KAMIUCHI

S type HOIST

Operation Manual

Thank you very much for the purchase of KAMIUCHI Hoist this time.

Please read this manual carefully before installation, operation and maintenance, and use our hoist correctly.

As this manual is necessary for maintenance and inspection, please keep this manual with care.

KAMIUCHI ELECTRIC WORKS. LTD.

SAFETY CAUTIONS

In case of using a hoist incorrectly, it should cause very dangerous situations such as dropping of lifted load and electric shock.
Before installation, operation maintenance and inspection, read this manual carefully and use our hoist correctly.

In this manual, warning level items are divided into DANGER and CAUTION.

⚠ **DANGER**	In case of incorrect usage, dangerous situations may occur and there could be a possibility of death or heavy injury.
⚠ **CAUTION**	In case of incorrect usage, dangerous situations may occur and there could be medium degree of injury and light injury.

However, even in case of articles mentioned in ⚠ **CAUTION**, there could be a possibility to cause serious results.
Every articles contains very important contents and so keep them without fail.

〈Example of Picture display〉

◇△ symbols show that there are contents to draw Danger and Caution.
The detailed content is described in the diagram. (Diagram left shows Electric shock caution)

⃠ symbol shows behavior to be prohibited. The concrete contents of prohibit is described in the diagram or nearby.

❗ symbol shows behavior to be forced to and instructed. The concrete contents of instructions is described in the diagram or nearby. (Diagram left shows to make grounding)

When the problem is caused by using the warning sentence described to the manual disregarding it, does not assume the responsibility as a manufacturer.
After reading, please keep this manual where anyone can use it anytime.

1. Handling in general

⚠ DANGER

- **Anyone who does not know or does not understand the contents of this operation manual and caution plates should not operate a hoist.**
- **Anyone without a recognized qualification should not operate a crane or do slinging work.**

- **Proceed inspection before operation and periodical independent inspection.**

2. Installation

⚠ DANGER

- **Installation should only be by experienced tradesman or people with exclusive knowledge.**
- **Do not install a hoist under any circumstance by others than those specified above.**

⚠ DANGER

- **Provide grounding connection without fail. Also, install an electric leakage breaker in the circuit besides grounding.**

- **Install stoppers at the ends of rail of trolley and runway rails without fail.**
- **Confirm that the installation area is suitable for the hoist.**

3. Operation

⚠ DANGER

- **Do not lift any item in excess of the rated load.**
  ※The rated load is displayed on the name plate of hook block.
- **Do not stand on the load lifted. Also, do not use for a passenger elevator application.**
- **Do not stand under the load.**
- **Do not operate when someone is in the load moving area.**
- **Do not carry the load over the head of people.**
- **Do not leave from the operating place lifting the load.**
- **Do not divert attention from the load during operation.**
- **Do not operate to cause swing of the load or hook block.**
- **Do not stop the hoist using the upper limit switch always.**
- **Do not lift the load obliquely.**
  ※Lift the load only after locating the hoist directly above the load.
- **Do not lift earth (such as pulling construction).**
- **When lowering, do not operate exceeding the lower limit.**
- **Do not make a reverse operation of the load without considering its safety.**
  ※The reverse operation should be done by exclusive reverse equipment.
- **Confirm the pushbutton switch operation before using the hoist, and if the pushbutton switch does not operate smoothly, do not operate the hoist.**

⚠ DANGER

- Stop operation immediately when the hoist moves to different directions against the instruction of the pushbutton.
- Confirm the brake operation before operation, and if the brake does not work properly, do not operate the hoist.
- Do not operate the hoist, when damaged and/or there are abnormal sound or vibration.
- Lever operate the hoist, if there are abnormalities on the wire ropes as mentioned below.
  - Kink, Deformation, Corrosion
  - Core wire cut and wear-out more than specified
- Do not make electric welding for the load lifted.
- Do not connect earth of welding machine to the wire rope.
- Do not touch the wire rope with a welding electrode.

⚠ CAUTION

- Do not use with a voltage or frequency other than the those rated.
- Do not use with a damaged hook latch.
- Do not quick reverse plucking and excessive inching.
- Do not hang the lifted load with other structures and wirings.
- Do not hang the push button switch cable with others and pull it strongly.
- Do not bump hoist itself and trolley to stopper and structure.
- Do not use in conditions exceeding the rated ED rate (Load-Time factor) and Starting frequency.
- Do not use without Warning label to be put on hoist or unclear labels.

- Confirm before using that the hook rotates smoothly.
- Hang sling fittings with hook correctly.
- Stop the winding up operation at once when the wire is stretched.
- Clean up always so that dusts and sands are piled up around push button switch.

4. Maintenance, Inspection and Modification

⚠ DANGER

- Never modify the hoist or the other accessories totally.
- Never use other than our genuine parts.

- Cut off power supply before maintenance, inspection and repair without fail.
- Proceed with maintenance, inspection and repair by people with special knowledge appointed by the company.
- Proceed maintenance, inspection and repair without load.
- Do not use, always repair immediately any abnormal points found during maintenance and inspection.

⚠ CAUTION

- When proceeding maintenance, inspection and repair, display a sign starting “Under inspection” or “Power supply prohibited”.

NOTE

- Request us or our authorized service shop for inspection items to be needed disassembly and assembly.

CONTENTS

1. Foreword

Thank you very much for your kind adoption of KAMIUCHI hoist this time. We have been developing hoist-crane and bringing them up according to our customers' requests. We would like you to use our products for many years to come.

2. Check of cargo delivered

○ Check the outside of the package before opening it when delivered. Is there any breakage on it to be caused by rough handling during transportation and unexpected accident.
◎ Confirm if any abnormal point on the outside of hoist after opening the package.
◎ In case spare parts and/or special accessories are included, check them with invoice.

3. Cautions for operational environments

⚠ DANGER

● **Do not install and/or use hoist under the conditions mentioned below.**

○ **At places where the temperature is below -10°C, or over 40°C or humidity is above 90%.**
※**Very dangerous due to fierce damage of each part.**
○ **At places where lots of acid and/or salt exist.**
※**Very dangerous due to fierce damage of each part.**
○ **At places where organic solvent and/or explosive dusts exist.**
Very dangerous due to explosion.
○ **At places where rain and/or snow fall directly on the hoist like weather beaten condition.**
※**Very dangerous due to rust generation and/or electric leakage.**
○ **At places where lots of general dust exist.**
※**It causes poor operation.**
○ **Can not be used in a location more than 1000 m high.**
※**Insulation and cooling efficiency drop due to decreasing air density.**

⚠ CAUTION

○ **Replace the standard push button switch with a metal switch in order to prevent plastic from heat deformation when using the hoist at a place where there is high temperature radiation heat such as in a cast iron manufacturing plant, etc.**
（Standard push button switch is plastic made.）

⚠ DANGER

○ **Make grounding of the switch when changed the switch to the metal switch.**

○ **When installing the hoist outdoors, make a roofed shelter to protect it from rain, wind and snow and to prevent internal rust and poor insulation.**
○ **Do not use the hoist where acid or vapor exist where explosive gas is generated.**
○ **When using in a bad environmental always, use the hoist at the normal condition by checking frequently, since damage to the parts becomes very severe.**
※**In case of under -10°C, the strength of metal parts such as gear case is decreased and cable deterioration is generated also in the case of over 40°C, abnormal overheat of motor and insulation deterioration are generated, use the hoist within normal temperature range.**

4. Operating time

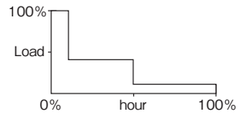
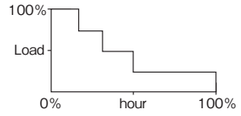
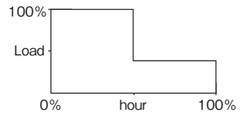
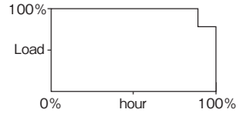
⚠ CAUTION

● **Never use in conditions exceeding the rated ED (Load-Time factor) and starting frequency.**

The lifetime of the products depends on the weight of load and loaded time. The use within the range of slanting line in order to be used for long time safely.
Consult us on the following cases.
○ The use exceeding the slanting line area is to be supposed.
※Enough preventive maintenance such as the periodical independent inspection is needed.

○ The use exceeding remarkably the slanting line area is to be supposed.
※It is necessary to select a hoist with one rank-up capacity.
○ The concentrated use within a short time is to be supposed.
※The overheat of motor and burning of brake could be occurred.

CLASSIFICATION OF LIFTING DEVICE (Table 1)

Load rate \ Total operating hour (Average daily operating hour)		Less than 800 (≦0.5)	More 800 Less 1600 (≦1)	More 1600 Less 3200 (≦2)	More 3200 Less 6300 (≦4)	More 6300 Less 12500 (≦8)	More 12500 Less 25000 (≦16)	More than 25000 (16<)
Light load	 Normally less than 50% of rated load. Seldom at rated load.	A	A	A	B	C	D	E
Medium load	 Normally more than 50% and less than 63% of rated load. Sometimes at rated load.	A	A	B	C	D	E	F
Heavy load	 Normally more than 63% and less than 80%. Often at rated load.	A	B	C	D	E	F	F
Extra heavy load	 Normally more than 80%. Mostly at rated load or nearly rated load.	B	C	D	E	F	F	F

● Loaded time and starting time
【Model】S type
Allowable frequency
（1） Loaded time rate (%) 25
（2） Starting time (time/hour) 200

$$\text{(1) Loaded time rate} = \frac{\text{Total motor power-on time (min.) at the most hard operation per hour}}{60} \times 100\%$$

（2） The starting time is the accumulated time of the inching time.
For example; in case of 5 inching per one time lifting and 20 times lift, 5×2×20＝200 times/hour

5. Installation and erection

⚠ DANGER

- **Installation should not be made by other people than exclusive tradesman or people with exclusive knowledge.**
  ※Very dangerous, since there would be a possibility of electric shock and fall-down of the hoist.

- **Make grounding without fail. Also, put electric leakage breaker in the electric circuit besides grounding.**
  ※This is for preventing electric shock accident in case of electric leakage.
- **Install stoppers at the ends of trolley rail and runway rail.**
- **Confirm that the place installing a hoist have enough strength.**
  ※Very dangerous, since there would be a possibility of fall-down of hoist.

Regarding erection, always request specialists for erection work consulting with a dealer from whom you bought our hoist or our authorized service shop. Furthermore, erect after deciding erection direction of hoist, considering operation purpose before erection.

○ Do not erect by yourself.
※Very dangerous for a possibility of electric shock and fall-down of hoist.

5-1 In case of using with electric trolley

（1） Applicable I shape steel

Correct range of I shape steel for trolley is shown below.
Trolley rail width is adjusted for I shape steel marked ◎.
※Trolley rail width adjustment is necessary in case of using I shape steel marked ○.

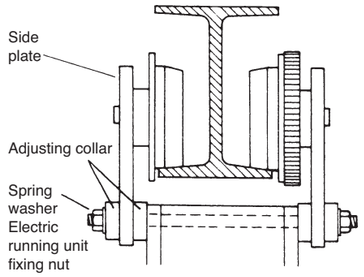
(Table 2)

Hoist type	S type		
I shape steel dimension (mm) \ Capacity (t)	1	2	2.8 (3)
200×100×7	○	○	
250×125×7.5	◎	◎	◎
300×150×11.5	○	○	○

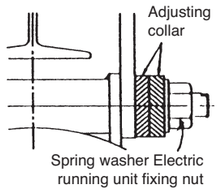
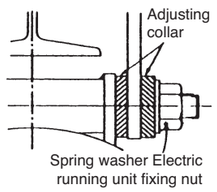
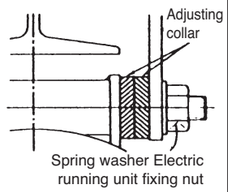
(2) Trolley rail width adjustment method for I shape steel

In case I shape steel width to be used is different from trolley rail width to be delivered, adjust it by replacing of adjusting collar to match with I shape steel width according to the following method.

1. Remove electric running unit fixing nut, spring washer and then adjusting collar.
2. Remove left and right side plates, and in case of widening, put adjusting collars inside of side plate and in case of narrowing, put adjusting collars outside of side plates.
3. Fasten electric running unit fixing nut.



(Table 3)

	Narrowing	Intermediate	Widening
Rail width adjustment			
Adjusting collar position at the time of delivery and Capacity		1t 2t 2.8t (3t)	

(3) Erection work

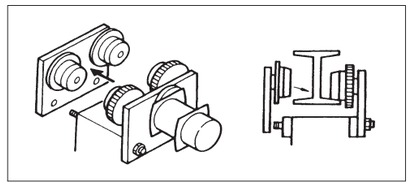
⚠ DANGER

- **If electric trolly fixing nuts loose, side plates distance becomes wide and hoist could fall down, so make sure that the fixing nuts are tightened properly.**

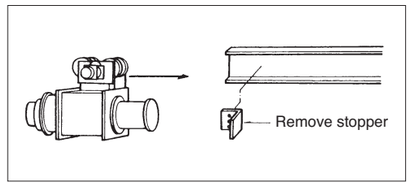
When erecting, install either method of removing side plates and put trolley rail between both side plates or of removing stopper of trolley rail and inserting from the end of rail.

※There are two method ①②mentioned below in order to erect standard and low head hoists with capacity less than 2.8t.

① Erection by inserting to I beam



② Erection by removing side plates



○ After erection, loosen electric running unit fixing nut a little bit and confirm that running face of all 4 wheel touches with rail and then fasten the nut firmly.

※Very dangerous, since there is a possibility of fall-down of hoist.

(4) Erection of stopper

⚠ DANGER

- **Install stopper at the end of trolley and runway rails without fail.**
- **Do not stop a trolley by bumping onto stopper.**

(1) Stopper fixing method of Ordinary type, Low headroom type hoist

○ After fixing the trolley to I beam, fix the stopper at the ends of I beam in order to prevent any danger such as hoist drop-down.

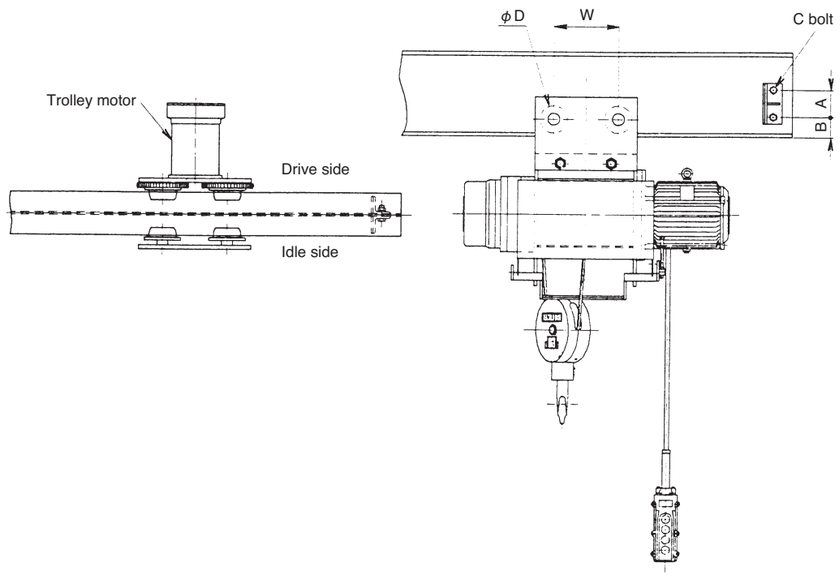
○ Do not stop a trolley by bumping onto stopper.

※Very dangerous due to hoist drop-down.

○ It is very useful to change the color of the stopper and I beam for preventing collision.

○ Fix the stoppers so that both sides of wheels touch with stoppers simultaneously.

【Stopper fixing position】



5-2 In case of using as under-hung type

As to the stopper fixing dimension, follow to the table below.

(Table 4)

I beam (mm)	200×100×7	250×125×7.5	300×150×8
L beam (mm)	L-40×40×5	L-50×50×6	L-65×65×6
A (mm)	80	80	100
B (mm)	40	50	55
C (Bolt size)	M12	M12	M16

Stopper fixing dimension is decided by W dimension (Wheel distance) and ϕD dimension (Wheel dia.) and follow to the table below .

(Table 5)

Model No.	Capacity (t)	W (mm) (Drive side/ Idle side)	ϕD (mm)
S type	1	165	80
	2・2.8 (3)	180	100

(1) Installation place

Install firmly not so as to be dangerous by hoist drop-down.

(2) Setting of hanging pin and metal

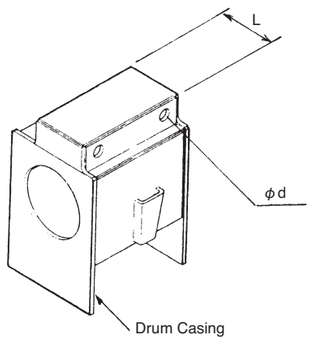
Hanging pin dimension is to be set according to the table below.

○ Use S45C steel

○ After fixing it, fasten both sides of hanging pin with nuts.

Drum case hanging pin part dimension (Table 6)

Capacity (t)	Frame hanging pin hole	Hanging pin shaft dia	Frame hanging part dia
1	32	30	166
2・2.8 (3)	32	30	166



5-3 Lubrication

⚠ CAUTION

● Grease is to be replaced with new after 12 months' use. This is standard and if necessary, shorten the lubrication interval according to operation conditions and frequency. It is good idea to lubricate to rotating parts occasionally for long life of the products.

○ After installation, replace suitable quantity of grease every 12 months according to hoist capacity by disassembling gear case.

○ Proceed maintenance check and repair by skilled people with special knowledge authorized by the company.

S type hoist capacity (Table 7)

	1t	2t	2.8t (3t)
Grease volume	800g	1400g	1800g

● Lubrication oil

Grease …… JT-6HTO

○ Spray suitable quantity of paste spray every month at trolley gear part.

○ Spray on wire rope with aerosol type lubricant.

5-4 Grounding work and fitting of electric leakage breaker

⚠ DANGER

● Provide grounding connection without fail. Also, install an electric leakage breaker in the circuit besides grounding.

Grounding must be done with grounding resistance less than 100Ω in case of power supply less than 300V and less than 10Ω in case of voltage more than 300V.
Grounding and electric leakage breaker fixing works shall be done according to the related laws and/or regulations.
※This is to prevent electric shock accident for electric leakage.

(1) In case of hoist with trolley

○ Ensure insulated by removing paint and rust from the fixing part of I beam.

○ Do not paint at wheel rotating surface of rail.

○ Remove rust proof paint from the contact surface of trolley wheel with rail.

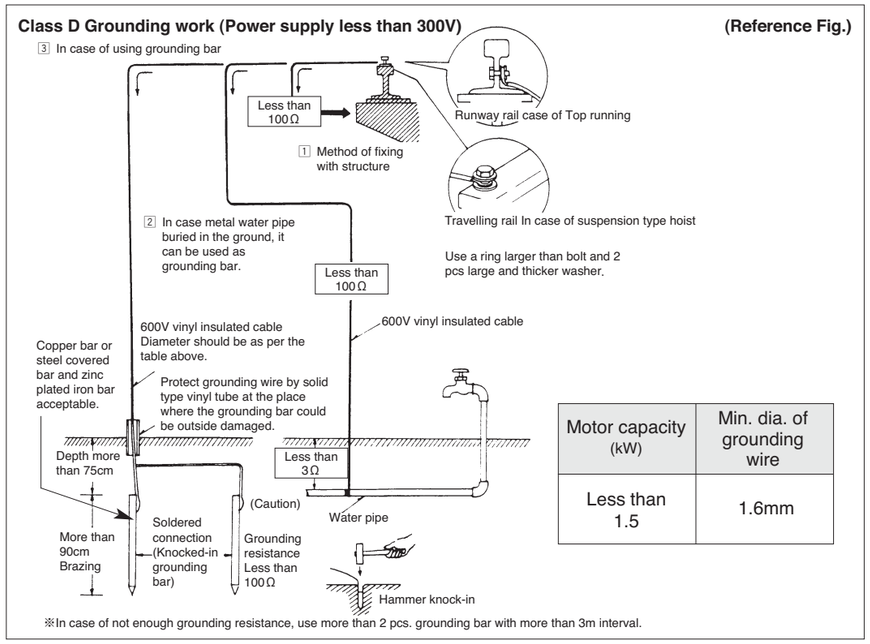
5-5 Electric wiring

(2) In case of under-hung type (suspended) hoist

○ In case of fixing with iron frame construction, pay attention not to be insulated by taking off paint and rust at the fixing part.

○ In case of fixing with wooden construction, make grounding work connecting grounding wire more than 2.6mm dia. with the body.

Class D Grounding work (Power supply less than 300V) **(Reference Fig.)**



Motor capacity (kW)	Min. dia. of grounding wire
Less than 1.5	1.6mm

※In case of not enough grounding resistance, use more than 2 pcs. grounding bar with more than 3m interval.

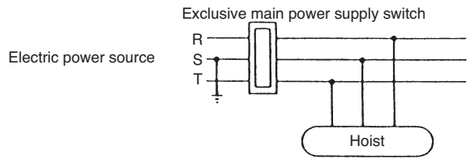
⚠ CAUTION

- **Do not use with other voltage and frequency than the rated ones.**

Electric works should be made according to the related laws and regulations.

○ Before connecting the power supply with hoist, confirm that the voltage and frequency meet with the applicable voltage and frequency with the hoist.

※ The grounding wire among the power supply 3 wires should be connected to the terminal symbol S, when wiring the hoist inside.



5-6 Power supply method

○ The power supply should be provided through the exclusive power supply switch.

※ When not using the hoist, cut off the main power supply switch to preventing danger.

⚠ CAUTION

- **Avoid a bare trolley power supply method due to danger of electric shock. The power supply method should be made by cable or insulated trolley power supply system.**

(1) Cable power supply system

In case of the cable power supply system, use cabtyre cable with the applicable conductor cross section and length.

○ Do not use the lead-out power supply wire instead of the power supply cable.

※ Very dangerous due to over-heat and wire cut.

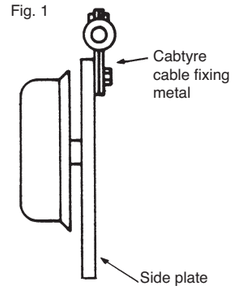
○ The length and diameter of the power supply cable should be decided considering voltage drop-down by cable.

※ Big voltage drop-down would cause poor starting and motor over-heat.

○ Fix the cabtyre cable with the fixing metal so that no excessive force do not charge at the lead inlet part of control panel. (Refer to Fig. 1)

Also, do not connect the power supply cable inbetween.

Fig. 1



Acceptable length of the hoist power supply cabtyre cable (Table 8)

Hoist model	Hoist capacity	Winging-up motor	Power supply	Acceptable length of 3 core cabtyre cable cross section of cabtyre cable (mm^2)											Remark
				1.25	2	3.5	5.5	8	14	22	30	38	50		
S type	1t	1.5kW 4P	200V 50Hz	18	29	54	<84>	119	210						15 (A)
			200V 60Hz	20	32	59	<92>	131	230						
			220V 60Hz	20	32	59	<92>	131	231						
	2t	2.6kW 4P	200V 50Hz		22	41	<64>	90	159	248					30 (A)
			200V 60Hz		24	44	<70>	98	174	271					
			220V 60Hz		24	45	<70>	98	174	272					
	2.8t	3.7kW 4P	200V 50Hz		15	28	43	61	109	<170>	229				40 (A)
			200V 60Hz		17	31	48	69	121	<189>	256				
			220V 60Hz		17	31	48	69	121	<189>	256				

1. The above is under the condition of voltage drop within 10% between transformer and hoist.
2. The above is calculated with hoist winding-up motor only. In case of hoist crane, add

5-7 Confirmation and test operation after installation and erection

those for trolley motor.

3. In case the winding-up motor is different from the standard one, ask us since starting current and power factor could be changed.
4. The figure marked < > is the max. cross section of cabtyre cable connectable with the control panel.
5. In case of using the cable more than the above size, contact us since the starting current and power rate could be changed.

(2) Insulated trolley type

Use an insulated trolley with suitable specifications to an equipmemt sold in the market.

(3) Trolley bus duct

Use a trolley bus duct with suitable specification to an equipment sold in the market.

After installing the hoist, confirm the following items.

(1) Confirmation of Up/Down pushbutton switch

After finishing hoist wiring, switch on power supply. Firstly, press pushbutton (up) a bit. (Never press for a long time, as this is just to check the direction of travel.)

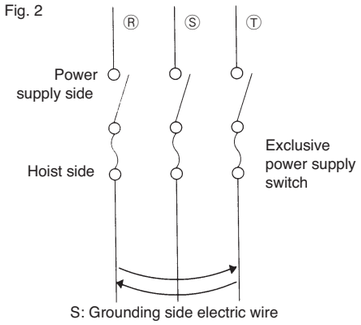
At this time, if the hook block goes down contrary to pushbutton display, switch off power switch immediately and replace 2 wires (R phase and T phase) except grounding wire of secondary side power supply switch as shown in Fig. 3.

※At this time, do not decide the direction by changing the wiring of pushbutton switch. In case of coinciding the direction by changing the wiring of pushbutton, the overwinding prevention limit switch does not work and the emergency limit switch works. If the emergency limit switch works, the hoist does not move even by pressing Up or Down pushbutton.

At this time, restore it according to the following order.

1. Replace R phase and T phase. (Secondary side of power supply switch)
2. Bring up the hook block and put it horizontally, so that the limit lever is down and the emergency limit switch is released.
3. Lower the hook block gradually by inching operation by pressing Down pushbutton switch, after raising and holding a hook block by hand.

Fig. 2



(2) Confirmation of upper limit switch

Stop the hook block before the overwinding prevention limit switch by pressing the pushbutton switch (up). Then, confirm if the hook block pushes up the overwinding

switch lever by inching operation and the winding-up stops by the overwinding limit operation.

Next, after lowering the hook block down to 1 - 2 meters from the overwinding prevention limit switch, confirm if the winding-up stops by the limit switch operation, keeping to press the pushbutton switch UP.

⚠ CAUTION

- **Confirm that the upper limit switch operates correctly.**

※If operating Up/Down opposite direction without confirming the overwinding limit switch, the emergency limit switch works and the hoist does not move to both Up and Down or continues to wind up due to no limit switch operation. Confirm surely as it would cause rope and/or drum damages.

(3) Confirmation of trolley pushbutton switch

In case of the hoist with an electric trolley, confirm if the trolley pushbutton switch display works to coincide with the hoist direction display.

In case of moving to the opposite direction, replace the operation cable in the control panel.

(4) Confirmation of lifting height

⚠ DANGER

- **Do not operate over the lower limit on lowering operation.**

Confirm lift (the max. horizontal distance of hook movement) according to the following method.

Confirm if wire rope remains more than 2 turns on the drum by lowering the hook block to floor surface without load.

The lift where 2 turns of wire remains on the drum is the lower limit.

※In case more than 2 turns of wire does not remain on the drum, there would be in danger of load drop-down due to drop-out of wire rope. In this case, consult us.

(5) No load operation

- Confirm if there is no abnormal sound or vibration by operating hoist and crane in all operating range/area.
- Confirm if stoppers at both ends perform its normal functions.

(6) Rated load operation

- Confirm if there is any abnormal sound or vibration by lifting up and down the rated load.
- Confirm if there is any abnormality on hoist, crane, and/or constructions by lifting the rated load and trolley and travel operation.

6. Handling in general

Do not allow people without license and/or special training to operate the hoist.

Correct usage and cautions

⚠ DANGER

- **People who do not know the contents of the operation manual and caution plates should not operate a hoist.**
- **People without legal qualification should not perform hoist operation or slinging work and do not let him to do so.**

- **Proceed check and periodical independent inspection before operation.**

6-1 Check

⚠ DANGER

- **Confirm pushbutton switch movement before operation and in a case when the pushbutton switch does not work smoothly, do not operate.**
- **Stop operation immediately in case hoist moves to the opposite direction against an instruction of pushbutton switch.**
- **Confirm brake before operation and do not operate if brake does not work properly.**

○ In daily operation, perform a daily check specified in Article 7 before operation.
※Do not use under abnormal conditions as it is very dangerous to cause an accident.

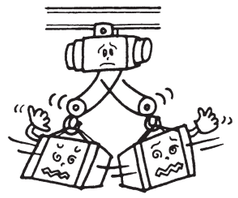
6-2 Sling

⚠ DANGER

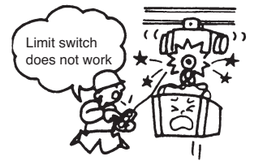
- **Do not permit slinging work by people without legal qualification and also do not let him to do so.**
- **Do not operate with damaged hook stop.**
  ※It cause fall off of sling from hook.

- **Confirm if hook rotates smoothly before operation.**
- **Put sling on hook correctly.**

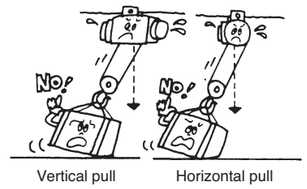
○ Do not swing a load on lifting up and down.
○ Even in case of no load, do not swing hook block.
※It causes load drop-down and wire rope damage through irregular winding.



○ Limit switch is a safety device. Do not use it always, and also do not run trolley under pushing up limit lever.
※It cause limit switch damage and there would be a possibility that limit switch does not work at the time of emergency.



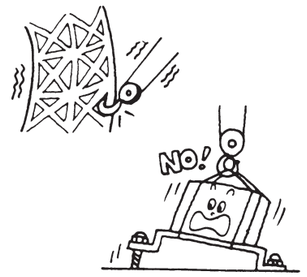
○ Do not side pull (vertical and horizontal pull). Lift load after moving hoist right above load.
※Very dangerous as the load crawls on the ground. Also, it gives excessive stress to hoist and cause trouble.



Vertical pull　Horizontal pull

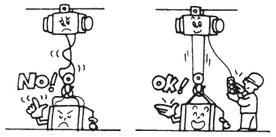
○ Pay attention not to lift earth (such as pulling construction) absolutely.
※It causes damage of equipment due to excessive stress.

○ Do not operate exceeding lower limit when lowering.
※If operating exceeding lower limit, wire rope is wound reversely.



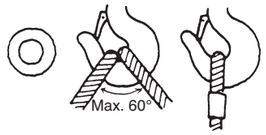
○ Do not make reverse operation under the condition without considering safety.
※Make reverse operation by using exclusive reverse equipment.
※It would generate a big impact.

○ When winding up, confirm safety by stopping once at the point when wire is stretched.
※It can soften a shock of load parting from earth and wire rope damage is reduced.



○ Use sling most suitable for load and its shape.
Safety rate : More than sling wire 6
Safety rate : More than sling chain 5

Right usage



Wrong usage

○ Put sling at the center of hook.
※Wrong sling work causes to the reasons mentioned below and it is very dangerous.
（1） Load drop down
（2） Shock load generation by sling position aberration
（3） Breakage of hook latch

6-3 Lifting-up and down of load

⚠ DANGER

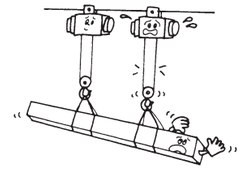
- **Do not lift a load exceeding the rated load.**
  ※The rated load is displayed on name plate of hook block.
- **Do not operate to swing load or hook block.**
- **Do not stop always by using the upper limit switch.**
- **Do not lift the load obliquely.**
  ※Lift the load only after locating the hoist directly above the load.
- **Do not lift earth (such as pulling construction)**
- **When lowering, do not operate exceeding the lower limit.**
- **Do not make reverse operation under the condition without considering safety.**
  ※The reverse operation should be done by exclusive reverse equipment.

⚠ CAUTION

- **Once stop lifting-up when wire is stretched.**
- **When lifting up a load with two hoists, lift it up with a good balance without any slant of the load.**

○ Do not lift a load more than the rated load.
※Very dangerous due to machine damage and/or drop-down of the load.

○ When lifting up with two hoist, pay attention to the followings for no slant of the load.
※Take a balance of the load so that the load is lifted up evenly by two hoist.
(Attach a load meter or overload prevention device).
※Use hoists with the same lifting speed.
※Make an operation system of two hoists as an interlock system.
※Fix an anti-collision device not to bump two hoists each other.
※Install a sling so that lifting points pitch do not change.
※In case of a load more than 3 tons, crane manufacturing approval is required.



6-4 Load movement

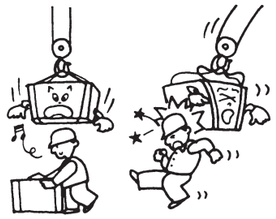
⚠ DANGER

- **Do not enter under a load.**
- **Do not operate a hoist when someone is within the load moving area.**
- **Do not transfer the load exceeding overhead of the person.**

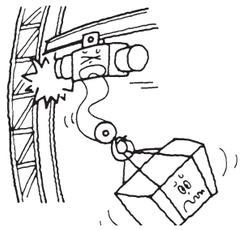
⚠ CAUTION

- **Do not tie to other construction and/or wiring.**
- **Do not hang pushbutton switch to other things or pull it strongly.**
- **Do not bump a hoist or trolley to constructions or stopper.**

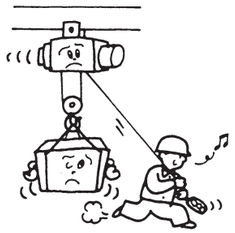
○ Do not stand right below of a load or moving direction of a hoist.
※Very dangerous as the load bump on the man.



○ Do not bump a hoist or trolley to structure trolley stopper.
※It causes a load drop-down and/or machine damage due to an excessive shock.



○ Do not hang a moving load to constructions or wiring.
※It causes a load drop-down.



○ Do not pull a trolley with a pushbutton switch cable.
※It would cause a wire cut.
※Very dangerous as the load may bump to the man.

6-5 Pushbutton operation

⚠ DANGER

- **Confirm pushbutton switch before operation and if it does not work smoothly, do not operate.**
- **Stop immediately operation when a hoist moves to different direction against pushbutton.**

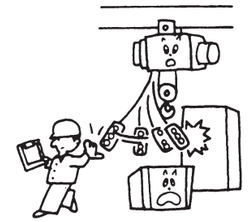
⚠ CAUTION

- **Do not plucking (Quick reverse) and/or inching.**

- **Clean up always so that dust and/or sands do not accumulate around the pushbutton switch.**

○ Press down pushbutton switch until some reaction is felt.
○ Do not perform inching operation frequently.
※It is to prevent wear-out of brake, contact or overheating of motor.
○ In case of reverse operation, do not make a quick reverse operation after a stop.
※Quick reverse would shorten lifetime of hoist and wire rope extremely.
○ Clean up always so that dust and sand do not accumulate around pushbutton switch.
※If dust and/or sand enter between pushbutton and case, pushbutton would not sring back.

○ When using a pushbutton switch case after operation, return it to a natural hangdown position.
※If released suddenly, it could strike other things, make malfunction and/or be damaged.



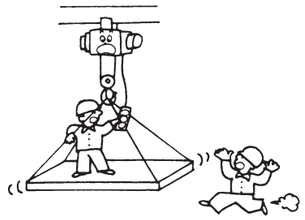
6-6 For safety operation

⚠ DANGER

- **Do not stand on a lifted load. Also, do not use as a passenger elevator application.**
- **Do not enter under a lifted load.**
- **Do not operate when any person is within a moving area of lifted load.**
- **Do not transfer the load over any person.**
- **Do not leave from the operating position while lifting a load.**
- **Do not distract attention from the load while operating.**

6-7 Other cautions

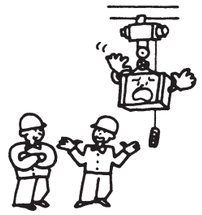
○ Do not climb up on the lifted load and/or work on it absolutely.
※The lifted load is very unstable and very dangerous for fall down of a person or drop down of the load.



○ Do not operate the hoist over any person.
※Very dangerous, should the load drop down.

○ Do not leave the hoist while lifting the load absolutely.

○ Do not distract attention from the load while operating.
※Very dangerous if the outside person approaches to the load.



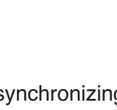
○ In case of no operation, raise the hook block to a position above head a height.
※If the hook block is in a low position, it is dangerous to passing personnel.

⚠ DANGER

- **Do not operate in case the hoist is damaged or has some abnormal sound and/or vibration.**
  ※Using with some abnormality can cause an accident and is very dangerous, so do not operate.
- **Do not operate when the following abnormal points are apparent.**
  • Kink, Deformation, Corrosion
  • Core wire cutting and worn-out more than use limitation (Article No.9-2)
- **Do not electric weld the lifted load.**
- **Do not connect grounding of welder with wire rope.**
- **Do not touch the welder electrode with wire rope.**

⚠ CAUTION

- **Do not use with other than the rated voltage and frequency.**
- **Do not use removing the name plate or label of Danger or Caution display fitted on the machine or with unclear name plate or label.**
- **Proceed daily checks and periodical independent inspection without fail.**
- **In case wire rope has the following abnormality, do not operate.**



① Wire rope is cut off.
② Wire rope is kinked.
③ Wire rope is deformed.
④ Abnormal wire gearing
⑤ Rust and corrosion
※It would cause the load drop-down due to wire rope cut-off.

○ Do not make electric welding the lifted load.
※Electricity flows through wire and it causes decrease of strength on each part of hoist.

○ Follow to the related laws when using for crane, simple lift, ship, mine, petro-chemical plant, etc.

○ Follow to the instruction of the related regulation, when using for 2 units lifting.
When approving the production, instruct to equip the following safety device for protection of accident on 2 units lifting works.
ａ） Crane for lifting-up and down by Main hoist and Auxiliary hoist simultaneously.
The device which Total value of the load charged to Main hoist and Auxiliary hoist does not exceed the rated load of Main hoist and also the load charged to Auxiliary hoist does not exceed the rated load of Auxiliary hoist.
ｂ） Crane with multiple number of hooks for joint lifting purpose.
The device which does not exceed the rated load of each hook, the synchronizing device of lifting up and down and the trolley anti-collision device.

○ As to details, refer to［Part use limit］(Article 9)

7. Maintenance check, independent inspection and modification

7-1 Prohibition of modification

⚠ DANGER

● Do not modify products and their parts absolutely.
※Very dangerous as it would cause to an accident.

(1) Daily check

The daily check is to confirm if it operate correctly without disassembly before daily operation and to be made by operator.

But, in case of operating by multiple numbers of operator, it is to be done by a responsible person of its crane.

Operate the hoist without the load before daily work and confirm the following items.

1. Pay attention to obstacles within the moving area of the operator.
2. Is there any abnormality on trolley rail and travel rail through checking from floor?
3. Does pushbutton switch work Up, Down, Left and Right correctly and smoothly according to the display of pushbutton switch ?
4. Does the limit switch work surely ?
5. Does the brake work efficiently ?
6. Is there any abnormal sound and/or vibration ?
7. Does the sheave of the hook block rotate smoothly ? Is there any lubrication oil shortage ? Does hook rotate easily and also is there any abnormality on the spring nut of hook nut ? Furthermore, is wire rope located in the sheave ?
8. Is there any abnormality on the wire stopper ?
9. Is wire rope wound on the drum correctly ?
10. Is there any oil shortage on wire ?
11. Is there any abnormality on the sling ?

● Hook block mentioned in「Hook inspection and its use limit」(Article 9-1) is apt to be damaged and to support the load directly, and so inspect carefully.

○ In case of any abnormality, stop operation and make correct countermeasures according to［Reasons of general break-down and their counter-measures］(Article 11) and start operation again.
※Usage with abnormality could cause to an accident and so do not such usage.

(2) Monthly independent inspection

⚠ DANGER

● Do not use other parts than genuine parts.

● Cut off the power supply and display Power-on prohibited before making independent inspection and repair.
● Independent inspection and repair should be done by the specialist with special know ledge to be appointed by the company.
● Proceed independent inspection and repair without load.
● When any abnormal point is found through independent inspection, do not use and repair immediately.
※Do not use under abnormal condition, since it would cause an accident and very dangerous.

⚠ CAUTION

● When doing independent inspection and repair, display as【Under checking or Power-on prohibited】

Proceed periodical independent inspection without fail to use crane safely with using their functions fully.

○ When making part replacement or adjusting work according to periodical independent inspection, use crane after confirming［Confirmation items after installation and erection and trial operation］(Article 5-7).

○ Inspection have to be done after cutting off the power supply and confirming environmental safety.
※Make inspection after displaying［Under check］ without fail.

○ Recommending to prepare an exclusive checking table.

○ Proceed the same inspection even if it is not applicable for crane.

Make independent inspection more than one time per month.
If any abnormal point is found, make correct countermeasures.

○ Inspection cycle will vary according to how to use hoist.
In case of using higher frequency than the condition of the specification, make inspection with shorter cycle. As to the inspection method and its treatment, refer to ［Inspection method of each part of hoist］(Article 10).

Check classification (Table 9)

Classification	Classification basis	Practice
A	Check point important on safety	Once per month
B	Check point important on machine maintenance	Once per 3 months
C	Parts with less worn-out and breakage	Once per 6 months

The record should be kept for 3 years.

(3) Annual inspection

⚠ DANGER

- **Do not use other part than genuine parts.**

- **Cut off the power supply before making annual inspection and repair.**
- **Annual inspection and repair should be made by the specialist with special knowledge to be appointed by the company.**
- **Proceed annual inspection and repair without load.**
- **Disassembly the hoist after taking it down to the ground without fail.**
- **If any abnormal point is found through annual inspection, do not use and repair immediately.**
  ※Do not use with abnormal point, as it would cause an accident and very dangerous.

⚠ CAUTION

- **When proceeding annual inspection and repair, display as 【Under check or Power-on prohibited】**

Disassembly and inspect inside more than 1 time per year.
Also, when any abnormal point is found through inspection, proceed correct counter-measures.

○ As to Inspection method and treatment, refer to ［Inspection method of each part of hoist］(Article 10).
Ask to our service shop on disassembly.
※Assembly and erection by yourselves is very dangerous.

8. Maintenance adjustment

8-1 Magnet brake for winding up

(1) Brake operation outline explanation

This brake is a magnet brake of negative operation type (Spring close type) releasing by energizing coil and stop winding up and down automatically by brake operation at the time of power supply stop and damage of electric circuit.
No adjustment is required under normal operation. But, it must be done at the time of monthly and annual inspection.

(2) Caution on handling

⚠ CAUTION

- **This brake is a dry type. Pay attention for oil not to be adhered on the friction surface absolutely. If oil is adhered on it, the torque is decreased.**
- **Do not pull the lead wire, bend it sharply at acute angle or pull down the brake with lead wire.**

(3) Caution on operation

⚠ CAUTION

- **Is the brake fixed firmly ?**
- **Confirm if the rated voltage of magnet brake is supplied. Confirm the voltage at the terminal of the brake lead wire, since the voltage drop-down would happen by electric wire resistance in case of long electric circuit even if the power supply voltage is the rated one.**
- **Confirm if the movable core in the construction diagram is attracted and released smoothly by switching on and off.**

(4) Maintenance

① Pay attention carefully for oil not to be adhered, as this brake is a dry type.
If oil is adhered, the torque is decreased and the brake is slips, to which pay careful attention.

② Adjustment of brake power
The friction power of the brake is adjusted at the most suitable condition at the time of our delivery but in case the brake power becomes weak by wear-out of friction surface of the brake lining for long use, adjust the gap.

③ Gap adjustment
The brake operation becomes blunt in case the gap between the stationary core and the protection plate for remenence becomes more than 1mm due to the wear-out of brake lining.

Tools necessary for the gap check and adjustment
○ Feeler gauge, Spanner

In case of normal wear-out, the brake lining can be used for the use limit as mentioned the table 10 below.

(Table 10)

Hoist capacity	1 - 2.8 t (3t)
Lining original thickness (mm)	3
Allowable thickness	1.5
Proper gap	0.2 - 0.5
Rated voltage	DC90V

④ Check/adjusting method
1. Remove the brake case cover.
2. Loosen hex nuts at 3 brake fixing pins of brake moveable core side.
3. Insert 0.3mm filler gauge between the stationary core and the protection plate for remenence and fasten nuts at the outside of brake fixing pins located nearby the inserted place by spanner to the extent that the inserted filler gauge is not pull out so easily.
4. Fasten the loosened hex nuts at the movable core side. Confirm fastening of outside nuts.
5. In order to confirm the adjusted gap, insert the filler gauge used for the above adjustment at several positions.
   - Proceed with the same manner in case of replacing with a new one due to wear-out.
6. Please install the brake case cover.

(5) In case of finding some abnormality during operation

⚠ DANGER

- **When any abnormality is found out, stop to use immediately and use again only after rectifying the fault.**
  ※It is very dangerous and may cause an accident to used under abnormal conditions and so don't do it.

When discovering any abnormality, check the following points and take necessary counter-measures.

1. Brake is slipped.
   (1) Is oil not adhered on the friction surface ? Or, is any foreign substance in the brake ?
   (2) Does the temperature of brake fixed core become high (100°C) ?
   (3) Is any overload put on the hoist ?

2．The brake operation becomes poor.

（1） Is the rated voltage supplied ?

（2） Is the friction plate near to the use limit ?

（3） Does the temperature of brake fixed core become high (100°C) ?

3．Brake does not work at all.

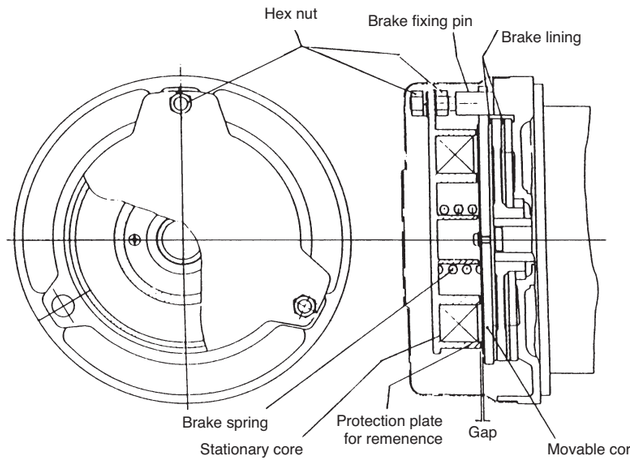
（1） Is there any wire-cut on coil and/or lead wire ?

（2） Is there any abnormality on electric circuits ?

（3） Is the friction plate near to the use limit ?

（4） Is the rated voltage supplied ?

（6） Construction



8-2 Brake of Electric trolley (A-TYPE)

（1） Caution on handling

⚠ CAUTION

- **This brake is dry type. If oil is adhered on the friction surface, the torque is decreased and so pay attention so that oil is not adhered on it absolutely.**
- **Magnetic brake is made from soft materials. If beating, dropping and/or giving excessive force on it, it would cause damage or deformation and then poor operation and/or shortage of torque, and so pay attention to it.**
- **Do not pull lead wire, bend it with an acute angle and pull down brake with lead wire.**

（2） Cautions on operating

⚠ CAUTION

- **Is there any axial play on the inner driver ?**
- **Confirm if the rated voltage is supplied.**
  Even if the power supply voltage is the rated one, the voltage goes down due to cable resistance in case of long circuit, and so confirm the voltage at the terminal part of the brake lead wire.
- **Confirm if the armature is attracted and released smoothly by switching on and off.**

（3） Maintenance

（1） Pay attention carefully for oil not to be adhered, as this brake is a dry type.
If oil is adhered, the torque is decreased and the brake is slips, to which pay careful attention.

（2） Braking power adjustment
As the friction plate with small torque fluctuation is used, no adjustment is required.
But, proceed it at the time of the monthly and annual inspeciton.

（3） Gap adjustment
As the friction plate with high wear resistant capability is used, it is of long life with excellent durability, but if the gap becomes to the marginal limit mentioned below, replace it with a new one or parts (armature, disc, side plate).

Tools necessary for gap adjustment

○ Feeler gauge / Cross point screwdriver

(Table 11)

Gap	Original value	0.1～0.2mm
	Limit value	0.5mm
Rated voltage		DC90V

（4） Check and adjusting method

1. In case the gap gauge (0.55mm thick) can be inserted, adjust the gap.
   In case the gap gauge (0.35mm thick) can not be inserted, no need to adjust and use as it is, since wear-out condition does not come to the adjusting time.
2. In case of replacing parts (armature, disc, side plate), loosen 3 pcs. cross head cap screw, remove the above parts and replace them with new ones. At that time, confirm that the gap becomes 0.1～0.2mm

⚠ CAUTION

- **Fasten cross head cap screw fully after replacement.**
- **Make gap become uniform at 3 points.**

(4) In case some abnormality is found while operating

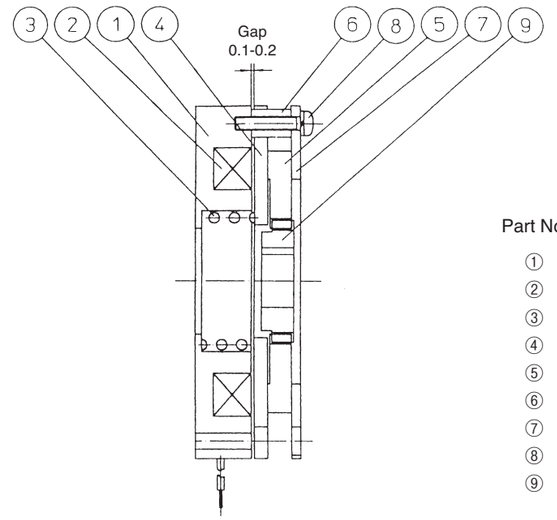
⚠ DANGER

- **When any abnormality is found, stop operation immediately and proceed proper counter-measures and then use it again.**
  ※It is dangerous and causes to an accident to use under abnormal condition, and so don't do that.

When any abnormality is found, check and maintain the following points.

1. The brake is slipping.
   (1) Is there any oil adhered on the friction surface ?
   (2) Is there any temperature raise on brake (100°C) ?
   (3) Is there any overload on crane ?
2. Poor brake operation
   (1) Is the rated voltage is supplied ?
   (2) Does the gap between the core and the armature come to the marginal limit ?
   (3) Is the brake temperature too high (100°C) ?
3. The brake does not work at all.
   (1) Is there any wire-cut on coil and lead wire ?
   (2) Is there any abnormality on electric circuit ?
   (3) Does the gap exceed the marginal limit due to wear of the disc ?
   (4) Is the rated voltage supplied ?

(5) Construction and part name



Part No.	Name
①	Field core
②	Coil
③	Coil spring
④	Armature
⑤	Disc
⑥	Collar
⑦	Side plate
⑧	Cross head cap screw
⑨	Inner driver

(1) Caution on handling

⚠ CAUTION

- **This brake is a dry type. If oil is adhered to the friction surface, the torque is reduced and so pay attention not to adhere oil on it absolutely.**
- **Lot of soft materials are used in the electromagnetic brake. If hitting, dropping and/or charging excess power, it generates hitting damages and/or deformation and causes poor operation and/or torque shortage and so pay attention to such matters.**

(2) Caution on operation

⚠ CAUTION

- **Confirm if the rated voltage is supplied.**
  As the voltage drops down due to wire line resistance in case of long electric circuit even if the rated voltage is supplied, confirm the voltage at the terminal part of brake lead wire.
- **Confirm if a movable iron core performs attract/release function smoothly by switching on and off.**

(3) Brake maintenance and check

⚠ DANGER

- **Do not commence a job under active line condition. Proceed a job after cutting off power supply source. There is a danger of electric shock.**
- **Do not operate under a condition of a brake released by a manual bolt.**
  There is a danger of a reckless driving.
- **Confirm a brake operation by switching on and off the power source before actual operation. There is a danger of a reckless driving.**
- **Do not adhere water and/or oil with a brake. There is a danger of an accident of a reckless driving due to a brake torque decrease.**

⚠ CAUTION

- **Do not operate removing fan cover after check and adjustment of the gap.**
  There is a danger of injury by rolling in.
- **Perform replacement of brake linings takes skill and consult KAMIUCHI, please.**

Brake mechanical lifetime is long as 2 million times but proceed a gap check periodically. Brake can not be released after long time use due to wear-out of brake lining. Also, there is a danger of an accident of a reckless driving due to wear-out and damage of mechanical parts, if using for more than 2 million times.

① Brake manual release operation

In case of releasing a brake without power on, operate a brake loosening device according to the following order.

(1) Brake is released by screwing in bolts again with hex wrench after removing brake loosening two bolts at the opposite angle and taking out a spacer once.
At this time, do not loosen the loosening bolts too much. (Rotate the brake loosening bolts confirming the brake is released or not.) [refer to Fig. 2]

(2) In case of restoring to the original condition after releasing the brake, install the spacer taken out in the above (1) for safety as before.
[Refer to Fig. 3]

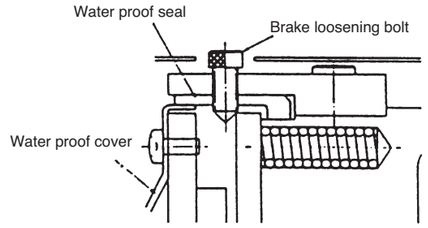


Fig. 2

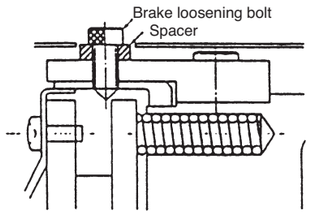


Fig. 3

② Gap check

Brake can not be released after long time use.

Perform gap check periodically according to the following procedure.

(1) Remove a cover.

(2) Measure a gap by inserting a gap gauge between the fixed iron core and movable iron core shifting a water proof cover.
At that time, if the gap becomes near to the limit value in the table below, it is necessary to adjust the gap. By the way, proceed the gap measurement at 3 points of circumference.

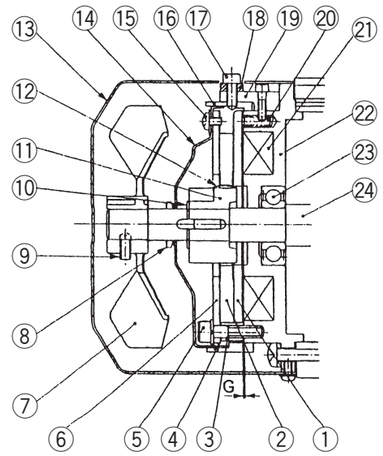
(3) Please install the cover.

Note) As to details of disassembly order, refer to gap adjustment ③).

Brake gap (Table 12)

Motor capa	Gap value G (mm)	
	Rated value	Limit value
0.2kW 0.4kW	0.15～0.25	0.5

③ Gap adjustment



Part No.	Part name
①	Movable iron core
②	Brake lining
③	Spacer
④	Gap adjusting shim
⑤	Fixing bolt
⑥	Fix plate
⑦	Fan
⑧	V ring
⑨	Fan set bolt
⑩	Shaft C shape stop ring
⑪	Boss
⑫	Plate spring
⑬	Cover
⑭	Water proof cover
⑮	Water proof cover fixing bolt
⑯	Water proof seal
⑰	Loosening bolt
⑱	Manual release protection spacer
⑲	Loosening metal
⑳	Torque spring
㉑	Magnetic coil
㉒	Fixed iron core
㉓	Ball bearing
㉔	Motor shaft

Brake gap adjusting method

In case of 0.2kW and 0.4kW

(1) Remove a cover ⑬.

(2) Loosen fan set bolt ⑨ and remove fan ⑦.

(3) Pull out V ring ⑧.

(4) Remove loosening metal ⑲.

(5) Unscrew water proof cover fixing bolt ⑮ and remove water proof cover ⑭.

(6) Loosen the fixing bolt ⑮ a bit and fasten the fixing bolt again after rotating the fix plate ⑥ counterclockwise fully. Measure the gap after fastened and confirm that the gap value is between the rated value and the limit value.
(The gap becomes smaller by approx. 0.3mm by this operation.)

(7) Fix the waterproof cover with the fixing bolt. At this time, fix the waterproof cover so that the gap (A dimension of Fig. 4) between the waterproof cover hole and the motor shaft become almost equal on the full circumference.

(8) Remove dirt from the waterproof seal surface and clean it up.

(9) Install the waterproof seal between the fix iron core and the waterproof cover as shown in the construction diagram.
At this time, match the position of the loosening bolt hole of the waterproof seal and the loosening bolt and fix it along with the edge of the waterproof cover.
(Pay attention so that the waterproof seal will not meander. There is a danger of water intrusion.)

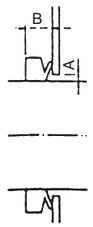


Fig. 4

(10) Confirm the brake action by switching on and off the power supply.

(11) Fix V ring. At this time, clean up the rip of V ring and the rip surface and put a small amount of grease on the rip surface and fix it according to the fixing dimension (B=4.5mm). [refer to Fig. 4]

(12) Fix fan ⑦ and cover ⑬. At this time, put a small amount of the fixing agent on the fan set bolt ⑨. (Three bond 1102)

Note) In case of with the loosening bolt, disassemble after removing it first.
Item No. ④ Gap adjusting shim is not fixed.

④ Replacement of Trolley speed reducer

Replace a set of speed reducer at the time when the thickness of brake lining becomes to the use limit thickness in Table 13 (In case of the brake of 0.2kW, 0.4kW, at the time when the brake gap becomes to the limit value in Table 12 Page 32 after the gap adjustment.)

Brake lining dimension (Table 13)

Motor capa	Brake lining Dimension diagram	Original thickness to (mm)	Use limit thickness to (mm)
0.2kW 0.4kW		7.0	6.2
0.75kW		7.0	6.0
1.5kW		8.2	7.2

⑤ Replacement of V ring, Rubber seal

Replace V ring, Rubber seal periodically according to Table 14, since the waterproof ability is decreased due to the aged deterioration.

Replacement interval of each part (Table 14)

Motor capa	Part name (Model No.)		
	Water proof seal	V ring	Seal washer
0.2kW 0.4kW	DX549WW-01	V-14A	M4×3 pcs
0.75kW	DU469WW-01	V-16A	M4×3 pcs
1.5kW	DW242WW-01	V-20A	M8×3 pcs
Recommendable replacement period	3 years	3 years	3 years

9. Part use limit

When consumable parts exceeding their use limit are found through monthly or annual independent check or other checks, replace them with new ones.

○ It is very dangerous to use parts exceeding their use limit.
○ Inspection method of use limit are described in Article 10.
○ Keeping consumable parts at your hands always can shorten non-working time and is very effective to use.

9-1 Hook inspection and its use limit

(1) Mouth opening, crack, wear-out inspection and use limit and limit of wear-out volume

⚠ DANGER

- **Do not use hook with the increased mouth opening.**
- **Do not use hook with crack.**
- **Do not use hook with more than 5% wear-out volume of the part contacted with sling.**

In case the following conditions are found when inspecting hook, do not use as it is absolutely and replace them.

○ Hook with the increased mouth opening.

○ Hook with crack.

○ Hook with more than 5% wear-out volume of the part contacted with sling.

(2) Limit of mouth opening dimension and wear-out volume

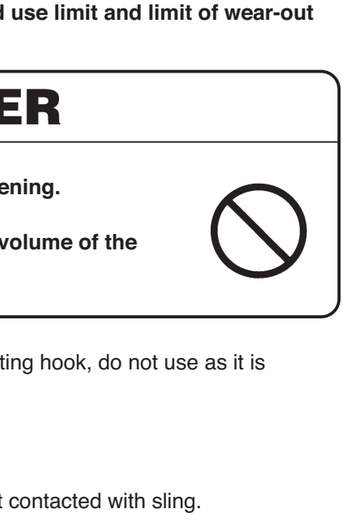
① Mouth opening dimension (Dimension inbetween knock pin marks)
Measure mouth opening dimension (Dimension inbetween knock pin marks) and in case it is applicable to the use limit mentioned in the table below, replace it.

○ The measuring position is die stamped at the hook as shown below.
Also, the original b dimension listed in the table is described at Figure die-stamped position marked ▨ and so refer to it.

② Hook wear-out volume
Measure hook thickness (t) and in case it is applicable to the use limit mentioned in the table below, replace it.

Hook block use limit table (Table 15)

Hoist capacity	Ob Dimension		t Dimension	
	Original	Use limit	Original	Use limit
1t	59	61	37	35.2
2t	79	82	48	45.6
2.8t・3t	92	96	56	53.2



Load and test load direction

9-2 Inspection and use limit of wire rope and wire ends

⚠ DANGER

- **Do not operate the hoist when the following abnormalities are found.**
  - **Kink, Deformation, Corrosion**
  - **Core wire cut-off and wear-out more than the use limit**
- **Do not electric weld the lifted load**
- **Do not connect grounding of welder with wire rope.**
- **Do not touch welder electrode with wire rope.**

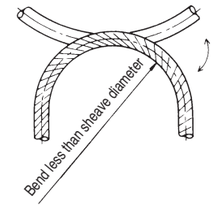
Inspection more than once per month is necessary.
Wire abandment standard is to be followed to your law and regulation.

For rope ends, the following inspections are required.

○ For wire rope fixing, taking off and rope ends fixing procedure, refer to [Wire rope replacement method] (Article 9-3)

(1) Wire rope inspection and its use limit

Wire rope inspection is to be done by bending all the length with less than sheave diameter as shown right.



○ Do not use wire rope absolutely in case one of the following (a) - (e) is applicable.
※There would be a danger of wire cut-off and very dangerous.

(a) More than 10% of core wire are cut off between 1 twist (except filler wire)

○ Recommended replacement even if wire cut-off is less than 10%.
※It can prevent an injury when touching bare wires.

(b) Diameter decrease is more than 7% of the nominal diameter.

(c) Kinked wire

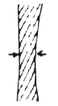
(d) Remarkable deformed wire

(e) Remarkable corrosion
※The surface of core wire becomes pocket marked surface due to pitching.
※Core wire is loosened due to inside corrosion.

(f) Coat wire rope with oil or non-corrosion oil carefully in case wire rope becomes dry.

(a)

(b)



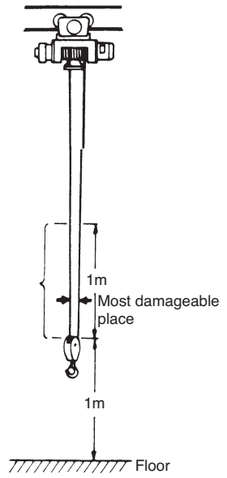
(c)

(d)

Wire rope use limit table (Table 16) (mm)

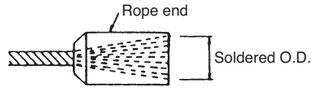
Wire rope dia	Construction	93% dia	No. of core wire cut-off per 1 twist	HOIST capacity	
				2 falls	4 falls
φ 5	6×W (19)	(φ 4.7)	11		1 t
φ 8	6×37 (29)	(φ 7.5)	17	1 t	2 t
φ 9	6×37 (29)	(φ 8.4)	17		2.8 t (3 t)
φ10	6×37 (29)	(φ 9.4)	17	2 t	
φ12.5	6×37 (29)	(φ11.7)	17	2.8 t (3 t)	

○When inspecting wire, take out all wire from drum and stretch them and inspect all the length. The place of wire where is apt to be damaged is approx. 1 meter above from the place where stopping equalizer, equalizer part and wedge part at approx. 1 meter from the floor surface.



(2) Rope end inspection and use limit

○Do not use absolutely and replace in case the rope end condition is applicable to any one of the following (a) - (c).



(a) Sink of core wire is observed and/or all the soldered part is sunk.

(b) Core wire of rope end (base part) are cut.

○Replace wire rope in case even one piece of core wire cut-off is observed at wire rope base part.

(c) Remarkable corrosion is generated at the base part of rope end.

9-3 Wire rope replacement method

⚠ DANGER

- **Do not process rope ends by yourself.**

- **When fixing wire rope at wedge part, pay attention to fixing method and fix correctly.**
- **Stretch wire rope and replace it.**

○Wire rope to be used for replacement Use wire rope of our genuine parts without fail.

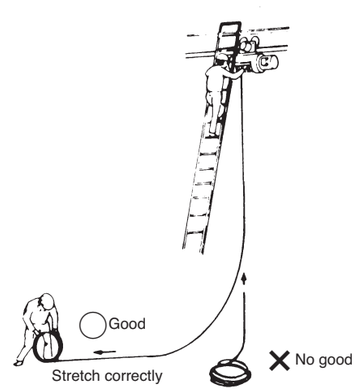
※As to genuine part No. of wire rope.

※Do not process rope end by yourself.

○Wire rope replacement

Wire rope replacement is to be done with wire stretched.

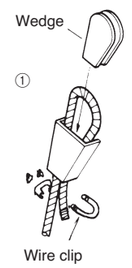
Note：Fixing of twisted wire would cause danger on operation and so never do it.

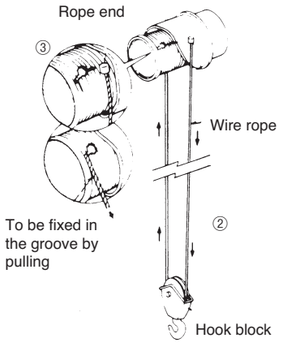


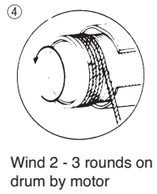
○Wire rope replacement work

【Standard type hoist (In case of 2 fall wire rope)】

Order ①-④

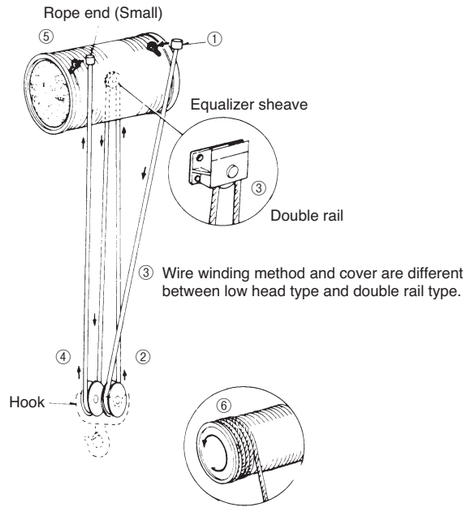


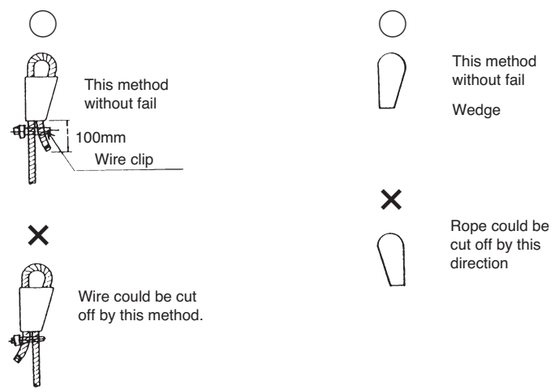




【Low head type hoist (4 fall wire rope)】

Order ①-⑥





Note：1） When fixing wire rope at rope end, fix it as per Fig. left. If fixing it as per Fig. right, rope could be cut off.

2） Insert a wedge to the direction shown in Fig. If inserting to the opposite direction, rope could be cut off.

3） Fix a wire clip to the direction shown in Fig. correctly in order to increase safety.

○ Confirmation of operation

After fixing wire rope, wind it up gradually by motor.

Before operation, make a test operation and confirm if it perform correct functions.

10. Inspection method of each part of hoist

⚠ DANGER

- **If any abnormal is found, make necessary treatments such as adjustment, replacement, etc.**
  ※Operation with any abnormal would cause an accident and very dangerous,and so never do it.

Inspection method of each part of hoist is shown below.

10-1 Inspection of pushbutton switch

○ Does pushbutton switch operate correctly ?

○ Is there any damage and/or crack on case, cover, etc. ?

○ Is there any screw looseness and/or abnormality on lead wire through checking by removing cover ?

○ Is there any foreign substance inside and/or is the contact worn out abnormally ?

10-2 Inspection of magnetic contactor

Remove control panel cover and inspect magnetic contactor.

○ When turning on power supply and operating by pressing pushbuttons, is movement of each part sure ?

○ Cut off power supply and confirm the following points.

（1） How is wear-out condition of contacts ?

（2） Is there any looseness on fastening nuts and/or wiring ?

（3） Is interlock (mechanical and electrical) normal ?

※Confirm if the both moveable insulation base does not work simultaneously when pressing by finger one removable insulation base (a projection of center part of magnetic contactor) and also pressing another removable insulation base.

（4） Is the interlock restored completely when pressing a projection of center part completely and then release it ?

○ Caution for replacing magnetic contactor

［Note］ When replacing magnetic contactor, use the same type in combination.

10-3 Inspection of overwinding limit switch

○ Does the overwinding prevention limit switch move up and down smoothly and is there any deformation on it ?

○ What is the contact wear-out and color change condition ?

○ Does the overwinding limit switch work when pushing up the overwinding prevention limit lever ?

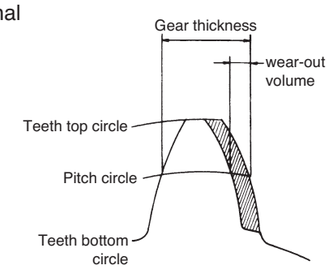
10-4 Inspection of brake of hoist and electric trolleying device

○ Is wear-out volume of lining under the limit value ?
○ Is there any wear-out on mechanical parts ?
○ Is a slipping of brake under the limit value ?

As to maintenance/adjustment, refer to Article 8.

10-5 Inspection of gears

○ Wear-out limit of gear is less than 10% of the original gear thickness on a pitch circle. (but, in case of 1st step, less than 5%)
※ Wear-out limit of gears to be used for trolley system must be 20% (40% in case of exposed gear) [refer to the Attached Fig. 1]



10-6 Inspection of bearing

○ In case bearing does not rotate smoothly (bearing is lying about when rotating by hand), it shows use limit.
Especially, ball bearing of motor part is apt to be of high temperature according to operation frequency and so need to be inspected and replaced a little bit earlier.
※ Replace parts of use limit with our genuine parts.

10-7 Inspection of sheave

○ Sheave wear-out limit is less than 25% of wire rope diameter on sheave diameter (Cast iron)
※ As the sheave wear-out depends on shape of surface, confirm surface wear-out condition.
○ Is there any grease shortage on circumferential moving part ?

10-8 Inspection of casing

○ Is there any crack ?
○ Is there any deformation ?

10-9 Lubrication

○ Is suitable amount of oil lubricated ?
Refer to［Lubrication］(Article 5-3).

10-10 Inspection of trolley

○ Is the running plate fastening bolt not loosened ?
○ What is wear-out condition of trolley wheel (refer to the Attached Fig. 2) and side roller ?

10-11 Inspection of cable

○ Is there any damaged or aged core wire or looseness and abnormal on terminals ?

10-12 Inspection of stopper

○ Is there any looseness on the stopper fastening screw on I beam end and what is wear-out condition ?

10-13 Inspection of sling equipment

○ Proceed the following inspections of sling equipment.
① Wire cut, kink, wear-out, damage and rust of wire rope
② Pitch elongation, ring cross section decrease and crack of sling chain
③ Deformation, wear-out and crack of shackle

10-14 Total operation inspection

After the above inspections, erect the unit and confirm the following points.
① Confirmation of hoist operation. Does hoist work correctly by pushing pushbutton switch ?
② Confirmation of overwinding prevention limit lever. Dose hoist stop when pushing up overwinding prevention limit lever by hand under winding up operation ?
Overwinding limit switch of hoist is of 2 step type.
Confirm if winding up stops by 1st step and lowering stops by 2nd step.
③ Confirmation of winding up allowance
Is there an allowance to wind up hook block more than another 50 cm when hook block pushes up overwinding limit lever and stops winding up under winding up operation status ?

11. Reasons of general break-down and their counter-measures

It is rather difficult to describe about break-down in general.
Refer to the quick reference table for break-down and counter-measures regarding general examples.
In case any break-down not listed below, contact us or authorized service shops.

Quick reference table on Saddle break-down and counter-measures

Abnormality or Break-down	Main reason	Counter-measure	Remarks
Motor does not work	No power-on of main power switch	Confirm main power switch and power on	
	Phase shortage	Connect R.S.T. of power supply surely	
	Reverse phase connection of power supply	Replace 2 wire (R.T) of power supply	
	Transformer break-down, Poor connection of pushbutton switch, magnetic contactor or limit switch, inside wiring cut-off	Confirm power supply Repair cut-off part Replace damaged part	
	No brake release	Connect brake unit surely	
	Wrong voltage	Correct voltage as name plate	
	Voltage down	Secure the rated voltage Use correct power cable	In case power capacity is small, the starting volt could go down.
Different move-ment from Pushbutton instruction	Reverse phase power connection	Replace 2 wires (R.T) of power supply	
	Wrong wiring of Push-button switch and/or magnetic switch	Connect correctly according to wiring diagram	
	Reverse winding due to too much lowering	Winding up and wind correctly	

Abnormality or Break-down	Main reason	Counter-measure	Remarks
Over winding due to Upper limit switch does not work.	Reverse phase rotation of Power supply	Replace 2 wires (R/T) out of 3 wires of Power supply	
	Reverse winding due to too much lowering	Winding up and wind correctly	
	Break-down of Over-winding limit switch	Replace part	
Motor generates abnormal sound and load does not goes up.	No magnet brake release	Confirm conductivity and replace damaged parts	
	No brake release due to magnet coil damage or wire cut	Replace parts or repair at wire cut part	
	Voltage down	Increase voltage to the rated voltage	
	Contactor wear-out of magnet contactor	Replace contactor	
No lift up of the rated load	Voltage drop down	Increase voltage to the rated voltage Use suitable power supply cable size	
	Motor break down	Contact the authorized service shop	
	Gear wear-out	Replace gear	
No winding down	Poor contact of push-button switch, Magnet contactor or limit switch and/or Inside wiring looseness	Confirm conductivity and replace damaged parts Make connection sure	
Low speed	Overload	Reduce the load less than rated load	
	Low voltage	Secure the rated voltage	
Abnormal motor overheat	Overload	Reduce the load less than rated load	
	Voltage drop	Secure the rated voltage	
	Extremely high environmental temperature	Protect heat radiation and keep environmental temp less than 40°C	

Abnormality or Break-down	Main reason	Counter-measure	Remarks
Extremely high gear sound	Poor lubrication	Lubricating or oil replacement	
	Overload operation	Keep the rated load	
	Gear wear-out	Replace gear	
	Bearing breakage	Replace bearing	
Electric shock with hoist	Imperfect grounding	Ground surely Ground travel rail Do not paint on contact surface of travel rail with trolley wheels	
	Poor insulation on electric parts such as pushbutton switch	Repair and replace abnormal points	In case of poor grounding, electric shock would be received due to static electric even if unit body insulation is good
Oil leakage	Oil seal fault	Replace oil seal	
	Gear case breakage	Contact authorized service shop	
	Excess oil volume	Decrease oil to the rated volume	
Trolley wheel slipping	Paint or oil adhesion on I beam	Wipe up paint or oil	
	Fault on I beam bend	Rectify I beam	
	Slant of I beam	Rectify I beam	
	Fault on balance	Contact authorized service shop	
	Load swing	Improve operating method	
Fault on wire rope winding	Slant of I beam	Rectify I beam	
	Erection fault	Erect correctly	
	Side pull operation	Avoid it absolutely	

Abnormality or Break-down	Main reason	Counter-measure	Remarks
Abnormal wear-out of wire rope	Slant of I beam	Rectify I beam	
	Side pull operation	Avoid it absolutely	
	Deformation of rope drum groove	Replace rope drum	
	Deformation of sheave groove	Replace sheave	

12. Periodical independent inspection and after-service

We execute this periodical independent inspection on their account according to their request of our customers. In case of making a periodical independent inspection contract, you can have the following merits and so we would like you to do so.

（1）It ineffective same as having skilled maintenance person by yourselves and man-power saving.
（2）You can avoid dangerous high place works.
（3）You can maintain safe and steady daily operation by preventing a sudden accident. (But, a daily check have to be done by you.)
（4）Hoist longer life.
（5）Advantageous compared with an individual contract case by case.

We would like to recommend you to make this contract for stepping up the safety.
As to the details, contact us or our authorized service shop.

12-1 Repair based on result of Independent inspection/ check procedures

⚠ DANGER

- **In case any abnormality is found through independent inspection and check, repair immediately and use it again.**
  ※Do not use with abnormality, since it causes to an accident and very dangerous.

The company is under obligation to repair immediately whenever any abnormality is found.

12-2 After-service

In case some spare parts and/or repair are to be necessary, contact us or our authorized service shop according to the following method.

- In case of purchasing spare parts
  Advise the model No./Production serial No. and part No., name based on part list and quantity.

- In case of contacting us about repair
  Advise us the model No. and Production serial No. mentioned on Specification plate (attached with the hoist itself) or Caution plate (attached with Push button switch).

13. Warrantee

Immediate repair and/or part replacement shall be provided for breakage/poor condition to be clearly considered as our responsibility and to be generated within one year after our delivery.

Consumable parts and their replacement shall be out of our warrantee.

However, the following cases shall not be warranted.

（1） In case of operating with ED rate exceeding the limit and very high frequency.

（2） In case of operating with the load more than the rated one.

（3） In case of modifying the products and/or accessories without our approval.

（4） In case of operating under very severe conditions exceeding the conditions of their specifications.

（5） In case of operating, neglecting Caution/Danger items mentioned in this operation manual.

Any damage for production down to be caused by hoist damage shall not be warranted.

We will not supply any parts that become inoperative because of improper maintenance, eccentric loading, overloading, chemical or abrasive action, excessive heat, or other abuse.

Equipment and accessories not of our manufacture are warranted only to the extent that they are warranted by the manufacturer, and only if the claimed defect arose during normal use, applications and service.

EXCEPT AS STATED HEREIN, WE MAKE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

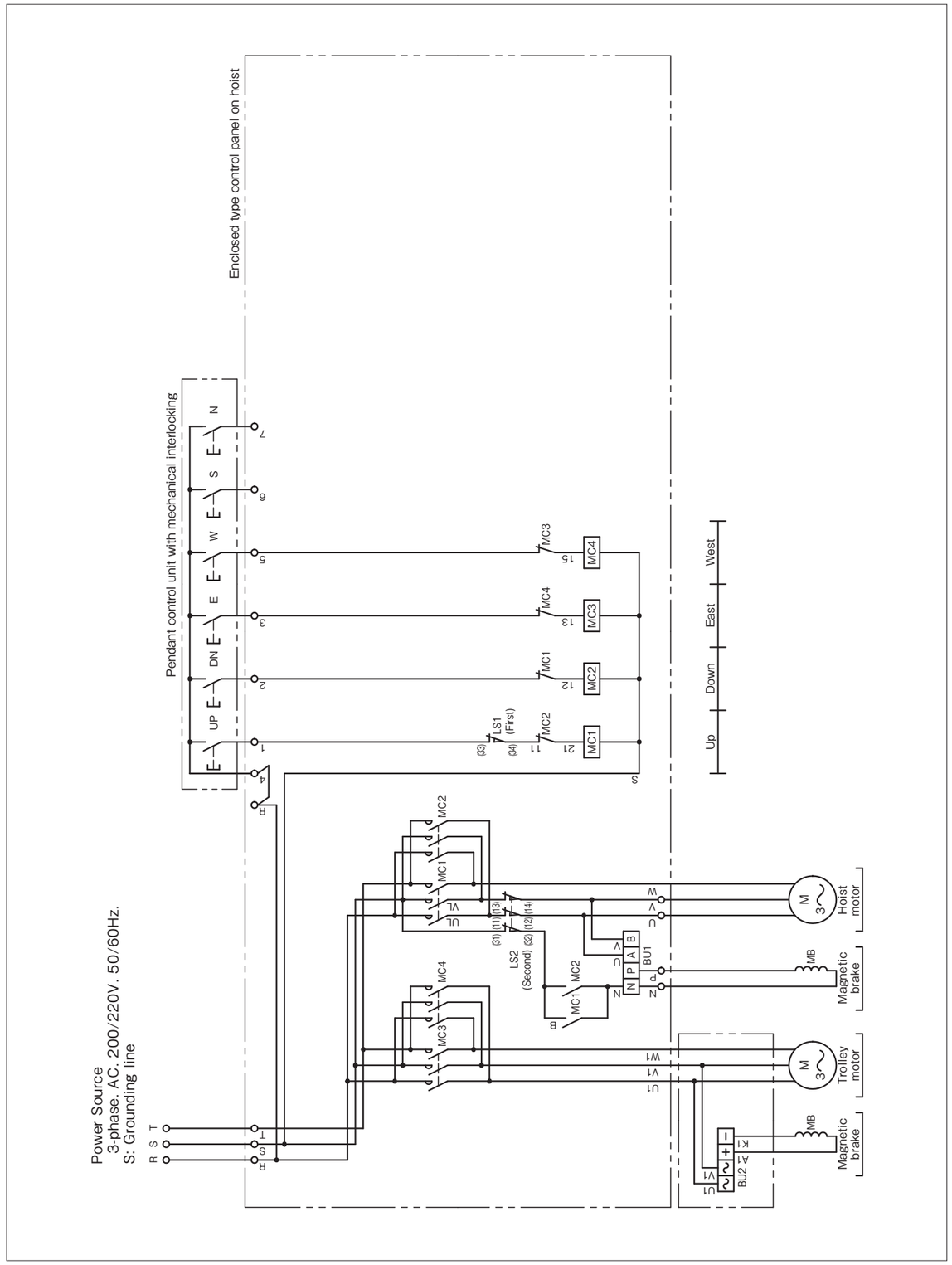
“Normal use, applications and service” : Those conditions during which a electric hoist, other products, equipment or accessories is (are) being operated and is (are) performing functions within the scope of the original design.

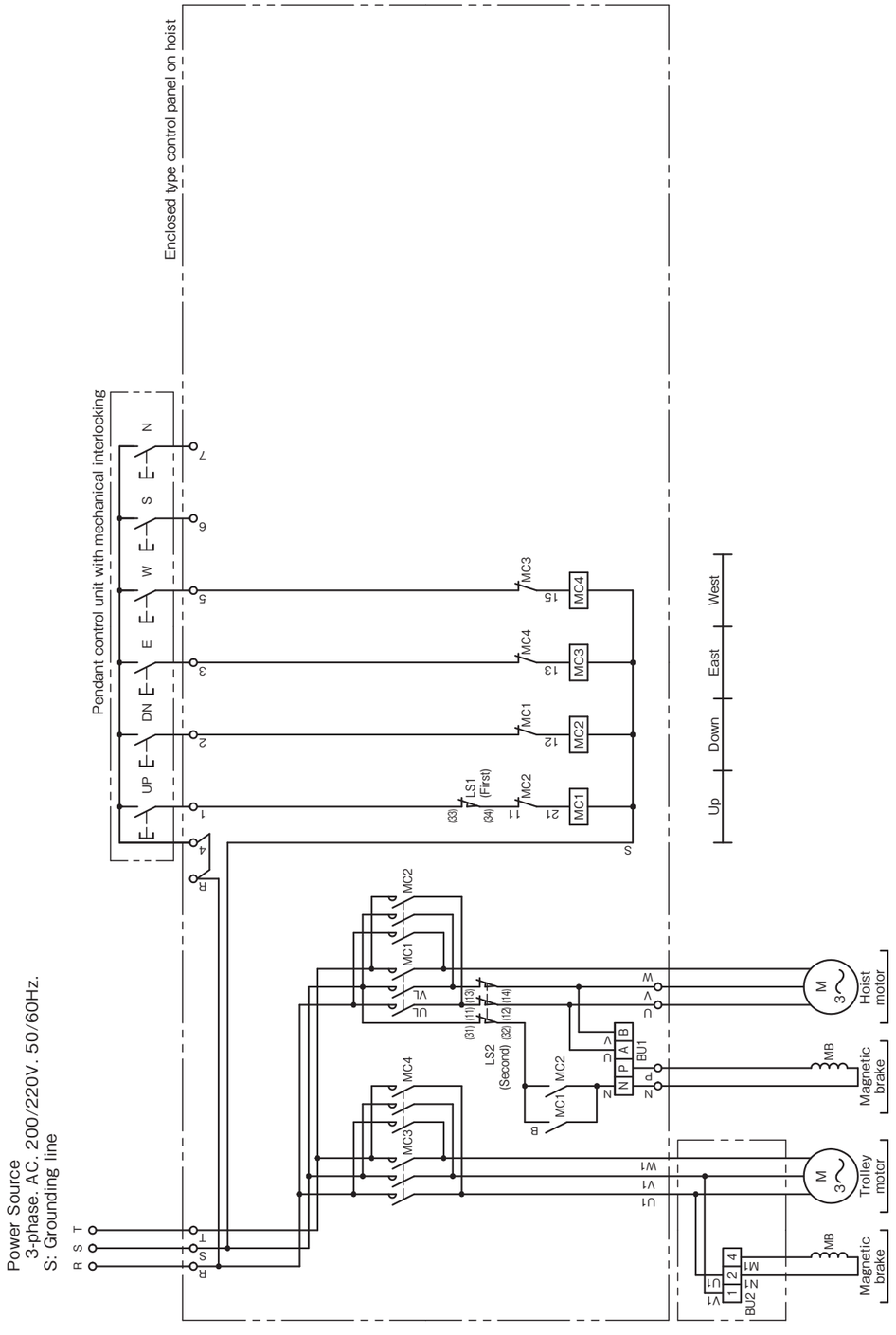
⚠ CAUTION

- **Do not use our electric hoist or other products in an explosive atmosphere or corrosive environment.**
- **Do not use our electric hoist or products for passenger elevator application.**

Our products are exempted from the scope of guarantee if exported to other nations regulated by the PL law than Japan.

Wiring diagram (A type)





ATTACHED TABLE

ATTACHED TABLE 1 Hoist crane monthly independent inspection items and record

Hoist No. Rated load Hoist model Hoist serial No.

Inspection item				Class	Good/ NG	NG content/ Counter-measure	Repair date
Operation	Pushbutton switch	1	Outside appearance/Abnormality/Operation	A			
		2	Cable go-through part abnormality	A			
		3	Interlock of each operation button	A			
		4	Contact damage and wear-out	C			
		5	Wiring/Grounding fastening screw looseness	B			
		6	Damage on switch box and insulated material	B			
	Magnetic contactor	7	Contact damage and wear-out condition	C			
		8	Wiring fastening screw looseness	C			
		9	Confirmation of operation	A			
	Upper limit switch	10	Limit lever operating condition	A			
		11	Contact condition	C			
		12	Wiring fastening screw looseness	C			
		13	Limit switch operating position adjustment	A			
Brake	Magnetic brake	14	Is the gap not exceed the limit ?	A			
		15	Lining wear-out condition	C			
		16	Mechanical part wear-out condition	B			
		17	Screw looseness	A			
Wire rope	Wire rope	18	Core wire cut-off	A			
		19	Wear-out condition	A			
		20	Kink	A			
		21	Remarkable deformation or corrosion	A			
		22	Abnormality on rope ends	A			
		23	Abnormality on the part contacted with the equalizer sheave	B			
		24	Oil on wire rope	C			
Hook block and wire wheel	Hook block	25	Thrust bearing rotating condition	A			
		26	Hook nut condition	A			
		27	Sheave damage	A			
		28	Sheave groove wear-out condition	B			
		29	Bearing wear-out condition and rotating condition	B			
		30	Breakage and/or looseness on hook cover, nuts, stop screws, etc.	A			
	Hook	31	Wear-out condition	A			
		32	Crack	A			
		33	Mouth opening, deformation, stopper	A			

Inspection item				Class	Good/ NG	NG content/ Counter-measure	Repair date
Hook block and wire wheel	Wire wheel	34	Rotating condition		B		
		35	Damage		B		
		36	Fixing part condition		B		
Drum case	Drum case	37	Crack		C		
Lubrication	Hoist lubrication	38	Gear lubrication condition		B		
		39	Gear case lubrication condition		C		
Power supply	Machine inside wiring	40	Damage and fixing condition		C		
		41	Fixing part looseness of control panel on girder		C		
	Cable	42	Outer damage		B		
		43	Abnormal bend and repeated torsion on flexible part		B		
		44	Slackening on cable messenger wire		B		
		45	Cable sling dislocation		B		
		46	Looseness on cable go-through part		B		
	Current corrector	47	Looseness on cable connecting part		C		
		48	Current corrector rotation condition		C		
		49	Current corrector wear-out condition		C		
		50	Current corrector fixing condition		C		
		51	Spring deformation and corrosion		C		
	Insulated trolley wire	52	Slackening, rust and dirt on insulated trolley wire		B		
		53	Insulated trolley wire supporting insulator condition		B		
No load operation	Winding up/down	54	Correct operation, no abnormal sound		A		
	Overwinding limit switch	55	Correct operation at upper limit		A		
	Brake	56	Operating normally		A		
	Trolley	57	Correct operation, abnormal sound, abnormal vibration		A		
Display		58	Confirm display of the rated load		A		
		59	Danger/Caution display name plate or label clear		A		
Confirm effective period of Inspection certificate					A		
Remark							

A: One time/every month
B: One time/every three months
C: One time/every six months

ATTACHED TABLE 2 Hoist crane annual independent inspection item and record

Hoist No. Rated load Hoist model Hoist serial No.

Inspection item				Maintenance inspection standards	Good/ NG	NG content/ Counter-measure	Repair date	Remark
Crane/ Hoist	Gear	1	Winding-up gear thickness wear-out	Pitch circle original thickness 1st step gear less than 5% Others less than 10%				
		2	Trolley gear thickness wear-out	Pitch circle original thickness 1st step gear less than 10% Others less than 20% (Exposed gear less than 40%)				
		3	Gearing condition	No one-side touch and proper gearing depth				
	Shaft, bearing and oil seal	4	Gear shaft wear-out	Less than 1% of original diameter				
		5	Other shaft wear-out	Less than 2% of original diameter				
		6	Gap between shaft and bearing	Original diameter Gear shaft less than 2% Motor pinion less than 1% Drum shaft less than 1% Others less than 4%				
		7	Roller bearing wear-out	No damage and no harmful scratch				
		8	Oil seal wear-out	No harmful scratch on lip and/or contacted shaft surface				
	Brake	9	Lining wear-out	Original thickness Dry type less than 50% Wet type less than 20%				
		10	Brake disc wear-out/deformation	No crack and abnormal deformation				
		11	Brake mechanical part wear-out	No hindrance on brake operation				
	Trolley wheel	12	Running face wear-out	Less than 5% of original diameter of running face				
		13	Circularity of running face	Less than 0.8mm of running face diameter				
		14	Dia. difference of left/right wheel	Less than 1% of running face dia.				
		15	Flange thickness wear-out	Less than 50% of the original thickness But, in case of monorail type, the max. gap between flange and rail width shall be less than 50% of wheel running face dia.				
	Hook	16	Wear-out of the place where the sling is touched with.	Less than 5% of the original dimension				
		17	Hook mouse opening, Stopper	No deformation				
		18	Hook outside damage	No crack on hook surface				
		19	Abnormality on hook screw	No crack and wear-out				
	Sheave & Wire wheel	20	Groove bottom wear-out	Wire rope dia at the groove bottom Cast iron, Cast steel: Less than 25% Steel plate: Less than 15%				

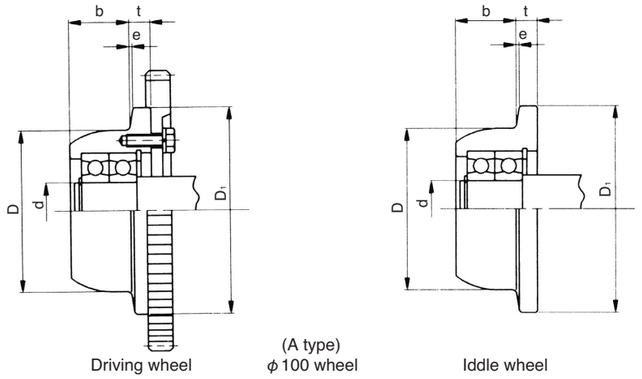
Inspection item				Maintenance inspection standards	Good/ NG	NG content/ Counter-measure	Repair date	Remark
Crane/ Hoist	Wire rope	21	Deformation, corrosion	No remarkable deformation/corrosion				
		22	Abnormal rope ends	Pay attention especially to wire cut and corrosion				
		23	Wire rope length	Rated length				
	Load chain	24	Corrosion	No remarkable corrosion				
		25	Chain ends condition	No abnormality on chain ends metal				
	Shaft fitting	26	Key, Key groove & Spline conditions	No deformation, looseness & abnormal wear-out				
	Other mechanical parts	27	Damage existence	No harmful damage				
Electric parts	Switches	28	Contact wear-out	Less than 50% of the original thickness (In case of silver alloy, less than 0.5mm)				
		29	Mechanical part wear-out	No hindrance on operation				
	Current collector wheel	30	Current collector wheel contact surface wear-out	Less than 20% of original diameter of wheel				
		31	Gap between wheel hole and shaft	Less than 20% of original diameter Correct level				
	Cable	32	Cabtyre cable	No abnormality such as Outside damage, age, cut-off, etc.				
		33	Lead wire	- same as above -				
		34	Cable support metal	Moving freely				
	Power supply line	35	Confirm cable of trolley	Confirm one end of operation coil of magnet switch is connected with cable at grounding side				
		36	Control panel condition cable grounding side	No damage				
		37	Control panel inside condition	No looseness on connection and damage				
	Insulation	38	All circuit insulation resistance value	200V More than 0.2MΩ 400V More than 0.4MΩ				
	Grounding	39	Grounding of runway rail	Good condition of grounding				
Erection	Erection	40	Lubrication	Lubricate a suitable quantity of the specified oil				
		41	Erection	Erect according to the specified instruction				
Trial operation	No load operation	42	Check before trial operation	No obstacle				
		43	No load operation	Moving according to Pushbutton switch display No abnormal sound				
		44	Overwinding limit switch	Stops surely at the upper limit				
	Rated load test	45	Measure deflection and restoration of crane girder by lifting the rated load at the center of crane span.	Deflection value : Less than 1/800 of span Complete restoration				
		46	Winding up/down	No abnormal sound and vibration				
		47	Magnet brake	Hook slip less than 1% after releasing pushbutton switch during winding up				

Inspection item				Maintenance inspection standards	Good/ NG	NG content/ Counter-measure	Repair date	Remark
Trial operation	Rated load test	48	Trolley of hoist Mechanical brake	No abnormal sound and vibration				
	Mechanical brake	49	No acceleration function	Load is going down under the no acceleration condition				

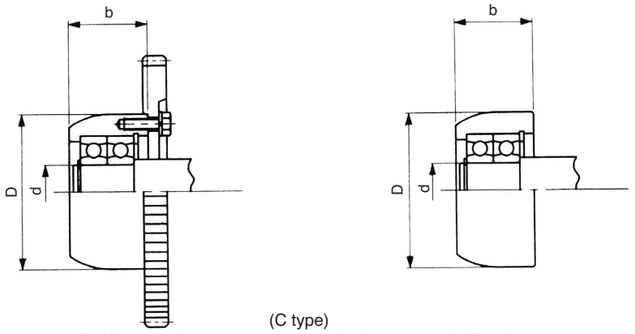
ATTACHED FIGURE

ATTACHED FIGURE 1

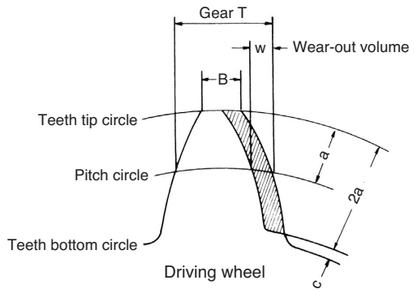
(1t, 2t, 2.8t, 3t · Normal type, Low head type trolley wheel)



Driving wheel (A type) ϕ100 wheel Iddle wheel



Driving wheel (C type) ϕ80, ϕ100 wheel Iddle wheel



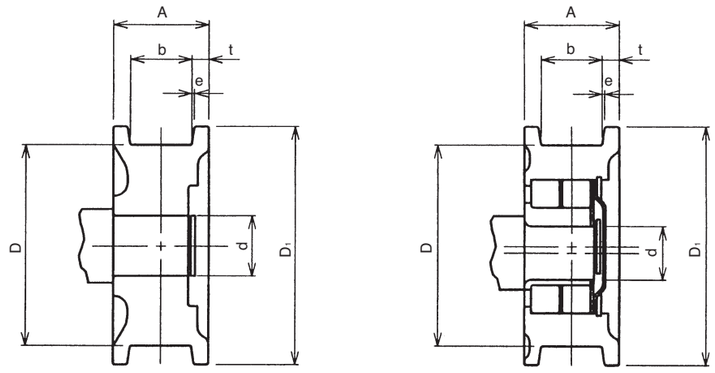
Driving wheel

Our company wheel use limit table (Unit : mm)

			b	e	D		t		D_1 (ϕ)	d (ϕ)	Teeth thickness T		Applicable model
					Original dia	Allowable dia	Original thickness	Allowable thickness			Original thickness	Allowable thickness	
A type	ϕ100		37	2	ϕ100	ϕ95	13	9	128	ϕ35	3.1	1.9	1t·2t·2.8t·3t
C type	ϕ100		38	—	ϕ 80	ϕ76	—	—	—	ϕ25	4.7	2.9	1t
	ϕ 80		50	—	ϕ100	ϕ95	—	—	—	ϕ35	4.7	2.9	2t·2.8t·3t

ATTACHED FIGURE 2

(2.8t, 3t Double rail type trolley wheel)



Driving wheel ϕ150 wheel Iddle wheel

Our company wheel use limit table (Unit : mm)

			A	b	e	D		t		D_1 (ϕ)	d (ϕ)	Remarks
						Original dia	Allowable dia	Original thickness	Allowable thickness			
C type	ϕ150	Drive wheel	70	45	2	ϕ150	ϕ143	12.5	10	ϕ178	ϕ45	2.8t · 3t
		Iddle wheel									ϕ35	

※A type is not supplying

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