INSTRUCTION MANUAL

AIR BALANCER

EHB-85D/MSD

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⚠ WARNING

- Never use the AIR BALANCER 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-10101c

Issued on Sep. 2023

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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 or 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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1. ⚠ Safety Instructions

If the air balancer is not used correctly a serious accident may occur, such as dropping the load or the air balancer itself.
Before installing, operating, controlling, inspecting of air balance, read and understand this instruction manual.
*Until understanding of all equipment terminology, safety information, caution and warning, do not use the air balancer.

1.1 Review of Safety Instruction

⚠ WARNING

- Do not use this air balancer or attached equipment for lifting, supporting, or transporting people or lifting or supporting loads over people.
- Before installing, operating, storing of air balancer, read and understand this instruction manual carefully to prevent the accidents by the incorrect operation.
- Keep this manual available for maintenance and inspections.
- Always check the supporting member from which the air balancer is suspended is strong enough to support the weight of the air balancer plus the weight of the rated load, etc. The customer has the responsibility for this.

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1.2 Instruction for safe operation

If there are any differences between instruction manual and the standard of your company, give the priority to stricter standards from either of both.

1.2.1 General Handling

⚠ WARNING

- Never operate the air balancer unless the contents of this manual and caution plate (warning label) are completely known.
- Never operate the air balancer nor sling a load unless you were trained in safety rules and in operating manner of the air balancer. Never allow untrained persons to do so. Never remove or deface any nameplates, caution plates or warning labels which are attached to the air balancer.
- Always check the air balancer before each shift, and inspect it periodically.
- Never operate the air balancer if you are not physically fit to do so. The operator must have good hearing, vision and depth perception.
- When instruction signs put on the push button switches such as "EQUIPMENT BEING INSPECTED" or "DO NO RUN", never operate the hoist until the sign is removed by the designated person.

1.2.2 Installation

⚠ WARNING

- Always employ specialists or well trained persons for installation.
- Never install the hoist in any environments which are out of specifications.
  For example, the air balancer should not be exposed to rain or water.
- Always install stoppers at the end of the rails for traveling or traversing.
- Always check the supporting member for the air balancer has enough strength.
- Always attach a secondary support wire rope.

⚠ CAUTION

Never operate the air balancer when the air balancer is placed on the floor.
Only operate the air balancer when it is hanging.
*Never operate the air balancer when the wire rope is loose.

1.2.3 Air pressure

⚠ WARNING

Never exceed the working air pressure of 0.7MPa (7kgf/cm^2).
*If it is necessary, reduce and set the air pressure to the requirement of working air pressure by the regulator.

⚠ CAUTION

- Never use the lubricator on the air supply hose to the air balancer.
  *Using a lubricator on the air supply hose will cause the failure of control module on air balancer.
- Always locate the filter and regulator.

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1.2.4 Operation and Handling

⚠ WARNING

- Never lift a load greater than the rated capacity of the air balancer.
  *The rated load is marked on the air balancer body.
- Never stand on a suspended load.
  Also never apply and use the air balancer for transporting people.
- Never stand and walk under the suspended loads, and keep out of its area of projection.
  Never place hands, feet and etc., under or between suspended loads.
- Never operate the air balancer when anyone is in the traveling area of the load.
- Always check there are no objects in the ways of the load or the load hook when moving the air balancer.
- Never carry a load over people.
- Never leave a load suspended for any extended period.
- Always pay attention to the load at all times when operating the air balancer.
- Never swing the load or the load hook when moving the air balancer.
- Never use the stopper as a means of stopping the air balancer.
- Never pull a load at an angle.
  Never lift a load when the load hook is not over the load's center of gravity.
  *Always move the air balancer over the load's center of gravity before lifting.
- Never face the wire rope to the sharp edged material.
- Never wind the wire rope around the suspended load of air balancer directly.
- Never do earth suspending (lifting locked loads).
- Never turnover a suspended load.
  *Always employ special equipments in case of turn over work.
- Always check movement of the push button switches before operation.
  Never operate the air balancer if the push button switches do not move smoothly.
- Stop the air balancer immediately when up / down operations are contrary to the indications marked on the push button switches.
- Never operate the air balancer when damaged or abnormal sound / vibration occurs.
- Never operate the air balancer with the wire rope in any of the following conditions.
  1. Twisted, kinked and deformed.
  2. The number of broken wires reaches the service limit.
  3. The reduction of diameter reaches the service limit.
- Never perform cutting work on a load suspended by the air balancer.
- Never perform electro-welding work on a load suspended by the air balancer.
- Never use the wire rope of the air balancer as a ground for welding.
- Never attach a welding electrode to the wire rope of the air balancer.
- Never lift any single load with 2 or more air balancers.
- Never lock the push button switches.
  *The air balancer must be manually operated by the operator herself at all times.
- When moving a load with a plain trolley, never push the wire rope of air balancer but push the load itself. Never pull the load.
- If the air supply hose or control hose are come off or cut, the load may fall down so handle the air balancer with care.

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⚠ CAUTION

- Never use the hook with a damaged or malfunctioning hook latch.
- Carry out the smooth operation of lifting up and lowering.
  Never start, stop or reverse the air balancer suddenly.
- Never keep holding stopper while operating.
- Never allow the suspended load to touch the nearby structure or power lines, etc.
- Never jerk the hose of the push button switches nor catch it on the nearby structure.
- Never allow the air balancer or trolley to collide with the I-beam stopper or the structure.
- Always check the load hook can swivel smoothly before operating the air balancer.
- Always position the slings at the center or the load hook.
- When starting to lift, stop the air balancer once as the wire cable becomes tensioned.
  *Never jerk the air balancer.
  Never operate the air balancer suddenly while the wire rope is slack.
- Always check the load-lifting height of the air balancer is enough for required work.
- Never leave a load suspended for any extended period.
  After the several hours, the suspended load will go down slowly.
- If the air supply is stopped, the suspended load will keep staying the height by functioning the check valve.
- While the air balancer is not used, the suspending load will slowly go down, so lower the suspended load after the operation.
- Lower the bottom hook by manual paying out when the hook could not lower automatically because of maximal stroke of the wire rope.

1.2.5 Maintenance, Inspection and Alterations

⚠ WARNING

- Never alter the air balancer or its accessories.
- Always use genuine parts for replacement.
- Always shut off the air supply before carrying out maintenance, inspection or repair.
- Always employ specialists or well trained persons for maintenance, inspection and repair.
- Always remove the load from the air balancer before maintenance, inspection or repair.
- Always disassemble the air balancer on the floor.
- If any problems are detected during maintenance or inspection, never use the air balancer but correct and repair the problems immediately.
- Periodically, inspect the air balancer thoroughly and replace any worn or damaged parts.
- Stretched, worn or damaged hooks should be discarded.
  Never attempt to repair it, just replace it with a new hook.
- Always put up an instruction sign("EQUIPMENT BEING INSPECTED", "DO NOT OPEN THE VALVE",etc.) before carrying out maintenance, inspection or repair.
- Never do anything if you have any questions about the air balancer, please do not hesitate to contact you dealer or us.

⚠ CAUTION

- Follow the lubrication instructions.
- Always hang the air balancer when carrying out test run after maintenance or repair.
  *Never operate the air balancer when the wire rope of air balancer is slackened.

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2. Specification

2.1 Specification

Model	Air Pressure (MPa)	Capacity range (kg)	Mass (kg)	Stroke (mm)	Dia of wire rope (mm)	Air inlet
		Lifting control				
EHB-85D +MSD	0.7	90	41.0	1900	4.76	Rc 3/8
	0.6	75				
	0.5	62				
	0.4	50				

<note>

- Weight of trolley is approx. 7kg.

  EHB-85D+MSD (41kg) −upper hook (1kg) +trolley (7kg) =47kg

Working conditions

Application area: Indoor and normal atmospheric condition

Temperature range: –5°C to +50°C

2.2 Labels and tags position

Warning label, name plate, tag are attached as the drawing below.

In inspection, see this figure and warning label, name plate, tag are in the right position.

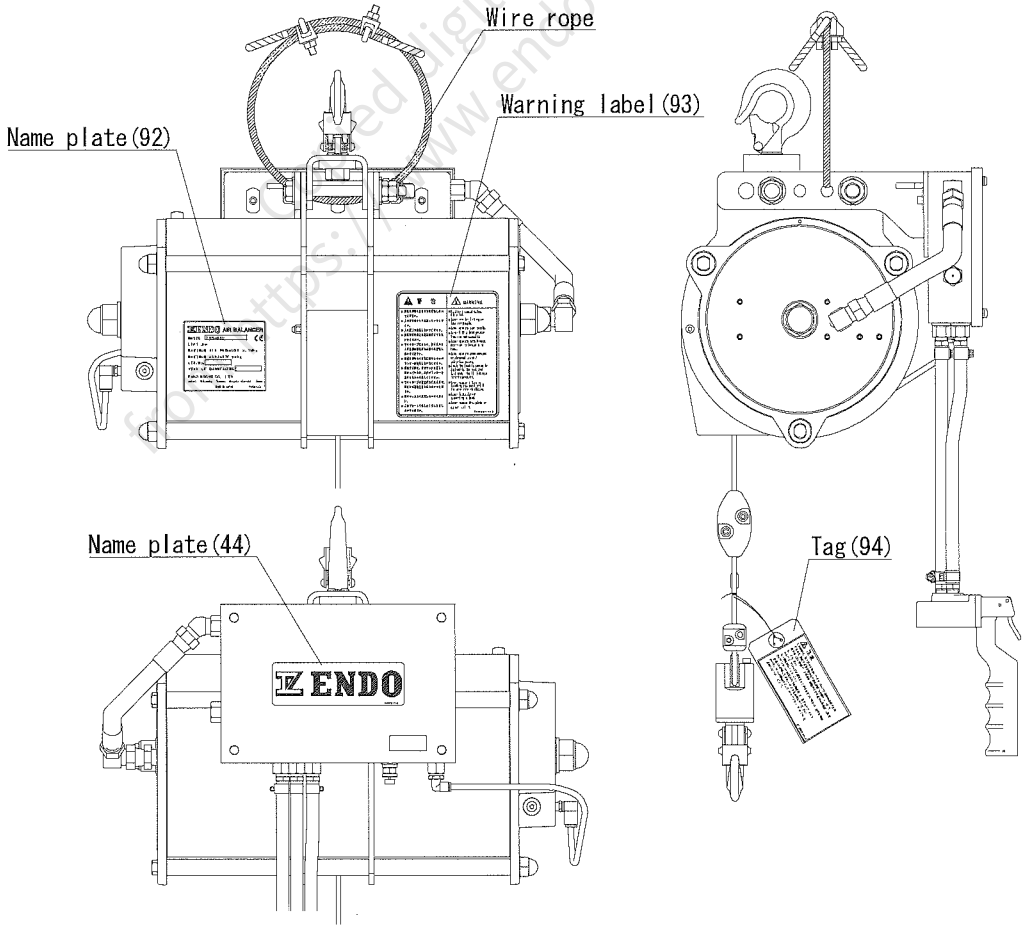

Fig.1

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3. Checks and Instructions before the Installation

3.1 Checks of the Product

- Check the delivered air balancer is what you ordered(Check the name plate)
- Check there was no damaged or deformation on the air balancer during the transportation.
- Check the pressure of the available air supply corresponds to the working air pressure of the air balancer.

3.2 Instructions on Working Condition

⚠ WARNING

- Never use the air balancer at a temperature below –5°C or above +50°C.

⚠ CAUTION

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

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4. Installation of accessories

4.1 Installation of control module / MSD

4.1.1 Installation to air balancer

1. Fit the bracket(1) into outside of the hanger(12) and adjust the fitting hole as shown on fig.2.
2. Insert pipe(69) into between hangers and pass hex bolt(67) through the pipe.
   Hex bolt must be surely fixed with hex nut(70) and U nut(71).
3. Connect tube(25) to elbow(91).
4. Connect adapter(48) to inlet of main body.

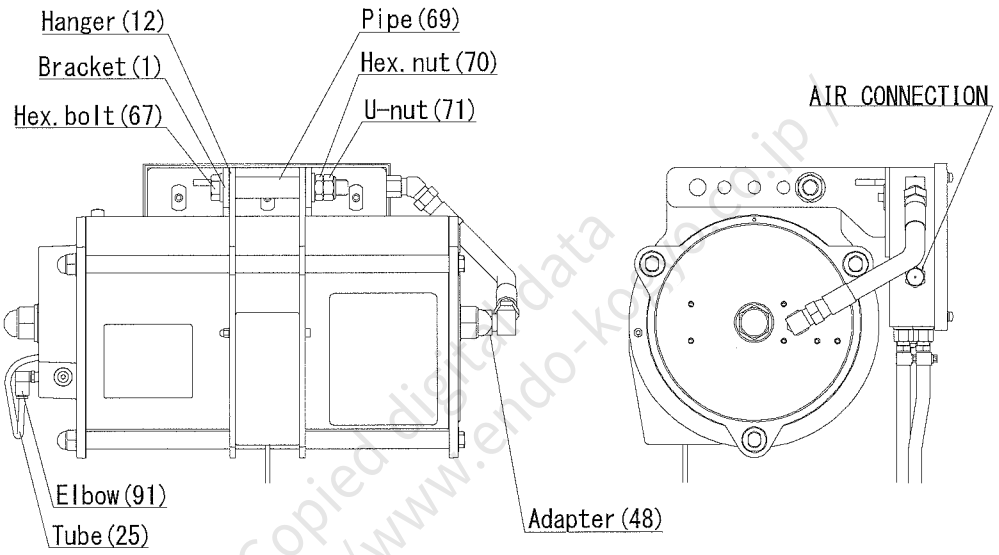

Fig.2

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4.1.2 Piping the air inlet

1. Before installing air hose and piping to the air balancer, blow the dust inside of piping. Then make sure there is no foreign matter in the piping.
2. Supply clean air pressure with no moisture and no foreign matter to the casing (2). (Use less than 5 μ m air filter and supply air with no lubrication)

4.1.3 Operating adjustment

Note: Speed controller (16) for "UP" and "DN" speed adjustment is strangled clockwise to prevent unexpected accident when the items are leaving from the manufacturer.

Turn the each knobs of the speed controller (16) to counterclockwise and adjust the speed.
If making turns of the knob to counterclockwise, the lifting and lowering speed will be increased.
In another hand, the lifting and lowering speed will be decreased if making turns to clockwise.

Note: The Lifting speed without the suspended load are different from the lifting speed with the suspended load.
In case the lifting speed is adjusted faster, the retract control system may work as the lifting speed without the suspended load is too fast. It is recommended to adjust the speed with the suspended load and the lifting speed must be adjusted in the range which the retract control system will not work.

4.1.4 System reset

＊ If the safety retract control system cannot be released, take the next procedures to release the system.

1. Payout the wire rope by pushing the lowering switch button (DN). But in case not to lower the bottom hook even if you took this procedure then pull down the bottom hook with pushing the lowering switch button.
2. After taking this procedure, the safety retract control system should be released and up / down control will be available.

4.1.5 Operation

Push lifting push button "UP" for lifting.
Push lowering push button "DN" for lowering.
After releasing the handle, it is available to lifting up and down the suspended load within about 35cm by hands. Therefore, it is the floating system and convenient to place the suspended load into the certain place.
This floating condition is different from the balance condition because the floating system is applied with the characteristic of air, so the suspended load will come back to the initial suspended position when an operator releases a hands.

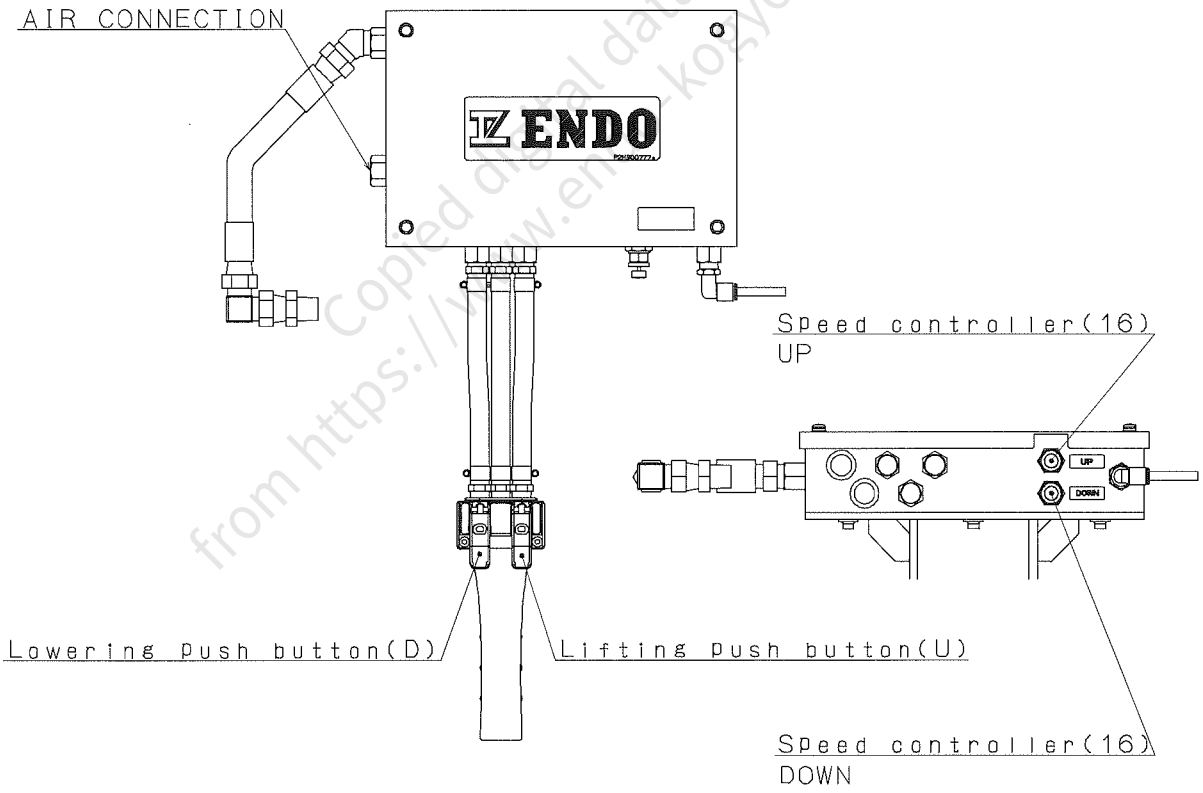

Fig.3

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4.2 Installing the supporting wire

⚠ WARNING

- Always attach the supporting wire rope which are attached in the same box to the hanger of the air balancer.
  It protects the operator when the upper hook of air balancer or supporting member (hanging ring) is broken.

- Always check the supporting member from which the air balancer is suspended is strong enough to support the weight of the air balancer plus the weight of the rated load, etc.
  The customer has the responsibility for this.

1. Wind the supporting wire rope over the supporting member after take through the supporting wire rope (12) into the hall of bracket.
2. Make sure to clamp the supporting wire rope (12) by wire clip (13) after gathering and adjusting the length of supporting wire rope.
   In addition, give the 10Nm of torque to clamp nut of the wire clip (13).
   Please adjust the supporting wire rope in order that the drop of air balancer must be within 100mm.

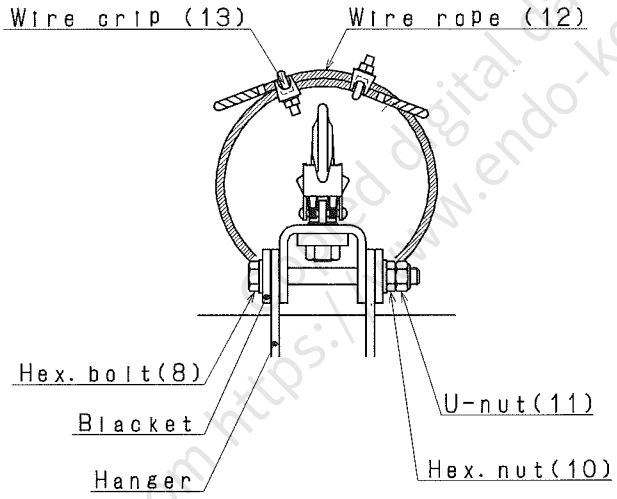

Fig. 4

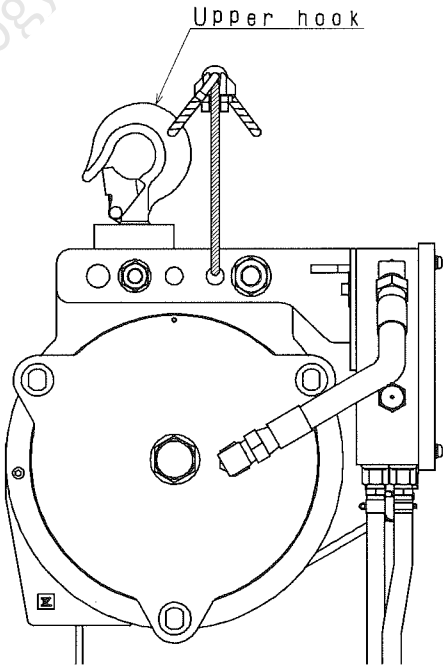

Fig. 5

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5. Instruction about inertia braking unit

Inertia braking unit is a unit that prevents the suspended tools from rising and descending due to inertia after the tools were stopped lifting or lowering.
Note: This unit cannot perfectly fix the tools at the point of stopping.

5.1 Adjustment of inertia braking unit

> **CAUTION**
>
> Adjustment must be done after cutoff of supplying air.

Side view of inertia braking unit is shown on Fig. 6
Press brake shoe(20) with spring(24) so that brake wheel(49) can generate resistance to brake inertia.
Screw the screw(25) until its depth become 11mm as shown on Fig. 6 to adjust the press power of spring and also screw the screw(26) to lock the screw(26).

Note: The performance of the lifting and lowering falls off because brake shoe(20) is not released when screw(25) is screwed more than required.

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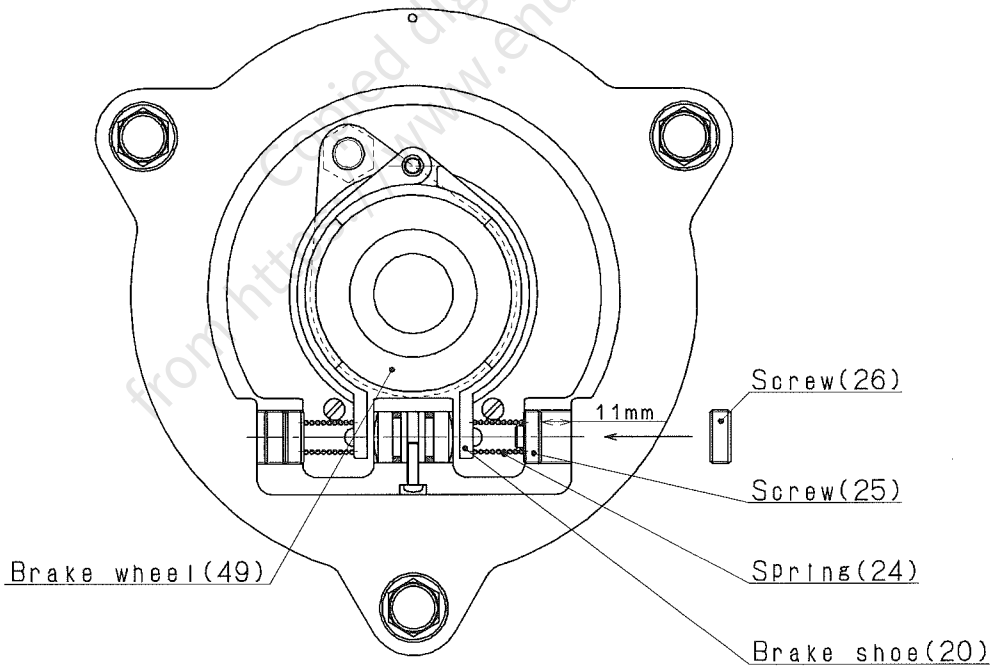

Fig.6

6. Installation

*If the accessory and the air balancer are separately delivered, attach the accessory to the main body of air balancer following the procedures before installing the accessory to the air balancer.
*For details and procedures, see chapter 4 "Installation of accessories".

6.1 Installation

⚠ WARNING

- Always check the supporting member from which the air balancer is suspended is strong enough to support the weight of the air balancer plus the weight of the rated load, etc.
- Always attach secondary support wire rope.

- Install the air balancer properly.
- Check the top hook is correctly rigged onto the supporting member and the hook latch is correctly closed.
- Never use a supporting member that suspends the air balancer at an angle.

6.2 Checks before piping the air inlet

⚠ WARNING

- Always keep the working pressure no greater than 0.7MPa (7kgf/cm^2). If necessary, use an air regulator for reducing air pressure.
- The air balancer is designed to operate with air pressure with no greater than a working pressure range of 0.7MPa(7kgf/cm^2).

⚠ CAUTION

- Never use the lubricator for the piping of air balancer.
  *If used, it could be failure of control module by damaging components inside of air balancer.
- Never operate air balancer without filter and regulator.

- Check sufficient air can be supplied to the opening are of the air balancer. For a pipe of excessively small diameter or of greater length, the pressure drop can become large enough to prevent the specified performance.
- Use an air hose whose inside diameter is at least 9.5mm(3/8 in)
- Before connecting the air hose or pipe to the air balancer, be sure to flush or blow out with air to prevent the invasion of foreign matter (dust, etc) into the air balancer. In addition, take the same care for control hose and air chamber.
- Compressed air supplied to the air balancer should be free from moisture or foreign matter. Install an air filter to eliminate them from air supply.
- Install a dump valve (drain valve) at the lowest point in the piping.

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7. Check after Installation and Test run

7.1 Check Lifting Operation

- Keep the working air pressure no greater than 0.7 MPa(7kgf/cm^2).
- Check the indications marked on the push buttons correctly show the actual directions of up / down operations.

7.2 Checking the flying up prevention apparatus

> **⚠ WARNING**
> Never use the internal flying up prevention apparatus and a stopper as a means of stopping air balancer.
> Use them only in emergency case of preventing the snap back of bottom hook.
> If the stopper is frequently used, wire rope will be worn and broke hitting by the stopper.

Check the activation of the flying up prevention apparatus by making fast rotation to the drum when no load is suspended.
To release the flying up prevention apparatus, push the lower button (or turn the regulator switch to left fully) to payout the wire rope.
But if does not work, push the lower button and pull the lower hook at the same time.
This procedure will release the flying up prevention apparatus.

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7.3 Check of application range

> **⚠ WARNING**
> Never use the air balancer at maximum length.

Check the stopper does not hit the main body and the internal flying up prevention apparatus does not work during the regular operation.
If the activation of the internal flying up prevention apparatus or hit of stopper is happened, readjust the speed and relocate the stopper position.

7.4 Other Checks

Operate the air balancer lifting and lowering with the load.
If the air balancer is using a trolley, run the trolley sideway.
Make sure that lifting loads stops when releasing "UP" and "DOWN" button.
If the I-beam application is using for the air balancer operation, check I beam condition and length of air hose.

8. Checks before operation – At the beginning of each shift

⚠ WARNING

- Always execute the following checks at the beginning of each shift.
- If a malfunction occurs during the operation of the air balancer, stop operation immediately and take the necessary steps to rectify the problem.
  Never operate the air balancer if damaged or malfunctioning.
  This is serious hazard and could result in personal injury or death.

8.1 Check before Start up

(1) Check wire rope is not twisted, kinked, damaged, or worn. See "Wire cable inspection and service limit of wire rope"
(2) Check Load hook is not stretched or damaged and hook latch is in the normal position.
(3) Check cap screw is not loose.
Tighten cap screw with torque of 5.9N·m if cap screw is loose.
(4) Check no cracks and wear on the hose.
(5) Check no air leakage around the body and control module.
(6) Check the trolley wheels track the rails properly and the wheels and rails are not worn.
(7) Check the lifting sling (suspension fastening) is not damaged or worn.

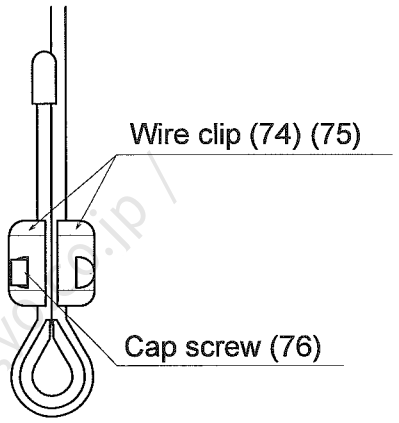

Fig.7

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8.2 Check by Idling Operation

(1) Check the push buttons can be easily operated and up/down operations are correct as indicated.
(2) Check the retract control does not work.
In case the retract control works, adjust it according to the "operating adjustment".

8.3 Check by Load Operation

(1) Lift related or equivalent load suspended a few inches off the floor and check whether the air balancer stops after lifting and lowering operation.
(2) Check the air balancer is not abnormally noisy or vibrating.

9. Periodic Inspections

⚠ WARNING

- Periodically, inspect the air balancer thoroughly and replace any worn or damaged parts.
- Always shut off the air supply before carrying out inspections.
  Exceptions are checks or inspections of the push button, floating operation, the safety retract control and etc., during that the air balancer should be operated.

Monthly Inspection

Inspect the air balancer 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 air balancer.
  Therefore, make the inspection interval shorter according to your operation condition.
- For inspection items and methods, see Chapter 10, Section 10.2 "Inspection procedure".

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.

10. Maintenance and Inspection

⚠ WARNING

- Never alter the air balancer or its accessories.
- Always remove the load from the air balancer before maintenance, inspection or repair.
- Always shut off the air supply before carrying out maintenance, inspection, or repair.
  Exceptions are checks or inspections of the push button switches, floating operation and the safety retract system.
- Always employ specialists or well trained persons for maintenance, inspection and repair.
- Always disassembly the air balancer on the floor.
- Always use genuine parts for replacement.
- Replace any parts damaged or worn beyond its service limit.
- Always execute the load test after disassembling the air balancer for maintenance or inspection. See section 10.2"(7) General Operation Inspection".

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10.1 Lubrication

(1) Main body

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

Manufacturer	Case and piston	Ball screw and thrust bearing
Kyodo	Oneluber MP1	Oneluber MP1
Shell	Alvania grease EP1	Alvania grease EP2
Esso	Ristan EP1	Ristan EP2
Mobil	Mobilux EP1	Mobilux EP2

(2) Control module

⚠ CAUTION
Never apply any type of lubricants to the control module.

- Control module is using the elaborated components on the air circuit, so never use the lubricator to the piping for the air balancer.
- The air supply for air balancer must be come through the air filter.
- Periodically remove drain water deposited in the air filter bowl.

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10.2 Inspection

(1) Inspection of Hook and Service Limit

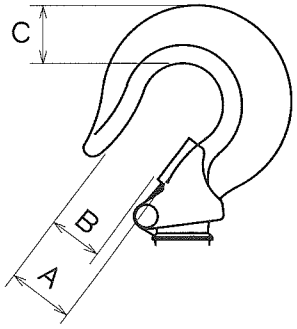
⚠ WARNING
Never repair the hooks.
Always replace a stretched, worn or damaged hook with new one.

Inspection on hook opening, cracks and wear.
If any of the following conditions apply to the inspected hook, never reuse always replace with new one.
- The hook opening is visibly stretched, or the opening dimension is different from the specified.
- The hook is deformed or cracked.
  Carefully check for any bends or cracks on the hook shank.
- Wear on the hook saddle, where the lifting sling(suspension fastening).
  Rests, reaches the service limit.
- The hook latch is damaged or malfunctioning.
- Check hook rotates smoothly. Hook which does not rotate smoothly (feels rugged when manually rotated) is beyond it service limit.

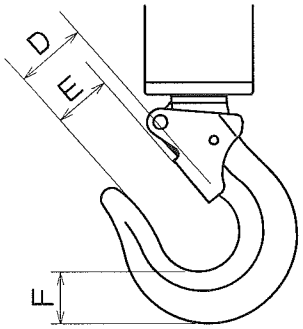
Hook opening dimension and wear limit

For the hook opening dimension A, B, D, E refer the standard dimension in the table right side for the inspectional standards.

Upper hook



Bottom hook



	Standard dimension	Service limit
A	25.5mm	Never exceed the standard dimension
B	23.0mm	Never exceed the standard dimension
C	22.0mm	20.7mm
D	26.0mm	Never exceed the standard dimension
E	21.0mm	Never exceed the standard dimension
F	19.0mm	16.9mm

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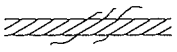
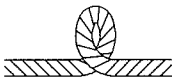
(2) Inspection of wire rope and Service Limit

Inspect the entire length of wire rope.


Wire breakage


Kink

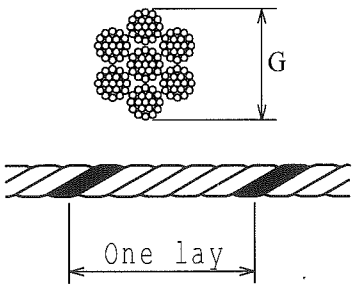
Deformation

Never use the wire rope having any one of the following defects.

- Kinked, deformed or corroded.
- The number of broken wires reaches the service limit.
- The reduction of diameter reaches the service limit.

Wear limit and limit of broken wires.

The number of broken wires in one lay should be no greater than 10% of all wires.
And the number of broken wires which are close each other and in the same strand should be no greater than 5%.



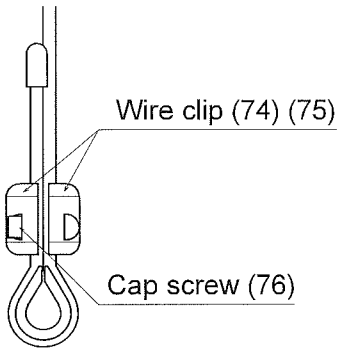
(mm)

	Standard dimension	Service limit
G	4.76	4.3

Number of all wires	Limit of broken wires	
	in one lay 10%	close each other and in the same strand 5%
133(7x19)	13	7

Fixed fitting of wire rope edge.

- Are there any deformation, cracks?
- Is cap screw loose?



Repair parts

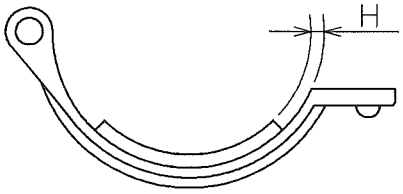
Always use genuine wire rope for replacement.

(3) Inspection of brake and its service limit.

Disassemble brake and inspect component parts of lining and brake.

- Is abrasion loss of lining more than its service limit?
- Is there any damages such as crack or deterioration at spring(24)?
- Is locknut for brake wheel loosened?
- Is there any damage to or deformation of O-ring(16) and is it worn?

■ Limit of lining's abrasion loss



(mm)

	base dimension	service limit
H	4.0	3.0

■ Measures

- Replace the parts if they are worn, damaged, deformed or cracked.
- Wipe oils with clothes containing solvent if lining is stained with oils.
- Lining must be replaced if its abrasion loss is more than its service limit.

Replacement of lining is also recommended when its loss is in the near of the limit even if the loss is not above the limit.

(4) Inspection of Air balancer

- Are there any cracks on casing?
- Are there any deformation, cracks on hanger?
- Are there any cracks in mounting hole for bolt on end cap?
- Are there any deformation or cracks?
- Check for air leakage.
- Are the bolts loose?

(5) Inspection of Switch and Valve

- Check for air leakage.
- Is fitting connection loose?
- Do the push buttons correctly return to the neutral position after being pushed?
- Are the bolts loose?
- Is the hose damaged, or is the connection part loose?

(6) Inspection on Other

1. Label and tag
   Check the location of labels and tags. Is it easy to see it? If it is not, replace it.
   *Attaching position is mentioned in the chapter 2.2 「Labels and tags position」.
2. Trolley
   - Check wheels of trolley run on I-beam and H-beam or other rails properly.
   - Check the tire of trolley or I-beam and H-beam is worn or not. If so, replace the defective part.
3. The structure of supporting member.
   Are there any defects such as deformation, wear, and cracks?

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(7) General Operation Inspection

After completing the inspections described in the foregoing sections, reassemble the whole unit and inspect as follows:

Idling

-Check the push button switches can be easily operated and up / down operations are correct as indicated.
- Check the air balancer is not abnormally noisy or vibrating.

Rated load test

- Check for malfunctions while lifting and lowering.
  Operate the air balancer at least twice through the full lifting range.
- Check the air balancer stops after the lifting and lowering operation.
- Check there is no significant reduction in the air balancer performance.
- Check the air balancer is not abnormally noisy or vibrating.

10.3 Storing the Air Balancer

If the air balancer is to be stored for a long time, store the air balancer in a dry location.

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10.4 Troubleshooting

⚠ WARNING

If a malfunction occurs during the operation the air balancer, stop operation immediately and take the necessary steps to rectify the problem.

⚠ CAUTION

Careless repairs can cause damaged to the air balancer or personal injury.
Therefore, be careful but through when making repairs.

The following shows probable causes and solutions of common malfunctions.
Contact your dealer or us if a malfunction is not listed below occurs.

Malfunction	Main causes	Solution
The air balancer does not run in the lifting direction.	Insufficient air pressure	Increase air pressure. Check for air leak around pipe fitting.
	Load over capacity of air balancer.	Check the weight of load.
	The flying up prevention works.	Replace spring which keeps ratchet.
	Ball screw and thrust bearing do not work.	Clean and lubricate ball screw and thrust bearing or replace it.
The air balancer does not hold load.	Air leak around bolt at the center of end cap	Replace O-ring between ball screw cover and end cap.
	Air leak from between end cap and casing.	Replace O-ring on end cap.
	Air leak from between piston and casing.	Replace worn piston then clean and lubricate inside of casing.

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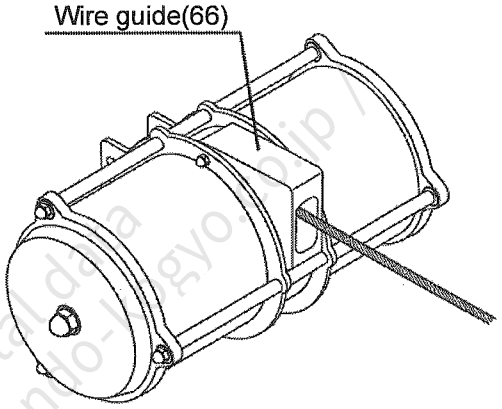
11. Wire rope Assembly

> **⚠ WARNING**
> - Shut off air supply after pull out all wire rope until wire rope will be slack and all air inside cylinder will come out.
> - Always disassemble the air balancer on the floor.

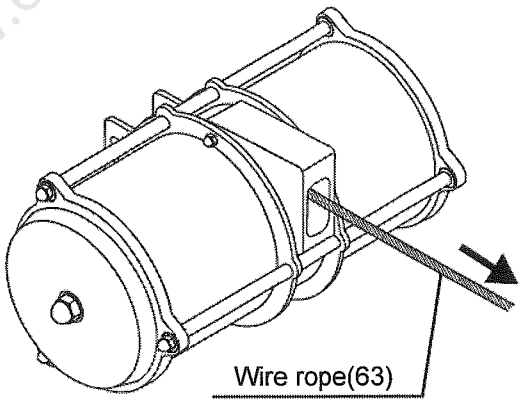
*Refer to the disassembly drawing and follow procedure below.

11. 1 Disconnecting the Wire Rope

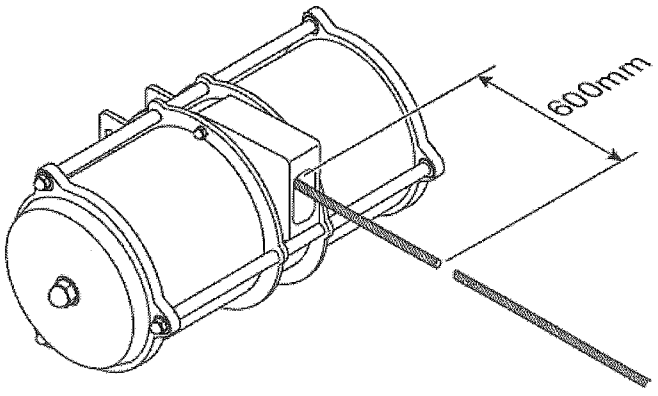
(1)Place the air balancer on the level as mentioned in right. Wire guide (66) must be turned up.



(2)Pull out the wire rope (63) until the drum (30) will stop.



(3)Cut the wire rope at approx. 600mm from outside of the wire guide (66).



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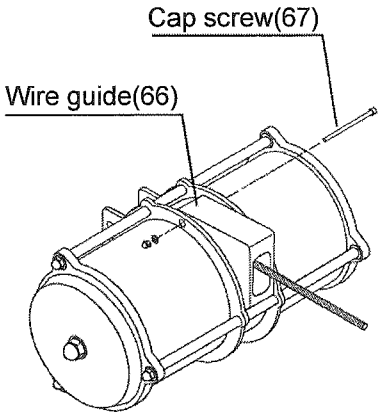
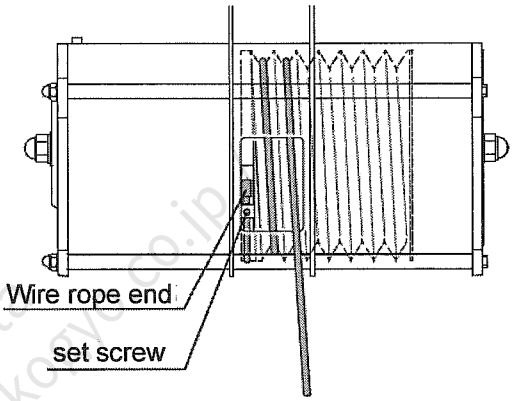
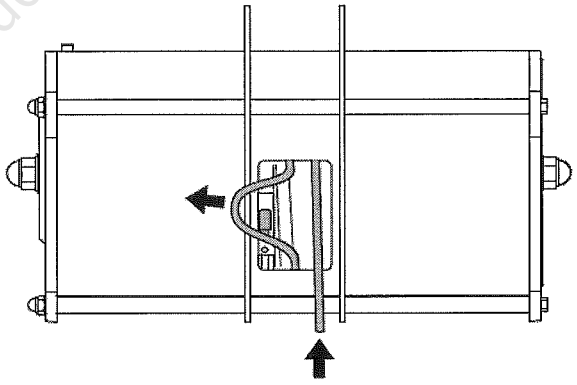
(4)Remove the cap screw (67) and the wire guide (66) from the casing (1).



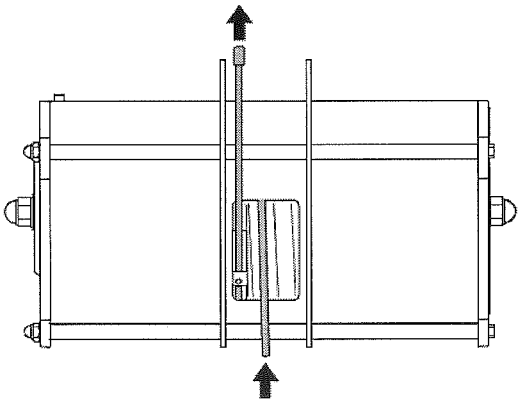
(5)Check terminal of the wire rope is on the left.
Turn set screw of wire rope end 3 rounds to counter clockwise direction and loosen it
*Do not remove set screw from the drum completely.



(6)Push the wire rope (63) into the drum (30) and pull out the coming out wire rope.



(7)Push into the wire rope (63) more and pull out the end of coming out wire rope then remove the wire rope.



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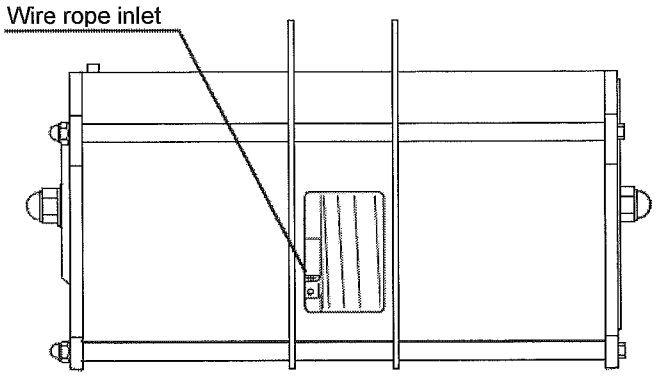
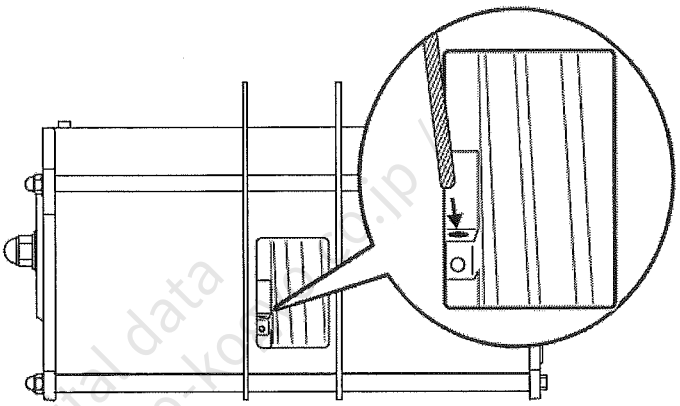
11.2 Assembling the Wire Rope

(1) Check the anchor hole for wire rope is on the left same as when the wire rope was removed.
Be sure the wire rope has attached the plain washer(65).

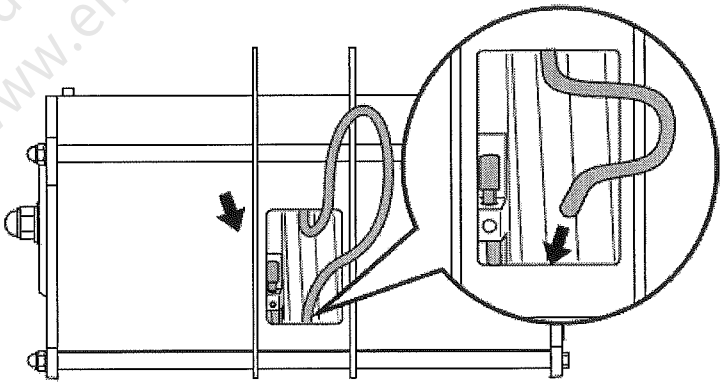


(2) Insert the end of wire rope(63) to the anchor hole in the drum(30).

*Pull out all wire rope(63) from the top of drum and keep pushing until the lock tube and plain washer on the wire rope will be touched to the drum

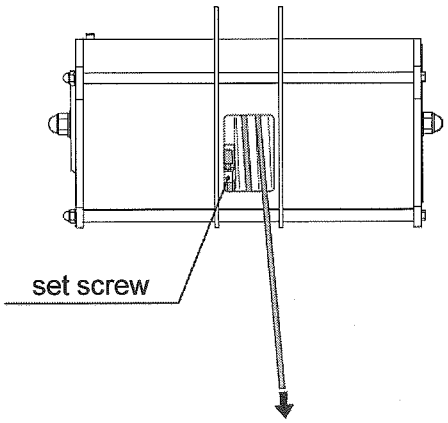


(3) Push the wire rope which comes out from upper side of the drum(30) into the same groove .
Never twist the wire rope.



(4) The wire rope (63) will come out from upper side ofthe second groove on the drum then pull out all wire rope. After that, turn set screw in clockwise, tighten up and fix the wire rope(63).

*Tightening torque 0.7N·m



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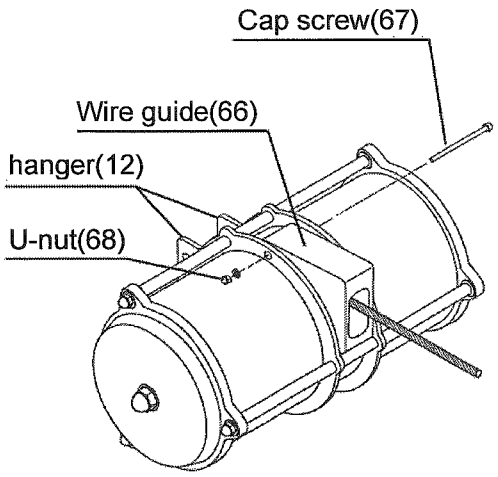
(5) Let the wire rope (63) into the wire guide (66) and attach he wire guide (66) to the casing (1).

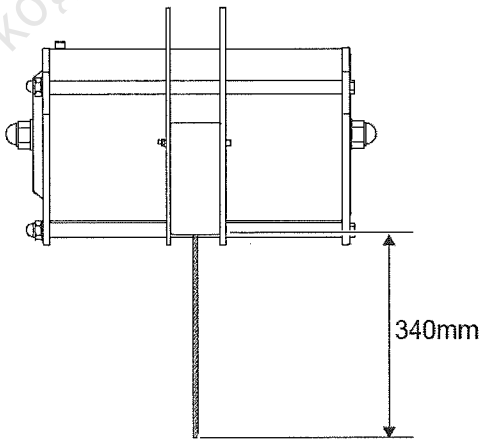
*Screw up the U-nut (68) until the hanger (12) and the
wire guide (66) will be touched.



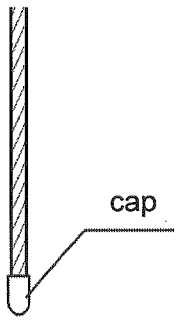
(6) After assembling the wire guide, suspend the air balancer using crane, etc. and connect temporary piping.

(7) Pressure of air supply should be under 0.1MPa and slowly rewind all wire rope.

(8) Cut the wire rope at 340mm from the wire guide (66)



(9) After cutting the wire rope (63), ravel prevention treatment or bonding the cap to the wire rope (63) is necessary.*In case of using the cap, bond the wire rope after degreasing the end of wire rope.



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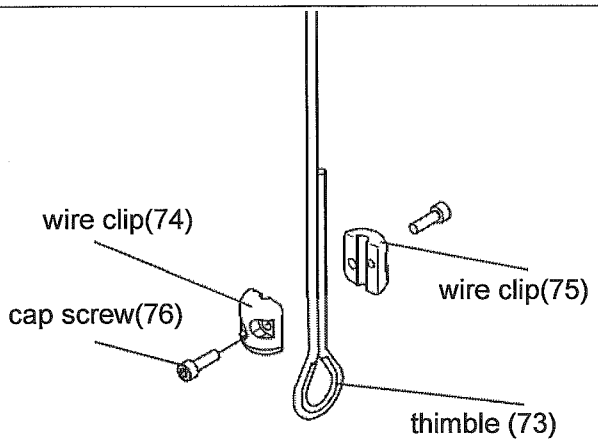
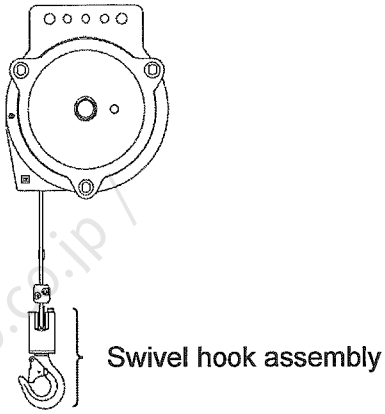
(10) Attach the wire rope to the thimble (73) and tighten the wire clip (74)(75) by the cap screw (76).

*Tightening torque : 5.9N·m

*Distance between the wire guide and bottom of the thimble --- 190mm

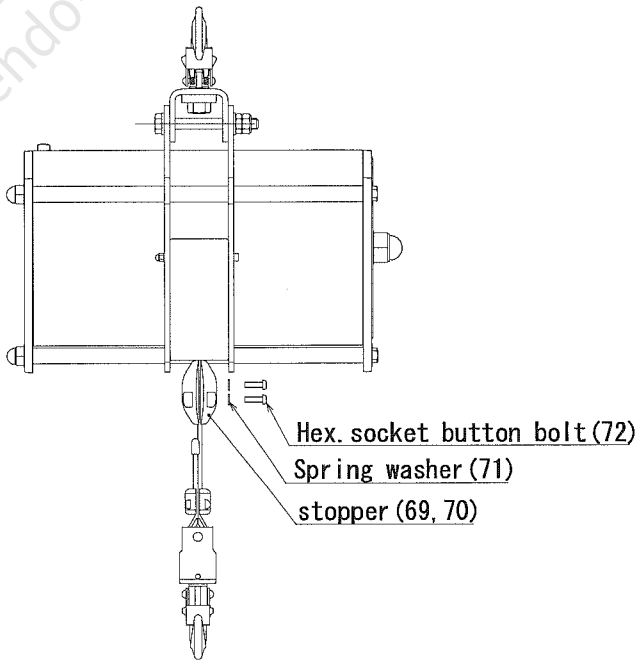


(11) Attach the swivel hook assembly.
*See chapter 12 「Bottom hook (Swivel hook assembly) replacement」



(12) Attach the stopper (69),(70) by spring washer (71) and Hex. socket button bolt (72) in the slightly separated position from the wire guide(48).

*Tightening torque --- 9.1N·m



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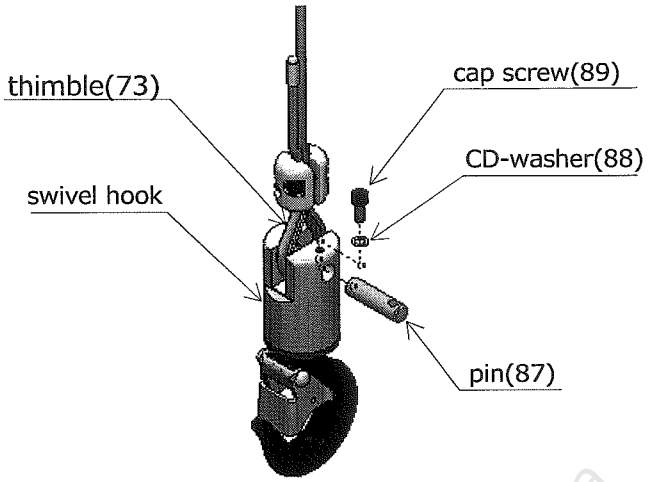
12. Bottom hook (Swivel hook assembly) replacement

(1) Remove the cap screw (89), pin (87) and swivel hook assembly.
(2) Align mounting hole for the pin (87) on new swivel hook assembly with the thimble (73) and insert pin.
(3) Attach the CD-washer (88) and cap screw (89) then fix the pin (87).



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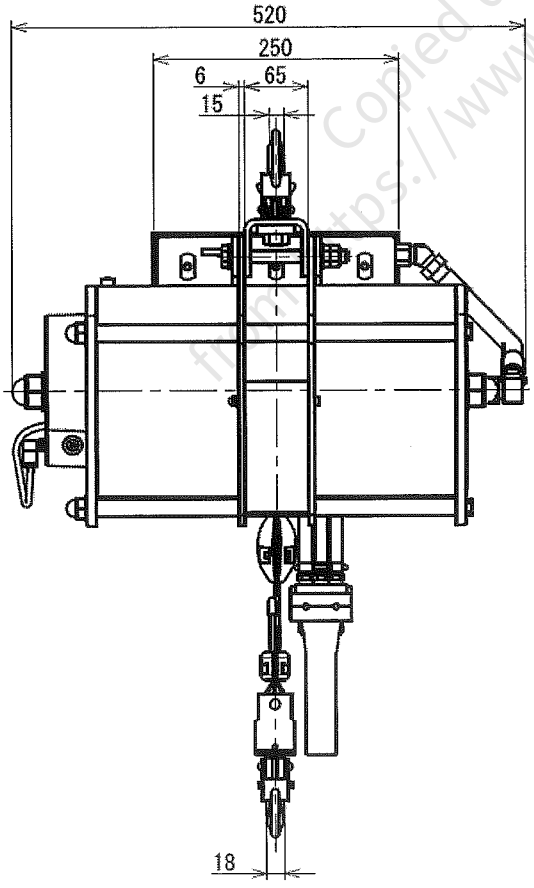
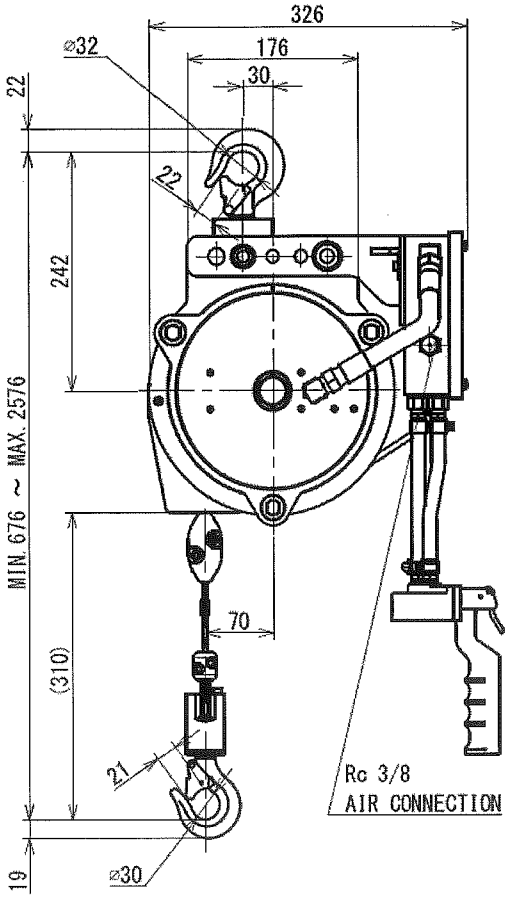
13. Dimensions of Air Balancer





14. Parts list

Remarks when purchasing parts

- Specify the part No., part name and model name of the hoist.
- State SER. No. (product No.) clearly if attached.
- Parts without a part number cannot be supplied individually.
  Please purchase a set or complete unit.

■ How to read parts list

Ref No.	Part No.	Quantity	Description
-	LHP000844	1	Swivel hook assembly
-	LHP000843a	1	—Hook compl.
77	—	1	——Hook
-	LHP001674	1	——Hook latch set
78	—	1	———Hook latch
79	—	1	———Spring
80	—	1	———Rivet
81	—	1	——Nut
82	KA42419820	1	——Spring pin

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

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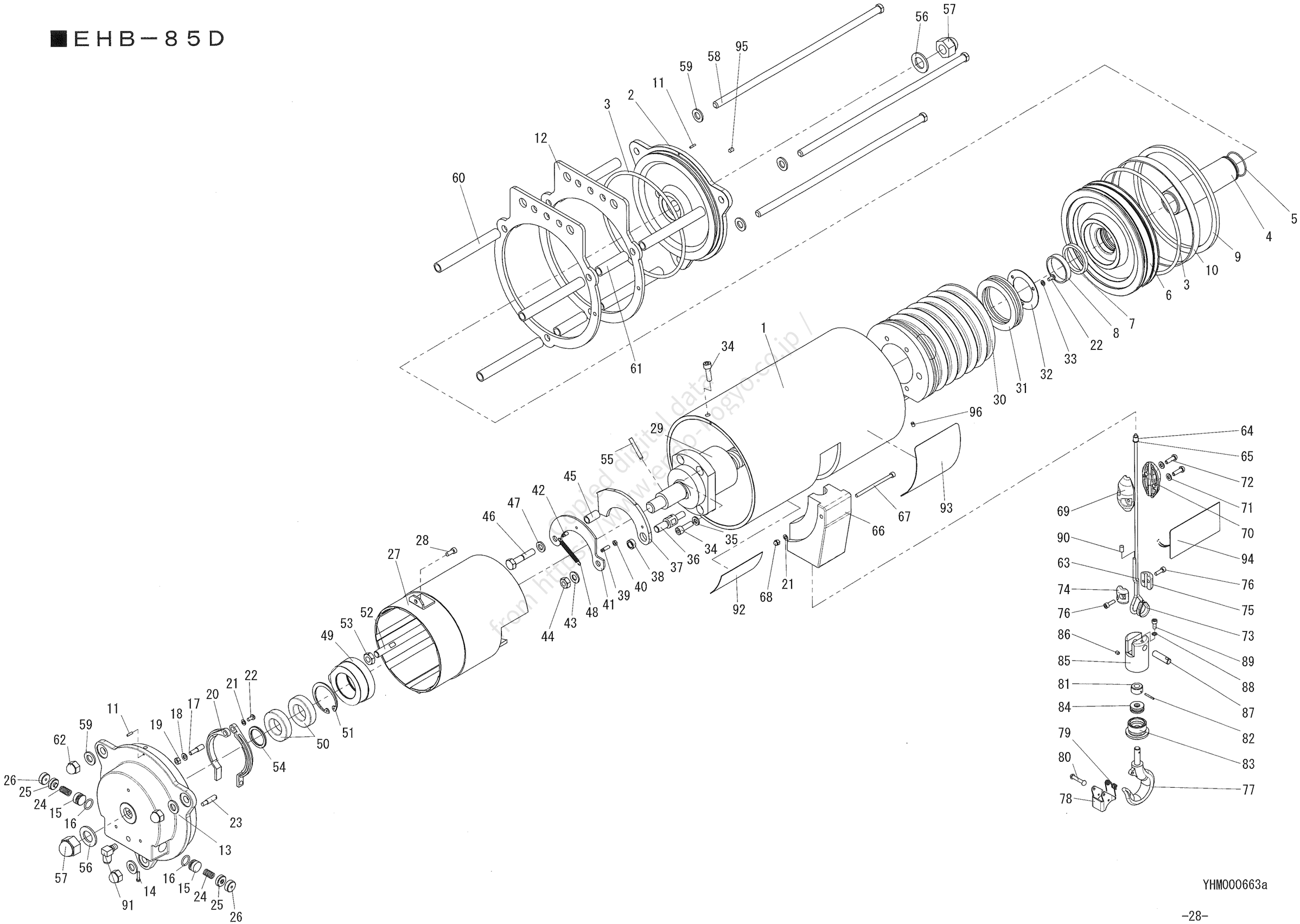
■ PARTS LIST EHB-85D

Ref. No.	Part No.	Quantity	Description	Ref No.	Part No.	Quantity	Description
1	P2H301136	1	Case	50	KA60103062	2	Bearing
2	P2H200238	1	End cap	51	KA40210055	1	Retaining ring
● 3	KA50301900	2	O-ring	52	P2H402399	1	Shaft
4	P2H301137	1	Ball screw cover	53	KA20321200	1	Hex. nut
● 5	KA50200420	1	O-ring	54	P2H402398	1	Washer
6	P2H200233	1	Piston	55	P2H402353	1	Pin
● 7	P2H402349	1	Packing	56	KA30222000	2	Washer
● 8	P2H402350	1	Wear ring	57	KA25722001	2	U-nut
● 9	P2H402351	1	Packing	58	P2H402361	3	Bolt
● 10	P2H402474	1	Wear ring	59	KA30221200	6	Washer
11	KA42510312	2	Spring pin	60	P2H402362	6	Pipe
12	P2H301138	2	Hanger	61	P2H402363	3	Pipe
13	P2H200237	1	End cap	62	KA25721202	3	U-nut
14	KA10120416	1	Machine screw	● —	LHP001904	1	Wire rope
15	P2H400564	2	Brake piston	63	—	1	—Wire rope
● 16	KA50100150	2	O-ring	64	—	1	—Lock tube
17	P2H400563	1	Pin	65	—	1	—Washer
18	KA30220600	1	Washer	● 66	P2H301145	1	Wire guide
19	KA20120600	1	Hex. nut	67	P2H402364	1	Cap screw
● —	LHP001929	1	Brake shoe set	68	KA25720502	1	U-nut
20	—	2	—Brake shoe	69	P2H301547	1	Stopper
21	KA30220500	2	Washer	70	P2H301548	1	Stopper
22	KA10120510	4	Machine screw	71	KA31120600	2	Spring washer
23	P2H400570	2	Bolt	72	KA01710620	2	Hex.socket button bolt
24	P2H400571	2	Spring	73	P2B400067	1	Thimble
25	P2H400572	2	Screw	74	P2H301141	1	Wire crip
26	P2H400573	2	Screw	—	P2H301142	1	Wire crip
27	LHP001903	1	Ratchet wheel	—	KA00910516	2	Cap screw
28	KA00910614	2	Cap screw	75	LHP000844	1	Swivel hook assembly
29	P2H301167	1	Ball screw	—	LHP000843	1	—Hook compl.
30	P2H200289	1	Drum	76	—	1	——Hook
31	KA60401140	1	Thrust bearing	● 77	LHP001674	1	——Hook latch set
32	P2H402354	1	Plate	78	—	1	———Hook latch
33	KA31120500	3	Spring washer	79	—	1	———Spring
34	KA00910825	5	Cap screw	80	—	1	———Rivet
35	KA31120800	4	Spring washer	81	—	1	——Nut
36	P2H402355	1	Shaft	82	KA42419820	1	——Spring pin
37	P2H301140	1	Ratchet	83	P2H401216	1	—Hook holder
38	P2H402356	1	Coller	84	KA60401000	1	—Thrust bearing
39	P2S400020	1	Pin	85	P2H300665	1	—Hook holder
40	KA20320500	1	Hex. nut	86	KA16510506	1	—Set screw
41	P2H402357	1	Plate	87	P2H401218	1	—Pin
42	P2H402358	1	Pin	88	KA32410520	1	—CD-washer
43	KA30221000	1	Washer	89	KA00910512	1	—Cap screw
44	KA25521002	1	U-nut	90	P2H402365	1	Cap
45	P2H402359	1	Pipe	91	P2H402401	1	Elbow
46	KA00121044	1	Hex. bolt	92	P2H402402	1	Name plate
47	KA31121000	1	Spring washer	93	P2H301149	1	Warning label
48	P2H402360	1	Spring	94	P2H300779	1	Tag
49	P2H301165	1	Brake wheel	95	KA16410610	8	Set screw
				96	P2H402976	1	Set screw

We recommend that you stock parts indicated by a bullet (●).
Parts without part numbers can not be supplied separately.

from old digital catalog www.engineer.co.jp

■EHB−85D



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■ PARTS LIST MSD

Ref. No.	Part No.	Quantity	Description	Ref No.	Part No.	Quantity	Description
1	LHP001974	1	Bracket	45	P2H402511	1	adapter
—	LHP001976	1	Control box	46	P2H301191	1	Hose
2	LHP001975	1	—Casing	47	P2H402461	1	adapter
3	P2H301170	1	—Operate valve	48	P2H402460	1	adapter
4	P2H402406	2	—Elbow	—	LHP001941	1	Handle assembly
5	P2H402409	1	—Union	—	LHP000851	1	—Handle compl.
6	P2H402408	4	—Elbow	49	P2H100058	1	——Handle
7	P2H402405	2	—Elbow	50	LHP000145	1	——Push button set
8	P2B400179	1	—Plug	51	KA42410325	4	——Spring pin
9	P2H400007	1	—Plug	52	P2H400296	1	——Silencer
10	KA30220400	2	—Washer	53	P2H400297	1	——Support
11	KA31120400	2	—Spring washer	54	P2H400298	1	——Collar
12	KA10120435	2	—Machine screw	55	KA42410206	2	——Spring pin
13	P2H402411	2	—Union	56	P2H200193	1	—Valve body
14	P2H402410	4	—Union	57	P2H400293	2	—Spring
15	P2H402270	1	—Elbow	58	P2H300170	2	—Spool
16	P2H402412	2	—Speed controller	● 59	KA50110080	6	—O-ring
17	P2H402404	1	—Silencer	60	P2H401220	2	—Spacer
18	P2H402403	1	—Tee	● 61	KA50200090	1	—O-ring
19	P2H402459	2	—Union	62	P2H400307	2	—Pin
20	P2H402458	1	—Shuttle valve	63	P2H400957	4	—Cap screw
21	P2H402509	1	—Tube	64	P1R400322	3	—Nipple
22	P2H402463	1	—Tube	65	P2H402372	3	Hose
23	P2H402462	2	—Tube	66	KA86100120	6	Hose clip
24	P2H402510	1	—Tube	67	KA00171667	1	Hex. bolt
25	P2H402468	2	—Tube	68	KA30221600	2	Washer
26	P2H402416	1	—Tube	69	P2H402475	1	Pipe
27	P2H402417	1	—Tube	70	KA20321600	1	Hex. nut
28	P2H402464	1	—Tube	71	KA25521601	1	U-nut
29	P2H402465	1	—Tube				
30	P2H402420	1	—Tube				
31	P2H402466	1	—Tube				
32	P2H402467	1	—Tube				
33	P2H402456	2	—Grommet				
34	KA31120600	3	—Spring washer				
35	KA00910614	3	—Cap screw				
36	P2H301190	1	—Cover				
37	KA30220500	4	—Washer				
38	KA31120500	4	—Spring washer				
39	KA10120514	4	—Machine screw				
40	P1R400322	3	—Nipple				
41	P2H402428	1	—Label(DOWN)				
42	P2H402429	1	—Label(UP)				
43	P2H402457	1	—Name plate				
44	P2H300777	1	—Name plate				

We recommend that you stock parts indicated by a bullet (●).
Parts without part numbers can not be supplied separately.

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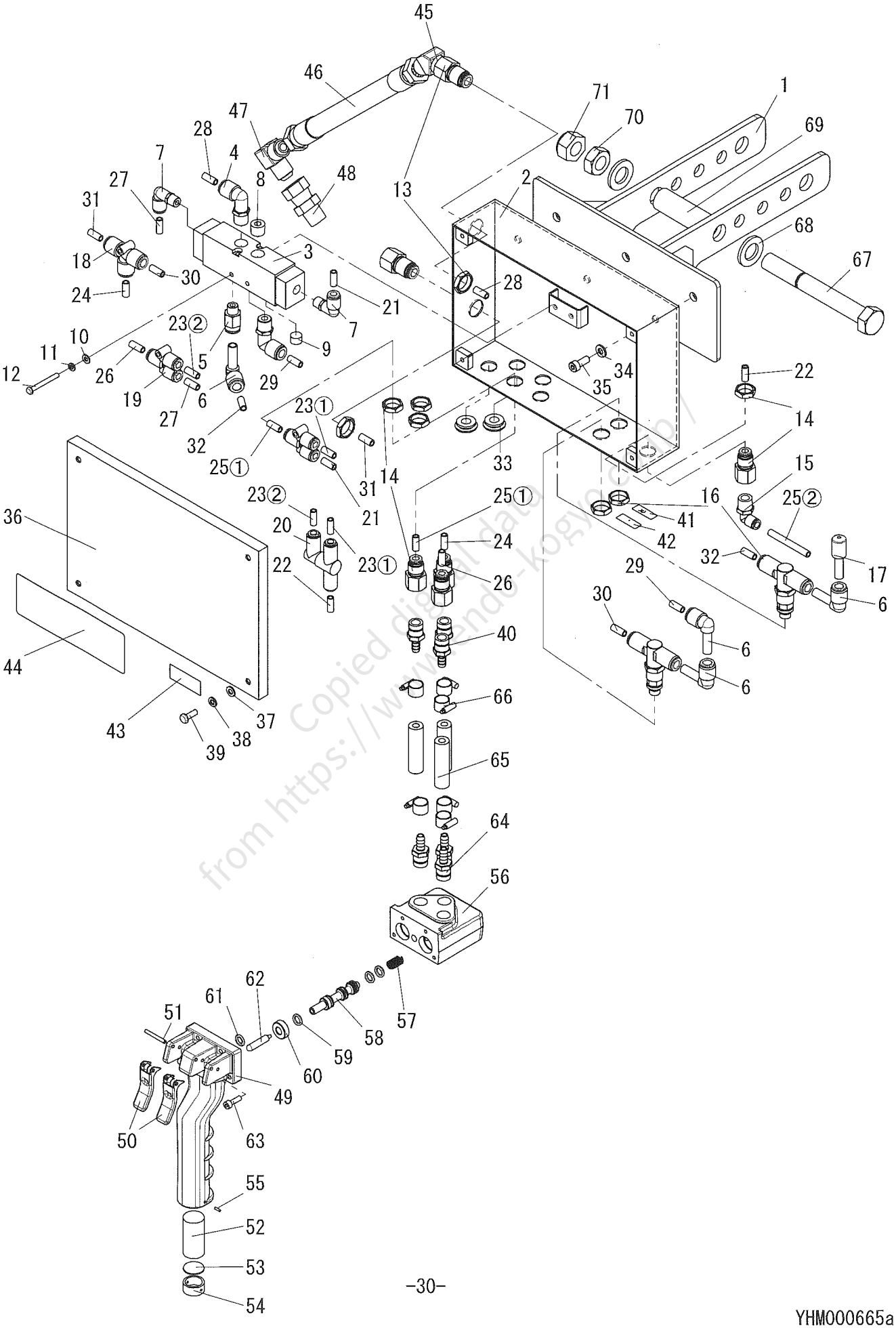
■MSD



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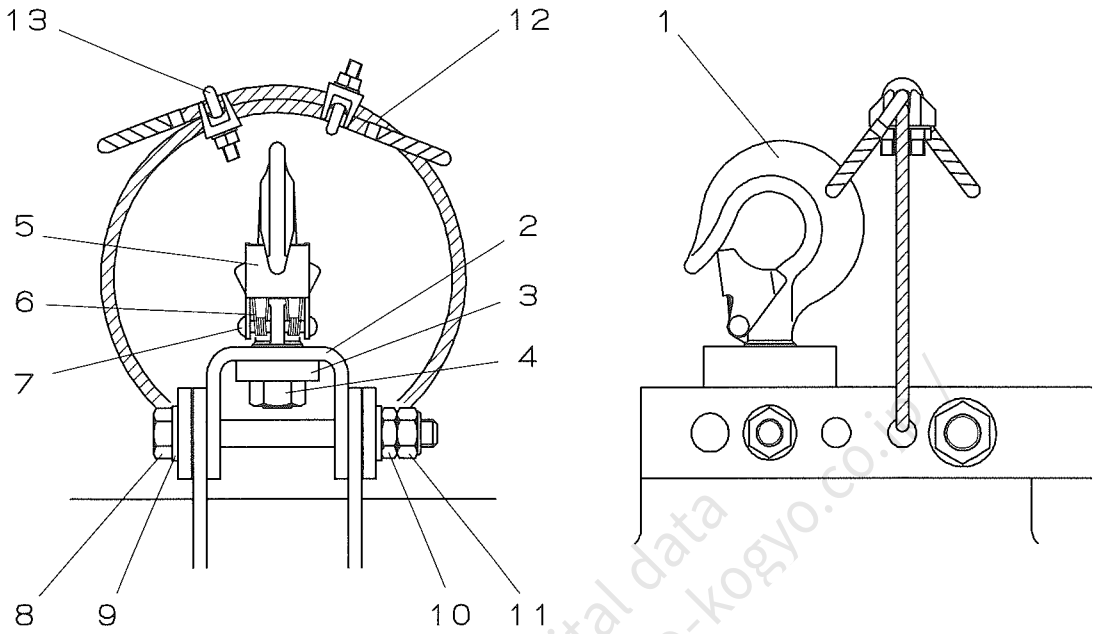
■PARTS LIST Hook assembly



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Ref.No.	Part No.	Quantity	Description
—	LHP001918	1	Hook assembly
—	LHP001917	1	—Hook
1	—	1	——Hook
2	—	1	——Plate
3	—	1	——Plate
4	—	1	——Hex. nut
● —	LHP000470	1	—Hook latch set
5	—	1	——Hook latch
6	—	1	——Spring
7	—	1	——Rivet
8	KA00171265	1	Hex. bolt
9	KA30221200	2	Washer
10	KA20321200	1	Hex. nut
11	KA25521202	1	U-nut
● 12	P2H401776	1	Wire rope
13	P2B400261	2	Wire crip

We recommend that you stock parts indicated by a bullet (●).
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