INSTRUCTION MANUAL

AIR HOIST

E H V 2 5 S
E H V 4 9 S

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WARNING

- Never use the hoist for lifting or lowering people.
- Supply this manual to the user.
- Read this manual before installation, operation, or maintenance.
- Keep this manual available.

ENDO KOGYO CO., LTD

ENDO

HM-10165b

Issued on May 2018

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SAFETY ALERT SYMBOL AND ALERT SIGNS

Please read this manual carefully and follow its instructions.
The SAFETY ALERT SYMBOL (⚠), WARNING, CAUTION, and NOTE carry special messages.

⚠	This SAFETY ALERT SYMBOL is used to call your attention to items or operations that could be dangerous to you or other persons using this equipment.Please read these messages and follow these instructions carefully.

⚠ **WARNING**	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ **CAUTION**	CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury, damage or destruction of the equipment and others.

NOTE	NOTE indicates a special instruction in operation or maintenance.

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Scope of warranty and liabilities for the equipment

1. We will repair or replace the product free of charge if a failure due to manufacturing defects occurs under proper usage during the warranty period.
   For details, contact us or your dealer.
2. The warranty will be void in the following cases:
   1) Change in ownership.
   2) Repair, adjustment, or modification performed by a party other than the manufacturer, agents, or dealers.
3. The warranty period is one (1) year from the date of purchase except for consumables.
4. Repairs applicable to any of the following shall be charged even during the warranty period:
   1) Failure/damage caused by incorrect use.
   2) Failure/damage caused by use of non-genuine parts.
   3) Failure/damage caused by fire, earthquake, natural disaster, or other unexpected incident.
   4) Incident caused by fall, shock, negligence, or by inadequate storage.
   5) Failure/damage caused by use of parts or other equipment that are not included in this product.
   6) Replacement of consumables.
   7) Usage in violation of dangers or cautions stipulated in this Instruction Manual or the warning labels.
   8) Failure/damage caused by any reason that is not attributable to the manufacturer.
5. Warranty exclusions such as mechanical loss.
   Either during or after the warranty period, mechanical loss, damage to anything other than our product(s), or other duties incurred on you/your customer as a result of the failure of our product(s) are outside the scope of the warranty

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Important

- Before installing or operating the air hoist, carefully read and understand all of the instructions in this manual in order to avoid accidents as a consequence of incorrect handling.
- All of the people who will install, operate or maintain the hoist, should read this manual.
- After reading, keep this manual available for maintenance and inspections.
- Be sure to abide by trade associations', local and national rules and regulations relating to safety.
- Strictly obey the contents described in this manual.

⚠ I . WARNIG – READ THESE INSTRUCTIONS

If the hoist is not used correctly, a serious accident may occur, such as dropping the load or the hoist itself. Observe the following instructions for safe operation.

・The following safety precautions should be posted in a conspicuous location.

1. General Handling

- Anyone who operates the hoist must know and observe the safety rules and regulations.
- Do not operate the hoist unless the contents of this manual and warnings on the caution plate are completely known.
- Only allow qualified people to operate the hoist.
  Do not operate the hoist without being qualified and familiar with the safety rules, etc.
- Install the hoist properly and carefully.
- Be sure to check the hoist before each shift, and inspect it periodically.

2. Operation and Handling

- Never lift a load greater than the rated capacity of the hoist.
- Never use the hoist for lifting or lowering people, and never stand on a suspended load.
- Never operate the hoist if it is damaged or has a malfunction.
- Never operate the hoist with the load chain in any of the following conditions:
  ① Twisted, kinked or deformed.
  ② When elongation or the reduction of diameter exceeds the service limits.
  ③ Cracked, damaged or corroded.
  ④ Improperly engaged on the chain wheel.
- Never carry loads over people.
- Be certain there are no objects in the way of the load or hook when moving the hoist.
- Always stand clear of the load.
  Never walk under a suspended load, and keep out of its area of projection.
  Never place hands, feet, etc., under or between suspended loads.
- Never leave a load suspended for any extended period.
- Never use the load chain as a sling.
- Never use a load chain as a ground for welding.
  Do not attach a welding electrode to the hoist or sling chain.
- Never use the upper and lower limit switches as a means of stopping the hoist - these are emergency devices only.

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- Before each shift, check the hoist for wear or damage.
- Check brakes, load chain, limit switches, etc.
- Stretched, worn or damaged hooks should be discarded.
- Do not attempt to repair it, just replace it with the new hook.
- Do not use the hook with a damaged or malfunctioning hook latch.
- Be sure that all slings are correctly positioned on, or attached to the load hook.
- Never splice the hoist chain by inserting a bolt between links or by any other means.
- Do not force a load chain or hook into place by hammering, and never insert the point of the hook into a chain link.
- Always operate the hoist carefully during lifting and lowering operations.
- Do not start suddenly, do not stop suddenly, and do not reverse the hoist suddenly.
- Never lock the pull rope or the push button switches. The hoist must be operated by the operator himself/herself at all times.
- Never operate the hoist when the load block is not centered under the hoist. Do not pull the load at an angle. Move the hoist over the loads' center of gravity before lifting the load.
- Ease the slack out of the load chain when starting to lift. Do not jerk the hoist. Carefully take up the slackened load chain.
- Always keep the load chain clean and well lubricated. Do not drag the load chain or hook on the floor.
- Be careful the suspended load does not touch the nearby structure or power lines, etc.
- Be careful the hoist or trolley does not collide with the I-beam stopper or the structure.
- Do not swing the load or load block when moving the hoist.
- When moving a load with the trolley, do not push the load chain but push the load itself. Do not pull the load.
- Pay attention to the load at all times when operating the hoist.
- Keep the load block overhead when not in use.
- Do not operate the hoist if you are not physically fit to do so.
- The operator must have good hearing, vision and depth perception.
- Do not lift any single load with 2 or more hoists.
- Properly secure an outdoor hoist before leaving it unattended.
- Be sure to protect the hoist from rain and water.
- Never use the emergency stop button in the usual stop operation - this is an emergency device only.
- Rectify any dangerous situation before releasing the emergency stop button when the emergency button is activated.
- Do not loosen or remove the emergency stop button. Tighten the emergency stop button by hand if loosened.

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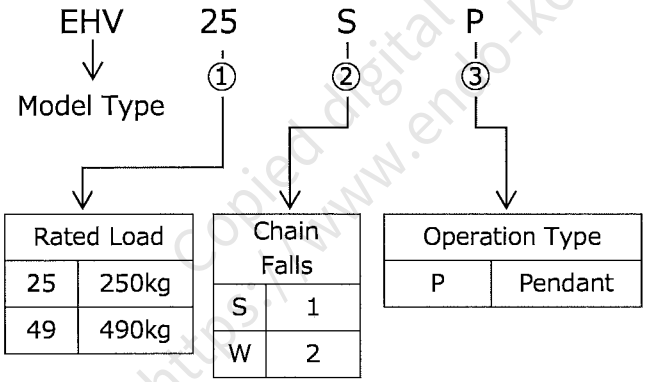
3. Maintenance and Alterations

- Never alter the hoist or its accessories.
- Be sure to shut off the air supply before performing any maintenance work on the hoist.
- Periodically, inspect the hoist thoroughly and replace worn or damaged parts.
- Always employ qualified or well trained personnel for inspection and maintenance.
- Only use genuine parts.
- Follow the lubrication instructions.
- Never operate the hoist without lubricator and filter.
- The air pressure must never exceed 0.6 MPa {6 kgf/cm^2}
- Do not do anything if you have any questions about the hoist, please do not hesitate to contact the dealer from whom you purchased the hoist, or the nearest dealer shop.

II. Specifications



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Model description

① This shows the rated load.

② This shows the number of chain falls-S is single fall and W is double falls.

③ This shows the operation type. P means Pendant control.

Standard Specification (Pendant type)

Model	Rated Load	Standard Lift	Air pressure	Lifting Speed	Air consumption	Chain	Air Inlet	Length of control Hose	Mass
	kg	m	MPa {kgf/cm²}	m/min	m³/min [normal]	Size x falls	Rp	m	kg
EHV25SP	250	3	0.4{4} 0.5{5} 0.6{6}	12.0 16.0 18.0	0.9 1.3 1.6	6.3×1	1/2	2.0	23
EHV49SP	490	3	0.4{4} 0.5{5} 0.6{6}	7.5 9.0 10.5	0.95 1.3 1.65	6.3×1			23

Working conditions

Application area : Indoor and normal atmospheric conditions
Temperature range : -10℃ to +50℃

Pull Rope control

Pull rope control needs additional parts. Please see "XIII. Change into Pull rope (Control handle)" for Pull rope control.

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III. Checks and Cautions before Installation

1. Checks of the Product

- Check the delivered hoist is what you ordered (check the name plate).
- Check there was no damage to the hoist during transportation.
- Check the pressure of the available air supply corresponds to the working air pressure of the hoist.

2. Instructions on Working Conditions

⚠ WARNING

- Never use the hoist at a temperature below -10℃ or above +50℃.

⚠ CAUTION

- Do not install and leave the hoist outdoors. If it is necessary to use the hoist outdoors, be sure to make a shelter with a roof for housing the hoist.
- Under hostile environments such as high temperatures, high humidity, acidic, corrosive and/or extremely dusty atmospheric conditions, the mechanical parts of the hoist may be seriously damaged (for example, corroded).
  Therefore, frequently check the hoist is maintained in normal conditions at all times.

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IV. Installation

1. Installation of pendant switch

■Fitting Pendant switch to the main body (See Fig. 1)

Pendant switch is separated from the main body when it is delivered.

Assemble pendant switch to the main body before air hoist installation.

-1) Loosen Machine screws on Cover(i).

-2) Assemble Cover(ii) between Cylinder and Valve housing with Cap screws.

-3) Fix Tubes on Tube connector according to the indicated colors.

-4) Fix Cover(i) with Machine screws.

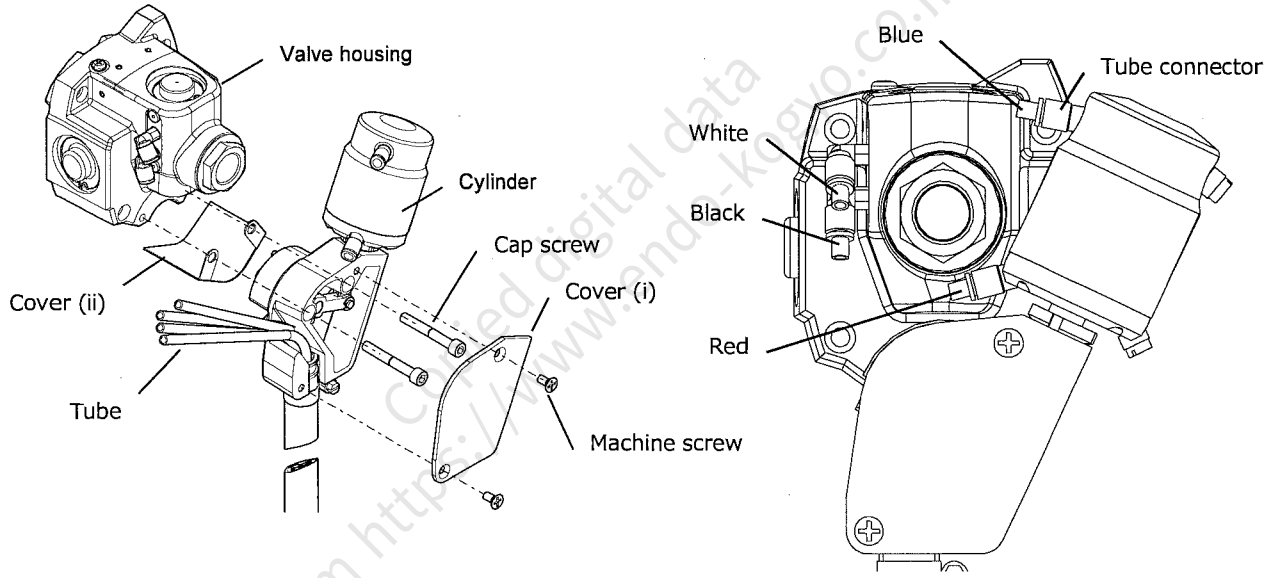

Fig.1

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2.Installation

> **⚠ WARNING**
>
> - **Make certain the hoist is properly installed. Otherwise, it could result in dropping the hoist and personal injuly or death.**
> - **Always make certain the supporting member from which the hoist is suspended is strong enough to support the weight of the hoist plus the weight of the maximum rated load, etc.**

- Check Hook is correctly rigged onto the supporting member and Hook latch is correctly closed.
- Never suspend the hoist as an I-beam flanges.
- Do not use a supporting member that suspends the hoist at an angle. Otherwise, it could result in dropping the hoist and personal injury or death.
- Do not install hook to edged supporting member The hook is easily worn and degraded.

■ **Supporting hunger is possible to support Air hoists with supporting wire rope or supporting chain.**

Installation for using supporting hanger

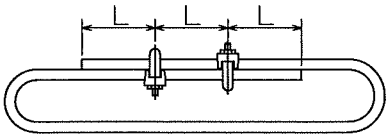
① The support member installed supporting chain or supporting wire rope must be different member from the support member installed top hook.

② The safety factor of the support member installed supporting chain or supporting wire rope must be plenty for supporting Air hoists and for the rated load of Air hoists.

③ Adjust supporting wire rope to keep the falling distance of Air hoists within 100mm in case Air hoists fall down.

④ Case1: Using supporting wire rope

- Let supporting wire rope through Cap screw (132) attached to Casing(1) and the connecting part.
- Use more than 2 wire clips for connecting wire rope
- Use forging wire clips for connecting wire rope.
- Refer to Fig.2 shows the mounting distance of wire clip.
- Process the end of supporting wire rope to prevent it from untwists.
- Bend up the tip of Split pin (134) completely. Split pin (134) is not bent completely at the time of dispatching from the manufacturer.



Dimension of L is 6-7 times the diameter of wire rope

Fig.2

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⑤ Case2: Using supporting chain

- Remove Cap screw(132), let supporting chain through supporting hanger and assemble Cap screw(132) again.
- After fix Hex. slotted nut(133) temporally by hand, place Hex. slotted nut (133) back to fit the slot of Hex. slotted nut (133) to the hole of Cap screw(132).
- Insert Split pin (134) into the hole of Cap screw(132), and bend up the tip of Split pin (134)

Note : Never use bended split pin again. Replace it with new one when remove bended split pin.

⑥ Refer to Table.1 for choosing supporting wire rope, chain, and connecting parts.

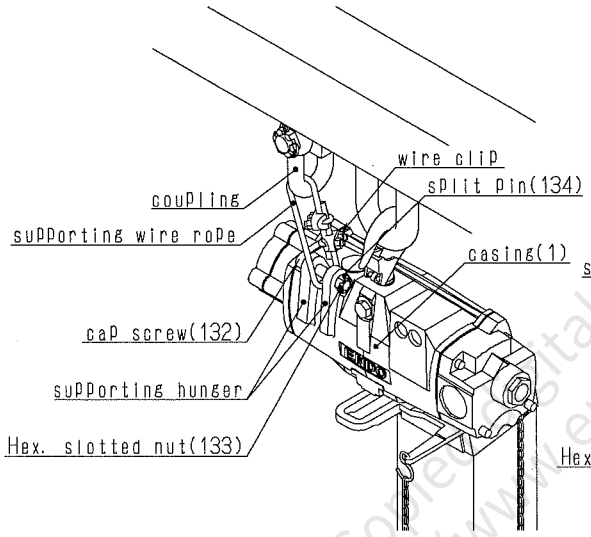

Fig.3 example of using supporting wire rope

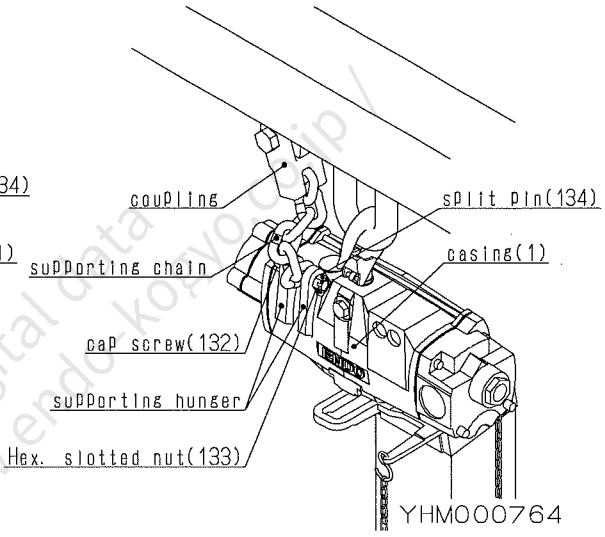

Fig.4 example of using supporting chain

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Table.1 Specification of supporting wire rope and supporting chain sling.

Model	Wire rope ϕ 6.35mm(A7×19) Breaking load 31.1kN or more	Wire rope ϕ 9.0 mm (6×24) Breaking load 37.1kN or more	Wire rope ϕ 10.0 mm (6×24) Breaking load 45.8kN or more	Chain sling Diameter 10.0 mm Breaking load 125kN or more	Working load of connecting part t
EHV25S	○	○	○	○	0.5
EHV49S	×	○	○	○	1.0

In case supporting hanger is not used, bend Split pin (134) both side completely or dismount Cap screw (132).

3. Before Air Connection

- Check sufficient air can be supplied to the operating area of the hoist.
  Compare the air supply from the compressor to the air consumption of the hoist
  (See Chapter II "Specifications").
  For a pipe of excessively small diameter or of great length, the pressure drop can become large enough to prevent the specified performance.
- Use an air hose whose inside diameter is at least 12.5 mm (1/2 in.).
- Before connecting the air hose or pipe to the hoist, be sure to flush out or blow out with air to prevent the invasion of foreign matter (dust, etc.) into Air motor.
- Compressed air supplied to the hoist should be free from moisture or foreign matter.
  Install an air filter to eliminate them from air supply.
- The hoist is designed to operate within a working pressure range of 0.4 ~ 0.6 MPa {4 ~ 6 kgf / cm^2 }.
  Keep the working pressure no greater than 0.6 MPa.
  If necessary, use an air regulator for reducing air pressure.
- Install a lubricator to feed lubricant to Air motor. See Chapter IX "1. Lubrication ".
  (Do not operate the hoist without lubricant.)
- Connect the air filter, regulator and lubricator as close to the hoist as possible.
- When the air hose is connected to the hoist, pour about 10 drops of lubricant into the connecting port of the hoist. (See Chapter IX "1.(6) Recommended Lubricants".)
- Install a dump valve (drain valve) at the lowest point in the piping.

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V. Checks after Installation and Test Run

1. Load Chain

Check the welds on Load chain are faced away from the center of Chain wheel (See Fig. 5).

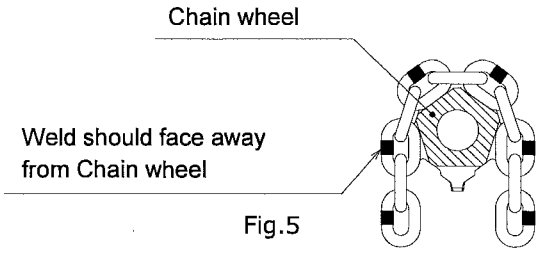


Fig.5

2. Hoisting Operation

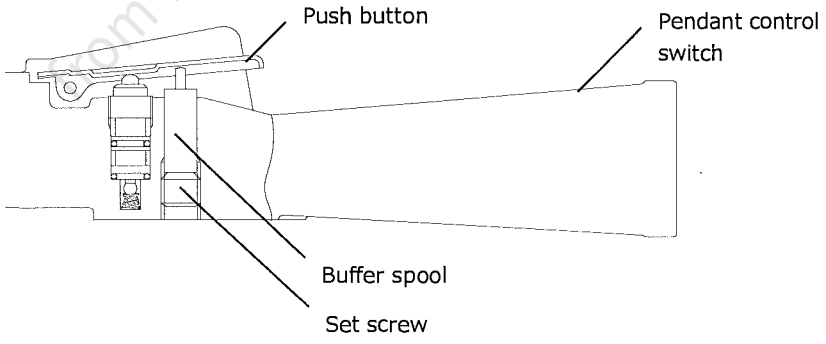
At the initial operation, repeat up/down operations several times at low speed, then go to the full-speed operation. Adjust the speed by controlling the pulling force on Pull rope (for Pendant control switch, adjust the pushing force on buttons).
At this point, check the lubricator is feeding lubricant to Air motor.
(See Chapter IX "1. Lubrication ".)

- Pull Rope Type
  Pull down Red grip (marked ↑) of Control handle. If Hook goes down, Control chain is incorrectly attached to Control lever, hence Control chain must be attached to the other side of Control lever, and checked for correct operation again.

- Pendant Control Type
  Push the button ↑ on the push button switch panel.
  If Hook goes down, the hose is incorrectly connected to the cylinder.
  Reverse the connection to the cylinder, and check for correct operation.

  When Push button is pressed slightly, Push button first touches Buffer spool.
  The hoist will start lifting/lowering at low speed in this state.
  As Push button is pressed, the hoist will increase speed from low to the maximum.

  Buffer spool is set before delivery so that the hoist will start lifting the rated load at low speed when the air pressure is 0.4 MPa {kgf/cm^2}.
  If necessary, the starting speed can be adjusted by resetting the Buffer spool position.
  Turn Set screws counterclockwise to increase, turn clockwise to decrease.



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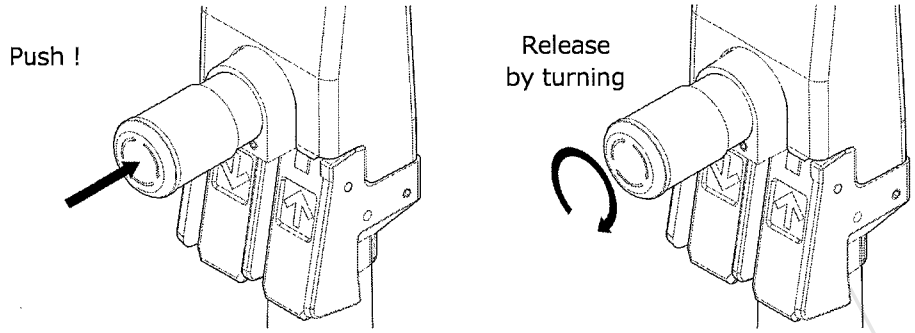
■ Emergency Stop Device

- Push Emergency stop button strongly while pressing Push button during the lifting and lowering operation.
- Loosen Push button, then release Emergency stop button by turning clockwise as indicated by the arrow.



⚠ WARNING

- Never release Emergency stop button while pressing Push button.
  The hoist will operate suddenly, causing serious danger.
- Do not turn Emergency stop button counterclockwise (opposite to the arrow).
  If turned, Emergency stop button will become loose and air may leak, causing serious danger.
  Tighten Emergency stop button by hand if loosened.

- Check the lifting/lowering operation is normal after releasing Emergency stop button.

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3. Hoisting and Lowering Limit Switches

After checking Control handle or Pendant control for correct operation,
slowly lift Load hook (Bottom hook) to the upper limit.
At this point, Control lever is pushed up by Load hook so that the hoist is stopped automatically.

Next, slowly lower Load hook to the lower limit.
Control lever is lifted up by Load chain so that the hoist is stopped automatically.

Ensure these operations are carefully carried out (See Fig. 6).

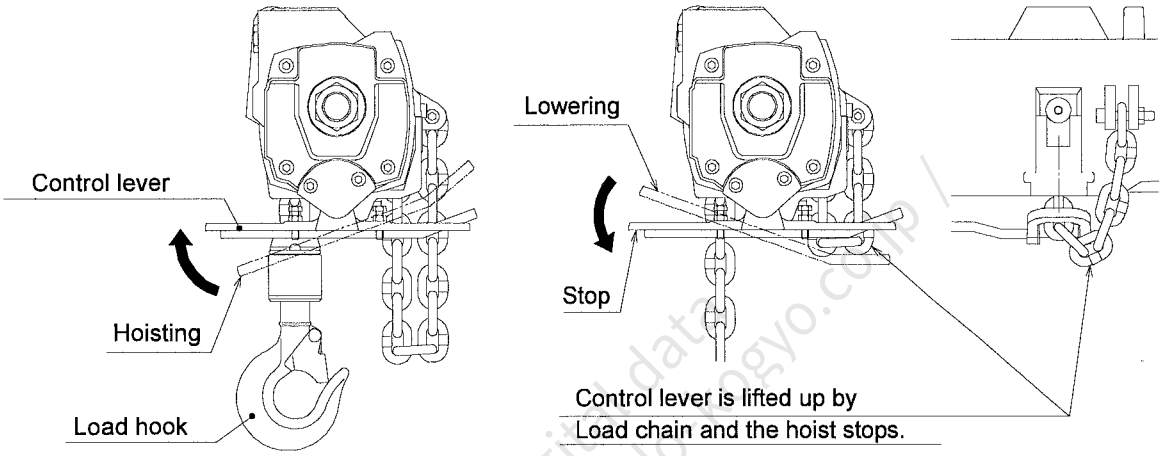

Fig.6

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4. Load Test

- Lift the rated load a few inches off the floor and check ability of braking system to stop and hold the load without excessive drift.
- In case of using the hoist with the trolley, traverse the trolley over the entire length of I-beam with the rated load suspended a few inches off the floor.
  Check the condition of I-beam and the length of the air hose.
- Lift 125 % of the rated load and check the operation. This test should be performed for the safety check concerning the hoist, I-beam, etc.

VI.OPERAION - Proper Operation and Caution

⚠ CAUTION: Only allow qualified people to operate the hoist.

1. Never exceed the rated load of the hoist.

- Never lift a load greater than the rated load.

＊Otherwise, the hoist may be damaged or the suspended load may drop, causing serious danger.

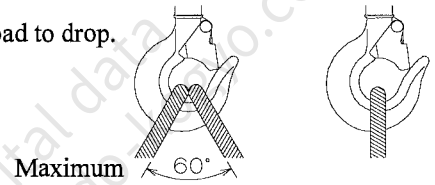
2. Before operating the hoist, check the condition of Load chain.
See Chapter V "1. Load Chain" and Chapter IX "2.(2) Inspection of Load Chain and Service Limit".

- Do not operate the hoist if Load chain is stained or unlubricated.
  ＊Otherwise, Load chain will wear out, making the hoist operation dangerous.

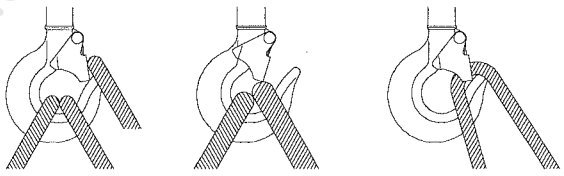
3. Properly hang the slings (suspension fastenings).

Position the slings at the center of the Load hook saddle.

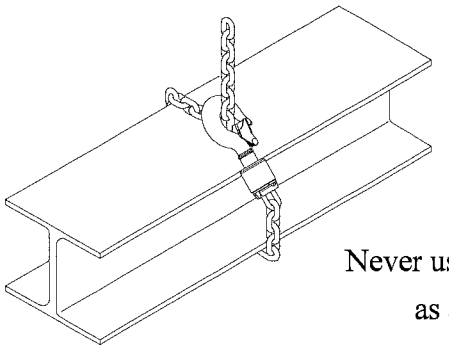
- Incorrect positioning of the slings can cause the load to drop. Always hang the sling securely to avoid slipping.
- Never use Load chain as a sling.
  ＊Otherwise, Hook and Load chain may be damaged or the suspended load may drop, causing serious danger.
- Discard Hook if stretched or damaged. Do not attempt to repair it, just replace it with a new Hook. When Hook latch is damaged or malfunctioning, do not use.
  ＊Otherwise, the sling may slip from Hook or the suspended load may drop.
- Use the appropriate sling according to the weight and shape of the load.



Correct use



Incorrect use



Never use load chain as a sling!

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4. Move the hoist over the loads' center of gravity before lifting.

- Do not pull a load at an angle.

＊Otherwise, the load may slip on the floor or swing when lifted, causing serious danger.
In addition, the hoist may possibly be damaged.

5. When starting to lift, stop hoist once as Load chain becomes tensioned.

Carefully take up the slackened Load chain.
Thereby, lift-off shock can be reduced, while preventing the hoist from damage.

- Stop once and check the condition of the sling.
- Check the balance of the load by slightly moving or lifting the load.

6. Carefully lift and lower the load without swinging.

- Do not lift or lower with the load swinging. Even if there is no load, do not swing Load hook.

＊Otherwise, Load chain may be damaged due to the irregular winding or the suspended load may drop.

- Be careful Load hook or the suspended load does not touch the structure, etc.

＊Otherwise, the hoist may be damaged or the suspended load may drop due to abnormal shock.

7. Stop lifting or lowering before Upper or Lower limit switches are activated.

- Never use Upper and Lower limit switches as a means of stopping hoist.

＊Otherwise, Control lever may become worn or deformed, causing failure in an emergency.

8. Employ 1 hoist for hoisting and lowering.

- Do not lift any single load with 2 or more hoists.

＊The air hoist is different from the electric hoist, hoisting speed varies depending on the weight of the load, pressure or flow rate of supplied air, etc.
Therefore, 2 hoists can not be operated at the same speed.
When this is done, a dangerous situation will occur, as the load is applied to only one hoist, creating overloading.

9. Carefully traverse the trolley to prevent the load from swinging.

- When moving the load with the trolley, do not push Load chain but push the load itself.
  Do not pull the load.
- Do not pull the trolley by pulling Control chain (Pull rope type) or Control tube (Pendant control type).

＊Otherwise, an operating mistake may occur and the chain or the tube may be damaged.

- When traversing the trolley, be careful that the trolley does not collide with the I-beam stopper.

＊Otherwise, excessive shock may cause the suspended load to drop or the hoist to be damaged.

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10. Correctly operate the hoist.

- Do not reverse the hoist suddenly.
  When reversing, stop lifting or lowering once.
  Do not start suddenly, do not stop suddenly.

* Otherwise, shock may occur and the hoist may be damaged.

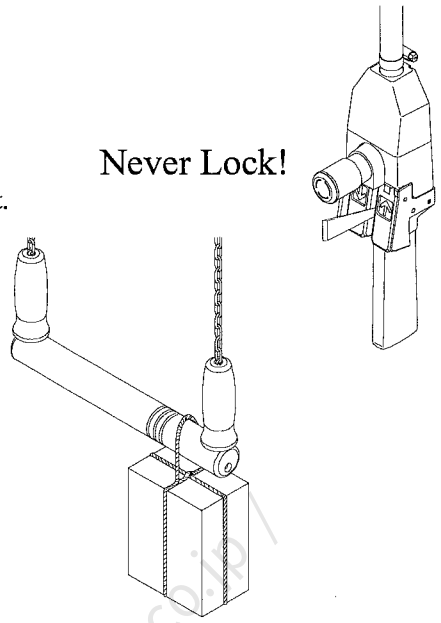
- Smooth operation for lifting and lowering is very important.

- Never lock Pull rope or the push button switches.

* Otherwise, the hoist can not be operated in an emergency, causing serious danger.

- After operation, do not let go of Pull rope or the push button switch panel until it has been centered below the hoist.

* Otherwise, the Pull rope or panel may swing and hit something, causing an operating mistake or damage.



11. Be sure to unload all loads on the floor.

- Never leave a load suspended.

* This is a serious hazard for any person near the suspended load.

12. Carefully choose a safe position for operation and check the surroundings.

- Never walk under a suspended load or in the traveling area of the load.

* Serious danger if the load drops.

- Never stand on a suspended load.

* The suspended load is very unstable, causing a person or the load to drop.

- Never carry a load over people.

* Serious danger if the load drops.

- Before operating the hoist, be sure to check that no one is in the travelling area of the load.

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VII. Checks before Operation (At the beginning of each shift)

Be sure to execute the following checks at the beginning of each shift.
If there is anything unusual noticed, do not use the hoist until the problem has been corrected.
Never operate the hoist if damaged or malfunctioning.
At least the following items should be checked:

1. Check before Start up

1) Check Load chain is not twisted, kinked, damaged, or worn.
Wear or damage on the chain can not be detected by casual or formal observation.

See Chapter V "1. Load Chain" and Chapter IX "2.(2) Inspection of Load Chain and Service Limit".

2) Keep Load chain clean and well lubricated.

3) Check Load hook is not stretched or damaged
and Hook latch is in the normal position.

4) Check the support bearing of Load hook is not
damaged, and swivels easily and smoothly.

5) Check the trolley wheels track the rails properly
and the wheels and rails are not worn.

6) Check the lifting sling (suspension fastening) is not damaged or worn.

2. Check by Idling Operation

1) Check Pull rope or the push button switches can be easily operated and
the up/down operations are correct as indicated.

- Check hoisting speed can be changed from low to high speed
by controlling the pulling force on Pull rope or the pushing force on the push button switches.

2) Check Load chain flows freely and smoothly into and out of the Chain wheel and there is no noise
indicative of binding or other malfunctions.

3) Check Upper and Lower limit switches function correctly.
See Chapter V "3. Hoisting and Lowering Limit Switches" .

4) Check the hoist is not abnormally noisy or vibrating.

3. Check by Load Operation

1) Lift the rated or near the rated load a few inches off the floor and check ability of braking system to stop
and hold the load without excessive drift.

2) Check Load chain flows freely and smoothly into and out of the Chain wheel and there is no audible
clicking or other evidence of binding or malfunction.

3) Check the hoist is not abnormally noisy or vibrating.

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VIII. Periodic Inspections

Be sure to periodically inspect the hoist for safe operation.

- **Before inspection, shut off the air supply completely.**
- Preparing a special table for inspection is recommended.

■ Monthly Inspection

Inspect the hoist at least once a month.
Correct and repair any problems which are detected.

- Required interval for inspection depends on the operating environment, operating frequency, and loading conditions of the hoist.
  Therefore, make the inspection interval shorter according to your operating condition.
- For inspection items and methods, **see Chapter IX "2. Inspection" .**

■ Annual Inspection - Disassembly is required

Completely disassemble the hoist at least once a year for inspection and maintenance.
Correct and repair any problems which are detected.

- Inspect the hoist yearly or every 1000 hours of operation, whichever is shorter.
  If daily operation time exceeds 5 hours, inspect the hoist every 6 months.
  However, the required interval for inspection also depends on the operating environment and loading conditions of the hoist.
  Therefore, make the inspection interval shorter according to your operating condition.
- For inspection items and methods, **see Chapter IX "2. Inspection".**

■ Service Limit of Parts

If any part is found to be worn beyond its service limit in the monthly, annual, or other inspections, never reuse it.

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IX. Maintenance and Inspection

1. Lubrication

(1) Air motor

- To prevent Air motor from dry operation, continuously lubricate using a lubricator.
- Adjust the frequency and volume of lubrication at the lubricator so that one drop of lubricant might fall off from the nozzle when the hoist works with no load at one meter lift 3 times.
- Periodically check the oil level in the lubricator, and replenish if necessary.
  Do not allow the oil level to go below the indicated line.
- Periodically remove drain water deposited in the air filter bowl.

(2) Reduction Gear

- The reduction gear has been greased before shipment.
- Replace grease in the reduction gear when the hoist is disassembled for maintenance or inspection. Daily lubrication is not required.
- Required quantity of grease is 150 cm^3 (150 mL). Lubricate 50 cm^3 (50 mL) respectively in each of the two gear stages, and 50 cm^3 (50 mL) in the space between Internal gear and Casing.

(3) Load Chain

- Always keep Load chain and the chain anchor pin clean and well lubricated.
- Before installation, load test or initial operation, be sure to lubricate Load chain.
  Even if operating with no load, lubricate Load chain.
- Periodically coat Load chain with lubricant to minimize wear on Load chain or Chain wheel.
  Poorly lubricated Load chains will wear out quickly, making the hoist operation dangerous.
- Determine the lubrication interval according to the operating frequency and the loading conditions.
- Before reapplying lubricant, completely clean Load chain.
  Lubricate in the no-load condition.
- Use heavy gear oil, for example, "Shell Omala Oil S2 G 320", etc.

(4) Hook Block, Load Hook

- Each time the hoist is disassembled for inspection, maintenance, or replacement of Load chain, lubricate the support bearing (Steel ball) of Load hook.

(5) Brake Part

- Each time the hoist is disassembled for inspection, maintenance or repair, completely clean the inner mechanism and reapply lubricant.
  For lubricating position, see Chapter IX "2.(3) Inspection of Brake and Service Limit".
- For lubricant, use lithium saponified silicon grease corresponding to
  theNo.2 class of NLGI (National Lubrication Grease Institute).
  For example, "Molykote (R) 33M", etc.

(6) Recommended Lubricants

The following table shows the recommended lubricants.
Always use the same type or equivalents recommended by the oil manufacturer.

Manufacturer	Air motor (Lubricator)	Reduction gear (Incl. bearing of reduction gear)	Other bearing
Exxon Mobil	Mobil DTE Light	Mobilux EP0	Mobilux EP2
COSMO OIL	COSMO NEW MIGHTY SUPER 32	COSMO GREASE DYNAMAX EP No.0	COSMO GREASE DYNAMAX EP No.2
JX Nippon Oil & Energy	FBK OIL RO32	EPNOC GREASE AP (N)0	EPNOC GREASE AP (N)2
Shell	Tellus S2 M32	Alvania EP Grease R0	Alvania EP Grease 2

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2. Inspection

⚠ CAUTION:

- **Be sure to shut off the air supply before inspection.**
- **Always disassemble the hoist on the floor.**
- **Always use genuine parts for replacement.**
- **Always employ qualified or well trained personnel for inspection and maintenance.**

(1) Inspection of Hook and Service Limit

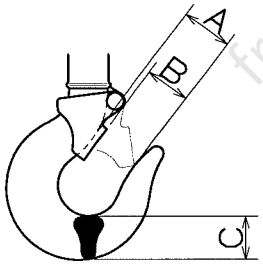
■ If any of the following conditions apply to the inspected Hook, never reuse, always replace with a new Hook.

Never repair Hook.

- Hook opening is visibly stretched, or opening dimension is different from that specified.
- Hook is deformed or cracked.
  Carefully check for any bends or cracks on the hook shank.
- Those which do not rotate smoothly.
  Wear or indents on the raceway surface of Steel ball.
- Wear on the hook saddle, where the lifting sling (suspension fastening) rests, exceeds the service limit.
- Hook latch is damaged or malfunctioning.

■ Major Dimensions of Hook and Wear Limit

For hook opening dimensions A and B, measure Hook before use as a reference for later inspections.



(mm)

Model		Standard dimension		C	
		A	B	standard dimension	Service Limit
EHV25S EHV49S	Top hook	25.5	23	22	20.7
	Bottom hook	25.5	23	22	20.7

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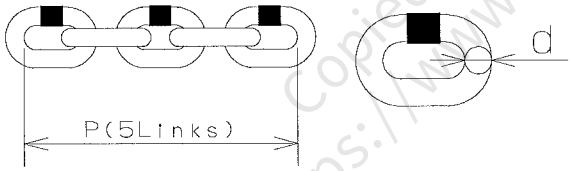
(2) Inspection of Load Chain and Service Limit

Clean Load chain using solvent so any damage can be located.
The inspection should be carried out on each link of Load chain.
Never use acidic solvents.

■ Never use Load chain having any one of the following defects.
Replace it with a new Load chain.
Never repair Load chain.

- Flaws or cracks.
  In particular, carefully check the weld on the links and end links which are connected to the main body or Load hook (Hook holder).
- Deformed or corroded.
- Stretch exceeding the service limit.
- Reduction of diameter exceeding the service limit.

■ Limit of Stretch and Wear
For dimensions P and d, measure the entire working length of Load chain.
Pay special attention to the links which engage Chain wheel when the load is at the upper or lower limit.
If the hoist is always used for the same lifting distance, wear on these links will be about two to four times that of other links.
For dimension P, measure the length of 5 links while tensing Load chain as shown in the figure below.



(mm)

	Standard dimension	Service Limit
d	6.3	5.9
P	95.5	97.4

- When any number of links in the working length reaches or exceeds the service limit, replace the entire chain.

■ Replacement Parts and Maintenance after Inspection

- Never use a new Load chain with a worn Chain wheel.
  Replace Load chain and Chain wheel at the same time.
- See Chapter XI "Replacement of Load Chain".
- **Always use a manufacturer's genuine replacement chain.**
  Never use any other chain.
- Always coat Load chain with lubricant after inspection or upon replacement.
  See Chapter IX "1. Lubrication".

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(3) Inspection of Brake and Service Limit

Disassemble the brake and inspect the lining and component parts.

■ Disassembly of Brake
For details, see Chapter XII "1. Procedures of Disassembly" .

a) Loosen Cap screws(60) sequentially by 1/6 turns, and remove Brake cover(58).

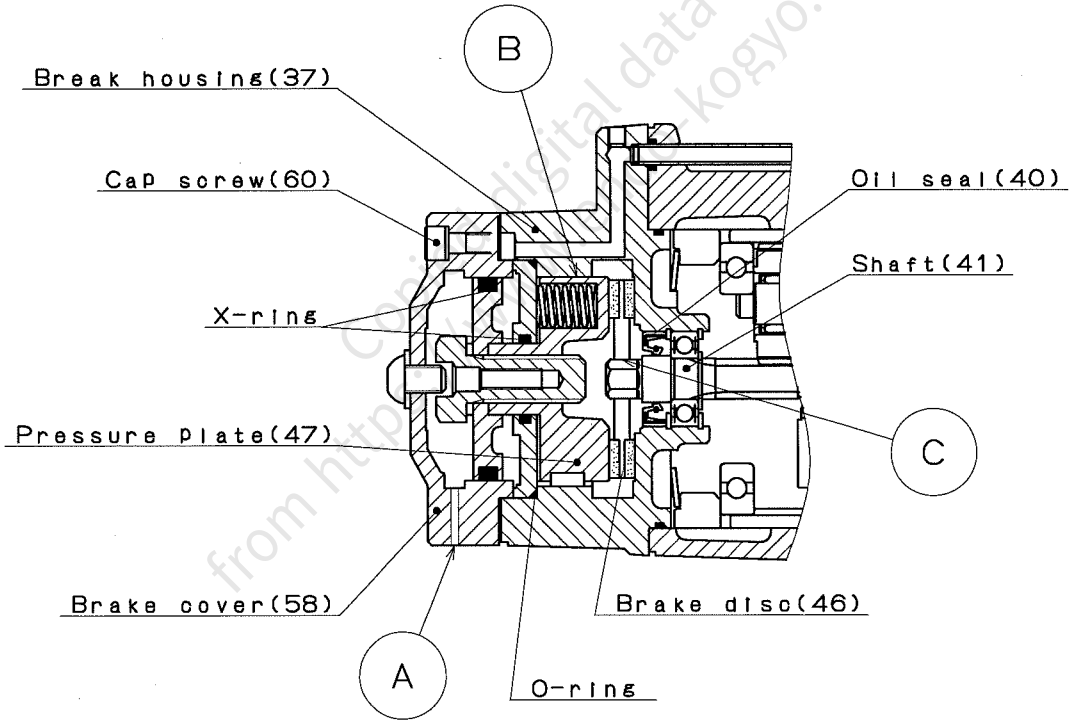
b) Check grease from the reduction gear has not leaked through Oil seal (40) when removing Brake disc(46) from Brake housing(37).

c) If grease leakage is found, remove Brake housing(37). Loosen cap screws sequentially by 1/6 turns.

d) Clean each part.

NOTE:

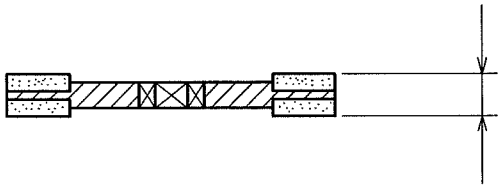
- Never use solvent when cleaning Oil seal(40), X-rings(51),(54) or O-rings(36),(44),(52).
- If oil adheres to the lining, wipe off with a cloth wetted with solvent.
- Be careful to prevent solvent or foreign matter entering the air circuit of the brake.



■ Inspections should be performed on all parts, checking cracks, flaws, deformation and wear. In particular, check the following items:

- Does wear on the lining exceed the service limit?
- Is Spring(49) decayed, cracked or flawed?
- Are there any pressed marks or cracks at engaged part Ⓒ between Brake disc(46) and Shaft(41)?
- Is air exhaust hole Ⓐ on Brake cover(58) open?
- Are there flaws, deformation or wear on Oil seal(40) or X-rings(51),(54)? Are there any flaws on the shaft surface where Oil seal(40) rests?

■ Wearing Limit of Lining



Standard dimension	Service Limit
7.5mm	5.5mm

■ Solution

- Replace cracked, flawed, deformed or worn parts.
- Replace Oil seal(40), if grease has leaked from the reduction gear.
  Wipe up any grease adhering to the lining, etc., by using a cloth wetted with solvent.
  If Shaft(41) is worn or flawed, replace it with a new one.
- Replace Brake disc(46) if wear on the lining exceeds the service limit.
  Even if wear is close to the service limit but not exceeding, replacement is recommended.
- Replace Springs(49) at the same time as Brake disc(46).
- Replace all Springs(49) at the same time.

■ Assembly

- See Chapter XII "2. Reassembly" for assembling procedure.
- Apply " Molykote (R) 33M" to the sliding surface of X-rings(51),(54), sliding surface Ⓑ of Pressure plate(47) and Brake housing(37), and engaged part Ⓒ between Brake disc(46) and Shaft(41) before assembly. (See Chapter IX "1. Lubrication").
- Thinly coat the sliding surface Ⓑ of Pressure plate(47) and engaged part Ⓒ of Shaft(41) with grease.
- The brake is a self-adjust system. Therefore adjustment is not required.

(4) Inspection of Chain Wheel

- Are there any visible indents from Load chain on the pocket of Chain wheel?
- Is there any deformation, or cracks?
  Carefully check the filleted and connected sections of the shaft.
- Are Bearings damaged or worn?
  Those which do not rotate smoothly (feels rugged when manually rotated) are beyond their service limit.
- Replace Chain wheel at the same time as Load chain.

(5) Inspection of Hook Holder

- Is there any deformation, cracks, or indents on Hook holder?
  Carefully check the part where Load chain is attached.
  Is there any wear or indents on the raceway surface of Steel ball?
- Are there any pressed marks, deformation, flaws, cracks, or corrosion on the chain anchor pin?
- Is Ring deformed?
  Is there any play when Ring is fitted in the groove?
- Are there any cracks on Steel balls?

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(6) Inspection of Casing (Main body Case)

- Are there any flaws, cracks, or deformation?
  Carefully check the part where Top hook and Chain guide is attached.
- Has Bolt, which fixes the dead end of Load chain (end link on the non-loading side), dropped or is it loose?
- Are Bolts loose?

(7) Inspection of Chain Guide

- Are there any flaws, cracks, deformation or corrosion?
  Carefully check the contact areas of the Casing and the chain anchor pin is fixed.
- Is there excessive wear on the contact surface from Load chain?
- Are there any pressed marks, deformation, flaws, cracks or corrosion on the chain anchor pin?
  Is Split pin in place?
- Is Bolt for fixing Chain guide loose?

(8) Inspection of Switches

■ Pull Rope Type

- Is Pull rope (Control chain) twisted or broken?
- Does Pull rope correctly return to the neutral position after being pulled down?

■ Pendant Control Type

- Is Control tube damaged, or is the connection part loose?
- Is Protection tube broken or bent?
- Does the push button correctly return to the neutral position after being pushed?
- Is there any damage to the Switch case?
- Has Retaining ring dropped, or are Bolts loose?

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(9) Inspection of Valve (Main Valve)

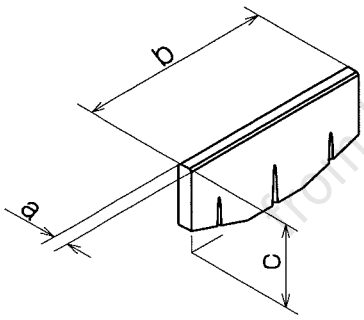
- Are there any deformations or cracks on Control lever?
- Is the tightening bolt loose?
- Does Control lever quickly return to the neutral position after being pushed up or pulled down?
- Is Cover deformed?
  Clogging of Strainer in Adapter at the inlet port may reduce hoist performance.
  Therefore, clean Strainer periodically.

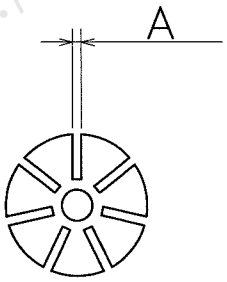
(10) Inspection of Air Motor

■ Replace parts which show the following conditions:

- Vanes are warped (curved), seized or cracked.
  Wear on Vanes exceeds the service limit.
- Side face of Rotor is gouged or seized.
- The vane slot of Rotor is worn beyond the service limit or is narrower than the standard dimension.
- Rotor is cracked, or there is a visible indent or deformation on the contacting surfaces between Rotor and Coupling.
- End plate is gouged or seized, or the surface is rough due to wear.
- Abnormal wear, flaw or corrosion is found on/in Cylinder.
- Bearings are damaged, worn, or do not rotate smoothly (feels rugged when manually rotated).
- Silencer is clogged.

■ Wearing Limit of Vane and Rotor





	Standard dimension	Service Limit
A	3.5	3.9
a	3.2	2.9
b	45.0	44.5
c	19.3	18.7

(11) Inspection of Coupling

- Are there any cracks, visible indents or deformation on the internal hexagon part or the grooves?

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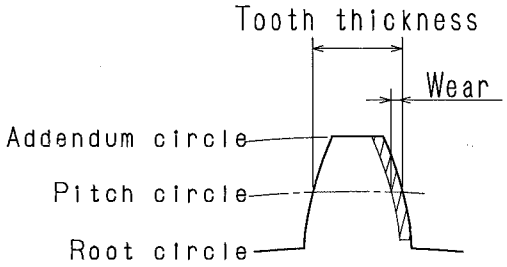
(12) Inspection of Reduction Gear Part

- Are there any shavings, burrs, marks, or deformation on the engaged parts at each end of Shaft?
- Is any part deformed or cracked?
- Are Bearings damaged or worn?
  Those which do not rotate smoothly (feels rugged when manually rotated) are beyond their service limit.
- Wear limit of Gear on the pitch circle should be within 10 % of the original dimension of tooth thickness. However, the limit for the first stage should be 5 %.



(13) Inspection of Chain Bucket

- Is there excessive wear on fabric Chain bucket?
- Are the mounting bolts loose?
- Is there any dust or foreign matter in Chain bucket?
- Chain bucket should be large enough to contain entire Load chain.

(14) Inspection of Trolley

- For details, see "Instruction Manual of Trolley".
- Are the mounting bolts for the I-beam stopper (rail stopper) loose?
- Check the trolley wheels track the rail properly.
  Is the rail excessively worn?
- Are the trolley wheels or the side rollers damaged or worn?
- Check all supporting members are not deformed, cracked or worn.

(15) Inspection of Lifting Slings

- Is the cable kinked, worn or flawed?
- Is the sling chain worn (reduction of diameter) or cracked?
  Is the pitch of the sling chain stretched?
- Is hook, shackle, or ring deformed, cracked or worn?

(16) Inspection of supporting hanger

- Split pin must be attached certainly.
- Cap screw must be replaced in the case of its deformation, wear or corrosion.
- Supporting hanger must be replaced in the case of its deformation, crack or wear.
- Supporting wire rope or supporting chain must be replaced in the case of its damage.

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(17) General Operation Inspection

After completing the inspections described in the foregoing sections, reassemble the whole unit according to Chapter XII "2. Reassembly" and inspect as follows:

■ Idling

- Check Pull rope or the push button switches can be easily operated and up/down operations are correct as indicated.
- Check hoisting speed can be changed from low to high speed by controlling the pulling force on Pull rope or the pushing force on the push button switches.
- Check Load chain flows freely and smoothly into and out of Chain wheel and there is no noise indicative of binding or other malfunctions.
- Check Upper and Lower limit switches function correctly.
  See Chapter V "3. Hoisting and Lowering Limit Switches".
- Check the hoist is not abnormally noisy or vibrating.

■ Rated Load Test

- Check for malfunctions while lifting and lowering.
  Operate the hoist at least twice through the full lifting range.
- Lift the rated load a few inches off the floor and check ability of braking system to stop and hold the load without excessive drift.
- Check Load chain flows freely and smoothly into and out of Chain wheel and there is no audible clicking or other evidence of binding or malfunction.
- Check there is no significant reduction in the hoist performance.
- Check the hoist is not abnormally noisy or vibrating.
- Be alert for unusual visible or audible signs which may indicate a defect.
  Do not operate the hoist until all defects have been determined and corrected.

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3. Storing the Hoist

If the hoist is to be stored for a long time, lubricating oil type rust preventive oils (class2), through the air inlet port and run the hoist at low speed for several seconds.
Store the hoist in a dry location.

4. Troubleshooting

⚠ CAUTION:

If a malfunction occurs during the operation of the hoist, stop operation immediately and take the necessary steps to rectify the problem. Careless repairs can cause damage to the hoist or personal injury. Therefore, be careful but thorough when making repairs.

The following table shows probable causes and solutions of common malfunctions.

Malfunction	Main Causes	Solution
Motor does not run. Slow rotation or no rotation of Motor.	• Insufficient air pressure. • Supplied air volume is insufficient. • Inner diameter of pipe is too small. • Strainer in Adapter at air inlet port is clogged. • Silencer is clogged. • Powder or dust in Motor. • Vanes have be enlarged due to moisture or long term storage. • Vanes are burned due to the dry operation. • Vanes are worn or damaged. • Main valve does not open. • Control lever is bent or damaged. • Brake does not release. • Reduction gear: Incorrect assembly. Or gears, bearings, etc., are worn or damaged.	• Increase air pressure. • Increase compressor output. • Replace pipe with a larger inside diameter. • Clean Strainer. • Replace with new Silencer. • Clean Motor then lubricate. Clean air filter and replace filter element. • Replace Vanes. Discharge drain water from air filter. Or clean air filter and replace filter element. • Clean Motor and polish Vanes Replace Vanes if required. Supply oil to lubricator or clean lubricator. • Replace Vanes. • Tighten connecting bolt on the respective part. Or disassemble and check. • Replace Control lever. • Clean air circuit of the brake. Thereafter, perform leakage test. • Disassemble and check. Replace the worn or damaged parts.
Brake does not work sufficiently.	• Lining is worn. • Oil on lining. • Air exhaust hole on Brake cover is clogged. • Main valve does not return to the neutral position.	• Replace with new Brake disc. • Clean. Replace oil seal if required • Clean. See Chapter IX "2.(3) Inspection of Brake and Service Limit". • Check the operation system, e.g., bending of Control lever. Disassemble and check Valve housing if required.

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X. Adjustment of Speed and Operating Limit of Control Lever (See Fig. 7)

Control lever(110) has been adjusted before shipping so it touches Casing(1),
physically stopping Control lever before Main valve reaches the operating limit position.
This prevents Main valve from overloading.

■ Re-adjust Control lever for each lifting and lowering direction in the following manner:

> ⚠ **CAUTION: Before readjustment, be sure to shut off the air supply.**

(1) Loosen Hex. nut(112), and screw Hex. head bolt(111) completely into Control lever(110).

(2) Loosen Hex. head bolt(111) until it touches Casing(1) while Control lever (110) is being pulled down.

(3) Release Control lever(110), and loosen Hex. head bolt(111) another 1.5 turns, then lock Hex. head bolt(111) with Hex. nut(112).

■ Adjustment of speed

Lifting and lowering speeds can be reduced, if required, by readjusting the operating limit of Control lever.

To reduce speed, turn Hex. head bolt(111) counterclockwise.

> ⚠ **CAUTION:**
>
> **Be sure to shut off the air supply before turning Hex. head bolt(111).**
>
> **Otherwise, the hoist will move during adjustment, causing danger.**

To recover lifting and lowering speed, adjust Control lever in the same manner,

to prevent Main valve from overloading.

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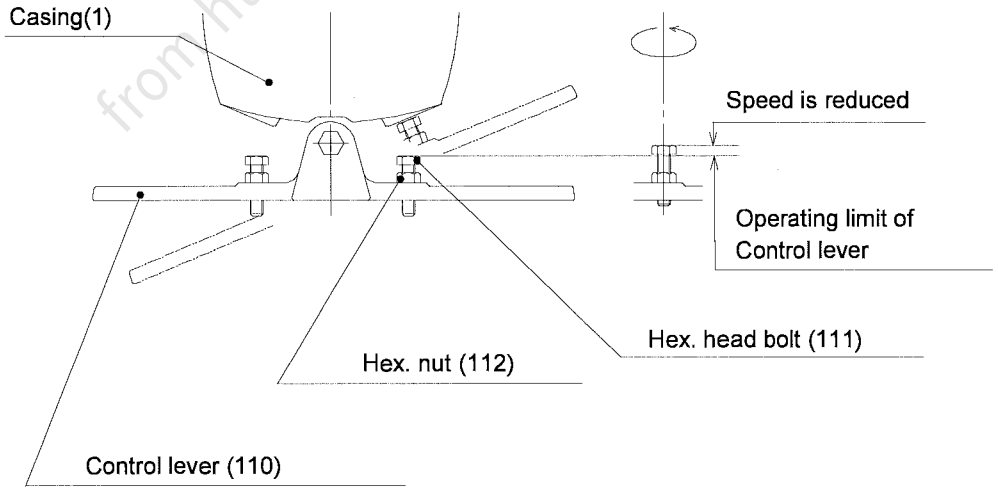

Fig.7

XI. Replacement of Load Chain

Chain wear or damage can not be detected by casual observation.
Inspect Load chain according to Chapter IX "2.(2) Inspection of Load Chain and Service Limit".
Always use a manufacturer's genuine replacement chain.
Never use any other chain.

1. Method 1 (See Fig. 8)

- 1) Remove old Load chain. See Chapter XII "1. Procedures of Disassembly".

> **⚠ CAUTION:**
> **When removing old Load chain, do not place your hands in an area where they may be injured.**
> **Be sure to shut off the air supply after removing old Load chain.**

- 2) Loosen Cap screws(60) sequentially by 1/6 turns, and remove Brake cover(58). Remove Pressure plate(47), Cylinder cover(50), and Brake piston(53) together from Brake housing(37) to expose Shaft(41).

- 3) Pass a steel wire through Chain guide(16). Attach the end link of new Load chain to the steel wire on the loading side "A".

- 4) Pull Load chain into Chain guide(16) by pulling the steel wire.
The first link must be a standing link
〔link perpendicular to Chain wheel(14)〕.

NOTE: The weld must face away from the center of Chain wheel(14). Check also the subsequent standing links have the weld facing outwards.

- 5) Rotate Shaft(41) by hand to feed Load chain through the hoist.

- 6) When the first link comes out, pass it through the middle of Control lever(110), then fix to hoist with Cap screw(124) and U-nut(125) without twisting Load chain.

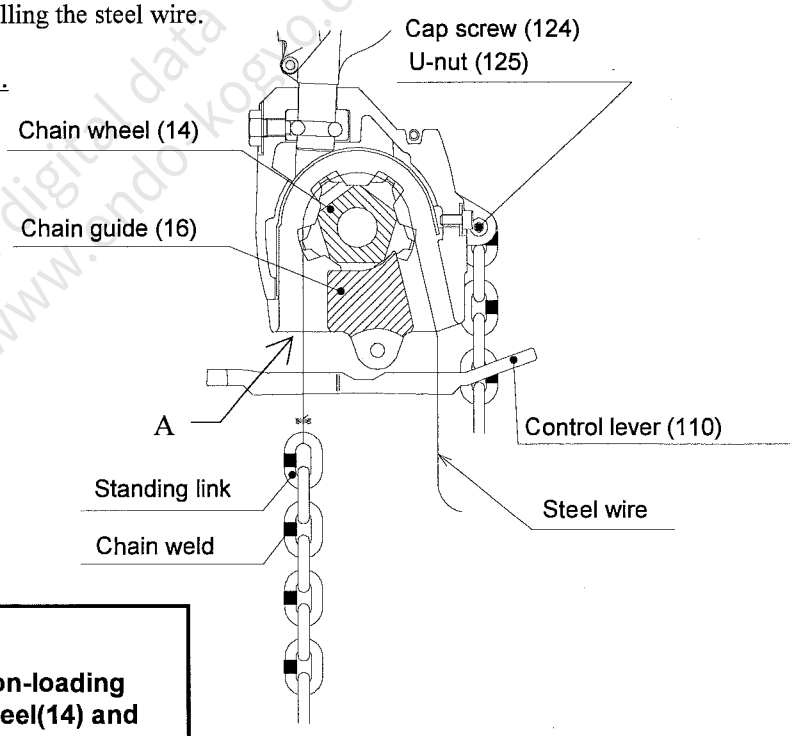

Fig.8

> **⚠ WARNING:**
> **Make certain there are no twists on the non-loading side of the Load chain between Chain wheel(14) and the end link.**
> **Using the hoist when the Load chain is twisted could result in damage to the hoist or the Load chain breaking, causing personal injury.**

- 7) Insert the end link of Load chain on the loading side into Hook holder (141), and fix with Pin(144). Then attach Ring(145).

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-8) Clean the brake parts and inspect them before reassembling.

-9) Lubricate Load chain according to Chapter **IX "1. Lubrication".**

-10) Run Load hook (Bottom hook) up and down several times under power with no load to make certain Load chain is running smoothly over Chain wheel.
There must be no apparent binding, abnormal noise or other malfunction.

2. Method 2 (See Fig. 9)

⚠ WARNING:

When replacing the Load chain, do not place your hands in an area where they may be injured. Always shut off the air supply before cutting the Load chain, removing or fixing the end link of the Load chain, or loosening or tightening the bolt.

-1) Disconnect the end link of Load chain from Hook holder(141).
At this stage, do not remove Load chain from the hoist.

-2) Using an abrasive wheel, etc. , cut a portion of the second link from the end (i.e. the first flat link) as shown in Fig. 11.

NOTE:

Do not distort the link in any manner, otherwise Load chain will not pass over Chain wheel.

-3) Connect new Load chain to old Load chain by hooking the end of new Load chain onto the cutaway link.
The first link of new Load chain must be a standing link 〔link perpendicular to Chain wheel(14)〕.

NOTE:

The weld must face away from the center of Chain wheel(14). Check also the subsequent standing links have the weld facing outwards. Slowly operate the hoist in the lifting direction, feeding out old Load chain, leaving new Load chain on the Chain wheel(14).

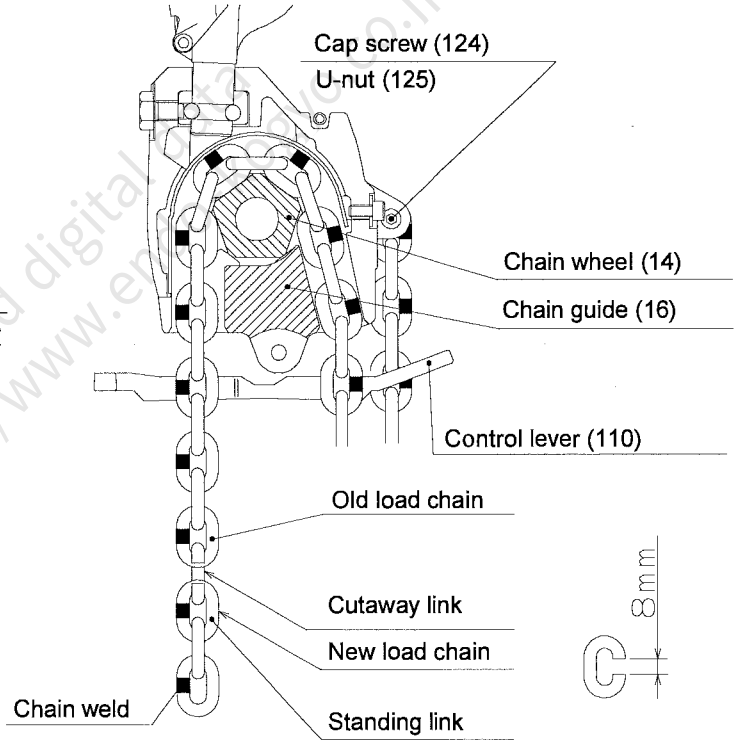

Fig.9

-4) When the end link of new Load chain comes out, pass it through the middle of Control lever(110), then fix to hoist with Cap screw(124) and U-nut (125) without twisting Load chain.

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⚠ WARNING:

Make certain there are no twists on the non-loading side of the Load chain between Chain wheel(14) and the end link.

Using the hoist when the Load chain is twisted could result in damage to the hoist or the Load chain breaking, causing personal injury.

- 5) Insert the end link of Load chain on the loading side into Hook holder (141), and fix with Pin(144). Then attach Ring(145).

- 6) Lubricate Load chain according to Chapter IX **"1. Lubrication".**

- 7) Run Load hook (Bottom hook) up and down several times under power with no load to make certain Load chain is running smoothly over Chain wheel.
There must be no apparent binding, abnormal noise or other malfunction.

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XII. Disassembly and Reassembly

⚠ CAUTION:

- **Be sure to shut off the air supply before disassembly or reassembly.**
- **Place the hoist on the floor before disassembly or reassembly.**
- **Careless mistakes during maintenance may cause damage to the hoist or personal injury. Therefore, take care during maintenance.**
- **Always employ qualified or well trained personnel for maintenance.**
- Whenever grasping a part in a vice, always use copper-covered vice jaws to protect the surface of the part and help prevent distortion.

1. Procedures of Disassembly

Referring to the disassembly drawings , disassemble the hoist using the following procedure:

-1) Remove the hoist from the supporting member.

⚠ WARNING: Release the load, shut off the air supply, disconnect the piping, then remove the hoist. If this is neglected, serious danger will occur.

-2) Remove Link chain(135) (Load chain).

① Remove Cap screw(124) and disconnect the dead end of Link chain from the hoist.

② Suspend the hoist at about 1.5 m high using a crane, etc., and connect the temporary piping. Pressure of the air supply should be 0.4～0.6 MPa {4～6 kgf/cm^2} .

③ Slowly operate the hoist in the lowering direction and remove Link chain from the hoist.

⚠ CAUTION:

The Link chain drops down at the moment it is disengaged from the Chain wheel. So be careful.

④ After shutting off the air supply, disconnect the piping and lower the hoist onto the floor.

-3) Remove Chain bucket(161).

-4) If the hoist has a Pendant control switch, remove the whole Pendant control device. Remove the cover of the cylinder holder, then remove the cap screws.

-5) Remove Cap screw(115) from Shaft(107).

-6) Loosen Cap screws(105),(106) sequentially by 1/6 turns, and remove Valve housing(78).

NOTE: Do not loosen Cap screws(105),(106) on Valve housing(78) until Cap screw(115) has been removed.

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-7) Remove Control lever(110) and Shaft(107) together from Casing(1).

-8) Valve housing unit(78～104)

① Remove Retaining ring(97) and Lever(94).

② Remove Retaining ring(100) and Valve cone(83).

NOTE:
Do not remove Liner(82) except when O-ring(85),(86),(131) or Liner(82) itself is required to be replaced.
Set screws(38) are sealed with sealant. Do not disassemble them unless it is required.

-9) Valve housing unit(180~193)

① Remove Retaining ring(190) and Cap(189).

② Screw Cap screw(M4=P0.7) into the tap hole of Spool(182), and remove Valve set(180~187)

-10) Screw Cap screws(105) into the tap hole of End plate(71), and remove Air motor.
Remove Coned disc spring(35) and Coupling(64).

-11) Air motor unit(65～76)

① Keep Air motor vertical using a vice, by grasping its connecting section to the Coupling(64).

② Remove Countersunk head cap screw(76) and remove End plate(71).

NOTE:
Countersunk head cap screw(76) is fixed with adhesive. If it is tight, do not apply excessive force. In this case, heat Countersunk head cap screw to about 200 ℃ using a burner, etc.,
then remove before it becomes cool.

③ Remove Cylinder(69) and Vanes(70).

④ Take off Rotor(67) from the vice.
Place Rotor(67) with End plate(65) facing downwards as shown in Fig. 10, and check Rotor rotates smoothly.
If smoothly rotating, do not remove Rotor(67) from End plate(65).

NOTE:
End plate(65) and Rotor(67) are adjusted to a suitable clearance by means of Ball bearing(66) in End plate.
Do not disassemble Rotor(67) unless it is required.
Each part is fitted using an interference fit.

⑤ If disassembly is required, remove Rotor(67) from Ball bearing(66) in End plate(65) by using a jig and hand press.

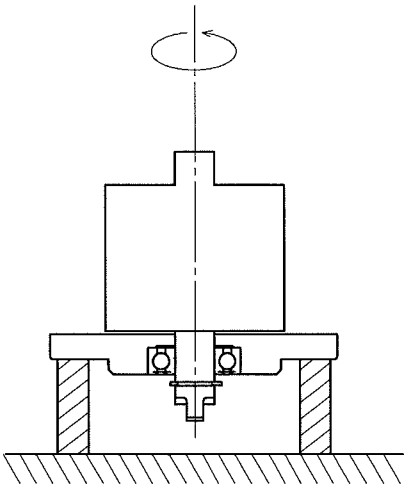

Fig.10

-12) Withdraw Pipe(77) towards Valve housing(78) side.

-13) Stand the hoist with the mounting side of Valve housing(78) facing downwards and Brake cover(58) upwards.

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-14) Brake unit(46～60)

① Loosen Cap screws(60) sequentially by 1/6 turns, remove Brake cover(58).

② Remove Bolt(56), Brake piston(53) and Cylinder cover(50).

③ Remove Pressure plate(47) and Brake disc(46).

NOTE:
Check grease from the reduction gear has not leaked through Oil seal(40) when removing Brake disc(46) from Brake housing(37).

-15) Loosen Cap screws(45) sequentially by 1/6 turns, remove Brake housing(37) and Shaft(41) together.

-16) Remove Retaining ring(39), and Shaft(41) and Ball bearing(42) together from Brake housing(37).

-17) Reduction gear unit

■ EHV25S

① Remove Coned disc spring(35), Spacer(34), Ball bearing(27), Gear wheels (32), Planet shaft(31), Internal gear(28), Coned disc springs(30) and Gear wheel(29).

② Remove Planet shaft(22). Remove Pins(26) and Gear wheels(24) from Planet shaft(22).

■ EHV49S

① Remove Coned disc spring(35), Ball bearing(27), Spacer(34), Planet shaft(31), Internal gear(28), Coned disc springs(30) and Gear wheel(29).

NOTE:
The engaging position of Internal gear(28) and Gear wheel(32) teeth on Planet shaft(31)is specified. Do not disassemble them unless it is required.
If required, be sure to engage the specified position of Internal gear(28) and Gear wheel(32) teeth, when they are reassembled.

② Remove Pins(33) and Gear wheels(32) from Planet shaft(31).

③ Remove Planet shaft(22).
Remove Pins(26) and Gear wheels(24) from Planet shaft(22).

-18) Remove Cap screw(18) and Chain guide(16).

-19) Turn Casing(1) upside down so the mounting side of Valve housing(78) is facing upwards and the mounting side of Brake housing(37) is facing downwards.

-20) Remove Retaining ring(11), and Chain wheel(14) and Ball bearing(12) together towards the Air motor side.

NOTE:
Be careful Chain guide(13) does not get between Casing(1) and Chain wheel(14) when removing Chain wheel(14).

-21) Remove Lock screw(21), Internal gear(20) and Washer(19).

NOTE:
Lock screw(21) is sealed with sealant. When it is tight, do not remove unless a problem is found such as wear or damage on Casing(1), Internal gear(20) or Lock screw itself.

-22) Remove Bolt(10), eight Steel balls(8) from Hook holder(7), and Hook(3).

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Disassembly of Pendant control

Please disassemble Pendant control according to the following procedure,
referring to the exploded view. (on page 52, 53)

-1) Remove Cover(30), disconnect Nylon tubes(57, 58, 59, 60) from Cylinder(10) and the hoist body.

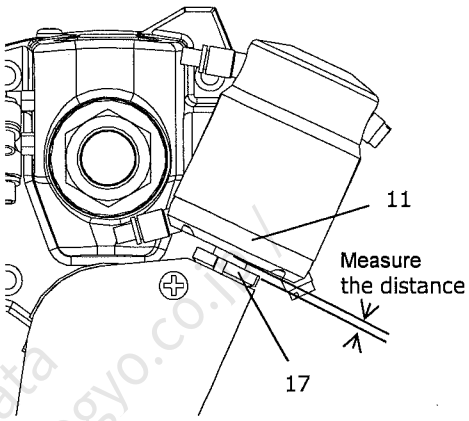
-2) Remove Wire rope (55) from Cylinder holder(20).

-3) Remove Cylinder(10) and Cylinder holder(20) together.

-4) Remove Retaining ring(27), and remove pin(26) through the hole at the back of Cylinder holder(20).

-5) Measure the distance between Bearing nut(17) and Cylinder cover(11) (see Fig. 3).

Note:
This distance is necessary
for reassembly. Be sure to measure it.



-6) Loosen Bearing nut(17), and remove Cylinder unit from Cylinder holder(20).

-7) Cylinder unit

① Remove Cap screws(12) and Cylinder(10).

② Remove Lock nut(9), Piston(7), Spacers(4, 6), Spring(5) and Ring(3).

③ Remove Retaining ring(2) and Cylinder cover(11).

-8) Cylinder holder unit

① Check Shaft(22) rotates smoothly and there is no wear on the fitting portion.
If there are no problems, disassembly is not required.

② If disassembly is required, remove Shaft(22) by pushing from the Sleeve(25) side using a protective buffer and hand press.
Do not reuse removed Sleeve because the fitting portion becomes loose.
Replace with a new one.

-9) Valve housing unit

① Remove Valve cover(52), Nylon tubes and Wire rope.

② Remove Pin(47) and Push buttons(46).

③ Remove Valve knobs(40) and Pins(39).

④ Remove Liners(38), Seats(37), Steel balls(35) and Springs(34).

⑤ Turn Emergency stop button(51) counterclockwise and remove.

⑥ Remove Valve cone(49) and Spring(48).

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2. Reassembly

NOTE

- **Before reassembly, thoroughly clean all disassembled parts and check for cracks, flaws, deformation and wear.**
- **Never use acidic solvents for cleaning.**
- **Replace any damaged or excessively worn parts.**
  Also replace burred or damaged screws.
- Never use solvents to clean rubber parts, such as O-rings, X-rings, Oil seals, etc., or plastic parts.
- Do not clean shielded Ball bearings(12), (15), (42), (155).
  If they are contaminated with foreign matter, replace them.
- Always replace the split pin and Retaining ring(43) with new ones at reassembly.
- Whenever grasping a part in a vice, always use copper-covered vice jaws to protect the surface of the part and help prevent distortion.
- Always press on the inner ring of a ball-type bearing when installing the bearing on a shaft.
- Always press on the outer ring of a ball-type bearing when pressing the bearing into a bearing recess.
- Always press against the stamped end of a needle-type bearing when pressing the bearing into a bearing recess.
  Referring to the disassembly drawing, reassemble the hoist using the following procedure:

-1) Assembling direction for Retaining ring (See Fig. 11)
Set up Retaining ring so the non-chamfered face bears the load.

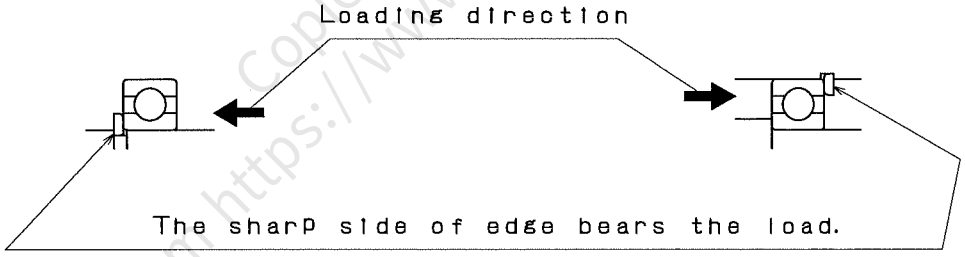

Fig.11

-2) Install Needle bearing(2) into Casing(1).

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-3) Hook unit(1～10)

① Hook holder(7) is stamped with a mark showing the hoist model.
Check the mark and be sure the correct Hook holder is used, especially when replacing.
Install Hook holder(7) so the non-stamped side bears the load (See Fig. 12).

Model	Mark
EHV25S EHV49S	5

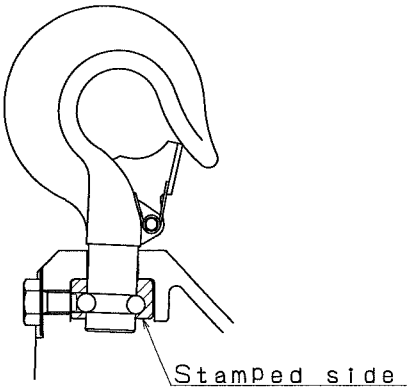

Fig.12

② Install Hook(3), and insert eight Steel balls(8).

③ Tighten Bolt(10), then lock with Washer(9).

④ Check the assembled condition of Hook(3). Normal conditions are shown in Fig. 13, in which Hook(3) leans slightly away from the center of the unit.

EHV25S
EHV49S

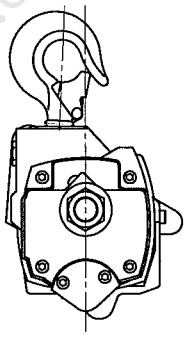

Fig.13

-4) Chain wheel unit(11～15)

① Install Ball bearings(12),(15) onto Chain wheel(14).
Set up Ball bearing(15) to protrude 0～0.5 mm from the non-jut end face of Chain wheel as shown in Fig. 14.

② Install Retaining ring(11) in Casing(1).

③ Install Chain guide(13) in Casing(1), then install Chain wheel(14) from the gear side.

④ In case Lock screw(21) has not been removed: Install Chain guide(13) and Chain wheel(14), then install Retaining ring(11).

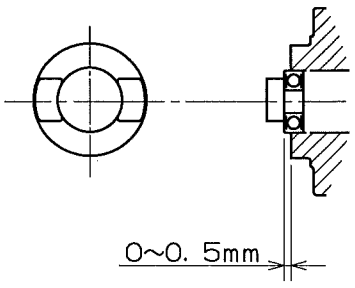

Fig.14

-5) Install Chain guide(16) and fix with Washer(17) and Cap screw(18).

-6) Reduction gear unit(19～35)
For lubrication volume and types of grease, see Chapter IX "1. Lubrication".

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■ EHV25S

① Lubricate Needle bearings(25),(130) and Ball bearings(27) with grease individually when assembling.

② Install Washer(19) and Internal gear(20) in Casing(1).
Set up Washer(19) so the highly chamfered face of internal periphery comes in contact with Internal gear(20).

③ Degrease Lock screw(21) and its setting position on Casing(1) using solvent.

④ Apply sealant to the bearing surface of Lock screw(21) and tighten it with a torque of 20～25 N·m {2.0～2.5 kgf·m} . (See Fig. 15)
Use Loctite 510 or equivalents as sealant.

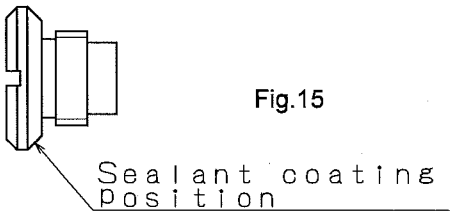

Fig.15

⑤ Fix Bushing(23) and Gear wheels(24) to Planet shaft(22), and install them in Casing(1).

⑥ Install Ball bearing(27), and lubricate the gear portion with grease.

⑦ Install Gear wheel(29), Coned disc springs(30), Internal gear(28), Planet shaft(31), Gear wheels(32) and Ball bearing(27) in this order.
See Fig. 16 for the setting direction of Coned disc springs(30) and Gear wheels(32).

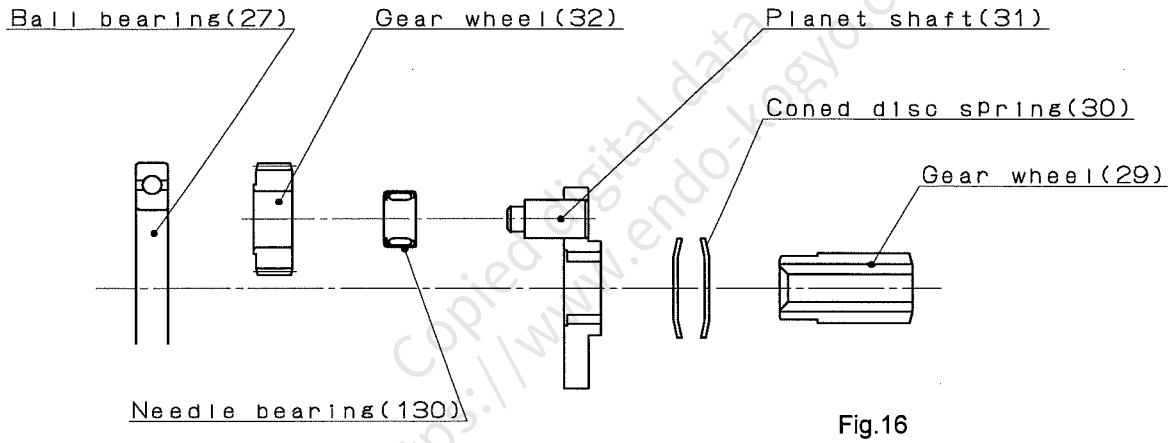

Fig.16

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⑧ Lubricate with grease, and install Spacer(34) and Coned disc spring(35).

⑨ After installing Shaft(41) in Brake housing(37), they should be installed together in Casing(1).

■ EHV49S

① Lubricate Needle bearings(2),(25) and Ball bearings(27) with grease individually when assembling.

② Install Washer(19) and Internal gear(20) in Casing(1).
Set up Washer(19) so the highly chamfered face of internal periphery comes in contact with Internal gear(20).

③ Degrease Lock screw(21) and its setting position on Casing(1) using solvent.

④ Apply sealant to the bearing surface of Lock screw(21) and tighten it with a torque of 20～25 N·m {2.0～2.5 kgf·m} . (See Fig. 17)
Use Loctite 510 or equivalents as sealant.

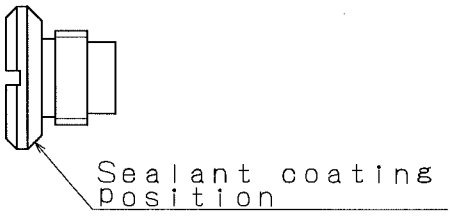

Fig.17

⑤ Fix Bushing(23) and Gear wheels(24)
to Planet shaft(22), and install them in Casing(1).

⑥ Install Ball bearing(27), and lubricate
the gear portion with grease.

⑦ Install Gear wheel(29), Coned disc springs(30) and Internal gear(28) in this order.
See Fig. 18 for the setting direction of Coned disc springs(30).

⑧ Fix Gear wheels(32) to Planet shaft(31), and install them in Casing(1).
At this stage, it is necessary to engage the specified positions of Gear wheel(32)
and Internal gear(28) teeth. For this purpose, there are three holes (inside diameter of 2.2 mm) on Planet shaft(31) and one hole on each Gear wheel(32). Prepare three pins with outside diameters of 1.9～2.1 mm and over 20 mm in length.

a) Fix Gear wheels(32) to Planet shaft(31).

b) Fix Gear wheels(32) onto Planet shaft(31) by inserting the pins into
the holes of Planet shaft and Gear wheels respectively (See Fig. 18).

c) With Gear wheel(32) fixed, insert Planet shaft(31) in Casing(1).
Engage Gear wheel(32) with Internal gear(28).

d) Draw out the pins.

NOTE:
Be sure to engage the specified position of Gear wheel(32) and Internal gear(28) teeth, as mentioned above, if previously disassembled.

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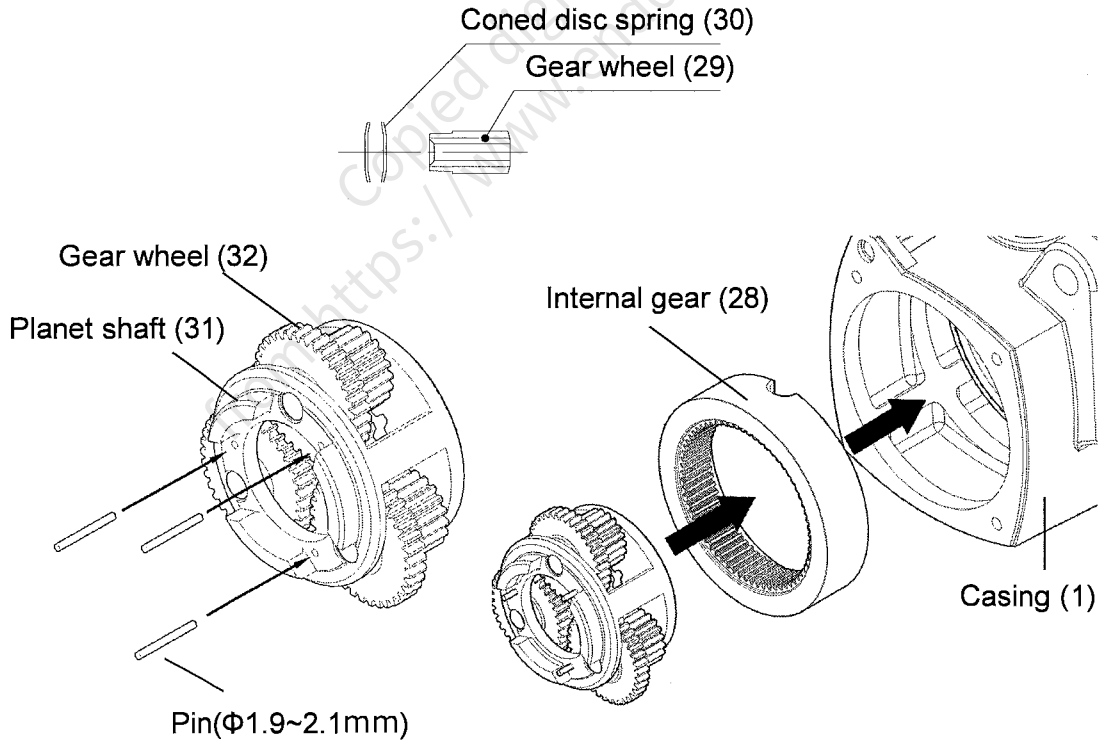

Fig.18

⑨ Lubricate with grease, and install Spacer(34), Ball bearing(27), and Coned disc spring(35).

⑩ After installing Shaft(41) in Brake housing(37), they should be installed together in Casing(1).

-7) Install Retaining ring(39) on the Oil seal side and Oil seal(40) in Brake housing(37).

-8) Fix Ball bearing(42) and Retaining ring(43) to Shaft(41), then install them in Brake housing(37).
At this point, be careful not to damage Oil seal(40).
Install Retaining ring(39) in Brake housing(37).

-9) Insert O-ring(36) in Casing(1).
Install O-ring(44) onto Brake housing(37), and install them in Casing(1).
Tighten Cap screws(45) sequentially by 1/6 turns.

-10) Brake unit(46～60)

① When assembling, apply "Molykote (R) 33M" to the sliding surfaces and engaged parts of each part.
For coating positions, see Chapter IX "2.(3) Inspection of Brake and Service Limit".
For details on grease, see Chapter IX "1. Lubrication".

② Be careful grease, etc., does not adhere to the Brake disc(46) lining.

③ Install X-rings(51) and (54) to Cylinder cover(50) and Brake piston(53) respectively.

④ Install Pressure plate(47), Keys(48), Springs(49) and Cylinder cover(50) in Brake housing(37).
Fix Brake piston(53) to Pressure plate(47) by tightening Bolt(56)
with a torque of 90～100 N·m(9.2～10.2 kgf·m).

⑤ Remove Pressure plate(47) and Brake piston(53) together from Brake housing (37).

⑥ Insert Brake piston(53) into Brake cover(58).
At this point, be careful not to damage X-ring(54).

⑦ Install Brake disc(46), O-ring(52), Gasket(57), and Pressure plate(47) and Brake cover(58) together into Brake housing(37). Tighten Cap screws(60) sequentially by 1/6 turns.

-11) Air motor unit(65～76)

① Press Ball bearing(66) into the bearing recess on each End plate(65),(71) using a jig and hand press (See Fig. 19).

NOTE:
End plates are fitted to Ball bearing using an interference fit.
Replace End plate if the interface between End plate and Ball bearing is loose (no interference).

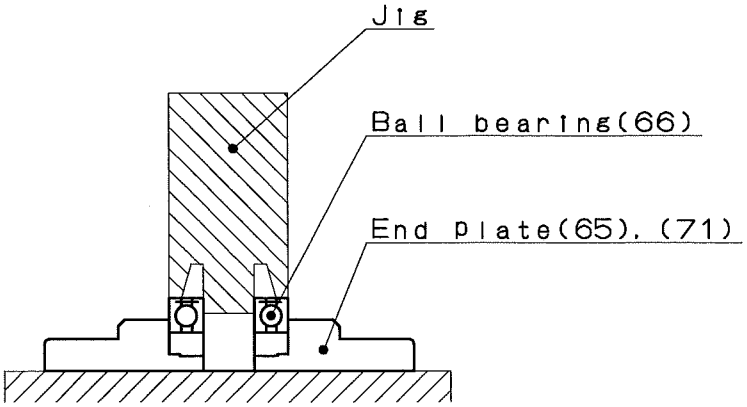

Fig.19

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② Using the inner ring of Ball bearing(66) in End plate(65) for support, press Rotor(67) into Ball bearing using a jig and hand press.
Adjust the clearance between End plate(65) and Rotor(67) to 0.02～0.03 mm with End plate facing downwards while subjected to the mass of Rotor. (See Fig. 20)
If Rotor(67) is not assembled properly, Rotor end will not be parallel to End plate(65), hence the clearance will be unsymmetrical. So be careful when assembling.

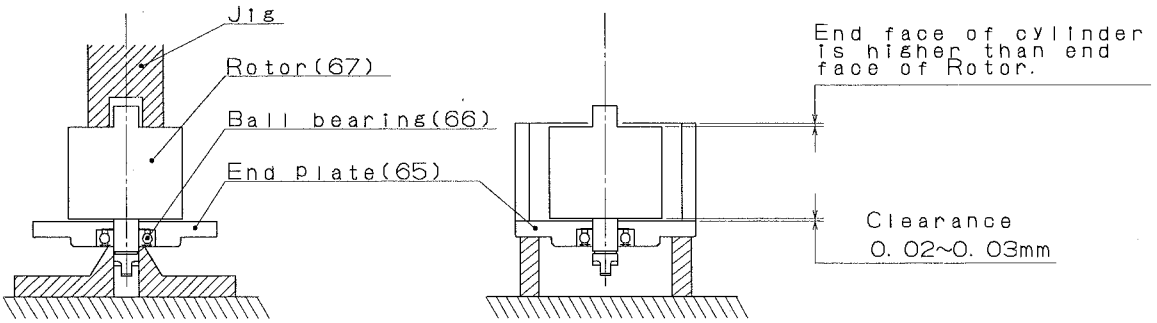

Fig.20

③ Degrease the internal thread of Rotor(67), Washer(75), Countersunk head cap screw(76), Machine screw(73), Support(72) and the setting part of Machine screw(73) on End plate(71) using solvent.

④ Install Support(72), apply adhesive to Machine screw(73) and tighten.
Use Loctite 262 or equivalents as adhesive.

⑤ Install Cylinder(69), making certain the end face of Rotor(67) does not protrude from the end face of Cylinder(69) (See Fig. 22).

⑥ Install Vane(70) into each vane slot on Rotor(67), slightly lubricating the vane portion.
Next, apply oil thinly on the end face of Rotor(67) and the outer face of the φ12 shaft 〔End plate(71) side〕.(Use the same oil used in the lubricator.)

⑦ Install Spring pin(74) into End plate(71) so both ends of Spring pin protrude the same amount from each face of End plate.

⑧ Install End plate(71). Apply adhesive to the internal thread of Rotor(67) and tighten Washer(75) with Countersunk head cap screw(76).Use Loctite 222 or equivalents as adhesive.

-12) Install Coupling(64), Coned disc spring(35), and Air motor in Casing(1).
Be careful Coned disc spring(35) does not come off the guide on End plate(65).

-13) Insert Pipe(77) into Casing(1) from Valve housing(78) side, and install O-ring(36) onto Pipe(77).

-14) Valve housing unit(78～104)

① Treat Liner(82) and Valve cone(83) carefully, as even a small flaw will render them useless.

② Degrease Set screws(38), Adapter(104) and their setting positions on Valve housing(78) using solvent.

③ Install Strainer(103) into Adapter(104).
Apply sealant to the Adapter(104) surface which contacts with the Valve housing(78) and set screws(38), then screw into Valve housing. Use Loctite 510 or equivalents as sealant.

④ Install Needle bearing(2).

⑤ Apply oil to O-rings(85),(86),(131), and place them onto Liner(82).
(Use the same oil used in the lubricator.) Insert Liner(82) into Valve housing(78) so the oblong hole of Liner aligns with the set hole of Lever(94).

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-15) Install Valve set(180~187) and Spring(188) into Valve housing(78), and fix Cap(189) and Retaining ring(190).

-16) Install Shaft(107) into Casing(1), and attach Control lever(110) and Washer (109) to Shaft. At this stage, do not attach Cap screw(114).

-17) Degrease the mating surfaces of Valve housing(78) and Casing(1) using solvent. Apply sealant (Loctite 510) to the mating surface of Casing(1), and join Valve housing(78) to it. At this stage, when Shaft(107) comes through Needle bearing(2) of Valve housing(78), install Washer(109) and Angle piece(108) in this order. Tighten Cap screws(105),(106) sequentially by 1/6 turns.

-18) Tighten Cap screw(115) with a torque of 4.5～5.5 N·m {0.46～0.56 kgf·m} . Next, bring Control lever(110) close to Valve housing(78) and tighten Cap screw(114) with a torque of 8.5～10.0 N·m {0.87～1.0 kgf·m} .

-19) Adjust the operating limit of Control lever(110). This adjustment is necessary to prevent the parts of Main valve from overloading. See Chapter X "Adjustment of Speed and Operating Limit of Control Lever".

-20) Bottom hook unit (141～145)

① Install Hook(3) in Hook holder(141), and insert eight Steel balls(8).

② Install Washer(142) and Sleeve(143).

③ Insert the end link of Link chain(135) into Hook holder(141), and fix with Pin(144). Attach Ring(145).

-21) Install Link chain(135). See Chapter XI "Replacement of Load Chain".

-22) Install Chain bucket(161).

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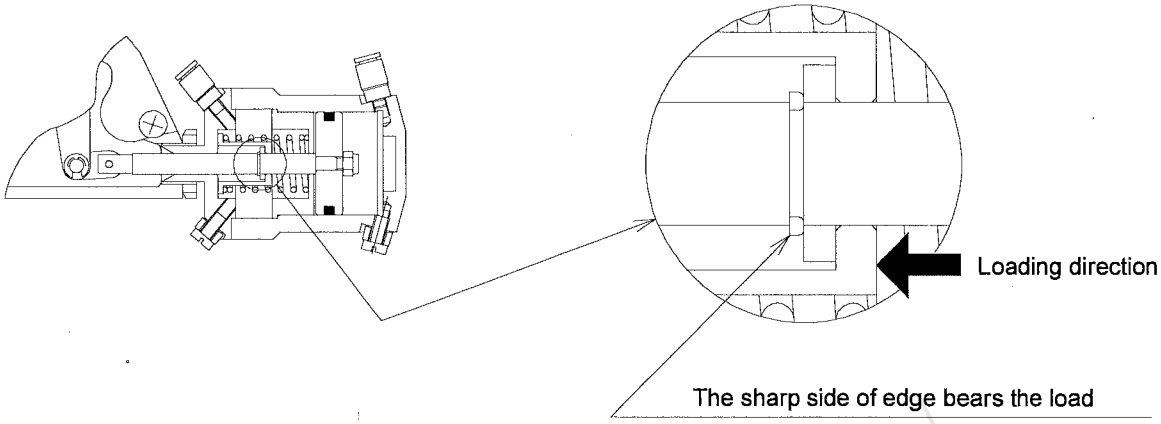
■ Pendant switch reassembly (on Page 52, 53)

-1) Always replace Retaining ring(2) with a new one.

-2) Assembly direction for Retaining ring
Set up Retaining ring so that the non-chamfered face bears the load.



-3) Assemble Cylinder(10) and Cylinder holder(20) so that the distance between Bearing nut(16) and Cylinder is the same as the distance measured during disassembly.

-4) Install Spring(34) as shown in Fig. 21.
Take care not to drop Steel ball(35) from the top of Spring(34) when installing Seat(37).

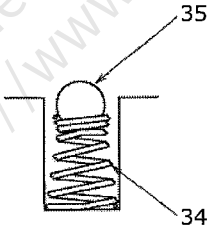


Fig.21

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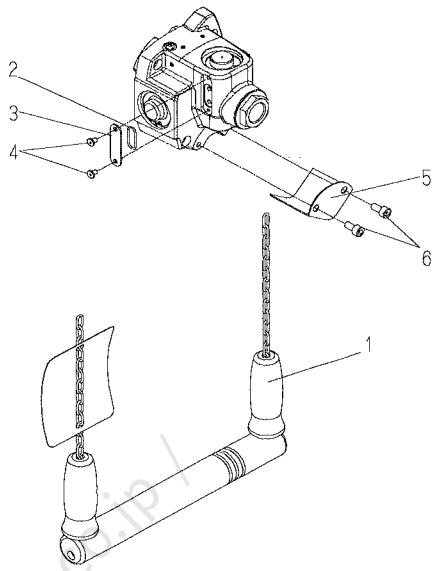
XIII. Conversion from pendant switch to Pull rope (Control handle)

In case of conversion Pendant control into Pull rope,
please purchase additional conversion parts in the list below.
Below pull rope length is 2m (standard). Please contact with distributor if rope needs different length.

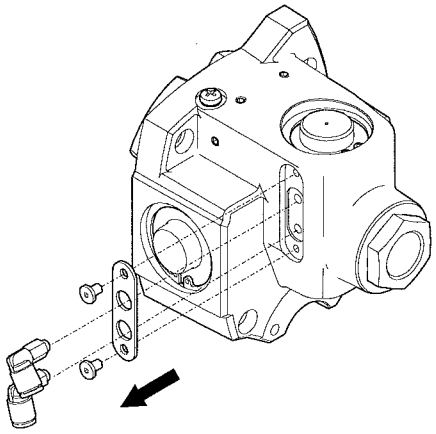


Name of parts : Pull rope set (standard length : 2m)
Part number : LHP002550

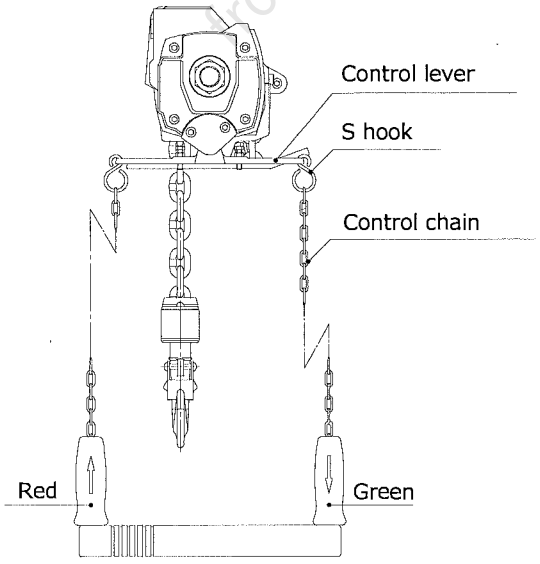
Ref. No.	Part No.	Description	Qty
—	LHP002550	Pull rope set	1
1	LHP000228	- Pull rope compl.	1
2	KA50200180	- O ring	1
3	P2H403052	- Plate	1
4	P2H403045	- bolt	2
5	P2H300431	- Cover	1
6	KA00910612	- Cap screw	2

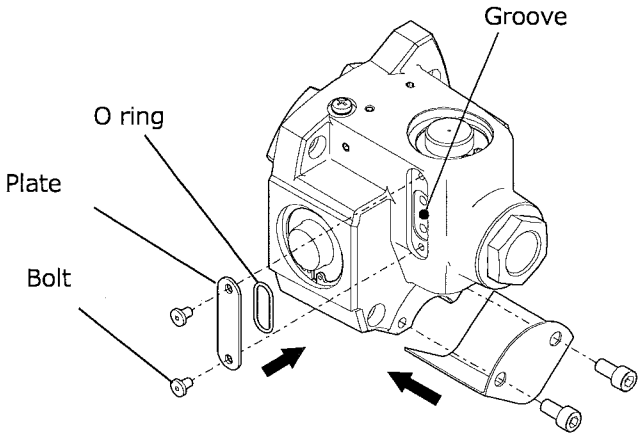
The procedure of change

⚠ CAUTION: Never fail to shut off the air supply before readjustment,.



1. Disassemble pendant switch from the main body according to Disassembly of Pendant control.
2. Loose Bolts on the main body and remove Elbow and Plate Fit O ring along with Groove, and fix Plate with Bolt.
3. Fix Cover with Bolt.
4. Attach Control handle to Control lever with Control chain and S hook and clamp it to prevent it disengaging from control chain.





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XIV. Parts list

Remarks When Purchasing Parts

- Specify part No., part name and model name of the product.
- State SERIAL NO. (product No.) clearly if attached.
- Parts without part Nos. can not be supplied individually.
  Please purchase a set or complete unit.

■How to read parts list

Ref. No.	Parts No.	QTY.	Description
1	P2H100084	1	Casing
2	P2H400145	1	Needle bearing
-	LHP000469	1	Hook set
3	-	1	—Hook
-	LHP000470	1	—Latch set
4	-	1	——Latch
5	-	1	——Spring

The mark indicates the range of the set or the complete unit.

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■Parts List EHV25SP

Ref. No.	Part No.	Quantity	Description	Ref. No.	Part No.	Quantity	Description
1	P2H100051	1	Casing	48	P2H400051	2	Key
2	P2H400145	1	Needle bearing	● -	LHP000472	1	Spring set
-	LHP000469	1	Hook compl.	49	—	6	—Spring
3	—	1	—Hook	50	P2H300427	1	Cylinder cover
-	LHP000470	1	——Hook latch set	● 51	P2H400324	1	X-ring
4	—	1	——Hook latch	● 52	KA50200670	1	O-ring
5	—	1	——Spring	53	P2H300428	1	Brake piston
6	—	1	——Rivet	● 54	P2H400054	1	X-ring
7	P2H300155	1	Hook holder	55	KA32411421	1	CD-washer
8	KA63100703	8	Steel ball	56	P2H400395	1	Bolt
9	P2H400211	1	Washer	● 57	P2H300429	1	Gasket
10	P2H400212	1	Bolt	58	P2H200148	1	Brake cover
11	KA40210068	1	Retaining ring	59	KA32410621	7	CD-washer
12	KA60103084	2	Ball bearing	60	KA00910630	4	Cap screw
13	P2H300421	1	Chain guide	61	P2H400809	2	Silencer
14	P2H200089	1	Chain wheel	62	P2H400601	2	Support
● 15	KA60103814	1	Ball bearing	63	KA40210020	2	Retaining ring
16	P2H100052	1	Chain guide	64	P2H400374	1	Coupling
17	P2H400357	1	Washer	-	LHP000543	1	Air motor compl.
18	KA00910612	1	Cap screw	-	LHP000219	1	—End plate set
19	P2H400358	1	Washer	65	—	1	——End plate
20	P2H300234	1	Internal gear	66	KA60103011	1	——Ball bearing
21	P2H400359	1	Lock screw	67	P2H200094	1	—Rotor
22	P2H200079	1	Planet shaft	● 68	KA40110011	1	—Retaining ring
23	P2H400360	1	Bushing	69	P2H200163	1	—Cylinder
-	LHP000215	1	Gear wheel set	● -	LHP000218	1	—Vane set
24	—	3	—Gear wheel	70	—	7	——Vane
● 25	P2H400510	3	—Needle bearing	-	LHP000220	1	—End plate set
26	P2H400361	3	Pin	71	—	1	——End plate
27	KA60107100	2	Ball bearing	72	P2H400375	1	——Support
28	P2H300240	1	Internal gear	73	P2H400639	1	——Machine screw
29	P2H300241	1	Gear wheel	66	KA60103011	1	——Ball bearing
30	P2H300264	2	Coned disc spring	74	KA42410316	1	——Spring pin
31	LHP000291	1	Planet shaft	75	P2H400542	1	—Washer
-	LHP000216	1	Gear wheel set	76	KA01310512	1	—Countersunk head cap screw
32	—	3	—Gear wheel	77	P2H400810	1	Pipe
● 130	P2H400139	3	—Needle bearing	-	LHP002508	1	Valve housing assembly
34	P2H300491	1	Spacer	78	P2H1000084	1	—Valve housing
35	P2H300263	2	Coned disc spring	2	P2H400145	1	—Needle bearing
● 36	KA50100060	2	O-ring	38	KA16110506	5	—Set screw
37	P2H100053	1	Brake housing	-	LHP000544	1	—Valve set
38	KA16110506	1	Set screw	82	—	1	——Liner
39	KA40210028	2	Retaining ring	83	—	1	——Valve cone
● 40	P2H400514	1	Oil seal	84	P2H400376	1	——Spring
41	P2H300425	1	Shaft	● 131	KA50200280	1	——O-ring
● 42	KA60103012	1	Ball bearing	● 85	KA50200290	2	——O-ring
● 43	KA40110012	1	Retaining ring	● 86	KA50300250	1	——O-ring
● 44	KA50200850	1	O-ring	87	P2H400813	2	——Spring
45	KA00910616	7	Cap screw	88	P2H400378	2	——Spacer
● 46	LHP000071	1	Brake disc	89	P2H400379	2	——Sleeve
47	P2H300426	1	Pressure plate	90	KA01310525	2	——Countersunk head cap screw

We recommend that you stock parts indicated by a bullet(●).
Parts without part numbers can not be supplied separately.
When ordering spare parts, specify part number (not the reference number), description and model of the hoist.

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Ref. No.	Part No.	Quantity	Description
94	LHP000224	1	—Lever
● 95	KA50100080	1	—O-ring
● 96	KA50200160	1	—O-ring
97	KA40210018	1	—Retaining ring
● 98	KA50200380	1	—O-ring
99	P2H400382	1	—Cover
100	KA40210040	1	—Retaining ring
101	P2H400214	1	—Seal
102	KA10120510	1	—Machine screw
103	LHP000264	1	—Strainer
104	P2H400391	1	—Adapter
-	LHP002527	1	—Valve set
180	P2H403036	1	——Liner
● 181	KA50200315	2	——O-ring
182	P2H403037	1	——Spool
● 95	KA50100080	1	——O-ring
● 183	P2H403038	1	——O-ring
184	P2H403040	1	——Washer
185	P2H403041	1	——Washer
186	P2H403043	1	——Washer
187	P2B402580	1	——Low head bolt
188	P2H403039	1	—Spring
189	P2H403044	1	—Cap
190	KA40210037	1	—Retaining ring
191	P2H403046	1	—Plate
192	P2H403045	2	—Low head bolt
193	P2H403056	2	—Elbow
105	P2H400150	2	Cap screw
106	KA00910620	2	Cap screw
107	P2H400863	1	Shaft
108	P2H400392	1	Angle piece
109	P2H400373	2	Washer
110	P2H200157	1	Control lever
111	P2H400883	2	Hex. Head bolt
112	KA20110500	2	Hex. Nut
113	P2H400402	2	S-hook
114	P2H400193	1	Cap screw
115	KA00910412	1	Cap screw
117	KA30210800	1	Plain washer
118	KA01710812	1	Button cap screw
124	KA00910635	1	Cap screw
125	KA25520602	1	U-nut
126	—	1	Name plate
128	KA14549803	4	Drive screw
132	P2H402786	1	Cap screw
133	KA23121205	1	Hex. Slotted nut
● 134	KA42129828	1	Split pin

Link chain

Ref. No.	Part No.	Quantity	Description
● 135	P2H300289	1	Link chain

Bottom Hook

Ref. No.	Part No.	Quantity	Description
-	LHP000546	1	Hook holder assembly
-	LHP000469	1	—Hook compl.
3	—	1	——Hook
-	LHP000470	1	——Hook latch set
4	—	1	———Hook latch
5	—	1	———Spring
6	—	1	———Rivet
141	P2H300296	1	—Hook holder
8	KA63100703	8	—Steel ball
142	P2H400544	1	—Washer
143	P2H400860	1	—Sleeve
144	P2H400546	1	—Pin
145	P2H400547	1	—Ring

Chain bucket

Ref. No.	Part No.	Quantity	Description
161	LHP000480	1	Chain bucket (for 6m chain)

Pendant control switch

Ref. No.	Part No.	Quantity	Description
200	LHP002512	1	Pendant control switvh set

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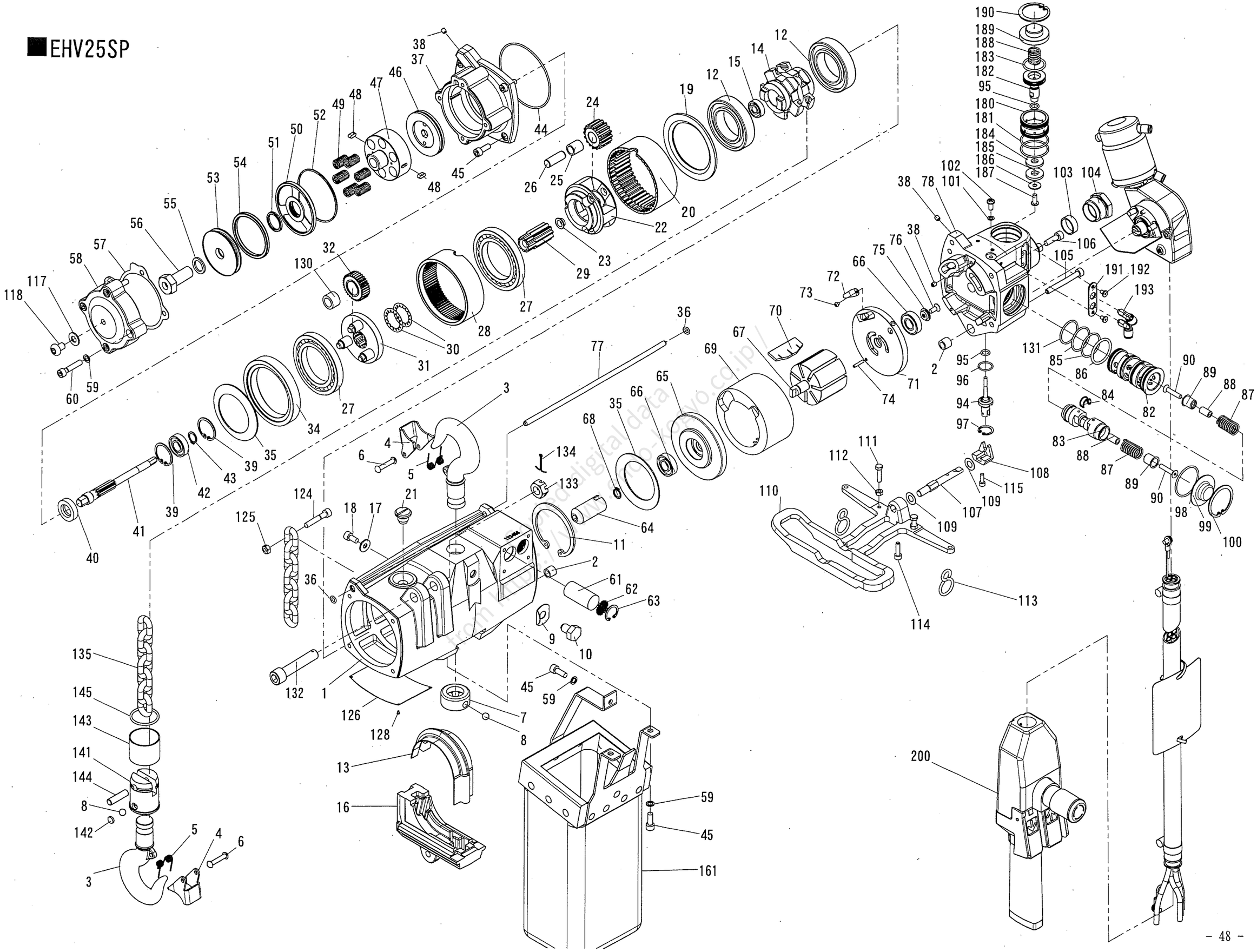
When ordering spare parts, specify part number (not the reference number), description and model of the hoist.

■EHV25SP



from KATO digital data (http://www.kato-kogyo.co.jp/)

■Parts List EHV49SP

Ref. No.	Part No.	Quantity	Description	Ref. No.	Part No.	Quantity	Description
1	P2H100051	1	Casing	48	P2H400051	2	Key
2	P2H400145	1	Needle bearing	● -	LHP000472	1	Spring set
-	LHP000469	1	Hook compl.	49	—	6	—Spring
3	—	1	—Hook	50	P2H300427	1	Cylinder cover
-	LHP000470	1	—Hook latch set	● 51	P2H400324	1	X-ring
4	—	1	——Hook latch	● 52	KA50200670	1	O-ring
5	—	1	——Spring	53	P2H300428	1	Brake piston
6	—	1	——Rivet	● 54	P2H400054	1	X-ring
7	P2H300155	1	Hook holder	55	KA32411421	1	CD-washer
8	KA63100703	8	Steel ball	56	P2H400395	1	Bolt
9	P2H400211	1	Washer	● 57	P2H300429	1	Gasket
10	P2H400212	1	Bolt	58	P2H200148	1	Brake cover
11	KA40210068	1	Retaining ring	59	KA32410621	7	CD-washer
12	KA60103084	2	Ball bearing	60	KA00910630	4	Cap screw
13	P2H300421	1	Chain guide	61	P2H400809	2	Silencer
14	P2H200089	1	Chain wheel	62	P2H400601	2	Support
● 15	KA60103814	1	Ball bearing	63	KA40210020	2	Retaining ring
16	P2H100052	1	Chain guide	64	P2H400374	1	Coupling
17	P2H400357	1	Washer	-	LHP000473	1	Air motor compl.
18	KA00910612	1	Cap screw	-	LHP000219	1	—End plate set
19	P2H400358	1	Washer	65	—	1	——End plate
20	P2H300234	1	Internal gear	66	KA60103011	1	——Ball bearing
21	P2H400359	1	Lock screw	67	P2H200094	1	—Rotor
22	P2H200079	1	Planet shaft	● 68	KA40110011	1	—Retaining ring
23	P2H400360	1	Bushing	69	P2H200150	1	—Cylinder
-	LHP000215	1	Gear wheel set	● -	LHP000218	1	—Vane set
24	—	3	—Gear wheel	70	—	7	——Vane
● 25	P2H400510	3	—Needle bearing	-	LHP000220	1	—End plate set
26	P2H400361	3	Pin	71	—	1	——End plate
27	KA60107100	2	Ball bearing	72	P2H400375	1	——Support
28	P2H300423	1	Internal gear	73	P2H400639	1	——Machine screw
29	P2H300241	1	Gear wheel	66	KA60103011	1	——Ball bearing
30	P2H300264	2	Coned disc sprign	74	KA42410316	1	——Spring pin
31	P2H200149	1	Planet shaft	75	P2H400542	1	—Washer
-	LHP000471	1	Gear wheel set	76	KA01310512	1	—Countersunk head cap screw
32	—	3	—Gear wheel	77	P2H400810	1	Pipe
● 2	P2H400145	6	—Needle bearing	-	LHP002508	1	Valve housing assembly
33	P2H400806	3	Pin	78	P2H1000084	1	—Valve housing
34	P2H300424	1	Spacer	2	P2H400145	1	—Needle bearing
35	P2H300263	2	Coned disc sprign	38	KA16110506	5	—Set screw
● 36	KA50100060	2	O-ring	-	LHP000544	1	—Valve set
37	P2H100053	1	Brake housing	82	—	1	——Liner
38	KA16110506	1	Set screw	83	—	1	——Valve cone
39	KA40210028	2	Retaining ring	84	P2H400376	1	——Spring
● 40	P2H400514	1	Oil seal	● 131	KA50200280	1	——O-ring
41	P2H300425	1	Shaft	● 85	KA50200290	2	——O-ring
● 42	KA60103012	1	Ball bearing	● 86	KA50300250	1	——O-ring
● 43	KA40110012	1	Retaining ring	87	P2H400813	2	——Spring
● 44	KA50200850	1	O-ring	88	P2H400378	2	——Spacer
45	KA00910616	7	Cap screw	89	P2H400379	2	——Sleeve
● 46	LHP000071	1	Brake disc	90	KA01310525	2	——Countersunk head cap screw
47	P2H300426	1	Pressure plate				

We recommend that you stock parts indicated by a bullet(●).
Parts without part numbers can not be supplied separately.
When ordering spare parts, specify part number (not the reference number), description and model of the hoist.

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Ref. No.	Part No.	Quantity	Description
94	LHP000224	1	—Lever
● 95	KA50100080	1	—O-ring
● 96	KA50200160	1	—O-ring
97	KA40210018	1	—Retaining ring
● 98	KA50200380	1	—O-ring
99	P2H400382	1	—Cover
100	KA40210040	1	—Retaining ring
101	P2H400214	1	—Seal
102	KA10120510	1	—Machine screw
103	LHP000264	1	—Strainer
104	P2H400391	1	—Adapter
-	LHP002527	1	—Valve set
180	P2H403036	1	——Liner
● 181	KA50200315	2	——O-ring
182	P2H403037	1	——Spool
● 95	KA50100080	1	——O-ring
● 183	P2H403038	1	——O-ring
184	P2H403040	1	——Washer
185	P2H403041	1	——Washer
186	P2H403043	1	——Washer
187	P2B402580	1	——Low head bolt
188	P2H403039	1	—Spring
189	P2H403044	1	—Cap
190	KA40210037	1	—Retaining ring
191	P2H403046	1	—Plate
192	P2H403045	2	—Low head bolt
193	P2H403056	2	—Elbow
105	P2H400150	2	Cap screw
106	KA00910620	2	Cap screw
107	P2H400863	1	Shaft
108	P2H400392	1	Angle piece
109	P2H400373	2	Washer
110	P2H200157	1	Control lever
111	P2H400883	2	Hex. Head bolt
112	KA20110500	2	Hex. Nut
113	P2H400402	2	S-hook
114	P2H400193	1	Cap screw
115	KA00910412	1	Cap screw
117	KA30210800	1	Plain washer
118	KA01710812	1	Button cap screw
124	KA00910635	1	Cap screw
125	KA25520602	1	U-nut
126	—	1	Name plate
128	KA14549803	4	Drive screw
132	P2H402786	1	Cap screw
133	KA23121205	1	Hex. Slotted nut
● 134	KA42129828	1	Split pin

Link Chain

Ref. No.	Part No.	Quantity	Description
● 135	P2H300289	1	Link chain

Bottom hook

Ref. No.	Part No.	Quantity	Description
-	LHP001462	1	Hook holder assembly
-	LHP000469	1	—Hook compl.
3	-	1	——Hook
-	LHP000470	1	——Hook latch set
4	-	1	———Hook latch
5	-	1	———Spring
6	-	1	———Rivet
141	P2H300296	1	—Hook holder
8	KA63100703	8	—Steel ball
142	P2H400544	1	—Washer
143	LHP001530	1	—Sleeve
144	P2H400546	1	—Pin
145	P2H400547	1	—Ring

Chain Bucket

Ref. No.	Part No.	Quantity	Description
161	LHP000480	1	Chain bucket (for 6m chain)

Pendant control switch

Ref. No.	Part No.	Quantity	Description
200	LHP002512	1	Pendant control switch set

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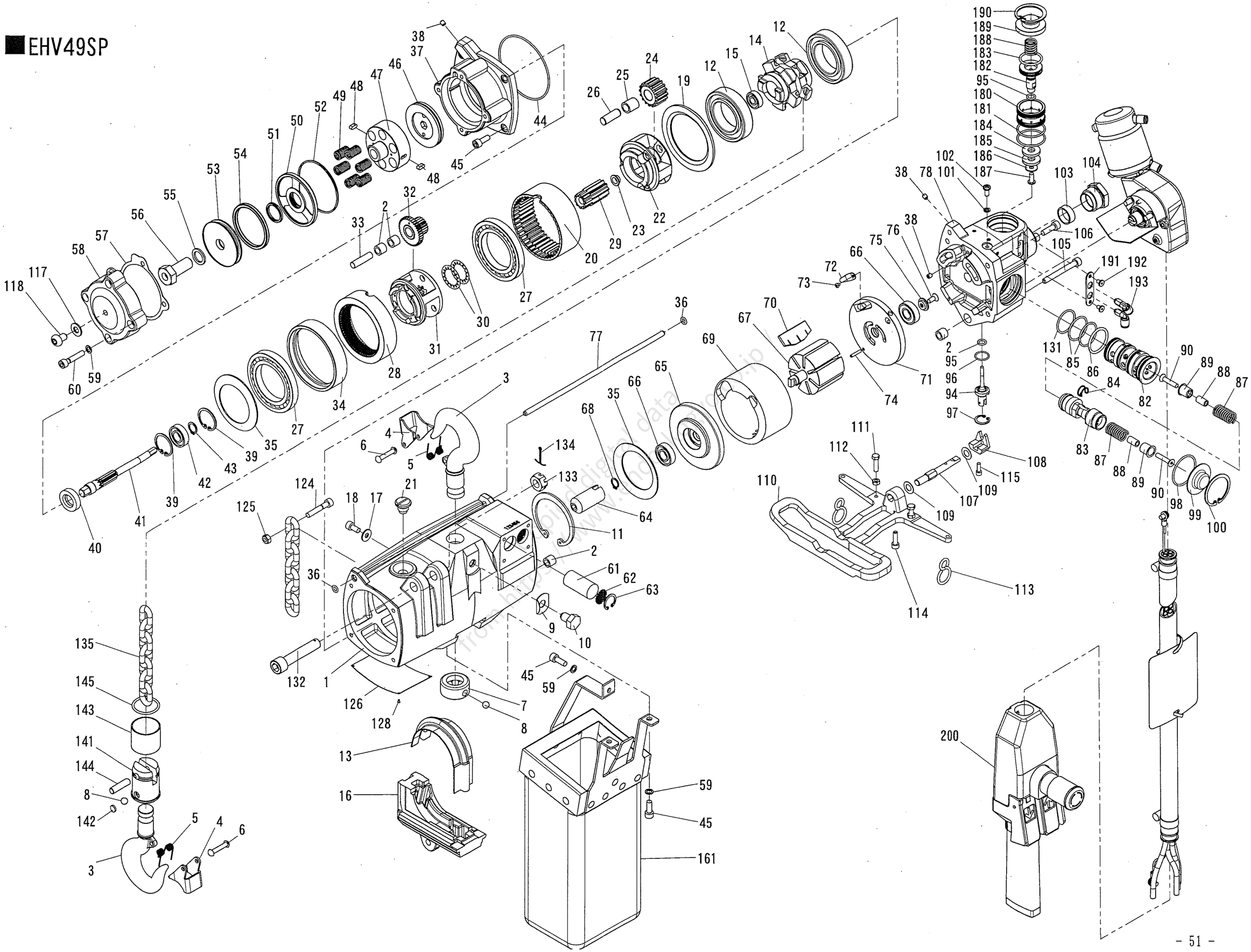
We recommend that you stock parts indicated by a bullet(●).
Parts without part numbers can not be supplied separately.
When ordering spare parts, specify part number (not the reference number), description and model of the hoist.

■EHV49SP



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■ Pendant Control Switch Parts List

	Ref No.	Part No.	Description	QTY
	-	LHP002549	Cylinder asembly	1
	-	LHP002583	−Cylinder compl.	1
	1	P2H400215	− −Piston rod	1
●	2	KA40110007	− −Retaining ring	1
	3	P2H400216	− −Ring	1
	4	P2H400217	− −Spacer	1
	5	P2H400218	− −Spring	1
	6	P2H400219	− −Spacer	1
	7	P2H400220	− −Piston	1
●	8	KA50100315	− −O-ring	1
●	9	P2H400221	− −Lock nut	1
	10	P2H300156	− −Cylinder	1
	11	P2H300157	− −Cylinder cover	1
	12	KA00910410	− −Cap screw	4
●	13	P2H400214	− −Seal	2
	14	P2H400222	− −Silencer	2
	15	P2H400223	− −Bolt	2
	16	P2H403042	− −connector	2
	17	KA64101002	− −Bearing nut	1
	18	P2H400224	− −Link	1
	19	P2H400865	− −Pin	1
	-	LHP000204	−Cylinder holder compl.	1
	20	P2H200058	− −Cylinder holder	1
	21	KA43200412	− −Parallel pin	1
	22	LHP000076	− −Shaft	1
	23	P2H400265	− −Spacer	1
	24	KA60102012	− −Ball bearing	2
	25	P2H400165	− −Sleeve	1
	26	P2H400228	− −Pin	1
	27	KA40310040	− −Retaining ring	1
	28	KA00910642	− −Cap screw	2
	29	KA16110508	− −Set screw	1
	30	P2H300162	− −Cover	1
	31	KA10220510	− −Machine screw	2
	32	P2H400229	−Cover	1

	Ref No.	Part No.	Description	QTY
	-	LHP002548	Control valve assembly	1
	33	P2H100054	−Valve housing	1
	34	P2H300158	−Spring	2
	35	KA63100304	−Steel ball	2
●	36	KA50100080	−O-ring	4
	37	P2H400247	−Seat	2
	38	P2H300159	−Liner	2
	39	P2H400248	−Pin	2
	40	P2H400249	−Valve knob	2
	-	LHP000053	−Buffer spool compl.	2
	41	-	− −Spring case	2
	42	-	− −Spool	2
	43	-	− −Spring	2
	44	-	− −Retaining ring	2
	45	P2H400256	−Set screw	2
	46	LHP000210	−Push button set	1
	47	P2H400251	−Pin	1
	29	KA16110508	−Set screw	5
	48	P2H400939	−Spring	1
	49	P2H300571	−Valve cone	1
●	50	P2H400937	−O-ring	3
	51	P2H400938	−Emergency stop buttor	1
	16	P2H403042	−Connector	4
	52	P2H200169	−Valve cover	1
	31	KA10220510	−Machine screw	2
	-	LHP002433	Control tube compl.	1
	53	-	−Protection hose	1
	54	-	−Inner	2
	55	-	−Wire rope	1
	56	-	−Lock tube	2
	57	-	−Nylon tube (Black)	1
	58	-	−Nylon tube (Red)	1
	59	-	−Nylon tube (Blue)	1
	60	-	−Nylon tube (White)	1
	61	KA86100220	−Hose clip	2
	62	KA30220500	Plain washer	2
	63	KA10120508	Machine screw	2
	64	P2H300273	Caution plate	1
	65	P2H400465	Comvex belt	2

We recommend that you stock parts indicated by a bullet (●).
Parts without patr numbers can not be supplied separately.
When ordering spare parts, specify part number (not the reference number) , description and model of the hoist.

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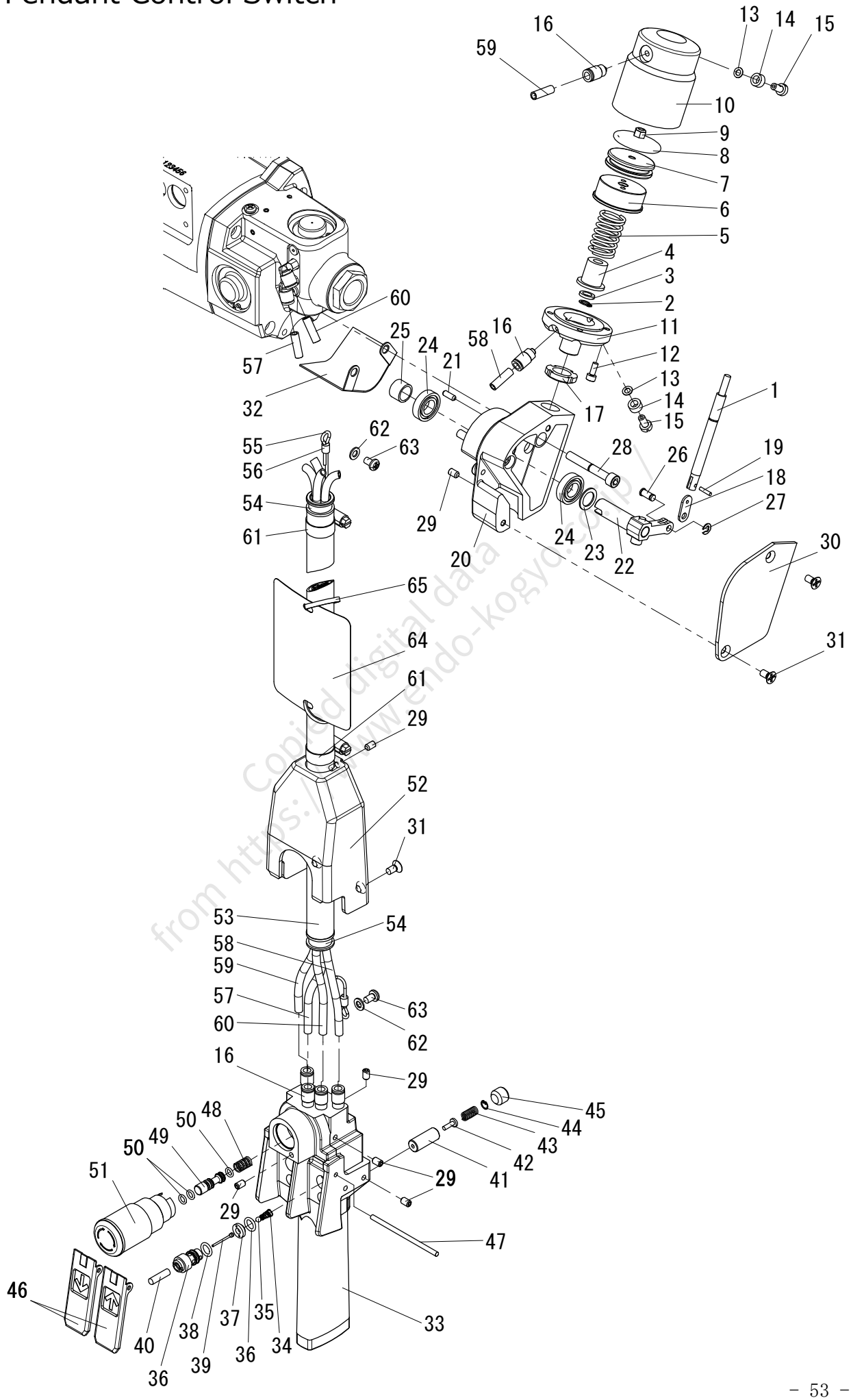
■ Pendant Control Switch



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