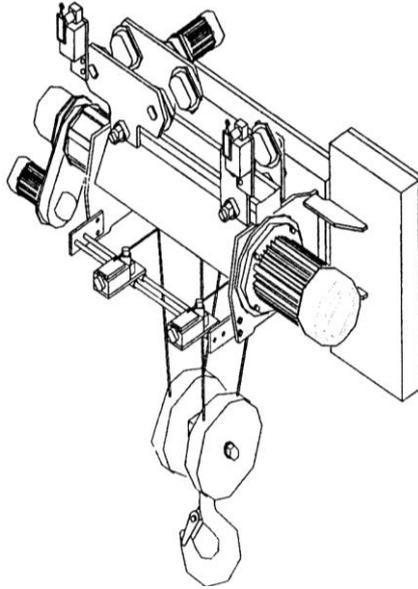


Electric Wire Rope Hoist

- Operating & Maintenance Manual -



Thank you very much for purchasing Hyundai Hoist.

- ◆ Observe all instructions and warnings for inspecting, maintaining and operating this hoist.
- ◆ The use of hoist presents unexpected risk of personal injury or property damage. The risk is greatly increased if proper instructions and warnings are not observed. Before using this hoist, every operator should become thoroughly familiar with warnings, instructions, and recommendations in this manual.
- ◆ Retain this manual for future reference and use.
- ◆ Hand over this manual to the hoist operator.
- ◆ Failure to operate the device as instructed in the manual may cause injury and property damage.

Please fill-up for future reference <i>(When ordering parts, please use hoist serial number)</i>	Model	
	Rated Load	
	Serial No.	



HYUNDAI HOIST CO., LTD.

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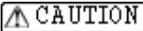
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SAFETY PRECAUTIONS

- This hoist is designed for safe operation within the limits of its rated capacity under proper inspection, operation and maintenance in accordance to all instructions and warnings in this manual.
- Be thoroughly familiar with proper operation of hoist to protect personnel and property from potential hazard.
- Do not perform installation, operation, maintenance and inspection of hoist unless fully understood this manual.
- Please use hoist when you are familiar with hoist, safety information and warning.
- In this manual, the warnings are classified into two categories of <Danger> and <Caution>.

 **DANGER** Improper operation of a hoist can create potential hazard, and could result in death or serious injury.

 **CAUTION** Improper operation of a hoist can create potential hazard, and could result in serious injury or property damage. Also, it might cause potentially hazardous situation such as death.

Symbol

-  These symbols point out warning of "Danger" and "Caution". Among symbols,  symbols represents prohibited action. The prohibited action is indicated close to the symbol.
 -  These symbols point out "Mandatory instruction". The instruction is indicated close to the symbol.
- ※ Retain this manual for future reference and use after reading thoroughly.

1. General

 DANGER	
• Do not operate a hoist until you have thoroughly read and understood this manual and warning.	
• Carry out daily inspection prior to operate a hoist.	

2. Installation

 DANGER	
<ul style="list-style-type: none">• Do not install or repair the hoist unless qualified to perform such activity.• Do not install a hoist where there are rain or water and non-designated location.	
<ul style="list-style-type: none">• Failure to proper ground/earth the hoist presents the danger of electric shock.• Install an electric leakage circuit breaker in the electric power supply line.	
<ul style="list-style-type: none">• Install stopper at the end of traversing and/or traveling rail.• Make sure all the supporting structures are strong enough to hold your intended load in the site.	

3. Operation & Control

 DANGER	
<ul style="list-style-type: none">• Do not lift more than rated load for the hoist.<ul style="list-style-type: none">※ Rated load is indicated on the hoist nameplate in main body.• Do not use the hoist to lift, support, or transport people.<ul style="list-style-type: none">※ Do not use a hoist as an elevator for people.• Do not enter under the suspended load. Do not leave the load suspended in the air unattended.• Do not move a load over heads of personnel.• Do not move a load, if there are personnel within its moving range.• Do not make unnecessary talk with others while in hoist control.• Do not use limit devices as routine operating stops. Those are emergency devices only.• Do not pull tied object or load on building or other structure.• Do not attempt to 'turn-over' load without proper turn-over device.<ul style="list-style-type: none">※ Please use 'turn-over' device in turn-over operation of the load.• Avoid side pull or end pull at all times.<ul style="list-style-type: none">※ Operate a hoist, if load is centered under the hoist.• Check push button function prior to a hoist operation.• Check brake function prior to a hoist operation.• Make sure hook moves to the same direction as shown on the push button. If not, stop immediately.	

 CAUTION

- Do not operate a hoist, if there is abnormal symptom such as noise, vibration, etc.
- Do not operate a hoist with twisted, kinked, worn or damaged wire rope.
- Do not weld suspended load in the air.
- Do not allow the wire rope or hook to be used as an electrical or welding earth/ground.
- Do not allow the wire rope or hook to be in contact with a live welding electrode.



 DANGER

- Do not operate a hoist unless it is with adequate electrical power supply.
- Do not operate a hoist with damaged hook latch or not closed or supporting any part of load.
- Do not make sudden reversal of load or jogging controls or inching work.
- Do not pull object or load, which is fixed onto building or other structure.
- Do not tie or pull any object with push button.
- Do not bump a hoist onto stopper or structure.
- Do not allow any part of the hoist, including wire rope to be subjected to sharp contact with any other objects or structures.
- Do not remove warning or caution sign and label attached to the hoist, and follow them correctly.
- Do not operate a hoist beyond its rated duty service class such as limit in number of starts and operation time.



- Be sure the hook is free to rotate.
- Be sure that load slings or other approved attachments are properly sized and seated in the hook saddle before operation.
- Do not place hook above personnel in all the times.
- Be sure that push button is clean without dust or sand.
- If load is lifted by two hoists, both of two hoists shall be inter-locked with one push button.
- Be clear enough to lift load without any obstructions.



4. Maintenance, Inspection & Modification

 DANGER	
<ul style="list-style-type: none">• Do not modify any part of this hoist unless you are qualified and authorized to do so.• Replacement parts must be obtained from Hyundai Hoist Co., Ltd.• Do not weld wire rope in all the times.	
<ul style="list-style-type: none">• Disconnect the power prior to start maintenance, repair, inspection and adjustment.• Maintenance, inspection, repair and adjustment should be accomplished only by qualified personnel.• Be sure that no load in hook prior to start maintenance, inspection, repair and adjustment.• Any unsafe condition should be corrected before operation of the hoist is resumed.	

 CAUTION	
<ul style="list-style-type: none">• Warning signs of "Out of order" or "On inspection" or "Do not power on" should be placed on the hoist. These signs should be placed and removed only by designated personnel.	

Special Caution

Hoist disassembly & assembly procedures are described on this manual from page 24 to 26.

Symbol

-  This symbol represents "Danger" (Danger)
-  This symbol represents "Caution" (Caution)
-  This symbol represents "Electric shock" (Danger)
-  This symbol represents "Prohibited action" (Prohibition)
-  This symbol represents "Mandatory instruction" (Mandatory)
-  This symbol represents "Ground/earth properly" (Mandatory)

1. UNPACKING AND INSTALLATION

Unpacking

After unpacking, carefully inspect as follows;

- 1) Check the hoist, if it is the same as purchase order. Retain serial number and fill-up other information in the cover of this manual for correspondence and service parts orders.
- 2) Check the hoist frame, hook, wire rope, push button and accessories for damage that may have occurred during shipment as well as loosen bolt or screw. If there is damage, please report to your local supplier.
- 3) Check the power supply to which the hoist is to be connected is the same as that shown on the hoist name plate.

1-2.  Caution for Installation site

Use the hoist properly after checking site conditions.

Do not use or install hoist under below condition which may result in dangerous situation.

- Below -10°C or over 40°C

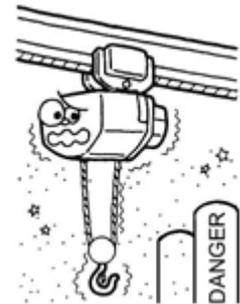
or RH 90%.

- Excessive acid or salt in the atmosphere.



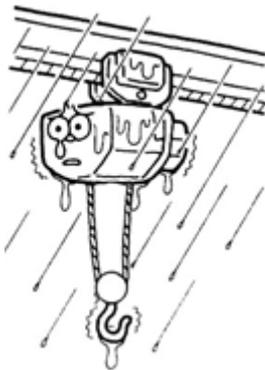
※ Causes excessive worn out.

- Hazardous area with flammable materials or vapors.



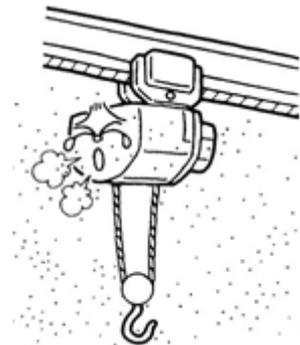
※ Electrical devices produces arcs or spark that can cause a fire or explosion.

- Our-door, exposed to wind, rain and snow.



※ Causes excessive rust and electric leakage.

- Excessive dust.



※ May cause malfunction.

1-3. Supplement

- If the hoist is exposed to high temperature radiation like steel mill, consideration shall be made for deformation of accessories such as push button and electric wire.

 If metallic push button frame is being used, it should be grounded to avoid electric shock.

- If hoist is exposed to rain, snow and wind, proper shelter should be provided to prevent rust and electric leakage.
- Contact us, if the hoist is intended to use in acid, salt, high humidity, dust and hazardous area.
- In extreme environmental condition, chance of hoist malfunction or damage is increased, and frequent inspections and services are recommended.
 - ※ Deterioration of strength and cable are concerned in cold environment, and overheating of motor and deterioration of insulation are concerned in hot environment.

1-4. **CAUTION** Operating Time

The life of product is depending on capacity and running hours. If a hoist is operated for a long time, use it within the shaded section in the below table. Please consult with us in the following cases.

- Exceeding operating hours, beyond shaded section in the below table.
 - ※ Conduct frequent inspection and maintenance.
- Heavily exceeding operating hours, beyond shaded section in the below table.
 - ※ Use the next larger capacity hoist than intended load capacity.
- Heavily used hoist in a short time.
 - ※ May cause overheating of motor and oil as well as brake slip.

Average operating hours per day		~ 0.25	0.25 ~ 0.5	0.5 ~ 1	1 ~ 2	2 ~ 4	4 ~ 8	8 ~ 16	16
Total operating hours		~ 400	400 ~ 800	800 ~ 1600	1600 ~ 3200	3200 ~ 6300	6300 ~ 12500	12500 ~ 25000	~ 25000
Light	Normally 1/3 of rated load & rarely rated load.	-	M1	M2	M3	M4	M5	M6	M7
Medium	Normally 1/3~2/3 of rated load & occasionally rated load.	M1	M2	M3	M4	M5	M6	M7	M8
Heavy	Normally 2/3 of rated load & frequently rated load.	M2	M3	M4	M5	M6	M7	M8	-
Severe	Normally at or near rated load.	M3	M4	M5	M6	M7	M8	-	-

Duty Factor and Starting Frequency

$$\text{*Duty Factor} = \frac{\text{running hours}}{\text{running hours} + \text{stopping hours}} \times 100\%$$

*Starting Frequency : Number of starts per hour.

Classification (ISO)	M1	M2	M3	M4	M5	M6	M7
Short-time rating (minutes)	7.5	7.5	15	15	30	30	60
Starting Frequency (times/hour)	90	120	150	180	240	300	360

Rating

The motor in the hoist is rated for 30 minutes (short-time rating).

* 15 minutes for low or creep speed in pole-change motor.

2. INSTALLATION

■ Ask qualified personnel for hoist installation.

⚠ DANGER ⚠ Do not install a hoist without sound knowledge.

※ Danger for electric shock or hoist falling down exist.

⚠ DANGER ⚠ The installation point must have sufficient strength to withstand several times the load imposed. In doubt, consult a qualified engineer and relevant regulation.

2-1. Traversing Beam

1) Selection of I-Beam

I-Beam is recommended for HN, HM, HL and HR series hoists and refer to below table for suitable I-Beam.

※ Span represents that the length between the supports of a Beam.

<Maximum Permissible Span for Traversing Rail>

Capacity I-Beam size	Permissible maximum span (m) with rated load (ton)									Remarks
	1/2	1	2	3	5	7.5	10	15	20	
200 X 100 X 7	5.8	4.1	2.9	2.3						
250 X 125 X 7.5	8.9	6.3	4.4	3.6	2.8					
250 X 125 X 10	10.6	7.5	5.3	4.3	3.3					
300 X 150 X 8	12.1	8.5	6	4.9	3.8					
300 X 150 X 10	14	9.9	7	5.7	4.4					
300 X 150 X 11.5	15	10.6	7.5	6.1	4.7	4	3.5			
350 X 150 X 9	15.3	10.8	7.6	6.2	4.8					
350 X 150 X 12	18.6	13.2	9.3	7.6	5.9					
400 X 150 X 10	19.2	13.6	9.6	7.8	6.1					
400 X 150 X 12.5	22.1	15.6	11	9	7					
450 X 175 X 11					7.7	7.3	6.4	5.2	4.5	
450 X 175 X 13					8.6					
600 X 190 X 15						9.1	7.9	6.5	5.6	
Min. radius of curvature	1.5	1.5	1.8	1.8	2.3	Straight line	Straight line	Straight line	Straight line	

2) Installation of I-Beam for Traversing

- I-Beam must be at a level.
- The slope should be within 1/300 of span.
- Increased number of the slopes in the track cause difficulty in hoist operation.
- The above table is based on standard hoists. Consult us for Non-standard hoist.
- If number of I-Beams are linked for extend length, it must be leveled.

3) Rail is recommended for HD, HC, HS, HT, HP and HQ series hoists and refer to below table for suitable rail.

Rail	2 ton	2.8 ton	3 ton	5 ton	7.5 ton	10 ton	15 ton	20 ton	30 ton	50 ton
15kg/m	●	●	●	●	●	●				
22kg/m							●	●		
30kg/m									●	
50kg/m										●

2-2. Stopper

•Make sure to install stopper at the each ends of traversing rail to prevent hoist falling down.

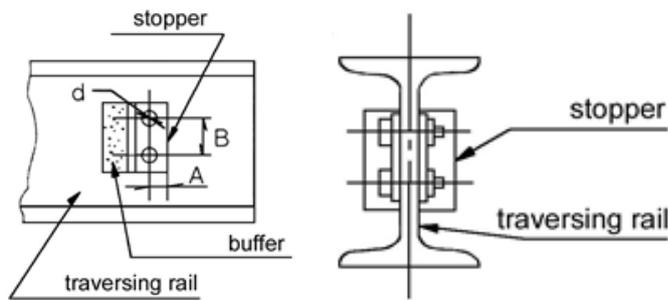
Install stopper at the end of traversing and/or traveling rail.

• **⚠ DANGER ⚠** Use the hoist not to run against stopper.

1) Refer to below table for HN, HM, HL, HR series hoist.

Stopper Size (mm)

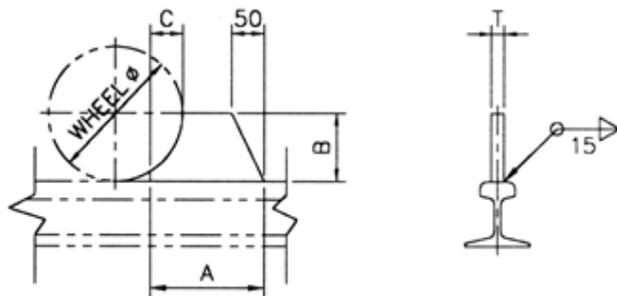
I-Beam	200 x 100	250 x 125	300 x 150	350 x 150	400 x 150	450 x 175	600 x 190
Square Bar	50 x 50 x 6		65 x 65 x 6				75 x 75 x 9
A (mm)	22		30				30
B (mm)	120	120	140	190	230	280	380
d (mm)	M16	M16	M20	M20	M20	M20	M24



2) Refer to below table for HD, HC, HS, HT, HP and HQ series hoist.

Stopper Size(mm)

Ton	2 ton	2.8 ton	3 ton	5 ton	7.5 ton	10 ton	15 ton	20 ton	30 ton	50 ton
Wheel diameter (mm)	140	140	140	165	165	165	180	220	250	450
T	15	15	15	15	15	15	20	20	20	20
A	120	120	120	140	140	140	140	190	210	390
B	70	70	70	83	83	83	90	110	125	225
C	35	35	35	40	40	40	50	55	60	110



2-3. Mounting the Hoist

- Hanger bolt is used for mounting traversing trolley ass'y to hoist main body.
- Refer below figures how to mount the hoist to the beam.

Fig. A is for motor-driven traversing hoist in mono-rail hoist. (HN, HM, HL, HR series)

Fig. B for the manual traversing hoist. (HB series)

- Adjust trolley width by relocating spacers, referring I-Beam width in below table.

※ Each spacer is 12.5mm thick.

<I-Beam width in mm for traversing>

I-Beam width \ Hoist capacity	100	125	150	175	190
1/2 ton ~ 1 ton	○	○	○		
2 ton ~ 3 ton	○	○	○		
5 ton		○	○	○	
7.5 ton ~ 10 ton				○	○
15 ton ~ 20 ton				○	○

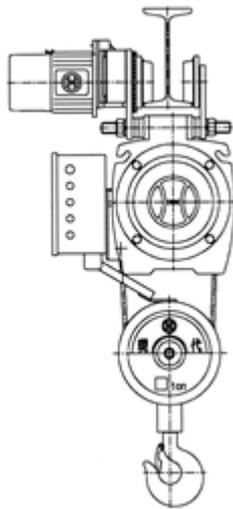


Fig. A. Motor-Driven traversing hoist

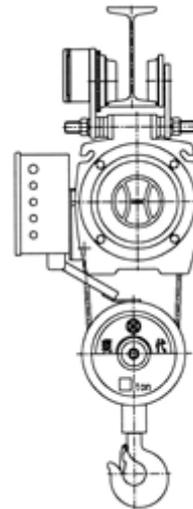
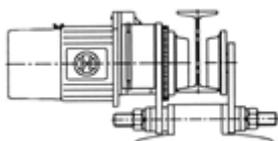
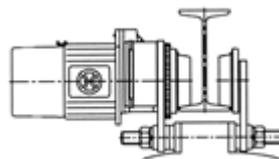


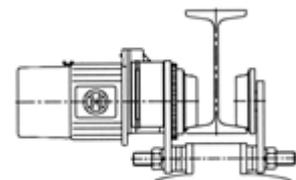
Fig. B. Manual traversing hoist



I-Beam width - 100mm



I-Beam width - 125mm



I-Beam width - 150mm

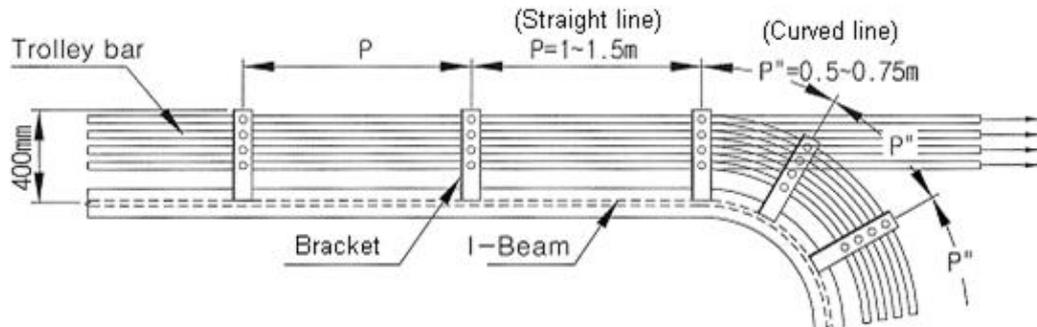
2-4. Traversing Power Supply System

1) Installation

- Should be installed horizontally with I-Beam or traversing rail of crane, if it is not restricted.
- There are two types of recommended traversing power supply system, trolley bar and festoon cable.
- The power supply shall in parallel with traversing rail/beam.

(1) Trolley bar

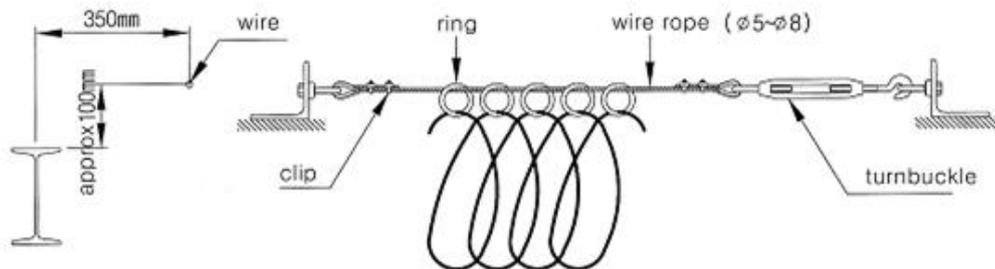
- Install trolley bar along outer side of the beam in curved section to reduce detachment of collector.



(2) Festoon cable

A. Carristor system

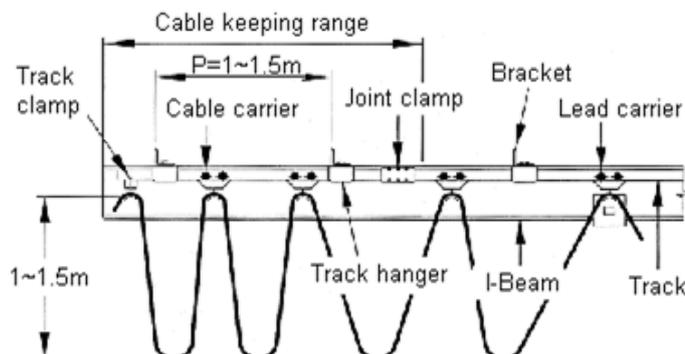
- Size of wire rope : Diameter 5 ~ 8mm is recommended.



- The cable shall be tied by 1~1.5m interval, and the cable shall be 15% longer than rail/beam length.

B. Track system

- A cable supporting device with flat cable or round cable.
- The cable should be at least 15% longer than rail/beam length.



2-5. Electric Wiring

Ask qualified personnel for the wiring work in accordance to applicable regulations.

⚠ CAUTION Be sure that power supply to which the hoist is to be connected is the same as that shown on the name plate located on main body of hoist prior to power on.

⚡ DANGER Effectively ground/earth the hoist as well as MCCB or electric leakage circuit breaker to reduce risk of electric shock.

1) Power connection

A. Connect to power through the MCCB or electric leakage circuit breaker.

⚠ CAUTION Power specification is shown on the name plate and control panel.

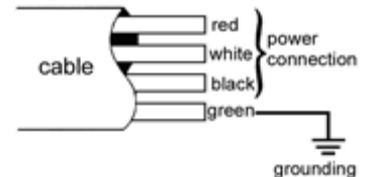
⚡ DANGER Cut-off power supply when hoist is not in operation to reduce risk.

B. Since the motor in a three phase hoist can rotate in either direction, depending on how it is connected to the power supply. The main power cable is with four wires in different colors of red, white, black and green.

Connect to red(R)phase, white(S)phase and black(T)phase.

⚡ DANGER Green wire is for grounding, which should be grounded.

⚡ DANGER Depress the UP button after power-on. If hook moves UP, the hoist is ready to use. If the hook moves DOWN, power-off and interchange red(R) and black(T). Then, power-on to repeat checking for correct hook moving direction. At the same time, check for limit switch activation, if it works correctly or not.



2) Power cable

⚠ CAUTION The cable must be sufficient size wires for proper operation.

3) Traversing Device

⚡ DANGER Effectively ground traversing rail/beam.

⚡ DANGER Keep clean contact area of traversing rail/beam and trolley wheel for improved current conduction to provide a least resistance for electric current.

2-6. Trial Run

1) First switch-on

- After completion of connection, depress "Up" button. If hook moves UP, the hoist is ready to use. If the hook moves DOWN, power-off and interchange red(R) and black(T). Then, power-on to repeat checking for correct hook moving direction. Also, check for East, West, South and North as well.

2) Trial run

- After above procedures, hoist is ready to operate in up, down, left, right, forward and backward.
- The hoist has been lubricated and calibrated by the factory prior to shipment. Run hoist up and down 5 to 6 times without load to circulate lubricants prior to commercial run.
- Run the hoist (if it is equipped with traversing trolley) from the end to another end of traversing rail/beam.
- To assure safety of structure and building, run hoist up, down, east, west, south, north with 100% load.

3. OPERATION & CONTROL



Do not operate a hoist unless you are appointed to do so with sound knowledge in the operation.

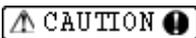
3-1 Checking before Work



Do not run hoist if any part of a hoist is damaged or disconnected or abnormal noises.

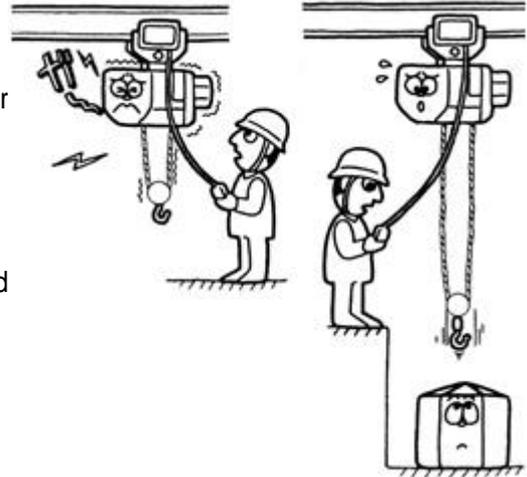
Be sure for proper limit devices operation as well as brake.

※ If any abnormality exist, report the same to the appointed personnel promptly, and place "Out of order" sign.



Be sure that it is clear enough to raise load.

※ Wire rope be get off from grooves, if the height is not enough.



3-2 Attaching the Load

Do not load the hoist beyond the rated load.

Do not use wire rope as a sling, or wrap wire rope around load.

The load should be attached to the hook by means of the proper slings or other approved devices.



The slings or other approved devices shall be seated properly in the saddle of the hook.

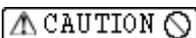
Do not apply load to the tip of the hook or to the safety latch.

※ Incorrect attachment may causes load falling-down or other accident as well as hoist damage.



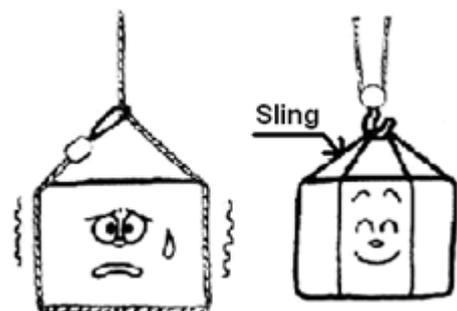
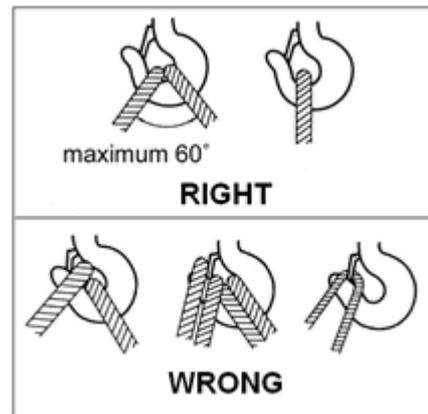
Do not operate hoist with damaged safety latch.

※ Sling and load may get off from the hook with damaged latch.



Do not allow wire rope to be subjected to sharp contact with other objects.

※ Wire rope may be damaged with sharp contact.



3-3 Handling the Load

⚠ DANGER Do not load the hoist beyond the rated capacity.

※ Overloading can cause failure of hoist or create a defect.

⚠ DANGER Center the hoist over the load, and raise the load just enough to clear the floor or supports, and check for brake action as well as proper load attachment on slings.

※ The lift should be continued, if the brake is operating properly.

⚠ CAUTION Take up a slack wire rope carefully and start to lift the load easily to avoid shock and jerking of wire rope. Make sure load is well balanced and secured.

⚠ DANGER Avoid swinging the load in hoisting.

※ May bump to person or object.

⚠ DANGER Avoid swinging the hook in hoisting.

※ May bump to person or object.

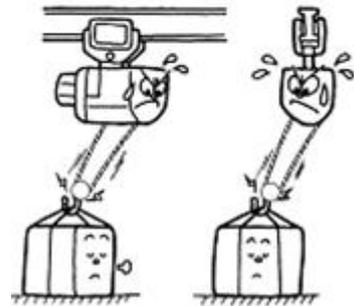
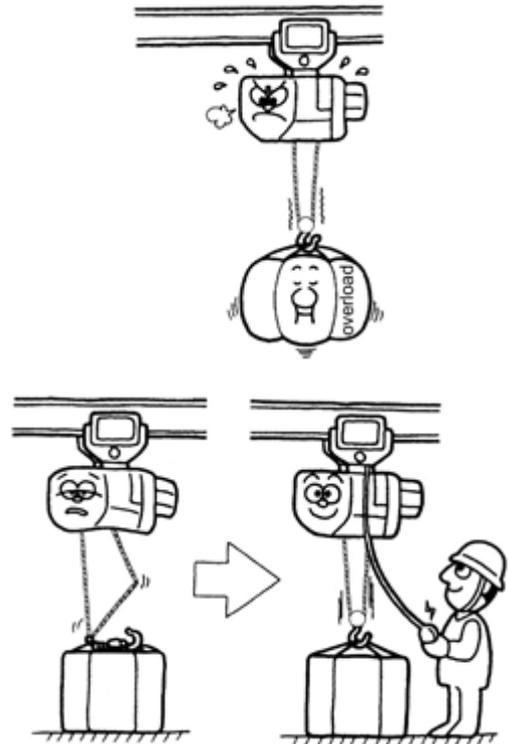
⚠ DANGER Avoid side pull or end pull at all times.

Center the hoist over the load before hoisting.

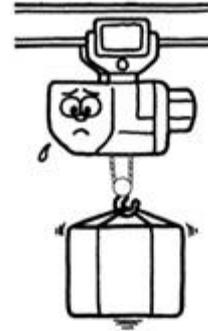
※ It may causes swinging the load and damage a hoist.

⚠ CAUTION Check the upper limit switch action.

※ Damaged limit devices must be repaired before hoist operation.

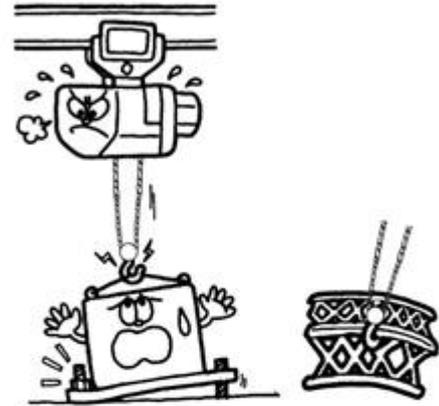


⚠ DANGER Do not use limit devices as routine operating stops. Those are emergency devices only.



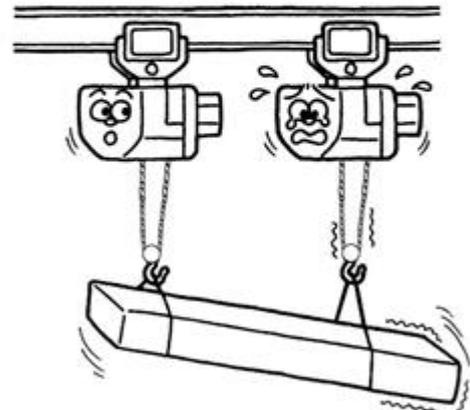
⚠ DANGER Do not pull tied object or load on building or other structure.

- ※ Brake-down of hook and wire rope, damage of gear or getting out of rail and falling-down of hoist may occur.



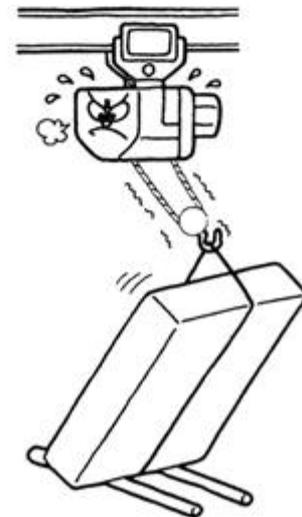
⚠ CAUTION When lifting load with two hoists, the load must be in level with careful attention.

- ※ The load should be equally distributed to the both hoists.
- ※ Both of the hoists should be with the same hoisting speed.
- ※ Both of the hoists should be inter-locked in control.
- ※ Anti-collision device and bumper should be installed.
- ※ Attach load properly.



⚠ DANGER Do not attempt to 'turn-over' load without proper turn-over device.

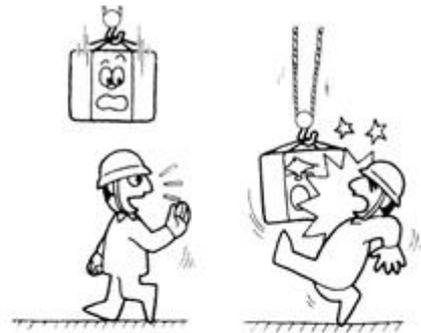
- ※ Use 'turn-over' device in turn-over work.
- ※ 'Turn-over' load cause severe shock to the hoist.



⚠ CAUTION Do not make sudden reversal movement of load or jogging controls or excessive inching work as well as unnecessary stops and starts.

3-4 Moving the Load

⚠ DANGER Stand clear of all loads and avoid moving or leaving a load over heads of personnel. Warn personnel of your intention to move a load



⚠ CAUTION Do not bump a hoist onto stopper or structure. Avoid shock to the trolley.

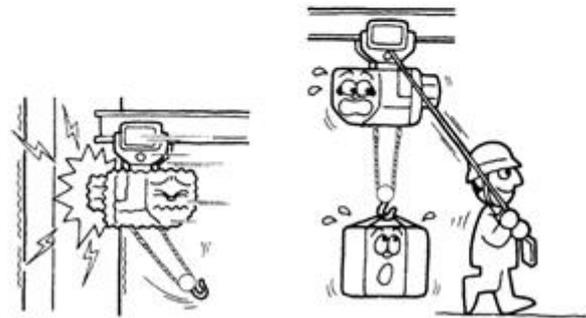
※ The load may fall down as well as damage to the hoist.

⚠ CAUTION Clear obstruction of your intention to move a load.

※ The load may fall down.

⚠ CAUTION Do not pull the push button.

※ The cable may be cut off.



3-5 Push button switch Control

⚠ DANGER Check the movement of push button switch before beginning work.

⚠ CAUTION Depress the push button, and keep it in the depressed position.

⚠ DANGER Make sure hook move in the same direction as shown on the push button.

⚠ CAUTION Stop the hoist by releasing the push button at all the time when you need to move the load in opposite direction.

※ Do not make sudden reversal control to protect hoist from shock.

⚠ CAUTION Keep clean push button without dust or sand.

※ Push button may be jammed, causing unable to stop hoist.

⚠ CAUTION Do not make jogging controls or inching work as well as unnecessary stops and starts.

※ Dual speed : Push button is in 2 steps, which is creep speed in 1st step and high speed in 2nd step.

※ Avoid direct run in high speed.

※ Avoid frequent control change between creep speed and high speed.

※ Good control may extend life of brake system and magnetic contactor.

⚠ CAUTION Leave the push button gently under the hoist.

※ Avoid collision to other object or unintended push button control with the collision.



3-6 Safety Control



Do not suspend the load in the air.



Do not make unnecessary talk with others while in hoist control.



Do not use the hoist to lift, support, or transport people by any means.

※ People could fall down.



Do not operate the hoist with gloves on.

※ Gloves may be jammed.



Do not move a load or hoist over personnel.

※ It is dangerous with falling down a load.



Do not hit a load with hammer or impose shock.



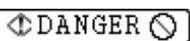
Do not operate a hoist over the heater or when flammable materials or vapors are present.

※ May cause a fire or explosion.



Do not allow a hook or wire rope be caught to the car.

※ May cause a damage of rope or falling down of hoist.



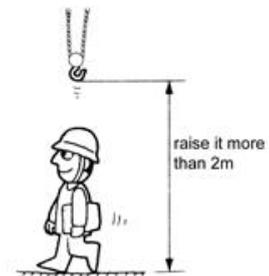
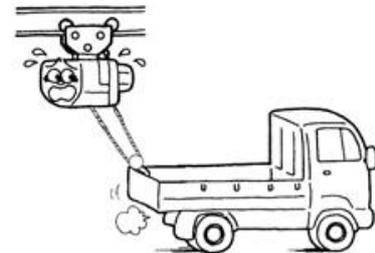
Do not move flammable load such as oil, gas and others flammable substances.

※ May cause a fire or explosion.



Leave a hook in suitable height where head of personnel would not bump into.

※ Avoid risk of collision.



3-7 Other Cautions

DANGER Do not operate a hoist unless you are qualified to do so with sound knowledge to control a hoist to avoid a dangerous situation.

DANGER Do not modify a hoist.
※ May cause break-down a hoist or an accident.

DANGER Make sure to carry out daily inspection and regular inspection.

DANGER Do not leave a hoist neglected in the rain or water.

DANGER ※ May cause rust, decreasing insulation and electric shock.

DANGER Make sure to prepare shelter or any means of protection against the rain.

Do not operate a hoist with unsafe wire rope.

- ※ Twisted, kinked or tangled.
- ※ Bended or stretched.
- ※ Excessively worn.
- ※ The load may fall down.

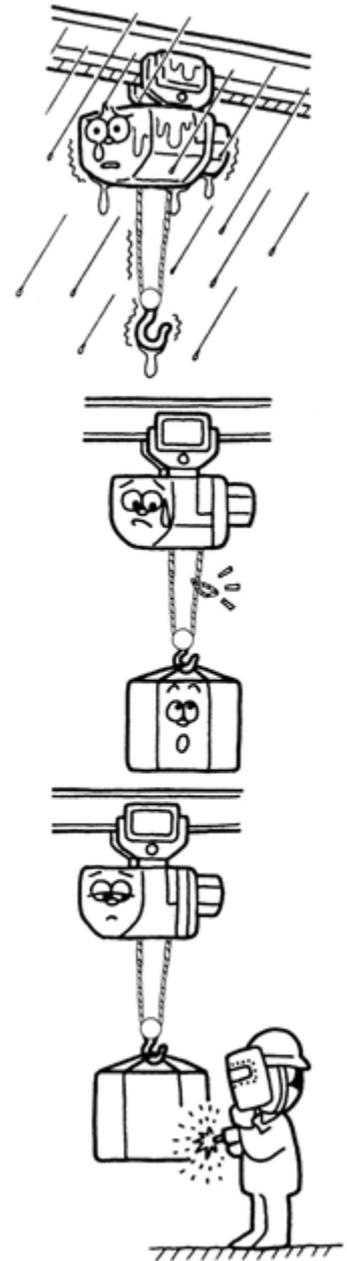
DANGER Do not weld a load with it is attached to the hoist.

- ※ Do not allow wire rope or any part of hoist to be in contact with welding ground.
- ※ Do not allow wire rope or any part of hoist to be in contact with a live welding electrode.
- ※ May cause a damage on wire rope with sparks or arcs and electric shock to a hoist circuit.

CAUTION The limit devices are a safety device.

- ※ Do not operate a hoist, if any of safety devices are not in proper function.
- ※ May cause damage to a hoist as well as injury.

CAUTION Observe the relative regulations in the country when hoist is used in crane, lift, vessel, mine, and petrochemical industry.



4. MAINTENANCE & INSPECTION

⚠ DANGER Inspect proper function of the hoist before operating a hoist.

- If there is any symptom of abnormality in the hoist, stop a hoist operation immediately and carry out necessary repairs or replacement as appropriate prior to its operation. (Refer to page 30 for Trouble Shooting.)
- ※ Operation of a hoist with symptom of abnormality may cause dangerous situation.

4-1. Daily Inspection

4-1-1 Inspection before operation

Please inspect the following items daily before operating hoist.

	Inspection Items	Inspection Criteria
1. Wire rope	A. Wear	A. No excessive wear.
	B. Deformation	B. No deformation such as twisted or distortion.
	C. Corrosion	C. No corrosion.
	D. Broken wires or foreign substance	D. No broken wires or foreign substances.
2. Hook and sheave	A. Throat opening	A. Not spreaded wider than the nominal dimension.
	B. Deformation	B. No deformation.
	C. Crack & other damages	C. No crack & other physical and chemical damages.
	D. Movement	D. Free rotation smoothly.
3. Main body	A. Fastening items (bolt, nut and split pin)	A. No loose or deformation / wear.
	B. Lubrication	B. Be lubricated various parts properly.
4. Traversing trolley	A. Fastening items (bolt, nut and split pin)	A. No loose or deformation / wear.
	B. Lubrication	B. Be lubricated various parts properly.
5. Push button switch	A. External appearance	A. No deformation, damage, twist and loosening. 2. Clear indication of the direction.
	A. Controls	A. Correct controls & interlock.
6. Power connection	A. Reverse phase	A. Proper connection in three phase.
7. Slings	A. Wear, deformation	A. No excessive wear or deformation.
8. Rail	A. Traversing and traveling rail	A. No obstructions, no missing rail connection or fastening bolt and other abnormalities.

4-1-2 Inspection in Operation without load

1. The hook should move according to the push button controls of up, down, east, west, south and north.
 - In 2-speed hoist, first step is for creep (slower) speed and second step is for high (faster) speed.
2. If push button does not work properly, the hoist must be stopped immediately.
3. Must not create a abnormal noise or vibration.
4. Upper limit switch must stop a hook immediately, if the hook reaches upper limit position.

4-1-3 Inspection in Operation with rated load

1. The brake must stop a hook immediately when any of push button (U/D/E/W/S/N) is being released.
(* Except **EMERGENCY** button, which is **stopping** a hook when it is being **depressed**.)
2. The hoist must be able to lift and traverse with rated load at not less than 90% of rated voltage.

4-1-4 Others

1. Lubricate wire rope to protect against rust.
2. Remove foreign substance in the wire rope.

4-2. Periodic Inspection

Please carry out periodic inspection to maintain continuous and satisfactory operation.

- Observe the requirements of applicable regulations in relation to the inspection in the country or state or location where a hoist is being used. It is recommended to carry out periodic inspection for the hoist (as well as crane) with established interval and keep the records. (However, this recommendation does not substitute or precede requirements of applicable regulations in the country or state or location where a hoist is being used.)



Be sure to disconnect power and secure safety surrounding areas before the inspection.

※ Be sure to place warning signs of "On inspection" and "Do not power on" before the inspection.

- Any unsafe condition disclosed by inspection should be corrected before operation of the hoist is resumed. After a corrective job, please follow TRIAL RUN procedures (refer to page 12) before resuming operation of the hoist.



4-2-1 Monthly inspection & Records

- Carry out periodic inspections regularly.
- Any unsafe condition should be corrected before operation of the hoist is resumed.
- Inspection items are as following table.

<Monthly Inspection & Record>

Crane No. :		Rated load :		Hoist Type :		Hoist Serial No. :			
Inspection Items						Category	Month		
							Result	Trouble and Remedy	Date.
Travelling Rail	Travelling Rail	1	Obstruction in the travelling range.	A					
		2	Abnormality and deformation of the rail.	C					
		3	Deformation of stoppers and detachment or loose bolts.	A					
		4	Loose rail mounting bolts.	C					
		5	Excessive wear.	C					
		6	Loose clips or damage in rail joints.	C					
Girder	Girder and Saddle.	7	Loose bolts.	C					
		8	Mounting of the traversing rails on the girder.	C					
		9	Mounting of the stoppers.	B					
		10	Lubrication of wheel shafts and gears.	B					
		11	Excessive wear and damage in the tread and flange.	C					
		12	Deformation and loose wheel shaft and key plate.	C					
		13	Excessive wear and loose connecting pins.	C					
		14	Mounting condition of saddle buffers.	C					
Girder	Traveling Drive	15	Loose mounting bolts in travelling motor and reduction gear.	C					
		16	Loose chain or V-belt.	C					
		17	Loose mounting bolts in the driving-shaft support fitting.	C					
		18	Lubrication of the driving shaft bearing.	C					
		19	Loose and excessive wear of the driving shaft coupling.	C					
Control	Push Button	20	External appearance.	A					
		21	Correct controls.	A					
		22	Physical damage.	C					
Control	Magnetic Switch	23	Loose terminal fitting screws.	C					
		24	Correct interlock.	A					
Control	Cable	25	Physical damage and mounting.	A					
Control	Upper Limit Switch	26	Correct function of the limit lever.	A					
		27	Loose wire clamping screws.	C					
		28	Be available at least 50mm clearance beyond activation of upper limit switch.	A					

Inspection Items				Category	Month.		
					Result	Trouble and Remedy	Date.
Brake	Magnetic Brake	29	Brake air gap.	B			
		30	Excessive wear of brake linings.	C			
		31	Loose screws or fastening items.	C			
Wire Rope	Wire Rope	32	A number of broken wires.(below 10% of broken wires in one strands)	A			
		33	Reduction of diameter below nominal.(below 7% of normal diameter)	A			
		34	Kinking or bent.	A			
		35	Excessive deformation or corrosion.	A			
		36	Corroded, broken wires, cracked, bent or worn at end connections.	A			
		37	Lubrication.	C			
Load Block	Load Block	39	Damage on thrust bearing and free rotation.	A			
		39	Status of hook nut split pin.	A			
		40	Damage of the sheave.	A			
		41	Damage of the sheave case.	A			
	Hook	42	Excessive wear.	A			
		43	Cracks & other physical and chemical damages.	A			
44		Throat opening	A				
Equalizer	Equalizer Sheave	45	Free rotation.	A			
		46	Physical damage.	C			
Power Supply	Collector	47	Loose cable connections.	B			
		48	Smooth movement of the collector.	C			
		49	Excessive wear of the collector.	C			
		50	Mounting of the collector.	C			
		51	Deformation or rust in the spring.	C			
	Cable	52	Arc, bending, rust and wear of the wires.	B			
53		Mounting and insulation.	B				
Traversing	Trolley	54	Loose hanger bolts / fastening trolley.	A			
		55	Excessive wear of the tread and flange.	B			
	Rail	56	Loose clamping bolts of stoppers.	C			
		57	Excessive wear.	C			
Lubrication	58	Lubrication of the shafts and gears.	C				
Sling	Rope	59	Breaking, kinking, wear, twist and other abnormalities.	B			
	Chain	60	Pitch elongation, diameter reduction, cracks, etc.	A			
	Hook, Link, Shackle	61	Deformation, excessive wear and cracks.	A			
Trial Run	Up/Down	62	Correct operation without abnormal noise and vibration.	A			
	Traversing	63	Correct operation without abnormal noise and vibration.	A			
	Limit Switch	64	Correct function at the upper limit position.	A			
	Brake	65	Immediate stop upon releasing depressed push button.	A			
	Travelling	66	Correct operation without abnormal noise and vibration as well as a straight drive.	A			
	Name Plate	67	Correct indication such as rated load, model, serial number, etc.	A			

Monthly Inspection The intervals of the inspection must be determined by individual application and are based upon the type of service which the hoist is subjected. The intervals, described on the table are based on general application, and deficiencies should be corrected in accordance to actual operating conditions.	Category		Interval
	A	Important for securing safety	Once every month
	B	Important for mechanical maintenance	Once every 3 months
	C	Relatively less wear or less damage	Once every 6 months

Supplement:

1. In addition to the above inspections, carefully examine loose screws and bolts as well as other fastening items in the entire hoist.
2. Check for loose screws as well as other unsafe conditions in the power cable ends,
3. Check for mounting of the push button and control cable as well as protective lead-wire.
4. The inspection intervals will vary due to operating conditions and amount of use. Deficiencies should be carefully examined and corrected.
5. For the brake functional test, lift down rated load at least 0.2m and then release being depressed DOWN button. The load must not fall down in excess of 1% over the distance, which hoist moves up a load in a minute at the rated load operation.

Inspected		Reviewed		Date	
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4-2-2 Yearly Inspection & Records

- Carry out visual inspection once every six months and physical inspection of the hoist mechanism once every 12 months.
- Any unsafe condition should be corrected before operation of the hoist is resumed.
- Inspection items are as following table.

<Yearly Inspection & Record>

Crane No. :		Rated load :		Hoist Type :		Hoist Serial No. :			
		Inspection Items		Inspection Criteria		Result		Trouble and Remedy	
Machinery	Gears	1	Excessive wear of hoisting gear tooth.	Wear must be less than 1% of the nominal thickness from the pitch circle.					
		2	Excessive wear of traversing gear tooth.	Wear must be less than 20% of the nominal thickness from the pitch circle.					
		3	Condition of gears.	No excessive wear.					
	Shafts, Bearings & Oil seals	4	Excessive wear of gear shaft.	Wear must be less than 1% of the nominal shaft diameter.					
		5	Excessive wear of other shafts.	Wear must be less than 1% of the nominal shaft diameter.					
		6	Gap between gear shaft and bearing.	Shaft dia. below 25mm...0.6mm, Shaft dia. below 40mm...0.8mm.					
		7	Gap between other shaft (coupling) and bearing.	Shaft dia. below 25mm...1.2mm, Shaft dia. below 40mm...1.6mm.					
		8	Excessive wear of bearings.	No physical damage or excessive wear.					
		9	Excessive wear of oil seals.	No physical damage or excessive wear.					
	Brake	10	Linings.	Wear must be less than 50% of the nominal thickness.					
		11	Excessive wear and deformation of the wheel.	No cracks, abnormal deformation and excessive wear.					
		12	Excessive wear of the brake mechanism.	No abnormality in the brake function.					
	Traversing wheel	13	Excessive wear in the tread.	Wear must be less than 5% of the nominal tread diameter.					
		14	Out-of-roundness in the tread.	Wear must be less than 0.8mm of the tread diameter.					
		15	Diameter differences in the wheels.	Wear must be less than 1% of the tread diameter.					
		16	Excessive wear of flanges.	Wear must be less than 50% of nominal thickness. For the mono-rail type, the max. gap between rail and flange must be less than 50% of the nominal tread width.					
	Hook	17	Excessive wear of the hook.	Wear must be less than 5% of the nominal dimension.					
		18	Opening of the hook.	Wear must be less than 5% of the nominal dimension.					
		19	Damage on the hook.	No harmful physical damage.					
		20	Fastening items.	No cracks, excessive wears and loose parts.					
	Sheave & Equalizer Sheave	21	Excessive wear of sheave groove.	Wear must be less than 20% of the nominal wire rope diameter.					
	Wire rope	22	Broken wires.	Below 10% of broken wires in one strands.					
		23	Excessive wear.	Wear must be less than 7% of the nominal diameter.					
		24	Deformation and corrosion.	Free from extreme deformation, kinking and corrosion.					
		25	Abnormality at the end connection.	Corroded and broken wires.					
		26	Length.	Should be in nominal length.					
	Shaft	27	Abnormality in the spline.	Free from deformation and excessive wear.					
	Others	28	Physical damage.	No harmful damages.					
Electric	Switches	29	Excessive wear.	Wear must be less than 50% of the nominal dimension.					
		30	Excessive wear of the switch mechanism.	No malfunction.					
	Current Collector	31	Excessive wear.	Wear must be less than 20% of the nominal dimension.					
	Wiring	32	Cable and lead wire.	No broken, bent, or any other abnormality.					
	Fuse	33	Fixture and fastening	To be firmly fixed.					
	Insulation	34	Insulation resistance in the circuit.	More than 1.0MΩ. (* Observe code & standard in the country)					
	Power supply	35	Earth/ground.	To be effectively grounded.					
Switch panel	36	Fuses, circuit breaker.	Use rated capacity fuses and circuit breakers.						
Assembly	General	37	Lubrication.	Adequate lubrication.					
	General	38	Assembly and painting.	Be done in correct way.					
Trial Run	Operation	39	No load test.	Operation must be in normal.					
	Lifting height	40	Lifting height.	Be able to reach specified height with two more windings being left.					
	Upper limit switch	41	Hook location after activation of the limit switch at no load & rated load operation.	Be available at least 50mm clearance beyond activation of upper limit switch.					
	Brake	42	Hook's slip in stop during down motion at rated load.	The hook's slip must be within 1% of the distance, which a load raised-up in a minute at the rated load operation.					
	Hoisting	43	Up and down at the rated load.	No abnormality after 2 cycles up & down operations in full lifting height.					
	Traversing	44	Traversing at the rated load.	Be free from abnormality in the hoist and rails after running a hoist throughout its traversing range.					
	Crane traveling	45	Travelling at the rated load.	Correct operation without abnormal noise and vibration as well as straight drive.					
Inspected				Reviewed				Date	

4-2-3 DISASSEMBLY & ASSEMBLY

When disassembling the hoist, please refer as follows;

4-2-3-1 Disassembly



① Drain oil, and remove control box and wire rope. Place hoist on wooden frame. (motor side down)



② Remove 3 nuts on guide pins and take-off armature.



③ Take-off brake disk.



④ Take-off brake wheel, moving core, spacer and magnet core.



⑤ Take-off first gear cover.



⑥ Take-off first planet gear.



⑦ Take-off first gear cage.



⑧ Remove the stop bolt and take-off first internal gear.



⑨ Take-off second gear cover.



⑩ Take-off second planet gear.



⑪ Remove 2 stop bolts and take-off second internal gear.



⑫ Take-off second gear cage.



⑬ Take-off gear case.



⑭ Take-off middle shaft.



⑮ Take-off the drum.

4-2-3-2 Assembly

1) Assembly

When assembling the hoist, follow instructions in reverse orders of "4-2-3-1 Disassembly" as above.

2) Caution

※ Make sure to lubricate gears.(Fig. C)

Washers must be placed between the gear and gear cage.(Fig. D)

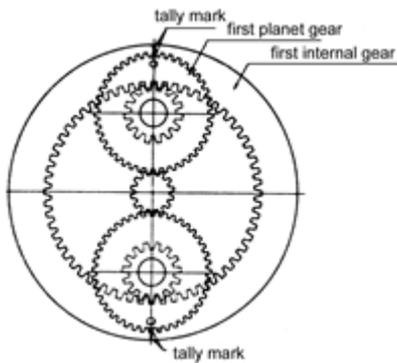


(Fig. C)



(Fig. D)

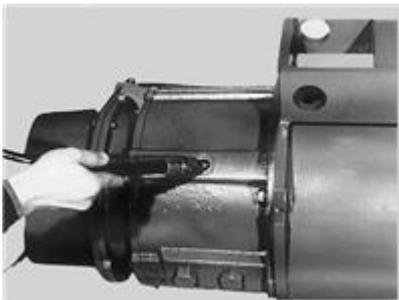
※ Since the first planet gear is a Second Compound Gear, two tally marks must be positioned in a straight line as illustrated Fig. E.



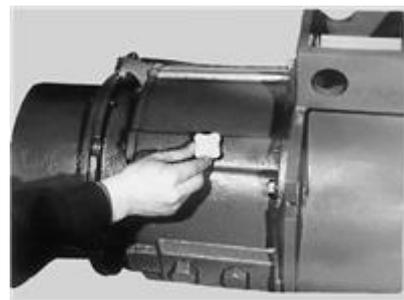
(Fig. E)

- Improper gear fitting causes excessive force to the gear tooth, shafts and bearings, resulting in noise and wear.
- Tally marks must be positioned at top and bottom of the gear system vertically as shown in the Fig. E. Adjustment in horizontal position may often result in disorder due to weight of gear wheels.

※ After assembly, fill-up suitable lubricant and close with the tap.



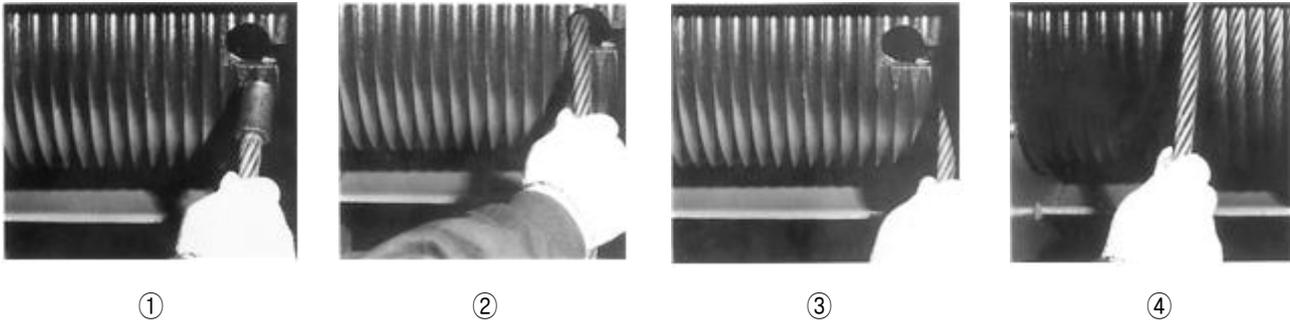
(Fig. F)



(Fig. G)

※ Wind the wire rope as follows.

- Put wire rope end entirely into the hole as shown in Fig. ② and push it right-down to secure the end to the fixture firmly as shown in Fig. ③, and then wind the rope as shown in Fig. ④.



3) After completion of the assembly, please follow TRIAL RUN procedures (refer to page 12) before resuming operation of the hoist.

5. SERVICE PART REPLACEMENT

⚠ DANGER Any of unsafe conditions disclosed by inspection must be corrected.

- Hoist operation with exceeding its part limit is very dangerous.
- Recommended to keep consumable parts in stock to shorten break down.

5-1. Hook

1) Check for throat opening dimension, twisted, excessive wear and deformation.

⚠ DANGER If the hook is in one of following condition, replace a hook immediately.

- ※ The throat opening is spreaded wider than the nominal dimension.
- ※ The is twisted.
- ※ The hook in excessive wear, deformation and physical or chemical damage.

2) Dimension and wear limit

Check for dimension of throat opening and wear of saddle, and replace it immediately, if it is in unsafe condition.

- Dimension of the throat opening.

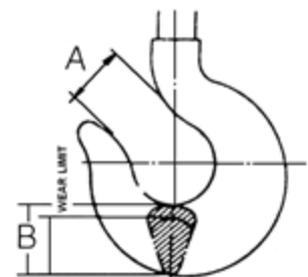
Measure dimension "A", which must be the same as nominal dimension.

- Dimension of the saddle

Measure dimension "B", which must be at least 95% the nominal dimension.

(Max. weared dimension should be not exceeding 5% of the nominal dimension.)

A		mm	B		mm
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- ※ Record the nominal dimensions, which were measured just after unpacking.

5-2. Sheave

1) Check for sheave

A condition of sheave is related with life of wire rope. Replace the sheave immediately, if it is in one of following condition.

- ※ The sheave groove diameter is in excessive wear.

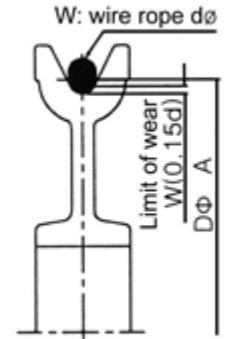
2) Wear limit of sheave groove diameter

Measure wear of the sheave groove diameter.

- ※ Max. wear dimension should be not exceeding 20% of the nominal wire rope diameter.

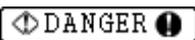
A	mm
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- ※ Record the nominal dimension, which was measured just after unpacking.



5-3. Wire Rope

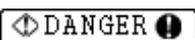
1) Check for wire rope



If the wire rope is in one of following condition, replace it immediately.

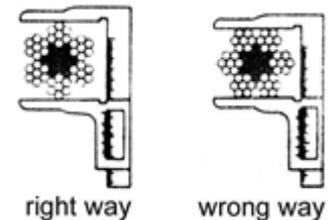
- ※ Broken wire rope.
- ※ Reduction of diameter below nominal diameter.
- ※ Corroded, cracked, kinked or bent.
- ※ Damaged or loose end connection.

2) Tolerance limit



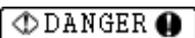
Replace wire rope, if it does not satisfy following criteria.

- ※ Below 10% of broken wires in one strands.
- ※ Reduction of wire rope diameter due to wear is less than 7% of the nominal diameter.



5-4. Main Body

1) Check for gears, axes and other mechanical parts



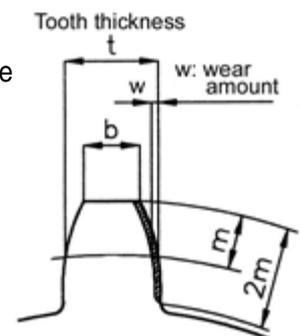
If the gears, axes or any of other mechanical parts are in excessive wear, replace it immediately.

2) Tolerance limit



Replace gears, axes or any of other mechanical parts, if it does not satisfy following criteria.

- ※ Wear of gear tooth must be less than 1% of the nominal thickness.
- ※ Wear of shaft must be less than 1% of the nominal diameter.



5-5. Brake

1) Check for Brake Lining



If the brake lining is in one of following condition, replace it immediately.

- ※ Excessively worn.
- ※ Cracks.

2) Tolerance limit



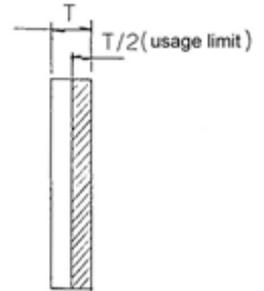
Replace brake lining, if it does not satisfy following criteria.

- ※ Thickness of the linings must be over 50% of the nominal thickness.
- ※ No cracks.

- Thickness of Hyundai hoist brake linings.

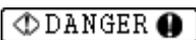
Hoisting brake lining : 4mm for 1 ton to 10 ton, and 5mm for 15 ton to 50 ton rated capacity.

Traversing brake lining : 10mm for 1 ton to 30 ton, and 12mm for 35 ton to 70 ton rated capacity.



5-6. Traversing Trolley Ass'y

1) Check for trolley and gear



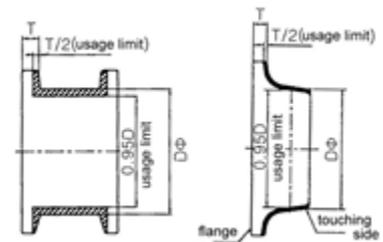
If the trolley wheel or gear is excessively worn, replace it immediately.

2) Tolerance limit

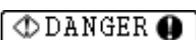


Replace trolley wheel or gear, if it does not satisfy following criteria.

- ※ Wear of the wheel tread must be less than 5% of the nominal diameter.
- ※ Wear of the gear must be less than 20% of the nominal dimension.
- ※ Wear of the flange must be less than 50% of the nominal dimension.



5-7. Upper Limit Switch



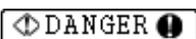
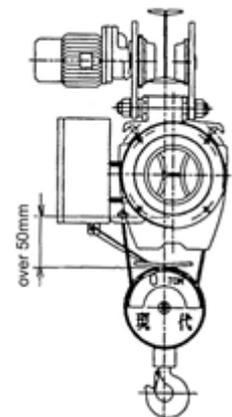
Check for following items.

1) Function

- ※ Does it stops up motion of the hook in two steps ?
(1st step - normal stop, 2nd step - emergency stop with 1st step failure)
- ※ Does upper limit switch lever works properly without deformation ?
- ※ Make sure to be installed to the hoist properly.

2) Hoisting space

- ※ The clearance between drum and sheave must be at least 50mm after activation of the first step of upper limit switch.
- ※ The clearance of 50mm is min. distance to initiate emergency second step upper limit switch.



If the clearance is less than 50mm, there are potential risk of damages in sheave, rope and drum.

5-8. Push Button Switch

⚠ CAUTION Check push button switch after power off and replace it immediately, if there is unsafe condition.

- ※ Is it properly works ?
- ※ Is there any damages or deformation ?
- ※ Is there loose screws or damages in the cable ?
- ※ Is there foreign substance or excessive wear in switch contacts ?

5-9. Hoist Control Box / Panel

⚠ DANGER Check the control panel, terminal and cable gland as well as loose bolts.

- ※ If there is loose bolts, must fasten it.

5-10. Lubrication

⚠ CAUTION Lubricate the various parts of the hoist, referring the lubricants specified below to assure extra life and best performance.

- ※ It is oil-sealed type which does not require initial lubrication when you purchase a hoist.
 - ※ For the gear case, replace lubricant two or three times in the first one month from initial run. Since then, once every 12 months.
 - ※ Below table is based on general operation, and frequency will vary due to operating conditions and amount of use. Deficiencies should be carefully examined and corrected.
- Lubrication is not necessary for other axes because of grease-sealed ball bearings.

<Lubrication in General Operation>

Part to be Lubricated	Instruction	Lubricants	Frequency	Remarks
Main body Gear case	Fill-up	Mobil (Mobilgear 630), Shell (Omala Oil 220), (ISO VG 220) or equivalent	Once in a year Check quantity once a year	Replace it 2 or 3 in the 1st month at initial use
Traversing Gear case	Apply grease	Mobil (Mobilux EP2), Shell (Darina R2) or equivalent	Once in a year	Apply grease in gear
Trolley Gear wheel	Apply grease in the gear		Once in a year	Apply grease in gear
Wire rope	Apply light coat	Heavy motor oil or a cable compound	Once in a year	

<Lubricants Quantity>

Hoist capacity	1 ton	2 ton	3 ton	5 ton	7.5 ton	10 ton	15 ton	20 & 30 ton	35 & 70 ton
Oiling amount (Liter)	0.3	0.7	1.3	1.6	1.8	2.2	2.6	6.0	20.0
Grease amount (Liter)	0.5	0.5	0.7	0.7	1	1	1.5	1.5	2.0 ~ 2.5

5-11. Trouble Shooting

Trouble	Probable Cause	Ref. No. for Remedy	Remedy
Hoist does not respond to push button control	Faulty fuse	1	<p>1. Check for faulty connection in one line of power supply system by measuring R-S, R-T and S-T. Check connections in power supply system and terminal block. Check for faulty fuse and contactor.</p> <p>2. Check voltage and frequency of power supply system against the rating on the hoist name plate. Check for power drop due to wiring resistance in the power supply system.</p> <p>3. Dusts or foreign substances on the trolley bar may cause faulty contact or power drop. Remove dusts or foreign substances on the trolley bar with care. (Power supply must be disconnected before check-up and cleaning.)</p> <p>4. Adjust brake air gap. Also, check for brake lining.</p> <p>5. Above an ambient temperature, the frequency of hoist operation must be limited to avoid overheating the motor. Special provisions must be made to ventilate the area surrounding the hoist and shield it from radiant heat.</p> <p>6. The brake does not work properly due to faulty rectifier, which causes over-load onto the motor. Replace faulty rectifier.</p> <p>7. Reduce load to within rated capacity of hoist as indicated on the hoist name plate.</p> <p>8. When depressing push button to start a hoist, extremely high starting current (about 400–600% of rated motor current) is applied instantly, resulting motor over heating. Avoid excessive inching, jogging and reversing.</p> <p>9. The motor withstands up to 105 °C, measured from surface of the motor frame.</p> <p>10. The brake lining may be contaminated by oil or foreign substances in overhaul. Wipe off the oil or foreign substances from the lining.</p> <p>11. Ineffective moving core due to dust in the guide pin or excessive wear of the brake lining. Clean the dust in the guide pin or replace the worn lining.</p> <p>12. Check for wrong connections in cut-out circuit, and loose screws in terminal block.</p> <p>13. Insufficient lubricants cause a noise. Lubricate various parts correctly.</p> <p>14. Check for excessively worn gears and shafts, and replace if necessary.</p> <p>15. Ground effectively.</p> <p>16. Avoid side pull. If side pull is essential, re-installation a hoist rather than side pull.</p> <p>17. Incorrect wire rope winding due to improper hoist operation as well as location of the hoist mounting.</p> <p>18. Lubricate wire rope.</p> <p>19. For the hoist with 2 falls wire rope, the hook is not true vertical. (The center of the hook moves horizontally as hook raise up or down.) The center of the hook must be vertically centered over the load, and must not be in contact with other unintended structures.</p> <p>20. Ineffective moving core due to excessive air gap between moving core and magnet core. Adjust the air gap.</p> <p>21. Check for loose screws in the limit switch, brake, magnetic switch (contactor), etc as well as disconnection in the cables.</p> <p>22. No power supply to the brake system due to faulty rectifier. Possible cause of the faulty rectifier are; (a) Abnormal voltage due to wrong power supply connection. (b) Wrong power supply.</p>
	Wrong voltage or frequency	2,3	
	Faulty collector	3	
	Brake does not release	20,21,22	
Hoist does not respond promptly	Excessive air gap	4,20	
Motor over heats	Phase failure	1	
	Low voltage	2	
	Extreme external temperature	5	
	Faulty rectifier	6,22	
	Excessive load	7	
	Frequent starting or reversing	8	
	Excessively frequent operation	9	
Brake slipping	Oil on brake lining	10	
	Jammed moving core due to dust in guide pin	11	
	Failure of cut-out brake circuit	12	
Excessive noise	Insufficient lubricants in gear case	13	
	Worn gears and shafts	14	
Electric shock/leak	Improper grounding	15	
Excessively worn out wire rope	Interference with wire drum or other parts due to side pull.	16	
	Incorrect winding	16,17	
	Insufficient lubrication	13,18	
	If the hoist is used as a winding device for a lift, the wire rope creates noise at top position	19	
Brake does not work	Excessive air gap	20	
	Disconnection in the brake circuit	21	
	Faulty rectifier	22	

5-12. Brake Adjustment and Replacement

5-12-1 Hoisting Brake

The adjustment of hoisting brake and replacement of lining is as followings.

1) Adjustment of the brake air gap must be made in following conditions.

- Brake slipping in no load operation or with light load operation.
- Delayed stop or does not fully opening/releasing (or dragging).
 - The motor would be damaged with excessive over-load, if the brake does not fully released.
- The air gap is excessively enlarged due to wear of the brake lining.
 - Adjust brake air gap.

2) Brake air gap adjustment

a) Remove nuts & cover, and take off a Adjust handle from a Armature, and assemble a Adjust handle, fastening with Adjust bolts to eliminate a gap between a Magnet core and a Spacer plate as shown in Fig. H.

b) Loosen the fully tightened Adjust bolts by 1~1.5 turn, and then adjust the air gap Spacer plate as shown in below Table 5 <Air Gap of Hoisting Brake>.

<Air Gap of Hoisting Brake> -Table 5-

CAPACITY (Ton)	AIR GAP (mm)	
	Adjustment	Wear limit
0.5	0.5	1.0
1	0.5	1.15
2	0.75	1.75
3 (2.8)	0.75	2.0
5	0.75	2.0
7.5 ~ 20	0.75	2.0
30 ~ 50	0.75	2.0

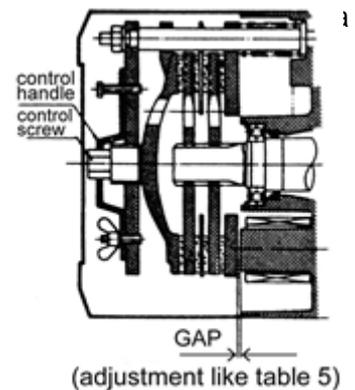


Fig. H

3) **⚠ DANGER ⚠** Warning in the brake adjustment

- ※ Do not attempt to carry out brake adjustment with load.
 - Load may falling down.

4) Replacement of lining

- ※ Replace the brake linings, it is less than 50% of the nominal thickness.
- ※ Use only factory supplied replacement lining and parts.

5) **⚠ DANGER ⚠** Warning in the replacement

- ※ Disconnect power supply before the replacement.
- ※ Leave a load or a hook on the floor in safe place before the replacement.
- ※ Make sure that the hoist is in safe condition by trial runs with no load, light load and rated load after replacement.

5-12-2 Traversing Brake

The adjustment of traversing brake and replacement of lining is as follows ;

1) Adjustment of brake

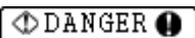
- ※ Brake slipping or does not work.
- ※ No brake releasing/opening sound with depressed push button.
- ※ Delayed stop or does not fully opening/releasing (or dragging).
 - The motor would be damaged with excessive over-load, if the brake does not fully released.
- ※ The air gap is excessively enlarged due to wear of the brake lining.
 - Adjust brake air gap to the nominal of 0.3mm +/- 0.05mm.

2) Brake air gap adjustment (Refer to Fig. 1)

- a) Loosen three Nuts (No.9) by 3 turns in counter-clockwise, and turn three Nuts (No.10) by 4 turns in clockwise.
- b) Secure enough adjustment space of a Magnet core.
- c) Fasten three Nuts (No.9) firmly in clockwise to eliminate a gap between a Magnet core and a Armature, and adjust air gap between 0.3mm +/- 0.05mm by loosening three Nuts (No.9) in counter-clockwise.
- d) Fasten three Nuts (No.10) firmly in counter-clockwise.
 - Fasten three Nuts equally in to obtain equal air gap

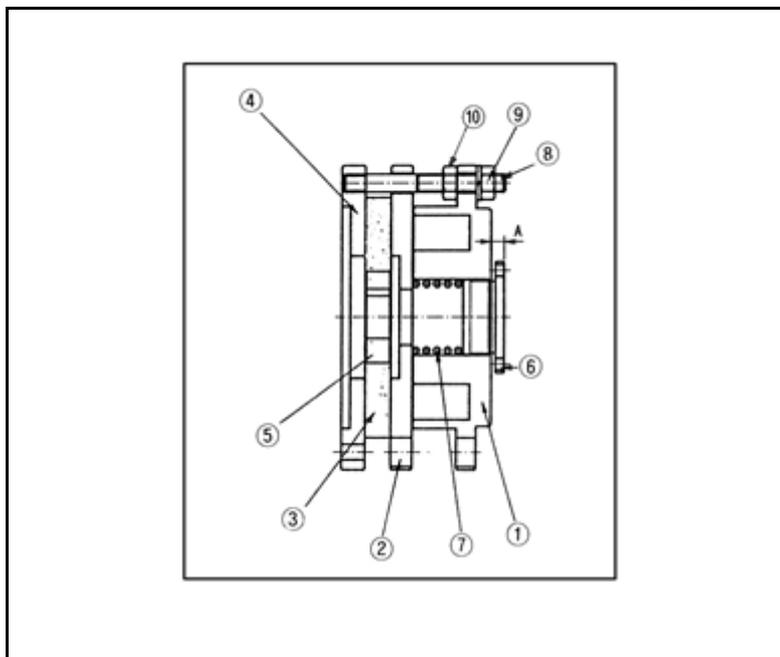
3) Replacement of lining

- ※ Replace the brake linings, if it is less than 50% of the nominal thickness.
- ※ Use only factory supplied replacement lining and parts.



4) Warning in the replacement

- ※ Disconnect power supply before the replacement.
- ※ Leave a load or a hook on the floor in safe place before the replacement.
- ※ Make sure that the hoist is in safe condition by trial runs with no load, light load and rated load after replacement.



- ① Magnet core
- ② Armature
- ③ Lining
- ④ Flange
- ⑤ Hub
- ⑥ Torque control bar
- ⑦ Spring
- ⑧ Stud bolt
- ⑨⑩ Nuts

(Fig. 1)

APPENDIX

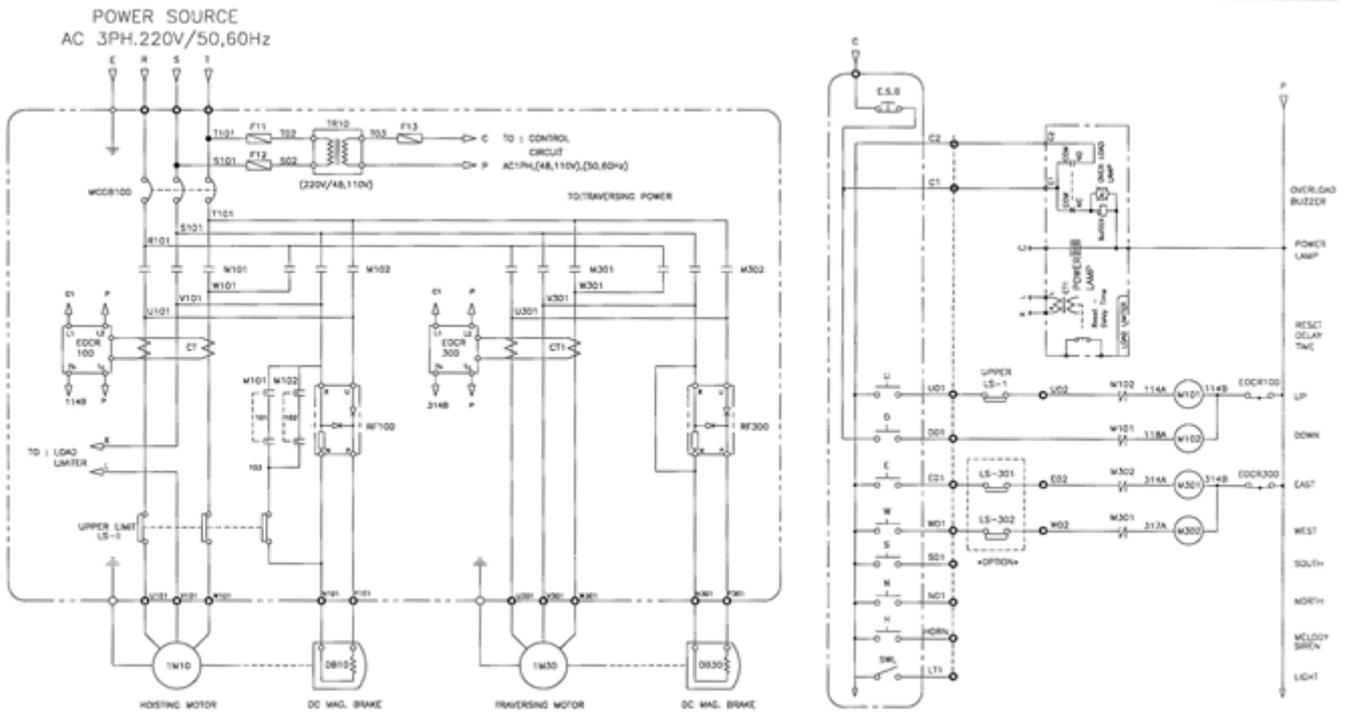
1. ELECTRIC CIRCUIT DIAGRAM

- ◆ STANDARD HOIST 0.5~7.5 TON (220V)
- ◆ STANDARD HOIST 10~ 30 TON (220V)
- ◆ STANDARD HOIST 0.5~7.5 TON (380V~440V)
- ◆ STANDARD HOIST 10~ 30 TON (380V~440V)
- ◆ CREEP HOIST 0.5~7.5 TON (220V)
- ◆ CREEP HOIST 10~30 TON (220V)
- ◆ CREEP HOIST 0.5~7.5 TON (380V~440V)
- ◆ CREEP HOIST 10~30 TON (380V~440V)

2. HOIST & MOTOR SECTION DRAWING

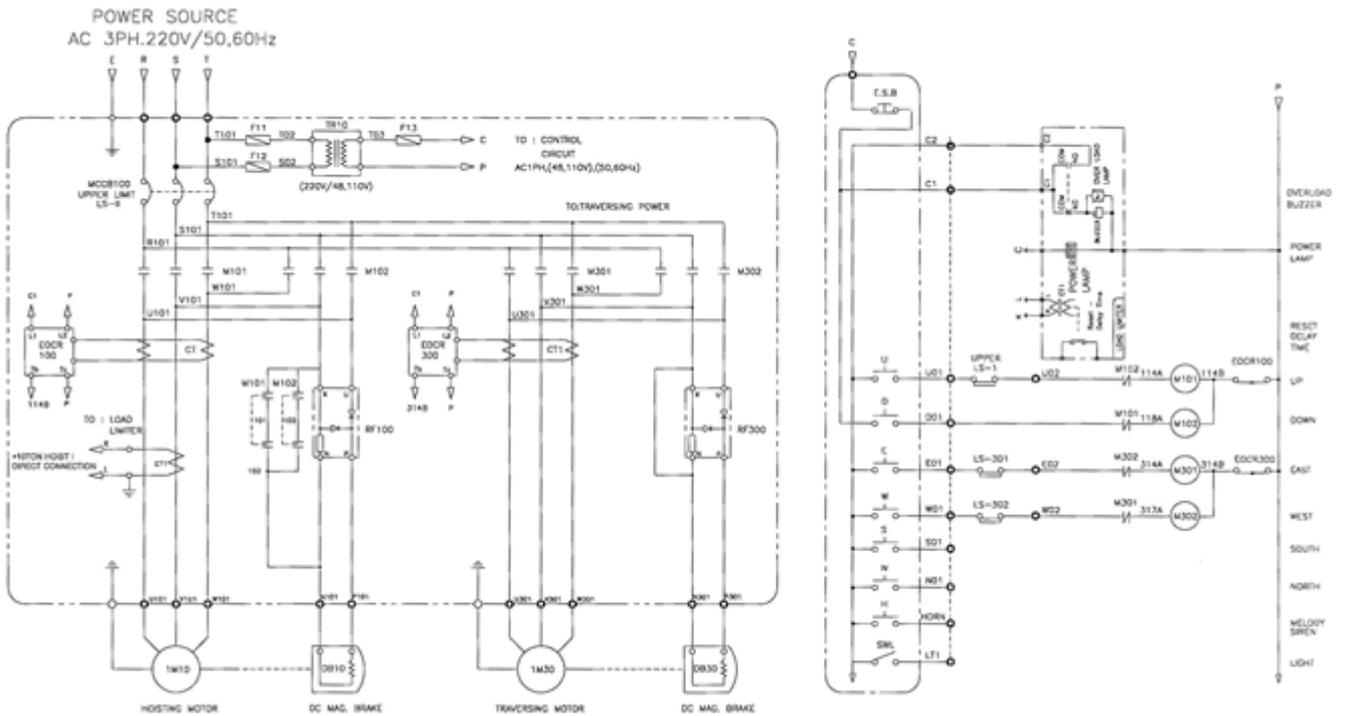
- ◆ STANDARD HOIST SECTION DRAWING
- ◆ CREEP HOIST SECTION DRAWING
- ◆ GEARED MOTOR SECTION DRAWING

◆ STANDARD HOIST 0.5~7.5 TON(220V)



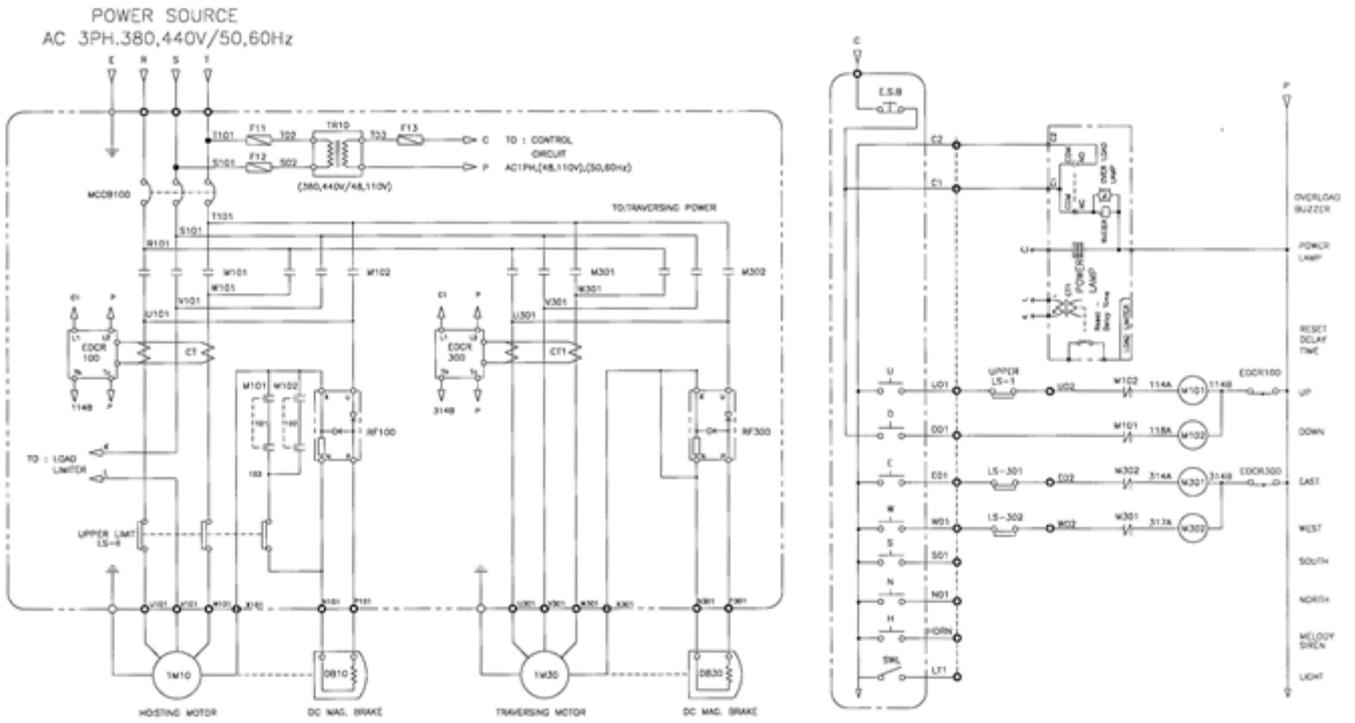
[05-7.5TON HOIST ELECTRIC CIRCUIT DIAGRAM]

◆ STANDARD HOIST 10~30 TON(220V)



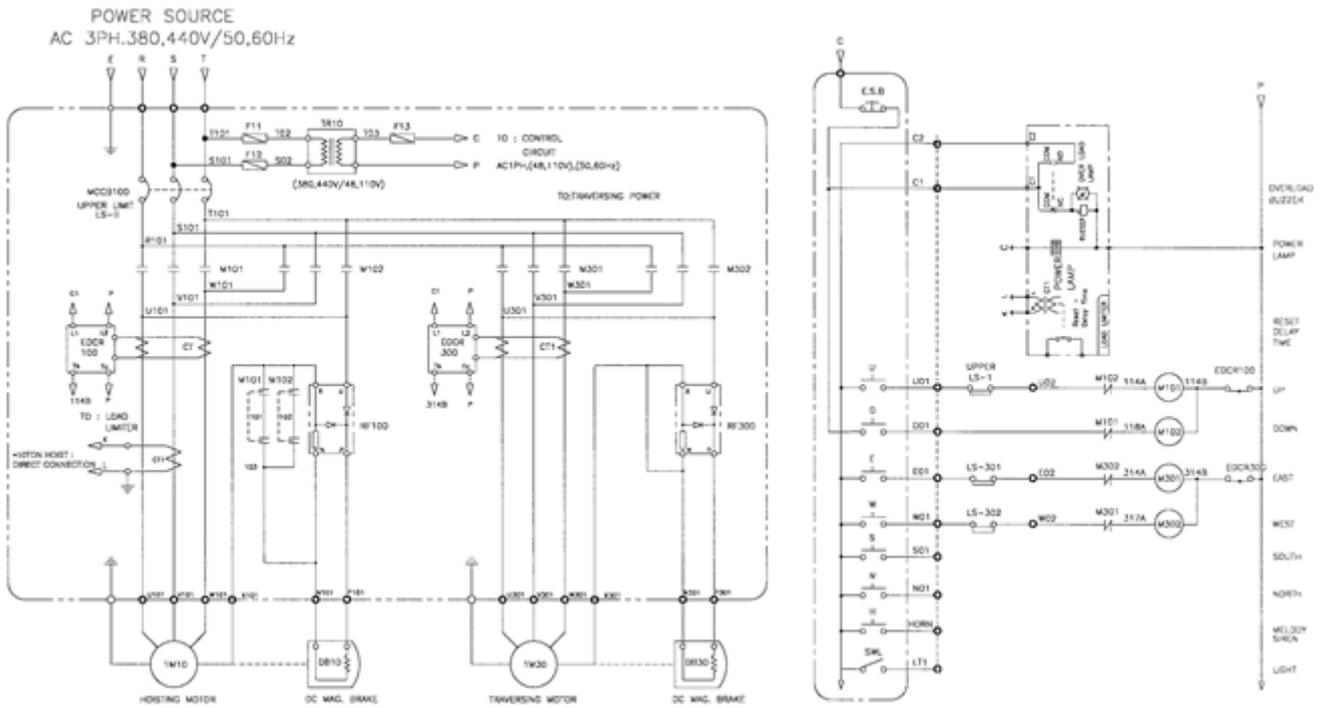
[10-30TON HOIST ELECTRIC CIRCUIT DIAGRAM]

◆ STANDARD HOIST 0.5~7.5 TON(380V~440V)



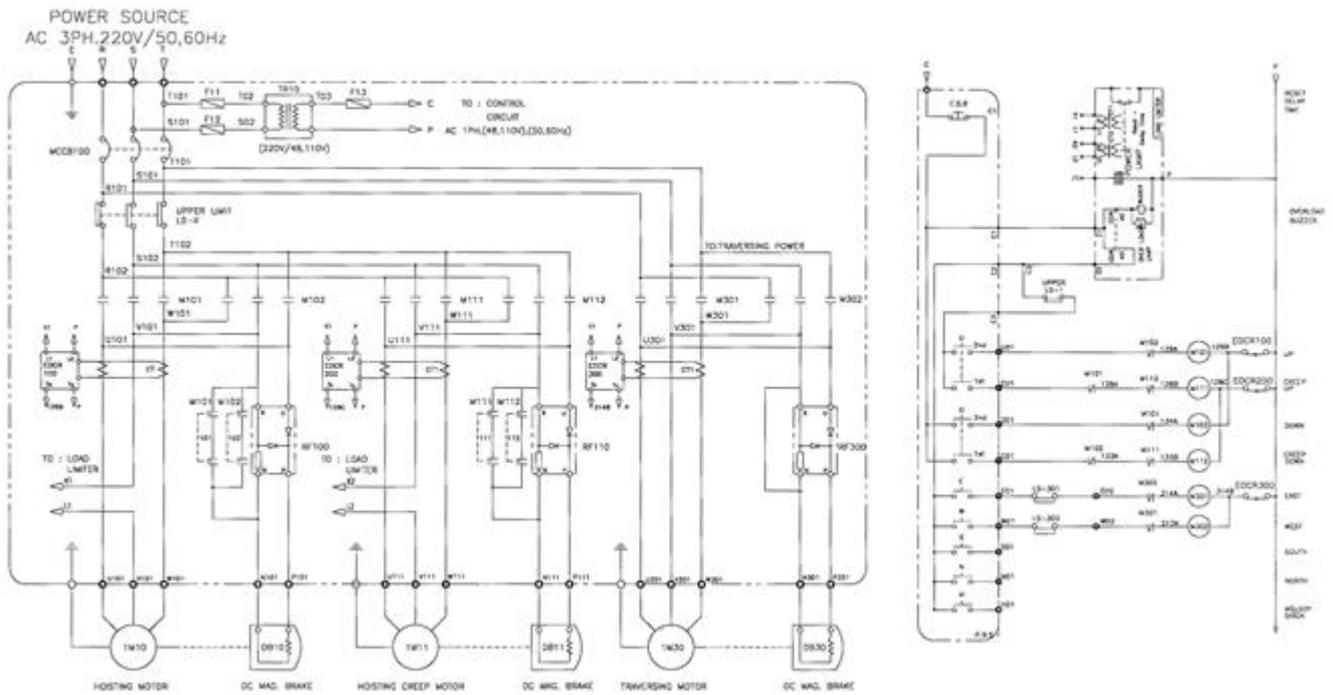
[0.5-7.5TON HOIST ELECTRIC CIRCUIT DIAGRAM]

◆ STANDARD HOIST 10~30 TON(380V~440V)



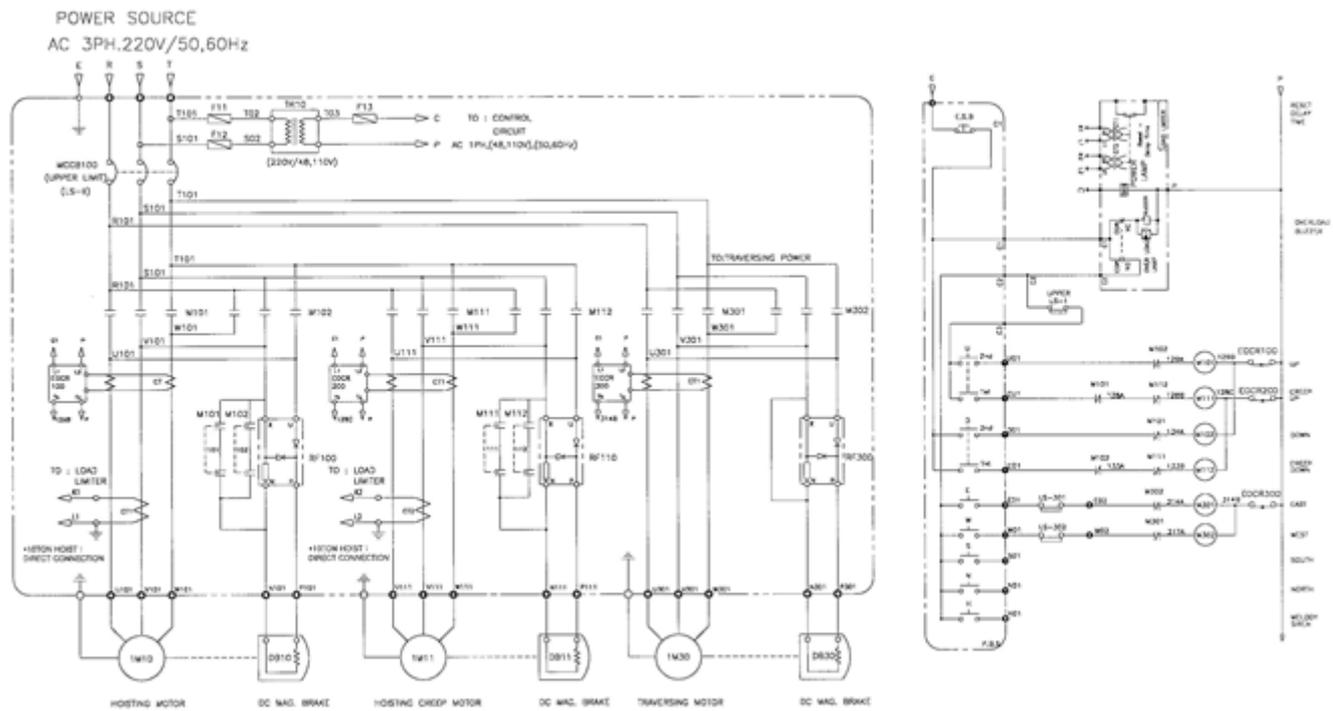
[10-30TON HOIST ELECTRIC CIRCUIT DIAGRAM]

◆ CREEP HOIST 0.5~7.5 TON(220V)



[0.5-7.5TON HOIST ELECTRIC CIRCUIT DIAGRAM]

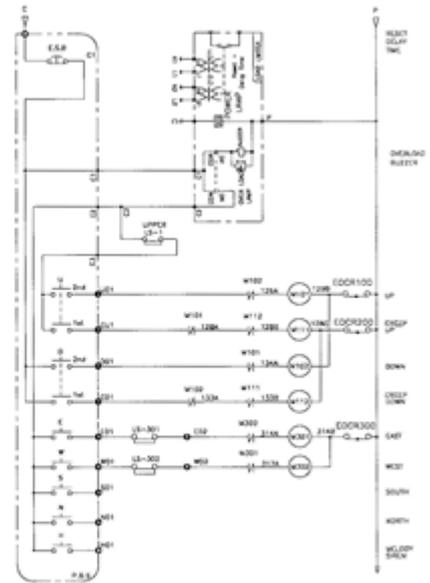
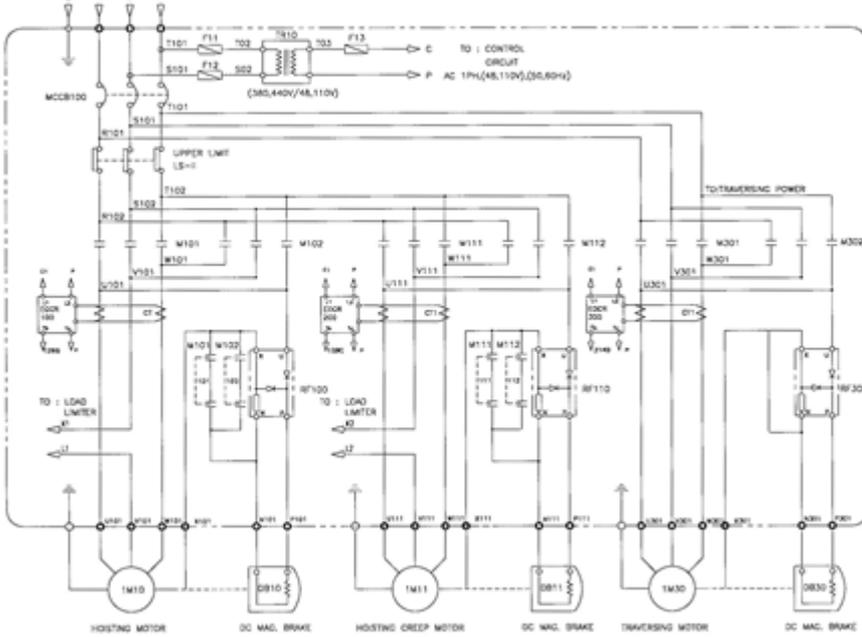
◆ CREEP HOIST 10~30 TON(220V)



[10-30TON HOIST ELECTRIC CIRCUIT DIAGRAM]

◆ CREEP HOIST 0.5~7.5 TON(380V~440V)

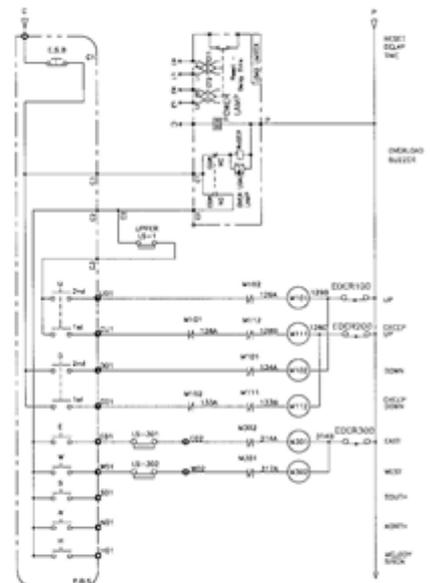
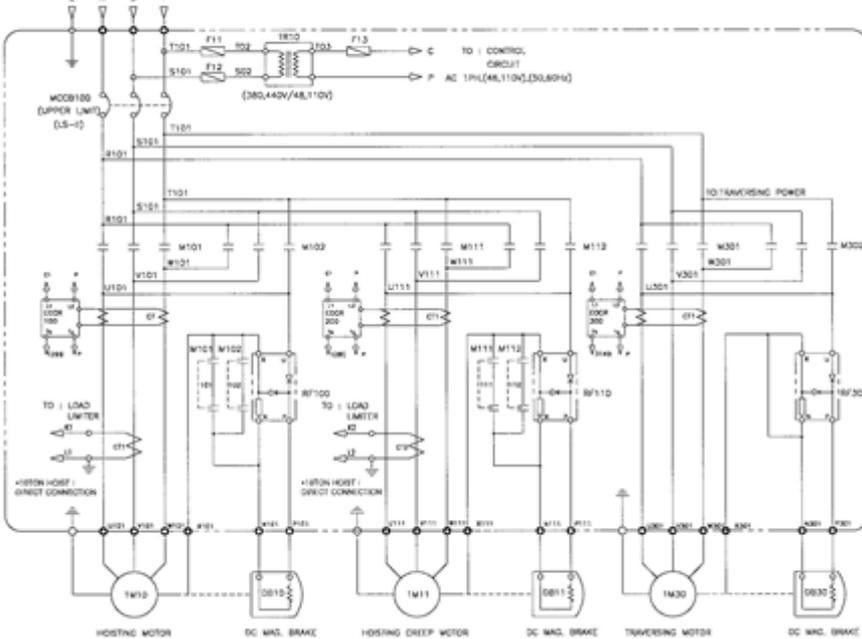
POWER SOURCE
AC 3PH.380,440V/50,60Hz



[0.5-7.5TON HOIST ELECTRIC CIRCUIT DIAGRAM]

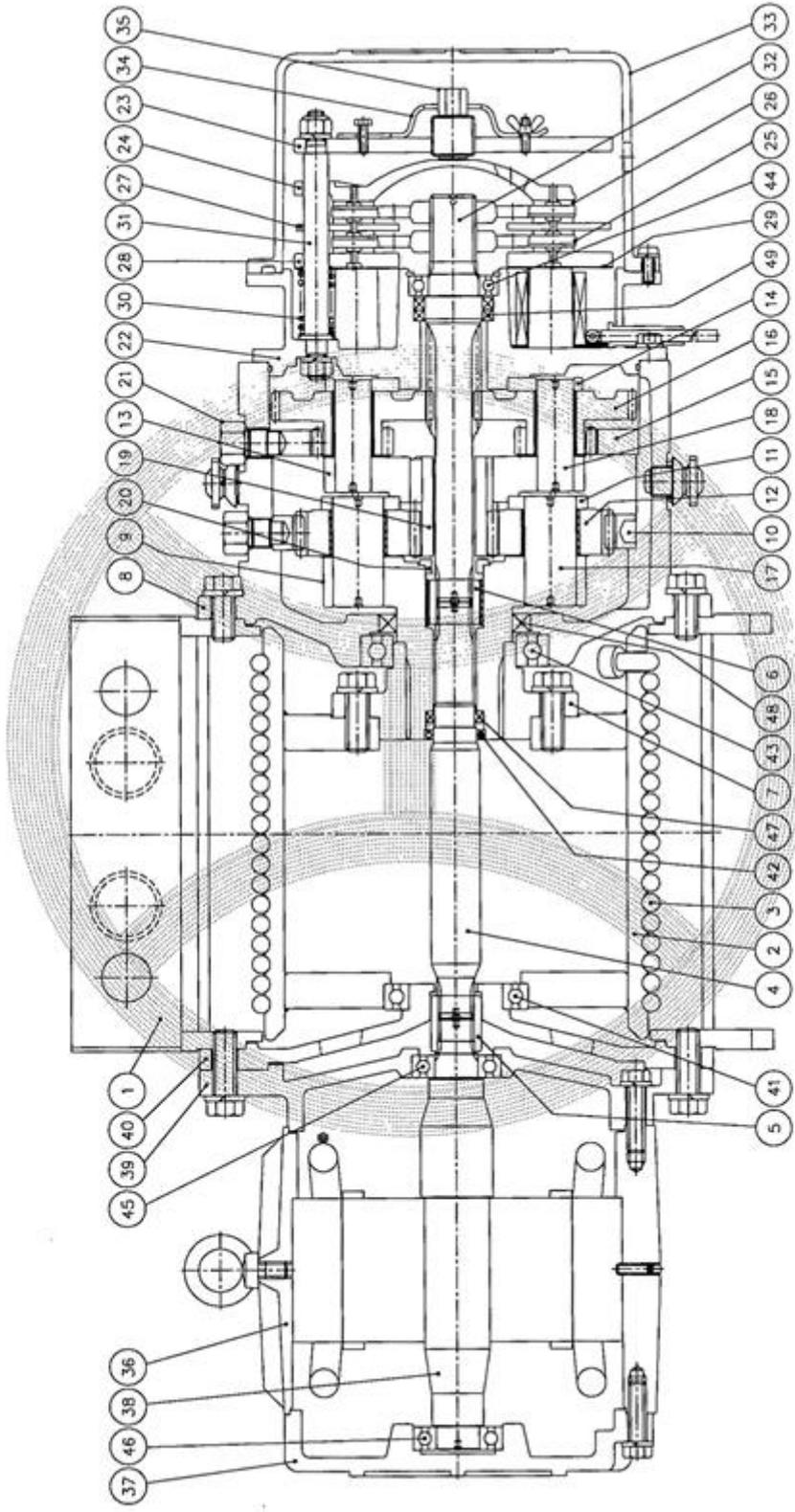
◆ CREEP HOIST 10~30 TON(380V~440V)

POWER SOURCE
AC 3PH.380,440V/50,60Hz



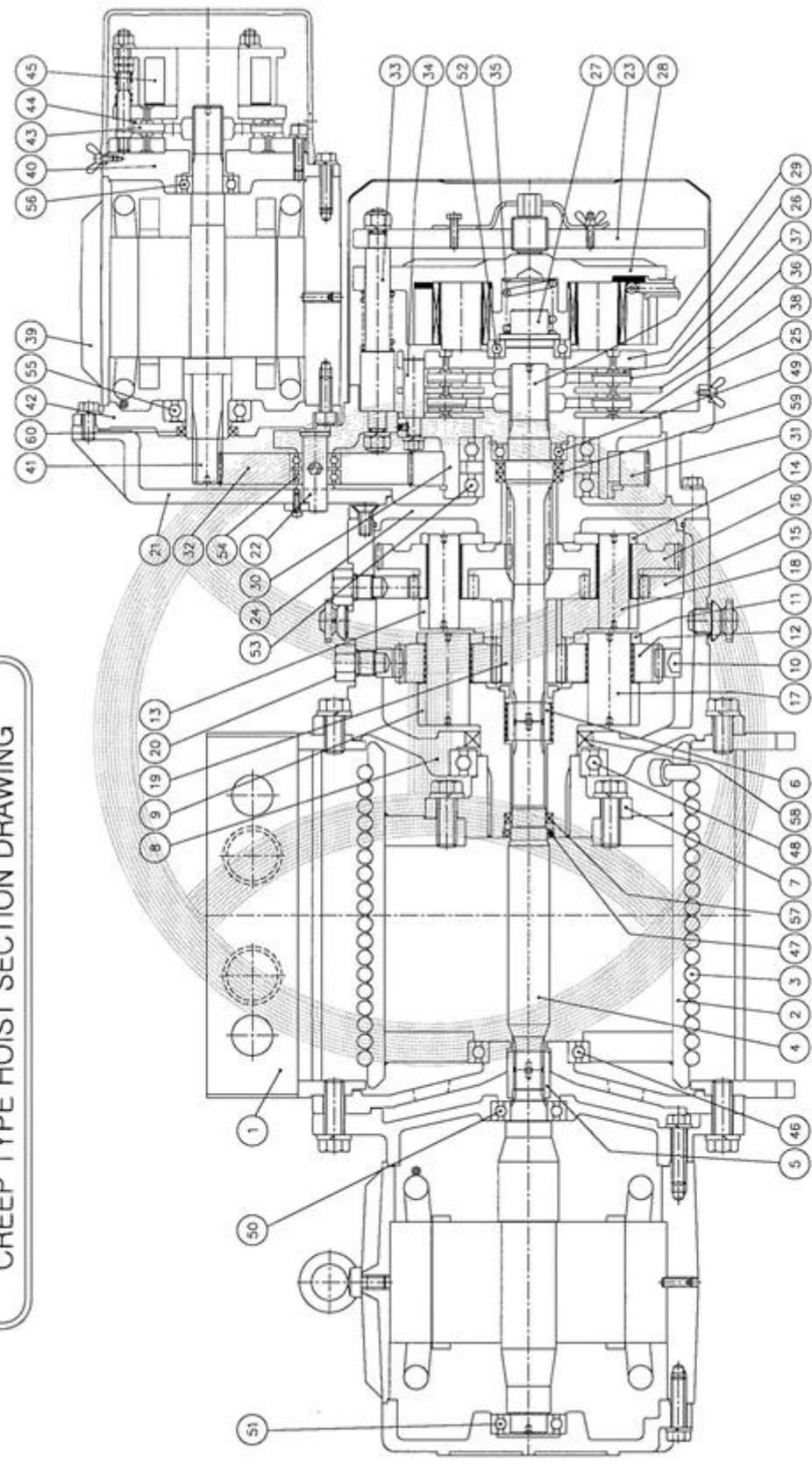
[10-30TON HOIST ELECTRIC CIRCUIT DIAGRAM]

NORMAL TYPE HOIST SECTION DRAWING



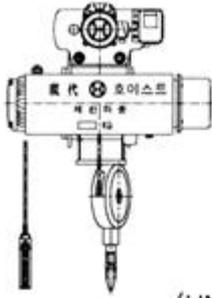
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1	DRUM CASE	SS400	1		11	2/GEAR CASE COVER	FC20	1		31	GUIDE PIN	S45C	3		41	BALL BEARING	PUR	1	
2	WIRE DRUM	SPCC38	1		12	2nd PLANET GEAR	S45C	3		32	MOTOR PINION	SCM4	1		42	BALL BEARING	PUR	1	
3	WIRE ROPE	PUR	1		13	1st GEAR CASE	S45C	1		33	BRAKE COVER	ABS	1		43	BALL BEARING	PUR	1	
4	MIDDLE SHAFT	S45C	1		14	1/2 GEAR CASE COVER	FC20	1		34	ADJUST HANDLE	SOP1	1		44	BALL BEARING	PUR	1	
5	MOTOR COUPLING	SCM4	1		15	1st INTERNAL GEAR	S45C	2		35	ADJUST BOLT	S45C	1		45	BALL BEARING	PUR	1	
6	REDUCER COUPLING	SCM4	1		16	1st PLANET GEAR	S45C	2		36	MOTOR FRAME	FC20	1		46	BALL BEARING	PUR	1	
7	DRUM COUPLING	S45C	1		17	2nd PLANET PIN	S45C	3		37	MOTOR COVER	FC20	1		47	OL SEAL	PUR	1	
8	GEAR CASE	FC20	1		18	1st PLANET PIN	S45C	2		38	MOTOR SHAFT	S45C	1		48	OL SEAL	PUR	1	
9	2nd GEAR CASE	S45C	1		19	2nd PINION	SCM4	1		39	MOTOR FLANGE	FC20	1		49	OL SEAL	PUR	2	
10	2nd INTERNAL GEAR	S45C	1		20	COLLAR/REDUCER	NYRONE	1		40	MOTOR DISC FLANGE	FC20	1						
					21	STOP BOLT	S45C	3											
					22	WASHER CORE	FC20	1											
					23	AMMATURE	SS400	1											
					24	BRAKE DISC "X"	FC20	1											
					25	BRAKE WHEEL	FC20	1											
					26	BRAKE LINING	PUR	4											
					27	BRAKE DISC "W"	SS400	1											
					28	MOVING CORE	SS400	1											
					29	SPACER PLATE	SUS304	1											
					30	BRAKE SPRING	SWP2	3											

CREEP TYPE HOIST SECTION DRAWING

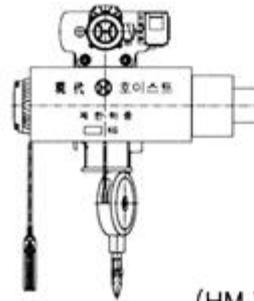
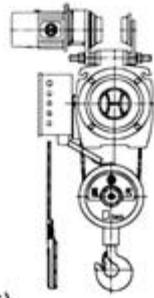


NO	PARTS NAME	MAT'L	QTY	REMARKS	NO	PARTS NAME	MAT'L	QTY	REMARKS	NO	PARTS NAME	MAT'L	QTY	REMARKS	NO	PARTS NAME	MAT'L	QTY	REMARKS	
1	DRUM CASE	S5400	1		21	3/4 GEAR CASE	FC20	1		41	MOTOR SHAFT	S2044	1		51	BALL BEARING	PUR	1		
2	WIRE DRUM	STPCLB	1		22	GEAR FIX PIN	S45C	1		42	MOTOR FLANGE	FC20	1		52	BALL BEARING	PUR	1		
3	WIRE ROPE	PUR	1		23	ARMATURE	S5400	1		43	BRAKE WHEEL	FC20	1		53	BALL BEARING	PUR	2		
4	MIDDLE SHAFT	S45C	1		24	GEAR FLANGE	FC20	1		44	BRAKE LINING	PUR	2		54	BALL BEARING	PUR	2		
5	MOTOR COUPLING	S2044	1		25	2 1/2 GEAR PIN A	S45C	3		45	DC MAGNET CORE	PUR	1		55	BALL BEARING	PUR	1		
6	REDUCER COUPLING	S2044	1		26	MOVING CORE	S45C	2		46	DC MAGNET CORE	PUR	1		56	BALL BEARING	PUR	1		
7	DRUM COUPLING	S45C	1		27	SPRING SHAFT	S45C	1		47	BALL BEARING	PUR	1		57	DRUM SEAL	PUR	1		
8	GEAR CASE	FC20	1		28	SPRING SHAFT	S45C	1		48	BALL BEARING	PUR	1		58	DRUM SEAL	PUR	1		
9	GEAR CASE	S45C	1		29	MOTOR PINION	S2044	1		49	BALL BEARING	PUR	1		59	DRUM SEAL	PUR	2		
10	2nd INTERNAL GEAR	S45C	1		30	2nd GEAR CASE	FC20	1		50	BALL BEARING	PUR	1		60	DRUM SEAL	PUR	1		
11	2/3 GEAR CASE COVER	FC20	1		31	3/4 GEAR	S45C	1												
12	2nd PLANET GEAR	S45C	3		32	IDLE GEAR	S45C	1												
13	1st GEAR CASE	S45C	1		33	ODDC PIN A	S45C	3												
14	1/2 GEAR CASE COVER	FC20	1		34	ODDC PIN B	S45C	3												
15	1st INTERNAL GEAR	S45C	1		35	C/2 BRACKET SPRING	SMP2	2												
16	REDUCER COUPLING	S2044	1		36	BRAKE WHEEL	FC20	2												
17	2nd PLANET PIN	S45C	3		37	BRAKE LINING	PUR	4												
18	1st PLANET PIN	S45C	2		38	BRAKE DISC "B"	S5400	1												
19	2nd PINION	S2044	1		39	MOTOR FRAME	FC20	1												
20	STOP BOLT	S45C	3		40	MOTOR COVER	FC20	1												

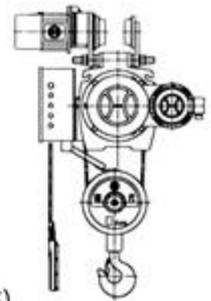
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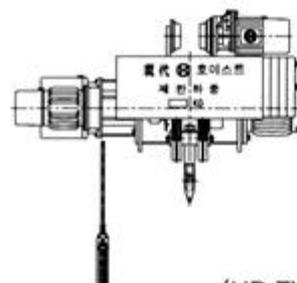
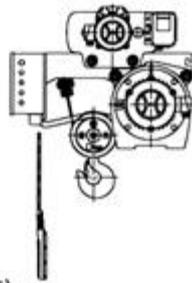
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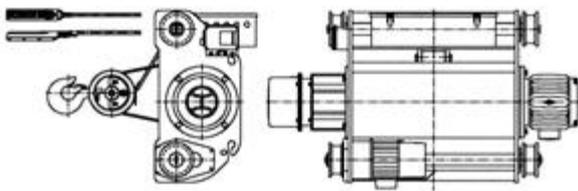
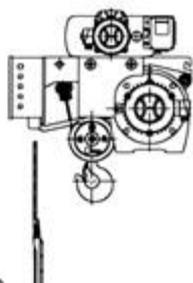
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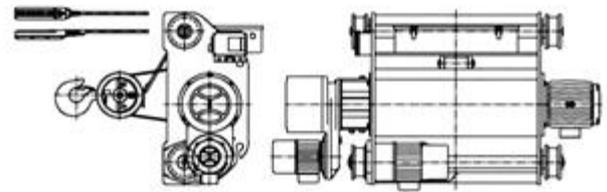
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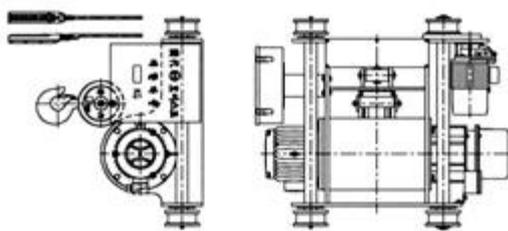
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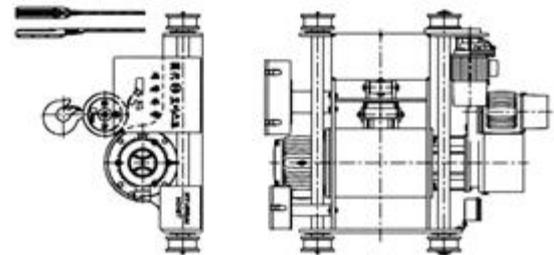
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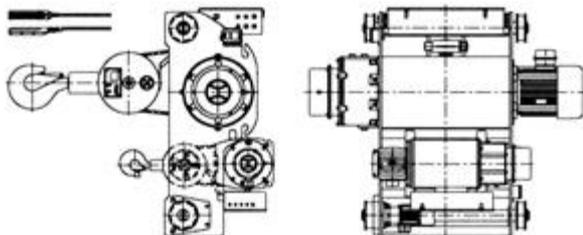
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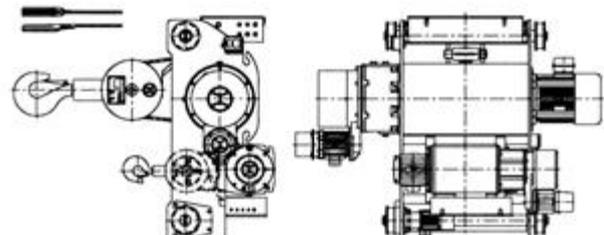
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(HT TYPE)



(HP TYPE)



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