

# Chapter 4

## INSTALLATION

This chapter explains the installation for sonar monitor and hull unit.

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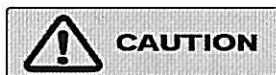
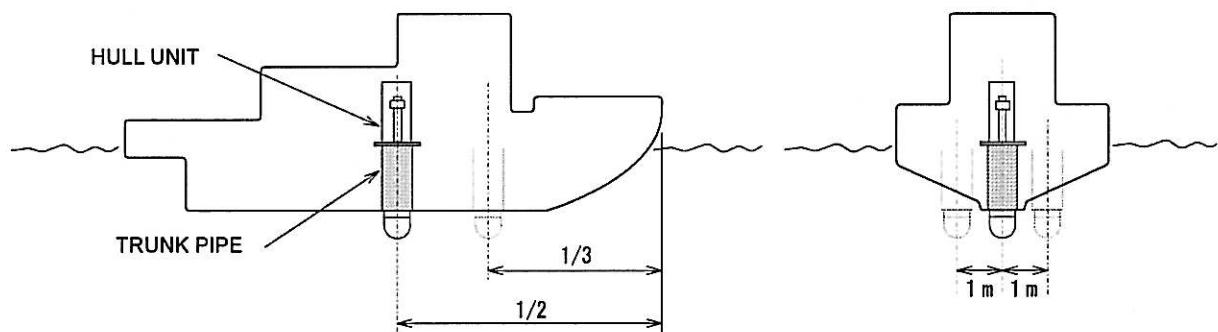
Fully discussion and agreement are required with the ship owner and dockyard in deciding the location for the hull unit. Give careful considerations on mounting.

## INSTALLATION POSITION

Select an area where noise, bubbles and interference from turbulences are minimal.

The point at  $1/3$  to  $1/2$  of the ship's length from the bow is the best.

If the hull unit can not be installed on the keel, the center of the Trunk Pipe should be within 1 meter of the keel.



Be sure there are no obstacles to interfere the ultrasonic beam when the Soundome is lowered.

Provide sufficient clearance around the Trunk Pipe for maintenance and inspection work.

Install the unit so that the Flange comes above the draft at full load.

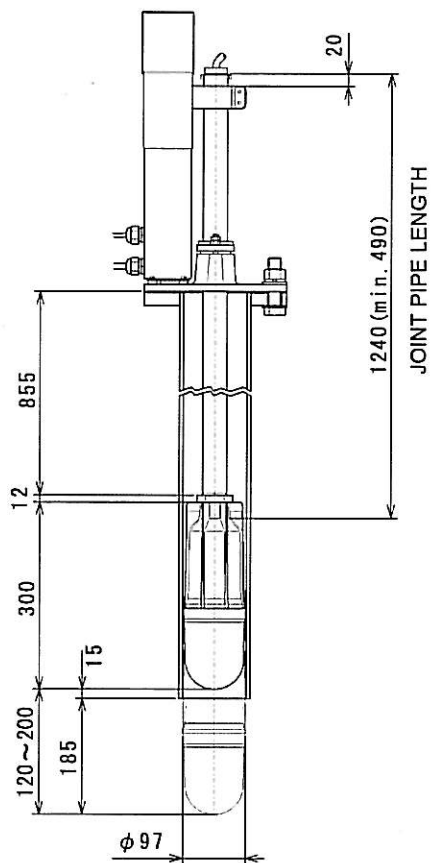
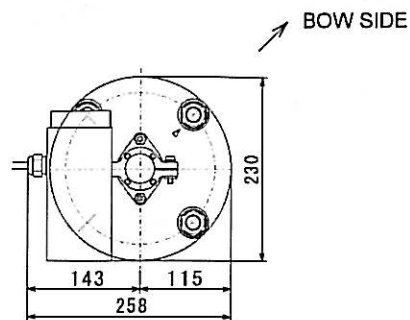
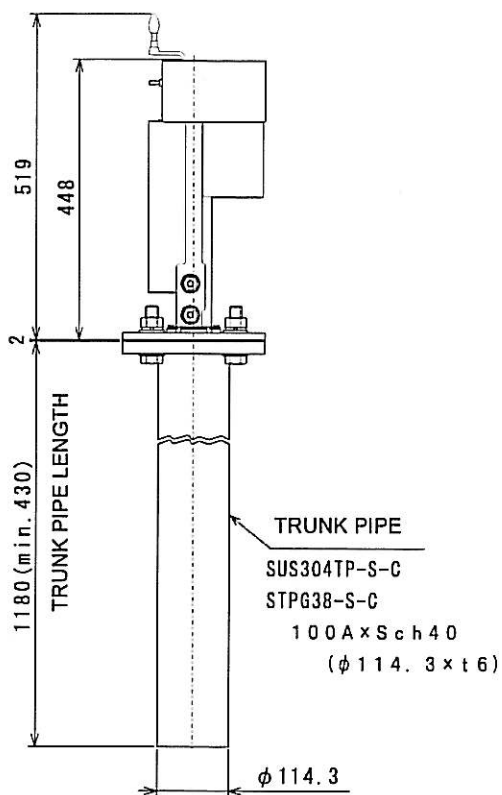
Make the bulkhead in consideration of safety to an emergency flood if you install the Trunk Pipe in the engine room.

The Bow mark ( $\Delta$ ) on the Flange should be installed facing the bow of the vessel. However, if this hinders maintenance or inspection, and there is no solution, direct the mark to the opposite ( $180^\circ$ ) direction toward the stern.

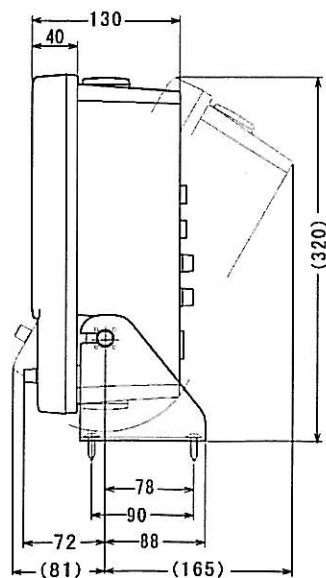
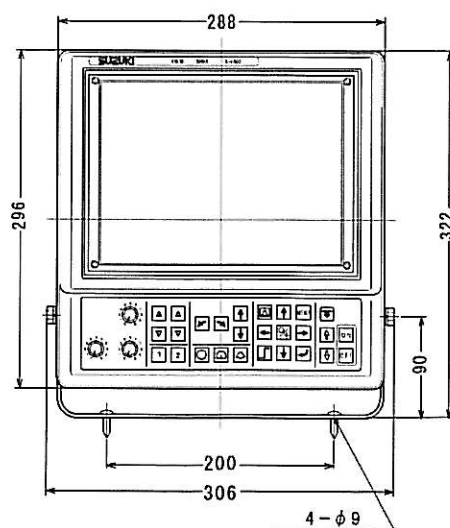
# INSTALLATION

## DIMENSIONS

### HULL UNIT



### DISPLAY UNIT

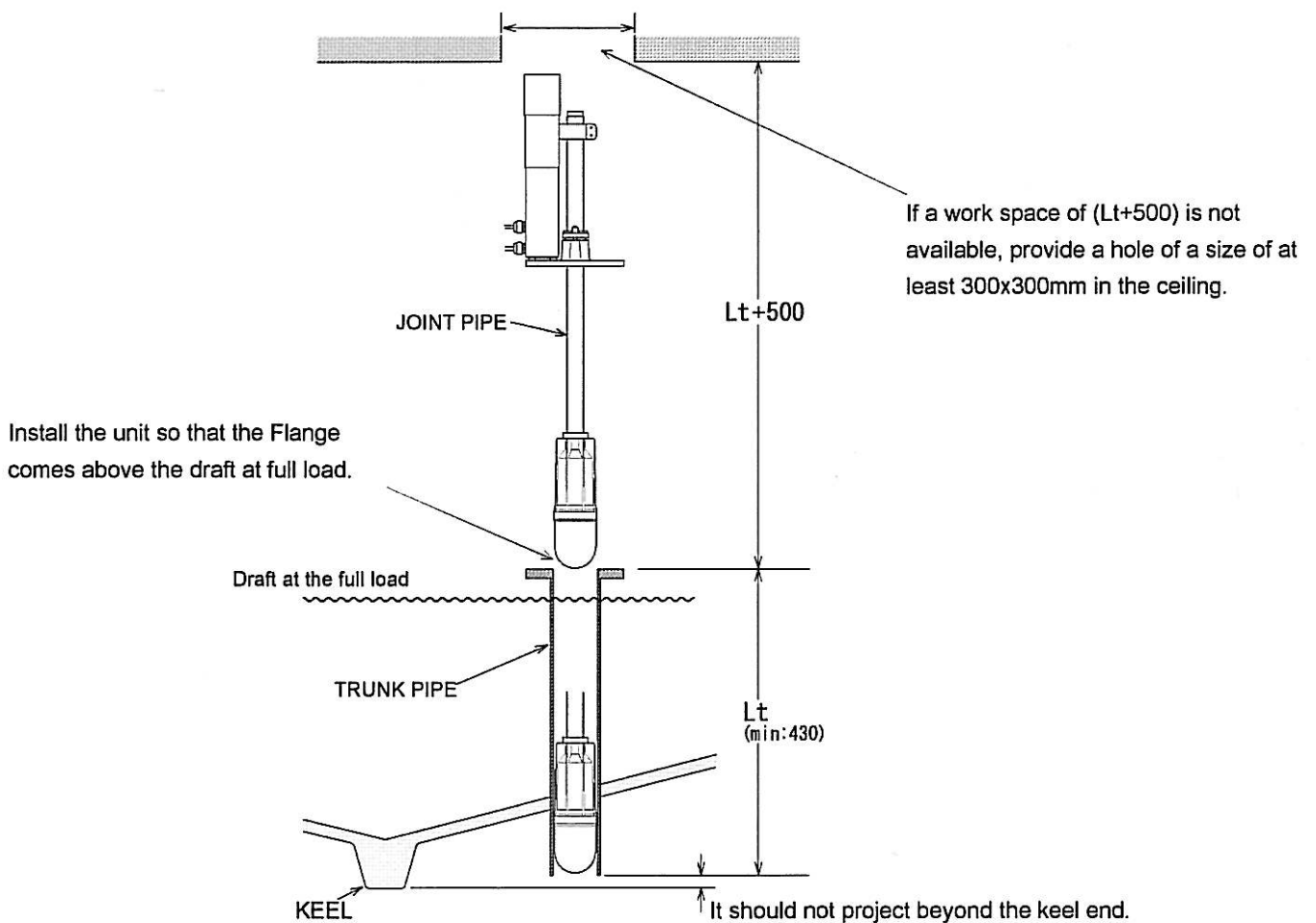


## TRUNK PIPE INSTALLATION

### 1. MAINTENANCE SPACE

When installing the Trunk Pipe, pay full attention to the safety (strength, water-tightness, etc.). At the same time, secure a space for maintenance and inspections.

- Since the Hoist unit is not a waterproof structure, keep it away from water drops and splashes.
- S-1400 is shipped from the factory with standard, 1,240mm Joist Pipe and without Trunk Pipe.
- When mounting the Joint Pipe to the Soundome, be sure not to damage the Joint Pipe thread or twist the Soundome cable.

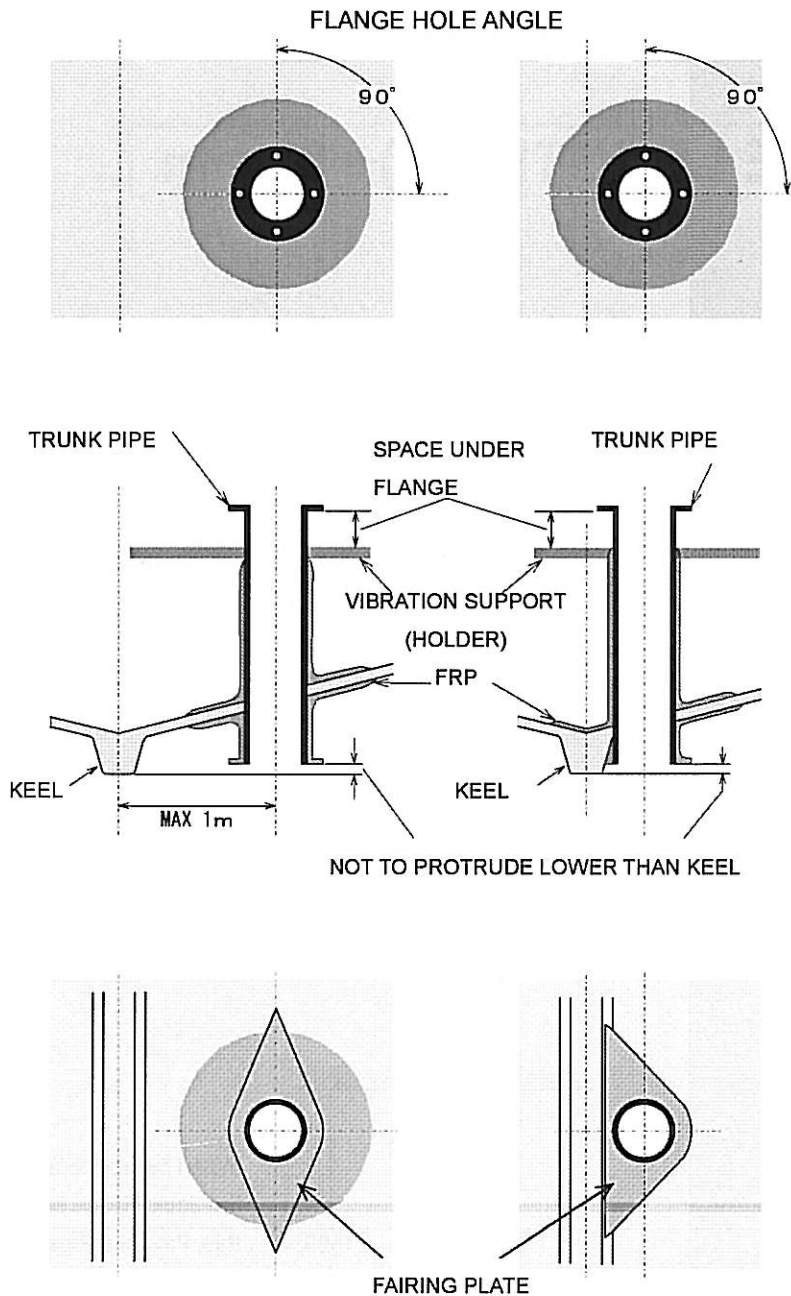


# INSTALLATION

## 2. INSTALLATION CONDITIONS

The Trunk Pipe should be installed satisfying the following conditions.

- The position for installation should be within 1/3 to 1/2 of the overall length from the bow.
- It also should be on the keel or within 1 meter from the keel.



- There should be no obstacles which may interrupt bolt clamping of the Flange right below the Flange of the Trunk Pipe.
- The top end of the Trunk Pipe should not project below the keel end.
- The Flange surface of the Trunk Pipe should stay level during standard cruise.
- Apply FRP sufficiently to all the necessary sections to prevent leakage of water.
- Make the surrounding of the Trunk Pipe projecting out from the bottom in a stream-line shape, and provide a fairing plate to suppress water resistance and generation of air bubbles to the minimum.
- Install a holder to stop shaking if necessary.
- When doing this, make sure the holder does not interfere bolt clamping of the Flange.



Fully discuss about the strength and water tightness with the ship owner, the engineer in the shipyard, and the installer before determining on the position, the method of installation, and necessary materials.

## HULL UNIT ASSEMBLY

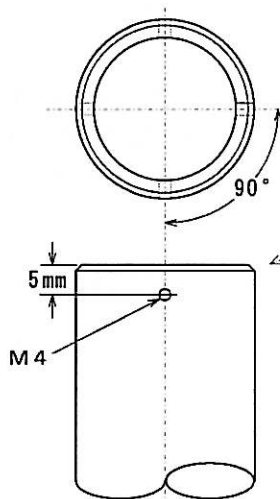
### 1. JOINT PIPE LENGTH

Calculate necessary length of joint pipe from the length of Trunk pipe ( $L_t$ ) and cut off the space portion if the shorter length than the standard 1,240mm is required.

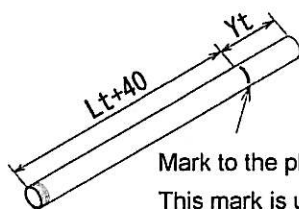
**TRUNK PIPE LENGTH ( $L_t$ )+ 60mm**

### 2. JOINT PIPE ADJUSTMENT

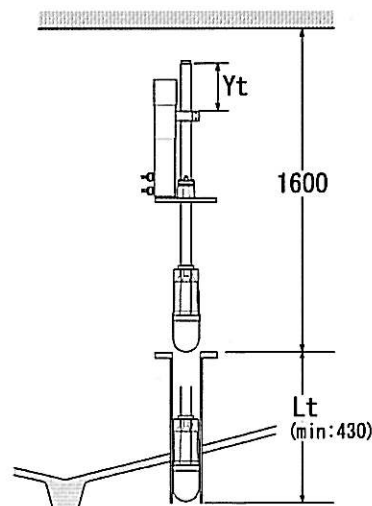
If the Trunk pipe length, 1,180mm is used, no adjustment is necessary.



- ① Cut the Joint Pipe to the required length, Trunk Pipe Length ( $L_t$ )+60mm.
- ② Smooth the cut piece and taper the edge (1mm).
- ③ Bore 4 holes in joint pipe:
  - every 90 degrees
  - 5mm from the cut end of the pipe
  - bolt circle size,  $\phi 3.4$ mm
  - set a tapping screw (M4) on each hole



Mark to the place of  $L_t + 40$ .  
This mark is united and bound tight at the upper end of Joint Arm.

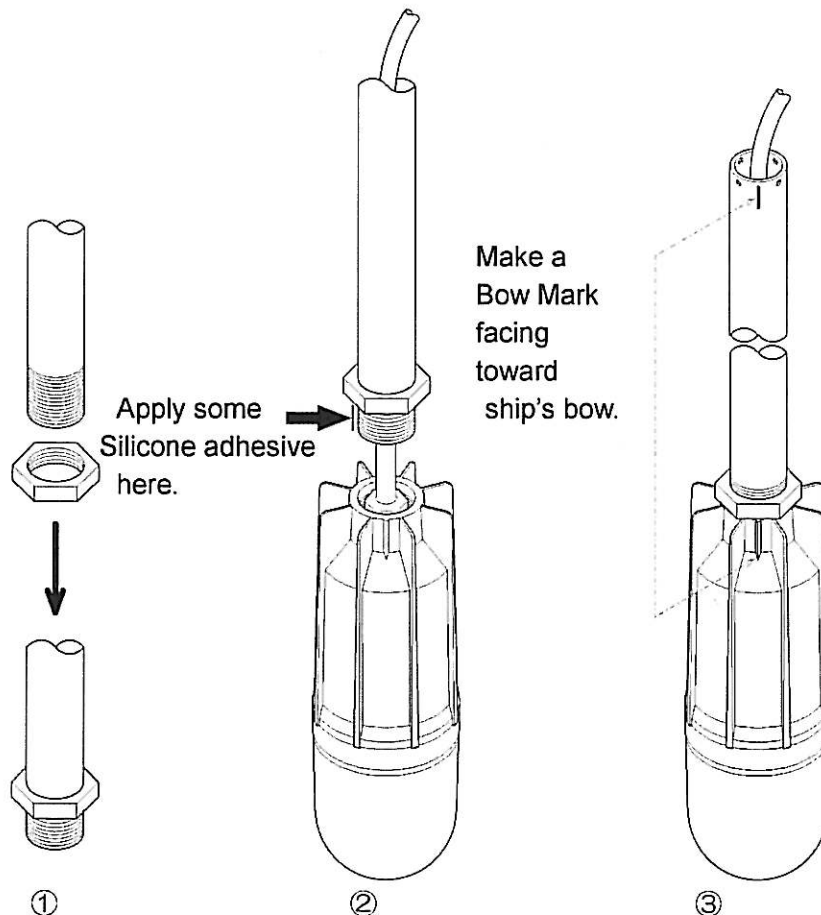


When the space above the Joint Pipe is equal to this, the Joint Pipe may be used without being cut.

## INSTALLATION

### 3. MOUNTING JOINT PIPE INTO SOUNDOME

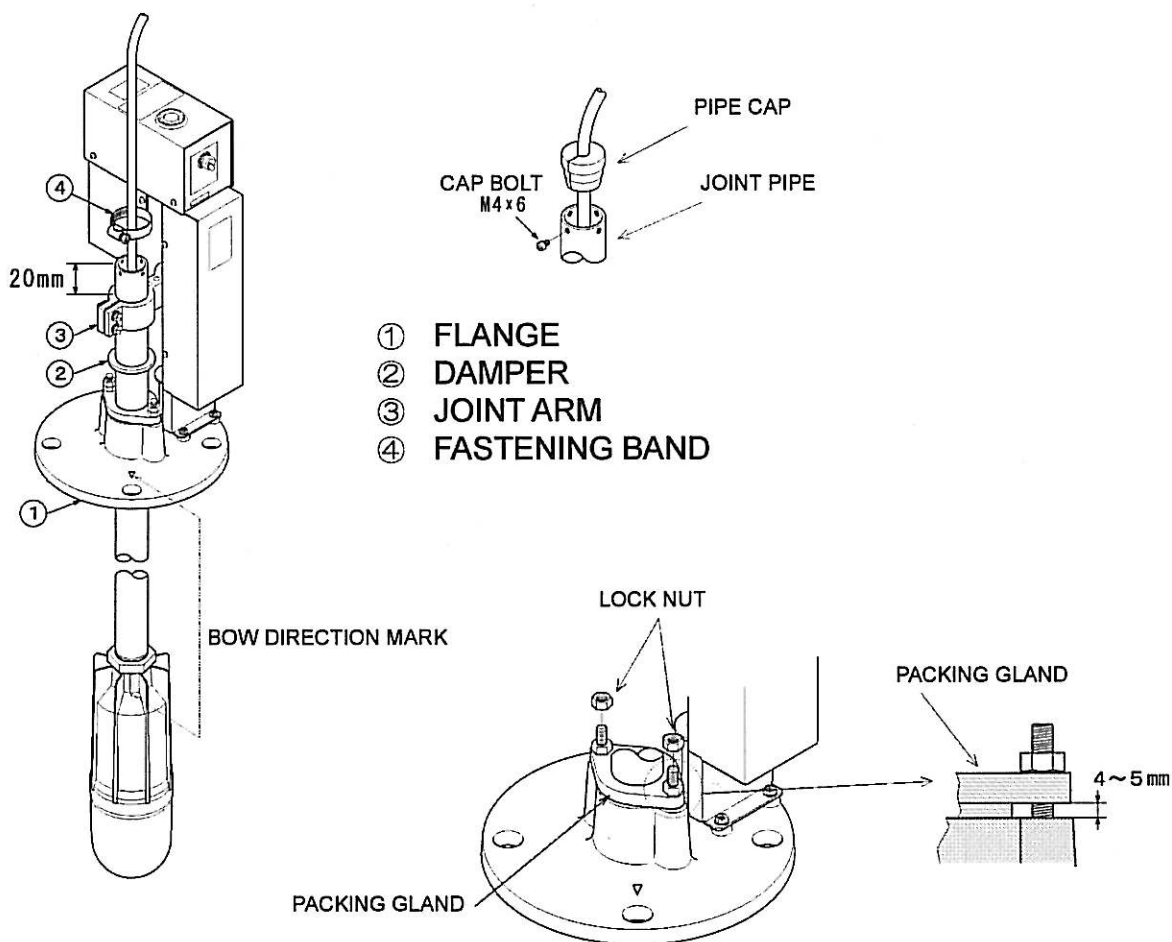
- When assembling the Joint Pipe into the Soundome, the Soundome must be fixed, and screw the Joint Pipe into the Soundome.
  - Be sure not to damage the Joint Pipe thread or twist the Soundome cable.
- ① - Totally wipe off dirt and grease from the threads of the Soundome and the Joint Pipe.  
- Screw the Lock Nut into the thread end of the Joint Pipe. (see figure ① below)
  - ② - Pass the Soundome cable through the Joint Pipe.  
- Apply some silicone adhesive (supplied) to the thread of the Joint Pipe. (see figure ② below)
  - ③ - Fully screw the Joint Pipe into the Soundome.  
- Clamp the Lock Nut to the Soundome.  
- Coat the Lock Nut and the Joint Pipe with silicone adhesive (supplied).  
- Apply the bow mark at the top end of the Joint Pipe. (see figure ③ below)



Care not to damage the Soundome cable should be taken.  
Screw or unscrew the joint pipe when mounting the joint pipe into the Soundome or dismounting it.  
Screwing the cable causes the damage of the Soundome or its cable.

## 4. ATTACHING SOUNDOME TO HOIST

- Apply grease to the Flange bearing (figure ①) where the Joint Pipe is passed through.
- Pass the Damper (figure ②) through and mount it into the Joint Arm (figure ③) facing the bow mark toward ship's bow.
- Ensure that the Joint Pipe end projects 20mm from the Joint Arm surface.
- In case of the length of the Trunk Pipe other than 1,180mm long, ensure the lowest part of the Soundome is at least 15mm above the lowest part of the Trunk Pipe.
- To prevent slip-out of the Joint Pipe, fasten the Fastening Band (figure ④).
- Pass the cable through the Pipe Cap.
- Insert the Pipe Cap in the end of the Joint Pipe, and fix evenly with four Cap Bolts.



## ADJUST THE PACKING GLAND

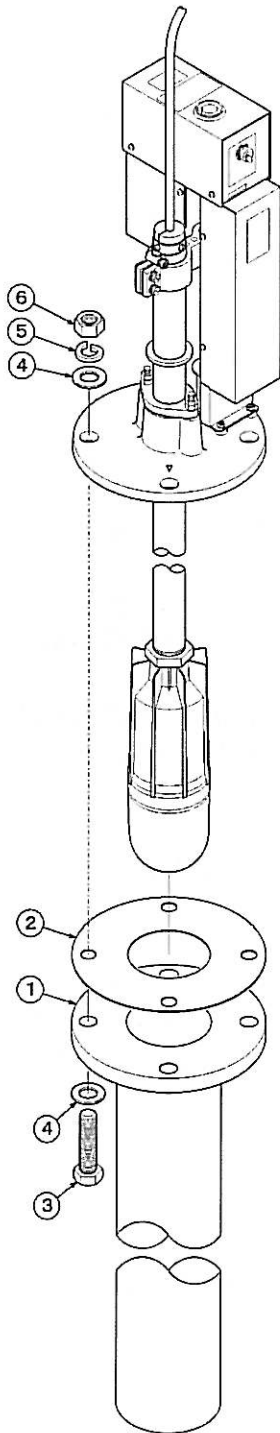
- Remove the upper Lock Nuts from the Packing Gland.
- Tighten the lower Lock Nuts until the space of the Packing Gland becomes 4 to 5mm.
- Make both side of spaces become the same.
- Put the removed upper Lock Nuts back. Clamp them tightly.
- In case of the water leakage after returning the ship to the water, the same procedure as described above is required again.



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### 5. HULL UNIT AND TRUNK PIPE ATTACHMENT

- Use 4 Hexagonal Bolts (M20x80) to fit the Hull Unit to the Trunk Pipe.
- Make tentative clamp and try to move the Soundome up and down for several times to confirm the alignment when making the final clamping evenly.
- The Hoist can be operated manually. (Refer to the page 4-11)



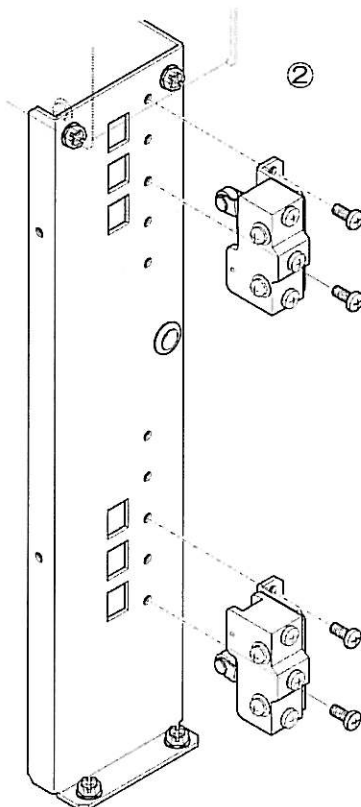
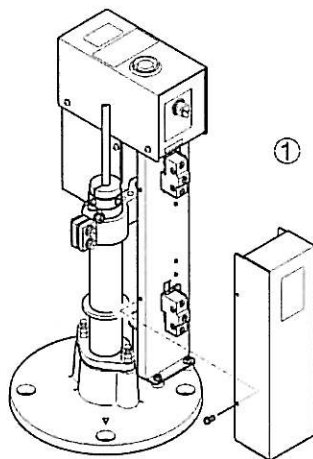
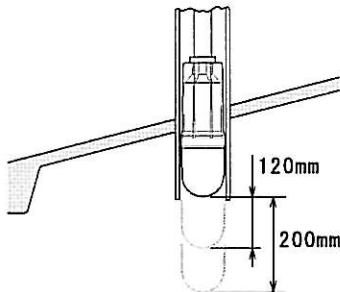
- ① TRUNK PIPE
- ② GASKET
- ③ HEXAGONAL BOLT (M20X80)
- ④ FLAT WASHER (Φ20X40X3)
- ⑤ SPRING WASHER (Φ20)
- ⑥ HEXAGONAL NUT (M20)



Do not apply any adhesive on the Gasket.  
Otherwise it disturbs being clamped evenly.

## ADJUSTMENT OF HOIST STROKE

The stroke can be adjusted from 120mm at the minimum to the 200mm at the maximum by changing the position of the Limit Switches.



Turn off the power for the motor before adjusting the Limit Switches.

- Remove 4 screws and open the cover so that the Upper/Lower Limit Switches are seen. (figure ①)
- The Upper Limit Switch indicates the upper end.
- The Soundome stops raising when the Joint Arm reaches here.
- The Lower Limit Switch indicates the lower end.
- The Soundome stops lowering when the Joint Arm reaches here.
- The initial set position of the stroke is 200mm.
- Change the position of the Limit Switch when the adjustment of the stroke is required. (figure ②)
- Shift the position of the Upper Limit Switch to the third hole from the top and Lower Limit Switch to the third hole from the bottom so that 120mm of the stroke can be provided.
- Pay attention to the direction of the switches when shifted.
- The retracted Soundome should be at least 15mm above the lowest part of the Trunk Pipe when the position of the Upper Limit Switch is shifted.
- If not, adjust the position of the Joint Pipe upward with the Joint Arm loosen.
- The position of the retracted Soundome and its stroke can be confirmed manually.
- Refer to the next page "MANUAL RAISE/LOWER OF SOUNDOME."

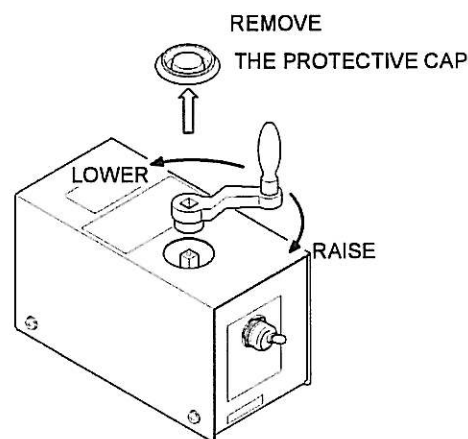
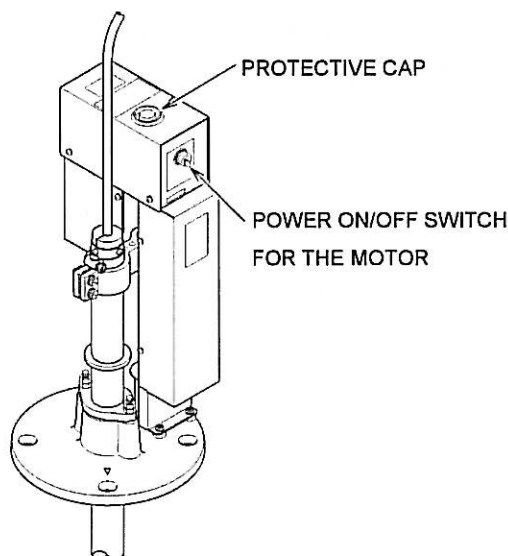
## INSTALLATION

### MANUAL RAISE/LOWER OF SOUNDOME

The Soundome can be raised or lowered manually when mounting the Hoist and the Trunk Pipe or adjusting the stroke.

The manual operation is also available in case of a trouble that the Soundome can not be raised or lowered automatically.

- If the power is supplied, make sure to turn off the power of the hoist motor and remove the Protective Cap when raising or lowering the Soundome.  
(Refer to the drawings below)
- Insert the Crank Handle (supplied) into the hole where the Protective Cap was attached and raise or lower the Soundome with the Crank Handle.  
(Refer to the drawings below)



- After finishing the work, remove the Crank Handle and put the removed Protective Cap back. Do not forget to turn on the power for the motor.



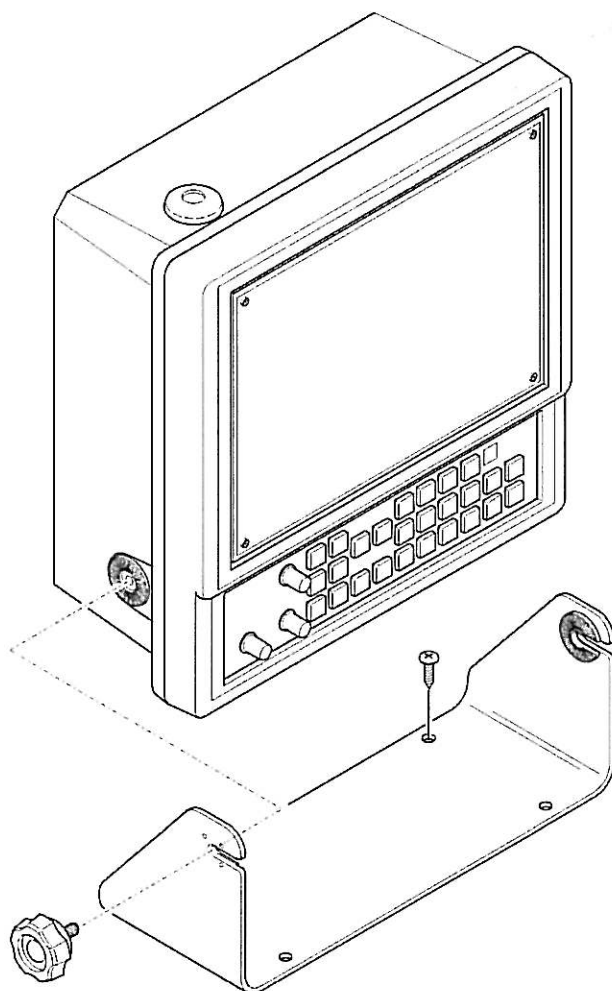
Turning off the power for the display unit does not mean turning off the power for the motor.

Make sure to turn off the power for the motor before manual raising/lowering. Otherwise it may cause trouble that the motor runs and the Crank Handle may rotate in reverse.

The brake is working while the power supply is not supplied to the hoist motor. It is hard to turn the Crank Handle while the power supply is not supplied to the hoist motor, however after both upper and lower limit switches are released, it will be turned easily.

### MOUNTING METHOD OF DISPLAY UNIT

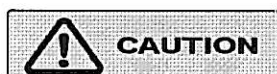
- ① Fasten the Bracket to the place you selected with 4 tapping screws.
- ② Screw the Knob Bolts to the hole on both sides of the Display Unit.
- ③ Insert the Display Unit into the Bracket.
- ④ Adjust the Knob Bolts to select a comfortable viewing angle of the Display Cabinet.



#### **WARNING**

Do not install the unit on unstable or uneven surface.

Do not use the unit while tentatively mounted. Otherwise it may result in the unit falling or toppling over, resulting in injury.



#### **CAUTION**

Be free as much as possible from shocks and engine vibrations.

Mount the unit in a location away from salt spray, heat sources, and direct sunlight.

## INSTALLATION

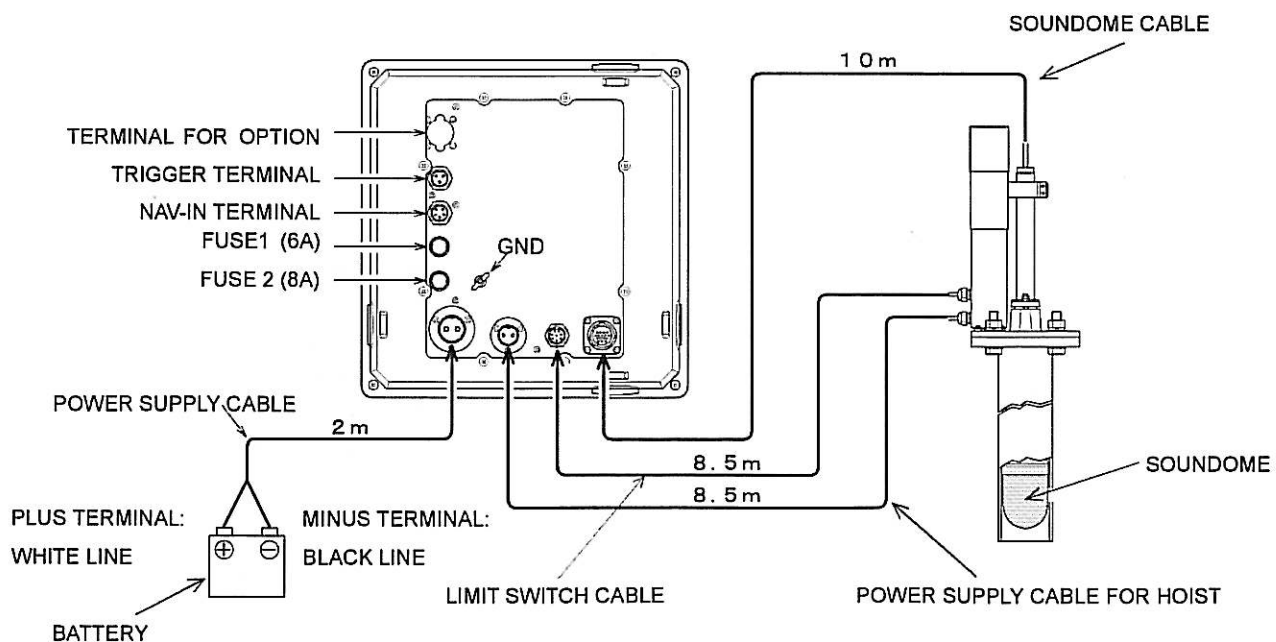
### CONNECTIONS

Prior to the connections between the Display Unit and the Hull Unit, read the following warning carefully to ensure its correct operation.



- Operating voltage: 20 to 30 volts DC
- Use the correct voltage, otherwise it will result in fire or electrical shock.
- Use the specified power supply cables.
- If not, it could result in serious trouble or fire.
- Always turn off the power before connecting or disconnecting the unit.
- Pulling the cables may damage the cables themselves and result in fire or electrical shock.
- Bring wiring to the following attention to avoid getting hurt or causing fire or damage.
- Run the cables not to touch the rotary obstacles or disturb the operation.
- Do not use the cables bent, twisted or stretched by force.
- Do not put heavy objects on the cables.

### WIRING AMONG UNITS

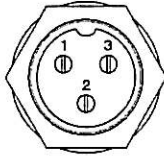


- Turn off the power by [OFF] key on the control panel.
- Do not turn off the power by the switch-board or the breaker.
- Confirm the retraction of Soundome and the power of the Display Unit is turned off before turning off the switch-board or the breaker.
- Use the proper fuses.

## ELECTRICAL CONNECTIONS - TERMINALS

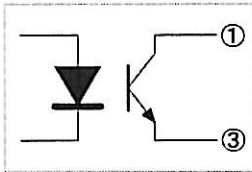
Explanation of the Terminals on the rear of the Display Unit.

### TRIGGER OUTPUT TERMINAL



- 1: TRIGGER OUTPUT +
- 2: GND
- 3: TRIGGER OUTPUT -

#### TRIGGER OUTPUT CIRCUIT

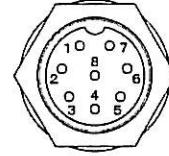


### NAV-IN TERMINAL



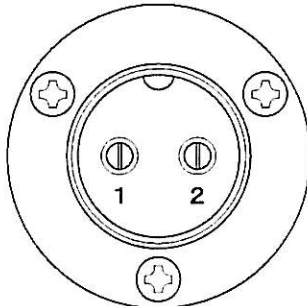
- 1: SIGNAL INPUT +
  - 2: SIGNAL INPUT -
  - 3: GND
  - 4: NC
  - 5: NC
- (Do not connect anything to NC)

### LIMIT SWITCH TERMINAL



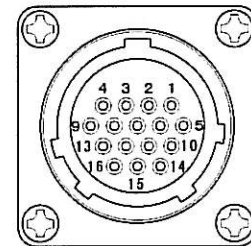
- 1: UPPER LIMIT SWITCH
- 2: UPPER LIMIT SWITCH
- 3: LOWER LIMIT SWITCH
- 4: LOWER LIMIT SWITCH
- 5: SENSOR LAMP LED SWITCH
- 6: SENSOR LAMP LED SWITCH
- 7: SENSOR LAMP LED
- 8: SENSOR LAMP LED

### POWER SUPPLY INPUT TERMINAL



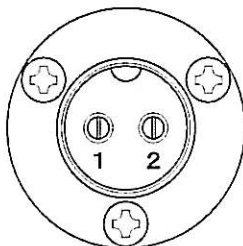
- 1: DC INPUT +
- 2: DC INPUT -

### SOUNDOME TERMINAL



- 1: GND
- 2: +12V
- 3: HALL IC OUTPUT
- 4: TRAIN MOTOR 1
- 5: TRAIN MOTOR 2
- 6: TRAIN MOTOR 3
- 7: TRAIN MOTOR 4
- 8: TRAIN COM (+12V)
- 9: TILT MOTOR 1
- 10: TILT MOTOR 2
- 11: TILT MOTOR 3
- 12: TILT MOTOR 4
- 13: TILT COM (+12V)
- 14: TRANSDUCER
- 15: GND
- 16: TRANSDUCER

### HOIST MOTOR OUTPUT TERMINAL



- 1: DC OUTPUT (+) / (-)
- 2: DC OUTPUT (-) / (+)

UPLOADING / DOWNLOADING