



KENSUI Hoist Unit[®]

A R S 0 7 0 - 1 3 0 0 A (9 0 0 A)

**Owner's Manual:
Installation, Operation, Maintenance**



- Be sure to read this operation manual and the other related manuals before attempting to install, operate, or perform maintenance on this system.
- Keep the operation manuals in a location near the system where they can be referenced in a regular manner.
- Failure to observe the instructions and safety precautions indicated in these manuals could result in serious injury or death, and could cause system and other property damage.



Introduction

Thank you for purchasing TOYOTSU TECHNO CORPORATION's "KENSUI Hoist Unit" (hereafter referred to simply as "hoist unit").

When used together with the ALFARAIL System, the hoist unit offers excellent material handling efficiency. Featuring TOYOTSU TECHNO CORPORATION's unique design and control format, the hoist unit can be operated simply by moving a lever up and down, allowing heavy loads to be moved quickly and safely with minimal force, and to be held motionless at any desired position.

Be sure to read this operation manual carefully in order to ensure that the hoist unit is used in a safe and correct manner and which makes full use of its functions.

After reading this manual, keep it in a location near the hoist unit so that it can be easily referenced when installing, operating or performing maintenance (periodic inspections, troubleshooting), etc.

When using the hoist unit in combination with the ALFARAIL System, the hoist unit operation manual should be kept together with the "ALFARAIL System Catalog", "ALFARAIL System Standard Mounting Fixture List", and the "ALFARAIL System Operation Manual".

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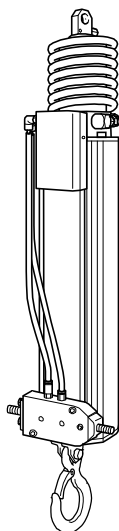
[1] Before Using The Hoist Unit

1. Accessories Check

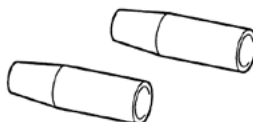
Before using the hoist unit, verify that all the following accessory parts are present.

If any accessory parts are missing, please contact either the sales outlet where the hoist unit was purchased, or contact TOYOTSU TECHNO CORPORATION directly.

●Hoist unit body...1 set



●Levers...2 pieces



●Operation manual...1 copy (this document)

Fig.1

In order to install the hoist unit, the user must provide the items shown below (or equivalent items) in addition to the items which are shipped with the hoist unit.

Table 1

Device Name	Recommended Model	Manufacturer
Filter regulator	AW30-03BDG [or equivalent]	SMC
Polyurethane tube OD ϕ 12 • ID ϕ 8 (for air supply)	TU1280Y-100 \times 3 (yellow, length: 100 m) [or equivalent]	SMC
	UB1280Y-100Y (yellow, length: 100 m) [or equivalent]	NIHON PISCO

* Prepare a length of polyurethane tube which is adequate for connecting the hoist unit to the user's air source.

* When an overhead rail system or ALFAYARD, etc., is required, please contact either the sales outlet or TOYOTSU TECHNO CORPORATION for details.

2. Component Names

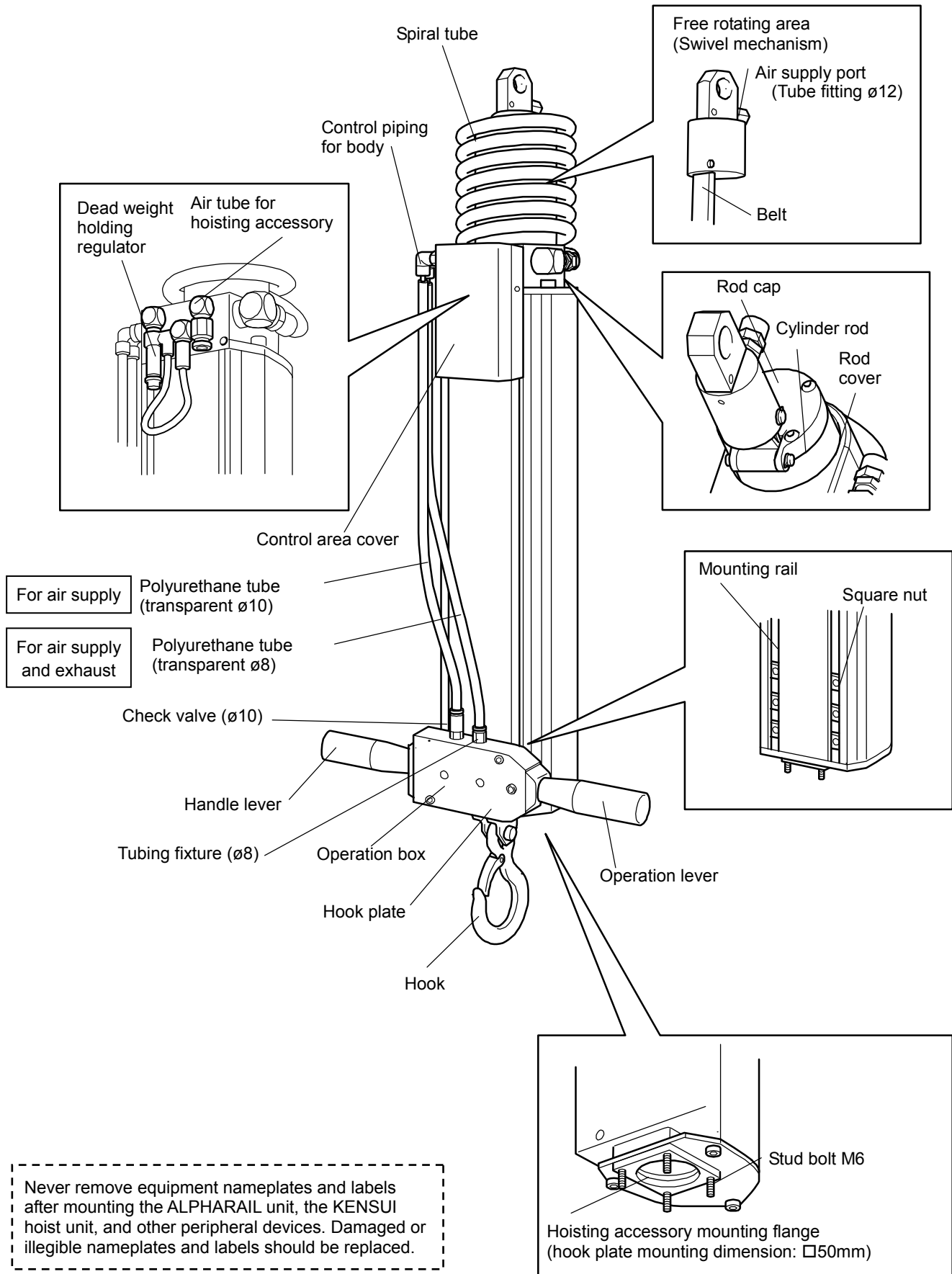


Fig. 2

[2] Safety Precautions

In order to use the KENSUI Hoist Unit (installation, operation, maintenance, inspection) in a safe and correct manner, be sure to read this manual carefully, making certain to understand its content. The graphical safety cautions which appear in this manual are designed to prevent injuries (to the operator, maintenance personnel, and bystanders) and property damage. These cautions are explained below.

1. Safety Headings


Precautions are classified under the following graphical headings, based on the degree of risk involved:

 **DANGER**

 **WARNING**

 **CAUTION**


 **NOTICE**

 **DANGER**


Failing to observe this precaution could result in an extremely hazardous condition which will result in serious injury or death to the user or to other persons in the vicinity.

 **WARNING**

Failing to observe this precaution could result in serious injury or death to the user or to other persons in the vicinity.

 **CAUTION**

Failing to observe this precaution could result in minor to moderate injury to the user or to other persons in the vicinity, and could cause system and other property damage.

 **NOTICE**

Failing to observe this precaution could result in damage to the system and other property.

2. Hoisting Accessory Handling

WARNING

Users who assume responsibility for designing and fabricating their own hoisting accessories should ensure that the work is performed by workers with adequate experience, and who have read this manual in its entirety. Moreover, these users should verify that the hoisting accessory satisfies the following conditions.

- (1) The hoisting accessory and the load holding area must be of adequate strength.
- (2) The hoisting accessory must not cause erroneous operation or malfunctions.
- (3) The hoisting accessory must have a design which does not pinch or entangle worker fingers, etc.
- (4) The workpiece center-of-gravity must not overhang from the hoisting accessory's mounting flange.

3. Before Installing

WARNING

Avoid using the hoist unit in a manner where it frequently strikes a fixed object such as the rail's end stopper, etc.

Such operation can damage the fixed object, and cause a hoist unit failure or hose disconnection.

Keep the load's center-of-gravity beneath the hoist unit.

As far as possible, the suspended load's center-of-gravity should be directly beneath the hook (or the hoisting accessory mounting flange). In cases where this is not possible, position the center-of-gravity behind the hoist unit as shown in the illustration.

Suspending the load with its center-of-gravity in other positions (to the sides of the hoist body) can cause belt wear and can dramatically shorten the equipment life if used in this manner for extended periods.

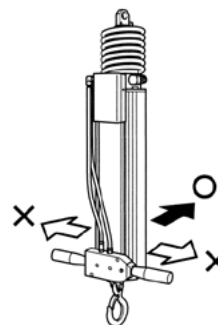


Fig. 3

Configure the hoist unit so that it can be secured when work is completed.

Prepare a securing stand, etc., to secure the hoist unit when not in use. If left in a suspended condition, the hoist unit could suddenly move, possibly striking someone in the vicinity, or causing other damage.

DANGER

Always be sure that the belt is in a vertical posture during lifting and lowering operations. When using the hoist in horizontal motion applications, select a suitable horizontal conveyance system, and install it in a manner which ensures that the load is always directly beneath the suspension point.

4. When Installing Or Moving The Equipment

WARNING

The supplied air pressure must not exceed 0.7MPa.

Supply the system with an air pressure within the 0.4MPa to 0.7MPa range. Using high-pressure air which exceeds 0.7MPa can cause hose and cylinder ruptures, and could cause equipment to fall.

Do not install in the following locations. Doing so could result in damage and malfunctions.

- Outdoors, or in a location exposed to spraying/splashing water.
- Near strong corrosive chemicals such as acid and alkali, etc.
- In a location where the ambient temperature falls below 5°C (41°F)
- In a location where the ambient temperature rises above 40°C (104°F)
- In a location exposed to vibration.
- In a soiled or dusty location.

5. When Using The Equipment

DANGER

Never change the dead-weight holding regulator's setting value when the air is OFF.

Doing so could upset the balance when the air is turned ON, causing the hoist unit to move in a violent manner.

Never use this equipment to lift humans or animals.

Do not reconfigure the equipment.

Reconfiguring the equipment (installing the hoist unit and operation box upside down, etc.) could cause injury or death.



Keep out of the load's up/down motion areas.

Keep out of the areas above and below a suspended load. Entering these areas could cause injury or death in the event of a dropped load or an unexpected violent motion of the hoist unit.

Never attempt to remove a load while it is suspended.

Doing so could cause injury or death if the load is dropped, or if an unexpected violent motion occurs at the hoist unit.

Never leave a load in a suspended condition.

Doing so could result in injury or death to a third party who collides with the load, possibly causing equipment damage as well. This will also shorten the equipment life or cause an early failure.

Never twist or scratch the belt.

Doing so could cause belt detachment, damage, hoist unit falls, possibly resulting in injury or death. Equipment damage could also occur.

Use care to prevent air tube damage.

Never subject the air tubing (polyurethane tube, spiral tube, etc.) to excessive bending, pulling, or squeezing forces, and never place heavy objects on, or pinch, the tubes. Doing so could cause injury or death. Equipment damage could also occur.

Never touch moving parts.

Accidentally touching moving parts could trap fingers, etc., possibly causing serious injury or death.

Never touch any part of the hoist unit other than the operation and handle levers.

Always verify the positions of the hoist unit and the worker before beginning operation. During operation, the worker should grasp the operation and handle levers with the hands, while keeping the body as far from the hoist unit as possible. Standing too close to the hoist unit could cause clothing to become entangled in the unit, possibly resulting in serious injury or death.

**Operation preparation inspection**

In order to ensure that the hoist is used in a safe manner, be sure to inspect the hoist system before using it. For inspection details, see page 32 "1. Operation Preparation Inspection".

Failing to perform this inspection could cause abnormal hoist operation to occur, possibly resulting in equipment damage, serious injury, or death.

Never exceed the permissible load limit.

The total combined weight of the load and the hoisting accessory must never exceed the "rated load" indicated on the hoist unit. Exceeding this permissible load could cause loads to be dropped, possibly resulting in serious injury or death.

Do not move the operation lever in a sudden manner.

The operation lever should always be operated while being lightly grasped in the hand, and must not be subjected to impact shocks as this could cause serious injury or death. Equipment damage could also occur.

Do not disassemble or modify this equipment (doing so nullifies the warranty).

Only the assembly and maintenance work indicated in this manual is permitted. Performing unauthorized disassembly and modification work could cause serious injury or death. Equipment damage could also occur.

Watch out for sudden upward motion of the hoist unit.

Sudden upward motion of the hoist unit will occur if the weight of a suspended load is significantly changed (lightened). The amount of upward motion is proportional to the amount of change in the load weight (the larger the load weight change, the greater the upward motion).

6. Maintenance & Inspection

**Be sure to turn the primary air OFF before performing maintenance and inspection operations.**

Failing to do so could cause serious injury or death. Equipment damage could also occur.

[3] Installation

This section explains how to install the hoist unit.

1. Items To Check Before Installing

⚠ CAUTION

Belt slackness will occur if the operation lever mounting area is positioned at the DOWN side. Therefore, do not move this area until installation is completed.

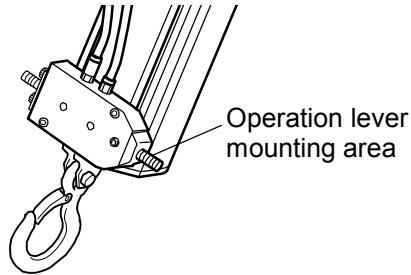


Fig. 4

Check the following before installing the hoist unit.

- (1) Verify that the hoist unit, operation box, and polyurethane tubing, etc., are undamaged. If damaged or abnormal, contact the sales outlet or TOYOTSU TECHNO CORPORATION.
- (2) Verify that the hoist unit is not extended, and that the belt is not slack.

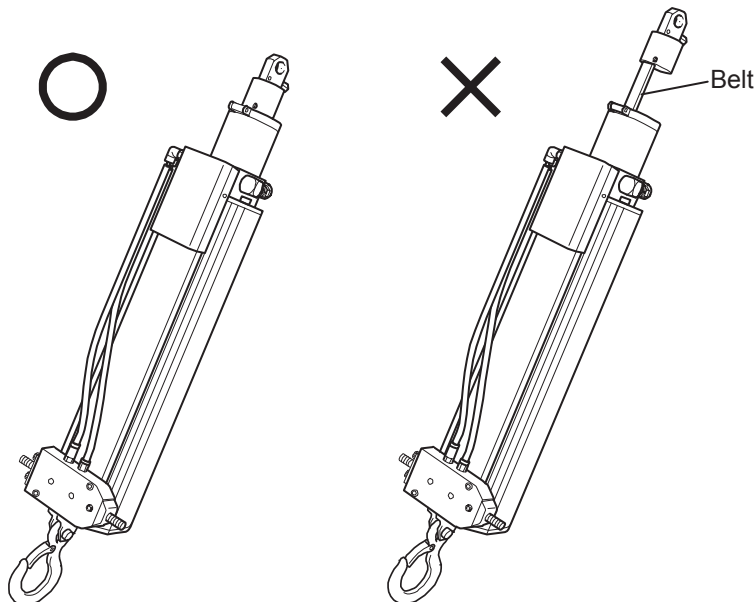


Fig. 5

Normal installation may be impossible if attempted with a slack belt. If the belt is slack, perform the page 11 procedure ("Belt Tightening Procedure") to tighten it, then install the hoist unit.

Belt Tightening Procedure



WARNING

Failing to push the polyurethane tube all the way in can cause air leakage which could result in malfunctions and dropped loads, possibly causing serious injury or death.

For details regarding polyurethane tube and fixture handling, refer to the product catalog and other technical reference materials. (The accessory polyurethane tube and fixture provided with this product are manufactured by the SMC and NIHON PISCO.)

[1]

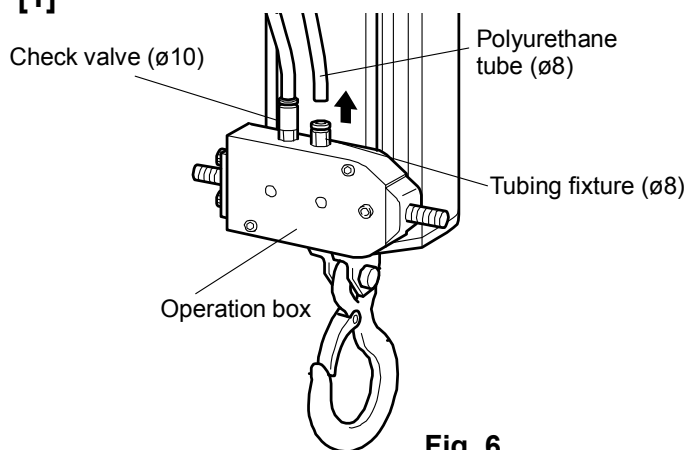


Fig. 6

Disconnect the polyurethane tube (ø8) from the operation box.

See "Cautions When Attaching/Detaching The Plug and Polyurethane Tube" below for details regarding how to disconnect the polyurethane tube.

[2]

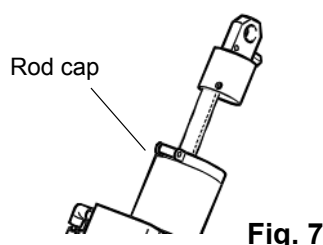


Fig. 7

Push the rod cap over the rod cover until it can be pushed no further (stops), thus shortening the hoist unit length.

[3]

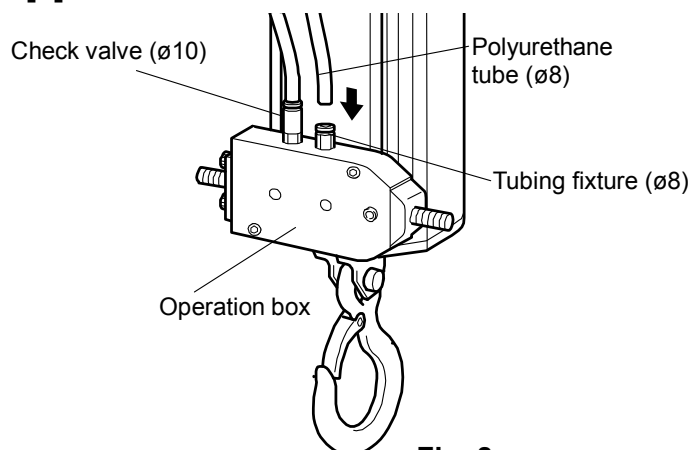


Fig. 8

Reconnect the polyurethane tube (ø8) to the operation box.

See "Cautions When Attaching/Detaching The Plug and Polyurethane Tube" on page 12 for details regarding how to connect the polyurethane tube.

Safety Precautions When Attaching/Detaching The Plug And Polyurethane Tube

<Disconnecting>

As shown in the figure below, remove the polyurethane tube and plug while pressing the ring area.

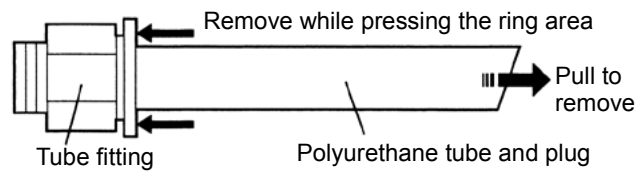


Fig. 9

<Connecting>

To connect the polyurethane tube and plug, cut the tube end in a square manner, then push it all the way in.

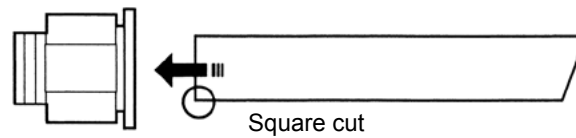


Fig. 10

2. Installation Procedure



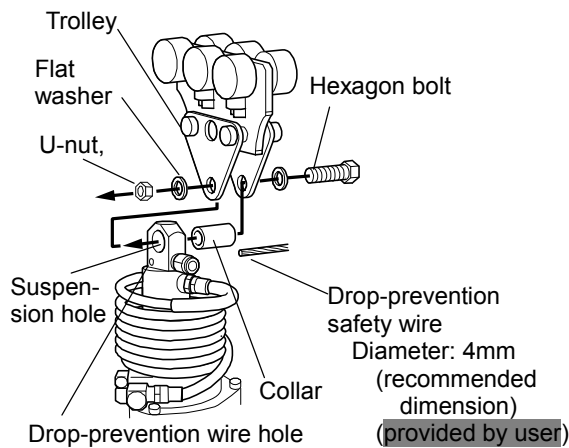
WARNING

- To ensure that the product is installed safely, the installation should be performed by a person with adequate experience and knowledge, after carefully reading this operation manual.
- Be sure to also read and follow the instructions in the ALFARAIL Operation Manual.

This section provides an example for installation in the overhead "ALFARAIL System". Other installations should be performed with reference to this content.
This installation example presumes that the "ALFARAIL System" and air source installation work have already been completed.

[1] Mounting on the trolley

Mount the hoist unit on the trolley which has been installed on the rail.



1. Remove the hexagon bolt from the rail-mounted trolley.
2. Pass the collar and hexagon bolt through the hoist unit's suspension hole, then securely tighten the bolt nut to prevent extraction.
3. Pass the drop-prevention safety wire through the drop-prevention wire hole, then link it to another trolley, etc., to prevent the hoist unit from dropping off the trolley.

Fig. 11

[2] Air supply connection

Connect the air source connected polyurethane tube to the hoist unit's air supply port.

⚠ DANGER

Position the air source connected polyurethane tube so that it does not make contact with the hoist unit or the spiral tube. Such contact could hinder the hoist unit's free rotation, possibly causing failure due to the belt becoming caught, etc. This could present a high risk of serious injury or death.

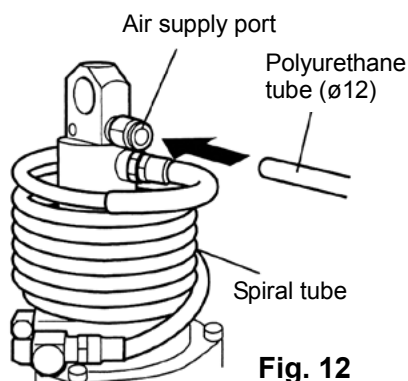


Fig. 12

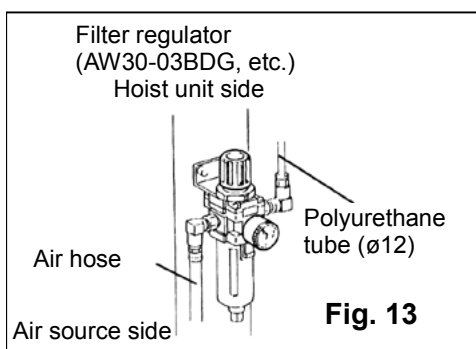


Fig. 13

If a filter regulator (*) is to be used, refer to the operation manual for that device.

* Recommended device: AW30-03BDG (SMC brand) or equivalent.

[3] Mount the levers

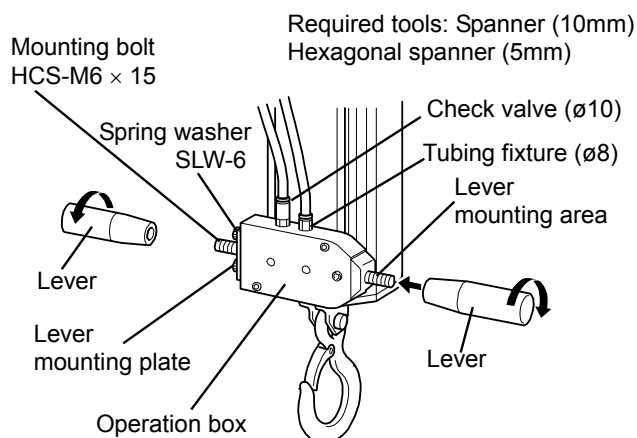


Fig. 14

⚠ DANGER

When using a hoisting accessory other than the provided hook, be sure to adjust the dead-weight holding regulator as described on pages 26 to 28 ("Mounting A Hoisting Accessory Other Than The Provided Hook").

Failing to make this adjustment could cause violent hoist unit motion when the air is turned ON, possibly resulting in serious injury or death.

1. Screw the levers firmly into the operation box by hand, turning them in the clockwise direction.

[4] Air supply

Turn the air source ON and supply air to the hoist unit.

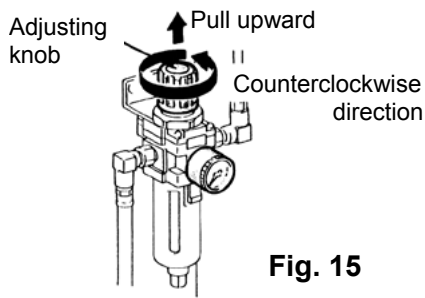


Fig. 15

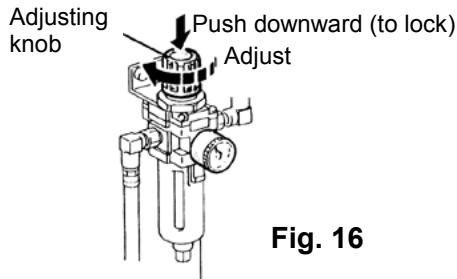


Fig. 16

! DANGER

Set the air source pressure with the 0.4MPa to 0.7MPa range. A pressure setting exceeding 0.7MPa could rupture the polyurethane tube or cylinder, possibly resulting in serious injury or death.

1. Pull the filter regulator adjusting knob upward to unlock it.
2. After verifying that the adjusting knob is turned all the way in the counterclockwise direction, supply the air.
3. Pull the filter regulator adjusting knob upward and adjust to the setting pressure by gradually turning the adjusting knob in the clockwise direction.
4. Push the adjusting knob downward to lock it.

[5] Check the operation

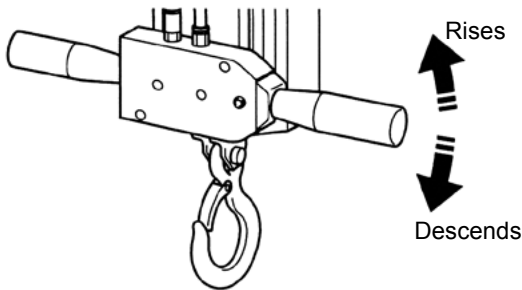


Fig. 17

1. With no load suspended (no-load condition), slowly raise and lower the operation lever to move the hoist unit to its upper and lower limit positions (several times), verifying that operation is normal.

The hoist unit should rise when the operation lever is slowly tilted upward, and should descend when the lever is tilted downward. If normal operation fails to occur, refer to page 36 (Troubleshooting), and check the hoist unit's installation condition.

3. Attaching & Replacing Hoisting Accessories



Hoisting Accessory Handling

Users who design and fabricate their own hoisting accessories should ensure that the work is performed by a worker with adequate experience, and only after thoroughly reading this manual. TOYOTSU TECHNO CORPORATION bears no responsibility for injuries, deaths, and equipment or property damage resulting from the use of user-fabricated hoisting accessories.

To ensure safety, users should verify that the hoisting accessory satisfies the following conditions.

- (1) The hoisting accessory and the load holding area must be of adequate strength.
- (2) The hoisting accessory must not cause erroneous operation or malfunctions.
- (3) The hoisting accessory must not pinch or entangle worker fingers, etc.
- (4) The workpiece center-of-gravity must not overhang from the hoisting accessory's mounting flange.
- (5) Install so that the operating range where the load weight is applied is the [maximum stroke] minus [50mm].
- (6) The body of KENSUI Hoist Unit was designed and fabricated to ensure a balanced center-of-gravity which prevents the hoist from tilting.

The accessory hook on the hoist unit can be removed and replaced by other hoisting accessories when desired. Use the following procedure to mount purchased or user-fabricated hoisting accessories.

[1] Detaching the load from the hoist unit

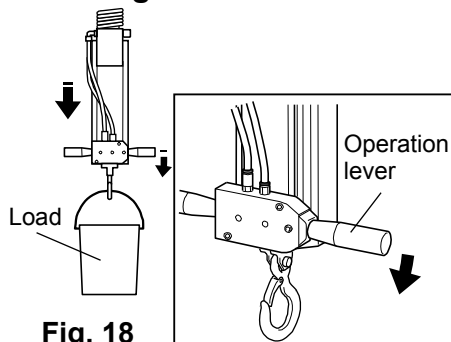


Fig. 18

1. Press the operation lever downward and lower the hoist unit until the hissing sound of venting air from the operation box is no longer heard.
2. Detach the load from the hoist unit.

[2] Shutting off the air supply

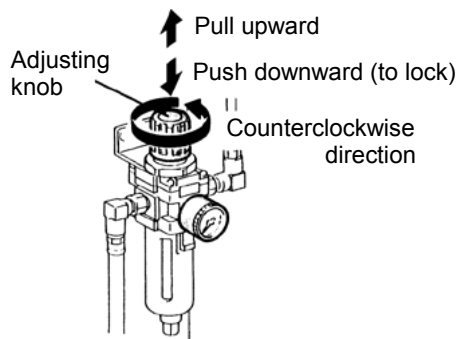


Fig. 19

1. Pull the air source's filter regulator adjusting knob upward and turn it in the counterclockwise direction until the pressure is 0Mpa (air supply OFF).
2. Push the adjusting knob downward to lock it.

If a filter regulator (*) is to be used, refer to the operation manual for that device.

* Recommended device: AW30-03BDG (SMC brand) or equivalent.

[3] Detaching the hook

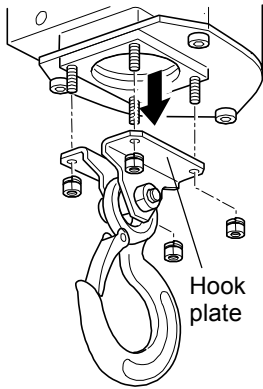


Fig. 20

1. Loosen the spring washer and nut (M6), then detach the hook plate from the hoist unit body.

Required tool: Spanner (10mm)

[4] Mounting the new hoisting accessory

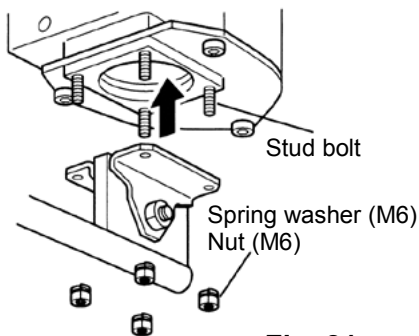


Fig. 21



WARNING
Do not loosen the stud bolts. Doing so could result in the hoisting accessory and load dropping, possibly causing serious injury or death.

1. Mount the new hoisting accessory on the stud bolts, then tighten the spring washer and nut (M6). Use a spanner to securely tighten the nut (M6).

Required tool: Spanner (10mm)

[5] Restoring the air supply

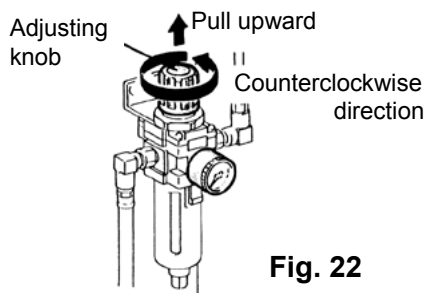


Fig. 22

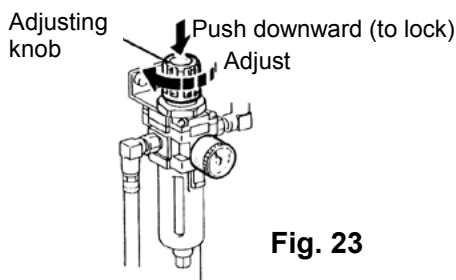


Fig. 23

1. Verify that the new hoisting accessory is securely mounted.
2. If securely mounted, pull the air source's filter regulator adjusting knob upward to unlock it, then turn it in the clockwise direction until the pressure is within a 0.4 to 0.7MPa range.
3. Push the adjusting knob downward to lock it.

When using the filter regulator (*), please refer to its operation manual.

* Recommended filter regulator: "AW30-03BDG (SMC brand)" or equivalent.

- [6]** Adjust the dead-weight holding regulator as described on page 26 ("Mounting A Hoisting Accessory Other Than The Provided Hook").



Failing to properly adjust the dead-weight holding regulator could cause violent hoist unit motion when the air is turned ON, possibly resulting in serious injury or death.

4. Supplying Air To A Hoisting Accessory

Air can be supplied to a hoisting accessory from the hoisting accessory air tube port located inside the control cover.

WARNING

To ensure that the design and work required to supply air from the hoist unit is performed correctly and safely, the worker must have adequate experience and knowledge, and must have read this manual thoroughly.

[1] Detaching the hoist unit from the load

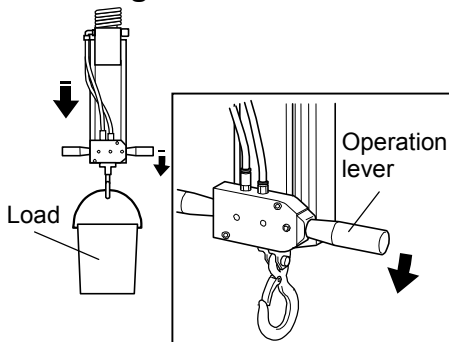


Fig. 24

1. Press the operation lever downward and lower the hoist unit until the hissing sound of venting air from the operation box is no longer heard.
2. Detach the hoist unit from the load.

[2] Shutting off the air supply

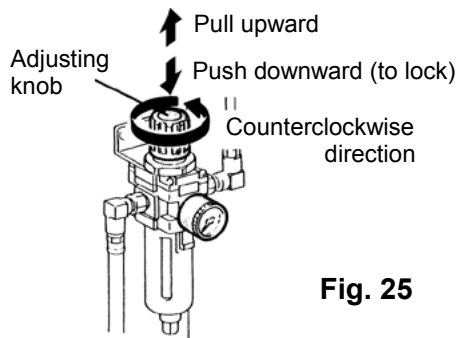


Fig. 25

1. Pull the air source's filter regulator adjusting knob upward and turn it in the counterclockwise direction until the pressure is 0Mpa (air supply OFF).
2. Push the adjusting knob downward to lock it.

If a filter regulator (*) is to be used, refer to the operation manual for that device.

* Recommended device: AW30-03BDG (SMC brand) or equivalent.

[3] Detaching the control area cover

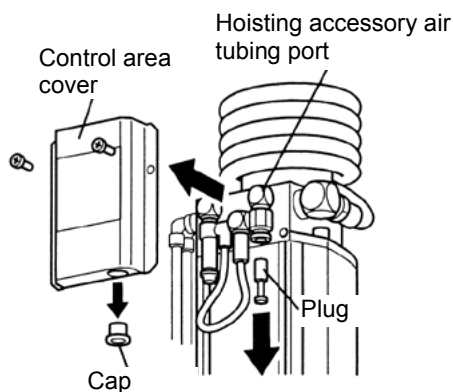


Fig. 26

1. Remove the control area cover screws, then open the control area cover.

Required tool: Phillips screwdriver

2. Remove the plug from the hoisting accessory air tubing port.
3. Remove the cap from the control area cover.

For the plug removing procedure, see page 12 ("Cautions When Attaching/Detaching The Plug And Polyurethane Tube").

[4] Connecting the hoisting accessory's air tube

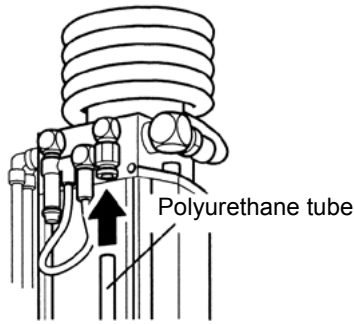


Fig. 27

1. Connect the polyurethane tube.

Use a polyurethane tube with an OD of $\varnothing 8$ and an ID of $\varnothing 5$.
Recommended items: UB-0850 5/16-CUB805 (NIHON PISCO Corp.)

For details regarding polyurethane tube handling, see page 12 ("Cautions When Attaching/Detaching The Plug And Polyurethane tube").

[5] Attaching the control area cover

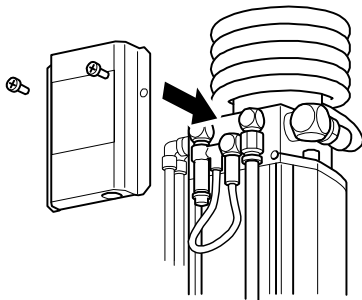


Fig. 28

1. Attach the control area cover, and tighten the cover screws (2 screws).

Required tool: Phillips screwdriver

[6] Restoring the air supply

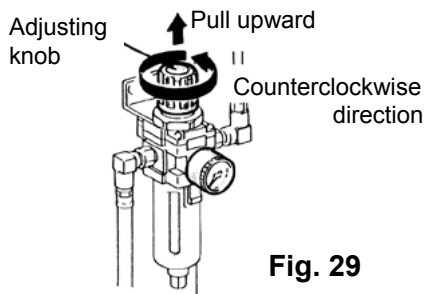


Fig. 29

1. Verify that the new hoisting accessory is securely mounted.
2. If securely mounted, pull the air source's filter regulator adjusting knob upward to unlock it, then turn it in the clockwise direction until the pressure is within a 0.4 to 0.7MPa range.
3. Push the adjusting knob downward to lock it.

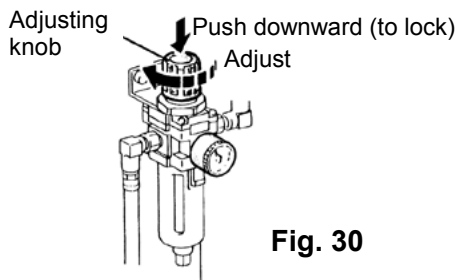


Fig. 30

When using the filter regulator (*), please refer to its operation manual.

* Recommended filter regulator: "AW30-03BDG (SMC brand)" or equivalent.

Pneumatic Circuit

When a hoisting accessory requires pneumatic equipment, design that pneumatic system with reference to the pneumatic circuit shown below.

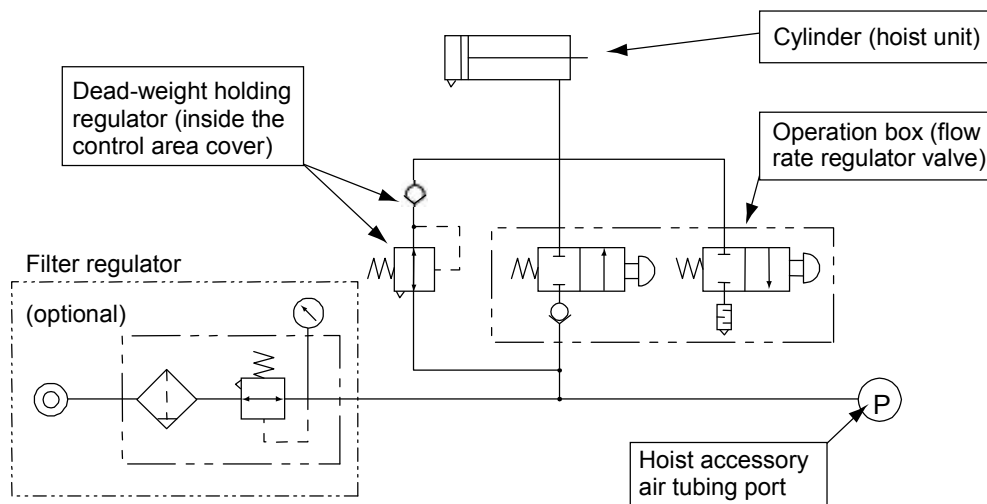
WARNING

Newly added pneumatic circuit designs must not modify the hoist unit's pneumatic circuit in any way except to tap into the air source. Any other modifications could cause serious injury or death.

CAUTION

When using pneumatic equipment such as a pump ejector, etc., which requires a large air flow rate, verify in advance that the air source flow rate is adequate to support such equipment.

(An insufficient air flow will slow the hoist unit's UP motion speed.)



<Hoist Unit's Pneumatic Circuit>

Fig. 31

5. Changing The Operation Box Position

The hoist unit's operation box can be removed and re-installed at a different position. Use the following procedure to change the position of the operation box.

⚠ DANGER

Mount the operation box with the tubing fixtures facing upward. If they face downward, the orientation of the UP/DOWN operation will be reversed, presenting a high risk of serious injury or death.

⚠ CAUTION

Be sure that the polyurethane tube size matches the tubing fixture's port size. A size mismatch will disable operation.

[1] Detaching the hoist unit from the load

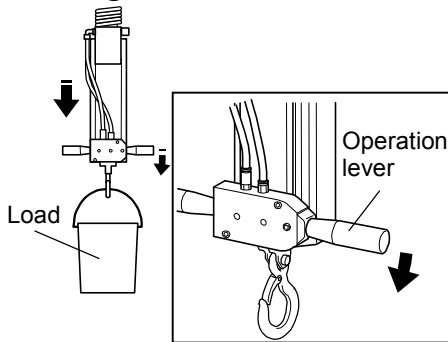


Fig. 32

1. Press the operation lever downward and lower the hoist unit until the hissing sound of venting air from the operation box is no longer heard.
2. Detach the load from the hoist unit.

[2] Shutting off the air supply

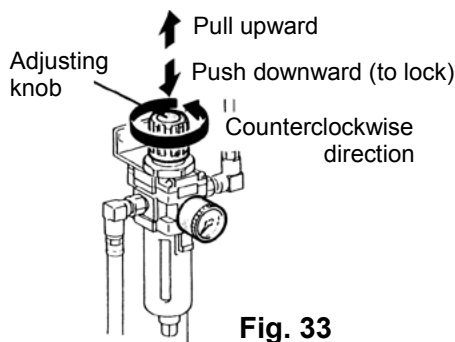


Fig. 33

1. Pull the air source's filter regulator adjusting knob upward and turn it in the counterclockwise direction until the pressure is 0Mpa (air supply OFF).
2. Push the adjusting knob downward to lock it.

If a filter regulator (*) is to be used, refer to the operation manual for that device.

* Recommended device: AW30-03BDG (SMC brand) or equivalent.

[3] Removing/mounting the operation box

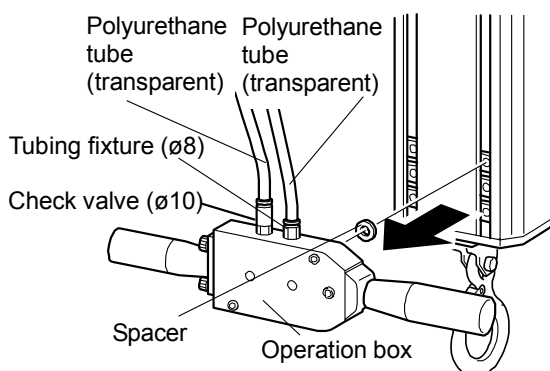


Fig. 34

1. Loosen the operation box mounting screws with the 4mm hexagon bar spanner, then remove the operation box.
2. Mount the operation box at its newly prepared position and tighten its screws.
3. Due to the protuberance on the operation box's mounting face, the accessory spacers must be inserted between the operation box and its mounting position before tightening the mounting screws.

Required tools: Hexagonal bar spanner (4mm)

[4] Restoring the air supply

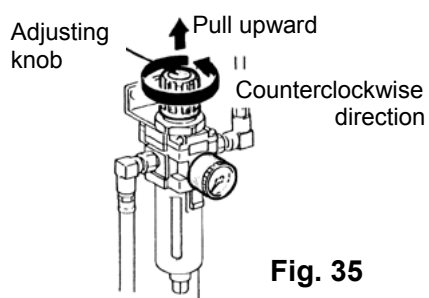


Fig. 35

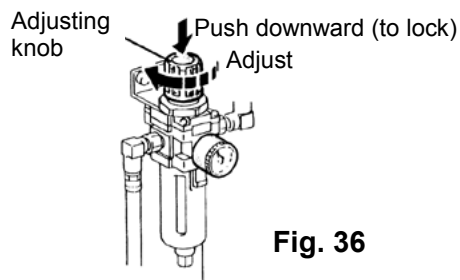


Fig. 36

1. Verify that the new hoisting accessory is securely mounted.
2. If securely mounted, pull the air source's filter regulator adjusting knob upward to unlock it, then turn it in the clockwise direction until the pressure is within a 0.4 to 0.7MPa range.
3. Push the adjusting knob downward to lock it.

When using the filter regulator (*), please refer to its operation manual.

* Recommended filter regulator: "AW30-03BDG (SMC brand)" or equivalent.

6. Using The Mounting Rails

The square nuts (M6) and rails on the hoist unit's front face can be used to mount a handle lever or an optional pneumatic circuit unit.

WARNING

- Do not suspend loads from the mounting rails and square nuts. Doing so could damage the hoist unit, and the load could be dropped, possibly causing serious injury or death.
- Do not use the mounting rails and square nuts to mount any component having a total weight which exceeds 5kg. Doing so could cause serious injury or death.

CAUTION

Use care in handling operation related items such as an auxiliary handle which have been mounted on the mounting rail's square nuts. Shaking or pushing these items could cause minor to moderate injuries, and could also damage the hoist unit.

[1] Detaching the hoist unit from the load

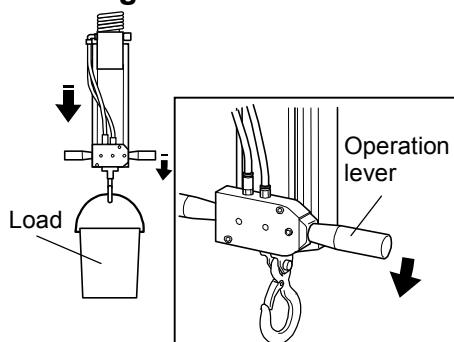


Fig. 37

1. Press the operation lever downward and lower the hoist unit until the hissing sound of venting air from the operation box is no longer heard.
2. Detach the hoist unit from the load.

[2] Shutting off the air supply

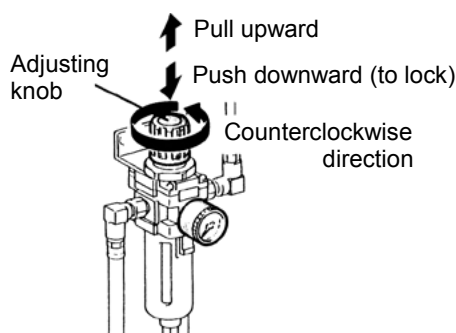


Fig. 38

1. Pull the air source's filter regulator adjusting knob upward and turn it in the counterclockwise direction until the pressure is 0Mpa (air supply OFF).
2. Push the adjusting knob downward to lock it.

If a filter regulator (*) is to be used, refer to the operation manual for that device.

* Recommended device: AW30-03BDG (SMC brand) or equivalent.

[3] Adjusting the handle lever mounting position

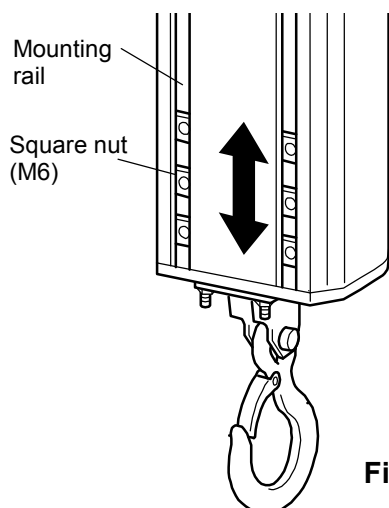


Fig. 39

1. Move the mounting rail's square nuts (M6) to the appropriate positions.
(Two of the square nuts (M6) are used to mount the operation box at the factory prior to shipment.)

[4] Mounting the handle lever

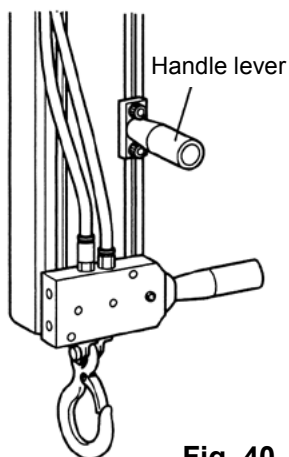


Fig. 40

1. Mount the handle lever and tighten its screws. An optional pneumatic circuit unit, etc., can also be mounted on these mounting rails.

Required tool: Hexagon wrench 5mm (for M6)

[5] Restoring the air supply

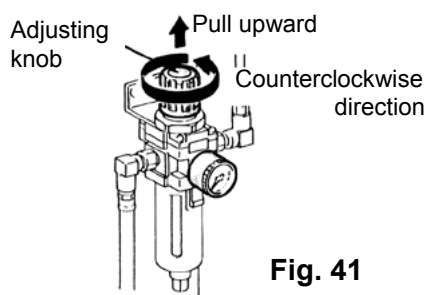


Fig. 41

1. Verify that the new hoisting accessory is securely mounted.
2. If securely mounted, pull the air source's filter regulator adjusting knob upward to unlock it, then turn it in the clockwise direction until the pressure is within a 0.4 to 0.7MPa range.
3. Push the adjusting knob downward to lock it.

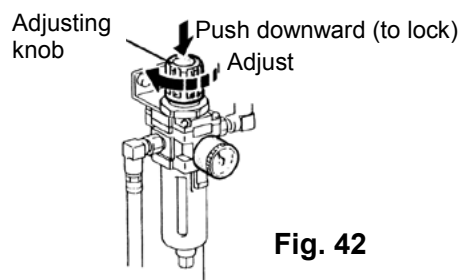


Fig. 42

When using the filter regulator (*), please refer to its operation manual.

* Recommended filter regulator: "AW30-03BDG (SMC brand)" or equivalent.

7. Mounting A Hoisting Accessory Other Than The Provided Hook

When using a hoisting accessory other than the provided hook, perform the procedure given below to adjust the dead-weight holding regulator in order to reduce the pushing force against the workpiece when in a no-load condition.

DANGER

Be sure to adjust the dead-weight holding regulator after a hoisting accessory replacement. Failing to make this adjustment could cause violent hoist unit motion when the air is turned ON, possibly resulting in serious injury or death.

WARNING

Users who design and fabricate their own hoisting accessories should ensure that the work is performed by a worker with adequate experience, and only after thoroughly reading this manual. However, even if this is done, TOYOTSU TECHNO CORPORATION assumes no responsibility for injuries, deaths, and equipment or property damage resulting from the use of user-fabricated hoisting accessories.

[1] Detaching the hoist unit from the load

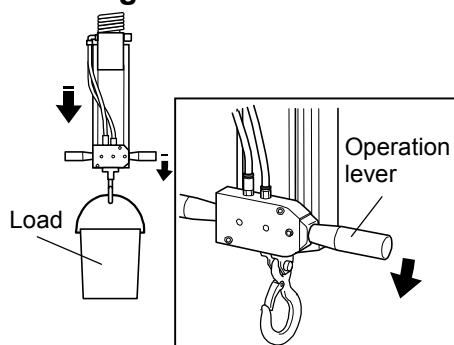


Fig. 43

1. After verifying that air source is shut off, perform the following procedure.
2. Press the operation lever downward and lower the hoist unit until the hissing sound of venting air from the operation box is no longer heard.
3. Detach the hoist unit from the load.

[2] Check the position of the dead-weight holding regulator adjusting knob

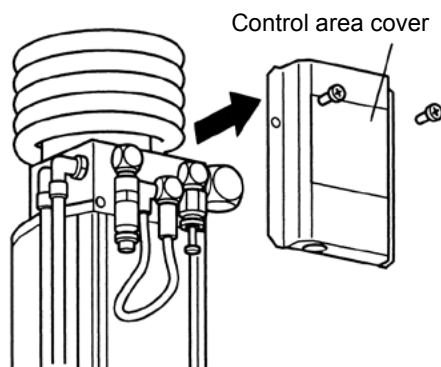


Fig. 44

1. Remove the two screws at the control area cover, then open the cover.

Required tool: Phillips screwdriver

Dead-weight holding regulator

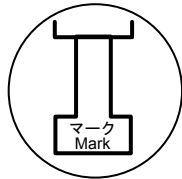
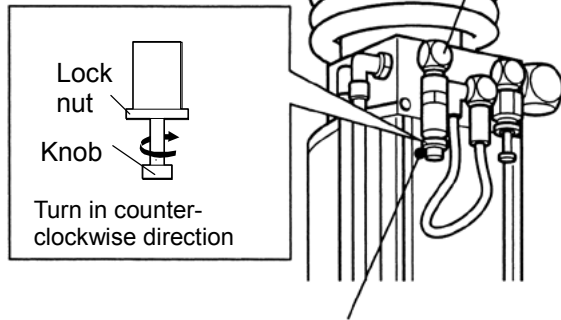



Fig. 45


<p>Turning the air ON without the dead-weight holding regulator knob adjusted to the mark position can cause sudden and violent hoist unit motion, possibly resulting in serious injury or death.</p>

2. Check to see if the dead-weight holding regulator's knob is at the mark position.
If not, use a pair of pliers to loosen the lock nut, then turn the knob counterclockwise until it is aligned with the mark position.
(The knob is aligned with the mark position when shipped from the factory.)

Required tool: Pliers

[3] Restoring the air supply

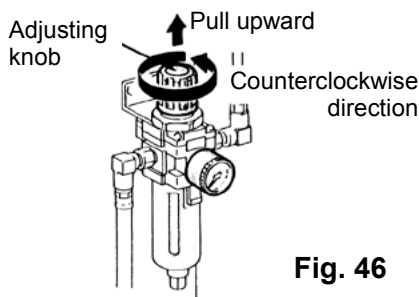


Fig. 46

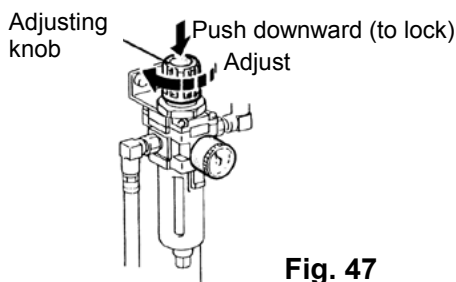




Fig. 47


<p>Set the air source pressure within the 0.4MPa to 0.7MPa range. A pressure exceeding 0.7MPa could rupture the polyurethane tube or cylinder, possibly causing serious injury or death.</p>


<p>Readjust the dead-weight holding regulator after replacing a hoisting accessory, or if hoist unit UP motion tends to occur when the air is turned ON while in a no-load condition. Failing to make this adjustment could result in serious injury or death.</p>

1. Turn the air source ON to supply air to the hoist unit.
2. Pull the filter regulator adjusting knob upward to unlock it.
3. After verifying that the adjusting knob is turned all the way in the counterclockwise direction, supply the air.
4. With the filter regulator adjusting knob pulled upward, adjust to the setting pressure by gradually turning the adjusting knob in the clockwise direction.
5. Push the adjusting knob downward to lock it.

[4] Adjust the dead-weight holding regulator

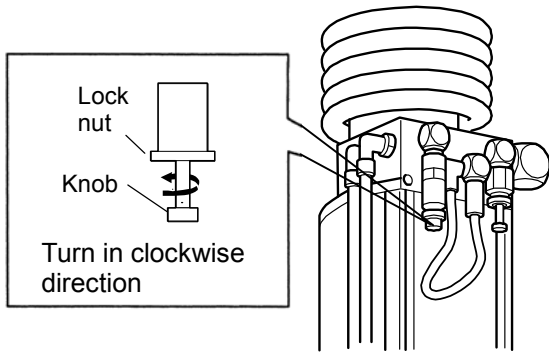


Fig. 48

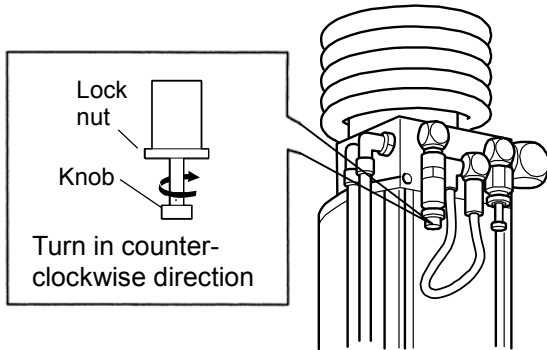


Fig. 49

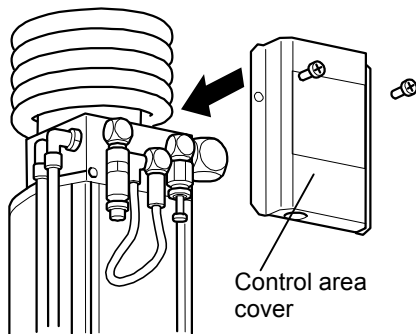


Fig. 50



Do not adjust the dead-weight holding regulator unless the hoisting accessory has been replaced.

1. Use the pliers to loosen the dead-weight holding regulator's lock nut, then turn the adjusting knob in the clockwise direction.
2. As the adjusting knob is turned, the hoist unit will begin to rise. After this UP motion begins, slowly turn the dead-weight holding regulator's adjusting knob in the counterclockwise direction until the UP motion stops.
3. Use the pliers to tighten the lock nut at the position where hoist unit UP motion stopped.
4. Attach the control area cover and secure it by tightening the two screws.
5. Perform a no-load operation check as described on page 15, item [5].

Required tool: Phillips screwdriver

[4] Operating Procedure

This section explains how to operate the hoist unit. Before beginning hoist unit operation, be sure to read pages 5 to 9 "Safety Cautions" and the page 32 "Operation Preparation Inspection" information. Always perform the "Operation Preparation Inspection" before operating the hoist unit.

⚠ DANGER

Set the air source pressure within the 0.4MPa to 0.7MPa range.
A pressure exceeding 0.7MPa could rupture the polyurethane tube or cylinder, possibly causing serious injury or death.

⚠ CAUTION

The amount of weight which can be lifted varies according to the air source pressure. Select an appropriate air pressure with reference to the figure at right.
Be sure to use the appropriate air pressure.
(Lifted weight & primary air pressure)

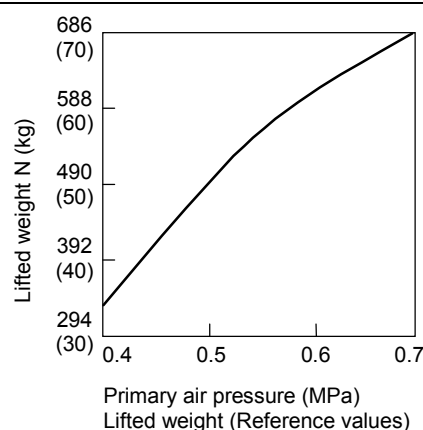


Fig. 51

1. Startup Procedure

Startup preparation check

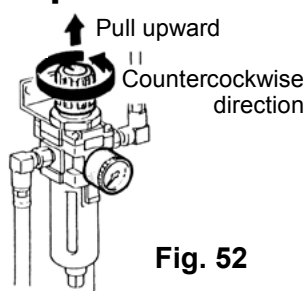


Fig. 52

1. Pull the filter regulator's adjusting knob upward to release its lock. Verify that the adjusting knob has been turned all the way in the counterclockwise direction, then supply the air.
2. Verify that the belt is not broken or cracked.

Filter regulator setting

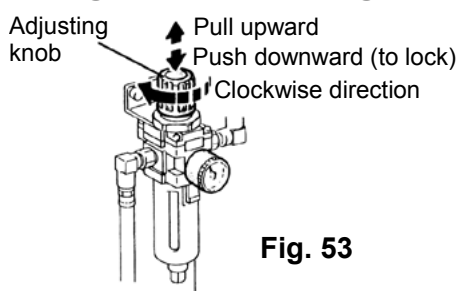


Fig. 53

1. Pull the filter regulator's adjusting knob upward, then slowly turn it in the clockwise direction to the setting pressure (e.g., 0.5MPa).
2. Push the adjusting knob downward to lock it.

If a filter regulator (*) is to be used, refer to the operation manual for that device.

* Recommended device: AW30-03BDG (SMC brand) or equivalent.

2. Operating Procedure



When lifting/lowering loads, the operator should grasp the operation lever with one hand, and the handle lever with the other hand.

- Grasping the air tubing could cause air leakage
- Grasping the hoist unit body could cause the unit to sway, possibly resulting in a dropped load.
- Grasping the hoisting accessory could pinch the fingers, etc.

Any of these unsafe actions could cause serious injury, death or equipment damage.

[1] Suspend a load from the hook.

[2] Push the operation lever upward to lift the load (UP motion), and push the lever downward to lower the load (DOWN motion).

The UP/DOWN motion speed varies according to how far the operation lever is pushed.

Motion is slow if the operation lever is pushed only slightly upward or downward, and speeds up as the lever is pushed farther.

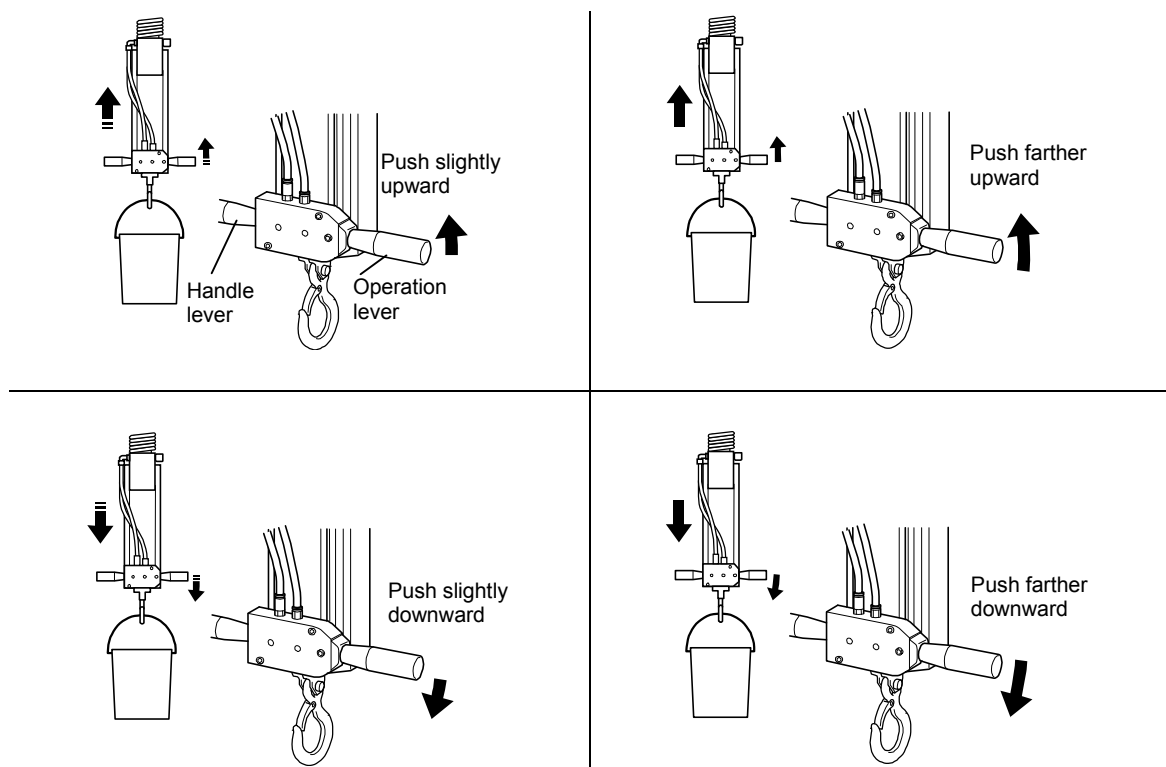


Fig. 54

3. Ending Operation

Ending Operation

- [1] Detaching the hoist unit from the load.

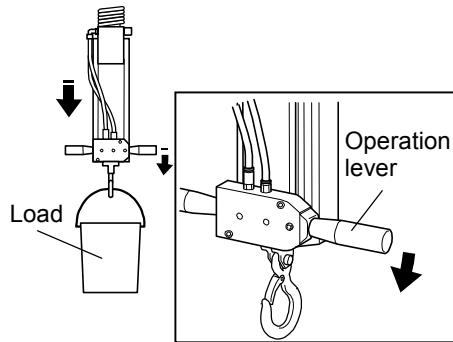


Fig. 55

1. Press the operation lever downward and lower the hoist unit until the hissing sound of venting air from the operation box is no longer heard, indicating that the hoist is at its DOWN limit position.
2. Detach the hoist unit from the load.

- [2] If horizontal motion equipment is installed, either place the hoist unit on a work stand, etc., or secure it with rope so that it cannot move.

- [3] Shutting off the air supply.

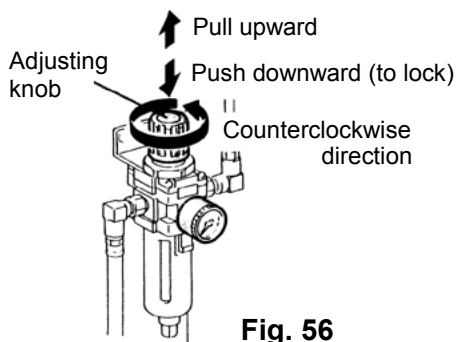


Fig. 56

1. Pull the air source's filter regulator adjusting knob upward and turn it in the counterclockwise direction until the pressure is 0Mpa (air supply OFF).
2. Push the adjusting knob downward to lock it.

If a filter regulator (*) is to be used, refer to the operation manual for that device.

* Recommended device: AW30-03BDG (SMC brand) or equivalent.

[5] Maintenance

This section explains the inspection and troubleshooting procedures for the hoist unit.



Before performing these procedures, be sure to read pages 5 to 9 "Safety Cautions" and the "Operation Preparation Inspection" information described below. Always perform the "Operation Preparation Inspection" before operating the hoist unit.

1. Operation Preparation Inspection

To help safety, the following inspection must be performed at the beginning of each work day.

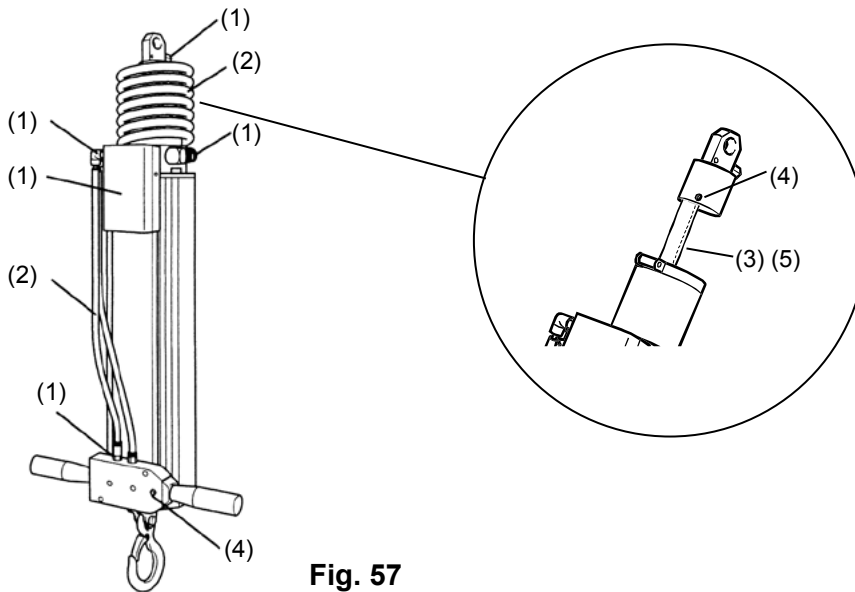


Fig. 57

Inspection Point	Inspection Description	Corrective Action
(1) Air piping connection fittings	Check for air leakage from the air piping connection fittings.	Air leakage represents a hazardous condition. If air is leaking, stop operation immediately and contact the supervisor or maintenance personnel. Replacement and repair of air piping connection fittings should be requested from TOYOTSU TECHNO CORPORATION or the sales outlet.
(2) Polyurethane tube, spiral tube	Check for air leakage from the polyurethane tube, spiral tube, and tube fittings.	Air leakage represents a hazardous condition. If air is leaking, stop operation immediately and contact the supervisor or maintenance personnel. Replacement or repair of the polyurethane tubes, spiral tubes, and tube fittings should be requested from TOYOTSU TECHNO CORPORATION or the sales outlet.
(3) Belt motion	Verify that up/down motion is smooth.	Improper belt motion represents a hazardous condition. If it occurs, stop operation immediately and contact the supervisor or maintenance personnel. Check with TOYOTSU TECHNO CORPORATION or the sales outlet to determine if the belt is interfering with the air piping.
(4) Retainer ring	Verify that the retainer ring fitting is not detached.	A detached retainer ring fitting represents a hazardous condition. If detached, stop operation immediately and contact the supervisor or maintenance personnel. Retainer ring replacement work should be requested from TOYOTSU TECHNO CORPORATION or the sales outlet.
(5) Belt fault	Check for belt fraying, scratches, deformation (twisting, bending), etc.	A frayed or damaged belt represents a hazardous condition. If found, stop operation immediately and contact the supervisor or maintenance personnel. Either the KENSUI hoist unit should be replaced, or belt repair work should be requested from TOYOTSU TECHNO CORPORATION or the sales outlet. Refer to pages 36 and 37.

* Suspending a load in a manner which twists the belt or which positions the load to the sides of the hoist body, can dramatically shorten the KENSUI hoist life.

2. Monthly Inspection

To further increase hoist unit safety, the operation supervisor should perform the following inspection on a monthly basis.

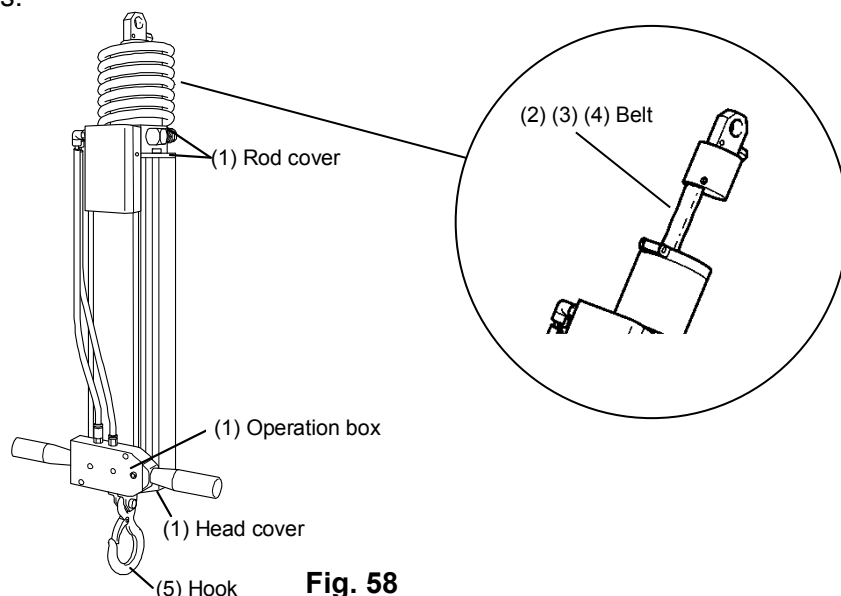


Fig. 58

Inspection Point	Inspection Description	Corrective Action
(1) Bolts and nuts	Check all bolts and nuts for looseness.	Loose bolts and nuts represent a hazardous condition. If found, stop operation immediately and contact the supervisor or maintenance personnel. The loose bolts and nuts must be tightened.
(2) Belt motion	Check for abnormal sounds and catching during belt up/down motion.	Improper belt motion represents a hazardous condition. If it occurs, stop operation immediately and contact the supervisor or maintenance personnel. Take the appropriate corrective action with reference to Table 2 on page 36. If the problem persists, contact TOYOTSU TECHNO CORPORATION or the sales outlet.
(3) Belt fraying, scratches, deformation (twisting, bending), etc.	Check for belt fraying, scratches, deformation (twisting, bending), etc.	A frayed or damaged belt represents a hazardous condition. If found, stop operation immediately and contact the supervisor or maintenance personnel. The belt life may vary according to usage conditions. When a frayed or damaged belt is found, either replace the KENSUI hoist unit, or request belt repair work from TOYOTSU TECHNO CORPORATION or the sales outlet.
(4) Belt (width)	Verify that the belt width exceeds 20mm.	A belt width smaller than 20mm represents a hazardous condition. In such a case, stop operation immediately and contact the supervisor or maintenance personnel. A belt width smaller than 20mm indicates that the KENSUI hoist unit life has expired. Either replace the KENSUI hoist unit, or request belt repair work from TOYOTSU TECHNO CORPORATION or the sales outlet. Refer to page 34 of this manual.
(5) Hook	Check for hook cracks, and for gaps at the drop-prevention plate spring.	Hook cracks and plate spring gaps represent a hazardous condition. If such a condition is found, stop operation immediately and contact the supervisor or maintenance personnel. Either the KENSUI hoist unit should be replaced, or a new hook should be purchased from TOYOTSU TECHNO CORPORATION or the sales outlet.

* Suspending a load in a manner which twists the belt or which positions the load to the sides of the hoist body, can dramatically shorten the KENSUI hoist life.

DANGER

Replace the belt with a new one without delay when the belt becomes frayed, scratched, or deformed (curling, bending, etc.). Failing to replace the belt could cause the unit to fall, possibly resulting in serious injury or death to nearby personnel.

Example of belt which is suitable for continued use



Examples of belts which require immediate replacement



Fraying, scratching

Curling

Bending

* When unsure whether or not a belt requires replacement, consult with TOYOTSU TECHNO CORPORATION or the sales outlet.

* Suspending a load in a manner which twists the belt or which positions the load to the sides of the hoist body can dramatically shorten the belt's life.

3. Troubleshooting

■ Before Contacting The Sales Outlet Or TOYOTSU TECHNO CORPORATION Regarding Repairs

When any of the problems indicated in the following table occur, try to resolve the problem by performing the corresponding "Corrective Action". If the problem persists after the corrective action, please contact the sales outlet or TOYOTSU TECHNO CORPORATION.



When performing checks and corrective actions, be sure to observe the safety precautions contained in this manual. Failure to do so could result in serious injury or death.

Table 2

Problem	Items To Check	Corrective Action (Reference Page)
UP motion fails to occur	Check for a detached polyurethane tube or spiral tube.	Refer to page 12, and properly attach the polyurethane tube or spiral tube.
	Check for a ruptured or pinched polyurethane tube or spiral tube.	If pinched, correct the tube or spiral tube posture. If ruptured, replace.
	Check to see if the air pressure is sufficient to lift the load weight.	Set a suitable air pressure with reference to the graphs on pages 29 and 40.
	Verify that the operation lever is being used correctly.	Refer to page 30 "Operating Procedure" and use the operation lever in the correct manner.
	Check to see if the operation lever is catching on something.	Remove the obstacle.
	Check for air leakage from the air tubing.	Inspect/replace the tubing joints.
	Check to see if a plug is present in the hoisting accessory's air tubing port. Verify that the hose is securely connected to the hoisting accessory's air tubing port.	Insert the hose/plug correctly.
DOWN motion fails to occur.	Verify that the operation lever is being used correctly.	Refer to page 30 "Operating Procedure" and use the operation lever in the correct manner.
	Is the operation lever catching on something?	Remove the obstacle.
	Check for a pinched polyurethane tube.	Correct the polyurethane tube's posture, or replace.
	Verify that the dead-weight holding regulator is set correctly.	Adjust the regulator with reference to page 26 "Mounting A Hoist Accessory Other Than The Provided Hook".
Both UP and DOWN motion fail to occur.	Check for a ruptured or pinched polyurethane tube or spiral tube.	If pinched, correct the tube or spiral tube posture. If ruptured, replace.
	Verify that the polyurethane tubes are connected to the correct ports.	Connect correctly.
	Check to see if the belt is twisted and is making contact with the rod cap.	Correct the belt posture. Verify that installation is correct, with reference to page 10, item [3] "Installation Procedure".
Arbitrary UP motion occurs.	Is the operation lever catching on something?	Remove the obstacle.
	Verify that the dead-weight holding regulator is set correctly.	Adjust the regulator with reference to page 26 "Mounting A Hoist Accessory Other Than The Provided Hook".
Arbitrary DOWN motion occurs.	Check to see if the air pressure is sufficient to lift the load weight.	Set a suitable air pressure with reference to the graphs on pages 29 and 40.
	Is the operation lever catching on something?	Remove the obstacle.
	Check for a detached polyurethane tube.	Refer to page 12, and properly attach the polyurethane tube.
	Check for ruptured polyurethane tube.	Replace the polyurethane tube with a new one.
Free rotation fails to occur.	Check for interference between the spiral tube and the hoist unit body or air tubes, etc.	Remove the obstacle.

[6] After-Service

1. Repair Service

Before requesting repairs, users are requested to inspect the product with reference to the page 36 "Troubleshooting" information.

When contacting TOYOTSU TECHNO CORPORATION regarding product repairs, please be prepared to provide the following information.

- (1) Name of the person who is requesting the repair, and contact information (address, telephone number, FAX number, email address) for the site where the product is being used.
- (2) Model and Manufacture No. of product being used
- (3) Detailed description of the problem symptoms.

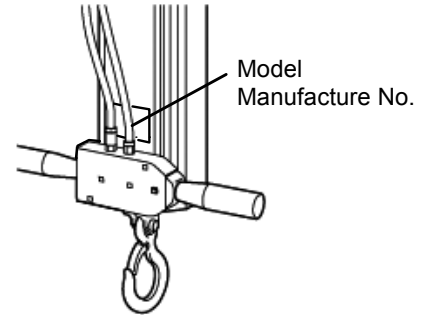


Fig. 59

Products must be returned to TOYOTSU TECHNO CORPORATION for repairs which TOYOTSU TECHNO CORPORATION performs. Please contact the sales outlet or TOYOTSU TECHNO CORPORATION for details about this procedure.

Within the warranty period, TOYOTSU TECHNO CORPORATION bears all costs for repair parts, labor, and shipping to and from TOYOTSU TECHNO CORPORATION. The customer shall bear all costs in cases where the warranty period has expired, and when the repair content is outside the scope of the warranty. When requested, TOYOTSU TECHNO CORPORATION will provide an estimate of costs (for a fee) for the repair of a returned product. In such cases, the customer shall be responsible for shipping costs to and from TOYOTSU TECHNO CORPORATION, regardless of whether or not the repairs are performed.

2. Warranty Period

- The warranty period for free repair or replacement shall extend for a period of six months from the date of purchase.
- Regarding TOYOTSU TECHNO CORPORATION-acknowledged defects in workmanship and material which occur within the warranty period, TOYOTSU TECHNO CORPORATION shall bear all costs related to the replacement or repair of the relevant parts. (For products in use outside of Japan, only product replacements shall be performed.)
- Repairs necessitated by the following conditions are not recognized as faults. These repairs are outside the scope of this warranty, and all costs will therefore be borne by the customer.
 - (1) Repairs related to a product failure caused by incorrect usage, including failure to follow the instructions and products in this manual, or unauthorized repair, modification, or disassembly.
 - (2) Product damage or failure caused by other equipment.
 - (3) Product damage or failure caused by a natural disaster, pollutants, salt, or chemicals, etc.
- The customer shall bear the cost for repairs which are requested after the warranty period has expired.

3. Spare Parts Inventory & Holding Period

Although spare parts for the hoist unit are kept in stock for a period of seven years from the manufacture discontinuation date, some parts may not be immediately available.

Depending on the product fault/failure, some repairs are possible beyond seven years. Please contact TOYOTSU TECHNO CORPORATION for details.

* Modifications and improvements to enhance product functions may occur at any time without prior notice.

4. Specifications & Installation Requirements Table

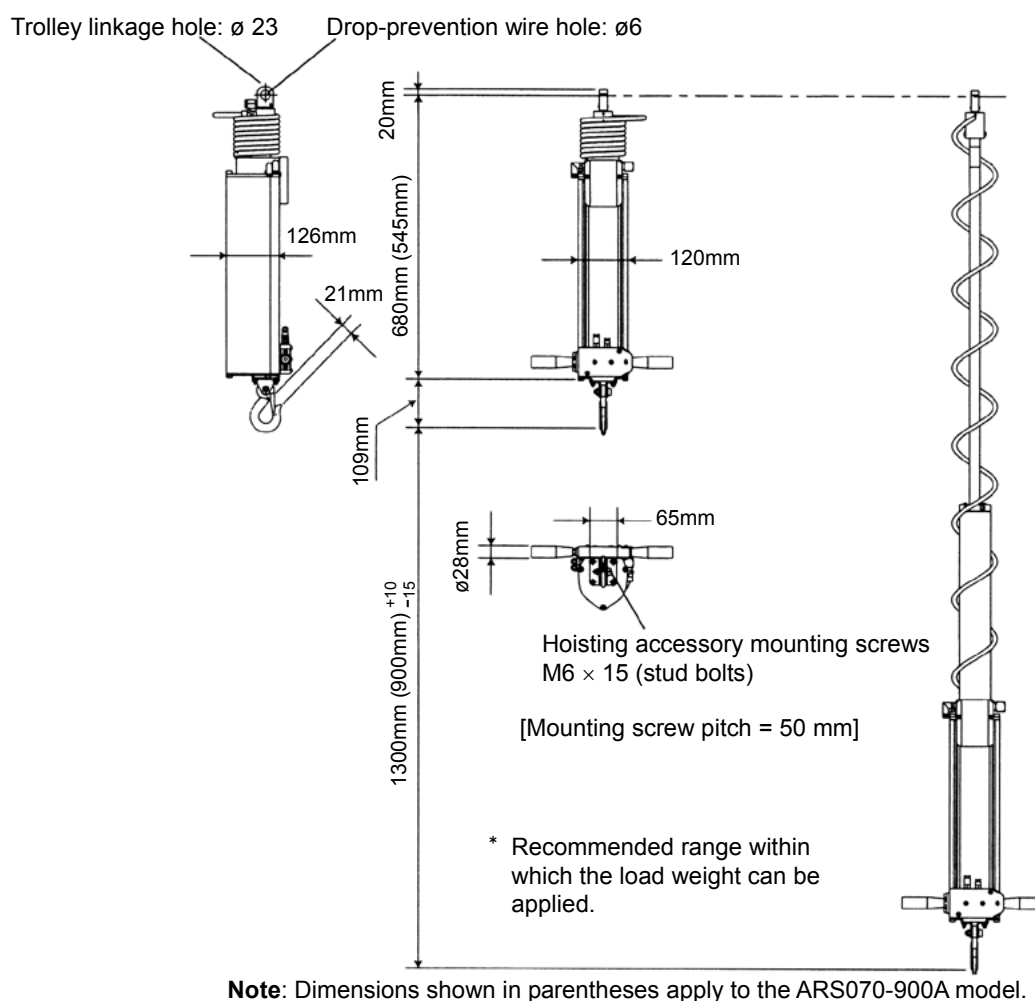


Fig. 60

Table 3 Hoist Unit General Dimensions Information

Model	ARS070-1300A	ARS070-900A
Up/Down motion amount	1300mm ⁺¹⁰ ₋₁₅	900mm ⁺¹⁰ ₋₁₅
Hoist unit weight	Approx. 10kg (with hook)	Approx. 9kg (with hook)
Hoist unit height (excluding hook)	Approx. 680mm	Approx. 545mm
Rated lifting weight (including hoisting accessory weight)	Max. 70kg (686N) (With air source pressure of 0.7MPa)	
Air pressure used	0.4 to 0.7Mpa	
Air amount used	Approx. 2.5L (per stroke)	Approx. 1.8L (per stroke)
Up/Down speed (reference values)	In no-load condition : 0 to 50m/minute When lifting 50kg : 0 to 30m/minute	
Hoist unit rotation	Free rotation (uninhibited)	

Lifted weight (Reference values)

Primary air pressure (MPa)	Lifted weight N (kg)
0.4	294 (30)
0.5	490 (50)
0.6	588 (60)
0.7	686 (70)

Fig. 61

Fig. 61

Specification changes to improve product functions may be made at any time without prior notice.

Please direct any inquiries regarding this manual to TOYOTSU TEC CORPORATION at the following address:



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Sales Outlets

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- The specifications of products which appear in this manual may be changed at any time without prior notice.
 - Actual product colors may vary slightly from the printed colors.
 - Do not use this products for applications other than those given in this catalog. Contact TOYOTSU TEC if the product is to be used for a different application.
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 - The main components of the **ALFA RAIL SYSTEM**[®] are protected by industrial property rights, including utility model patents and design rights, etc.