value	
		400V class	
		S1-38	S1-41
		Low speed	High speed
10t	RYWC100ISIS09/12	100	118

In the case of RYWC100ISIS09, 400 V class

<Low speed S1-38> <High speed S1-41>

8) Press ENTER to register the changed value.

9) The word “TEST” starts blinking on the display, and test mode is activated.

10) After setting both the low- and high-speed parameters, press ESC until the screen returns to the default screen.

11) Carry out a load test.
12) After the load test is finished, follow steps 2 to 10 to set the values from the table shown in step 5 as the low-speed (S1-38) and high-speed (S1-41) parameters.
13) After exiting test mode, press ESC until the screen returns to the default screen. Test mode is automatically disabled if any of the following occurs.
    (1) Test mode remains active for more than 1 hour.
    (2) The power is turned off and back on (i.e., the machine is restarted).

■1-9-3 Check after Installation

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

■Check items

- No bolt, nut nor split pin is lost. Tightening and assembling are completed.
- Protection Wire for Push Button Switch Cord (Push Button Switch Wire) 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.
- Source voltage is proper.
- The earth wire is connected securely.
- The stoppers are securely mounted on the Traverse Rail.
- The running surface of Traverse Rail is not attached with paint or oil. (The running surface must be bare metal. Do not paint.) There is no obstacle for the Traversing Device to run. The rail is level.
- The Main Unit is installed in a level position without any tilt.
- Cables are not loose and have not come off.

■Operational Check

Carry out the operational check in accordance with “■1-11-5 Function and Performance” (P47) of Daily Inspection.

1-10 How to Use

⚠ WARNING

Prohibited

- **Do not use the Wire Rope with heavy rust, damage, breakage, abrasion or deformation.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.
- **Do not cut, extend, or weld the Wire Rope.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.
- **Do not use the Wire Rope with the Bottom Hook without smooth motion.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not use the Hook without a Hook Latch or damaged Hook.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.
- **Do not hook the Wire Rope with another hook.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not use the Wire Rope when its brake does not function securely, or when the stopping distance is too long.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not use the product if it moves oppositely to the direction indicated on the push button switch.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not lower the hoist while the Hook Block is on the load nor operate with no load while the rope is loosened. Otherwise, it may cause a turbulent winding of the Wire Rope.**
  Failure to comply with this instruction will lead to failure to obtain normal function and performance of the hoist and may lead to serious accidents.

Mandatory

- **Carry out daily inspection before operation.**
  (When any abnormality is found during inspection, turn off the power, indicate “FAILURE” and ask the maintenance engineer for repair.)
- **Check the slinging devices to make sure there is no abnormality.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury.

⚠ CAUTION

Prohibited

- **Do not use the product with an illegible nameplate or warning label affixed to the Main Unit.**
  Failure to comply with this instruction may lead to unexpected serious accidents.

Mandatory

- **When using the product for the first time, affix the labels indicating East, West, North and South on the push button switches according to the direction that the product moves.**
  Failure to comply with this instruction may lead to serious accidents due to operational error.
- **Check the contents of the work and make sure that the hoist has proper performance for the capacity and lifting range.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Check the contents of the work and operate the hoist at a place enabling to look out the operating area without hindrance.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **When looking out the operating area is difficult, arrange an observer near the area for safety.**
- **Operate the hoist at a place with firm foothold without danger of falling, stumbling, slipping or overturning.**
  Failure to comply with this instruction may lead to serious accidents due to operational error.
- **Before moving the load, warn all the people in the surroundings.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Even if the crane or the 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.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **When operating the hoist, wear clothes that do not impede the operation.**
  Failure to comply with this instruction may lead to serious accidents due to operational error.
- **Persons operating or working near the hoist must wear protective gears such as earplugs. (Refer to P110 for noise level of the hoist.)**
  Failure to comply with this instruction can affect the health of a human body due to noise.

NOTE

Appoint a maintenance engineer or competent personnel among the qualified personnel for operation of cranes or wire rope hoists. Display the name of the personnel in an easily viewable place.

■1-10-1 How to Operate the Push Button Switches

⚠ CAUTION

Prohibited

- **Do not hang the Push Button Switch Cord on other objects, or pull the cord strongly.**
  Failure to comply with this instruction will cause wire breakage, leading to failure to obtain normal function and performance of the hoist and may lead to serious accidents.
- **Do not use the Push Button Switch if its button does not operate smoothly.**
  Failure to comply with this instruction may lead to serious accidents due to operational error.
- **Do not bundle or tie the cord for the adjustment of its length.**
  Failure to comply with this instruction will cause wire breakage, leading to failure to obtain normal function and performance of the hoist and may lead to serious accidents.
- **The Push Button Switch is a resin product. Do not use the Push Button Switch in an environment such as using chemicals and solvents. It may cause the deterioration of its physical condition.**
  Failure to comply with this instruction will lead to failure to obtain normal function and performance of the hoist and may lead to serious accidents.

Mandatory

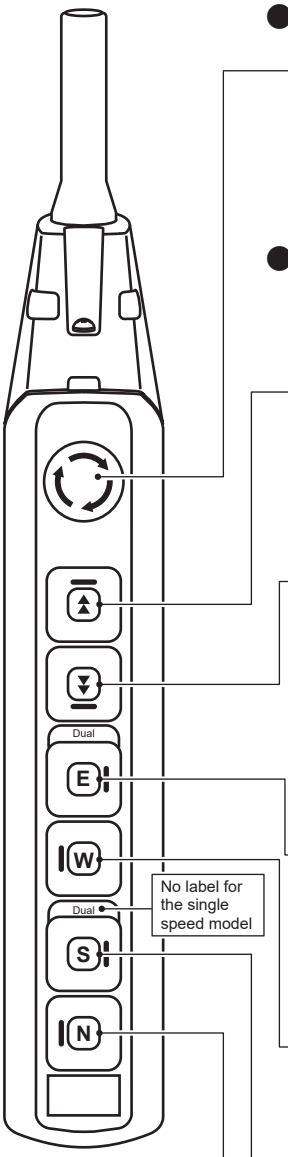
- **When starting operation of the hoist after stopping the hoist by pushing the Emergency Stop Button, be sure to confirm there are no hazards around the workplace before releasing the lock of the Emergency Stop Button and starting operation.**
  Failure to comply with this instruction may lead to unexpected serious accidents.

NOTE

When taking hands off the Push Button Switch after operation, do not throw the switch. Be careful not to hit other workers with the Push Button Switch.

■7-Push Button Switch Set

The 7-Push Button Switch Set has a lock type emergency stop button and operation push button switches. One-step push button switches or two-step push button switches are mounted as operation push button switches corresponding to speed.
The buttons of the push button switch set are expressed as (E) and (W) for traverse movement and as (S) and (N) for travel movement.



●Emergency Stop Button

	1) Press the Emergency Stop Button deeply when carrying out an emergency stop. • The button is locked at the pressed end. 2) Turn the Emergency Stop Button clockwise to cancel the lock. • Press-locked button returns to the original position. * When the hoist is not used, press the Emergency Stop Button deeply to the end.

●Operation Button

● Lift/Lower Button

Dual Speed Model	
	1) Press button to lift the load. 2) When lifting the load at high speed, press the button further to the end. • The hoist stops when the button is released.
	1) Press button to lower the load. 2) When lowering the load at high speed, press the button further to the end. • The hoist stops when the button is released.

● Traverse Button

Dual Speed Model	
E	1) Press E button to move the Traversing Device to the east at low speed. • The hoist stops when the button is released. 2) Press E button further to move the Traversing Device to the east at high speed.
W	1) Press W button to move the Traversing Device to the west at low speed. • The hoist stops when the button is released. 2) Press W button further to move the Traversing Device to the west at high speed.

● Travel Button

Single Speed Model		Dual Speed Model	
S	1) Press S button to move the crane to the south. • The crane stops when the button is released.	S	1) Press S button to move the crane to the south at low speed. 2) Press S button further to the end to move the crane to the south at high speed. • The crane stops when the button is released.
N	1) Press N button to move the crane to the north. • The crane stops when the button is released.	N	1) Press N button to move the crane to the north at low speed. 2) Press N button further to the end to move the crane to the north at high speed. • The crane stops when the button is released.

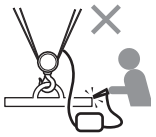
■1-10-2 Operation

■General

⚠ WARNING

Prohibited

- **Do not operate the hoist in an environment with flammable or explosive gas.**
  Failure to comply with this instruction may lead to serious accidents such as fire due to failure of the hoist.
- **Do not use the hoist exceeding the ratings (short period rating, intermittent rating) of the lifting motor and the maximum start-up frequency.**
  Failure to comply with this instruction may lead to serious accidents such as fire due to burning of the hoist motor.
- **Do not use the hoist by the voltage other than the rated voltage.**
  Failure to comply with this instruction may lead to serious accidents such as fire due to failure of the hoist.
- **Do not use the Emergency Stop Button for ordinary stop operation.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not expose the Wire Rope to sparks from welding.**
  Failure to comply with this instruction will significantly shorten the life of the wire rope, not only resulting in failure to obtain normal function and performance of the hoist, but also causing failure of the hoist, leading to serious accidents.
- **Do not contact welding rods or electrodes with the Wire Rope.**
  Failure to comply with this instruction will significantly shorten the life of the wire rope, not only resulting in failure to obtain normal function and performance of the hoist, but also causing failure of the hoist, leading to serious accidents.



A

- **Do not use the Wire Rope as the earth for welding work. (Fig. A)**
  Failure to comply with this instruction can seriously affect the health of user's body, and may lead to unexpected serious accidents.

Mandatory

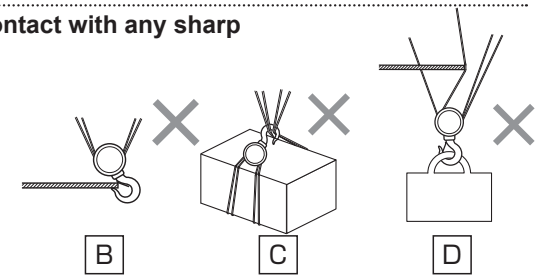
- **Follow the operating environment and conditions for the hoist.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.

■Slinging

⚠ WARNING

Prohibited

- **Do not apply a load to the tip of the Hook or the Hook Latch. (Fig. B)**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.
- **Do not bind a load with the Wire Rope directly. (Fig. C)**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.
- **Do not operate the Wire Rope while it is in contact with any sharp edges. (Fig. D)**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.



Mandatory

- **Use the sling appropriate for the weight and shape of a load.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted 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.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.
- **Attach the slinging devices securely to a load.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.
- **Attach the slinging devices to the Bottom Hook correctly.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.

■Lifting/Lowering

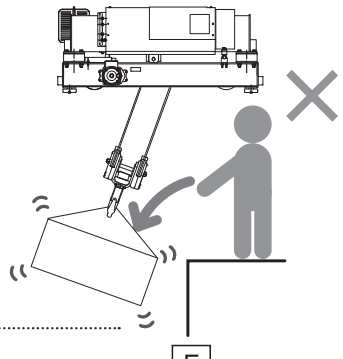
⚠ WARNING

Prohibited

- **Do not lift more than the capacity. (Fig. E)**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.

E

- **Do not operate the hoist exceeding the lifting range.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.
- **Do not try to lift fixed structures (floor, ground, or buildings).**
  Failure to comply with this instruction may cause physical damage to equipment and machines including the hoist.
- **Do not constantly stop the hoist with the Upper Limit Emergency Stop Device (Limit Switch).**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not use the hoist when the Overload Limiter is operated to stop winding.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.
- **Do not swing the lifted load.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not wind the slack Wire Rope with a load in one action to avoid exposing the Wire Rope to shock.**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist. Stop lifting when the Wire Rope is stretched tight. Then lift slowly.
- **Do not carry out excessively frequent inching.**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist.
- **Do not carry out plucking (sudden reversing of the motion).**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist. When reversing the motion, first stop the hoist, and then reverse it.
- **Do not cause the load on the hook to fall downwards when taking a load off from a pallet. (Fig. F)**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist.
- **Do not cause the load to come into contact with the Wire Rope.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.

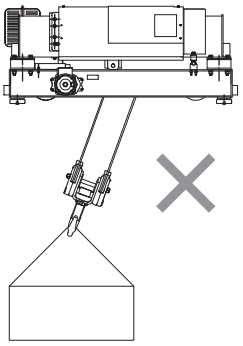

F

- **Do not rotate a lifted load. Use the device for rotation.**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist.
- **Do not carry out the welding or cutting work while a load is lifted.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not carry out repair or disassembling while a load is suspended.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load. When repairing or disassembling a wire rope hoist, ensure that the product is placed down on the floor and that only maintenance engineers maintain the hoist.
- **Do not enter beneath a lifted load.**
  Failure to comply with this instruction may lead to unexpected serious accidents.

⚠ WARNING

Mandatory

- **When the Upper Limit Emergency Stop Device (Limit switch) is operated, stop the lifting work immediately and lower the load.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Move the hoist right above the load and then lift the load. (Do not pull the load in an inclined direction.) (Fig. G)**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not leave from the operating position while a load is lifted. Always keep an eye on the lifted load.**
  Failure to comply with this instruction may lead to unexpected serious accidents.



G

⚠ CAUTION

Prohibited

- **Do not use the Overload Limiter to measure the weight of a load.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
  The use of the Overload Limiter other than the intended purpose may result in injury or property damage.

Mandatory

- **When carrying a lifted load using a lifting magnet or a vacuum chuck, lower the height of the lifted load as low as possible.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not lift a load with two wire rope hoists.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.

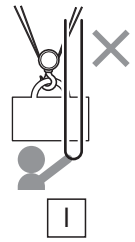
How to Use (Continued)

■Travel / Traverse

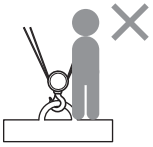
⚠ WARNING

Prohibited

- **Do not operate the hoist underneath the load or transport a load over people. (Fig. I)**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not operate the hoist when any person is in the area where the lifted load moves.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not allow people to enter into the area where a lifted load moves.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not ride on a lifted load and do not use the hoist to support, lift, or transport people. (Fig. J)**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Prevent the hoist from bumping against a building or a structure.**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist.
- **Do not operate or move the hoist while moving backward with a load kept lifted.**
  Failure to comply with this instruction can cause accidents affecting the health of a human body due to dropping, stumbling, tipping, or pinching.
  Operate the hoist while looking forward from the back of a load and moving ahead.



I



J

⚠ CAUTION

Prohibited

- **Do not bump the lifted load against other structures or wiring.**
  Failure to comply with this instruction may lead to unexpected serious accidents.

Mandatory

- **If the wire rope is entangled, stop the operation immediately and reset the entangled ropes.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.

■In Abnormality or Failure

⚠ WARNING

Mandatory

- **If the hoist is damaged or abnormal noise or vibration occurs, stop the operation immediately.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **If the hoist moves in the direction opposite to the indication on the Push Button Switch, stop the operation immediately.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **When the kink, entanglement, crack, deformation, attachment of foreign matters or abnormal engagement of the Wire Rope is observed, stop the operation immediately.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.

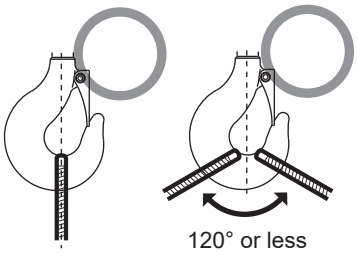
⚠ CAUTION

Mandatory

- **When any abnormality is observed during the operation, indicate “FAILURE” and contact the maintenance engineers.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Should the power be interrupted, secure safety and contact the maintenance engineers.**
  Failure to comply with this instruction may lead to unexpected serious accidents.

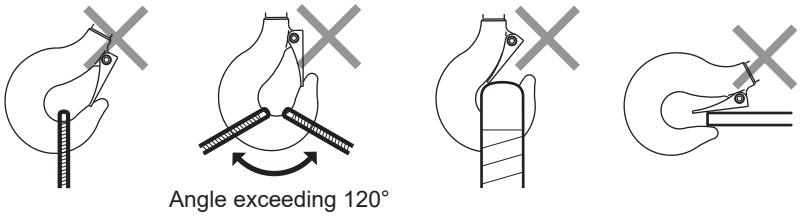
■1-10-3 How to Sling the Load Properly

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



120° or less

Do not carry out dangerous hooking as shown below.



Improper hooking position of the lifted load or the sling

Angle too wide

Hook Latch not closed

Hooking of the load at the tip of the Hook

■1-10-4 How to Suppress the Swinging of a Load

⚠ WARNING

Prohibited

- **Do not move the hoist with a load hung at one side of the Crane Saddle (edge of the rail).**

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

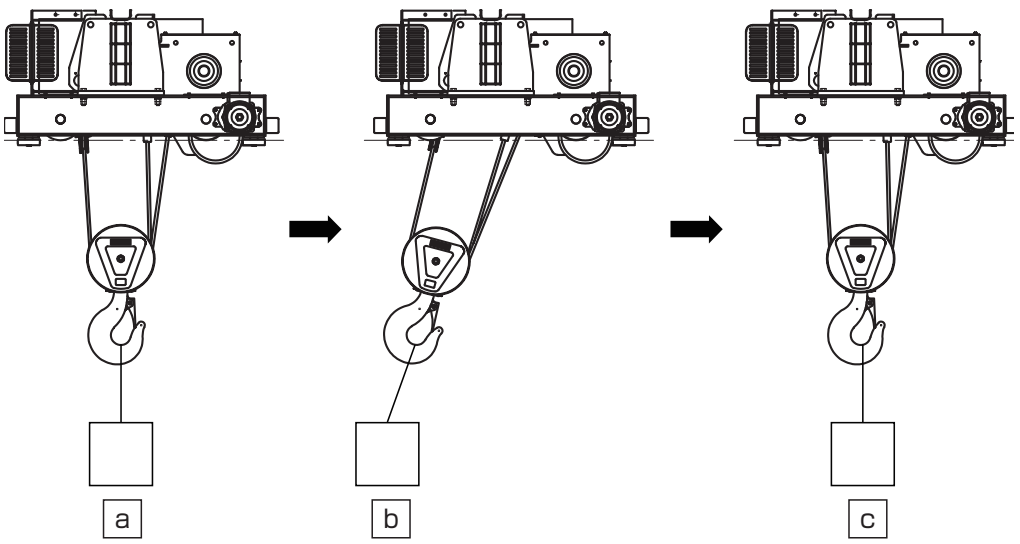
Swinging of a load makes it difficult and dangerous to move the hoist. The basic idea of the operation is not to cause a load to swing. For this purpose, observe the following instructions.

- Do not pull a load in an inclined direction.
- Start slowly when traversing the load.
- Do not lift a load suddenly.

Even if you observe the above instructions, the lifted load may swing at the start and the stop of the hoist. Following operations can reduce the swing of the lifted load.

■Operation

1) Press the Traverse Button. (Fig. a)
2) When the hoist starts to move, the lifted load delays slightly. (Fig. b)
3) Release the button slightly before the time when the lifted load swings to the center position.
4) When the lifted load comes to the position just beneath the hoist, press the button again and continue to traverse the load. (Fig. c)



■1-10-5 Precautions After Work

⚠ CAUTION

Prohibited

- **Do not store the hoist in the excessively lifted state (where the Upper Limit Emergency Stop Device is active), or excessively lowered state (lowered to a length beyond the lifting range).**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.

Mandatory

- **Store the hoist with power off.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Indicate "FAILURE" on the hoist that needs repair to prevent it from being used by mistake.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Clean the hoist by wiping off dust and water droplets before storing.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Clean the parts that house, or are scraped by, the wire rope, such as the rope drum, hook sheave, idle sheave, and rope guide, by removing the dirt, foreign matter, and water droplets from them before storing.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.
- **When the hoist is installed outdoors, cover it with rain cover or roof after applying rust proof treatment.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause malfunction and failure of the hoist and may lead to serious accidents.

NOTE

- **Frequently clean the push buttons not to allow the dust and sands to attach.**
- **When storing the hoist for a long period, it is effective to perform idling operation at a certain interval in order to prevent rusting.**
- **When not using the hoist, wind up the Hook for storage to the height where it does not interfere with passers-by or other works.**
- **Decide the place to store the hoist in advance. It is recommended to hang the push button set on the pillar.**

1-11 Daily Inspection

⚠ DANGER

Mandatory

- **Carry out daily inspection before use.**
  Failure to carry out the inspection may make it impossible to maintain normal function and performance of the hoist, resulting in failure to use the hoist safely and leading to serious accidents. When any abnormality is found during inspection, turn off the power, indicate “FAILURE” and ask the maintenance engineer for repair

Daily Inspection

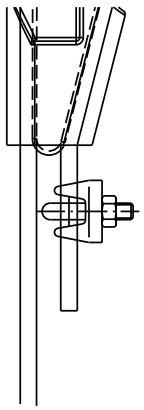
Mainly the operator of the hoist shall carry out the daily inspection to check the conditions of the hoist by visual check and operation under no load.

■1-11-1 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 a new nameplate or label. When ordering a nameplate, please inform Kito of the Product Code and Serial No.
Deformation and damage of Main Unit and each part	• Check visually.	• No apparent deformation or corrosion	Replace the parts with deformation, damage, flaw or crack.
Bolts, nuts and split pins	• Check visually.	• The bolts, nuts, and split pins that can be seen from exterior must be free from loosening and coming off.	Fasten bolts, nuts and split pins securely.
Traverse Rail	• Check visually on the floor.	• No apparent deformation, abrasion, or damage • No other structural abnormality	Replace the Traverse Rail.

■1-11-2 Wire Rope

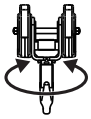
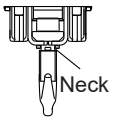
Item	Check method	Criteria	When failed
Type	• Check visually.	• Same as the indication on the nameplate. (outside diameter, number of strands, and direction of twist)	Use the genuine product.
Breakage of wire	• Check visually.	• No apparent breakage	Carry out the inspection item of “■2-2-2 Wire Rope” (P52) of Chapter 2, Frequent inspection.
Abrasion	• Check visually.	• No apparent abrasion	Carry out the inspection item of “■2-2-2 Wire Rope” (P52) of Chapter 2, Frequent inspection.
Rust, corrosion	• Check visually.	• No apparent rust and corrosion	Carry out the inspection item of “■2-2-2 Wire Rope” (P52) of Chapter 2, Frequent inspection.
Kink and loss of Shape  Kink  Loss of Shape	• Check visually.	• No kink or loss of shape	Carry out the inspection item of “■2-2-2 Wire Rope” (P52) of Chapter 2, Frequent inspection.
Grease	• Check visually.	• To be greased adequately.	Apply grease

Item	Check method	Criteria	When failed
Rope Anchorage Part	• Check visually. 	• No strand breakage or rust • No coming off of wire clip <Tightening Torque of Wire Clip> Rope diameter (mm): φ13 Tightening torque (N•m): 16 U-bolt size: M14	Carry out the inspection item of “■2-2-2 Wire Rope” (P52) of Chapter 2, Frequent inspection. Tighten the wire clip securely.

■1-11-3 Hook Block

Item	Check method	Criteria	When failed
Opening of the Hook	• Check visually.	• No apparent opening of the Hook	Carry out the inspection item of “■2-2-3 Hook Block” (P54) of Chapter 2, Frequent inspection.
Abrasion and corrosion of the Hook	• Check visually.	• No apparent abrasion or corrosion	Carry out the inspection item of “■2-2-3 Hook Block” (P54) of Chapter 2, Frequent inspection.
Deformation, flaw, corrosion (Whole unit)	• Check visually.	• No apparent deformation, flaw and corrosion • No attachment of foreign matters such as spatter • No bending or twisting	Carry out the inspection item of “■2-2-3 Hook Block” (P54) of Chapter 2, Frequent inspection.
Inclination and balance	• Check visually.	• To have no inclination, and to be balanced.	Correct the position and direction of hook block, and twist of the wire rope.
Hook Latch	• Check visually and by operation.	• To have no apparent deformation, and to open/close smoothly. • The Hook Latch is mounted securely inside the Hook opening.	Replace the Hook Latch.

Daily Inspection (Continued)

Item	Check method	Criteria	When failed
Hook movement (Rotation) 	• Check visually and by operation. 	• To rotate smoothly by 360 degrees.	Replace the hook or thrust bearing for hook.
Hook sheave	• Check visually and by operation.	• To move (rotate) smoothly. • The groove must be free from deformation, damage, and apparent abrasion.	Replace the hook sheave.
Hook nut	• Check visually and by operation.	• No coming off of the spring pin	Replace the spring pin.
Hook sheave cover	• Check visually.	• No deformation, damage, or loosened bolt	Replace the hook sheave cover.

■1-11-4 Push Button Switch

Item	Check method	Criteria	When failed
Switch body	• Check visually.	• No deformation, damage and no loosened screw • To have clear indication. • No discoloration	Clean and repair the label or replace with a new label. Affix the label securely.

■1-11-5 Function and Performance

● Check the following item with no load.

Item	Check method	Criteria	When failed
Operational check	• No-load operation	• The Wire rope can be wound smoothly. • Wire rope must be properly wound on the rope drum. • Rope guide must operate smoothly. • Idle sheave must rotate smoothly. • When the operation is stopped, the motor stops immediately. • When the Emergency Stop Button is pressed, all hoist motions stop. • When operating other push buttons while the Emergency Stop Button is pressed, the hoist does not start operation. • After canceling the Emergency Stop Button, the hoist operates normally. • To be operated in the same direction as the arrow indicated on the button. (Not to be operated in the reverse direction.) • Operation buttons must move smoothly. • Lifting and lowering operations must be smooth. • To traverse without snaking motion.	Refer to “3-1 Guidance on Troubleshooting” (P84). Check the cause of failure, and take measures.
Brake (before operation)	• No-load operation	• Brake must operate reliably to stop the hook block immediately.	Carry out the inspection item of “■2-3-8 Function and Performance” (P70) of Chapter 2, Frequent inspection.
Upper/Lower Limit Stop Device	• No-load operation	• Motor must stop automatically when operating the hoist to the preset upper limit and lower limit.	Refer to “3-1 Guidance on Troubleshooting” (P84). Check the cause of failure, and take measures.
Abnormal Sound	• No-load operation	• No abnormal sounds and vibrations	Refer to “3-1 Guidance on Troubleshooting” (P84). Check the cause of failure, and take measures.

Chapter 2

Regular Inspection

This chapter describes the frequent inspection items, the periodic inspection items, and the disassembly procedures.
Refer to Chapter 1 “Handling the Product” for the daily inspection items.
Inspection is the first step toward safety. Carry out daily inspection, frequent inspection and periodic inspection for safe use of the product.

2-1 Safety Precautions

■2-1-1 General Matters related to Regular Inspection

⚠ WARNING

Prohibited

- **Periodic inspection of the hoist must be performed by maintenance engineer.**
  Failure to comply with this instruction may make it impossible to properly perform inspection/checking and disassembling/assembling of the hoist, and may not only result in failure to obtain normal function and performance of the hoist, but also lead to serious accidents.
- **Do not use the part exceeding the service limit or criteria and the parts other than genuine part.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.
  Even if the part is genuine Kito part, it cannot be used for other models. Refer to Disassembly/Assembly Manual separately provided for the correct use of the part.
- **Do not carry out the inspection of the hoist with a lifted load.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Turn off the main power when carrying out the inspection.**
  Failure to comply with this instruction can lead to electric shock, which may seriously affect the health of a human body.
- **Do not use lubricant such as oil and grease in places with fire or sparks.**
  Failure to comply with this instruction may lead to serious accidents such as fire.

Mandatory

- **Carry out regular inspections (frequent and periodic). Keep the record of the frequent and periodic inspections. Carry out the inspections at an appropriate frequency, paying attention to conditions obtained from daily inspection and operating sound.**
  The record of inspection makes it possible to obtain information on the conditions of hoist such as function and performance of the hoist, and the cycle of part replacement, and facilitates maintenance planning for the hoist. Failure to carry out the inspection may make it impossible to maintain normal function and performance of the hoist, resulting in failure to use the hoist safely and leading to serious accidents.
- **Put the hoist on the floor or work bench when performing the repair and disassembling of the hoist.**
  Failure to comply with this instruction may make it impossible to properly perform inspection/checking and disassembling/assembling of the hoist, and may not only result in failure to obtain normal function and performance of the hoist, but also lead to serious accidents.
- **Even if the components of the hoist do not exceed the service limit, replace the parts when the hoist has exceeded the total operating hours derived from the grade indicated on the hoist and the load factor.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.
- **Do not use the hoist when any abnormality is observed during the inspection. Indicate "FAILURE" on the hoist and contact with maintenance engineer or Kito for repair.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Be sure to carry out the functional and performance check in the regular (frequent and periodic) inspections.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.
- **When performing the functional and performance check, be sure to perform the check first at no load and then at the rated load.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.
- **Indicate "CHECKING" when performing the inspection.**
  When a crane is operated erroneously during the inspection, it may result in accidents such as fall-off of parts and tools as well as fall-down of a person.

⚠ CAUTION

Mandatory

- **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 the work method, work procedure and work posture.**
  Weight of the product or parts may cause your hand to get caught or may hurt your waist.
  Especially be careful for the work on an unstable scaffold such as the work at a highly lifted place using a stepladder.
- **Wear a helmet and a safety belt when working at a highly lifted place.**
  Otherwise, it may result in injury or fall-down of a person.
- **Adequately remove the oil attached to the product or spilt on the floor.**
  Otherwise, it may result in injury due to dropping of the product or slipping.
- **Keep the work area clean when disassembling the product.**
  Assembling or mixing the parts other than genuine parts may result in damage of the product or accidents 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 due to erroneous use during inspection, the maintenance engineer shall instruct the user for correct use of the hoist.**

  e.g. (1) The damage of the Wire Rope and the Rope Guide (Cause: pulling in an inclined direction)

  (2) The loosening or deformation of the Upper Limit Emergency Stop Device (Cause: habitual use of the Upper Limit Emergency Stop Device)

2-2 Frequent Inspection

⚠ WARNING

Mandatory

- **Be sure to carry out the functional and performance check in the frequent inspection.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.

NOTE

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

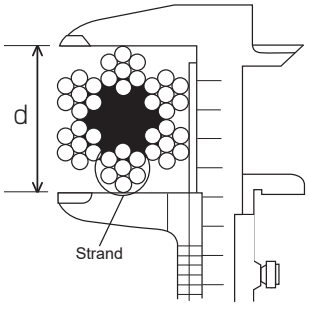
Frequent Inspection

The maintenance engineer, or the person appointed by the maintenance engineer, shall carry out the frequent inspection to check the conditions of the hoist by visual check, measurement, and operation under the rated load. Also, keep and store the record of inspection.

■2-2-1 Appearance

Item	Check method	Criteria	When failed
Traverse Rail	• Check visually.	• No bending of traverse surface • No deficiencies that affect traversing motion • No oil stain	Replace the Traverse Rail.
Stopper	• Check visually.	• No loosened bolt • No apparent deformation or damage	• Tighten the Stopper. • Replace the Stopper. • Avoid the Stopper from being struck constantly.

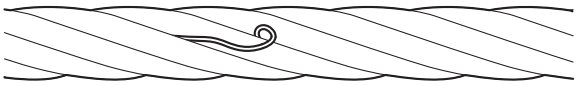
■2-2-2 Wire Rope

Item	Check method	Criteria	When failed
Breakage of wire	Check by measurement.	• Of one twist, one strand has 3 broken wires, or an entire rope has 6 or more broken wires.	Replace the Wire Rope.
Abrasion	Check by measurement. 	• Measure a part of the rope with significant abrasion and check that the diameter d is not reduced by 5% or more. (For the standard diameter d of the rope, refer to the values on page 10.)	Replace the Wire Rope.

Capacity	Wire Rope	
	Nominal diameter d (mm)	Structure
10t	φ13	IWRC6xP · WS(31)

Item	Check method	Criteria	When failed
Damage to the shape	• Check visually.	• No apparent damage to the shape as shown below	Replace the Wire Rope.

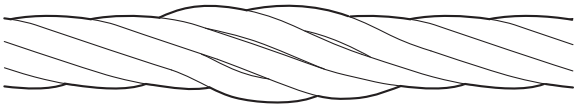
Wire getting out from the strands



Plus kink (the twist is partly tightened)

Core jutting out

Minus kink (the twist is partly loosened)

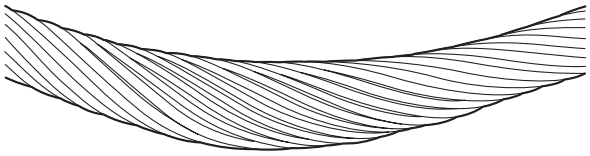


Partly reduced diameter of the strands

Waves (spiral-shaped)

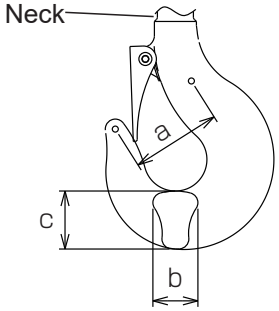
Strand getting out from other strands

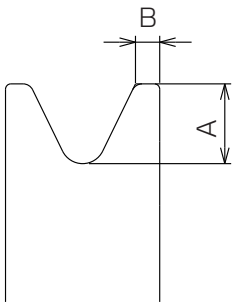
Basket shape (swollen in a basket shape)



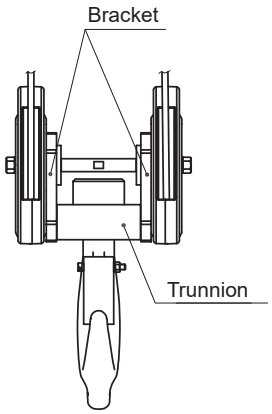
Flat rope (partly pressed to be flat)

■2-2-3 Hook Block

<table>
<tr><th>Item</th><th>Check method</th><th>Criteria</th><th>When failed</th></tr>
<tr><td>Opening of the Hook</td><td>• Check by measurement.
 
</td><td>• The opening of the Hook (Dimension a) must not exceed the limit value 5%.
• The abrasion of the dangerous section (Dimensions b and c) must not exceed 10%.
• The twist angle of the tip of the Hook must not exceed 10 degrees.
• The neck must not have plastic deformation.

<table>
<tr><td rowspan="2">Capacity (t)</td><td colspan="5">Hook</td></tr>
<tr><td>Dimension a (mm)</td><td colspan="2">Dimension b (mm)</td><td colspan="2">Dimension c (mm)</td></tr>
<tr><td></td><td>Standard</td><td>Standard</td><td>Limit</td><td>Standard</td><td>Limit</td></tr>
<tr><td>10</td><td>145</td><td>75</td><td>67.5</td><td>95</td><td>85.5</td></tr>
</table>
*) The above values of Dimension a are for reference. Perform checking based on the values measured at purchasing.</td><td>Replace the Hook.</td></tr>
<tr><td>Abrasion and corrosion of the Hook</td><td>• Check by measurement.</td><td>• No apparent abrasion and corrosion
• Each dimension must not exceed the limit shown in the table above.</td><td>Replace the Hook.</td></tr>
<tr><td>Hook Sheave</td><td>• Check by measurement.
 
</td><td>• The abrasion of the groove (A) must not exceed 15% of the wire rope diameter.
• The abrasion of the side wall (in thickness) (B) must not exceed 10% of the wire rope diameter.
• No deficiencies that damage the wire rope
• No cracks

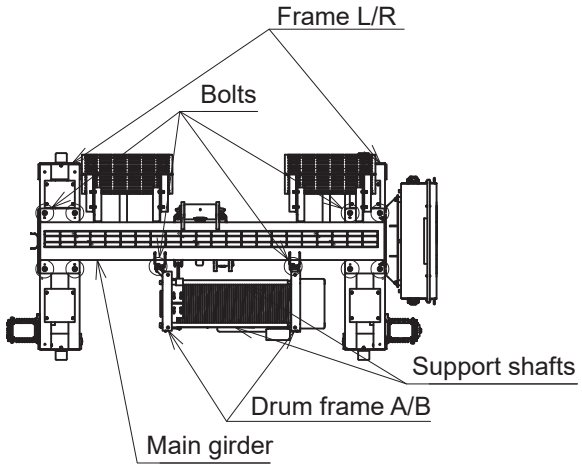
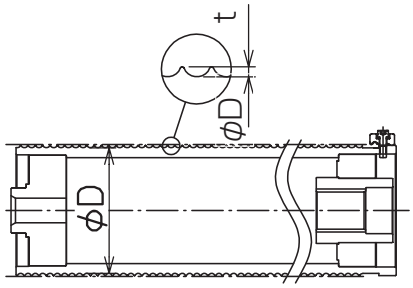
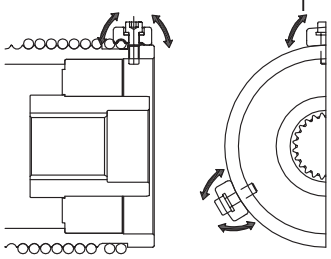
<table>
<tr><td rowspan="2">Capacity (t)</td><td colspan="4">Hook Sheave</td></tr>
<tr><td colspan="2">Dimension A (mm)</td><td colspan="2">Dimension B (mm)</td></tr>
<tr><td>Standard</td><td>Limit</td><td>Standard</td><td>Limit</td></tr>
<tr><td>10</td><td>22.5</td><td>24.5</td><td>5.7</td><td>4.4</td></tr>
</table></td><td>Replace the Hook Sheave.</td></tr>
</table>

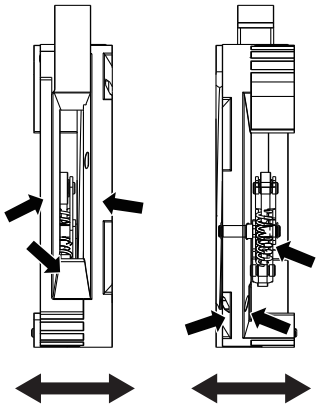
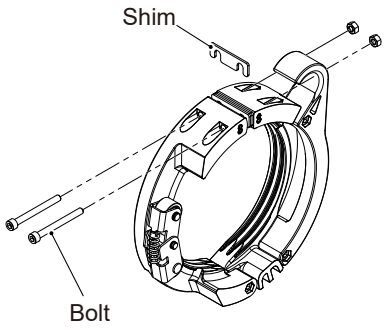
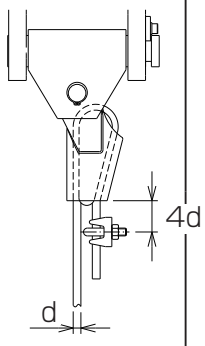
Item	Check method	Criteria	When failed
L Bracket, Trunnion	• Check visually. 	• No deformation, damage, or loosened nut • No apparent abrasion of holes	Replace the Hook Block. Tighten securely. Nut tightening torque values: 300 N•m for M20

■2-2-4 Push Button Switch

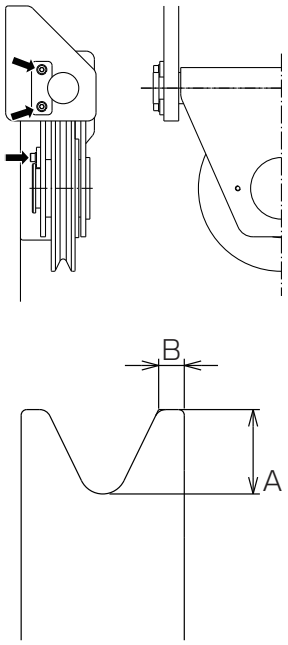
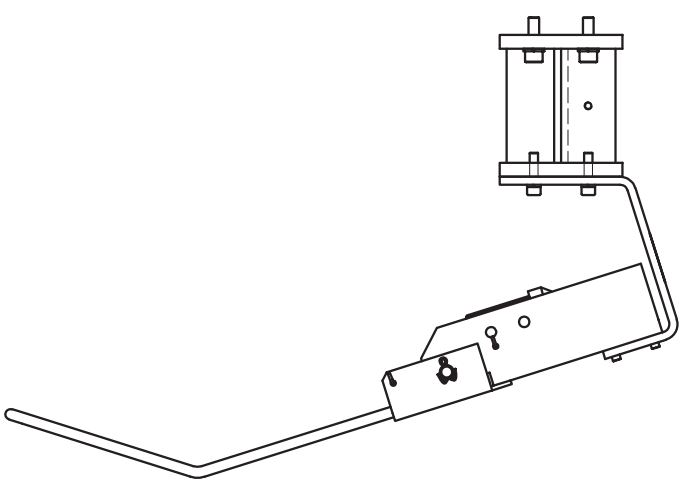
Item	Check method	Criteria	When failed
Push Button Switch Cord	• Check visually. 	• To be attached securely. • Protection Wire must prevent external force from being applied on the cord (cable) when Push Button is pulled. • To have no damage.	Tie the Push Button Switch Cord and the Protection Wire to the unit properly.

■2-2-5 Main Unit: Lifting Unit

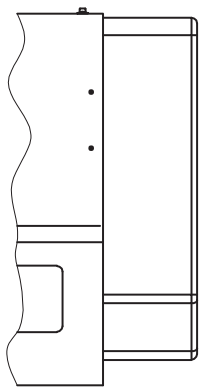
<table>
<tr><th>Item</th><th>Check method</th><th>Criteria</th><th>When failed</th></tr>
<tr><td>Drum Frame A, Drum Frame B, Support Shaft, Main Girder</td><td>• Check visually.</td><td>• No apparent deformation, abrasion, or damage
• No abnormality at connected parts
• No loosening of fasteners such as bolts
 
</td><td>Replace the Reduction Gear, Drum Frame A, Drum Frame B, Support Shaft, or Trolley Frame.
Tighten the bolts securely.</td></tr>
<tr><td>Rope Drum</td><td>• Check visually and by measurement.
 
</td><td>• No apparent deformation, abrasion, or cracking
• The abrasion in the groove must not exceed 20% of the wire rope diameter.
<table><tr><th rowspan="2"></th><th rowspan="2">Capacity (t)</th><th colspan="2">Dimension t (mm)</th><th colspan="2">Dimension D (mm)</th></tr><tr><th>Standard</th><th>Limit</th><th>Standard</th><th>Limit</th></tr><tr><td>Double Girder Type</td><td>10</td><td>5.5</td><td>8.1</td><td>φ253</td><td>φ247.8</td></tr></table></td><td>Contact Kito.</td></tr>
<tr><td>Rope Clamp</td><td>• Check visually.
  </td><td>• No loosening, displacement, or coming off</td><td>Tighten the Rope Clamp securely.
Bolt tightening torque values:
18 N•m for M8</td></tr>
</table>

Item	Check method	Criteria	When failed
Rope Guide	• Check visually and by operation. Check the amount of play.  	• The guide must be free from deformation, damage, and apparent abrasion. • To be clean and free from adhering oil. • No coming off of the coil spring • No apparent abrasion at the roller • The part which contacts with the limit switch must be free from deformation, damage, and apparent abrasion. • No abnormal noise from the Rope Guide • The play in the shaft direction of the Rope Guide (see the figure on the left)  	Replace the components of the Rope Guide. Clean the Rope Guide. Apply grease to the following locations of the Rope Guide, etc. (See below) • Guide Roller part • Convex part engaged with the Drum • Rope Drum groove • Loosen the bolts and remove the Shim to adjust the amount of play.
Rope Anchorage Part  	• Check visually.	• No apparent deformation, abrasion, or damage • No loosened nut • The wire clip must be fixed at a distance of four times the wire rope diameter from the lower end of the socket.	Replace the parts. Tighten the nuts securely. Torque value: 16 N•m for M14

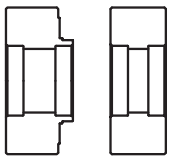
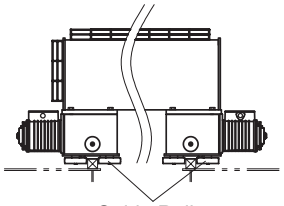
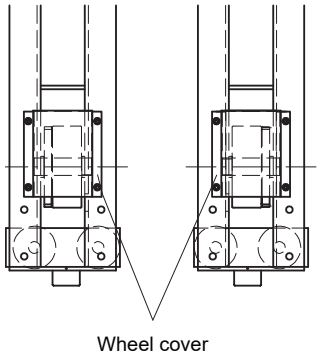
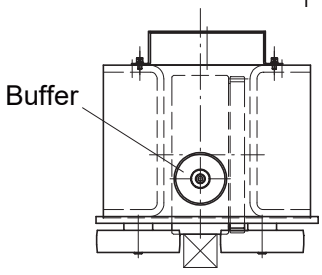
Frequent Inspection (Continued)

<table>
<tr><th>Item</th><th>Check method</th><th>Criteria</th><th>When failed</th></tr>
<tr><td>Idle Sheave</td><td>• Check visually and by measurement.
 
</td><td>• No loosening or coming off of the bolts
• To move smoothly.
• No deformation, damage, or apparent abrasion
• The abrasion (in diameter) of the groove must not exceed 15% of the wire rope diameter.
• The abrasion of the side wall (in thickness) (B) must not exceed 10% of the wire rope diameter.
• No deficiencies that damage the wire rope
• No cracks
<table>
<tr><td rowspan="2">Capacity (t)</td><td colspan="4">Sheave</td></tr>
<tr><td colspan="2">Dimension A (mm)</td><td colspan="2">Dimension B (mm)</td></tr>
<tr><td></td><td>Standard</td><td>Limit</td><td>Standard</td><td>Limit</td></tr>
<tr><td>10</td><td>22.5</td><td>24.5</td><td>5.7</td><td>4.4</td></tr>
</table></td><td>Tighten securely.
Replace the Idle Sheave.</td></tr>
<tr><td>Upper Limit Emergency Stop Device</td><td>• Check visually.
  </td><td>• The lever must be free from large deformation, damage, and abrasion.
• To move smoothly.
• To be clean.
• No loosened nut or bolt
• No coming off of split pins</td><td>Replace or clean the parts of the Upper Limit Emergency Stop Device.
Tighten the nuts and bolts securely.
Replace split pins.
Torque value:
18 N•m for M8
8 N•m for M6
2 N•m for M4</td></tr>
</table>

■2-2-6 Lifting Reduction Gear

Item	Check method	Criteria	When failed
Reduction Gear	• Check visually. 	• No apparent deformation, damage, or cracking • No leakage of oil	Replace the Reduction Gear. Tighten the bolts securely. 120 N•m for M16

■2-2-7 Trolley Frame

Item	Check method	Criteria	When failed
Wheel	• Check visually. 	• No apparent deformation, damage, or abrasion • No oil stain on the running surface • The teeth must be lubricated with sufficient grease.	Replace the parts. Clean the stained parts. Apply grease.
Guide Roller	• Check visually. 	• No apparent deformation, damage, or abrasion • The Guide Roller must rotate smoothly. • No loosened socket bolt	Replace the Guide Roller components. Tighten the bolts securely. Torque value: 3 N•m for M6
Wheel Cover	• Check visually. 	• No apparent deformation or damage • No loosened bolt	Replace the Wheel Cover. Tighten the bolts securely. Torque value: 3 N•m for M6
Buffer, Buffer Bracket	• Check visually. 	• No apparent bending or damage • No loosened bolt	Replace the Buffers and Buffer Brackets. Tighten the bolts securely. Torque value: 18 N·m for M8

■2-2-8 Control Box

Item	Check method	Criteria	When failed
Appearance	• Check visually.	• To be attached securely to the Main Unit. • No apparent deformation or damage • The cables must be connected securely without slack.	Replace the Control Box. Attach the Control Box securely. Connect the cables securely.
Internal Wiring	• Check visually.	• The electrical parts must be fixed securely. • The lead wire must not be slack. • No wire breakage, burning, or welding. • The connector must be securely inserted.	Connect the wiring securely. Replace the wiring with new wiring, referring to “3-1 Guidance on Troubleshooting” (P84).
Error Code Display	• Check visually.	• No error must be shown on the display of the inverter.	Check the error code and remove the cause or take measures, referring to the Inverter Manual separately provided.
Contamination and attachment of foreign matters	• Check visually.	• No contamination with water droplets or foreign matters	Remove the foreign matter.

■2-2-9 Power Supply and Wiring

Item	Check method	Criteria	When failed
Power Cable	• Check visually.	• To have enough length. • No damage • To be connected securely.	Replace the Power Cable.
External Relay Cable	• Check visually.	• To have enough length. • No damage • To be connected securely.	Replace the External Relay Cable. Connect the cable securely.

■2-2-10 Electric Characteristics

Item	Check method	Criteria	When failed
Source Voltage	• Check by measurement.	• The rated voltage must be supplied. **⚠ WARNING**  Prohibited • **Do not perform inspections with wet hands.** • **Do not directly touch the part where voltage is supplied.** Failure to comply with these instructions may lead to serious accidents such as fire due to failure of the hoist.	Supply proper power.

■2-2-11 Function and Performance

●Perform the following inspections with no load.

Item	Check method	Criteria	When failed
Abnormal noise	• No-load operation	• No irregular rotating sound • No howling sound of the Motor or scraping sound of the Brake • No abnormal sound from the place near the Rope Guide • No abnormal sound from the inside of the Reduction Gear **⚠ WARNING**  Mandatory • **Be sure to carry out the functional and performance check in the regular (frequent and periodic) inspections.** Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.	Take measures, referring to “3-1 Guidance on Troubleshooting” (P84).

2-3 Periodic Inspection

⚠ WARNING

Mandatory

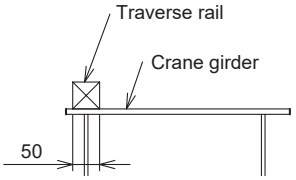
- **Put the hoist on the floor or work bench when performing the repair and disassembling of the hoist.**
  Failure to comply with this instruction may make it impossible to properly perform inspection/checking and disassembling/assembling of the hoist, and may not only result in failure to obtain normal function and performance of the hoist, but also lead to serious accidents.
- **Be sure to carry out the functional and performance check in the regular (frequent and periodic) inspections.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.
- **Wear insulating gloves when measuring voltage.**
  Failure to comply with this instruction can lead to electric shock, which may seriously affect the health of a human body.
- **When measuring the electric characteristics (insulation resistance, but except voltage measurement), turn off the power.**
  Failure to comply with this instruction can lead to electric shock, which may seriously affect the health of a human body.

NOTE

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

The maintenance engineer, or the person appointed by the maintenance engineer, shall carry out the periodic inspection to check the conditions of the hoist by checking the operation status with the inverter (Refer to "■2-4-1 Checking Number of Starts and Operating Hours" (P81)), disassembling, measurement, and operation under the rated load.

■2-3-1 Appearance

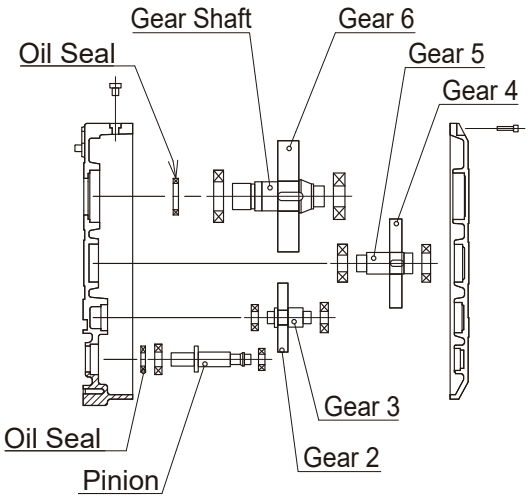
Item	Check method	Criteria	When failed
Traverse Rail	• Check by measurement.  	□ 50: The abrasion in width or the height direction must be 2.5 mm or less. * In the measurement, measure first the unworn part and then the worn part, and then compare the measurements.	Replace or repair the rail.

■2-3-2 Main Unit

Item	Check method	Criteria	When failed
Upper Limit Emergency Stop Device	• Check visually and by operation.	• To be fixed securely without looseness at mounting part. • • Perform lifting operation with no load and check that the Hook Block pushes up the lever to immediately stop the lifting operation. • Before the inspection, be sure to adjust the Upper/Lower Limit Stop Device so that the device will not be activated. After the inspection, be sure to return the position of the Upper/Lower Limit Stop Devices. (See “1-8 Setting Upper/Lower Limit Stop Device” (P26).)	Mount the Upper Limit Emergency Stop Device securely. Take measures, referring to“3-1 Guidance on Troubleshooting” (P84).
Upper/Lower Limit Stop Device	• Check by operation.	• The Upper/Lower Limit Stop Device must operate normally (when checked under no load).	Take measures, referring to “3-1 Guidance on Troubleshooting” (P84).

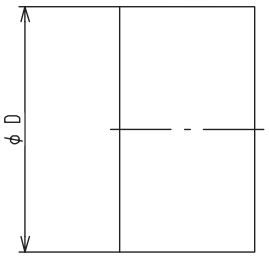
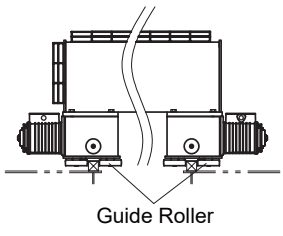
■2-3-3 Lifting Reduction Gear

Item	Check method	Criteria	When failed
Gear Case	• Check visually	• No abrasion, deformation, or damage on the inner surface • No displacement (coming off of positioning pin)	Replace the Reduction Gear.
Bearing	• Check the operating hours by visual inspection and using inverter.	• No abnormal sound and vibration from the Reduction Gear during operation • The total operating hours must not exceed the guideline for replacement (1600 H). • No apparent abrasion, flaw, or damage • To rotate smoothly.	Replace the Bearing.
Gear Shaft, Gear 2, Gear 3, Gear 4, Gear 6, Pinion	• Check for abnormal sound and vibration. • Check the operating hours using inverter.	• No abnormal sound and vibration from the Reduction Gear during operation • The total operating hours must not exceed the guideline for replacement (1600 H).	Replace the Reduction Gear.
Oil Seal and Packing	• Check visually	• No deformation or cracking • No leakage of oil	Replace the parts.



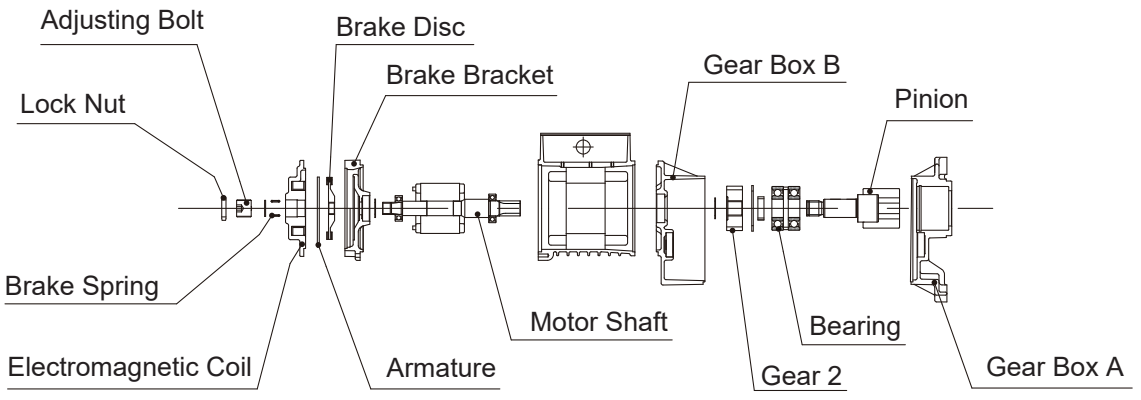
* After disassembling and inspecting the reduction gear, apply lubricant according to the instructions on “■2-4-2 Guidelines on Timing of Application of Lubricants” (P82).

■2-3-4 Main Unit: Traverse Unit

<table>
<tr><th>Item</th><th>Check method</th><th>Criteria</th><th>When failed</th></tr>
<tr><td>Frame</td><td>• Check visually and by measurement.</td><td>• No apparent deformation, abrasion, or damage
• No abnormality at welded parts
• No loosening of fasteners such as bolts</td><td>Replace the Frame.
Tighten the bolts and screws.
Refer to Disassembly/ Assembly Manual for the torque values.</td></tr>
<tr><td>Wheel</td><td>• Check visually and by measurement.
  </td><td>• The Dimension D must not be reduced to below the limit value due to abrasion of the running surface.
• The difference (ellipticity) in the running surface diameter must not exceed 1 mm.
<table><tr><th rowspan="2">Capacity (t)</th><th colspan="2">Dimension D (mm)</th></tr><tr><th>Standard</th><th>Limit</th></tr><tr><td>10</td><td>210</td><td>200</td></tr></table></td><td>Replace the Wheel.</td></tr>
<tr><td>Guide Roller</td><td>• Check visually and by measurement.
  </td><td>• The abrasion in the outside diameter (new: Φ110) must not exceed 8 mm (Φ102).</td><td>Replace the Guide Roller.</td></tr>
</table>

■2-3-5 Traversing Reduction Gear

Item	Check method	Criteria	When failed
Gear Case and Brake Bracket	• Check visually	• No abrasion, deformation, or damage on the inner surface • No displacement	Replace the Traversing Reduction Gear.
Bearing	• Check the operating hours by visual inspection and using inverter.	• No apparent abrasion, flaw, or damage • To rotate smoothly. • The total operating hours must not exceed the guideline for replacement (800 H).	Replace the Bearing.
Gear 2, Pinion, and Motor Shaft	• Check the operating hours by visual inspection and using inverter.	• No apparent abrasion, deformation, or damage • The total operating hours must not exceed the guideline for replacement (800 H). • The abrasion of the tooth must not exceed 10% of the tooth thickness.	Replace the Traversing Reduction Gear.
Packing	• Check visually	• No leakage of oil	Replace the Packing.



* After disassembling and inspecting the reduction gear, apply lubricant according to the instructions on “■2-4-2 Guidelines on Timing of Application of Lubricants” (P82).

■2-3-6 Oil/Grease

Item	Check method	Criteria	When failed
Oil/Grease leakage	• Check visually	• To have no leakage of Oil/grease from Packings, Oil Seals or Air Breather.	Replace the Packings and the Oil Seals.

■2-3-7 Electric Characteristics

Item	Check method	Criteria	When failed
Insulation Resistance	• Check by measurement using an insulation resistance meter.	• Insulation resistance must be 5 MΩ or higher.	Replace the defective parts.
Grounding Resistance	• Check by measurement.	• To be grounded with D-class grounding (with grounding resistance of 100 Ω or lower).	Make a grounding correctly.

⚠ WARNING

Mandatory

- **Be sure to shut off the power when measuring the resistance.**
  Failure to comply with this instruction may result in death or severe injury due to electric shock, etc.
- **After completion of the inspection of each part, perform the operational check for correct operation.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.

■2-3-8 Function and Performance

Item	Check method	Criteria	When failed
Operational Check	• Perform operation under the rated load.	• Perform inspection of the items on function/performance of daily inspection with no load, and then perform the inspection of the same items with the rated load. **⚠ WARNING**  Mandatory • **Be sure to carry out the functional and performance check in the regular (frequent and periodic) inspections.** Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents such as death or severe injury.	Take measures, referring to “3-1 Guidance on Troubleshooting” (P84).
Brake	• Perform operation under the rated load. • Check visually and by measurement.	• The stopping distance of lifting/lowering must be within 1% of the lifting distance per minute. • The stopping distance of traversing must be within 10% of the traversing distance per minute.	Take measures, referring to “3-1 Guidance on Troubleshooting” (P84).

■2-3-9 Wire Rope Replacement Procedure

To replace a Wire Rope, lower the Wire Rope Hoist body or the Hook Sheave onto the floor to sag the rope.

■ Removing Wire Rope

Follow the procedure below to remove the Wire Rope.

Advance Preparation:
Before starting operation, prepare the following items:
Hammer, Hexagonal wrenches, Spanners (or Adjustable spanners), Slotted screwdrivers, Snap ring plyers, and Leather gloves

↓

1. Remove the Rope Anchorage Part from the Main Unit.

↓

2. Remove the Wire Rope from the Rope Anchorage Part.

↓

3. Pull out the Wire Rope from the Hook Sheave and Idle Sheave.

↓

4. Remove the Rope Guide.

↓

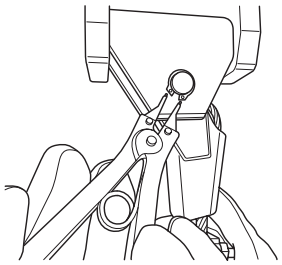
5. Remove the Wire Rope while unwinding the Rope Drum.

↓

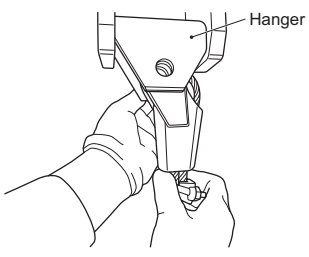
6. Remove the Rope Clamps from the Rope Drum.

■Removing Wire Rope

1) Remove the snap ring from the anchorage shaft supporting the Rope Anchorage Part of the Main Unit.

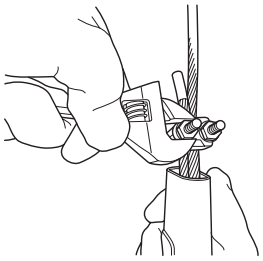


2) Pull out the anchorage shaft from inside.



Periodic Inspection (Continued)

3) Remove the socket, and then the Wire Clip at the rope end.

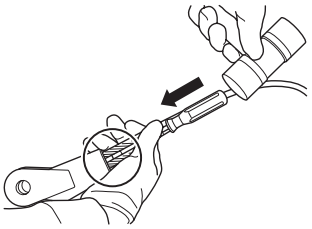


⚠ CAUTION

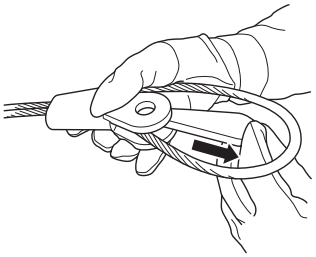
Your hand may be injured.

Wear gloves, etc., and be careful of frayed wires at the rope end during operation.

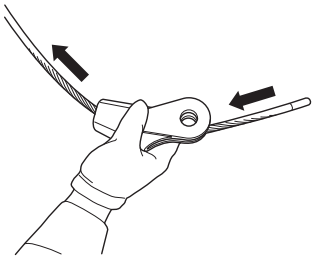
4) Tap lightly the tip of the cotter, and pull out the cotter from the socket.



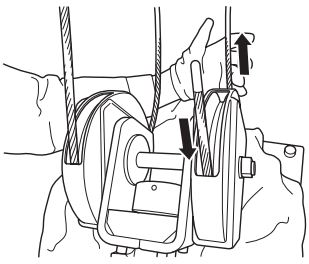
If it is difficult to tap the tip of the cotter, put a slotted screwdriver on the cotter as shown in the figure and tap the driver with a hammer.



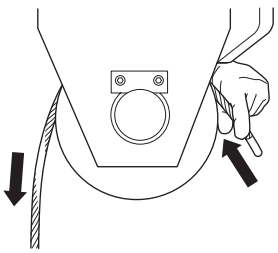
5) Remove the Wire Rope from the socket.



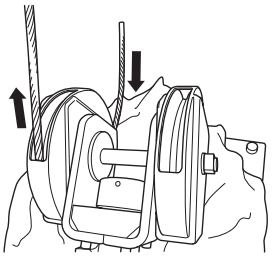
6) Pull out slowly the Wire Rope from the Hook Sheave of the Hook Block.

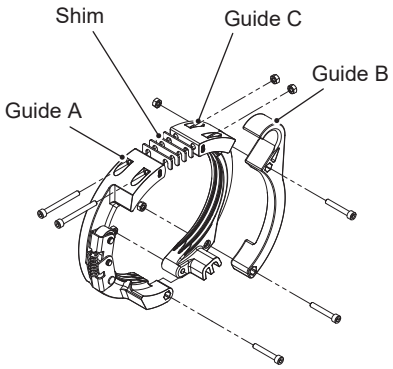


7) Pull out slowly the Wire Rope from the Idle Sheave.



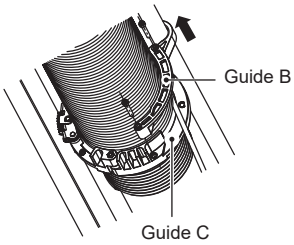
8) Pull out slowly the Wire Rope from the other Hook Sheave of the Hook Block.



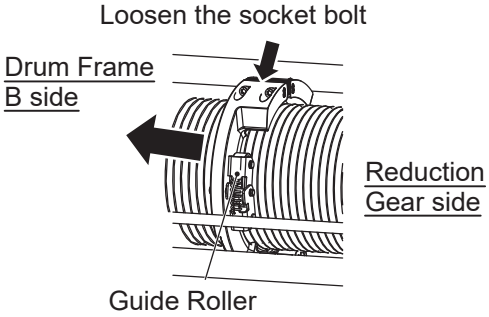


Structures of Rope Guides

9) Remove the bolt fixing Guide B, and remove Guide B from Guide C along the Support Shaft.

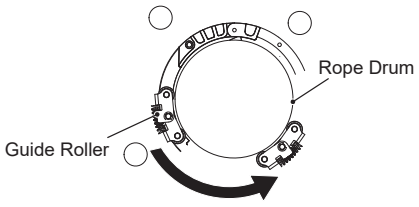


10) Loosen the socket bolt indicated by the arrow in the figure below. Next, move Guide A toward the Drum Frame B side until its Guide Roller does not lie on the wire, and remove the socket bolt you loosened.



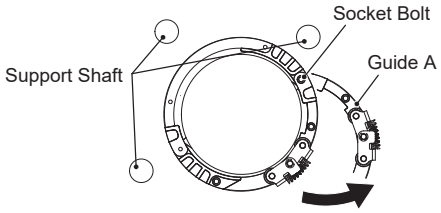
11) Remove the Rope Guide from the Rope Drum by following the procedure described below.

11-1 As shown in the figure on the right, rotate Guide A and Guide C along the Rope Drum using the Guide Roller as a guide.

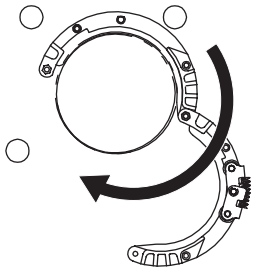


Periodic Inspection (Continued)

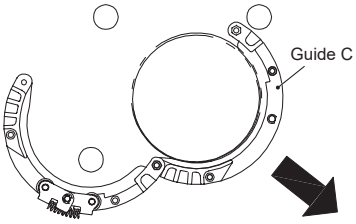
11-2 Loosen the socket bolt connecting Guide A to Guide C, and remove Guide A from the Rope Drum at a position where Guide A has no interference with the Support Shaft.



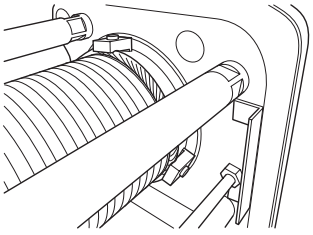
11-3 As shown in the figure on the right, rotate Guide A and Guide C along the Rope Drum with Guide A removed from the Rope Drum.



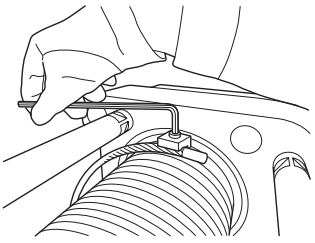
11-4 Remove Guide C from the Rope Drum at a position where Guide C has no interference with the Support Shaft.



12) Perform unwinding operation while pulling the Wire Rope by hand so that the Wire Rope does not float away from the Rope Drum. Remove in advance the Wire Rope to the position of the Rope Clamp as shown right.


(Fixed state)

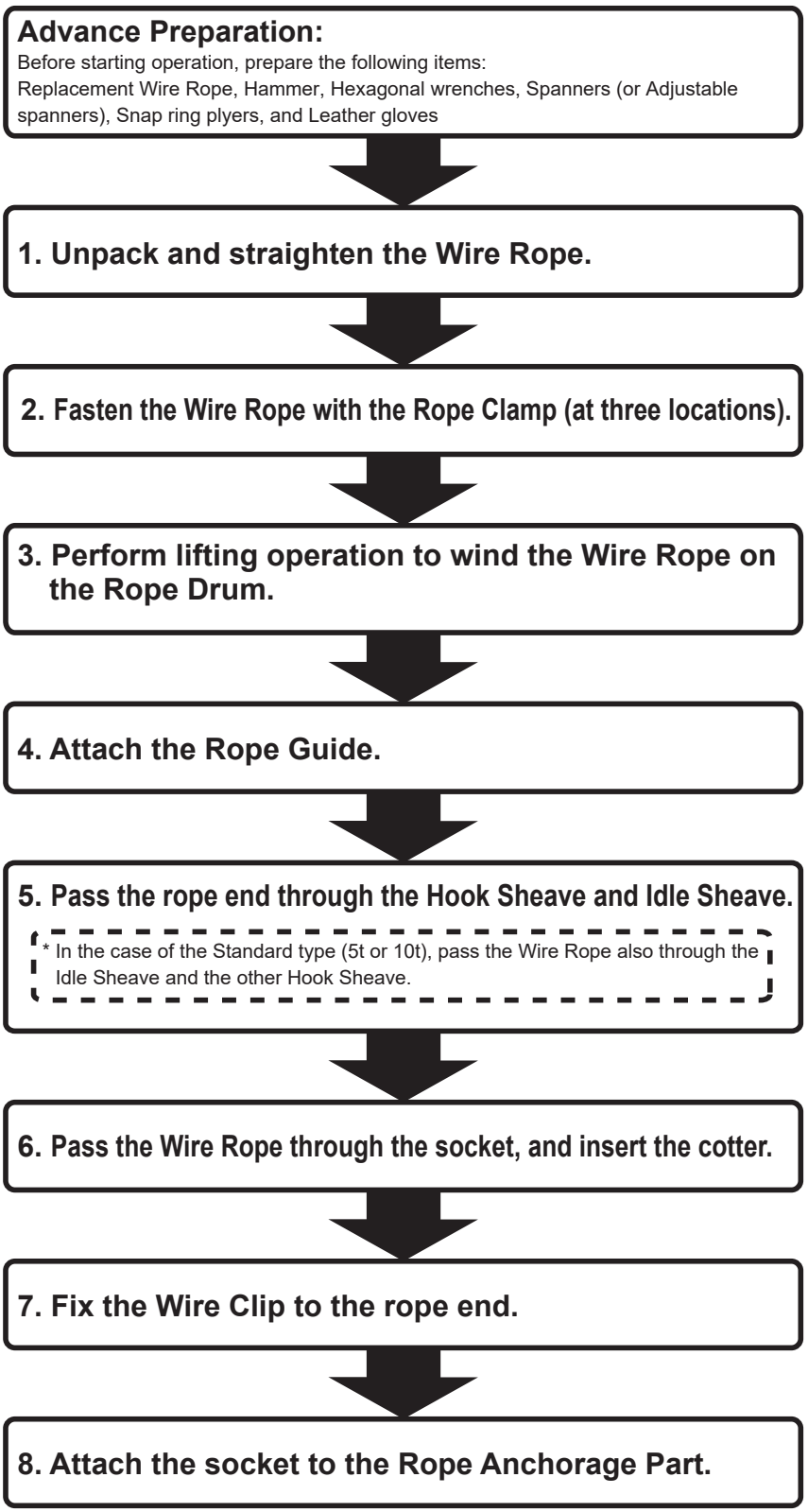
13) Loosen socket bolts and remove Wire Clamps at three locations to remove the Wire Rope from the Wire Drum. Remove the Wire Rope while holding it by hand so as to prevent the Wire Rope from being removed suddenly by tension of the Wire Rope.



After removing the Wire Rope using the above procedure, follow the procedure described from the next page to attach the Replacement Wire Rope.

■ Attaching Wire Rope

Follow the procedure below to attach the Wire Rope.



Periodic Inspection (Continued)

⚠ WARNING

Mandatory

- **Use a genuine Wire Rope having a proper rope diameter, length, and structure.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.

• Cut length of Wire Rope: (Unit: mm)

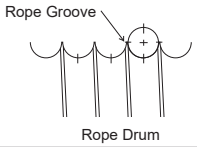
Capacity	Wire Rope diameter	Rope end processing color	Lift	
			For 9m	For 12m
10t	φ13	Blue	46,200±200	58,200±200

■Attaching Wire Rope

⚠ WARNING

Mandatory

- **Wind the Wire Rope along the rope groove.**
  If wound over the groove, the hoist may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.



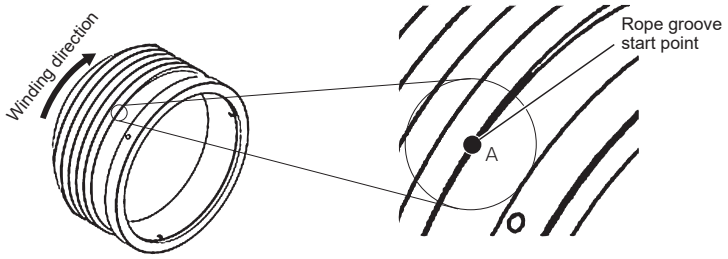
1) Unpack the Replacement Wire Rope. Straighten the Replacement Wire Rope into a straight untwisted line in a wide space.

* Note: Replace the Wire Rope in a straightened state. If the Wire Rope is assembled in a twisted state, it moves violently or floats away from the Rope Drum when wound on it.

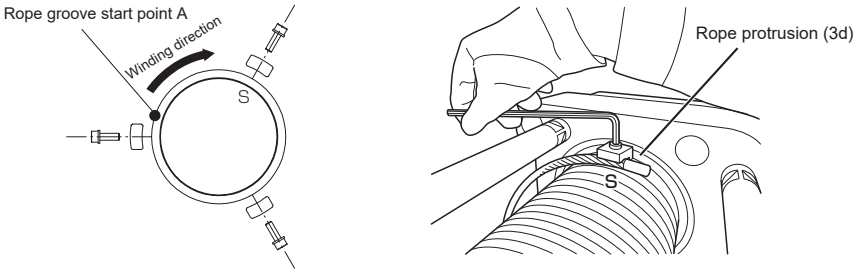
2) Fasten the end of the Wire Rope to the Wire Drum with the socket bolt and Wire Clamp as shown in the figure.

Step 1: Check the position where to initially fasten the Wire Rope.

· Check where the rope groove starts. (See the figure below)



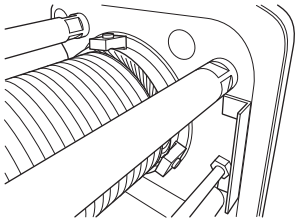
· The tapped hole closest to the winding direction with respect to the rope groove start point A is the position (S) where to initially fasten the Wire Rope.



Step 2: With the Wire Clamp, fasten the Wire Rope at the position (S) checked in Step 1. (See the upper right figure)

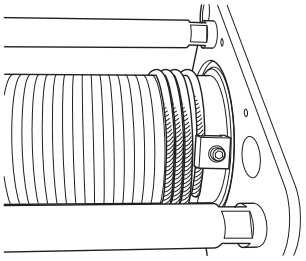
· Rope protrusion from the Wire Clamp should be about 3 times larger than the rope diameter. Tightening torque: 18 N•m (all 3 places)

3) Perform lifting operation to rotate the Rope Drum slowly by approximately 120 degrees. Fasten the Wire Rope at the following position.



4) Fasten the Wire Rope to the remaining position in the same way as Step 3). (The Wire Rope must be fastened to three positions in total.)

5) After fastening the Wire Rope, rotate the Rope Drum slowly, and place the Wire Rope in the groove of the Rope Drum from the groove's start point. Place the Wire Rope in the groove of the Rope Drum by rotating the Rope Drum in the lifting direction while pulling lightly the Wire Rope with a hand so as to prevent the Wire Rope from floating.



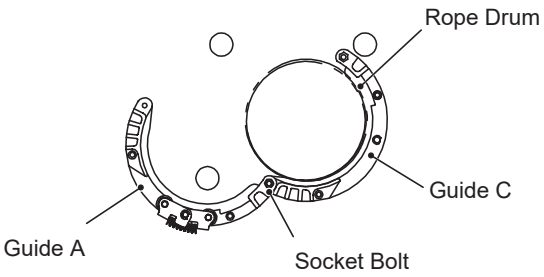
6) Wind the Wire Rope around the Rope Drum to some extent.

Next, apply grease (the same grease used for the Wire Rope, see P82) to the following locations.
To learn about the structure of the Rope Guide, see "Structures of Rope Guides" (P73).

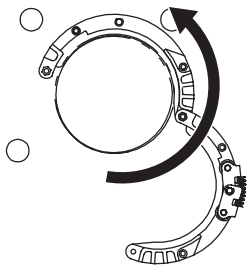
- Roller part of the Rope Guide
- Convex part engaged with the Rope Drum
- Rope Drum groove

7) Attach the Rope Guide to the Rope Drum by following the procedure described below.

7-1 Loosely connect Guide A to Guide C with a socket bolt, and place Guide C along the Rope Drum as shown in the figure on the right.

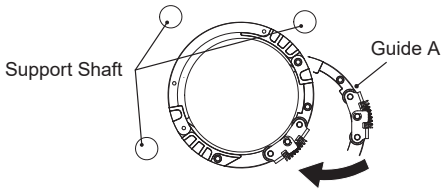


7-2 As shown in the figure on the right, rotate Guide A and Guide C along the Rope Drum with Guide C placed along the Rope Drum.

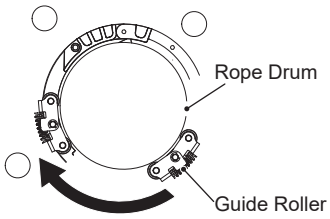


Periodic Inspection (Continued)

7-3 Place the Guide A on the Rope Drum at a position where Guide A has no interference with the Support Shaft.

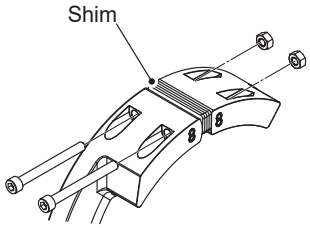


7-4 As shown in the figure on the right, rotate Guide A and Guide C along the Rope Drum using the Guide Roller as a guide.

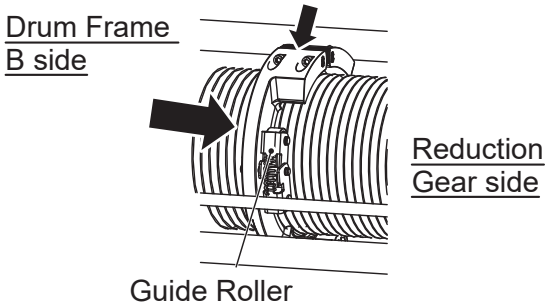


8) Move Guide A toward the Reduction Gear side until its Guide Roller lies on the Wire Rope on the Rope Drum, and tighten the socket bolt. Next, retighten the socket bolt you loosely connected Guide A to Guide C in Step 7-1.
(Tightening torque: 6 N•m)

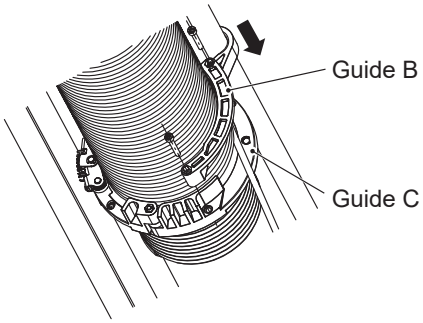
CAUTION: Put the Shim in the part connecting Guide A to Guide C.

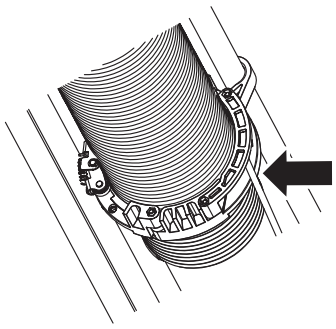


Tighten the socket bolt

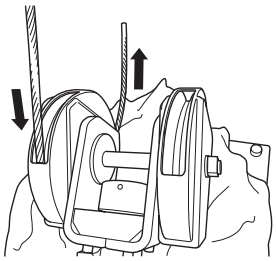


9) Hook the Guide B on the Support Shaft as shown in the figure and fasten the Guide B with socket bolts.
(Tightening torque: 6 N•m)
Pay attention to attach the Guide B so that the Wire Rope comes out from the gap between the Guide C and Guide B.

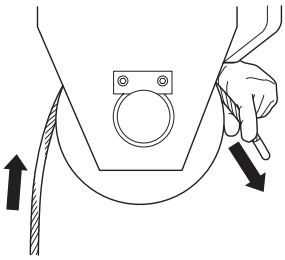




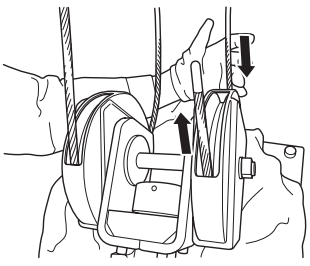
10) Paying attention to a passing position, pass the rope end through the Hook Sheave.



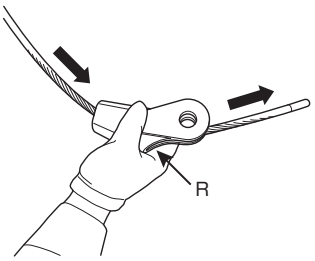
11) Paying attention to a passing position, pass the rope end through the Idle Sheave.



12) Pass the rope end through the other Hook Sheave of the Hook Block.

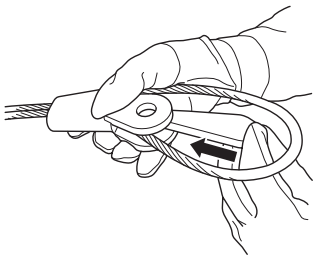


13) Pass the Wire Rope through the socket. Be careful about the position. (Pass the Wire Rope from the side not having an arc shape [R-shape].)



Periodic Inspection (Continued)

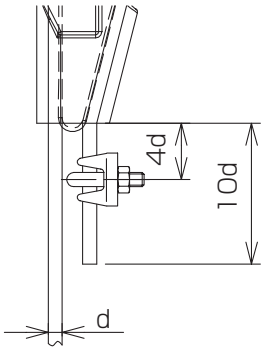
14) Insert the cotter.



15) Pass the Wire Rope from the gap between the cotter and the socket.

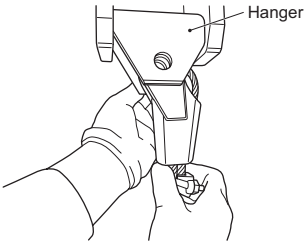
16) Fix the Wire Clip to the rope end.

Fix the Wire Clip at a distance of four times the wire rope diameter from the lower end of the socket, so that the Wire Rope of a length of four times the wire rope diameter is exposed.
Pull the Wire Rope sufficiently before fixing so that the Wire Rope does not float away from the cotter.
(Tightening torque of the Wire Clip: 16 N•m)）

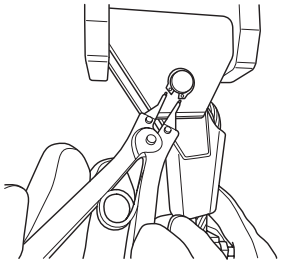


17) Insert the anchorage shaft from inside into the Rope Anchorage Part of the Main Unit, and fix the socket.

When this is done, untwist the Wire Rope and insert the socket into the hanger in the direction shown in the right figure.



18) Firmly fix the tip of the fixed end shaft with the snap ring.



⚠ WARNING

Mandatory

- **After replacing the Wire Rope, check that the Rope Guide moves smoothly under no load, and the Wire Rope moves without obstruction.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause failure of the hoist and may lead to serious accidents.

2-4 Guidelines on Replacement of Lubricants and Parts

In the regular inspection, check the number of starts and the operating hours with the inverter to replace lubricants and parts.
If it was found in the regular inspection that any parts must be replaced before the next regular inspection, replacing the parts before the next regular inspection is recommended.

⚠ CAUTION

Prohibited

- **Only the maintenance engineer and the personnel who has been appointed by the maintenance engineer are allowed to replace parts.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but also cause unexpected failure of the hoist and may lead to serious accidents.

Mandatory

- **When replacing parts, follow Disassembly/Assembly Manual.**
- **Do not use parts other than the genuine parts.**
- **Do not use lubricants other than the specified lubricants.**
- **After replacement of the parts is finished, carry out the daily inspection to confirm that there is no abnormality.**
  Failure to comply with these instructions may not only result in failure to obtain normal function and performance of the hoist, but also cause unexpected failure of the hoist and may lead to serious accidents.

■2-4-1 Checking Number of Starts and Operating Hours

The number of starts is separately displayed in the upper and lower levels as shown below.

No.	Name	Detail
U7-01	Number of starts (Upper level)	The number of starts for lifting/lowering is displayed in 1,000-time units. Displays 10,000 units at maximum. This represents 10,000 × 1,000 = 10 million times.
U7-02	Number of starts (Lower level)	The number of starts for lifting/lowering is displayed in 1-time units. Displays 999 units at maximum. When the number exceeds 999 and reaches 1,000, U7-01 (upper level) is increased by one unit. At the same time, the value of U7-02 (lower level) returns to 0.
U7-03	Operating hours	The operating time is displayed in 1-hour units. Displays 65,535 hours at maximum.

Note) The maximum values that can be displayed do not represent the service life.

■Displaying the Number of Starts and Operating Hours

Follow the procedure described below to display the number of starts and operating hours on the LED operator.
The following describes how to display the operating hours as an example.

● e.g.: The following describes how to display U7-03 (Operating hours) as an example.

Operating procedure	LED display
1. Turn on the power.	 Default display
2. Press ∧ until the monitor display screen is displayed.	
3. Press ENTER to display the parameter setting screen, and press ESC .	 Parameter setting screen
4. Press ∧ or ∨ to display U7-01.	
5. Press RESET and ∧ or ∨ to set U7-03 (Operating hours).	

6. Pressing ENTER displays the current setting value.
(For information on the monitor parameters, refer to Inverter Manual separately provided.)


75 hours

7. To restart the operation after the monitoring is finished, press ESC until the screen returns to the default screen.

■2-4-2 Guidelines on Timing of Application of Lubricants

Part		Lubricant Brand	Specified Quantity	Timing of Lubricant Replacement/ Application
Lifting Reduction Gear		ENEOS: BONNOC M260 or KITO HOIST OIL FC	5,000ml	400h
Traversing Reduction Gear		ENEOS: EPINOC AP (N) 2	235g	800h
Wheel Gear/Idle Gear			As appropriate	800h
Hook Sheave Bearing			As appropriate	1,600h
Spline or Key	Gear Shaft	MOLY PS Grease No. 2 or equivalent (Molybdenum Disulfide No. 3)	As appropriate	1,600h
	Pinion	Molybdenum Disulfide Lubricant Molytherm No. 2	As appropriate	1,600h
Spline	Traversing Motor Brake	Molybdenum Disulfide Grease Moly Paste 500 or Molybdenum Disulfide Lubricant Molytherm No. 2	As appropriate	800h
Oil Seal (Lip)		ENEOS: EPINOC AP (N) 2	As appropriate	1,600h
Wire Rope		Red Rope Grease (Wirol R-H or Wirol Aerosol): TOKYO ROPE MFG. CO., LTD.	As appropriate	When lack is found in daily inspection

■2-4-3 Guidelines on Timing for Replacing Reduction Gear, Motor, Brake, Sheave, and Wheel

	Lifting				
	Reduction Gear	Motor		Brake	Hook/Idle Sheave
	Gear/Bearing	Bearing	Shaft	Brake Shoe	Bearing
Timing of replacement	1,600h	1,600h	1,600h	1 million times	1,600h

	Traversing				
	Reduction Gear	Motor		Wheel	
	Gear/Bearing	Bearing	Shaft	Bearing	Wheel A (with a gear)
Timing of replacement	800h	800h	800h	800h	800h

Chapter 3

Troubleshooting

This chapter describes the main failure causes and inspection items based on the fault conditions and their troubleshooting. The inspection work may be accompanied with disassembling/assembling work of the hoist. Refer to the separate “Disassembling/Assembling Manual” for the correct work.

3-1 Guidance on Troubleshooting

The table below 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.
When the hoist shows an abnormal condition, an error is displayed on the inverter inside the Control Box. Refer to the Inverter Manual to solve the problem correctly.

Conditions			Main fault contents	Check item	Reference page
1	Stops during operation		Check the error display of the inverter, and specify the defective part according to the error display to take an appropriate measure. (Refer to Inverter Manual separately provided.)		
2	Does not operate without load	No brake operating sound	Improper source voltage	Power	87
			Breakage or burning of control circuit Faulty electrical part	Circuit breaker	87
				Power Cable	88
				Internal Wiring	91
				Inverter	92
				HBB Board	92
				Upper Limit Emergency Stop Device	93
				Push Button Switch	94
				Upper/Lower Limit Stop Device	93
			Breakage or burning of power circuit Faulty motor or brake	Motor	89
				Brake	90
				Internal Wiring	91
				Inverter	92
			Inverter trip due to overheating of the motor (electronic thermal)	Inverter	92
			Overheating of the inverter	Inverter	92
		Brake operating sound present	Breakage of driving part	Gears	94
			Sticking of Bearing	Bearing	100
			Improper Wire Rope and route	Wire Rope	98
				Rope Drum	100
				Rope Guide	101
				Hook Sheave Idle Sheave	101
3	Operates without load	Does not operate with a load (Motor howling present)	Open phase (single phase operation)	Power	87
				Power Cable	88
				Motor	89
				Inverter	92
		Does not operate with a load (No motor howling)	Overload (Overload Limiter operates)	Inverter	92
		Operates slowly with a load	Voltage drop	Power Cable	88
		Does not operate when lowering or reducing the speed	Improper Braking Resistor	Braking Resistor	92

Conditions			Main fault contents	Check item	Reference page
4	Operates differently from the indication of the Push Button Switch	Operates differently from the indication (operates in the opposite direction)	Negative phase connection	Power Cable	88
			Wrong connection	Internal Wiring	91
				Push Button Switch	94
		Does not operate when operating any one of the switches	Breakage of control circuit	Internal Wiring	91
				Push Button Switch	94
			Faulty electrical part	Inverter	92
				HBB Board	92
				Upper/Lower Limit Stop Device	93
				Upper Limit Emergency Stop Device	93
5	Does not stop normally	Too long (or short) stopping distance	Abrasion of Brake Shoes	Brake	90
		Does not stop at the upper/lower limit	Negative phase connection	Power Cable	88
			Wrong connection	Internal Wiring	91
				Push Button Switch	94
6	Abnormal noise	Change in operating sounds, intermittent sound	Deterioration of Bearing	Bearing	100
			Abrasion, mechanical interference and deformation of Gears	Gears	94
		Brake noise	Dragging	Brake	90
			Abrasion of Brake Shoes	Brake	90
		Abnormal noise at the rail (friction noise)	Mechanical interference of the rail and the wheel	Traversing Device	102
7	Unable to traverse		Slipping wheel	Traversing Device	102
			Inclined rail		
			Pulling a load in an inclined direction (floating wheel)		
			Defective gear engagement		
			Locking of brake		
8	Serpentine motion during traverse Abnormal noise		Mechanical interference of the rail and the wheel	Traversing Device	102
			Wrong adjustment of Frame interval		
			Uneven abrasion of the wheel		
			Deformation of the wheel		
			Deterioration of Bearing		
			Deformation and abrasion of the rail		
			Abrasion of Brake Disc		
9	Hook and those related to Hook		Deformation	Hook	96
10	Wire Rope and those related to Wire Rope		Abrasion, elongation, twist	Wire Rope	98
11	Electric shock when touching the Main Unit and Push Button Switch		Improper grounding, breakage of earth	Electric shock	95
12	Abnormal sound from the Rope Guide		Insufficient grease	Rope Guide	101

3-2 Safety Precautions

⚠ WARNING

Prohibited

- **This product shall not be disassembled and repaired by personnel other than maintenance engineers.**
  Failure to comply with this instruction may limit the normal functions and performance of the hoist, as well as causing malfunction or break down of the hoist, leading to serious accidents.
  “Disassembling/Assembling Manual” is provided separately for the maintenance. Disassembling and repair must be performed by the maintenance engineer in accordance with this document for maintenance.
- **When replacing the part, do not use parts other than the genuine Kito parts.**
  Failure to comply with this instruction may limit the normal functions and performance of the hoist, as well as causing malfunction or break down of the hoist, leading to serious accidents. Even if the part is genuine Kito part, it cannot be used for other models. Refer to Disassembly/Assembly Manual separately provided for the correct use of the part.

Mandatory

- **When any abnormality is observed during the inspection of the hoist, the maintenance engineer must survey the cause, implement countermeasures, and carry out the repair.**
- **Turn off the main power when carrying out the inspection.**
  Failure to comply with this instruction can lead to electric shock, which may seriously affect the health of a human body.
- **Indicate “CHECKING” when performing the inspection.**
  When a crane is operated erroneously during the inspection, it may result in accidents such as fall-off of parts and tools as well as fall-down of a person.
- **Carry out the hoist inspection with no load.**
  Failure to comply with this instruction may result in unexpected serious accidents.
- **Carry out regular inspections (frequent and periodic). Keep the record of the frequent and periodic inspections. Carry out the inspections at an appropriate frequency, paying attention to conditions obtained from daily inspection and operating sound.**
  The record of inspection makes it possible to obtain information on the conditions of hoist such as function and performance of the hoist, and the cycle of part replacement, and facilitates maintenance planning for the hoist. Failure to carry out the inspection may make it impossible to maintain normal function and performance of the hoist, resulting in failure to use the hoist safely and leading to serious accidents.

3-3 General Matters on Failure Cause and Countermeasure

Power

Symptom	Cause	Remedy	Main factor	Countermeasure
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.

⚠ WARNING

Prohibited

- **Do not perform inspections with wet hands.**
- **Do not directly touch the part where voltage is supplied.**
  Failure to comply with these instructions may lead to serious accidents such as fire due to failure of the hoist.

Circuit breaker (Distribution panel)

Symptom	Cause	Remedy	Main factor	Countermeasure
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, Brake, and Internal Wiring.
	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 P13.)
	Breaker was tripped due to overcurrent.	Check the cause of overcurrent and take necessary countermeasures. (Refer to each item of Power Cable, Motor, Brake, and Internal Wiring.)	Overvoltage, low voltage, overload, etc.	Refer to each item of Power Cable, Motor, Brake, and Internal Wiring.

Troubleshooting (Continued)

Power Cable

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate	Wire breakage (more than two wires)	Check the conduction, flaw, and crimping of terminals. When any deficiency was observed, repair or replace the cable.	Excessive force applied on the cable	Support the cable securely.
			Non-use of shake proof cable	Use shake proof cable to the moving part.
			Twist of wire	Layout the wires so that there is no twisting.
			Cable was interfered by another facility.	Fix the cable not to be interfered by other facilities.
	Wire burning (more than two wires)	Check the cable. Replace it if burnt.	Temperature rise due to insufficient cable capacity	Use the cable with proper capacity. (See P13.)
			Cables are bundled.	Do not bundle wires.
	Loosened cable gland (nut, cap)	Tighten the cable gland (nut, cap) securely.	Insufficient insertion at the installation	Fix it securely.
			Loosened cable gland (nut, cap)	Use proper gland packing.
			Wrong packing size	Use proper gland packing.
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 P13.)
Operates but is unable to lift a load (single phase status)	Breakage or burning of one phase only	Refer to the foregoing items on breakage and burning.		

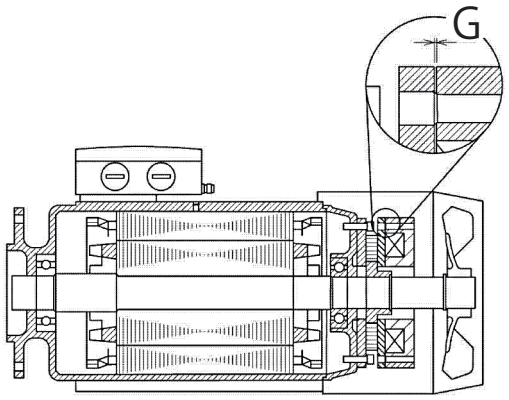
Motor

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate	Motor coil burning (two or more phases)	Measure the coil resistance of each phase. Replace the motor when the resistance of all phases is infinity.	Overcurrent due to overvoltage or low voltage	Operate the hoist at the rated voltage.
			Overcurrent due to overload	Use the hoist with a load equal to or less than the capacity.
			Operation exceeding short time rating or intermittent rating	Check the short time rating and intermittent rating. Use the hoist within these ratings.
			Excessive inching or plugging operation (consecutive impression of start rush current)	Do not perform excessive operation.
			Overcurrent 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 is infinity.	Lead wire damaged at assembling	Assemble with care.
			Vibration, impact	Use the hoist avoiding the impact.
Operates but is 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 is infinity.	Layer short due to poor insulation of coil (between phases)	Be careful about the intrusion of foreign matters 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 is infinity.	Lead wire damaged at assembling	Be careful not to have the lead wire caught when assembling.
			Vibration, impact	Use the hoist avoiding the impact.

Troubleshooting (Continued)

Brake

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate Does not stop normally Abnormal noise	Abrasion of Brake Shoes 1) Deterioration of brake performance 2) Exceeding the limit of attraction of the brake	For lifting: See the figure below. Measure the Brake Gap (G). If the Brake Gap exceeds the limit, replace the brake assembly. (Gap G: Standard Value: 0.3 mm, limit of attraction: 0.75 mm) For traversing: Perform an adjustment, referring to "■1-6-5 Adjusting Traverse Brake" (P20). If the brake cannot be adjusted, measure the thickness of the Brake Disc. Replace it if the thickness exceeds the limit. (Standard value: 11 mm, limit: 10 mm)	Excessive inching operation or sudden operation	Do not perform excessive operation.
Does not operate	Rusting	When the Brake is rusted shut, replace the part or clean it.	Leaving the hoist in an environment with rich moisture	Operate the hoist regularly.
			Dew condensation	Pay attention to the use in an environment where the ambient temperature changes rapidly.
Too long (or short) stopping distance (stopping distance may change slightly depending on the temperature.)	Abrasion of Brake Shoes	Carry out measurement, adjustment, and replacement in the same way as "Abrasion of Brake Shoes" described above. Also, for the main factor and remedy, refer to the above.		



Internal Wiring

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate	Breakage of wire	Check the wire. Repair the wire if broken.	Vibration, impact	Use the hoist avoiding the impact.
			Lead wire damaged at assembling	Be careful not to have the lead wire caught when assembling.
		Check the terminal. Repair the terminal without conduction.	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 (may cause heat generation resulting in burn)	Tighten the loosened screws.	Insufficient tightening at assembling	Tighten screws securely.
			Vibration, impact	Use the hoist avoiding the impact.
	Incomplete connection of the connector and insertion terminal	Connect the connector and insertion terminal correctly if they are not connected securely.	Incomplete connection at assembling	Connect the connector and insertion terminal securely.

Troubleshooting (Continued)

Inverter

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate	Overload	Stopped by the Overload Limiter of the inverter. The inverter can be activated by resetting with the Emergency Stop Button. Pressing the Lowering Button to reset can also activate the inverter.	Overload	• Use the hoist with a load equal to or less than the capacity. • When the ambient temperature is lower than zero, make a test run of the hoist with no load for a while.
	Failure of the inverter	Reset the inverter with the Emergency Stop Button, and check the inverter if it does not operate.	Failure of the inverter	Check the error code of the inverter, referring to Inverter Manual.
	Overheating of the motor	Stopped by the motor thermal function of the inverter. Cooling down and resetting with the Emergency Stop Button can activate the inverter.	Operation exceeding short time rating or intermittent rating	Check the short time rating and intermittent rating. Use the hoist within these ratings.
	Overheating of the inverter	Stopped by the overheating prevention function of the inverter. Cooling down and resetting with the Emergency Stop Button can activate the inverter.	Operation exceeding short time rating or intermittent rating	Check the short time rating and intermittent rating. Use the hoist within these ratings.
	Expiry of service life of the inverter (condenser)	Refer to Inverter Manual.	Operation exceeding short time rating or intermittent rating	Check the short time rating and intermittent rating. Use the hoist within these ratings.
Operates in a direction different from control via the Push Button (negative phase).	Mistake in wiring of the motor	Exchange two wires of the motor each other. **⚠ WARNING** Prohibited • **Do not exchange wires in the Push Button Switch circuit.** If this instruction is not followed, the limit switch will not operate, which results in a seriously dangerous situation.	Mistake in wiring when assembling the motor	Wire properly.

HBB Board

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate	Damaged circuit parts	Press the Push Button to check whether the Main Unit operates or not. If it does not operate, replace the board. * In this energizing test, be careful of electrical shock.	Expiry of service life, damage	Replace the HBB Board.
	Contact failure of the connector	Check the conduction of the connector. Replace the connector if it has no conduction.	Connector assembly failure	Crimp and insert the pin securely.

Braking Resistor

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate	Breakage of wire in the resistor	Measure the resistance value at the resistor. Replace the resistor when the value is infinity.	Operation exceeding intermittent rating Overload	Use the hoist within these ratings.

Upper Limit Emergency Stop Device

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate The motor does not stop at the upper limit.	Breakage, Contact point fusing	Check if the cable and lead wires are not unplugged or loosened, and if they are conducted. Check the lever position of the Upper Limit Emergency Stop Device and adjust it to an appropriate position. Replace it when the lever does not move smoothly.	Vibration, impact Excessive force is applied such as tangling of the cable.	Operate the hoist avoiding excessive vibration or impact. Make sure that the cable is not entangled while the hoist is in operation.
	Improper operation position		Improper installation	Install it to the correct location.
	Upper Limit Emergency Stop Device is activated. (defective return action of the moving part)		Habitual use of the Upper Limit Emergency Stop Device	Do not use the Upper Limit Emergency Stop Device habitually.
	Wrong wiring	Check the wiring in accordance with the wiring diagram, and perform the wiring correctly. If the wiring is correct, change two wires of the motor line.	Wrong wiring	Correct the wiring in accordance with the wiring diagram.

Upper/Lower Limit Stop Device

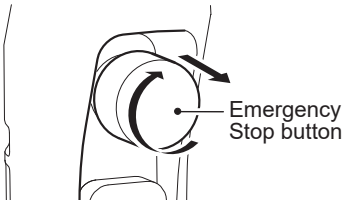
Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate (Inverter does not operate.)	Contact point melting	Activate the limit switch and check the conduction at the contact point. If it has no conduction, replace the limit switch as a set.	Habitual use of the limit switch	Do not use the Upper/Lower Limit Stop Device habitually.
	Breakage of wire	Check the wire. If broken, repair or replace the limit switch as a set.	Vibration, impact	Use the hoist avoiding the impact.
	Defective return action of the moving part	Check whether the moving part is locked or not. If locked, replace the limit switch as a set.	Leaving the hoist at the upper or lower limit for a long period of time	Do not leave the hoist at the upper or lower limit.
Motor does not stop at the upper/ lower limit.	Contact point fusing	Activate the limit switch and check the conduction at the contact point. If it does not turn off, replace the limit switch as a set.	Habitual use of the limit switch	Do not use the Upper/Lower Limit Stop Device habitually.
	Rusting shut of the moving parts	Check whether the moving part is rusted shut or not. If rusted shut, remove the rust or replace the rusted part.	Not operating the hoist for a long time, or using it in an environment with rich moisture	Conduct inspections 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 motor line.	Wrong wiring	Correct the wiring in accordance with the wiring diagram.

Troubleshooting (Continued)

Gears

Symptom	Cause	Remedy	Main factor	Countermeasure
Unable to lift a load (does not operate) Change in operating sounds Intermittent sound	Abrasion, damage	Visually check or measure the size, and replace the gear if it is noticeably deformed, damaged, or worn.	Long hour operation without sufficient grease	Keep the grease replenishment cycle.
			Habitual use of Overload Limiter	Make the load smaller than the capacity.
			Irregular motion	Do not perform inching or plugging.
			Expiry of service life	Periodically check the operating hours.

Push Button Switch

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate	Emergency Stop button is pressed to its end and locked.	When the Emergency Stop button is pressed and locked, turn it clockwise to release the lock.  	Forgot releasing the Emergency Stop button	Thoroughly read "■1-10-1 How to Operate the Push Button Switches" (P34) before use.
	Faulty switch unit	Check the conduction of the contact points. Replace the Push Button Switch if it has no conduction.	Vibration, impact	Use the 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. Be careful not to get the lead wire caught at assembling.	Vibration, impact	Use the hoist avoiding the impact.
	Loosened terminal screw inside the switch unit	Tighten the screw if loosened.	Vibration, impact	Use the 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 hoist so that it does not interfere with other facilities.
			External force applied on the cable due to improper tying of the protection wire	Tie the Protection Wire securely. (See "Connecting Push Button Switch Cord" (P16).)

Push Button Switch (Continued)

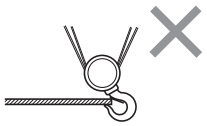
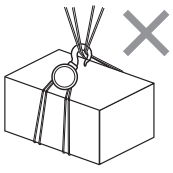
Symptom	Cause	Remedy	Main factor	Countermeasure
Operates differently from the indication of the Push Button Switch	Wrong wiring	Check the wiring in accordance with the wiring diagram. Perform the wiring correctly. If the wiring of the Push Button Switch is correct, the cause is in the negative phase connection. Change two wires of the power line.	Wrong wiring	Correct the wiring in accordance with the wiring diagram.
	Wrong attachment of the direction label	Attach the label correctly according to the installation place.	Installation place not corresponding to the label	Attach the label correctly.
Does not stop when pressing the Push Button	Defective return action of the switch unit	When the switch does not operate smoothly, replace the Push Button Switch.	Vibration, impact	Use the hoist avoiding the impact.

Electric shock

Symptom	Cause	Remedy	Main factor	Countermeasure
Electric shock when touching the Main Unit, Control Box, Push Button Switch, etc.	Improper grounding	Measure the grounding resistance. If it exceeds 100Ω, perform grounding work in accordance with the relevant laws and regulations.	Defective grounding work	Perform the grounding work securely.
			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 items of Power Cable and Push Button Switch.)
	Attachment of water droplets	Remove the droplets and dry the surface before use.	Operation by wet hands	Do not operate the hoist by wet hands.

Troubleshooting (Continued)

Hook

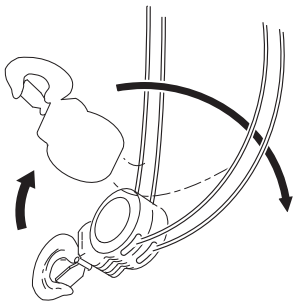
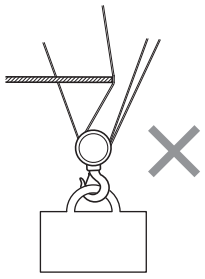
Symptom	Cause	Remedy	Main factor	Countermeasure
Widened Hook opening	Deformation of the Hook	Replace the Hook if the deformation exceeds the criteria. (See "■2-2-3 Hook Block" (P54).)	Overload	Use the hoist with a load equal to or less than the capacity.
			Earth lifting	Do not carry out earth lifting. Be careful not to interfere with the Hook with a protruding object during lifting.
			Slinging a load at the tip of the Hook 	Sling a load at the center of the Hook. Do not sling a load at the tip 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	Deformation of the Hook	Replace the Hook if the deformation exceeds the criteria. (See "■2-2-3 Hook Block" (P54).)	· Use of the Hook with the Wire Rope wound on a load 	Do not wind the Wire Rope directly on a load.
			· Slinging a load at the tip of the Hook · Pulling a load in an inclined direction	Sling a load at the center of the Hook. Do not pull a load in an inclined direction.
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 not to allow intrusion of foreign matters into the neck.

Hook (Continued)

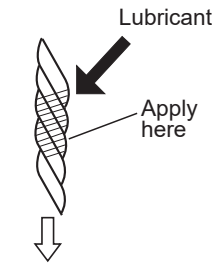
Symptom	Cause	Remedy	Main factor	Countermeasure
Hook Latch has come off.	Deformation of the Hook	Replace the Hook if the deformation exceeds the criteria. (See “■2-2-3 Hook Block” (P54).)	Overload	Use the hoist with a load equal to or less than the capacity.
			Earth lifting	Do not carry out earth lifting. Be careful not to interfere with the Hook with a protruding object during lifting.
			Use of the sling with a size improper to the Hook	Use the proper sling.
	Deformation or coming 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. Do not laterally pull the Hook.

Troubleshooting (Continued)

Wire Rope

Symptom	Cause	Remedy	Main factor	Countermeasure
Twisted Wire Rope	Capsized Hook	Turn over the Hook to the original position to cancel the capsizing. 	Hook was turned over by one turn during working.	When using Wire Rope multi fall model hoist, check that the Hook is not capsized before use.
	Wire Rope is twisted at the Rope Drum.	Remove the Rope Anchorage Part and Wire Rope, and then reassemble them.	Improper assembling	Assemble the hoist correctly. (See Disassembling/ Assembling Manual.)
Irregular abnormal noise from Hook Block, Rope Guide, or Rope Drum	Flaw and deformation of the Wire Rope surface	Replace the Wire Rope with an apparent flaw, deformation, abrasion or kink.	Use of the Wire Rope without canceling capsized state	When using Wire Rope multi fall model hoist, check that the Hook is not capsized before use.
			Use of the twisted Wire Rope	Assemble the hoist correctly. (See Disassembling/ Assembling Manual.)
	Dent on the Wire Rope surface		Hit against another object strongly 	Use the wire rope hoist carefully paying attention not to interfere with other objects.

Wire Rope (Continued)

Symptom	Cause	Remedy	Main factor	Countermeasure
Surface losing lust and discolored	Rusting and corrosion	Remove rust and apply oil. Replace the Wire Rope if the rust and corrosion is apparent.	Run-out of oil	Apply oil regularly. (See "■1-6-4 Oiling the Wire Rope" (P19).) 
			Use of a hoist exposed to rain	Store the hoist indoors or under the roof when not using.
			Influence of sea water and chemicals	Contact Kito for the use in a special environment in advance. Use the hoist correctly within the scope guaranteed by the manufacturer.
Significant wear of the Wire Rope	Abrasion caused by frequent lateral/vertical pulling	Check the position of the load and lift it directly under the hoist.	Rope Drum's excessive interference with the groove	Use it correctly. Replace it if there is abrasion or deformation.
	Turbulent winding of the Wire Rope	Check if the Wire Rope is correctly placed in the groove of the Rope Drum.	Operation while the Wire Rope is lifted up, due to excessive lowering without a load.	Do not operate while the Wire Rope is loosened. Replace the Wire Rope if there is abrasion or deformation.
	Use of the Wire Rope other than genuine Kito Wire Ropes	Check the size and configuration of the Wire Rope, and use a genuine Wire Rope.	Improper assembly	Replace the Wire Rope.
	Oil has not been applied on the Wire Rope.	Visually check the surface of the Wire Rope to check if oil is applied. Apply oil if not applied yet.	Oversight in inspection	Apply oil regularly. (See "■1-6-4 Oiling the Wire Rope" (P19).)
Irregular winding of the Wire Rope	Angle of lateral/ vertical pulling is too wide.	Check the positions of the hoist and the load, and lift the load directly under the hoist.	Pulling a load in an inclined direction	Use it correctly.
	Wire Rope is deformed.	Remove the interfering object. If the Wire Rope is significantly deformed, replace it.	Pulling a load in an inclined direction Object interfering with the Wire Rope	Use it correctly.

Troubleshooting (Continued)

Symptom	Cause	Remedy	Main factor	Countermeasure
Breakage of the Wire Rope	The load is caught during lifting.	Check if there are any interfering objects on the lifting path, and remove the object if found.	Object interfering with the Wire Rope	Handle it properly, conduct complete maintenance inspections, and remove defective wires (use genuine wires).
	Corrosion by chemicals, etc.	Check the usage environment of the hoist and make sure to avoid chemicals during operation.	Usage environment of the hoist	Replace the Wire Rope.
	Usage of the Wire Rope with significant wear	Check the usage and conduct inspections regularly.	Oversight in inspections	Replace the Wire Rope.
	Expiry of the service life	Check the Wire Rope, and replace it if the service life exceeds the criteria. (See "■2-3-9 Wire Rope Replacement Procedure" (P71).)	• Usage beyond the expiry of service life • Oversight in inspections	Use the Wire Rope correctly, and conduct proper management including daily and regular inspections.

Bearing (Inside Reduction Gear, Main Unit)

Symptom	Cause	Remedy	Main factor	Countermeasure
Unable to lift a load	Sticking, breakage	Replace the Bearing.	Use under hot environment or excessively frequent use	Follow the rules regarding conditions/ environment of use.
			Long hour operation without sufficient oil/ grease	Keep the oil/grease replenishment cycle.
Abnormal noise	Deterioration			Follow the rules regarding conditions/ environment of use.

Rope Drum

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate Lifting/lowering operation cannot be done smoothly. Abnormal noise	Deformation, breakage, or abrasion of the groove of the Rope Drum	Visually check or measure the size, and replace the Rope Drum if it is noticeably deformed, damaged, or worn.	Pulling a load in an inclined direction	Do not pull a load in an inclined direction. Shift the hoist above the load when lifting/ lowering.
			Habitual use of Overload Limiter	Make the load smaller than the capacity.
			Irregular motion	Do not perform inching or plugging.

Rope Guide

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate Lifting/lowering operation cannot be done smoothly. Abnormal noise	Deformation, breakage, or abrasion of the Rope Guide	Visually check or measure the size, and replace the Rope Guide if it is noticeably deformed, damaged, or worn. Remove any foreign matters from the Rope Guide if attached. Check if there is an E-type Retaining Ring on the Rope Guide Shaft.	Pulling a load in an inclined direction	Do not pull a load in an inclined direction. Shift the hoist above the load when lifting/lowering.
			Insufficient application of grease on the Wire Rope and the Rope Guide	Apply grease periodically.
	Derailing from the groove of the Rope Drum of the Rope Guide, and derailing from the Wire Rope of the Guide part		Improper mounting	Mount the inner groove of the Rope Guide to the groove of the Rope Drum correctly. For mounting procedure, refer to “■2-3-9 Wire Rope Replacement Procedure” (P71).
			Habitual use at the lifting range lower limit position	Do not use it frequently near the lower limit, which is not within the lifting range.

Hook Sheave, Idle Sheave

Symptom	Cause	Remedy	Main factor	Countermeasure
Does not operate Lifting/lowering operation cannot be done smoothly. Hook block tilts greatly. Abnormal noise	Abrasion of the Sheave groove	Visually check or measure the size, and replace the sheave if it is noticeably deformed, damaged, or worn.	Pulling a load in an inclined direction	Do not pull a load in an inclined direction. Shift the hoist above the load when lifting/lowering.
	Deformation of the Hook cover		Habitual use at the lifting range upper limit position	Do not use it frequently near the lifting range upper limit.
	Damage of the Bearing		Expiry of service life	Periodically check the operating hours.

Troubleshooting (Continued)

Traversing Device

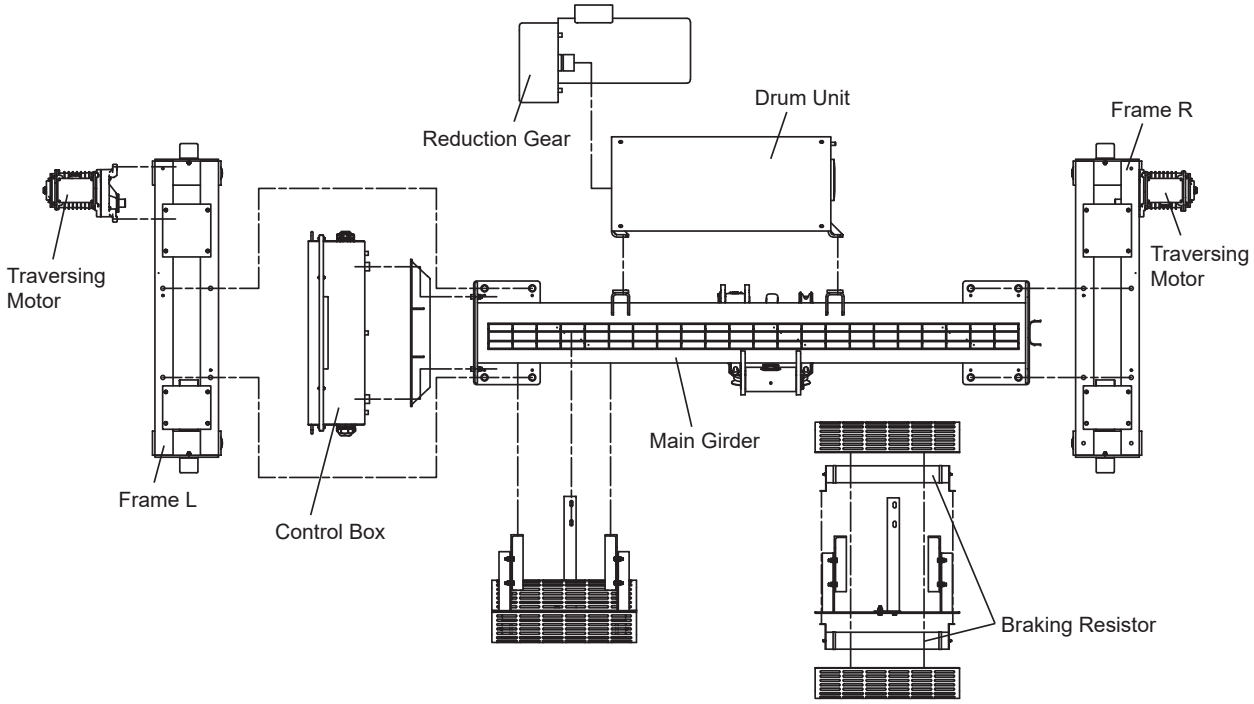
Symptom	Cause	Remedy	Main factor	Countermeasure
Unable to run due to slipping of wheel, or unable to run at a constant speed	Inclination of the rail	Make sure that rail gradient is within 1 degree.	Improper installation of the rail	Install the rail correctly.
	Oil attachment on the running surface of the rail wheel	Wipe off the attached foreign matters on the running surface.	• Use under the environment which causes foreign matters to attach easily • The joints of the rail are not smooth.	• Clean the rail regularly. • Make the joints of the rail smooth.
Abnormal sound when running on the rail	Friction resistance between wheel and rail	Apply small amount of oil on the rail surface where the noise is generated.		
Unable to run due to wheel floating	Pulling a load in an inclined direction (floating wheel)	—	Operation method	Use it correctly.
Wheel unable to rotate	Defective gear engagement	Remove the stain and foreign matters on the wheel and the gear.	Ambient conditions, environment	Check regularly.
	Locking of brake	Disassemble the motor cover. Remove rust and stains.	Ambient conditions, environment	Check regularly.
	Electric system failure	Refer to the guidance (P84).		
Serpentine motion Abnormal noise	Wrong adjustment of the Frame interval	Check the Frame interval.	Incomplete adjustment	Install the wheel correctly.
	Uneven abrasion of the wheel	Check the abrasion of the wheel.	Running on a curved rail, unevenness of the running surface, or expiry of the service life	• Do not use it on a curved rail. • Remove the unevenness of the running surface. • Replace the parts.
	Deformation of the wheel	Check the distortion of the wheel and damage on the running surface.	Excessively frequent collision with the stopper or unevenness of the running surface	• Replace the wheel. • Use the hoist correctly.
	Deterioration of wheel bearing	Check if rolling noise is heard when the wheel is rotating.	Expiry of the service life	Replace the wheel bearing.
	Deformation and abrasion of the rail	Check the abrasion and deformation of the rail.	Overload or expiry of the service life	• Replace the rail. • Use the hoist correctly.
	Abrasion of the Guide Roller	Check the abrasion.	Running on a curved rail or expiry of the service life	Check regularly.
	Abrasion of the Brake Disc	Check the abrasion of the Brake Disc.	Expiry of the service life	Replace Break Discs, Armatures, and Break Springs. (See P68).

Chapter 4

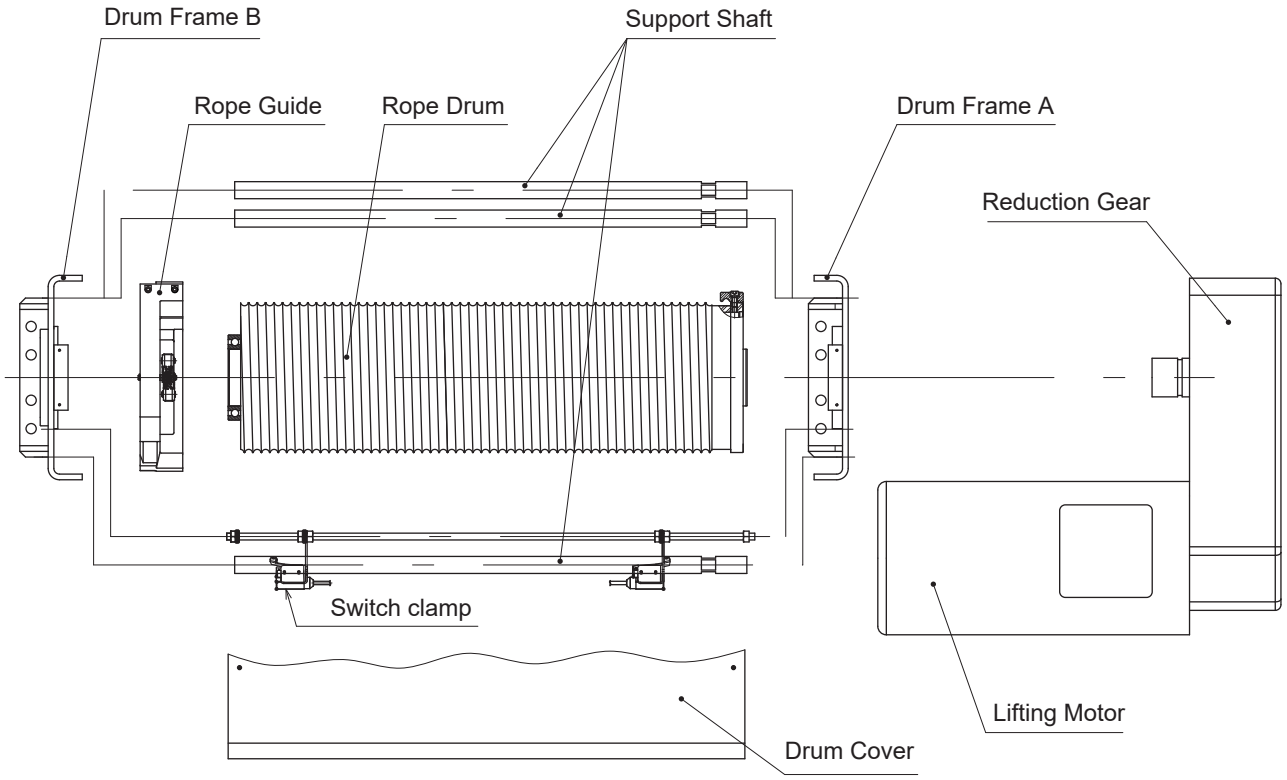
Appendix

4-1 Exploded Structure

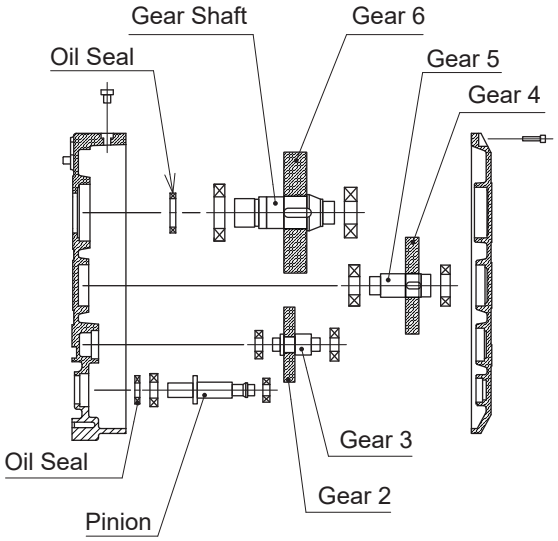
■Main Unit



■Reduction Gear Unit

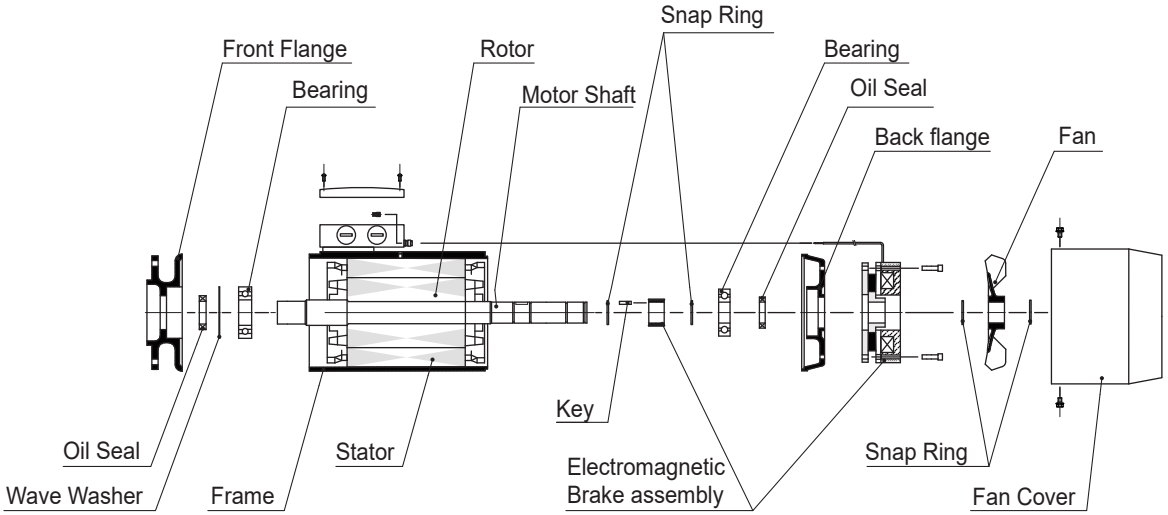


■Reduction Gear

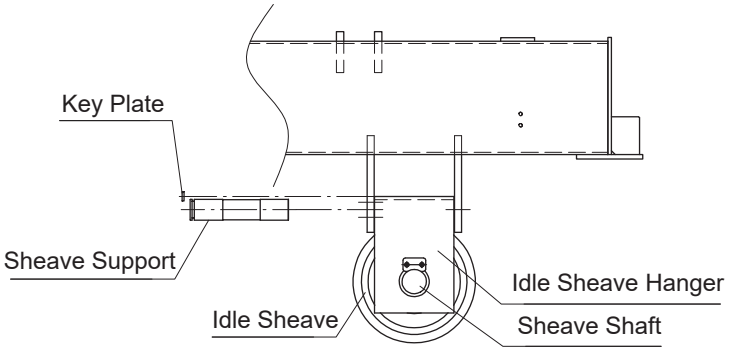


Exploded Structure (Continued)

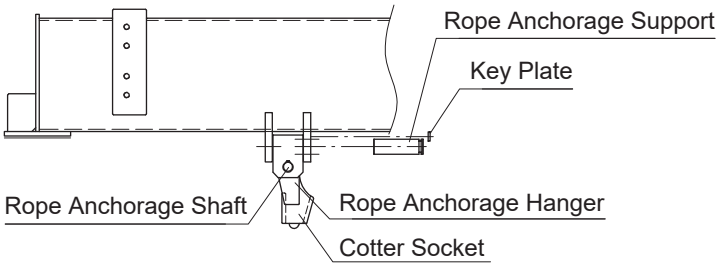
■Lifting Motor



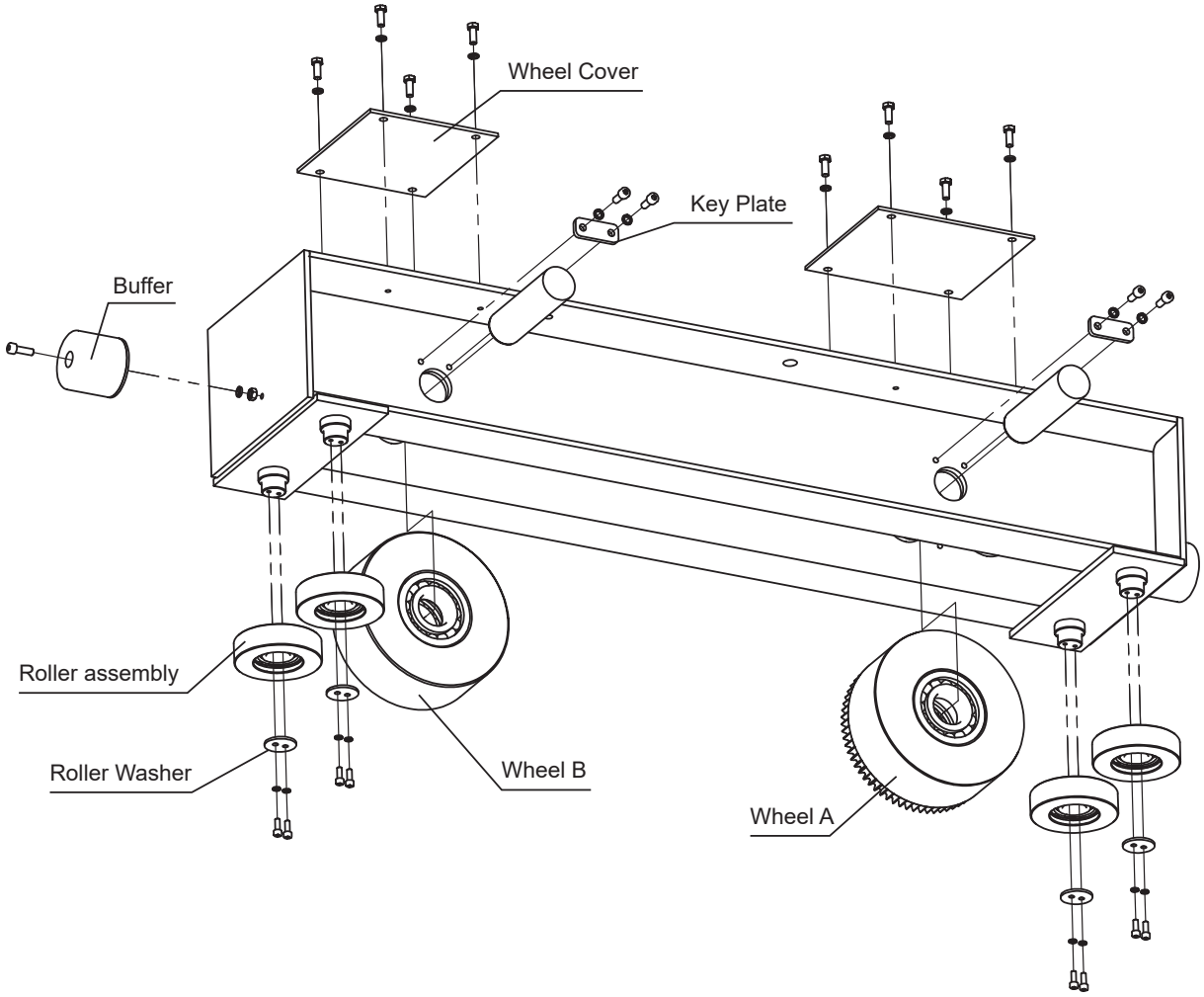
■Idle Sheave



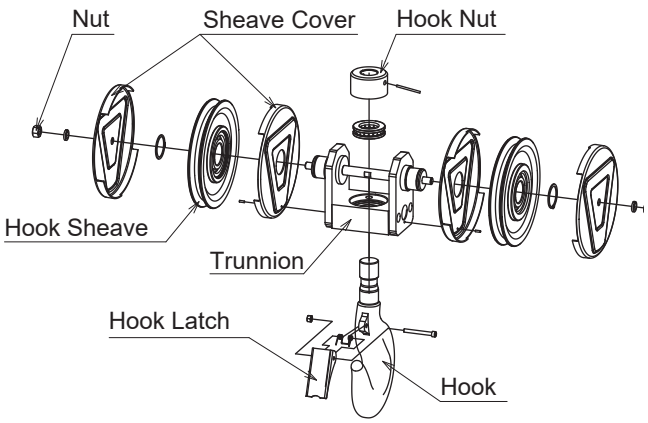
■Rope Anchorage Part



■Trolley Frame



■Hook Block

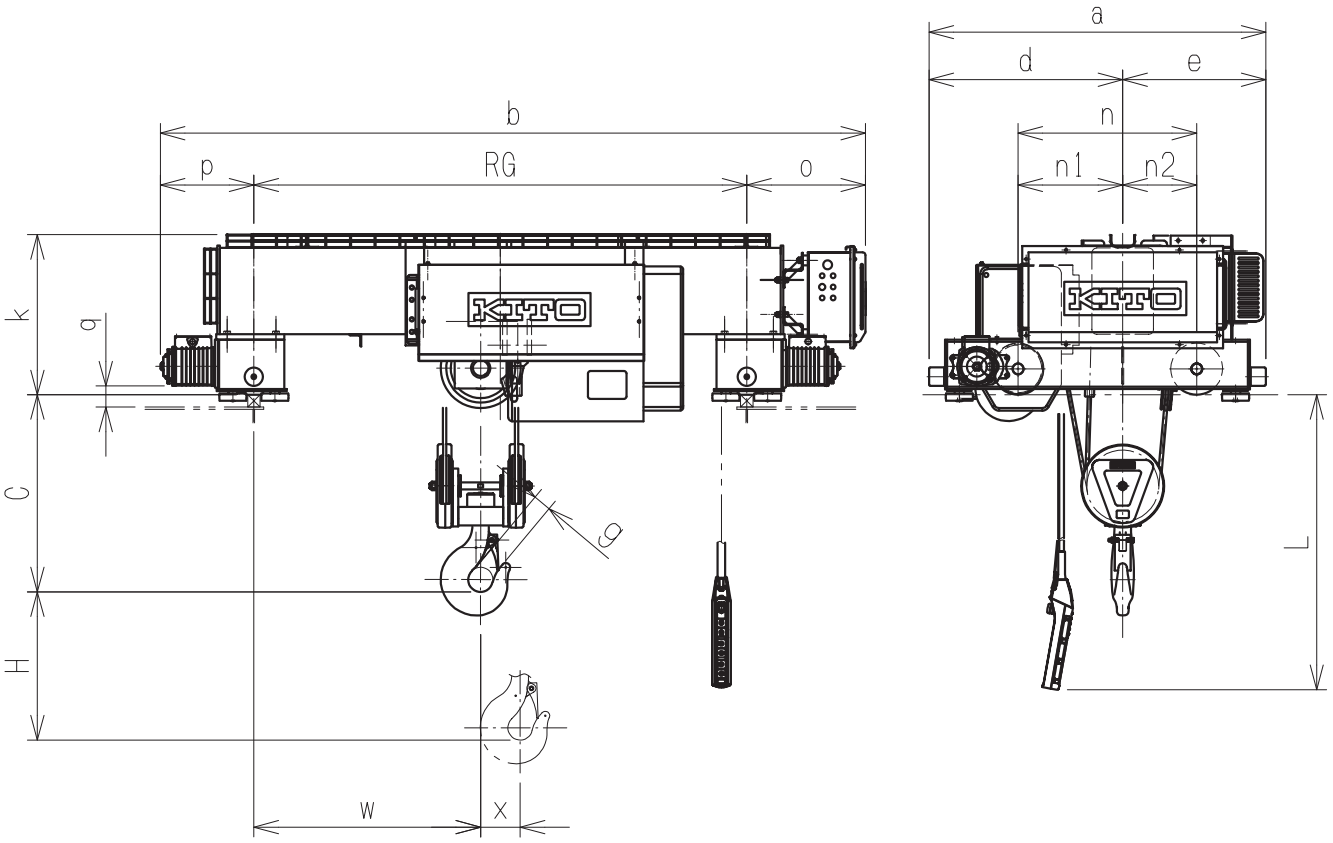


4-2 Specification and Dimensions of Each Part

Specification list for double girder model

Capacity (t)	Product code	Standard lift (m)	Rail gauge (mm)	Bridge rail (mm)	Lifting: Inverter operatrion				Traversing: Inverter operation			Wire rope		Weight (kg)
					Motror		Speed		Motor		Speed			
					Output (kW)	Intermittent rating (%ED)	With a rated load High / low speed m/s (m/min)	With a* low load m/s (m/min)	Output (kW)	Intermittent rating (%ED)	High / low m/s (m/min)	Rope diameter (mm)	Reeving	
10	RYWC100ISIS09	9	2000	50x50	13.2	40/20	0.100/0.017 (6.0/1.0)	0.150 (9.0)	0.4x2	20/10	0.400 / 0.067 (24.0 / 4.0)	ø13	4/1	1230
	RYWC100ISIS12	12												1260

* When a load is less than 25% of the ratd capacity, 1.5 times faster than high speed.

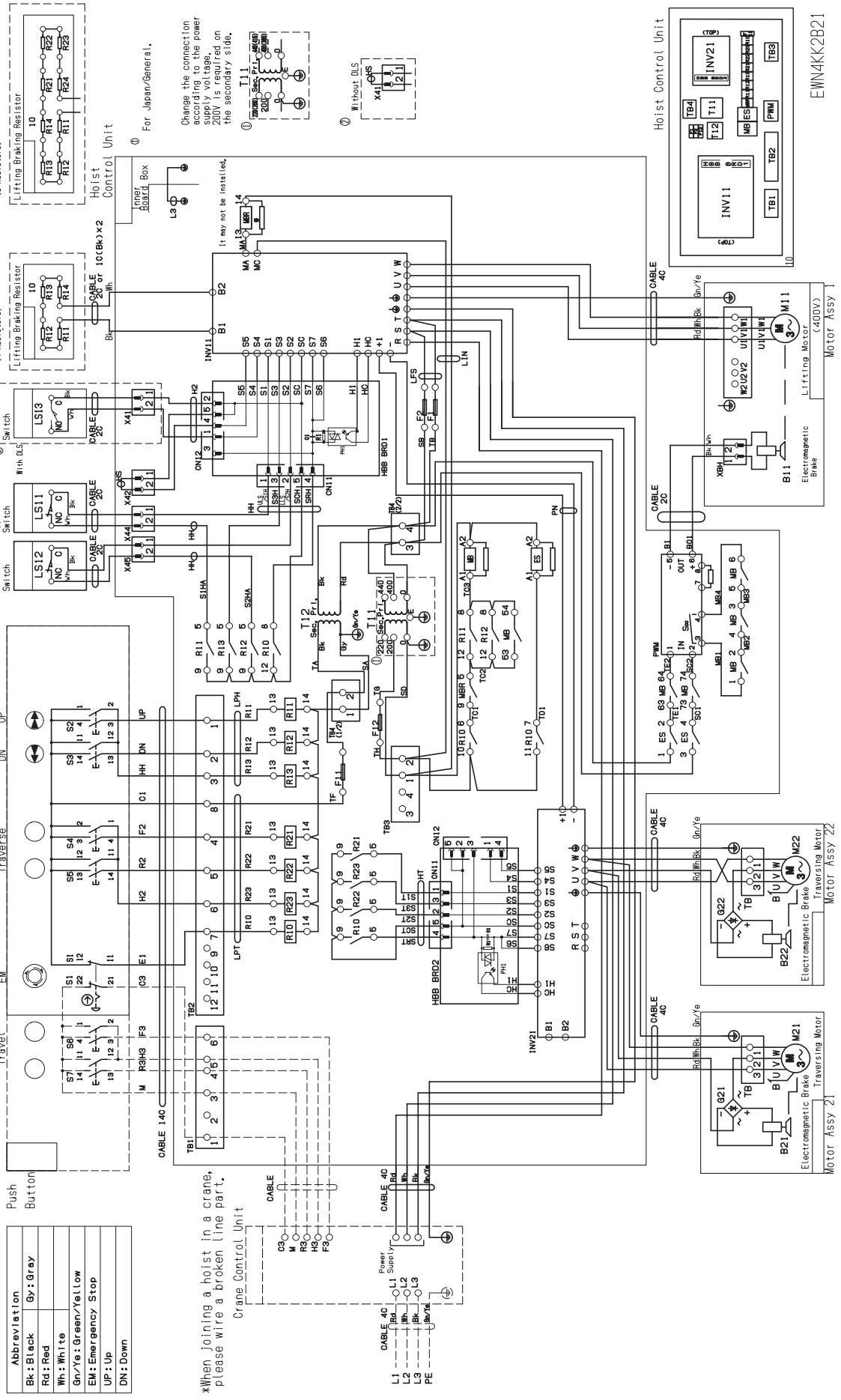


Dimension table for double girder model (mm)

Capacity (t)	Product code	Standard lift H (m)	Rail gauge RG	C	L	a	b	d	e	g	k	n	n_1	n_2	o	p	q	w	x
10	RYWC100ISIS09	9	2000	800	8700	1367	2863	786	581	72	650	725	425	300	482	381	86	920	160.5
	RYWC100ISIS12	12			11700													805	214

4-3 Wiring Diagram

■ 400V Class



4-4 Others

■Rated Current for Motors

Product code	Capacity	380V 50Hz • 60Hz 415V 50Hz 440V 60Hz		
		Lifting motor (A)	Traversing motor (A)	Total current (A)
RYWC100ISIS09/12	10t	27	2	29

■Noise Level of Wire Rope Hoist

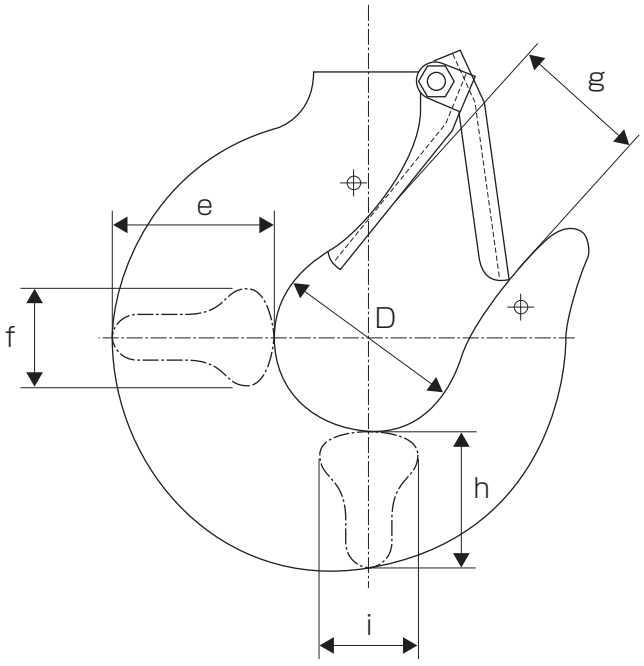
The sound noise levels of the new hoists at the shipment are as shown below.
The noise levels are measured at 1 m away from the hoists. The values corresponding to “2m” and “4m” from the hoists are the estimated values. In general, the noise level is said to be reduced by 3 dB(A) if the distance from the hoist is doubled.

(Unit: dBA)

Product code	Capacity	When lifting a rated load Distance from the hoist		
		1m	2m	4m
RYWC100ISIS09/12	10t	77	74	71

Note) The values in the table above are measured or estimated values, and are not guaranteed.

■Hook Dimensions



Product code	Capacity	Dimension (mm)					
		D	e	f	g	h	i
RYWC100ISIS09/12	10t	100	112	90	72	95	75

<Memo>

4-5 Check Sheet

■4-5-1 Daily Inspection Check Sheet

Product code	Capacity	Lot No.	Your CTRL No.	Installation date	Location	Inspection Certification valid date

Keep the check record for a certain period of time.

■ Check Result: = ○ Good, △ To be replaced (adjusted) during next inspection, × = Bad, Needs replacement (adjustment)

Category	Item	Check method	Criteria	Inspection date/result					
				／	／	／	／	／	／
Appearance	Indication of nameplates and labels	Check visually	No peel off. Indication can be seen clearly.						
	Deformation and damage of Main Unit and each part	Check visually	No apparent deformation or corrosion						
	Bolts, nuts and split pins	Check visually	The bolts, nuts, and split pins that can be seen from exterior must be free from loosening and coming off.						
	Traverse Rail	Check visually on the floor	No apparent deformation, abrasion, or damage No other structural abnormality						
Wire Rope	Type	Check visually	Same as the indication on the nameplate						
	Breakage of wire	Check visually	No apparent breakage						
	Abrasion	Check visually	No apparent abrasion						
	Rust, Corrosion	Check visually	No apparent rust and corrosion						
	Kink and loss of shape	Check visually	No kink or loss of shape						
	Grease	Check visually	To be greased adequately						
	Rope Anchorage Part	Check visually	No wire breakage or rust. No coming off of wire clip						
Hook Block	Opening of the Hook	Check visually	No apparent opening of the Hook						
	Abrasion and corrosion of the Hook	Check visually	No apparent abrasion or corrosion						
	Deformation, flaw, corrosion (Whole unit)	Check visually	· No apparent deformation, flaw and corrosion · No attachment of foreign matters such as spatter · No bending or twisting						
	Inclination and balance	Check visually	To have no inclination, and to be balanced.						
	Hook Latch	Check visually and by operation	· To have no apparent deformation, and to open/close smoothly. · The Hook Latch is mounted securely inside the Hook opening.						
	Hook movement (Rotation)	Check visually and by operation	To rotate smoothly by 360 degrees.						
	Hook sheave	Check visually and by operation	· To move (rotate) smoothly. · The groove must be free from deformation, damage, and apparent abrasion.						
	Hook nut	Check visually and by operation	· No coming off of the split pin						
	Hook sheave cover	Check visually	No deformation, damage, or loosened bolt						
Push Button Switch	Switch body	Check visually	· No deformation, damage and no loosened screw · To have clear indication. · No discoloration						

Category	Item	Check method	Criteria	Inspection date/result					
				／	／	／	／	／	／
Function and Performance	Operational Check	No-load operation	· The Wire Rope can be wound smoothly. · Wire rope must be properly wound on the rope drum. · Rope guide must operate smoothly. · Idle sheave must rotate smoothly. · When the operation is stopped, the motor stops immediately. · When the Emergency Stop Button is pressed, all hoist motions stop. · When operating other push buttons while the Emergency Stop Button is pressed, the hoist does not start operation. · After canceling the Emergency Stop Button, the hoist operates normally. · To be operated in the same direction as the arrow indicated on the button. (Not to be operated in the reverse direction.) · Operation buttons must move smoothly. · Lifting and lowering operations must be smooth. · To traverse without snaking motion.						
	Brake (before operation)	No-load operation	Brake must operate reliably to stop the hook block immediately.						
	Upper/Lower Limit Stop Device	No-load operation	Motor must stop automatically when operating the hoist to the preset upper limit and lower limit.						
	Abnormal sound	No-load operation	No abnormal sounds and vibrations						

Executed by	Inspector							
Checked by	Maintenance Engineer							

■4-5-2 Frequent Inspection Check Sheet

Product code	Capacity	Lot No.	Your CTRL No.	Installation date	Location	Inspection Certification valid date

Keep the check record for a certain period of time.

■ Check Result: = ○ Good, △ To be replaced (adjusted) during next inspection, × = Bad, Needs replacement (adjustment)

Category	Item	Check method	Criteria	Inspection date/result					
				／	／	／	／	／	／
Preceding inspection	Daily inspection	—	When performing the frequent inspection, carry out the daily inspection at the same time.						
Appearance	Traverse Rail	Check visually	· No bending of traverse surface · No deficiencies that affect traversing motion · No oil stain						
	Stopper	Check visually	· No loosened bolt · No apparent deformation or damage						
Wire Rope	Breakage of wire	Check by measurement	· Of one twist, one strand has 3 broken wires, or an entire rope has 6 or more broken wires.						
	Abrasion	Check by measurement	The diameter d must not be reduced by 5% or more						
	Damage to the shape	Check visually	No apparent damage to the shape						
Hook Block	Opening of the Hook	Check by measurement	· The opening of the Hook must not exceed the limit value. · The abrasion of the dangerous section must not exceed 10%. · The twist angle of the tip of the Hook must not exceed 10 degrees. · The neck must not have plastic deformation.						
	Abrasion and corrosion of the Hook	Check by measurement	· No apparent abrasion and corrosion · Each dimension must not exceed the limit.						
	Hook sheave	Check by measurement	· The abrasion (in diameter) of the groove must not exceed 0.15 d. · The abrasion (in thickness) of the side wall must not exceed 0.1 d. · No deficiencies that damage the wire rope · No cracks						
	Bracket/Trunnion	Check visually	· No deformation, damage, or loosened nut · No apparent abrasion of holes						
Push Button Switch	Push Button Switch Cord	Check visually	· To be attached securely. · Protection Wire must prevent external force from being applied on the cord (cable) when Push Button is pulled. · To have no damage.						
Main Unit: Lifting Unit	Drum Frame, Support Shaft, Main Girder	Check visually	· No apparent deformation, abrasion, or damage · No abnormality at welded parts · No loosening of fasteners such as bolts						
	Rope Drum	Check visually and by measurement	· No apparent deformation, abrasion, or cracking · The abrasion in the groove must not exceed 20% of the wall thickness.						
	Rope Clamp	Check visually	No loosening or coming off						
	Rope Guide	Check visually and by operation Check the amount of play	· The guide must be free from deformation, damage, and apparent abrasion. · To be clean and free from adhering oil. · No coming off of the coil spring · No deformation, damage, and apparent abrasion at the part which contacts with the limit switch						
	Rope Anchorage Part	Check visually	· No apparent deformation, abrasion, or damage · No loosened nut · The wire clip must be fixed at a distance of four times the wire rope diameter from the lower end of the socket.						

Category	Item	Check method	Criteria	Inspection date/result					
				/	/	/	/	/	/
Main Unit: Lifting Unit	Idle Sheave	Check visually and by measurement	· No loosening or coming off of the bolts · To move smoothly. · No deformation, damage, or apparent abrasion · The abrasion (in diameter) of the groove must not exceed 0.15 d. · The abrasion (in thickness) of the side wall must not exceed 0.1 d. · The abrasion of the groove must not exceed 3 mm. · No deficiencies that damage the wire rope · No cracks						
	Upper Limit Emergency Stop Device	Check visually	· The lever must be free from deformation, damage, and abrasion. · To move smoothly. · To be clean. · No loosened screw or bolt · No coming off of split pins						
Lifting Reduction Gear	Reduction Gear	Check visually	· No apparent deformation, damage, or cracking · No leakage of oil						
Main Unit: Traverse Unit	Wheel	Check visually	· No apparent deformation, damage, or cracking · No oil stain on the running surface · The teeth must be lubricated with sufficient grease.						
	Guide Roller	Check visually	· No apparent deformation, damage, or cracking · The Guide Roller must rotate smoothly. · No loosened socket bolt						
	Wheel Cover	Check visually	· No apparent deformation or damage · No loosened bolt						
	Buffer Fixing Bracket	Check visually	· No apparent bending or damage · No loosened bolt						
Control Box	Appearance	Check visually	· To be attached securely to the Main Unit · No apparent deformation or damage · The cables must be connected securely without slack.						
	Internal Wiring	Check visually	· The electrical parts must be fixed securely. · The lead wire must not be slack. · No wire breakage, burning, or welding · The connector must be securely inserted.						
	Error Code Display	Check visually	No error must be shown on the display of the inverter.						
	Contamination and attachment of foreign matters	Check visually	No contamination with water droplets or foreign matters						
Power Supply and Wiring	Power Cable	Check visually	· To have enough length. · To have no damage. · To be connected securely.						
	External Relay Cable	Check visually	· To have enough length. · No damage. · To be connected securely.						
Electric Characteristics	Source Voltage	Check by measurement	The rated voltage must be supplied.						
Function and Performance	Abnormal noise	No-load operation	· No irregular rotating sound · No howling sound of the Motor or scraping sound of the Brake · No abnormal sound from the place near the Rope Guide · No abnormal sound from the inside of the Reduction Gear						

Executed by	Inspector						
Checked by	Maintenance Engineer						

■4-5-3 Periodic Inspection Check Sheet

Product code	Capacity	Lot No.	Your CTRL No.	Installation date	Location	Inspection Certification valid date

Keep the check record for a certain period of time.

■ Check Result: = ○ Good, △ To be replaced (adjusted) during next inspection, × = Bad, Needs replacement (adjustment)

Category	Item	Check method	Criteria	Inspection date/result					
				／	／	／	／	／	／
Preceding inspection	Daily inspection	—	When performing the periodic inspection, carry out the daily inspection at the same time.						
	Frequent inspection	—	When performing the periodic inspection, carry out the frequent inspection at the same time.						
Appearance	Traverse Rail	Check by measurement	□50: Abrasion in width or in the height direction: 2.5 mm or less						
Lifting Unit	Upper Limit Emergency Stop Device	Check visually and by operation	· To be fixed securely without looseness at mounting part · With lifting operation with no load, the Hook Block must push up the lever to immediately stop the lifting operation.						
	Upper/Lower Limit Stop Device	Check visually and by operation	· The Upper/Lower Limit Stop Device must operate normally (when checked operated under no load).						
Lifting Reduction Gear	Gear Case	Check visually	· No abrasion, deformation, or damage on the inner surface · No displacement (coming off of positioning pin)						
	Bearing	Check by visual inspection and using the inverter display	· No apparent abrasion, flaw, or damage · To rotate smoothly. · The operating hours must not exceed the guideline for bearing replacement (1600 H).						
	Gear Shaft, Gear 2, Gear 3, Gear 4, Gear 6, Pinion	Check by visual inspection and using the inverter display	· The total operating hours must not exceed the guideline for replacement (1600 H). · No abnormal sound and vibration from the Reduction Gear during operation						
	Oil Seal and Packing	Check visually	· No deformation or cracking · No leakage of oil						
Traverse Unit	Frame	Check visually and by measurement	· No apparent deformation, abrasion, or damage · No abnormality at welded parts · No loosening of fasteners such as bolts						
	Wheel	Check visually and by measurement	· The Dimension D must not be reduced to below the limit value due to abrasion of the running surface. · The difference (ellipticity) in the running surface diameter must not exceed 1 mm.						
	Guide Roller	Check visually and by measurement	· The abrasion in the outside diameter must not exceed 1 mm (when compared with unworn parts).						

Category	Item	Check method	Criteria	Inspection date/result					
				／	／	／	／	／	／
Traversing Reduction Gear	Gear Case and Brake Bracket	Check visually	· No abrasion, deformation, or damage on the inner surface · No displacement						
	Bearing	Check by visual inspection and using the inverter display	· No apparent abrasion, flaw, or damage · To rotate smoothly. · The operating hours must not exceed the guideline for bearing replacement.						
	Gear 2, Pinion, and Motor Shaft	Check by visual inspection and using the inverter display	· No abrasion, deformation, or damage · The total operating hours must not exceed the guideline for replacement. · The abrasion of the tooth must not exceed 10% of the tooth thickness.						
	Packing	Check visually	· No leakage of oil						
Oil / Grease	Oil / Grease leakage	Check visually	· To have no leakage of Oil / Grease from Packings, Oil seals or Oil plugs.						
Electric Characteristics	Insulation Resistance	Check by measurement	· Insulation resistance must be 5MΩ or higher.						
	Grounding Resistance	Check by measurement	· To be grounded (with grounding resistance of 100Ω or lower).						
Function and Performance	Operational Check	Perform operation under the rated load	· Perform inspection of the items on function/ performance of daily inspection with no load, and then perform the inspection of the same items with the rated load.						
	Brake	Perform operation under the rated load Check visually and by measurement	· The stopping distance of lifting/lowering must be within 1% of the lifting distance per minute. · The stopping distance of traversing must be within 10% of the traversing distance per minute.						

Executed by	Inspector						
Checked by	Maintenance Engineer						

WARRANTY

Thank you for purchasing a KITO product. At KITO, we manufacture every component under thoroughly strict quality control. However, if there is any defect with the product, we will guarantee repairs based on this warranty as follows.

1. Warranty Coverage

During the warranty period, if there is a failure or damage in the product, despite it being used as instructed by the warnings and cautions displayed on the product, we will repair free of charge based on the descriptions in this warranty. This warranty is effective for the following product in the countries where Kito has sold.

Guaranteed product: RY Series Wire Rope Hoist

The warranty coverage by this warranty is limited to free product repairs. Other losses caused by the product failure or damage (production, lost working time, etc) will not be guaranteed. In case of such situations, we recommend that you prepare alternative products beforehand.

2. Warranty Period

The warranty period lasts till the earlier time of either 1 year after delivery or 1 and a half years after factory shipment.

3. Items out of Warranty

In the following situations, the repair may be charged even during the warranty period.

(1) When a load heavier than the specified safe working load is used
(2) When the product is used in the environment beyond product specifications
(where the product can be affected by external factors such as smoke, chemicals, and chloride damage, or it is used under special condition)
(3) When the product is used beyond the limits of load hour rate, start-up frequency, total operation hours/times, or time rating.
(4) When inspections and maintenance after use are not performed as instructed in the owner's manual
(5) When the damage is caused by wrong inspections or maintenance
(6) When the product or accessories are remodeled
(7) When the genuine parts or specified oil is not used
(8) When the product is used against the instructions in the owner's manual, etc
(9) When the damage is caused by natural disasters such as earthquake, typhoon, flood, as well as accidents or fires
(10) When the defect is caused by wear or deterioration with age
* Note that the following parts are considered as wearing parts and any failure and damage caused by these parts is not included in the warranty.
(Wire Rope, Hook, and Oil / Grease)

4. Repair Service

When requesting the repair service, make sure that you have the warranty and contact the dealer.

Memo

KITO®

Website: kitocrosby.com