

# FURUNO

# INSTALLATION MANUAL

COLOR SCANNING SONAR

MODEL CSH-5L



**FURUNO ELECTRIC CO., LTD.**

[www.furuno.co.jp](http://www.furuno.co.jp)

**ECF**

(Elemental Chlorine Free)

The paper used in this manual  
is elemental chlorine free.

© **FURUNO ELECTRIC CO., LTD.**

9-52 Ashihara-cho,  
Nishinomiya, 662-8580, JAPAN

Telephone : +81-(0)798-65-2111

Fax : +81-(0)798-65-4200

• FURUNO Authorized Distributor/Dealer

All rights reserved. Printed in Japan

Pub. No. IME-13190-C

(YOSH) CSH-5L

A : JAN. 2003

C : MAY 09, 2007



\* 0 0 0 8 0 9 4 0 6 1 2 \*



# SAFETY INSTRUCTIONS

## **WARNING**



**ELECTRICAL SHOCK HAZARD**  
Do not open the equipment unless totally familiar with electrical circuits and service manual.

Only qualified personnel should work inside the equipment.



**Turn off the power at the switchboard before beginning the installation.**

Fire or electrical shock can result if the power is left on.

**Do not install the equipment where it may get wet from rain or water splash.**

Water in the equipment can result in fire, electrical shock or equipment damage.

**Be sure no water leaks in at the transducer installation site.**

Water leakage can sink the vessel. Also confirm that the transducer will not loosen by ship's vibration. The installer of the equipment is solely responsible for the proper installation of the equipment. FURUNO will assume no responsibility for any damage associated with improper installation.

## **WARNING**

**Install the specified transducer tank in accordance with the installation instructions. If a different tank is to be installed the shipyard is solely responsible for its installation, and it should be installed so the hull will not be damaged if the tank strikes an object.**

The tank or hull may be damaged if the tank strikes an object.

**When assembling the hull unit, fasten the shaft retainer and fastening band with the torques shown below.**

Shaft retainer: 20 to 25 N•m  
Fastening band: 6 to 8 N•m

If torques are less than the above, water leakage may occur because the shaft may loosen and fall.

**⚠ CAUTION**

Turn off the **POWER** switch on the hull unit before using the hand crank.

Bodily injury can result if the hand crank rotates unexpectedly, because the raise/lower motor may start up.

**Observe the following compass safe distances to prevent interference to a magnetic compass:**

	Standard compass	Steering compass
Processor unit	0.4 m	0.3 m
Control unit	0.3 m	0.3 m
DC-AC inverter	1.4 m	0.9 m

**Observing the following speed limits when testing the equipment at sea trial:**

Raising/lowering transducer: 16 kts max.  
Transducer completely lowered: 18 kts max.

Exceeding above limits will damage the equipment and void the warranty.

**The zinc block near the transducer must be replaced yearly.**

The junction between the transducer and main shaft may corrode, which can result in loss of the transducer or water leakage inside the ship. Replace the zinc block yearly.

**⚠ CAUTION**



Attach protection earth securely to the ship's body.

The protection earth is required to the transceiver unit and DC-AC inverter (option) to prevent electrical shock.

# TABLE OF CONTENTS

---

**SYSTEM CONFIGURATION ..... iv**

**EQUIPMENT LISTS ..... v**

**1. MOUNTING ..... 1-1**

    1.1 Hull Unit ..... 1-2

    1.2 Pre-amplifier Unit ..... 1-13

    1.3 Transceiver Unit ..... 1-14

    1.4 Processor Unit ..... 1-15

    1.5 Control Unit ..... 1-15

    1.6 Ground ..... 1-18

    1.7 Monitor Sensor (option) ..... 1-19

    1.8 DC-AC Inverter (option) ..... 1-20

**2. WIRING ..... 2-1**

    2.1 General Description for Cabling ..... 2-1

    2.2 Hull Unit/Pre-amplifier Unit ..... 2-3

    2.3 Transceiver Unit ..... 2-8

    2.4 Processor Unit ..... 2-11

    2.5 Synchronizing Transmission with Other Equipment ..... 2-16

    2.6 DC-AC Inverter ..... 2-20

**3. ADJUSTMENTS ..... 3-1**

    3.1 Measurement TX Output ..... 3-1

    3.2 Heading Alignment ..... 3-3

    3.3 Setting for External Equipment ..... 3-4

    3.4 Setting GPS Navaid Smoothing ..... 3-7

    3.5 NMEA Version Setting ..... 3-8

    3.6 Adjusting Echo Sounder Video ..... 3-9

    3.7 Sea Trial ..... 3-10

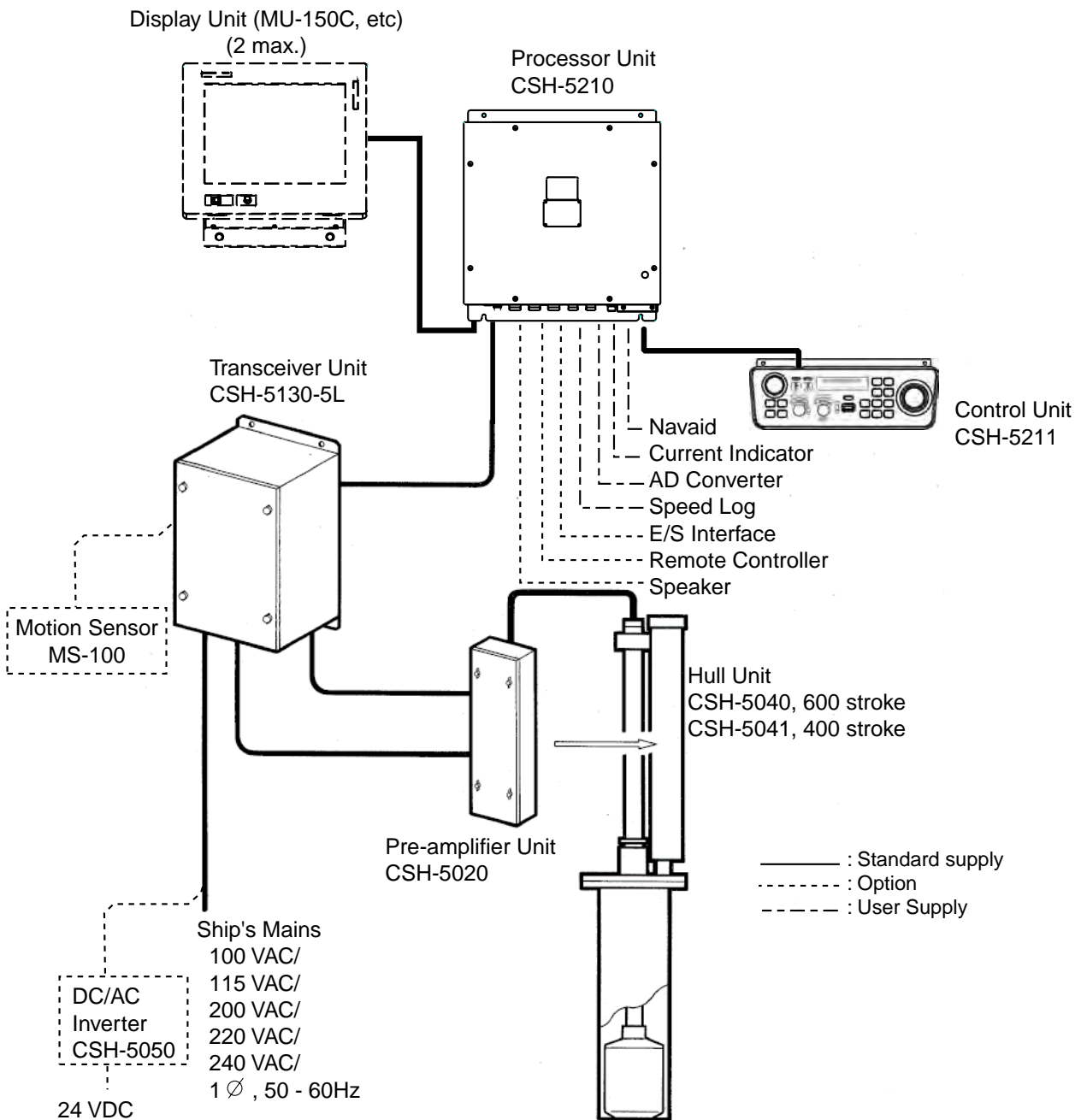
**APPENDIX INSTALLING CSH-5L ON THE RETRACTION TANK OF CH/FH  
SERIES SONARS OR BY USING 1800/3500 MM TANK ..... AP-1**

**PACKING LISTS ..... A-1**

**OUTLINE DRAWINGS ..... D-1**

**SCHEMATIC DIAGRAMS ..... S-1**

# SYSTEM CONFIGURATION



# EQUIPMENT LISTS

## Standard Supply

Name	Type	Code No.	Qty	Remarks
Processor Unit	CSH-5210	-	1	
Control Unit	CSH-5211	-	1	
Transceiver Unit	CSH-5130-5L	-	1	
Pre-amplifier Unit	CSH-5020		1	
Hull Unit	CSH-5040	-	1	600 stroke
	CSH-5041	-		400 stroke
Installation Materials	CP10-05201	006-910-940	1	For processor unit
	CP10-05202	006-904-860	1	For transceiver unit
	CP10-05203	006-904-880	1	For pre-amplifier unit
	For cables, see the table below.			
Accessories	FP10-02701	006-905-030	1	For control unit
Spare Parts	SP10-02901	006-907-700	1	For processor unit
	SP10-02902	006-904-850	1	For transceiver unit

## Installation Materials (Cables)

Type	Code No.	Transceiver unit/ Pre-amplifier unit		Processor unit/ Transceiver unit	Display unit/ Processor unit
		TX cable	RX cable	Processor cable	Display cable
CP10-05300	000-069-059	S10-7-5	10S1562 5m	S10-6-15(38P)	3COX-2P-6C 5m
CP10-05310	000-069-067		10S1562 5m	S10-6-30(38P)	
CP10-05320	000-069-068		10S1562 5m	S10-6-50(38P)	
CP10-05330	000-069-069	S10-7-10	10S1563 10m	S10-6-15(38P)	
CP10-05340	000-069-070		10S1563 10m	S10-6-30(38P)	
CP10-05350	000-069-072		10S1563 10m	S10-6-50(38P)	
CP10-05360	000-069-073	S10-7-5	10S1564 15m	S10-6-15(38P)	
CP10-05370	000-069-074		10S1564 15m	S10-6-30(38P)	
CP10-05380	000-069-075		10S1564 15m	S10-6-50(38P)	
CP10-05400	000-069-076	S10-7-10	10S1562 5m	S10-6-15(38P)	3COX-2P-6C 10m
CP10-05410	000-069-077		10S1562 5m	S10-6-30(38P)	
CP10-05420	000-069-096		10S1562 5m	S10-6-50(38P)	
CP10-05430	000-069-184	S10-7-5	10S1563 10m	S10-6-15(38P)	
CP10-05440	000-069-186		10S1563 10m	S10-6-30(38P)	
CP10-05450	000-069-229		10S1563 10m	S10-6-50(38P)	
CP10-05460	000-069-230	S10-7-10	10S1564 15m	S10-6-15(38P)	
CP10-05470	000-069-244		10S1564 15m	S10-6-30(38P)	
CP10-05480	000-069-245		10S1564 15m	S10-6-50(38P)	

Name	Type	Code No.	Qty	Remarks	
Processor cable	S10-6-15 (38P)	006-976-580	1	15 m	Processor/ Transceiver units
	S10-6-30 (38P)	006-976-590		30 m	
	S10-6-50 (38P)	006-976-600		50 m	
TX cable	S10-7-5	006-976-610	1	5 m	Transceiver/ Pre-amplifier units
	S10-7-10	006-976-460		10 m	
	S10-7-15	006-976-470		15 m	
RX cable	10S1562	006-976-620	1	5 m	Transceiver/ Pre-amplifier units
	10S1583	006-976-440		10 m	
	10S1584	006-976-450		15 m	
Display unit cable	3COX-2P-6C 5M	000-146-500	1	5 m	Display/ Processor units
	3COM-2P-6C 10M	000-146-501		10 m	

Hull unit can be arranged as below.

CSH - 5130 – 5L -  -

(1): Input voltage: 60 (100VAC), 72 (220VAC)

(2): Frequency: 55 kHz, 68 kHz

Hull unit can be arranged as below.

CSH-  -  -  -

(1): Stroke: 5040 (600 stroke) or 5041 (400 stroke)

(2): Frequency: 55 kHz or 68 kHz

(3): Tank: N (None), S (Steel), F (FRP)

(4): Shaft length: 13 (1300 mm), 15 (1550 mm), 23 (2350 mm), 40 (4065 mm), 94 (945 mm)

Ex) Stroke: 600 mm; Frequency; 55 kHz; Steel tank, Shaft length, 2350 mm, type is CSH-5040-55-S-23.

## Optional Supply

Name	Type	Code No.	Qty	Remarks
DC-AC Inverter	TR-2451	-	1 set	
E/S Interface	VI-1100A	-	1 set	
Retraction Tank	OP10-5	-	1 set	Made of aluminum
	SHJ-0001-2	-	1 set	Made of steel
Speaker	SEM-21Q	-	1 set	
Motion Sensor	MS-100	-	1 set	
Remote Controller	CSH-7040	-	1 set	



# 1. MOUNTING

---

## NOTICE

**Be sure the power supply matches equipment voltage rating.**

Improper power supply will damage the equipment.

**Locate the transducer where the affects of noise and air bubbles are minimal.**

Noise and air bubbles will affect performance.

**When selecting a mounting location keep the following points in mind:**

- Keep equipment out of direct sunlight.
- Keep equipment away from air conditioner.
- The useable temperature range of the display unit is 0° - 50° C.
- Provide sufficient ventilation.
- Select location where vibration is minimal.
- Locate the equipment away from magnets or equipment generating magnetic fields.

**Keep the transducer cable away from oil.**

Oil can corrode the cable.

**Do not expose the transducer to hot water.**

Hot water can damage the transducer.

**Do not turn on the equipment with the transducer exposed to air.**

Exposing the transducer to air may damage it.

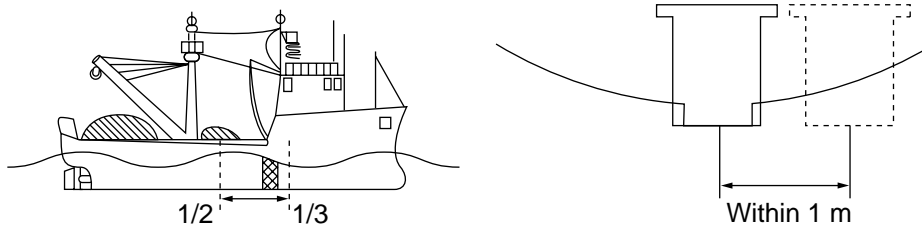
## 1. MOUNTING

### 1.1 Hull Unit

#### 1.1.1 Installation position of hull unit

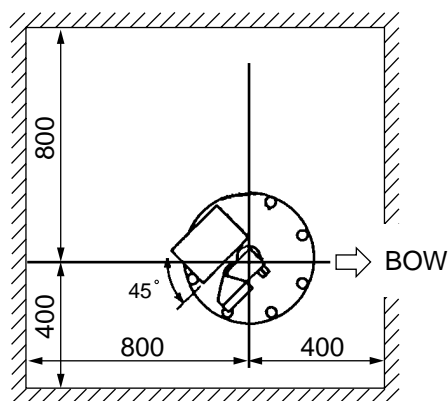
Discussion and agreement are required with the dockyard and the ship owner in deciding the installation position of the hull unit. When deciding the installation position, the following points should be taken into account.

- 1) Select an area where propeller noise, cruising noise, bubbles and interference from turbulence are at a minimum. Generally, the point at  $1/3$  to  $1/2$  of the ship's length from the bow on or near the keel is optimum. On-the-keel installation is advantageous for minimizing oil consumption in comparison with off-the-keel. In case the hull unit cannot be installed on the keel, the center of the retraction tank should be within 1 m of the keel so as to prevent a rolling effect.



*Installation position of hull unit*

- 2) Select a place where interference from other equipment is minimal. The hull unit should be at least 2.5 m away from the transducers of other equipment.
- 3) An obstacle in the fore direction not only causes shadow zone but also aerated water, resulting in poor sonar performance.
- 4) The following space is required around the hull unit for wiring and maintenance. If the ambient temperature of the unit is below  $0^{\circ}\text{C}$ , the sonar compartment must be provided with a heater so as to keep the temperature above  $0^{\circ}\text{C}$ .



*Sonar room*

Note: When the retraction tank is made locally, finish it so that the welding bead does not protrude on the inner surface of the tank. The tank guide will hit the bead, causing motor burn-out. The gap between the tank and tank guide is 1 mm. Also when installing the tank, orient the welding bead so it faces the port or starboard side.

The diagrams illustrate the retraction tank assembly. The top diagram shows a side view of the tank with a 'Welding Bead' at the top edge. The bottom diagram shows a top-down view of the tank with a 'Welding Bead' and a 'Tank guide' indicated. An arrow points to the 'Bow' direction.

### 1.1.2 Installation of retraction tank

The retraction tank is 1000 mm in length when supplied. Cut the end of the tank referring to the table below so that the transducer is fully protruded beyond the keel when it is lowered. Refer to the tank installation method at the end of this manual.

#### Cutting the end of retraction tank

Tank Installation Method	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Tank Cutting</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>When the length of tank is 1000 mm:</p> <p>750 mm (600 travel, shaft length 1300)</p> <p>550mm (400 travel, shaft length 945)</p> <p>Cut</p> </div> <div style="text-align: center;"> <p>When the length of tank is 1000 mm:</p> <p>750 mm (600 travel, shaft length 1300)</p> <p>550mm (400 travel, shaft ;ength 945)</p> <p>Cut</p> <p>Cut along the hull bottom.</p> </div> </div>

Note: It is not necessary to cut the shaft when there is enough space above the raise/lower drive assembly.

1. MOUNTING

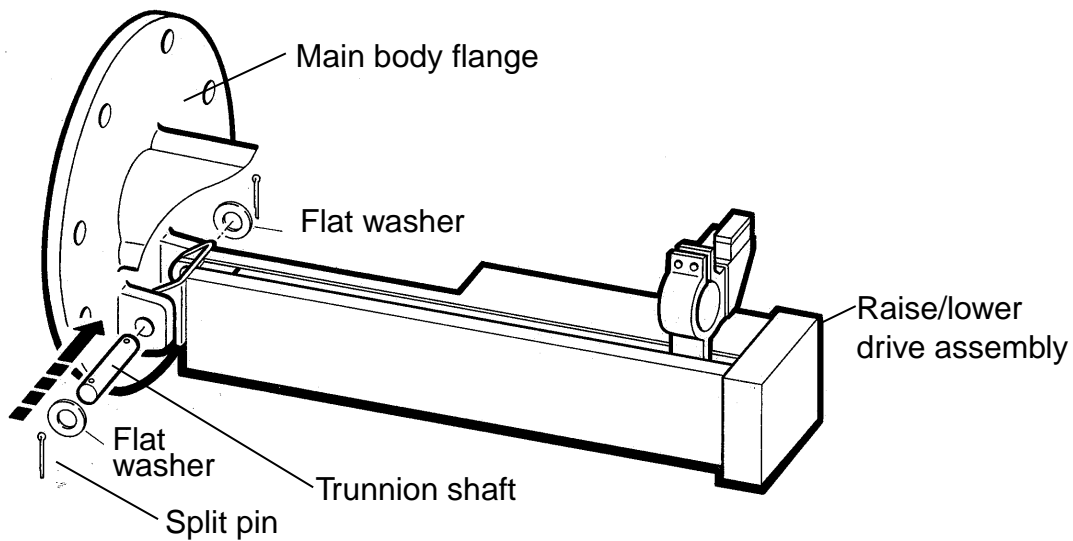
**1.1.3 Assembling and installation of hull unit**

The hull unit comes unassembled, with the parts shown on pages 1-10 and 1-11. Assemble the unit as shown below.

**Necessary Tools**

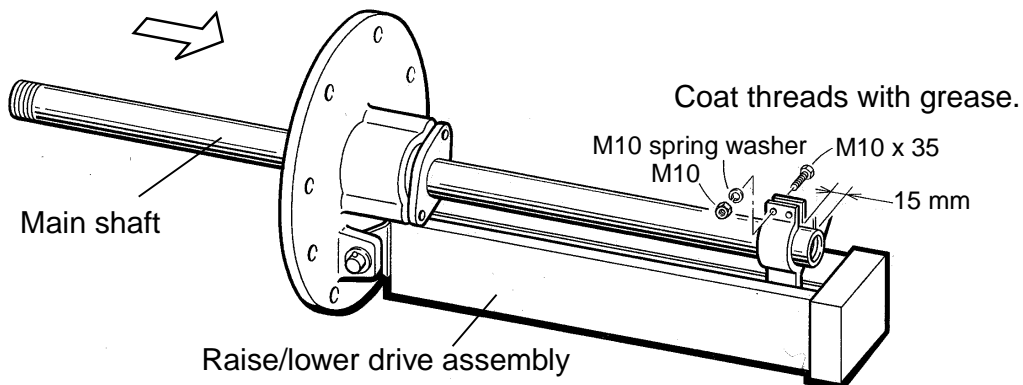
Name	Diameter	Remarks
Wrench	M10 (Hex. size: 17 mm)	Double-ended wrench is recommended.
	M20 (Hex. size: 30 mm)	
Pipe wrench	Ø55 mm	Used for fastening cable gland
Socket-set screw wrench	M6 (Hex. size: 3 mm)	Used for fixing main body flange

1. Fasten main body flange to raise/lower drive assembly with the trunnion shaft.



*Fastening main body flange to raise/lower drive assembly*

2. Apply a slight amount of grease to the top of main shaft. Pass the main shaft through the main body flange and fix it temporarily with the shaft retainer. (The shaft retainer should be secure enough to prevent shaft rotation.)



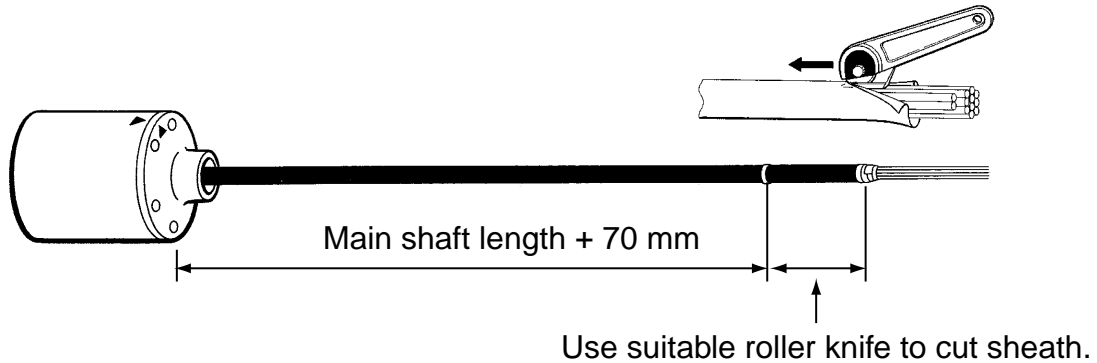
Wipe-off grease before tightening shaft retainer.

Main shaft should protrud by 15 mm from top of the shaft retainer.

*Installing main shaft*

3. Wrap the sheath end with vinyl tape to pass the cable through the main shaft, and then remove sheath of transducer cable at the length of "main shaft length + 70 mm."

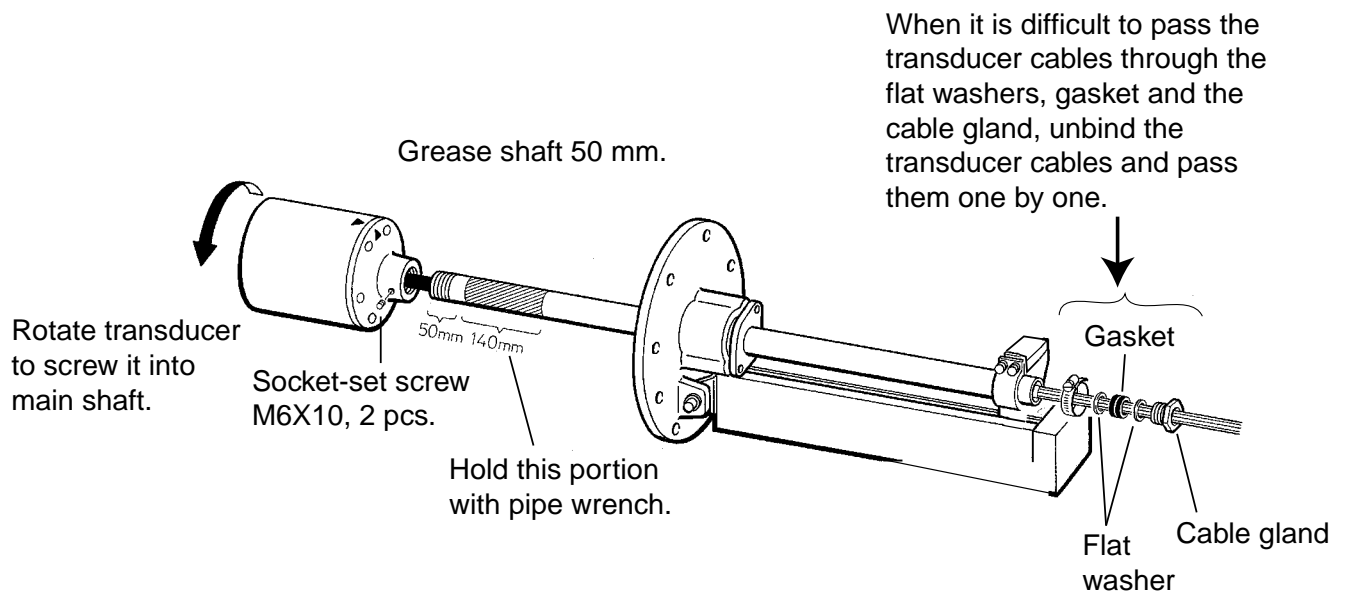
**Note:** Care should be taken not to damage inner wires when cutting the cable sheath, only paper tape exists between the cable sheath and inner wires.



*Transducer cable*

4. After screwing the transducer into main shaft, fasten two socket-set screws (M6x10, supplied) to fasten the main shaft to the transducer.

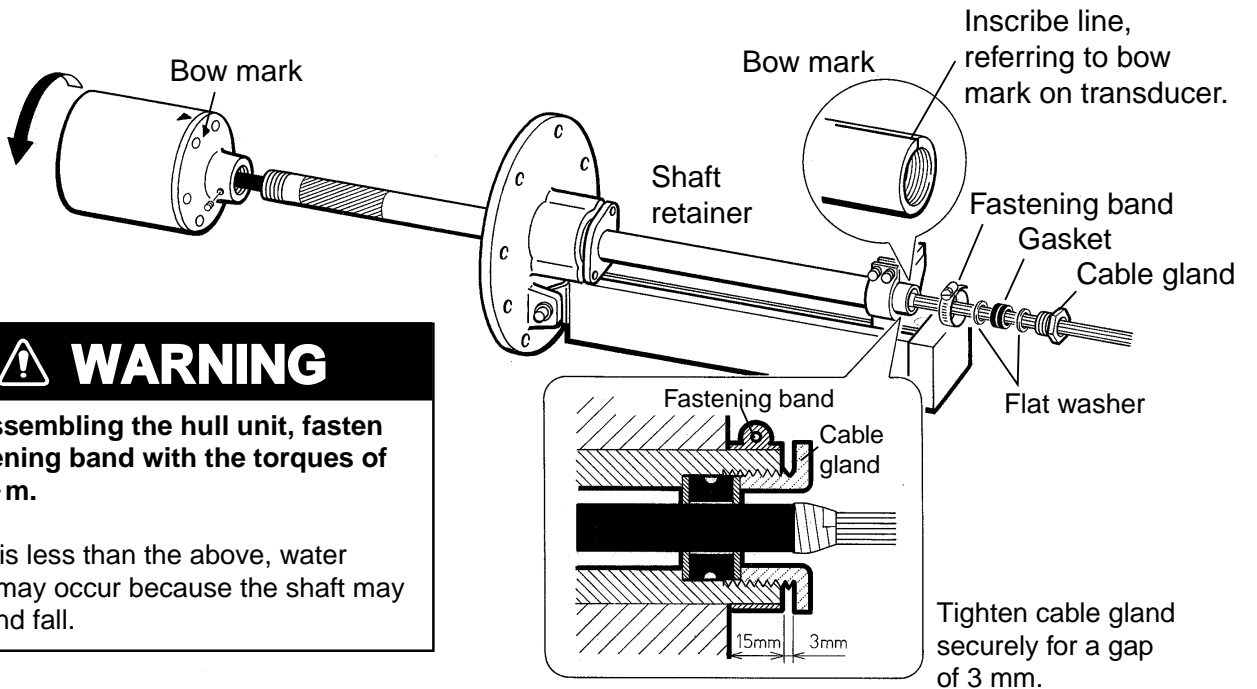
**Note:** The transducer should be screwed into the main shaft by 50 mm.



*Installing transducer*

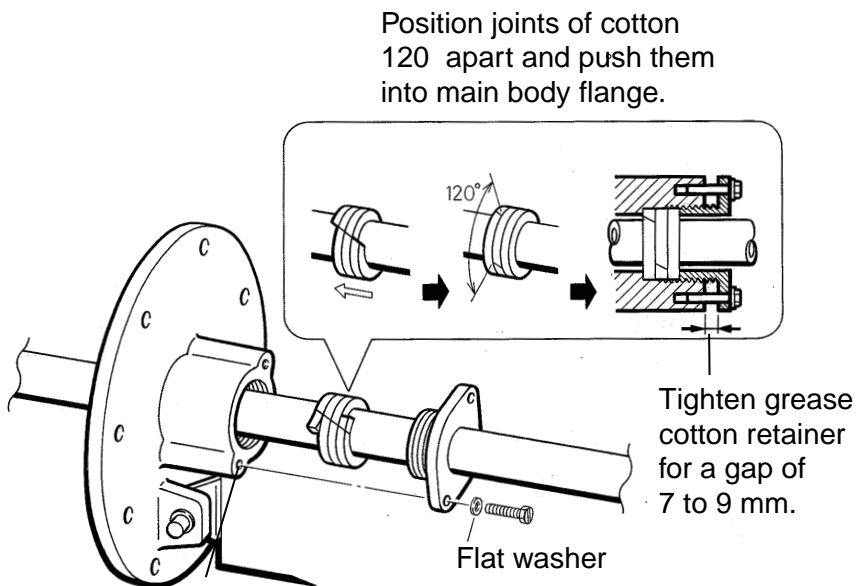
1. MOUNTING

5. Inscribe bow mark on the top part of main shaft. Install fastening band, flat washers, gasket and cable gland as shown below.



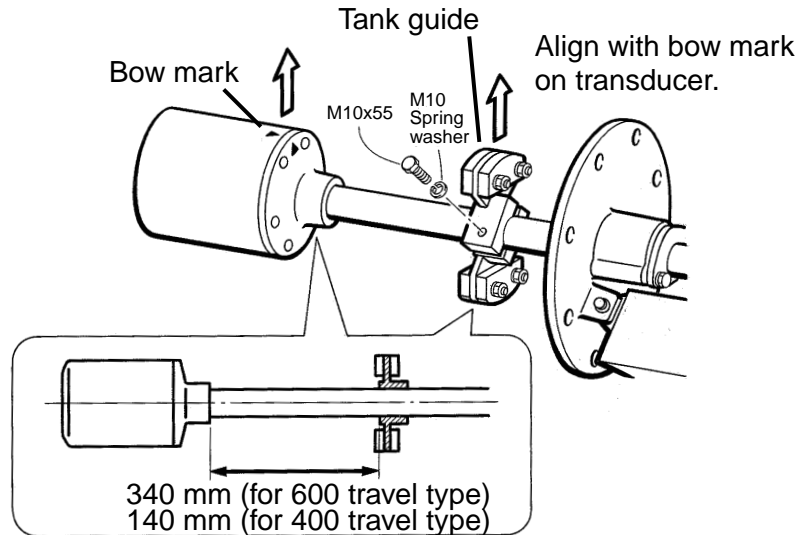
*Installing fastening band and cable gland*

6. Install grease cotton on the main body as below.
- Wind grease cotton onto main shaft.
  - Mark on the cotton as below.
  - Remove the cotton from the shaft, and then cut it at the position of the mark. Discard the ends.
  - Wind cottons as shown below.
  - Push cottons into the main body flange.
  - Tighten the grease cotton retainer.




*Installing grease cotton*

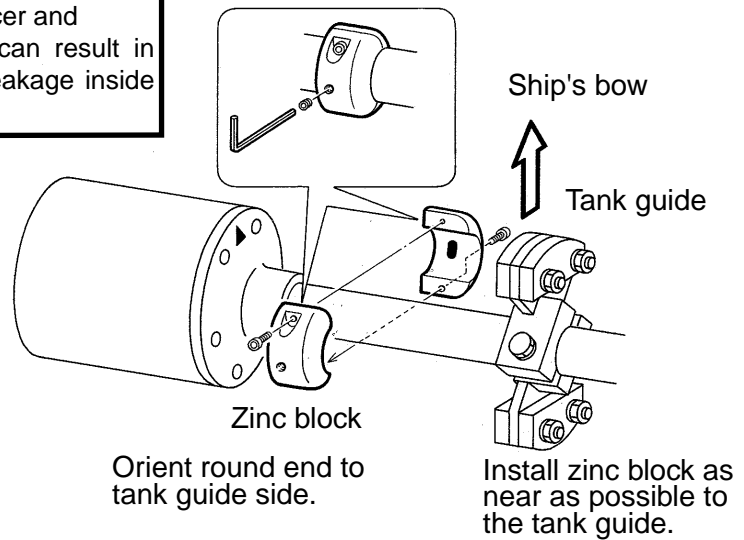
7. Install the tank guide as shown below.



*Installing tank guide*

8. Attach the zinc block to the main shaft as shown below.

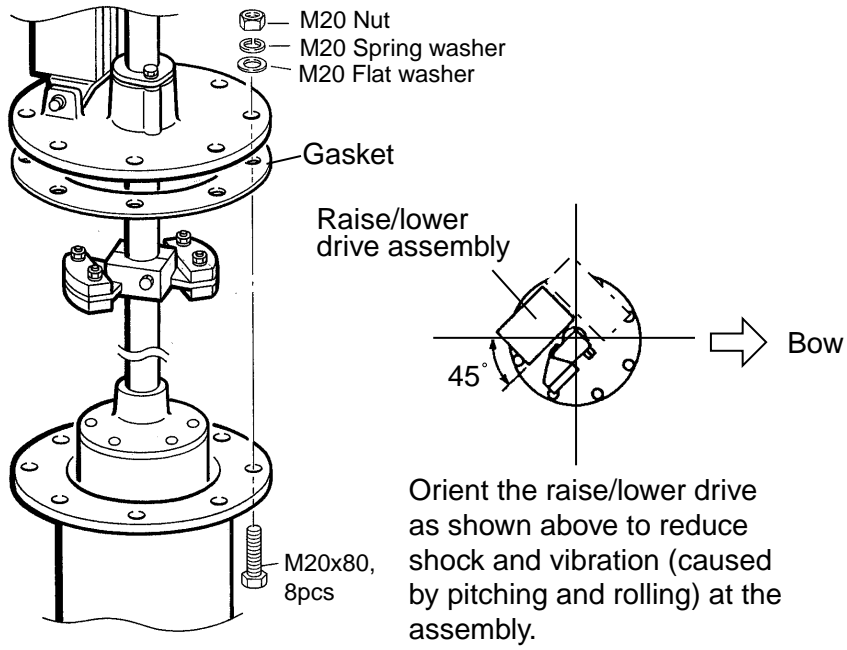
	<h1>CAUTION</h1>
<p><b>The zinc block must be replaced yearly.</b></p>	
<p>The junction between the transducer and main shaft may corrode, which can result in loss of the transducer or water leakage inside the ship.</p>	



*Attaching zinc block*

1. MOUNTING

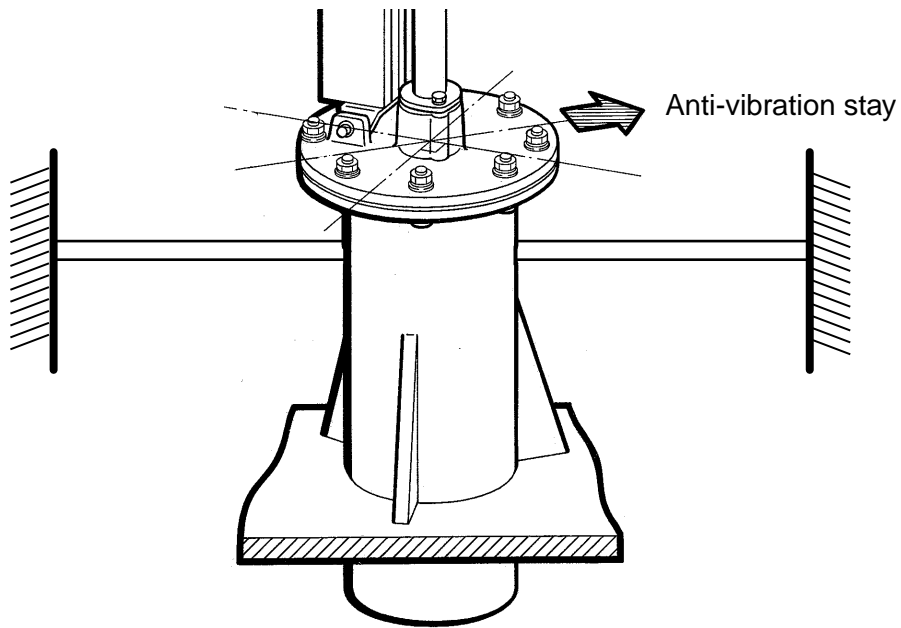
9. Fasten the hull unit to the retraction tank as shown below.



*Fastening hull unit to retraction tank*

10. Fix anti-vibration stays to the retraction tank.

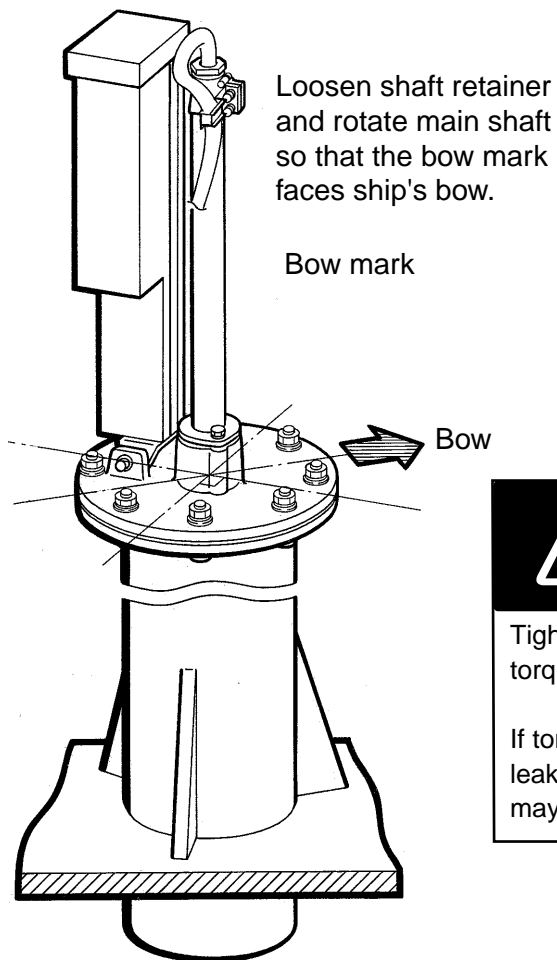
Anti-vibration stays should be fixed to directions of ship's bow - stern and port - starboard.



*Anti-vibration stay*



11. Set the main shaft so that the bow mark faces ship's bow, and then tighten the shaft retainer.



## WARNING

Tighten bolts fixing shaft retainer for torque of 20 - 25 N·m.

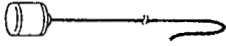
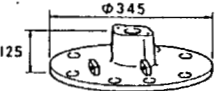
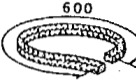
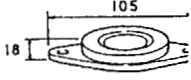
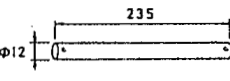

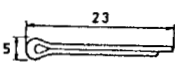

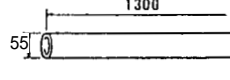
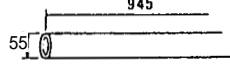

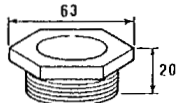
If torque is less than the above, water leakage may occur because the shaft may loosen and fall.


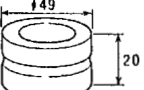
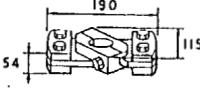
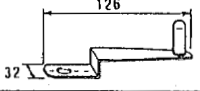
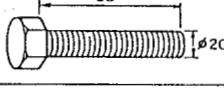
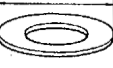

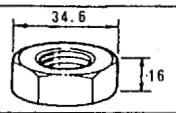
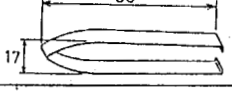
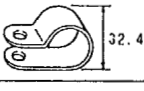
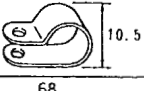
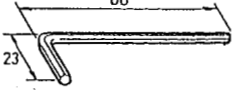
*Hull unit, orienting bow mark*

1. MOUNTING

上下装置 解体出荷リスト HULL UNIT KIT

\*\*\*\*\*

番号 No.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	上下動部 RAISE/LOWER DRIVE ASSEMBLY		CODE No.		
2	送受波器 TRANSDUCER ASSEMBLY		CODE No. 190-112-540		
3	フランジ圧入品 MAIN BODY FLANGE		10-044-2201 CODE No. 100-112-540	1	
4	グリスコットン GREASE COTTON		□9.5 *0.7M* CODE No.	1	
5	グリスコットン押え GREASE COTTON RETAINER		10-044-2204 CODE No. 100-112-571	1	フランジ圧入品に仮止め出荷 Temporarily fitted to main body flange
6	トラニオン軸 TRUNNION SHAFT		10-044-2205 CODE No. 100-112-581	1	同上 Ditto
7	フランジバッキン GASKET		SHJ-0009-1 CODE No. 661-000-091	1	同上 Ditto
8	割りピン SPLIT PIN		3×25 SUS304 CODE No. 000-801-702	2	同上 Ditto
9	ミガキ平座金 FLAT WASHER		M12 SUS304 CODE No. 000-864-132	2	同上 Ditto
10	上下シャフト MAIN SHAFT		10-044-2301 CODE No. 100-112-591	1	600 ストローク用 For 600mm travel
11	上下シャフト MAIN SHAFT		10-044-2305 CODE No. 100-112-630		400 ストローク用 For 400mm travel
12	ジュビリークリップ FASTENING BAND		2×SU304 CODE No. 000-801-924	1	
13	締付グランド CABLE GLAND		10-044-2302-1 CODE No. 100-112-601	1	上下シャフト防水用 For waterproofing main shaft

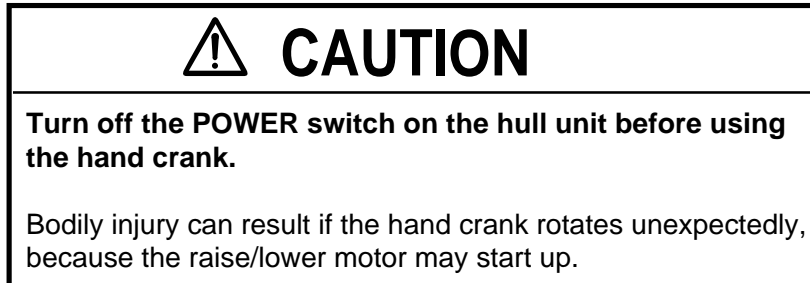
番号 No.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
14	ケーブル座金 FLAT WASHER		10-044-2303-2	2	同上 Ditto
			CODE No. 100-112-612		
15	ケーブルガスケット GASKET		10-044-2304	1	同上 Ditto
			CODE No. 100-112-621		
16	タンクガイド組品 TANK GUIDE			1	
			CODE No. 006-979-160		
17	手動ハンドル HAND CRANK		10-044-2411	1	
			CODE No. 006-979-150		
18	六角ボルト HEX. BOLT		M20×80 SUS304	8	
			CODE No. 000-801-893		
19	ミガキ平座金 FLAT WASHER		M20 SUS304	16	
			CODE No. 000-864-136		
20	バネ座金 SPRING WASHER		M20 SUS304	8	
			CODE No. 000-864-270		
21	六角ナット HEX. NUT		M20 SUS304	8	
			CODE No. 000-863-116		
22	XH抜き工具 CONNECTOR PULLER		10-044-2431	1	
			CODE No. 100-122-480		
23	配線バンド CABLE FIXING BAND		HP-18N	5	
			CODE No. 000-113-838		
24	配線バンド CABLE FIXING BAND		HP-5N	2	
			CODE No. 000-570-003		
25	六角レンチ SOCKET SCREW WRENCH		対辺 3mm HEX. SIZE 3mm	1	
			CODE No. 000-830-131		

## 1. MOUNTING

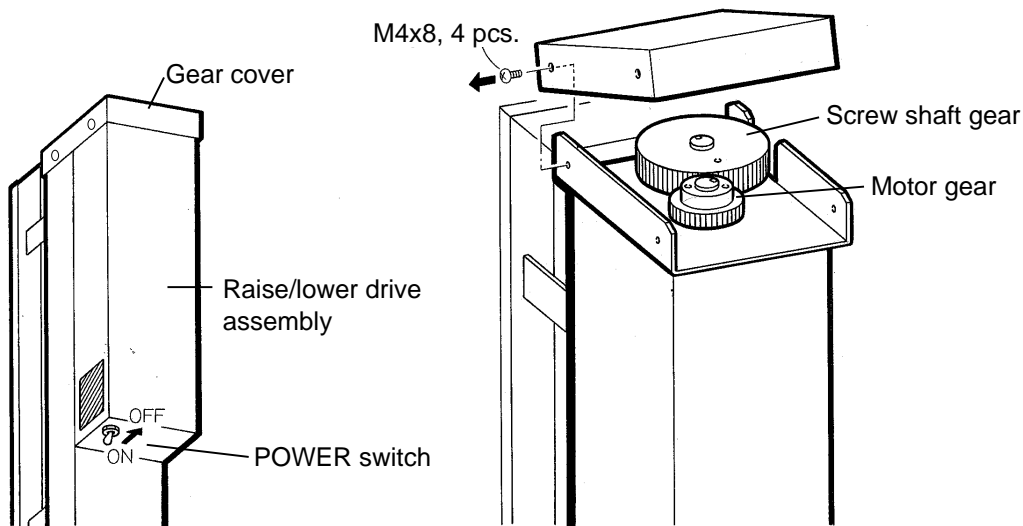
### 1.1.4 Confirmation of transducer movement

Confirm that the hull unit moves upward/downward smoothly by using the hand crank, which is supplied attached to the hull unit.

**Note:** When lowering the transducer, confirm that there is enough space below the ship's bottom.



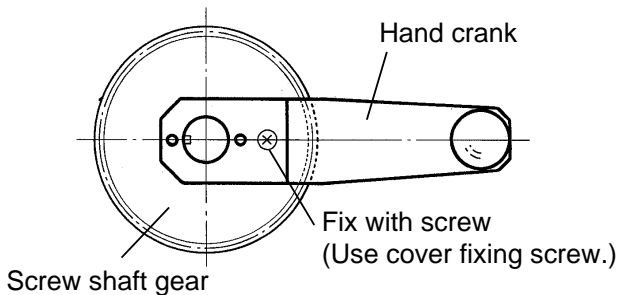
1. Open the gear cover.



*Hull unit, upper view*

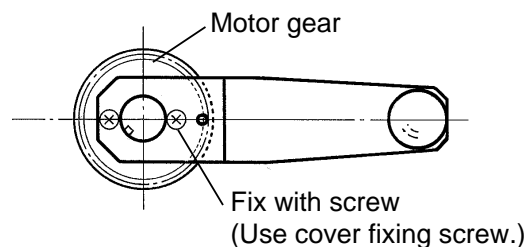
2. Attach the hand crank onto the screw shaft gear or motor gear.

a) Mounting hand crank on screw shaft gear  
(Requires greater force but smaller number-of-turns.)



120 turns to move main shaft by 600 mm.

b) Mounting hand crank on motor gear  
(Requires smaller force but greater number-of-turns.)



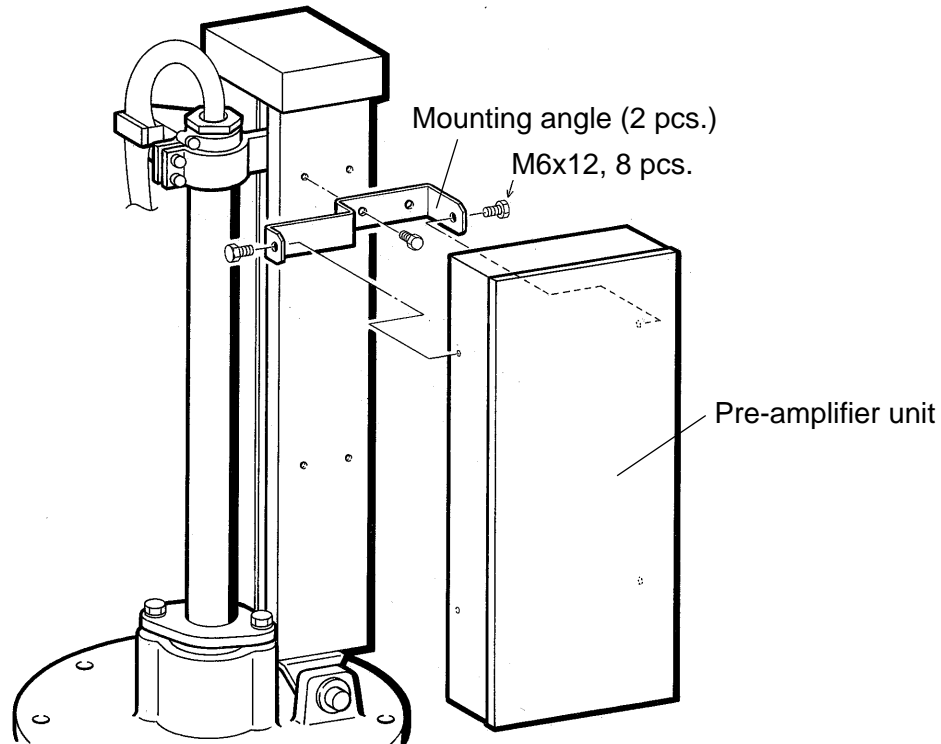
210 turns to move main shaft by 600 mm.

3. Turn the hand crank in both clockwise and counterclockwise directions. Confirm that transducer is raised and lowered smoothly.

## 1.2 Pre-amplifier Unit

Fix the pre-amplifier unit to the hull unit as follows:

1. Unfasten four hex. bolts (M6x12) to detach the mounting angles (2 pcs.) from the pre-amplifier unit.
2. Fix the mounting angles onto the hull unit with M6x12 hex. bolts.  
Hex. bolts are supplied with the hull unit.
3. Using the M6x12 bolts removed at step 1, fix the pre-amplifier unit to the mounting angles.

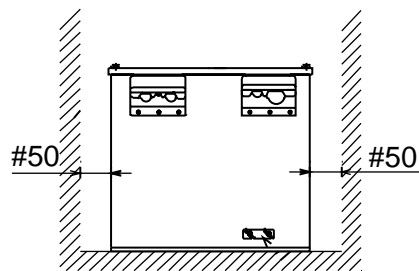
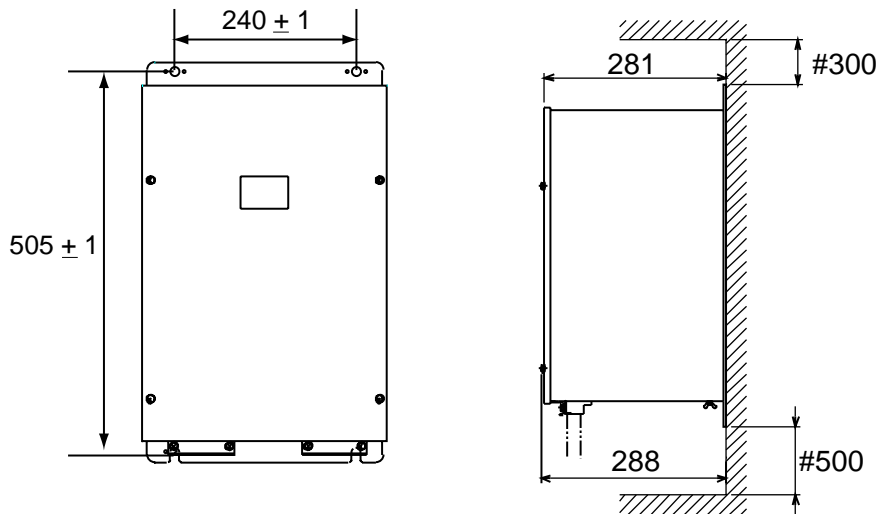


*Mounting pre-amplifier unit*

### 1.3 Transceiver Unit

When selecting a mounting location for the transceiver unit, keep the following points in mind.

- Since the transceiver unit generates heat, install it on a dry, well ventilated location.
- The unit weights 20 kg. For that reason reinforce the mounting area if necessary, especially for mounting on a bulkhead.
- Secure the maintenance space shown in drawing at the back of this manual for ease of maintenance and service.
- The maximum cable length between transceiver unit and pre-amplifier unit is 5, 10 or 15 m.



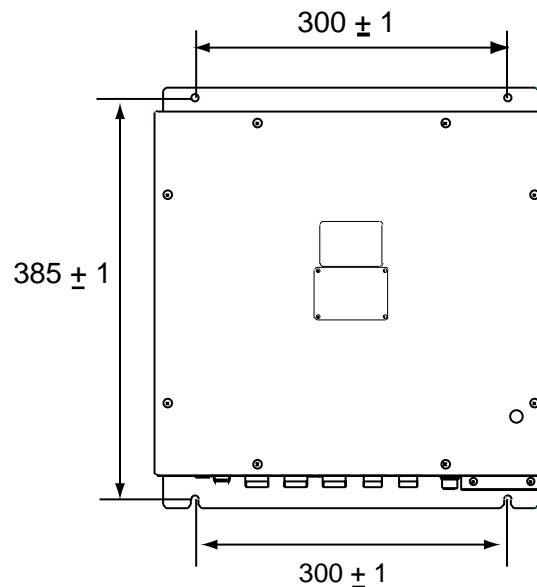
# = Meintenance space  
All dimension in millimeters

*Transceiver unit, mounting dimensions*

## 1.4 Processor Unit

Use four bolts or tapping screws (M6, local supplied) to install the processor unit. Consider the length of cables shown below when choosing a mounting location.

- Between processor and display units: Max. 10 m
- Between processor and transceiver units: Max. 50 m



*Processor unit*

## 1.5 Control Unit

The control unit may be permanently mounted on a desktop, with or without the KB fixing plate (supplied as accessories), which tilts the control unit at  $10^\circ$  degree. Also, the rubber feet can be used when the unit is not permanently fixed.

### 1.5.1 Non-permanent mounting

Attach four rubber feet (supplied) at the bottom of the control unit, and then place the unit on the selected location.

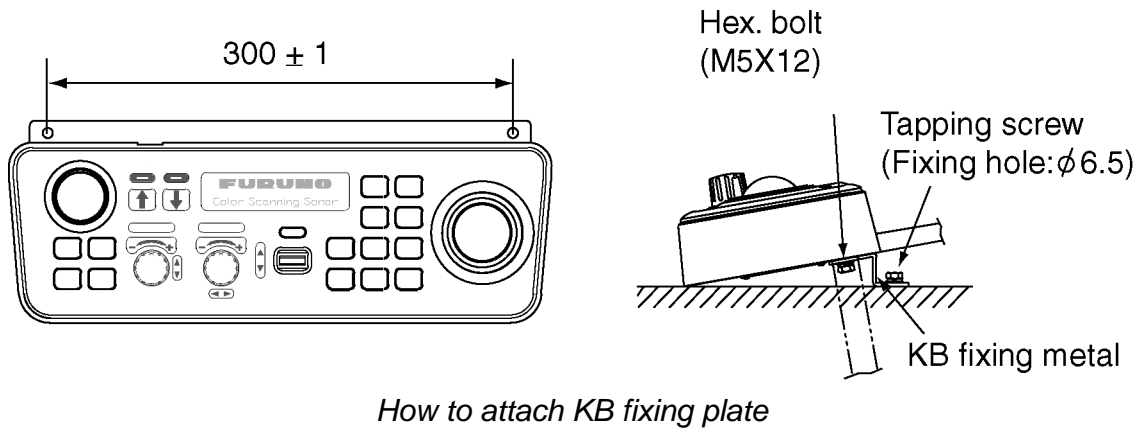
### 1.5.2 Permanent mounting

The control cable can be passed from the hole at the bottom of the control unit.

#### Installation with the KB fixing plate

1. Fix the KB fixing plate (supplied as accessories) to the bottom of the control unit with two hex. bolts (supplied).
2. If necessary, make a hole of diameter 30 mm through the desktop to pass the control cable from the bottom of the control unit.
3. Fasten the KB fixing plate with two tapping screws ( $\varnothing 6.5$ , local supply).

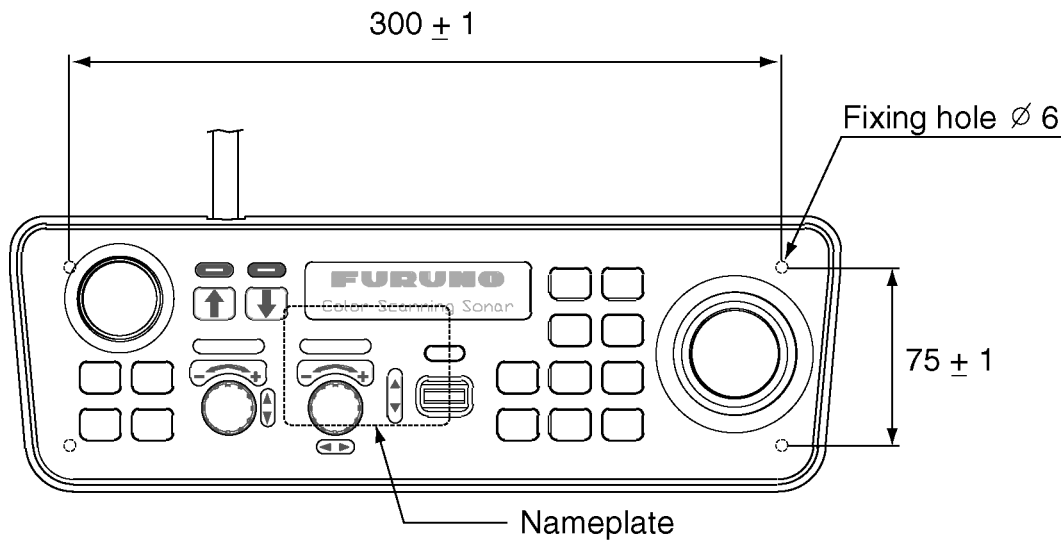
## 1. MOUNTING



*How to attach KB fixing plate*

### **Installation without KB fixing plate**

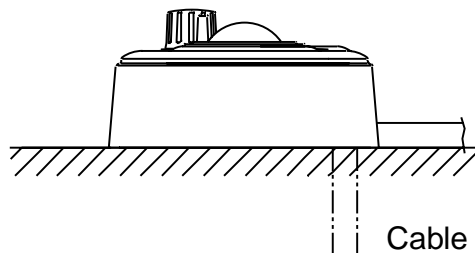
1. Make four holes of 6 mm in diameter referring to the figure below.



*Control unit, dimensions for directly mounting*

2. Make an indentation in the desktop to accommodate the nameplate (approx. 2 mm thickness) at the bottom of the control unit.
3. If necessary, make a hole of 30 mm in diameter in the desktop to pass the control cable from the bottom of the control unit. To run the cable from the bottom of the control unit, see the next page.
4. Screw in four hex. bolts (M5x12, supplied as accessories) from the under side of the table to fix the control unit.

When the supplied bolts are not long enough, use the locally supplied bolts, with their length the thickness of the desktop plus 5 to 8 mm.

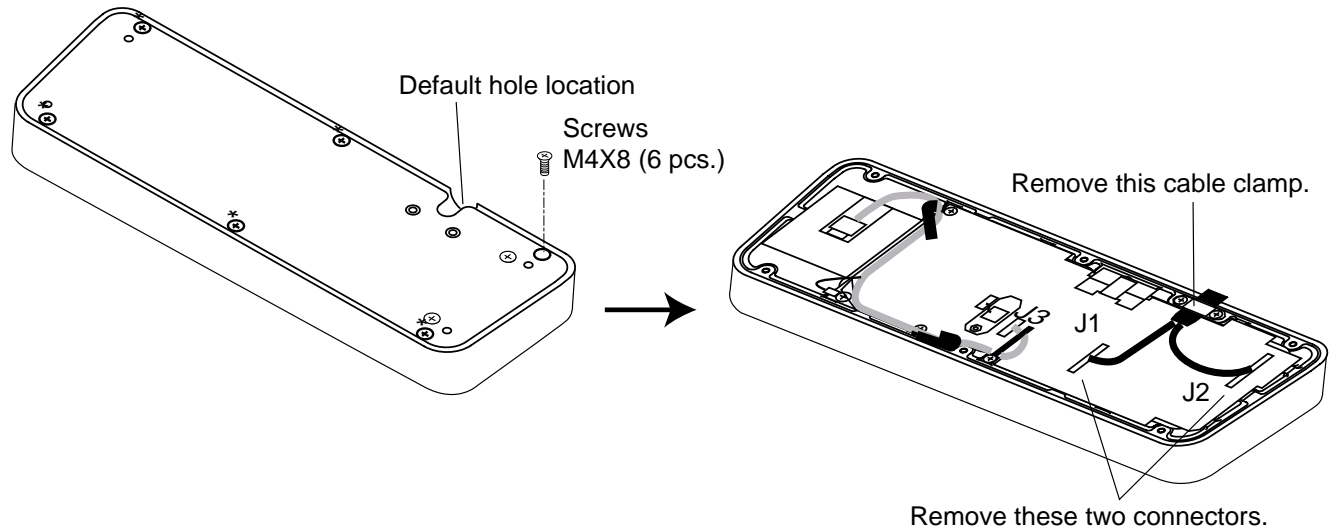


*Mounting control unit directly*

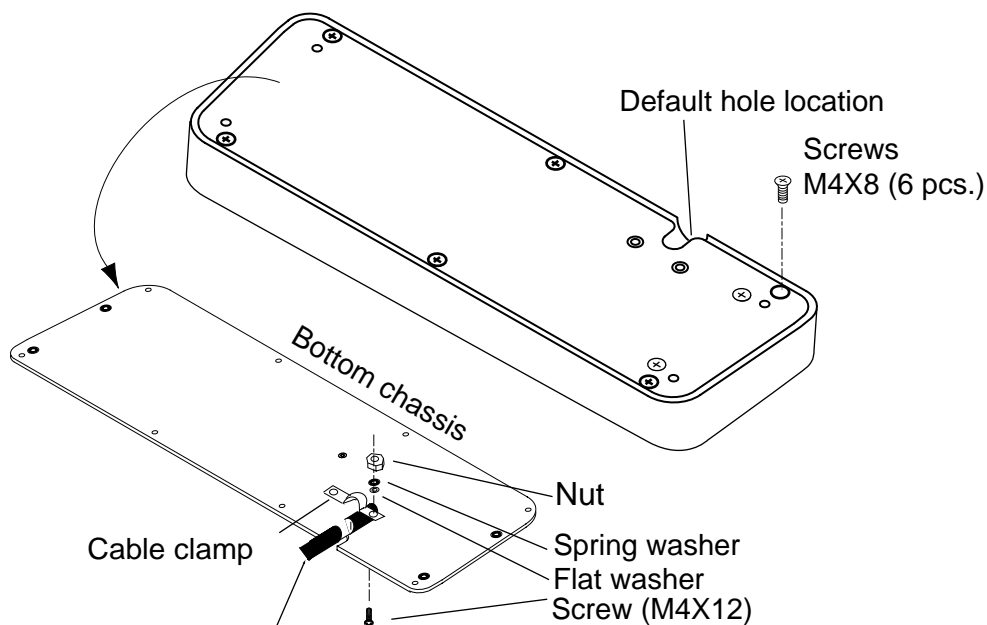


**Changing the cable entrance location**

1. Unfasten six screws (M4x8) at the bottom of the control unit.
2. Unfasten two screws (M4x10) fixing the cable clamp.  
Discard these screws.
3. Unplug connectors from J1 and J2 on the KEY Board 10P6951.

*Control unit*

4. Attach the cable clamp removed at step 2 and 3 with two screws, spring washers, flat washers and nuts (supplied with accessories) to fix the control cable as shown in the illustration below.



Fix the cable with cable clamp here.


*Changing the cable location*

5. Reattach connectors J1 and J2 removed at step 3.
6. Fasten six screws to assemble the control unit.


## 1.6 Ground

All units (excluding the control unit) should be grounded to ship's hull, with copper strap or earth wire depending on the unit.

**Note:** If the ground is not properly, operation error or bad video may occur.

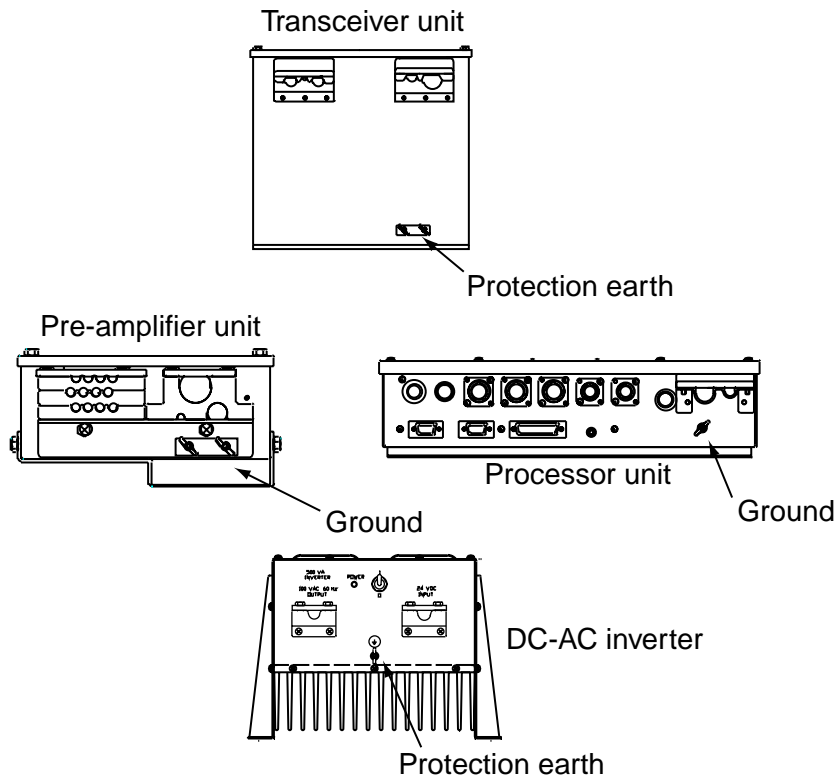


### CAUTION



**Attach protection earth (ground) securely to the ship's body.**

The protection earth (ground) is required for the transceiver unit and DC-AC inverter (option) to prevent electrical shock.



*Locations of earth*

## 1.7 Motion Sensor (option)

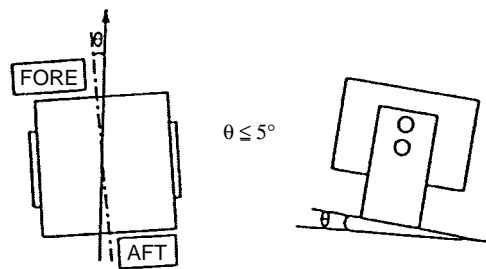
The motion sensor measures ship's pitching and rolling angles with a sensor, using the principles of the gyroscope. Because it is free from error caused by ship's vertical and horizontal motion, it can be installed at any convenient location. However, ship's semi-permanent inclination due to loading imbalance cannot be detected. Compensate for this as described in Chapter 3.

### 1.7.1 Mounting consideration

- Vibration in the mounting area should be minimal.
- Locate the unit away from areas subject to water splash.
- The ambient temperature should not exceed 50°C.

### 1.7.2 Mounting procedure

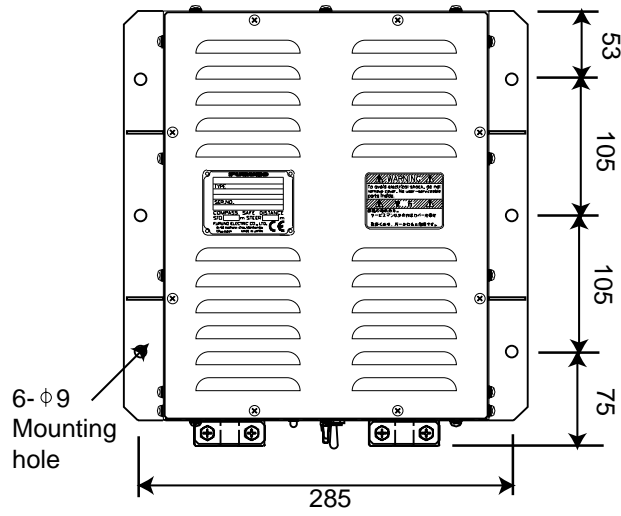
Orient the FORE mark on the unit toward the ship's bow and mount the unit within 5° of horizontal in all directions. For the offset, see Chapter 3.



*Mounting of motion sensor*

## 1.8 DC-AC Inverter (option)

The optional DC-AC inverter is required when the ship's mains is 24 VDC, The DC-AC inverter should be mounted on a bulkhead (weight of unit: 15 kg). Install the unit so that the cable entrances are facing downward. Note that providing sufficient ventilation.



*DC-AC inverter*

## 2. WIRING

---

### 2.1 General Description for Cabling

#### 2.1.1 Processor cable between processor and transceiver units

The processor cable is 15 m, 30 m or 50 m long as specified when ordering. A connector has been fitted for the transceiver unit end. The processor unit end of the cable should be fabricated at installation, after cutting it to an appropriate length.

#### 2.1.2 TX cable between transceiver and pre-amplifier units

##### TX cable (19 pair cable)

The length of the TX cable is 5 m, 10 m or 15 m long cable is available. Both ends of the cable are fabricated at the factory. However, the connector housing is not attached to the pre-amplifier unit end, so that the cable can easily be run through conduit pipe if necessary. Insert contact pins of the TX cable to the connector housing at installation referring to the interconnection diagram. Note that the cover plate should not be fitted to the connector of the pre-amplifier unit side.

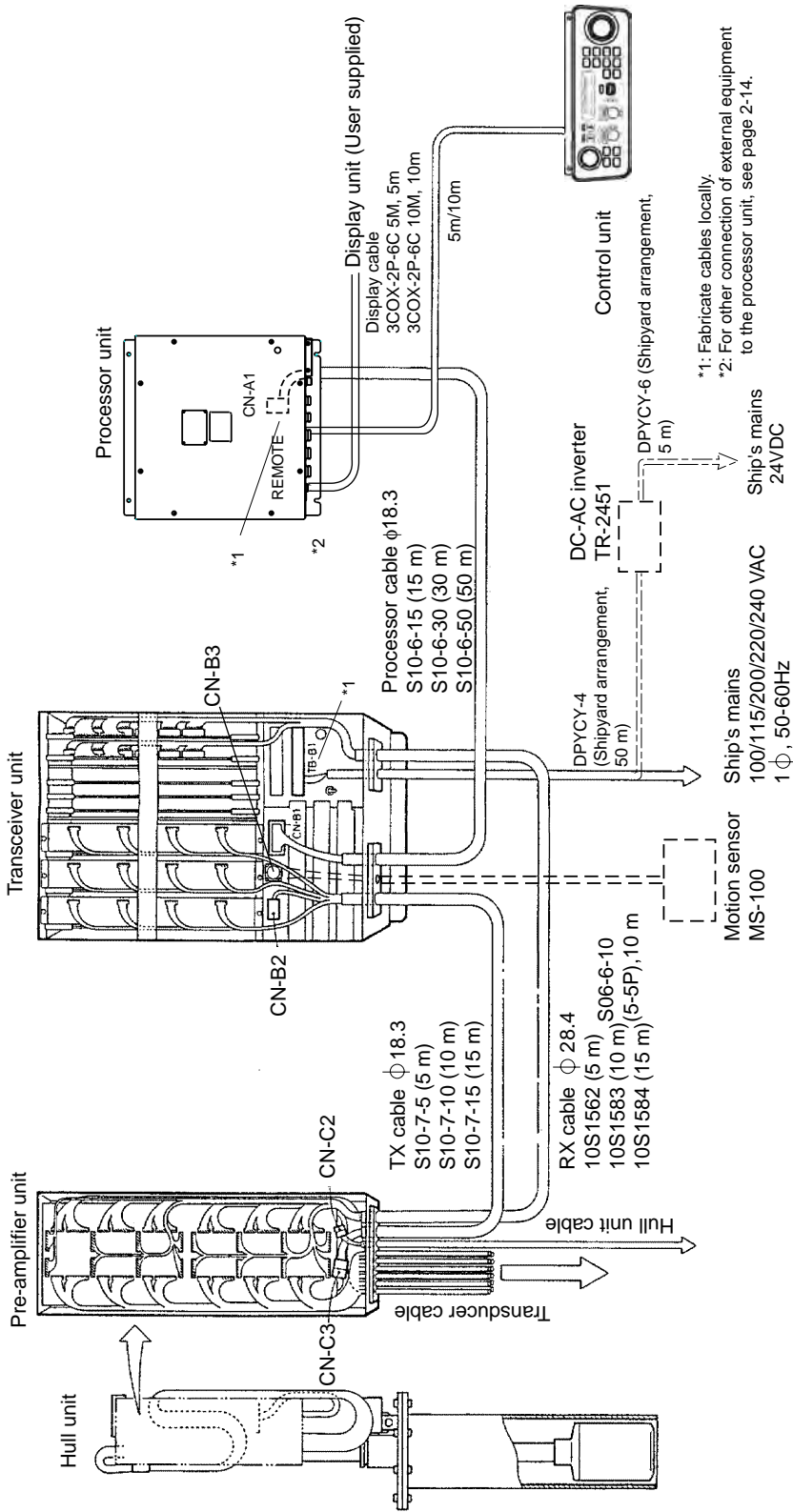
##### RX cable (RX168 core cable assy)

The RX cable is available in length of 5 m, 10 m or 15 m. The cable is fitted with connectors at both ends so fabrication in the field is not required.

#### 2.1.3 Hull cable between hull and pre-amplifier units

The hull cable is pre-connected to the hull unit. The other end is fitted with connector.

## 2. WIRING

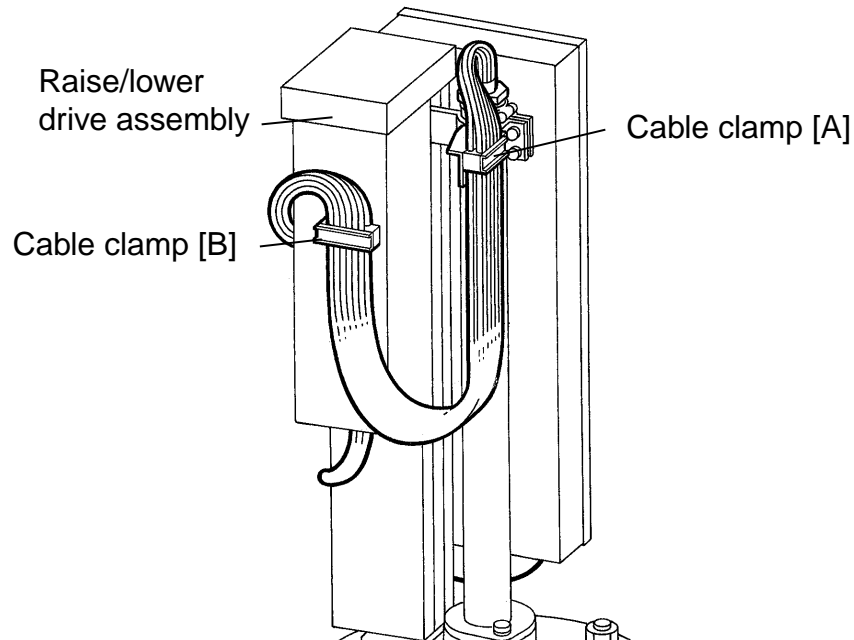


## 2.2 Hull unit/Pre-amplifier Unit

### 2.2.1 Running transducer cable

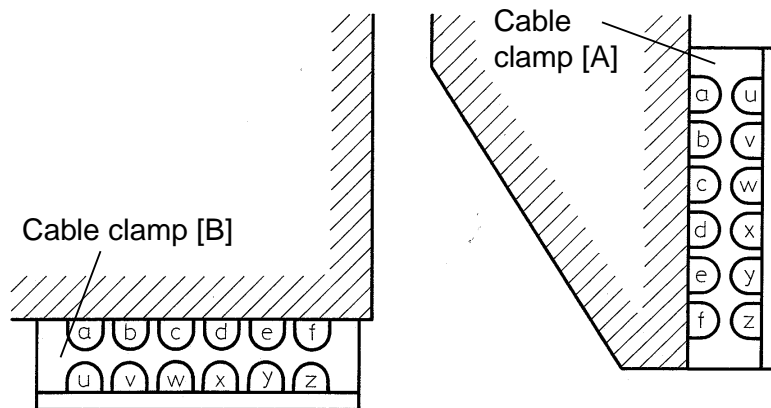
Excessive stress should not be placed on the transducer cables (12 pcs.) during raise/lower operation. Follow the procedure below to run the cables.

1. Fix the 12 transducer cables with the cable clamp [A].



*Cable clamp (1)*

2. Temporarily fix cable clamp [B]. Note the positions of cable in clamps [A] and [B] as shown below.



Ex) The cable which is fixed at (a) of the clamp [A] should be wired to (a) of the clamp [B].

*Cable clamp (2)*

2. WIRING

3. Adjust the cable length between the cable clamps [A] and [B] as follows.

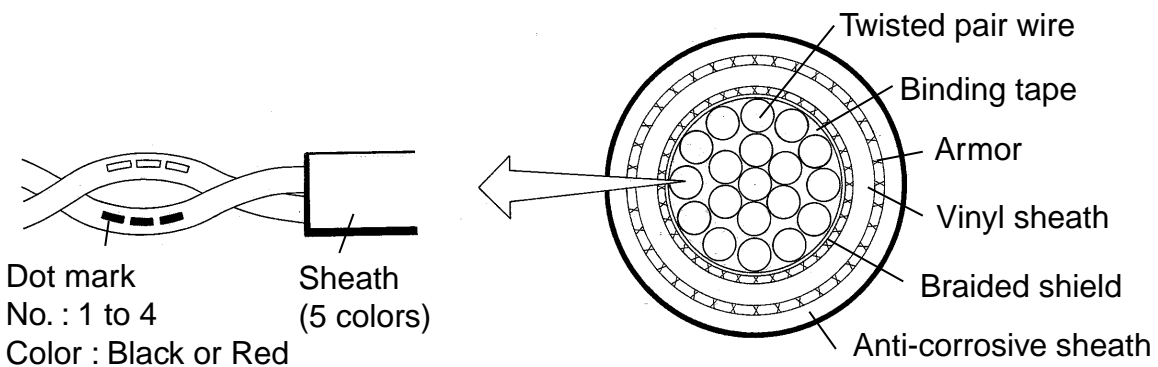
	600 mm Travel type	400 mm Travel type
Length of cable between [A] (a) and [B] (a)	660 mm	580 mm
Length of cable between [A] (u) and [B] (u)	690 mm	610 mm

4. Adjust slack of the other ten cables so that it becomes the same as the ones adjusted at step 3. Tighten the cable clamps [A] and [B].

**2.2.2 Fabricating TX cable (from transceiver unit)**

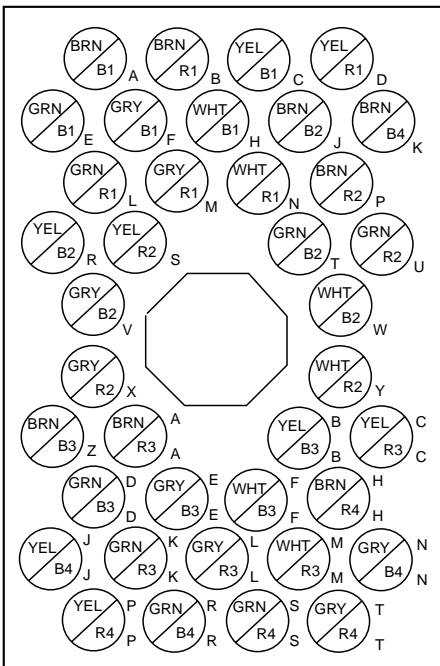
Each wire of the TX cable is pre-fitted with a contact pin. Insert it into the connector housing.

**Cable construction**

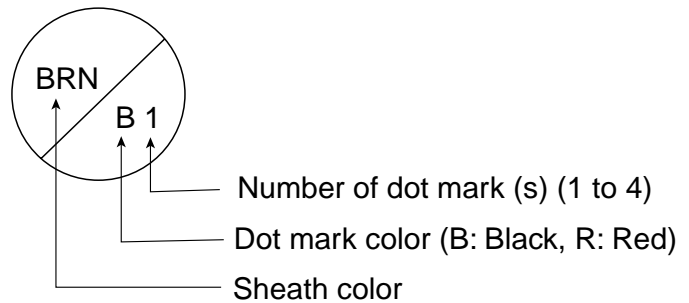


*TX cable, sectional view*

**Connector pin No. – wire color**



Note: 1. Wire differentiation



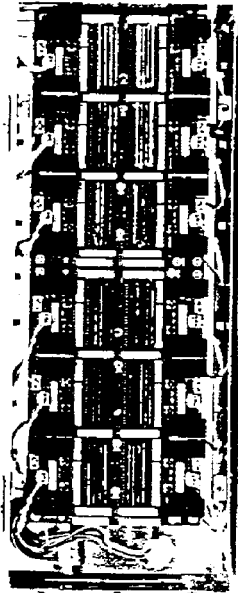
- 2. BRN and GRN show the following colors.  
BRN: Light brown  
GRN: Light green
- 3. Cover plate is not fitted to the connector.

*Connector pins*

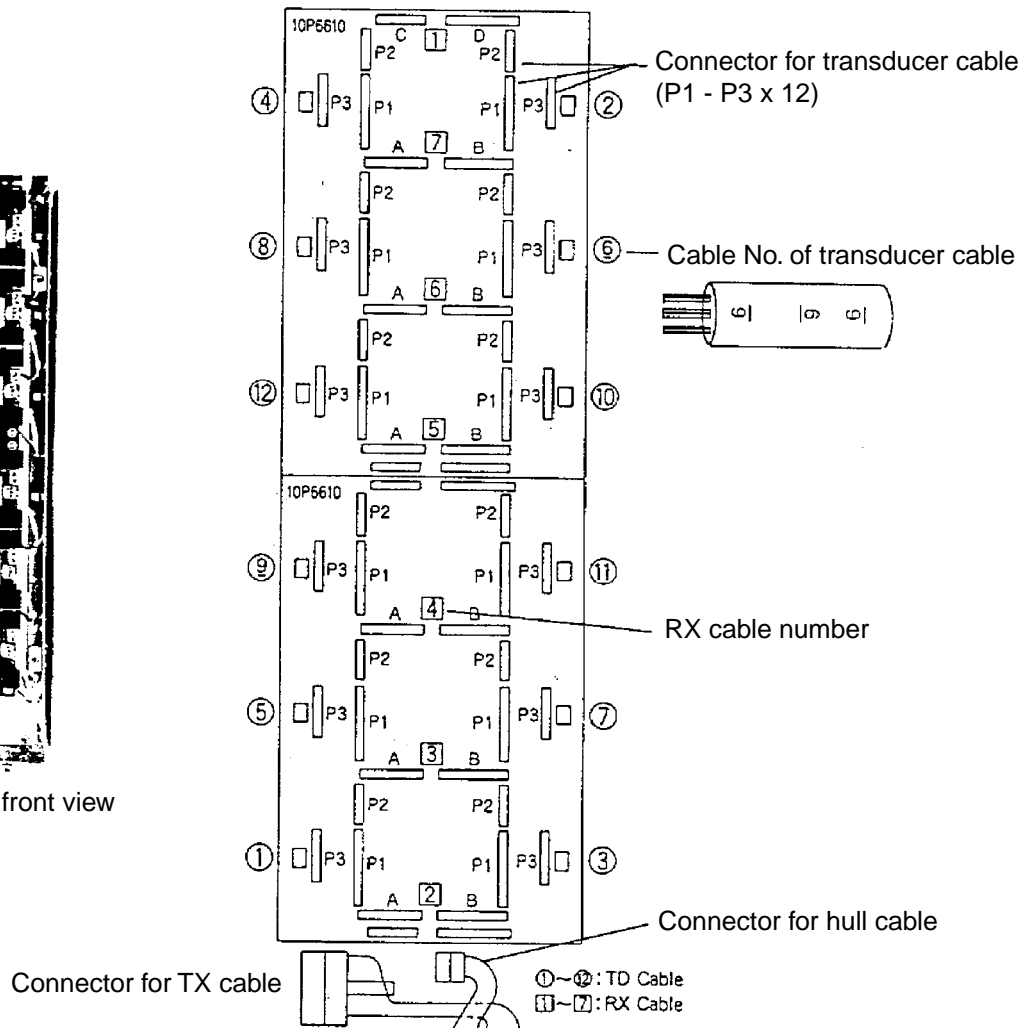


### 2.2.3 Pre-amplifier unit wiring

For wiring in the pre-amplifier unit, refer to the instruction sheet provided at the back of its front panel.



Pre-amplifier unit, front view



Wiring of pre-amplifier unit

1. Plug in the 38P connector of the TX cable (19 pair cable).
2. Connect the transducer cables in the following order and bind the wires with cable ties. Do not connect the slip-on lugs of cables 2 to 3 at this stage.

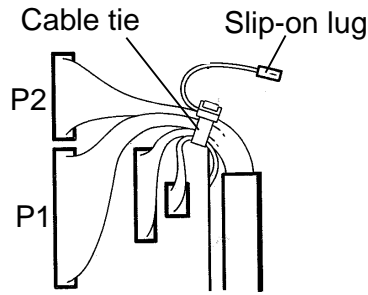
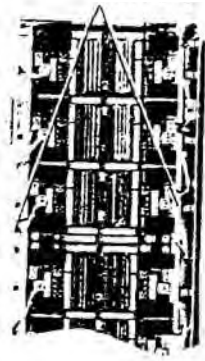
Pass the transducer cable under the board.

Cable connection order:

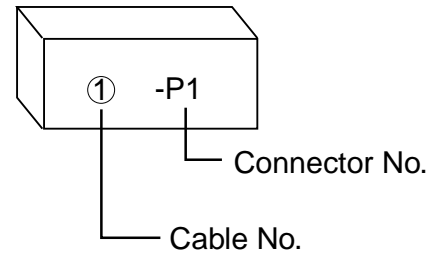
(upper) ② → ⑥ → ⑧ → ④ (mid) ⑩ → ⑪ → ⑨ → ⑫ (lower) ⑦ → ③ → ⑤ → ①

2. WIRING

Run cables through this space.

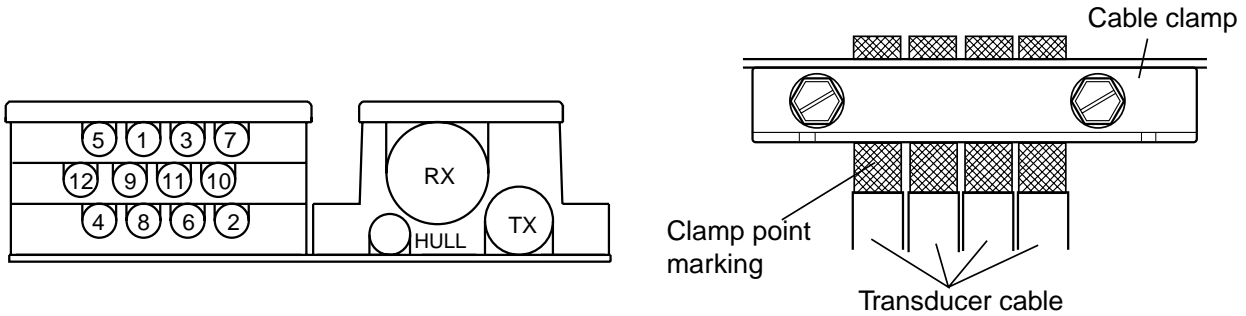


Note: Cable and connection numbers are marked on the side of each connector as shown below.



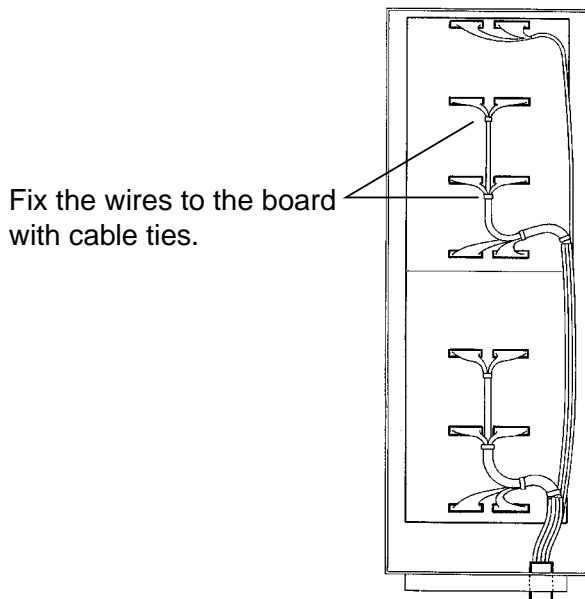
*Transducer cable connection*

3. Pass the transducer cable (12 cores) and TX cable through the cable clamp. Note that the transducer cables should be arranged as shown below and clamped at the point of marking.

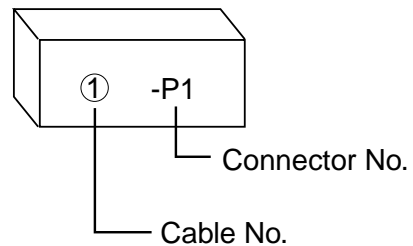


*Preamplifier unit, cable clamp*

4. Pass the hull and RX (168 cores) cables through the cable clamp, and tighten the cable clamp.
5. Run the RX cable as shown below and plug in the connectors.  
Pass the RX cable under the board.



Note: Cable and connector numbers are marked on the side of each connector as shown below.

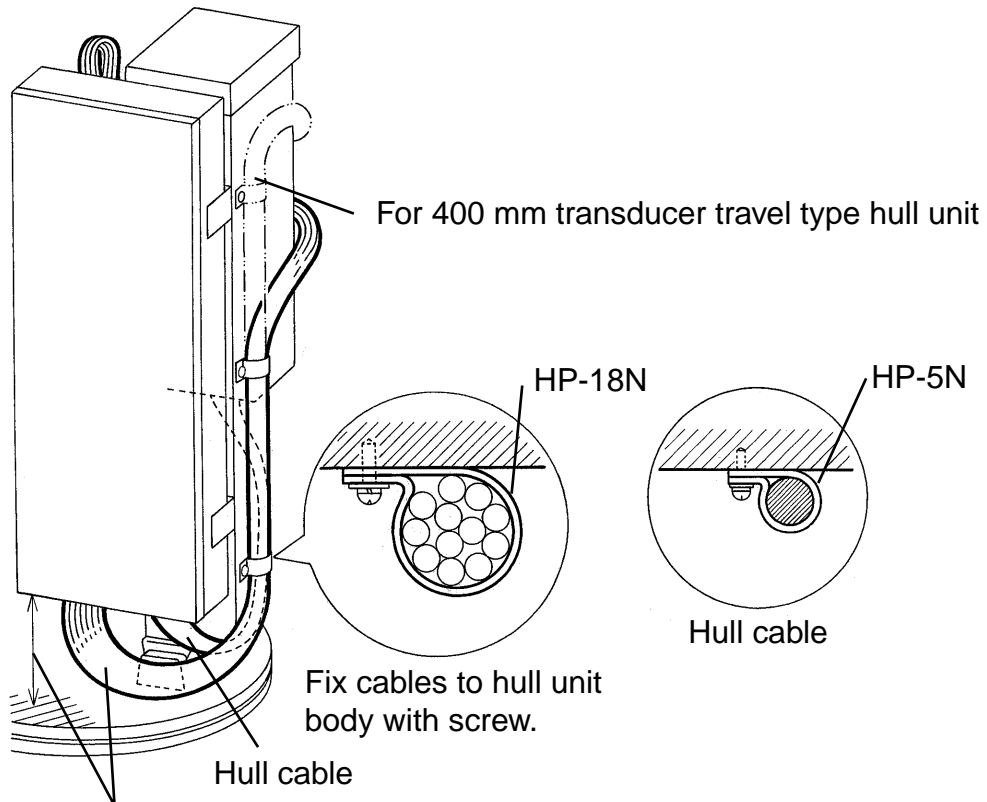


*RX cable connection*

6. Plug in the slip-on lugs of transducer cables ② to ③.

## 2.2.4 Fixing transducer and hull cables

Fix the transducer and hull cables to the hull unit body with cable clamps.

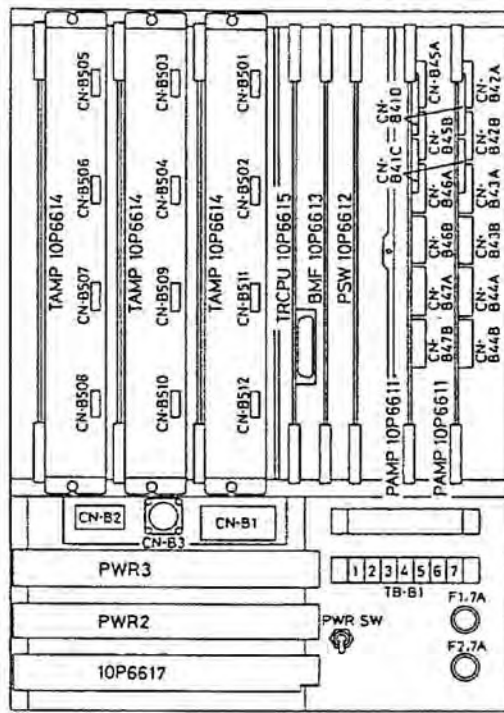


For 400 mm transducer travel type hull unit, make sure that the cable does not touch the flange.

*Fixing the hull cable*

## 2.3 Transceiver Unit

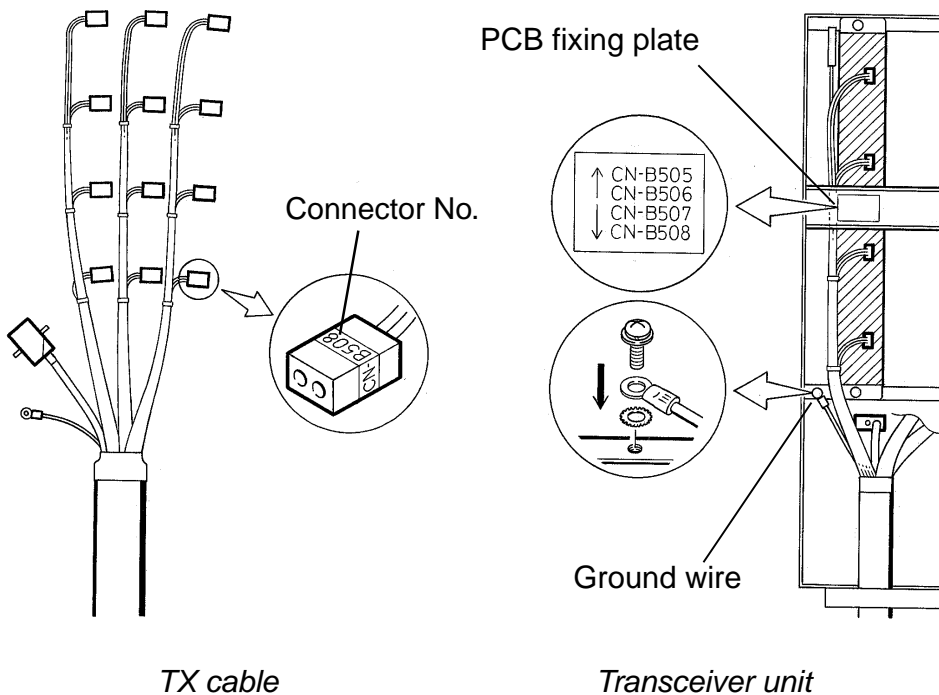
All cables, except for the power cable, connected to the transceiver unit are fitted with connectors and lugs.



Connector and terminal board location in transceiver unit

### 2.3.1 Connecting TX cable

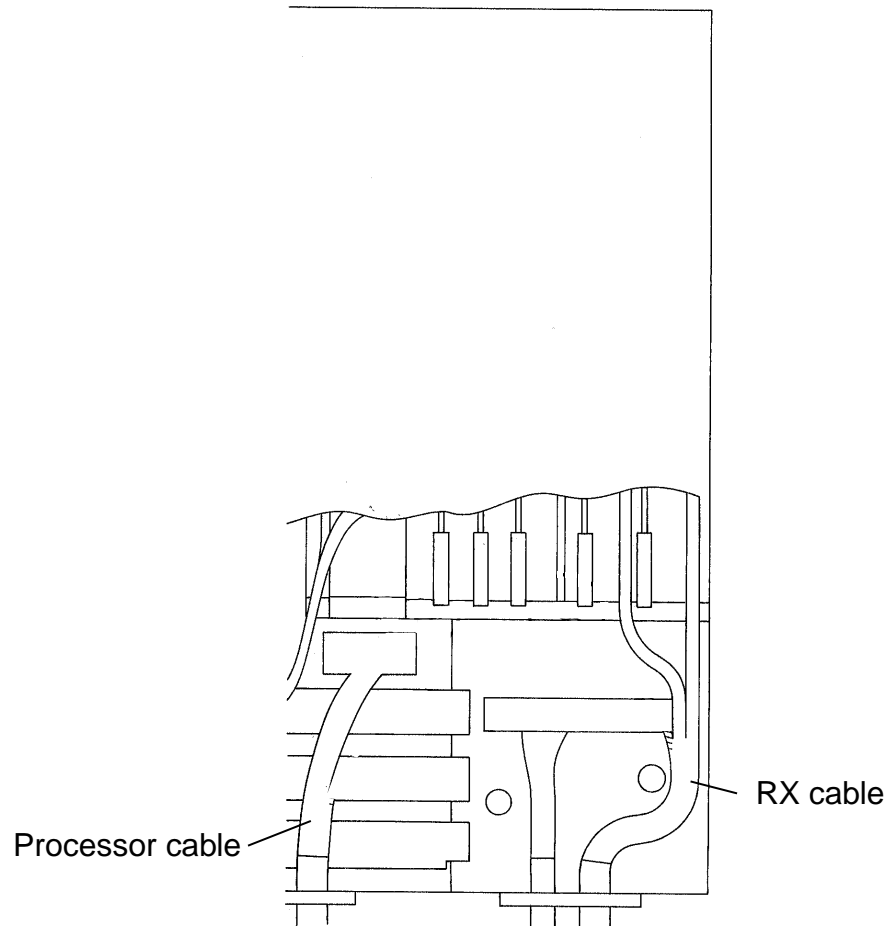
The connector numbers are marked on respective 2P plugs (12 pcs.) of the TX cable. Connect them to the transceiver unit, referring to the sticker on the PCB fixing plate. The ground wire should be connected to the chassis as shown below.



### 2.3.2 Connecting RX Cable

The connector numbers are marked on respective plugs. Connect them referring to the instruction at the back of the front panel of the transceiver unit.

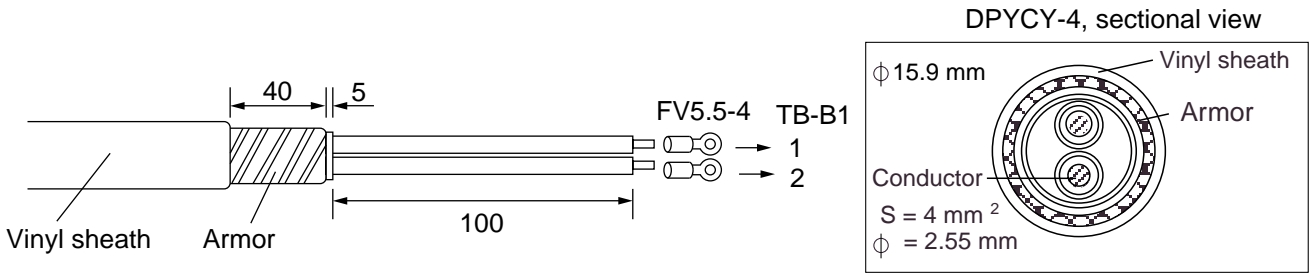
**Note:** CN-B41C/CN-B41D are provided on the both PAMP Boards and you may use either side.



*Connecting of Processor and RX cables*

### 2.3.3 Connecting power cable

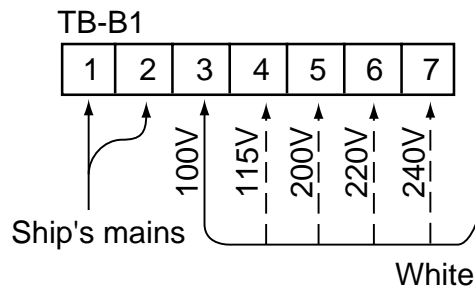
Fabricate the power cable DPYCY-4 (Japan Industrial Standard (JIS)) or equivalent (local supply.)



*Fabricating of power cable*

**Note:** Change connection of white wire at the TB-B1 according to ship's mains. And then, replace the fuse appropriately. On the stickers at the terminal board and back of the front lid of the transceiver unit, change the mark position for the used fuse.

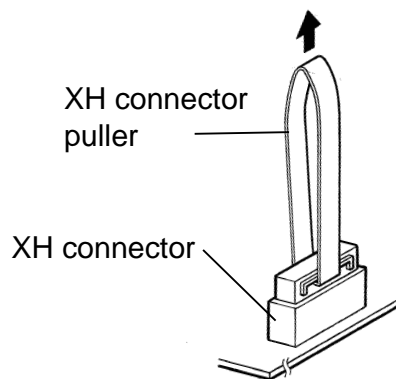
Ship's mains	Fuse
100/110/115 VAC	7 A 125 V
200/220/240 VAC	4 A 250 V



*Connections at TB-B1*

### 2.3.4 How to unplug the XH connector

If making a wrong connection of XH connector, use the XH connector puller to unplug the XH connector.



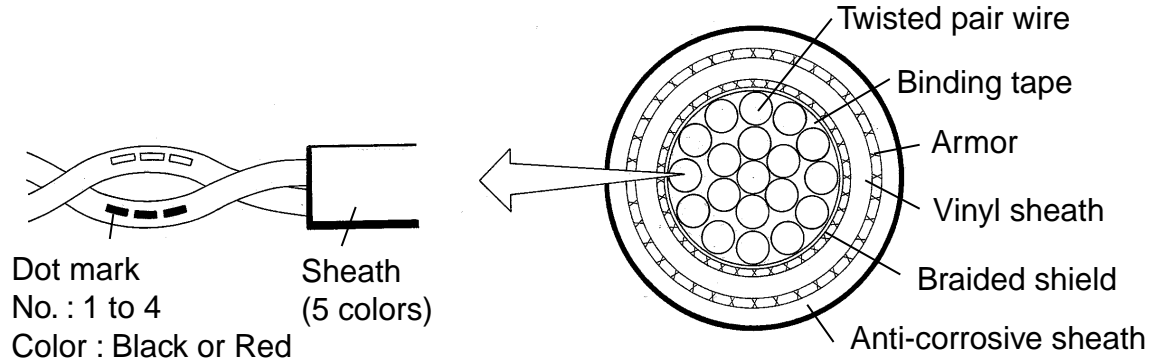
*XH connector puller*

## 2.4 Processor Unit

### 2.4.1 Cable fabrication

#### Cable construction

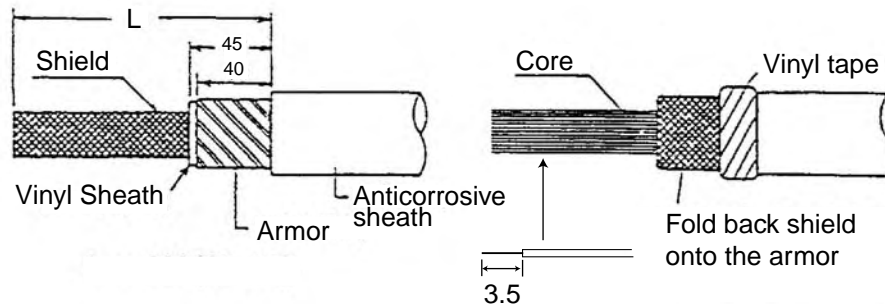
The processor unit end of the processor cable (interconnection cable between processor and transceiver units) is not fabricated at the factory. Attach the 38P connector locally. This cable is attached to CN-A1 on the MAIN Board.



*Processor cable, sectional view*

#### Cable fabrication

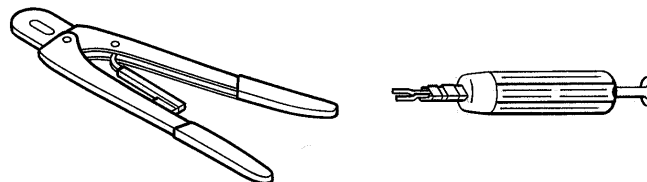
Remove the anticorrosive sheath, armor and vinyl sheath as shown below.



*Fabrication of processor cable*

#### Connecting contact pins

A special crimping tool is necessary for connection of wires to the contact pins of 38P connector. In addition, a pin extractor should be used to remove the contact pin from the connector housing. The following describes how to crimp and extract the contact pin.



Crimping tool

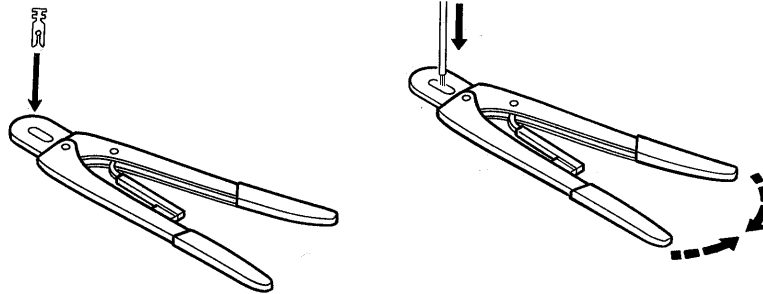
Pin extractor

*Tools for crimping, extracting contact pins*

## 2. WIRING

### Wire crimping procedure

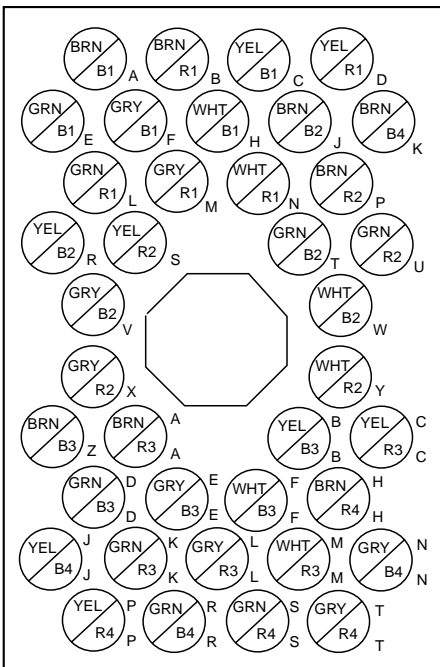
1. Strip the vinyl sheath of the wire to expose the core by 3.5 mm.
2. Hold the crimping tool horizontally and insert the contact pin, with its slit faced downward, into the crimp hole of the crimping tool.
3. From the same side, place the wire onto the contact pin and squeeze the handle until the ratchet is released. Pull the wire to make sure that it is securely crimped.



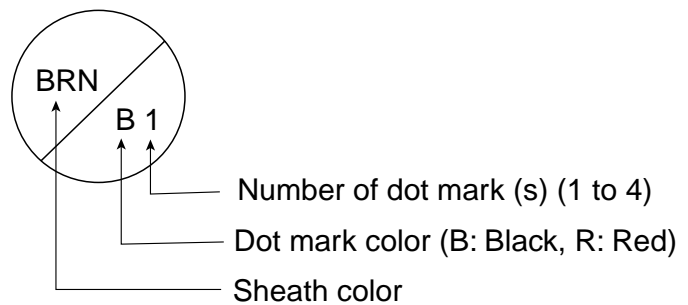
*How to use the crimping tool*

### Inserting contact pin into connector housing

The wires fitted with contact pins should be inserted into the connector housing referring to the drawing below or the interconnection diagram at the back of this manual.



Note: 1. Wire differentiation



2. BRN and GRN show the following colors.  
BRN: Light brown  
GRN: Light green
3. Cover plate is not fitted to the connector.

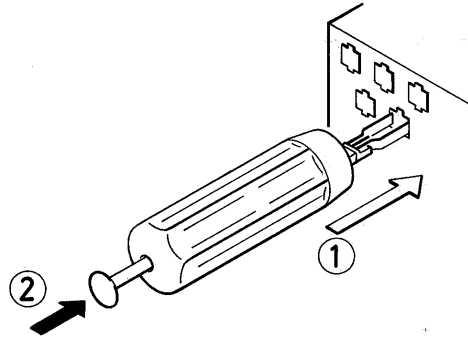
*Inserting pins contact*



### Procedure to extract contact pin

When a contact pin has been inserted into an incorrect hole on the connector housing, remove it by using the pin extractor.

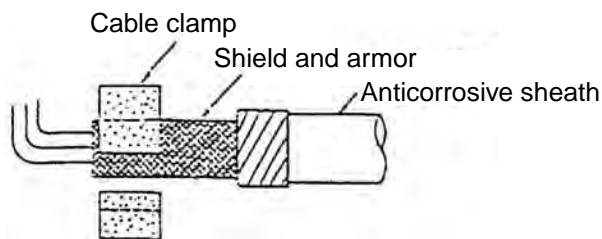
1. Push the pin extractor into the pin hole from the side opposite to the pin inserting side.
2. Firmly push in the head of the pin extractor. The retaining spring will come free and contact pin can be removed.



*Pin extractor*

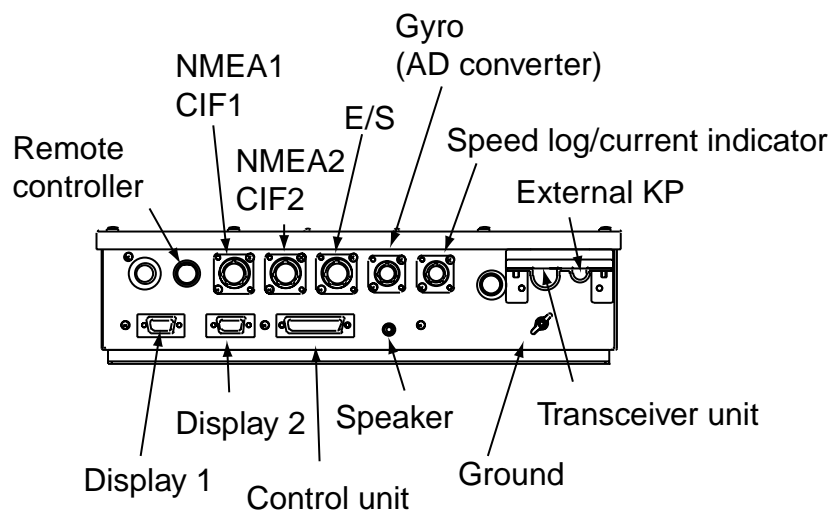
### Clamping cable

Secure the cable with cable clamp at the shield and armor.



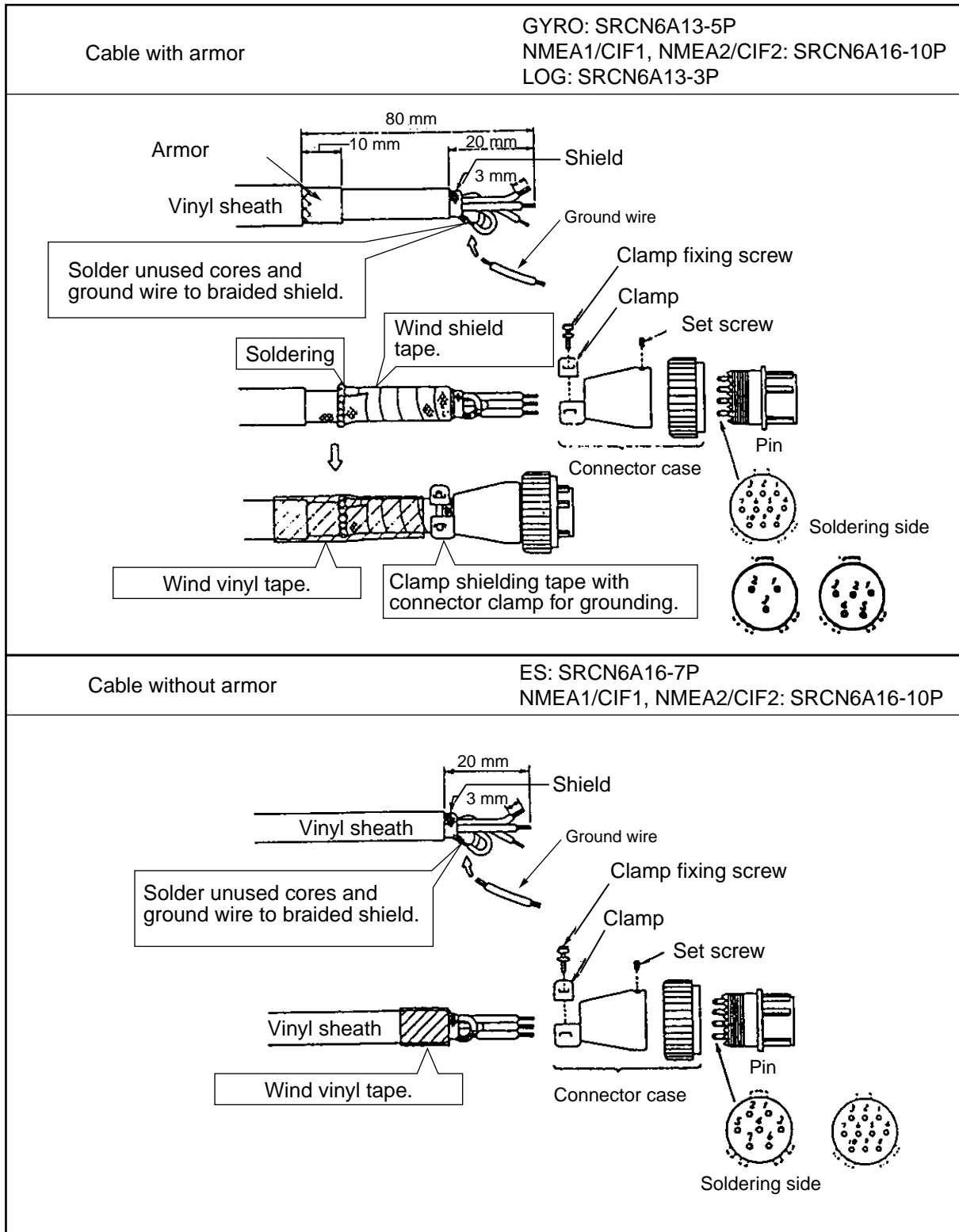
*Clamping cable*

## 2.4.2 Other connections



*Connection of processor unit*

## 2. WIRING



*Fabricating other cables*

### **Display unit**

Prepare XGA monitor locally. When using MU-150C as the display unit, see its operator's manual. Connect the processor unit and display with the monitor cable 3COX-2P-6C 5 m or 10 m (supplied). Use the MONITOR 1 port for a display unit.

**NMEA input sentences**

Talker	Sentence	Information
*1	GGA	GPS position data
*1	GLL	Own ship position
**	GTD	Own ship position (TD, LOP)
LC	GLC	TD (Loran-C)
**	HDG	Heading (compass)
**	HDM	Heading (magnetic bearing)
**	HDT	Heading (true)
*1	VTG	Course over ground speed
VD	VHW	Water speed, heading
LC	RMA	Recommended minimum specific Loran-C data
*2	RMC	Recommended minimum specific GPS data
**	DBT	Depth below transducer, Ver. 1.5
**	DBS	Depth below sea level
**	DPT	Depth below transducer plus offset value, Ver. 2.0
**	MTW	Water temperature
VD	VDR	Water current, single layer
VD	CUR	Water current, multi-layers

\*1: GPS navaid, Loran-C, II (other talker), TR

\*2: GPS navaid, II (other talker), TR

\*\* : Not specified

**NMEA output sentence**

Talker	Sentence	Information
SS	TLL	Target position (L/L)

**CIF input sentences**

Data No.	Information
21	DR position
24	Loran-C position
28	GPS position
54	Loran-C, TD
4:	Heading (true)
41	DR ship's speed and course
44	Loran-C ship's speed and course
48	GPS ship's speed and course
57	Depth of sea bottom
58	Water temperature
66	Current indicator ship's speed and course
56	Water current, single layer
76	Water current, multi- layers

**CIF output sentence**

Data No.	Information
5:	Target position (L/L)

**Gyrocompass**

Heading data from a gyrocompass can be input via A-D converter AD-100. For details, see the operator’s manual for AD-100.

**Echo sounder**

Echo sounder video can be input using the echo sounder interface VI-1100A. For details, see the installation manual for VI-1100A.

**Speed log**

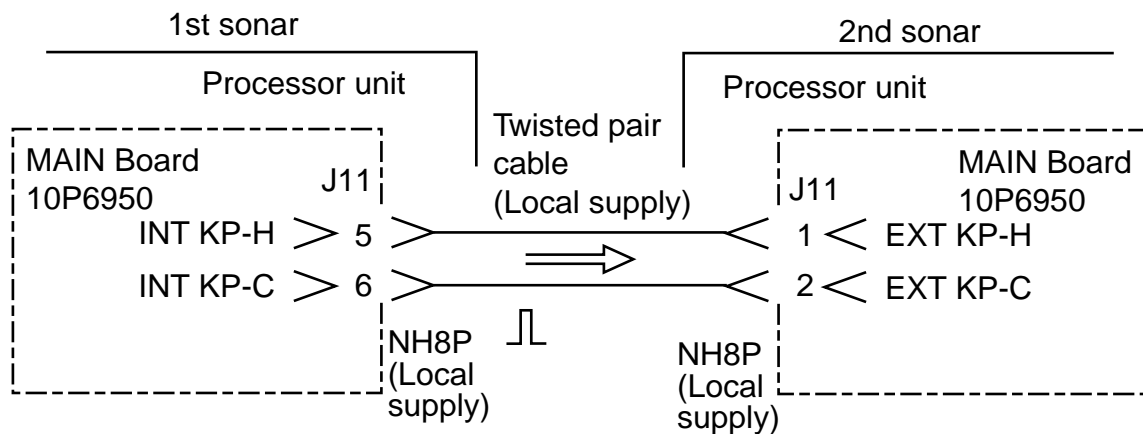
Log pulse (contact signal) can be input.

## 2.5 Synchronizing Transmission with Other Equipment

### 2.5.1 Synchronizing transmission with another CSH-5L

When two CSH-5Ls are installed, connect them as shown below, so that the transmission of the second sonar is synchronized with that of the first.

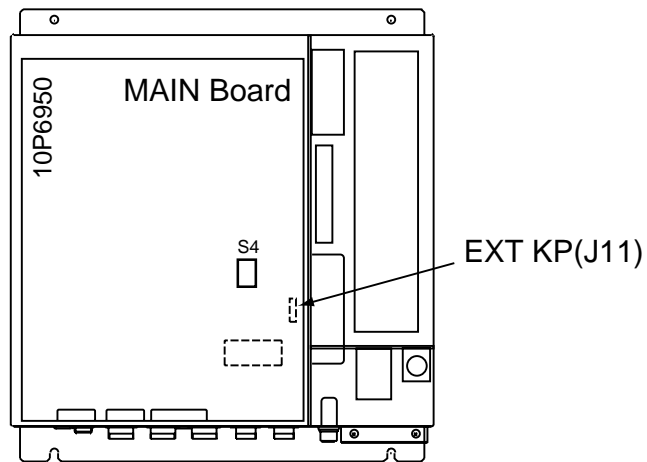
**Wiring**



*Connecting two CSH-5Ls*

**DIP switch setting**

Set DIP switch S4 on the MAIN Board in the processor unit as follows:



*Location of DIP switch S4*

DIP switch	1st sonar	2nd sonar
S4-#2	ON	-
S4-#1	-	OFF

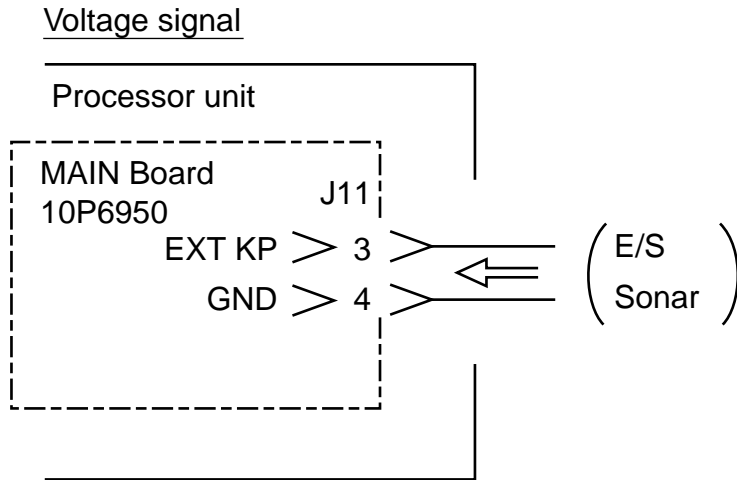
**Menu setting**

On 2nd sonar, set EXT KP SYNC to ON at the System menu. Refer to the operator's manual for the procedure.

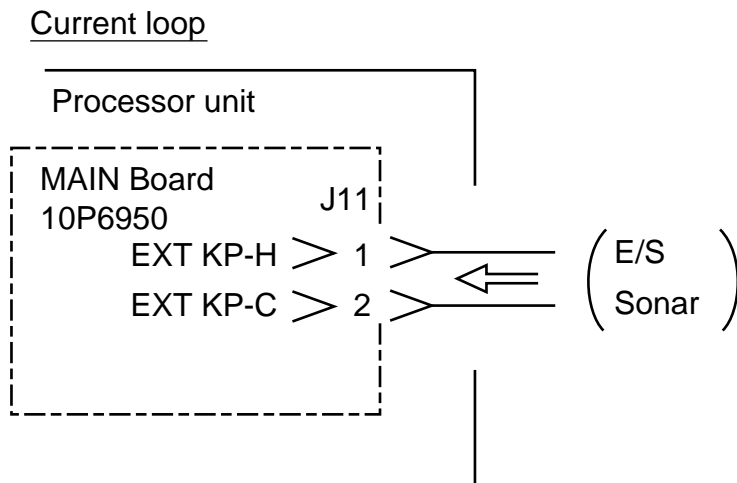
### 2.5.2 Synchronizing with echo sounder or other sonar

To synchronize the transmission of the CSH-5L with an echo sounder or other sonar, make the connections shown below.

#### Wiring



The CSH-5L accepts KP with an amplitude of 5 V to 15 V.



*Connecting CSH-5L with echo sounder or sonar*

#### DIP switch setting

Set DIP switch S4-#1 on MAIN Board as below.

Positive KP: OFF

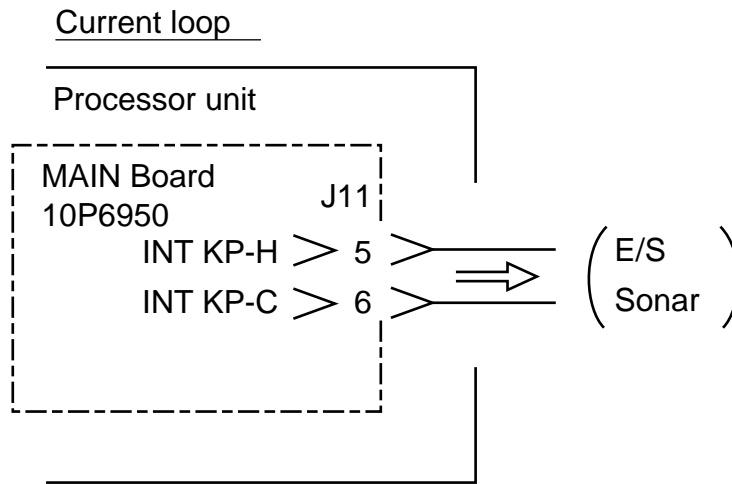
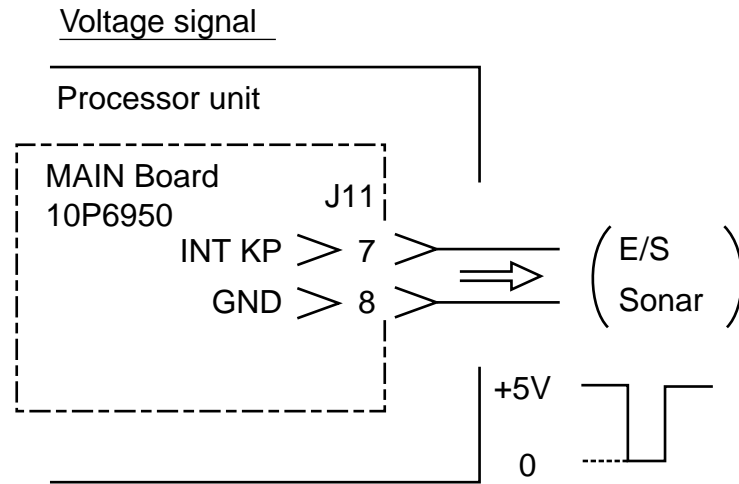
Negative KP: ON

#### Menu setting

Set EXT KP SYNC to ON at the System menu. Refer to the operator's manual for the procedure.

### 2.5.3 Outputting KP of CSH-5L to external equipment

To output KP of CSH-5L to an echo sounder or other type of sonar, make the connections shown below.



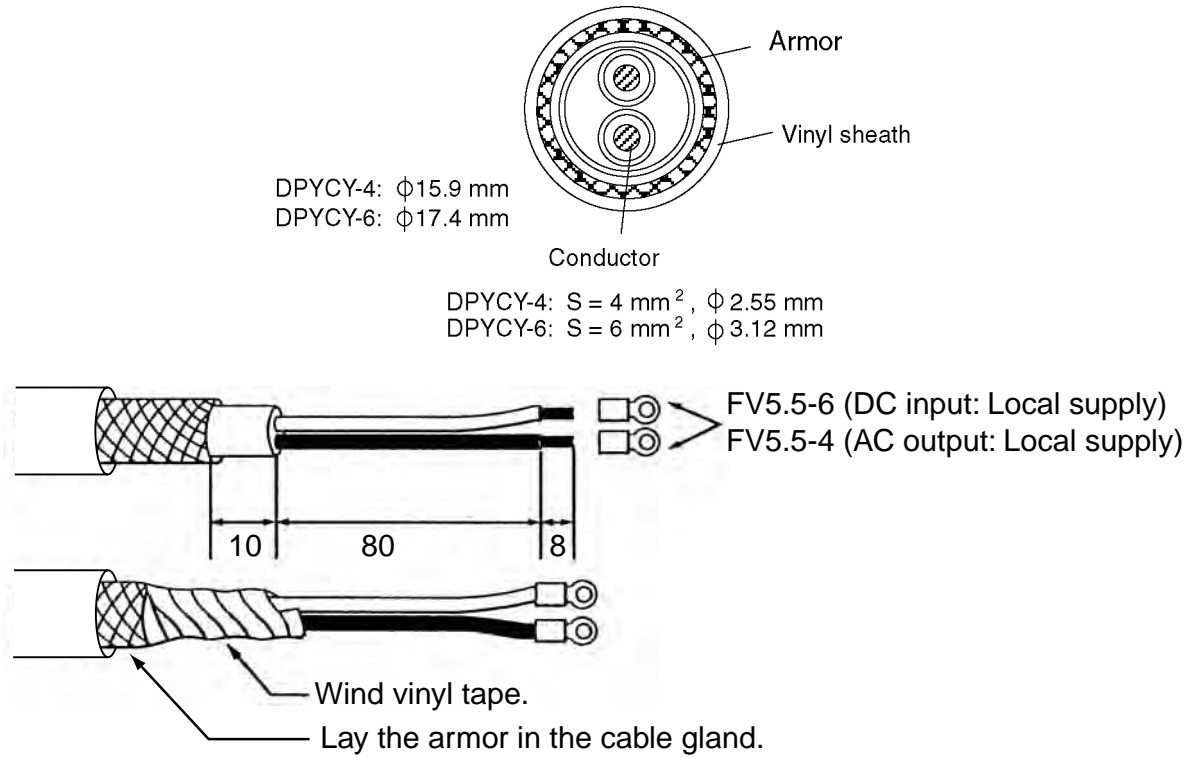
*How to output CSH-5L's KP to external equipment*

#### DIP switch setting

S4-#2	Transmission trigger
OFF	Negative
ON	Positive

## 2.6 DC-AC Inverter

Use the JIS (Japan Industrial Standard) cable DPYCY-6 or equivalent (max. 5 m) between the ship's mains and the DC/AC inverter. For output (100 VAC), use JIS (Japan Industrial Standards) cable DPYCY-4 or equivalent (max. 50 m).



*Fabricating JIS cable DPYCY-4, DPYCY-6*



# 3. ADJUSTMENTS

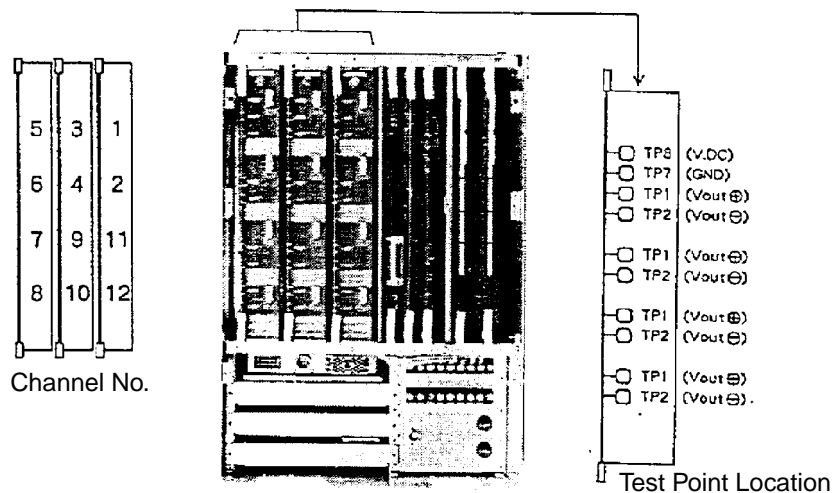
**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD**  
Do not open the equipment unless totally familiar with electrical circuits and service manual.

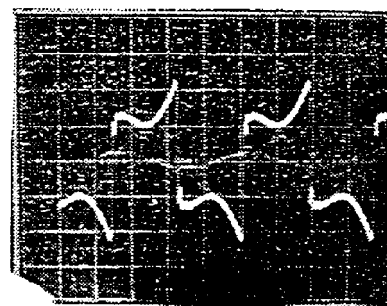
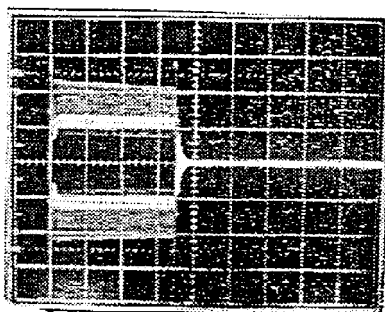
Only qualified personnel should work inside the equipment.

## 3.1 Measuring TX Output

- Set the controls of the control unit as follows.  
 Range: 400 m      Output: 10 (Max.)      Vertical Beam width: Wide  
 Tilt: 0°      Pulselength: 10 (Max.)
- Connect the oscilloscope across Vout + and Vout – jacks on the TAMP boards (10P6614) and measure the peak-to-peak voltage of the TX signal at the center point of its pulselength.



Waveform measured across Vout (+) and Vout (-)



Measuring TX output signal

### 3. ADJUSTMENT

To measure the peak-to-peak voltage (Vpp), expand the waveform to 5  $\mu$ s/div. In the example shown on the previous page, the amplitude is 220 Vpp.

Typical value of TX output (68 kHz)

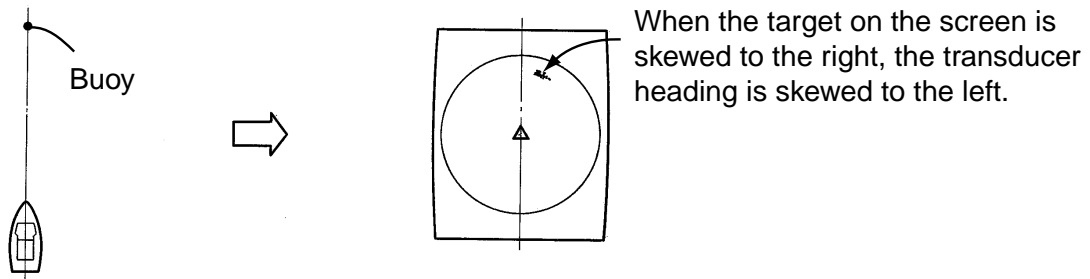
CH	Vout +, -	CH	Vout +, -	CH	Vout +, -
1	100 Vpp	5	240 Vpp	9	175 Vpp
2	100 Vpp	6	240 Vpp	10	175 Vpp
3	175 Vpp	7	240 Vpp	11	100 Vpp
4	175 Vpp	8	240 Vpp	12	100 Vpp

Typical value of TX output (55 kHz)

CH	Vout +, -	CH	Vout +, -	CH	Vout +, -
1	140 Vpp	5	310 Vpp	9	240 Vpp
2	140 Vpp	6	310 Vpp	10	240 Vpp
3	240 Vpp	7	310 Vpp	11	140 Vpp
4	240 Vpp	8	310 Vpp	12	140 Vpp

## 3.2 Heading Alignment

1. Turn on the power. Locate a target (buoy, etc.) in the bow direction and display it on the screen at a close range. The heading alignment is correct if the target in the bow direction is displayed 12 o'clock on the screen. If it is not, go to step 2.



*Displaying a buoy on the screen*

2. Read the skewed degree of the target selected at step 1.
3. Press the [MENU] key.
4. Use the [RANGE] control to choose [MENU MODE].
5. Use the [GAIN] control to choose SYSTEM to show the System menu.

** SYSTEM MENU **		(RANGE CTRL: U/D, GAIN CTRL: L/R)	
<b>[MENU MODE]</b>	: SONAR	SOUNDER	MARKS <b>SYSTEM</b>
DIMMER	: 10		
DISP SELECT	: <b>TEMP</b>	CURRENT	
HEADING ADJ	: 0°		
AUTO RETRACT	: OFF	(OFF, 5-16kt)	

*System menu*

6. Rotate the [RANGE] control to select HEADING ADJ.
7. Rotate the [GAIN] control to set value so a target directly ahead in bow direction is displayed at 12 o'clock.

### 3.3 Setting for External Equipment

Do the following settings depending on the external equipments connected. Open the System menu referring to the previous page.

** SYSTEM MENU **		(RANGE CTRL: U/D, GAIN CTRL: L/R)			
[MENU MODE]	:	SONAR	SOUNDER	MARKS	SYSTEM
DIMMER	:	10			
DISP SELECT	:	TEMP	CURRENT		
HEADING ADJ	:	0°			
AUTO RETRACT	:	OFF	(OFF, 5-16kt)		
SPEED MESSAGE	:	ON	OFF		
EXT KP SYNC	:	OFF	ON		
AUTO TRAIN SPD	:	LOW	HIGH		
AUTO TILT SPD	:	LOW	HIGH		
UNIT	:	METERS	FEET	FATHOMS	PA/BRA
SHIP'S SPD/BR	:	LOG/GYRO	CURRENT	NAV DATA	GYRO+NAV
LOG PULSE	:	200	400		
PORT1 BAUDRATE	:	19200	9600	4800	2400
PORT1 FORMAT	:	NMEA	CIF		
PORT2 BAUDRATE	:	19200	9600	4800	2400
PORT2 FORMAT	:	NMEA	CIF		
NAV DATA	:	GPS	LC	DR	ALL
COMBI SCALE	:	RIGHT	LEFT		
SUB TEXT INDI	:	OFF	ON		
LANGUAGE	:	ENGLISH	(JAPANESE)	ESPAÑOL	DANSK
		NEDERLND	FRANCAIS	ITALIANO	(KOREAN)
		NORSK			
TEST	:	SINGLE	CONTI	PANEL	COLOR
	:	PATTERN	SIO	ECHO-1	ECHO-2
	:	ECHO-3	ECHO-4		
SET TO DEFAULT	:	EXECUTE			
PRESS [MENU] KEY TO EXIT					

[Dashed Box] = Items should be set after the installation

*System menu*

#### EXT KP SYNC

Select using or not using the external keying pulse (See “2.5 Synchronizing Transmission with Other Equipment” on page 2-16.)

1. Rotate the [RANGE] control to select EXT KP SYNC.
2. Rotate the [GAIN] control to choose OFF or ON.

OFF: Not using the external keying pulse

ON: Using the external keying pulse.

**SHIP'S SPD/BR**

Choose the source of speed and course data with which to draw ship's track.

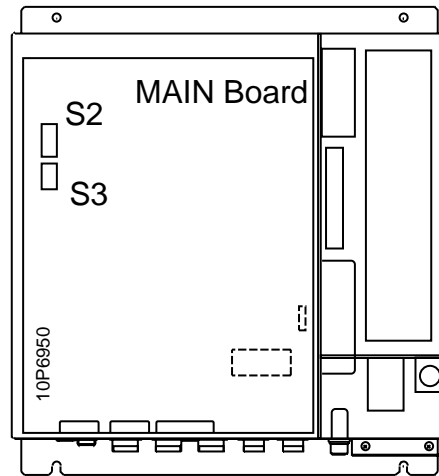
1. Rotate the [RANGE] control to select SHIP'S SPD/BR.
2. Rotate the [GAIN] control to choose item appropriately.

LOG GYRO: Use data from the speed log connected to LOG port as ship's speed, data from gyrocompass connected to GYRO port as ship's course.

CURRENT: Use data from the current indicator connected to NMEA1/CIF1 or NMEA2/CIF2 port.

NAV DATA: Use data from the GPS navaid connected to NMEA/CIF 1 or NMEA/CIF 2 port.

GYRO+NAV: Use heading data signal from the sensor connected to the GYRO port for course, data from the GPS navaid or current indicator connected to NMEA/CIF 1 or NMEA/CIF 2 port for the ship's speed. When using data from the current indicator (for positioning) for ship's speed, set DIP switch #2-2 in the transceiver unit to ON.



*Location of DIP switch S2*

**LOG PULSE**

Choose log pulse/mile specification of speed signal from the LOG port, 200 or 400 pulse/mile.

1. Rotate the [RANGE] control to select LOG PULSE.
2. Rotate the [GAIN] control to choose 200 or 400.

### 3. ADJUSTMENT

#### **PORT 1 BAUDRATE, PORT 2 BAUDRATE**

Set baud rate of equipment connected to NMEA1/CIF1 or NMEA2/CIF2 port, among 2400, 4800, 9600 and 19200 (bps).

1. Rotate the [RANGE] control to select PORT 1 BAUDRATE or PORT 2 BAUDRATE appropriately.
2. Rotate the [GAIN] control to choose item among 2400, 4800, 9600 and 19200.

#### **PORT 1 FORMAT, PORT 2 FORMAT**

Set format of equipment connected to NMEA1/CIF1 port or NMEA2/CIF2 port.

1. Rotate the [RANGE] control to select PORT 1 FORMAT or PORT 2 FORMAT appropriately.
2. Rotate the [GAIN] control to choose NMEA or CIF depending on the equipment connected.

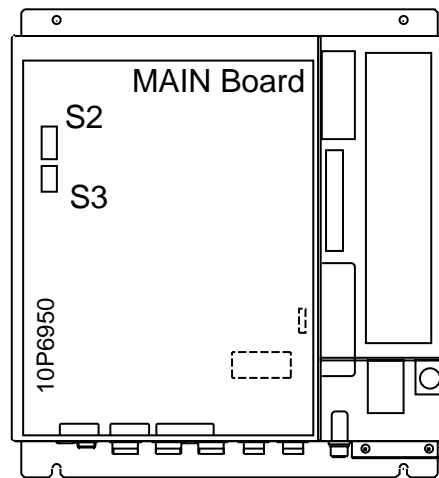
#### **NAV DATA**

Choose source of nav data among GPS, LC (Loran C), DR (Dead Reckoning) or ALL. "ALL" automatically chooses source in the order of GPS, Loran C and dead reckoning. (Priority: GPS>LC>DR)

1. Rotate the [RANGE] control to select NAV DATA.
2. Rotate the [GAIN] control to choose item appropriately.  
Select "DR" when using the equipment connected to GYRO port and LOG port.

### 3.4 Setting GPS Navaid Smoothing

If position data from the GPS navigator is not smooth, set DIP switch S2 in the processor unit as below to smooth it.



*Location of DIP switch S2 and S3*

#5	#6	GPS ship's speed average
ON	ON	2.0 kt
ON	OFF	1.5 kt
OFF	ON	1.0 kt
OFF	OFF	0.5 kt (default setting)

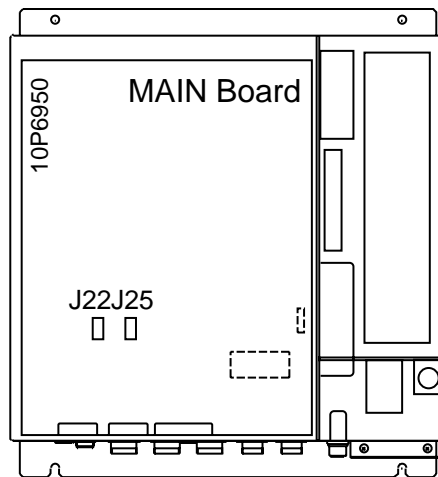
#3	#4	GPS course change
ON	ON	10°
ON	OFF	20°
OFF	ON	45°
OFF	OFF	90° (default setting)

#7	Smoothing function
ON	Yes
OFF	No (default setting)

When all switches are ON, GPS positioning data smoothed so that the course change is within 10° when own ship's speed is 2.0 kt or less.

### 3.5 NMEA Version Setting

Change the jumper block setting in the processor unit according to NMEA version to output.



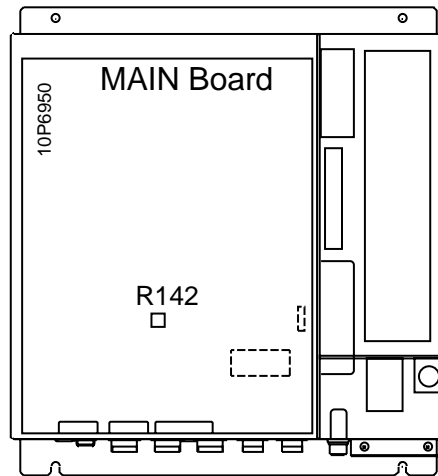
*Location of jumper block J22 and J25*

<i>Jumper</i>	<i>NMEA Ver1.5</i>	<i>CIF or NMEA Ver2.0</i>	<i>Port</i>
<i>J22</i>	<i>1-2 (Default setting)</i>	<i>2-3</i>	<i>NMEA1/CIF1</i>
<i>J25</i>	<i>1-2 (Default setting)</i>	<i>2-3</i>	<i>NMEA2/CIF2</i>



### 3.6 Adjusting Echo Sounder Video

When using the E/S interface to connect an echo sounder, adjust the video signal with the potentiometer R142 on the MAIN Board in the processor unit.



*Location of R142*

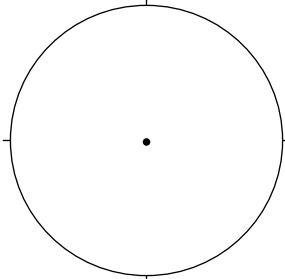
1. Rotate R142 so that the line on it locates at the center position.
2. Set the SOUNDER MENU as below.  
GAIN: 10, CLUTTER: 0
3. On the SOUNDER MENU, set E/S INT REJECT to ON.
3. Set GAIN to 0 on the SOUNDER MENU.
4. Adjust R142 so that noises disappear on the echo sounder display.
5. On the SOUNDER MENU, set the GAIN to 10, and then set the CLUTTER to 10.
6. Adjust R142 so that noises disappear on the echo sounder display.

### 3.7 Sea Trial

#### 3.7.1 Cruising noise check

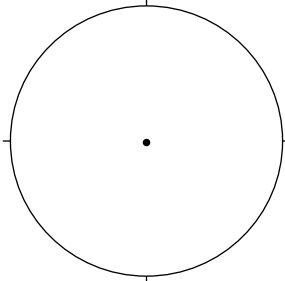
Check and record the cruising noise displayed on the screen. Do this with the transmitter turned off and the ship anchored, and also with the ship running at the speed normally used while the sonar is in use.

Ship anchored



NL	_____	ENG RPM	_____
RANGE	800 m	SPEED	0 KTS
GAIN	5.0	SEA CONDITION	_____
TVG	N <input type="checkbox"/> 5 F <input type="checkbox"/> 5		
TILT	0°		
DEPTH	_____		_____

Ship at cruising speed



NL	_____	ENG RPM	_____
RANGE	800 m	SPEED	_____
GAIN	5.0	SEA CONDITION	_____
TVG	N <input type="checkbox"/> 5 F <input type="checkbox"/> 5		
TILT	0°		
DEPTH	_____		_____

#### 3.7.2 Recording proper setting at sea trial

Record the suitable settings of controls and switches and take a photograph of the sonar picture as reference for later service.

PHOTOGRAPH	RANGE	<input type="text"/>
	TILT	<input type="text"/>
	TVG	N <input type="checkbox"/> F <input type="checkbox"/>
	GAIN	<input type="text"/>
	OUTPUT	<input type="text"/>
	TX PULSELENGTH	<input type="text"/>
	NOISE LIMITER	<input type="text"/>
	AGC	<input type="text"/>
	VP	<input type="text"/>
	INTERFERENCE REJ	<input type="text"/>

# APPENDIX

## INSTALLING CSH-5L ON THE RETRACTION TANK OF CH/FH SERIES SONARS OR BY USING 1800/3500 MM TANK

---

When retrofitting the CH/FH series with the CSH-5L it is not necessary to change the retraction tank. However, the hull unit must be chosen according to retraction tank length. Refer to the table below to choose hull unit. This must also be done with the 1800 mm or 3500 mm retraction tank.

Tank length (L) mm	Hull unit type	Remarks
$600 \leq L \leq 750$	CSH-5040-FFx13	XDCR cable: 4200 mm, Main shaft: 1300 mm
$750 < L \leq 1000$	CSH-5040-FFx15	XDCR cable: 4200 mm, Main shaft: 1550 mm
$1000 < L \leq 1800$	CSH-5040-FFx23	XDCR cable: 4900 mm, Main shaft: 2350 mm
$1800 < L \leq 3500$	CSH-5040-FFx40	XDCR cable: 6600 mm, Main shaft: 4065 mm

**Note 1:** The hull unit CSH-5041 (400 mm transducer travel) can not be used.

**Note 2:** When some portion of the main shaft is cut off, the parts listed below should be additionally ordered.

Name	Type	Code No.
Waterproofing attachment	10-044-2320-0	006-970-810
Lock-tight	#601	000-856-120

The waterproofing attachment is supplied with the CSH-5040-FFx40.

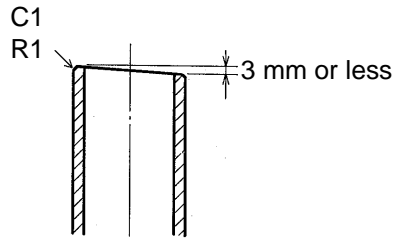
**Note 3:** FF: Frequency, x: Retraction tank type

### Installation when retraction tank is more than 750 mm long

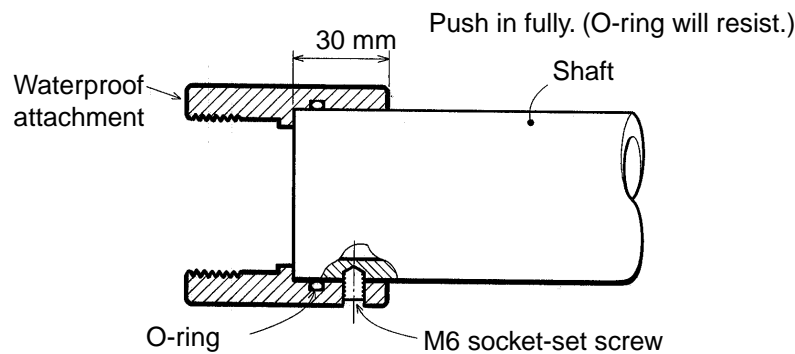
1. Calculate the necessary length of the main shaft.
  - Main shaft length = Tank length + 565 mm (See page AP-5.)
  - If there is sufficient space above the hull unit, it is not necessary to cut the main shaft; the main shaft is installed with its top portion protruded beyond the top of the hull unit.
  - If the cut length of the main shaft is less than 50 mm, use it without cutting it. The waterproofing attachment is not necessary. Note, however, that protrusion length of the transducer is reduced.
2. Cut the main shaft to the necessary length.
  - It is recommended to use a machine lathe to cut the main shaft.

## APPENDIX

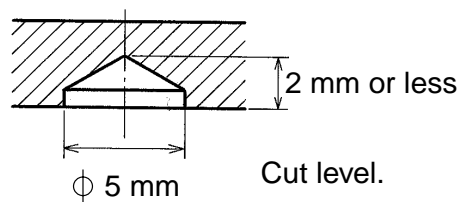
- Chamfer the top of the main shaft as shown below. (When chamfering with a file, use a fine file and finish the surface as smooth as possible.)
- When clamping the main shaft with a clamp, take care not to hurt the shaft surface.
- When a metal saw is used to cut the main shaft, finish the shaft top so that it is level within 3 mm.



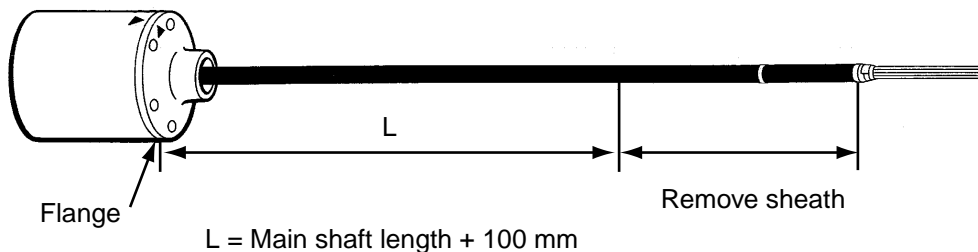
3. Temporarily install the waterproofing attachment on the top of the main shaft and make holes for socket-set screws.



- a) Mark drilling point on the shaft surface by tightening M6 socket-set screws (2 pcs.)
- b) Remove the waterproofing attachment.
- c) Drill less than 2 mm deep holes by using a drill with a  $\text{Ø}5$  mm and  $120^\circ$  tip. Do not drill holes through the shaft. Use a low rpm drill designed for stainless steel use.

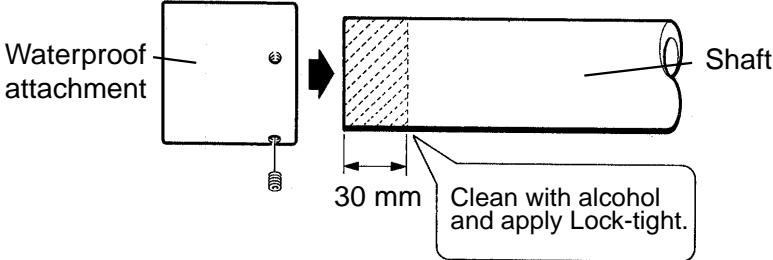


4. Remove the sheath of the transducer cable and wrap the sheath end vinyl tape.



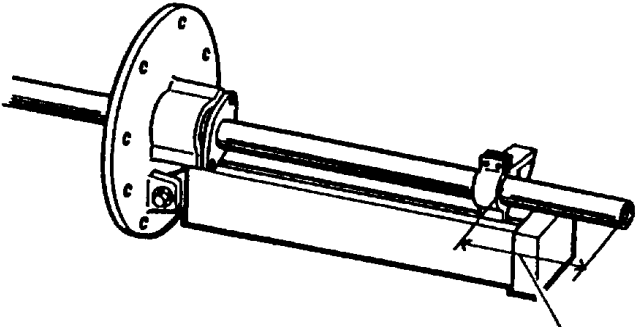
5. Pass the main shaft through the main body flange and assemble the hull unit. Refer to chapter 1 for the assembling procedure.

6. Clean the top of the main shaft with alcohol, apply bond “Lock-tight 601” and install the waterproof attachment.



- Tighten the M6 socket-set screws with a torque of 3.92 N·m to 4.9 N·m.

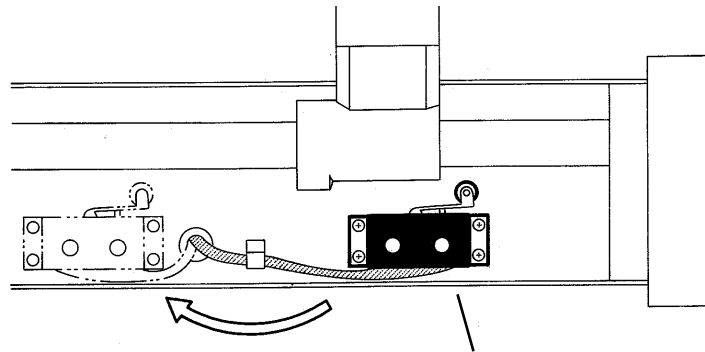
7. Assemble the hull unit completely, taking the following points into account.
- 1) The shaft retainer should be in contact with the waterproofing attachment.
  - 2) The fastening band should not be used on the main shaft fitted with the waterproofing attachment is used.
  - 3) When the main shaft is installed without cutting, position the shaft retainer as below.



L = Cut length shown on page AP-5 + 30 mm.

### Installation when retraction tank is 600 mm to 750 mm long

1. Follow the steps 1 to 5 in the previous procedure.
2. Modify the transducer travel to 450 mm by changing the upper limit switch position.

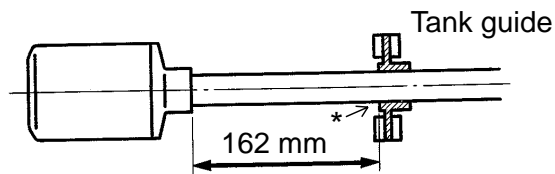


Move the upper limit switch to modify to 450 mm travel.

Upper limit switch.

3. Assemble the hull unit completely, taking the following points into account. Refer to chapter 1 for details of assembling and installation.

- a) The tank guide should be installed at a position 162 mm above the top of the transducer flange.



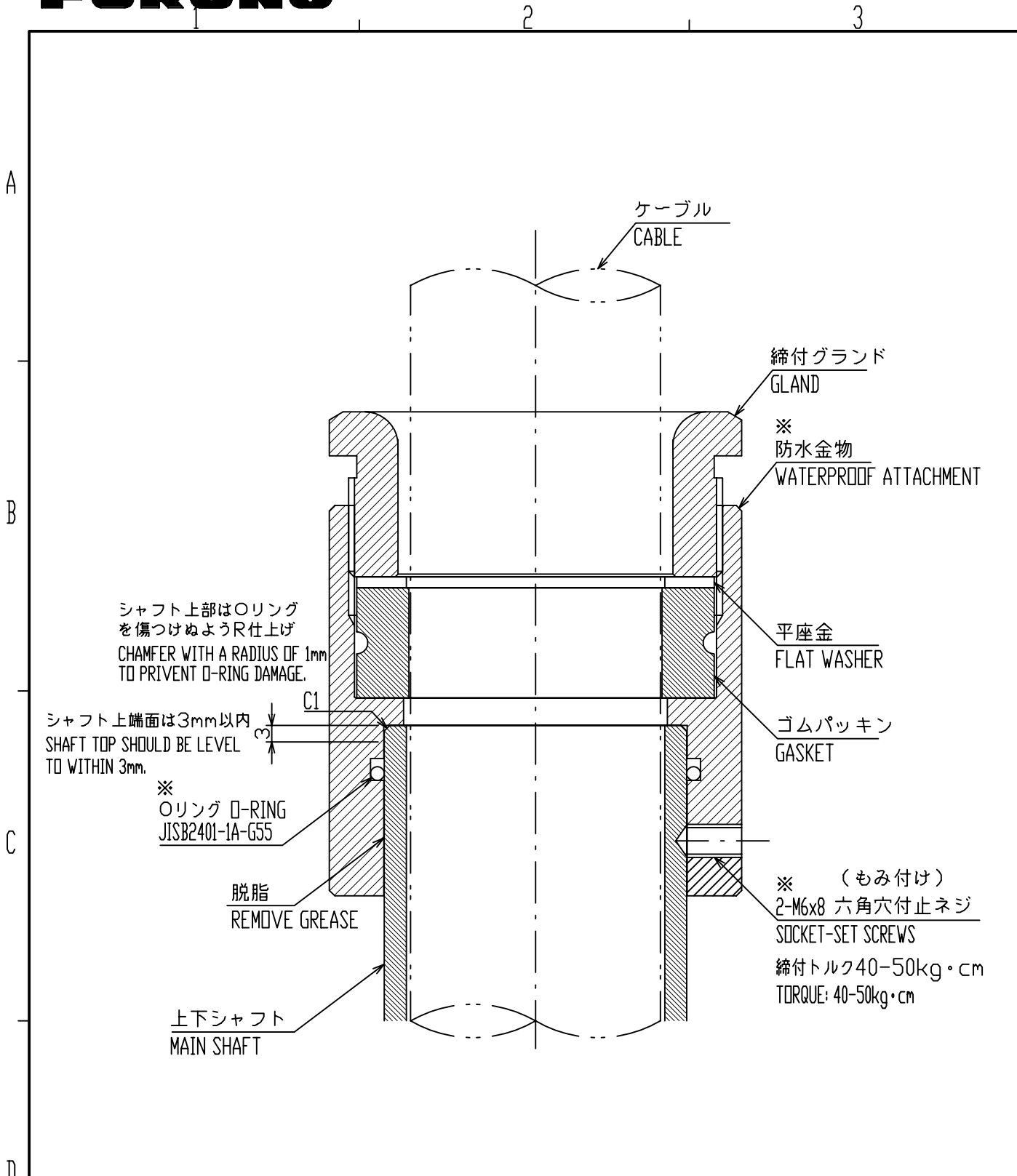
\*Measure from the inside of the tank guide.

- b) The shaft retainer should be in contact with the waterproofing attachment.

Relation between retraction tank length and main shaft length

Hull unit	Main shaft Shaft length/cut length Tank length	945		1300		1550		2350		4065	
		Shaft length	Cut length	Shaft length	Cut length	Shaft length	Cut length	Shaft length	Cut length	Shaft length	Cut length
CSH-5041 400 stroke	550	945	0								
CSH-5040 600 stroke converted to 450 stroke	600			1015	285						
	650			1065	235						
	700			1115	185						
CSH-5040 600 stroke	750			1300	0						
	800					1365	185				
	850					1415	135				
	900					1465	85				
	950					1515	35				
	1000					1550	0				
	1100							1665	685		
	1200							1765	585		
	1300							1865	485		
	1400							1965	385		
	1500							2065	285		
	1600							2165	185		
	1700							2265	85		
	1800							2350	0		
	1900									2465	1600
	2000									2565	1500
	2100									2665	1400
	2200									2765	1300
	2300									2865	1200
	2400									2965	1100
	2500									3065	1000
	2600									3165	900
	2700									3265	800
	2800									3365	700
	2900									3465	600
	3000									3565	500
	3100									3665	400
3200									3765	300	
3300									3865	200	
3400									3965	100	
3500									4065	0	

**Note:** When there is enough space above the hull unit, it is not necessary to cut the shaft.  
(Fasten the shaft with the shaft retainer at the position of “cut length + 30 mm” from the upper edge of the shaft.)



注記

1) ※: 防水金物セットに含む (オプション)。

NOTE

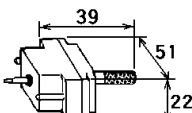

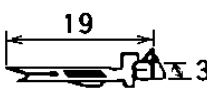
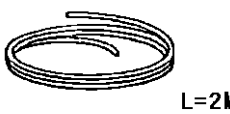
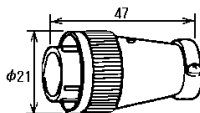
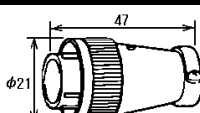
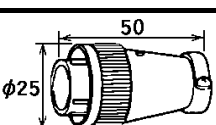
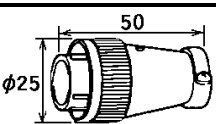
1. ※: SUPPLIED AS WATERPROOF ATTACHMENT (OPTION).

DRAWN	Dec. 25 '02	T.YAMASAKI	TITLE
CHECKED	Dec. 25 '02	Y.KIMURA	名称
APPROVED	Dec. 25, '02	<i>Y. Kimura</i>	上下シャフト上端 (防水金物)
SCALE	1/1	MASS ±10% kg	装備要領
DWGNo.	C1273-Y01- B		NAME
			CONSTRUCTION OF MAIN SHAFT TOP INSTALLATION PROCEDURE



**FURUNO**

CODE NO.	006-910-940-00	10CS-X-9403 -3
TYPE	CP10-05201	1/1

工事材料表					
INSTALLATION MATERIALS					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	コネクタ(8016) CONNECTOR(8016)		008016-038-313761HVF CODE NO. 000-159-017-10	1	
2	ラックスチューブ A INSULATION TUBE		3.0X0.3 YEL *50CM* 3.0X0.3 黒 *50CM* CODE NO. 000-162-841-10 000-568-226-00	2	
3	コンタクトピン(8017) CONTACT PIN(8017)		60-8017-0313-00339F+ CODE NO. 000-159-417-10	40	
4	ビニル線 VINYL WIRE		KIV 2.0SQ 黒 *2M* CODE NO. 000-554-516-00	1	
5	コネクタ(SRCN) CONNECTOR(SRCN)		SRCN6A13-3P CODE NO. 000-508-660-00	1	
6	コネクタ(SRCN) CONNECTOR(SRCN)		SRCN6A13-5P CODE NO. 000-160-726-10	1	
7	コネクタ(SRCN) CONNECTOR(SRCN)		SRCN6A16-10P CODE NO. 000-160-728-10	2	
8	コネクタ(SRCN) CONNECTOR(SRCN)		SRCN6A16-7P CODE NO. 000-160-730-10	1	

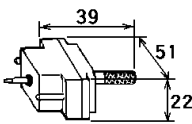
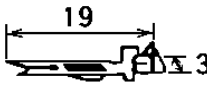
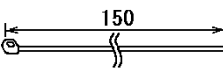
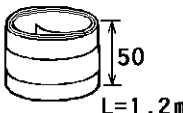
型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

**FURUNO**

CODE NO.	006-904-860-00	10CS-X-9401 -4
TYPE	CP10-05202	1/1

工事材料表 INSTALLATION MATERIALS					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	コネクタ(8016) CONNECTOR		008016-038-000761HVF 00-8016-038-000761HV CODE NO. 000-159-016-10 000-118-309-00	1	
2	コンタクトピン(8017) CONTACT PIN (8017)		60-8017-0313-00339F+ 60-8017-0313-00-339 CODE NO. 000-159-417-10 000-519-542-00	38	
3	コンパックス PLASTIC BAND		CV-150N CV-150N CODE NO. 000-162-186-10 000-570-325-00	20	
4	アース板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040-00	1	

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。

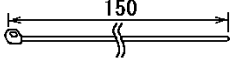
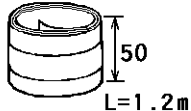
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

10CS-X-9401

**FURUNO**

CODE NO.	006-904-880-00	10CS-X-9402 -2
TYPE	CP10-05203	1/1

工事材料表 INSTALLATION MATERIALS					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	コパックス PLASTIC BAND		CV-150N ----- CV-150N CODE NO. 000-162-186-10 ----- 000-570-325-00	30	
2	アース板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040-00	1	

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

10CS-X-9402

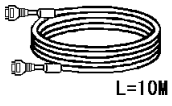
**FURUNO**

		CODE NO.		10CS-X-9404 -0	
		TYPE		1/2	
<b>工事材料表</b> INSTALLATION MATERIALS		CSH-5L			
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS		数量 Q'TY
1	信号ケーブル組品 SIGNAL CABLE ASSY.	 L=15M	S10-6-15(38P) *15M*		1
			CODE NO.	006-976-580	
2	信号ケーブル組品 SIGNAL CABLE ASSY.	 L=30M	S10-6-30(38P) *30M*		1
			CODE NO.	006-976-590	
3	信号ケーブル組品 SIGNAL CABLE ASSY.	 L=50M	S10-6-50(38P) *50M*		1
			CODE NO.	006-976-600	
4	RX168 芯ケーブル組品 168C CABLE ASSY.	 L=5M	10S1562 *5M*		1
			CODE NO.	006-976-620	
5	信号ケーブル組品 SIGNAL CABLE ASSY.	 L=5M	S10-7-5		1
			CODE NO.	006-976-610	
6	RX168 芯ケーブル組品 168C CABLE ASSY.	 L=10M	10S1583 *10M*		1
			CODE NO.	006-976-440	
7	RX168 芯ケーブル組品 168C CABLE ASSY.	 L=15M	10S1584 *15M*		1
			CODE NO.	006-976-450	
8	信号ケーブル組品 SIGNAL CABLE ASSY.	 L=10M	S10-7-10		1
			CODE NO.	006-976-460	
9	信号ケーブル組品 SIGNAL CABLE ASSY.	 L=15M	S10-7-15		1
			CODE NO.	006-976-470	
10	ケーブル組品 CABLE ASSY.	 L=5M	3COX-2P-6C *5M*		1
			CODE NO.	000-146-500	

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

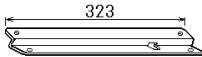
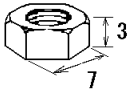


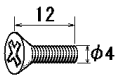
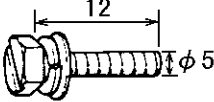
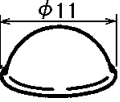
**FURUNO**

		CODE NO.		10CS-X-9404 -0	
		TYPE		2/2	
<b>工事材料表</b> INSTALLATION MATERIALS		CSH-5L			
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS		数量 Q'TY
11	ケーブル組品 CABLE ASSY.		3COX-2P-6C *10M*		1
			CODE NO.	000-146-501	
					表示部/制御部 FOR MONITOR/CONTROL UNIT *選択*TO BE SELECT

FURUNO ELECTRIC CO., LTD.  
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

**FURUNO**

CODE NO.	006-905-030-00	10CS-X-9501 -2
TYPE	FP10-02701	1/1

付属品表					
ACCESSORIES					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	KB固定金具 KB MOUNTING PLATE		10-078-2221-0 CODE NO. 100-302-210-10	1	
2	六角ナット 1種 HEX. NUT		M4 C2700W MBN12 CODE NO. 000-863-206-00	2	
3	バネ座金 SPRING WASHER		M4 C5191W MBN12 CODE NO. 000-864-206-00	2	
4	ミガキ平座金 FLAT WASHER		M4 C2600P MBN12 CODE NO. 000-864-106-00	2	
5	+ サラ小ネジ OVAL HEAD SCREW		M4X12 C2700W MBN12 CODE NO. 000-163-309-10	2	
6	+ アフセットロッカセムズ HEX. BOLT		M5X12 SUS304 CODE NO. 000-162-574-10	4	
7	ゴム足 RUBBER FEET		SJ-5003 ㌦ CODE NO. 000-801-787-00	4	

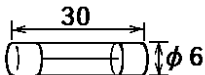
型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

**FURUNO**

CODE NO.	006-907-700-00	10CS-X-9302 -2 1/1
TYPE	SP10-02901	BOX NO. P

SHIP NO.		SPARE PARTS LIST FOR		U S E			SETS PER VESSEL
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY			REMARKS/CODE NO.
				WORKING		SPARE	
				PER SET	PER VES		
1	ヒューズ FUSE		FGB0-A 125V 2A PBF ----- FGB0-A 2A AC125V			2	000-155-849-10 ----- 000-549-062-00
MFR'S NAME	FURUNO ELECTRIC CO.,LTD.			DWG NO.	10CS-X-9302		1/1

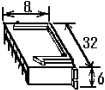
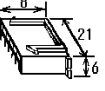
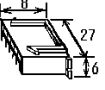
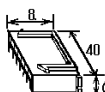
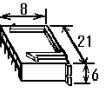
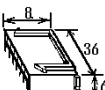
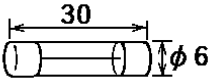

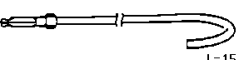
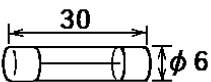
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

**FURUNO**

CODE NO.	006-904-850	10CS-X-9301 -2 1/2
TYPE	SP10-02902	BOX NO. P

SHIP NO.		SPARE PARTS LIST FOR		U S E			SETS PER VESSEL
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY			REMARKS/CODE NO.
				WORKING		SPARE	
				PER SET	PER VES		
1	コネクタ(XH) CONNECTOR (XH)		XHP-12			2	000-116-944-10
2	コネクタ(XH) CONNECTOR (XH)		XHP-14			2	000-112-430-10
3	コネクタ(XH) CONNECTOR (XH)		XHP-10			2	000-110-947-10
4	コネクタ(XH) CONNECTOR (XH)		XHP-15			2	000-110-946-10
5	コネクタ(XH) CONNECTOR (XH)		XHP-7			2	000-105-683-10
6	コネクタ(XH) CONNECTOR (XH)		XHP-13			2	000-102-045-10
7	ヒューズ FUSE		FGBO 250V 4A PBF FGBO 4A AC250V			2	000-155-842-10 000-546-707-00
8	XHコンタクト組品 XH CONTACT ASSY.		80-0075			20	006-979-310-00
9	MLソケットコンタクト組品 NK SOCKET CONTACT ASSY.		80-0074			6	006-979-300-00
10	ヒューズ FUSE		FGBO 125V 7A PBF FGBO 7A AC125V			2	000-155-831-10 000-549-013-00
MFR'S NAME		FURUNO ELECTRIC CO.,LTD.		DWG NO.	10CS-X-9301	1/2	

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

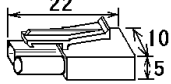
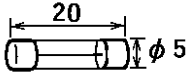
型式/コード番号が2段の場合、下段より上段に代わる過渡期品でどあり、ちらかが入っています。なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.



**FURUNO**

CODE NO.	006-904-850	10CS-X-9301 -2 2/2
TYPE	SP10-02902	BOX NO. P

SHIP NO.		SPARE PARTS LIST FOR		U S E			SETS PER VESSEL
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY		REMARKS/CODE NO.	
				WORKING	SPARE		
				PER SET	PER VES		
11	コネクタ(ML) CONNECTOR(ML)		MLP-02			2 000-505-750-00	
12	ヒューズ FUSE		FGMB 250V 2A PBF FGMB 2A 250V			4 000-157-497-10 000-122-000-00	
MFR'S NAME	FURUNO ELECTRIC CO.,LTD.		DWG NO.	10CS-X-9301		2/2	

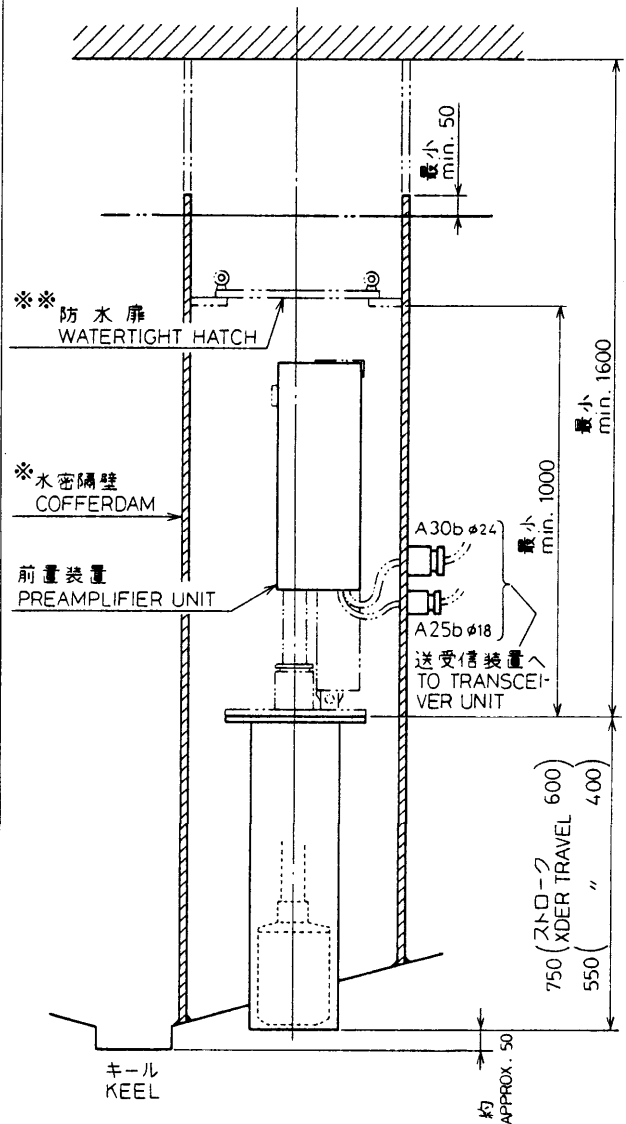
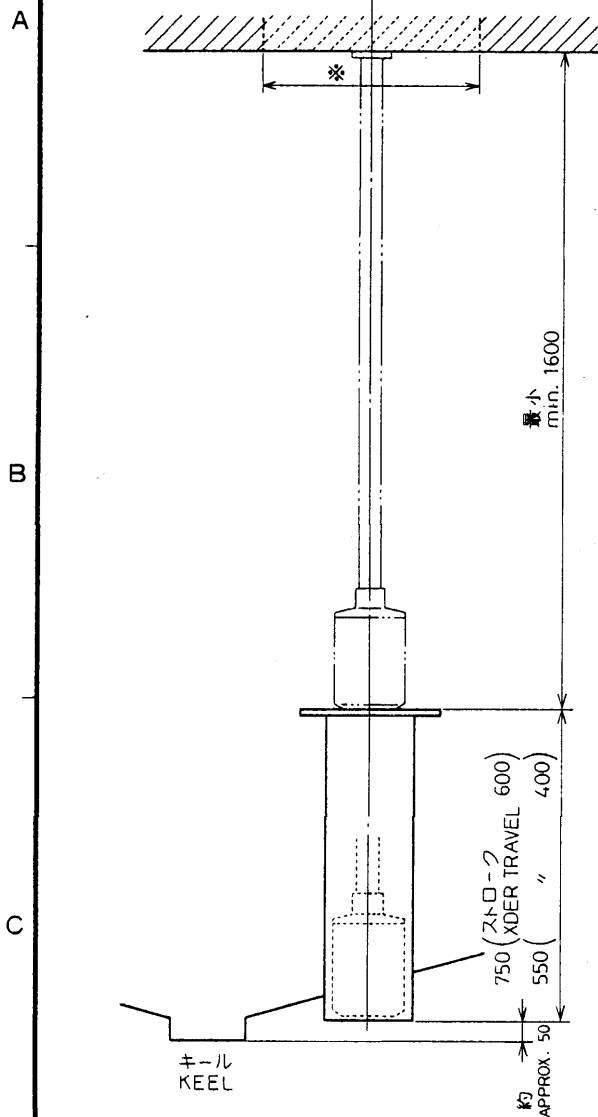
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

型式/コード番号が2段の場合、下段より上段に代わる過渡期品でどあり、ちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

## 標準装備 STANDARD INSTALLATION

## 防水室内装備 WATERTIGHT ROOM INSTALLATION



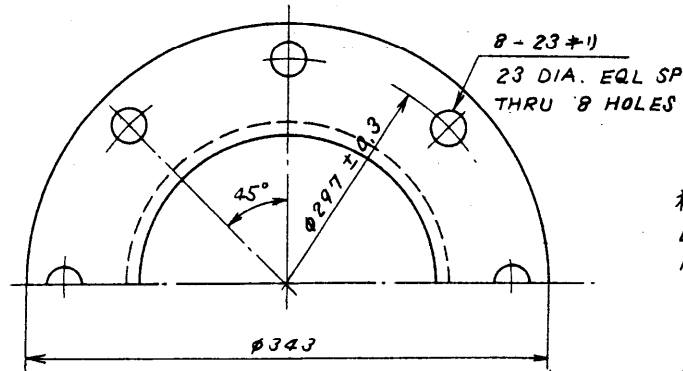
※ 上下装置上部に1600mmのサービス空間を取れない場合は、天井に“300×300”の穴をあけておくこと。

※ IF OVERHEAD CLEARANCE OF 1600MM IS NOT ALLOWED, MAKE A HOLE OF 300×300MM ON CEILING FOR EASE OF INSTALLATION AND FUTURE SERVICE.

1. 水密隔壁は船級協会規則を参照し、造船所で作成下さい。その際サービススペースも考慮して下さい。
2. ※※水密隔壁の上限を吃水線の上までとれない場合には上下装置取り外しの為、防水扉を設けること。
1. CONSTRUCT THE COFFERDAM IN ACCORDANCE WITH CONCERNED REGULATION. ALSO ALLOW ENOUGH MAINTENANCE SPACE.
2. ※※ PROVIDE A WATER TIGHT HATCH FOR FUTURE MAINTENANCE IF A COFFERDAM IS NOT HIGH ABOVE WATER LEVEL.

CSH-5		品番 ITEM	品名 NAME		材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	• •	三角法 THIRD ANGLE PROJECTION		名称 TITLE	格納タンクの装備例 RETRACTION TANK INSTALLATION METHOD			
検図 CHECKED	• •	尺度 SCALE	✕					
製図 DRAWN	M. USUDA	重量 WEIGHT	kg		図番 DWG.NO.	C1273-Y02-A		

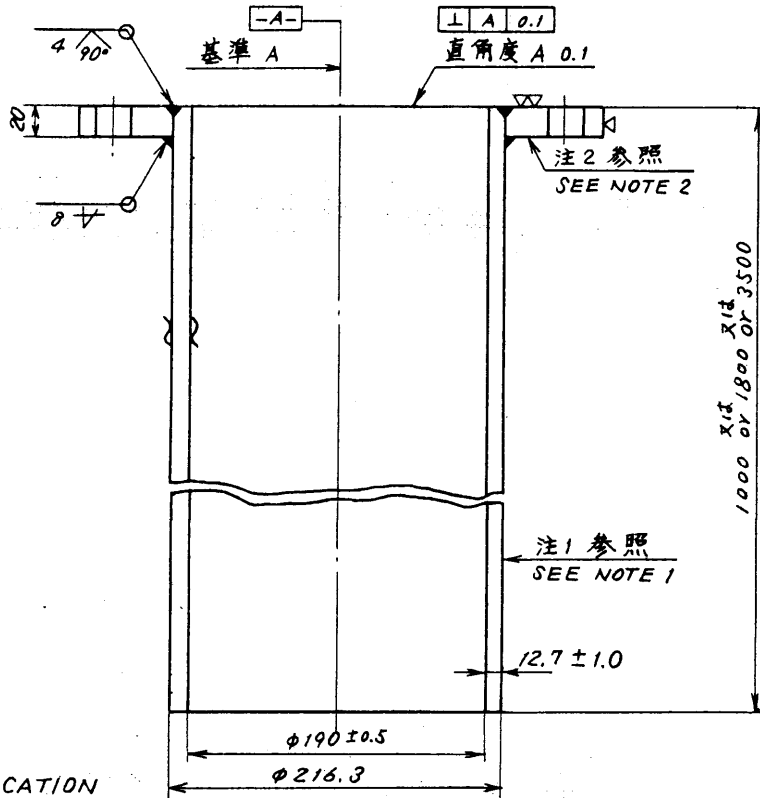
A



格納タンクの長さ;  
LENGTH OF  
RETRACTION TANK;

Lt =  mm

B



製作時の注意  
NOTE FOR FABRICATION

1. 材料はSTPG38-E-C(圧力配管用炭素鋼管冷間仕上電気抵抗溶接鋼管呼び径200Aスケジュール80)を使用のこと。
2. 材料はSS41Pを使用のこと。
3. タンク側面は大日本ペイント速乾鉛丹ペイントを2回塗布のこと。
4. タンク内面はビニールAF(中国塗料)を2回塗布のこと。
5. タンク上面は塗装しないこと。

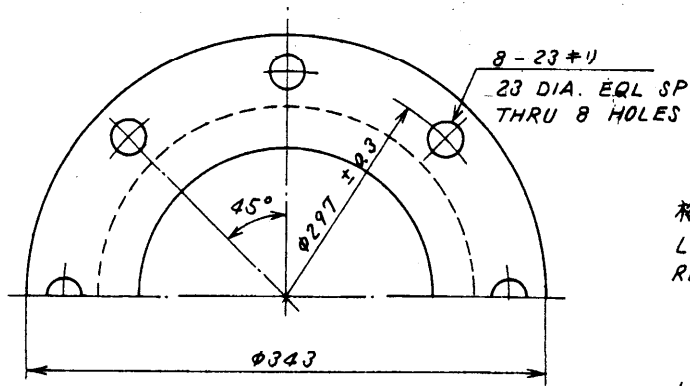
D

1. USE STPG-38-E-C (8" SCHEDULE 80, JIS G3454, CARBON STEEL PIPE FOR PRESSURE SERVICE).
2. USE SS41P (JIS G3101, ROLLED STEEL FOR GENERAL STRUCTURE).
3. GIVE TWO COATS OF FAST-DRYING RED LEAD PAINT ON OUTSIDE OF TANK.
4. GIVE TWO COATS OF VINYL PAINT AF OR ANTI-FOULING PAINT ON INSIDE OF TANK.
5. DO NOT PAINT ON SURFACE OF FLANGE.

単位 UNIT: mm

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	三角法 THIRD ANGLE PROJECTION	名称 TITLE 鉄製格納タンク外觀図 STEEL RETRACTION TANK OUTLINE DRAWING			
検図 CHECKED	尺度 SCALE 1/5				
製図 DRAWN	重量 WEIGHT	図番 DWG.NO. C1229-006-G			
		1000mm : 73 1800mm : 123 kg 3500mm : 231			

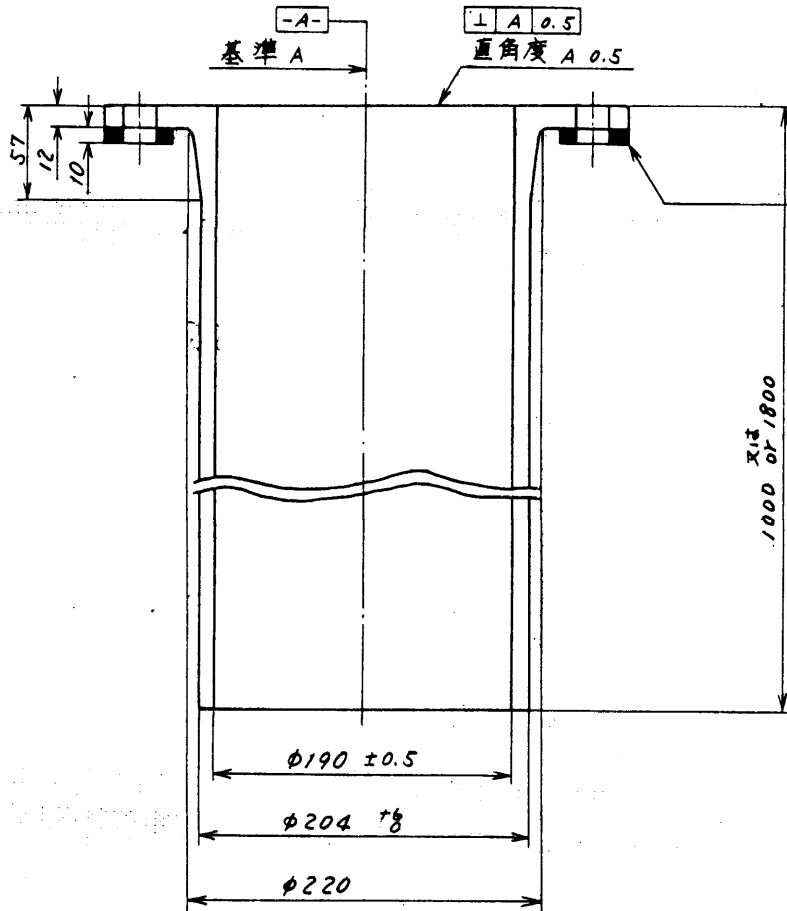
A



格納タンクの長さ;  
LENGTH OF  
RETRACTION TANK;

Lt =  mm

B



鉄製補強フランジ  
STEEL  
REINFORCING  
FLANGE

C

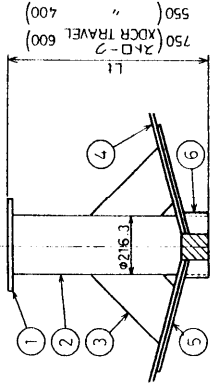
D

単位 UNIT: mm

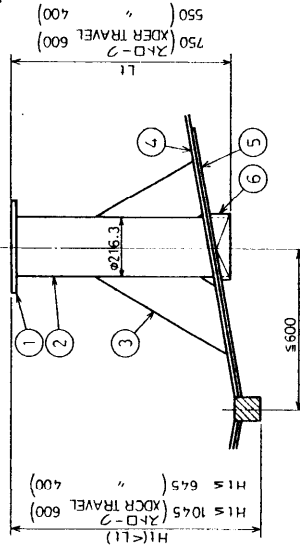
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
------------	------------	----------------	------------	---------------	---------------

承認 APPROVED	三角法 THIRD ANGLE PROJECTION		名称 TITLE		
検 CHECKED	尺 SCALE	度 1/5	FRP製格納タンク外觀図 FRP RETRACTION TANK OUTLINE DRAWING		
製 DRAWN	重 WEIGHT	1000mm: 20kg 1800mm: 27kg	図 DWG.NO.	C1229-007-E	

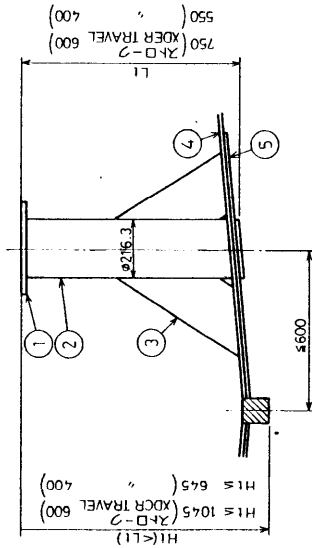
① キール上 (突出) ON KEEL (PROJECTED)



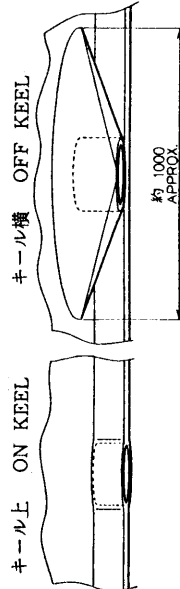
② キール横 (突出) OFF KEEL (PROJECTED)



③ キール横 (非突出) OFF KEEL (NOT PROJECTED)



④ 整流覆 FAIRING PLATE



## INSTALLATION METHOD OF RETRACTION TANK

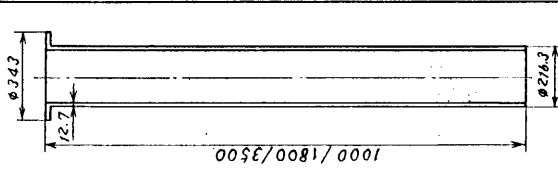
- Cut out  $\phi 217$  hole on hull and inner hull plate.
- Install tank to hull plate with fillet welding taking the following points into account.
  - Flange face is horizontal at normal Ship's trim.
  - Allow height "Ht" of flange face from keel bottom as mentioned in the drawings, otherwise transducer beam is blocked by the keel when transducer is fully lowered.
  - Tank's length "Lt" should be less than "Ht", otherwise the tank is protruded below keel level. The tank should be cut to the specified length so that the transducer can be fully protruded. (The tank is supplied with 1000 mm long as standard.)
- Fit doubling plate ③ of outer dia.  $\phi 1000$ mm around the tank on hull plate. Fit fairing plate ④ referring to the drawing ④ for installation method ④ and ⑤. Use same material and thickness of doubling and fairing plate as hull plate.
- Provide cofferdam around the tank in order to isolate the tank from the oil tank.
- Install 4 pcs. of reinforcement plates between the tank and the hull plate.
- Allow clearance of more than 100mm below the flange face for easy bolting. Lower the inner hull plate as shown in the drawing ⑥ if the specified clearance is not secured.

## 装 備 手 順

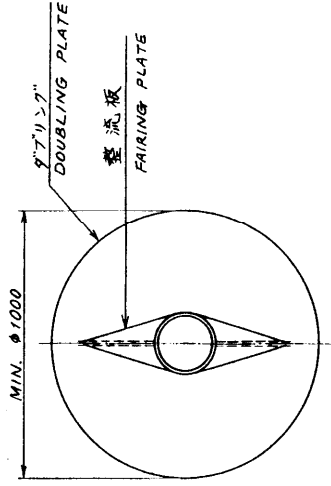
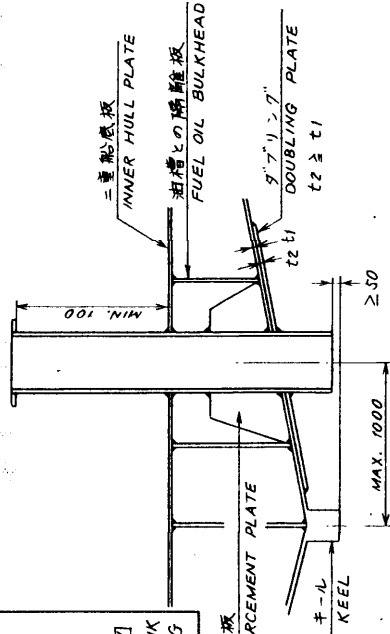
- 船底板及び二重船底板に $\phi 217$ の穴を開ける。
- 次の点に注意して、格納タンクを船底板に連続スミ肉溶接する。
  - タンクのフランジ面が、操縦走行時に水平になる事。
  - 送受波器を突出させた時に送受信ビームがキールで遮られないように、フランジ面のキールよりの高さ "Ht" を図示の範囲内にする事。
  - タンク下端がキールより下に出ないよう、タンクの長さ "Lt" は "Ht" より短くする。且つ、送受波器がタンク下端より出ないように図示の範囲内にする。(標準支給長1000mm)
- 格納タンクの周囲に外径 $\phi 1000$ 以上のダブリング③を取り付ける。又、突出接継 (④、⑤) の場合には、整流覆④ (D図) を取り付ける。ダブリングと整流覆には、船底板と同じ材質、肉厚のものを使用する事。
- タンク周囲に油槽がある場合には、隔壁⑥をめぐらせコファダム⑥を設ける事。
- タンク周囲4ヶ所以上に補強板⑤を溶接する。
- 上下装置本体を格納タンクにボルト締めるのに必要なスペースとして、フランジ面の位置が二重船底板より100mm以上離す。二重船底が高い船には⑥図の方法で二重船底板を下げ、スペースを確保する事。

品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG.NO.	備 考 REMARKS
6	整流覆 FAIRING PLATE				
5	ダブリング DOUBLING				
4	船底板 HULL PLATE				
3	補強板 REINFORCEMENT PLATE				
2	格納タンク RETRACTION TANK				
1	タンクフランジ TANK FLANGE				

DRAWN	Apr. 25 '97
CHECKED	T. YAMASAKI
APPROVED	Apr. 25 '97 Kikisawaki
SCALE	1/1
APPLICABLE TO:	MASS KE
DWG. NO.	C-1273-I01-C



格納タンク外觀図  
RETRACTION TANK  
OUTLINE DRAWING



4. 格納タンクの装備は次の条件を満すこと。
- 1) 取付位置は船首から1/3 (小型船の場合は1/2) 程度。
  - 2) キールより1m以内。
  - 3) フランジのボルト締めのたのフランジ下面と構造物 (ニ重船底等) との間に100mm以上のスペースがあること。
  - 4) タンクの先端はキールの先端より50mm以上であること。
  - 5) タンクのフランジ面は標準走航時に水平であること。

2. 格納タンクの周辺の船底板に径1000程度のダブリングを施工すること。
3. 格納タンクの突出部分に網眼板を兼ねた整流板を設けること。
4. 必要に応じて格納タンク周辺に油槽との隔離板を設けること。またタンク周囲、3.4ヶ所を船底板に向けて補強板を添付すること。

注: 強度及び水密性について、船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

1. SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
  - 1) ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW ON FORE-AFT LINE.
  - 2) WITHIN 1000 mm FROM KEEL LINE.
  - 3) ALLOW CLEARANCE OF MORE THAN 100 mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
  - 4) KEEP LOWEST END OF TANK 50 mm ABOVE BOTTOM OF KEEL.
  - 5) TANK FLANGE SHOULD BE EXACTLY HORIZONTAL WHEN SHIP IS NORMALLY TRIMMED.
2. DOUBLING PLATE OF ABOUT 1000 mm IN DIA. SHOULD BE INSTALLED BY THE SHIPYARD.
3. FAIRING PLATE (NET PROTECTOR) SHOULD BE INSTALLED AROUND THE PARTS OF THE TANK PROTRUDING FROM THE HULL BOTTOM BY THE SHIPYARD.
4. IF REQUIRED, FUEL OIL BULKHEAD AND REINFORCEMENT PLATE SHOULD BE INSTALLED BY THE SHIPYARD.

CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG.NO.	備考 REMARKS
承認 APPROVED	Nov. 9. 1977				
検図 CHECKED	Nov. 8. 1977				
製図 DRAWN	1977. 11. 7				
名称 TITLE		格納タンク船底装備図 (鋼船) RETRACTION TANK INSTALLATION ON STEEL HULL			
三角法 THIRD ANGLE PROJECTION		R 度 SCALE			
重量 WEIGHT		C1243-017-F			

CSH-5  
CSH-5 MARK-2  
CH-12/14/16/24/26

単位 UNIT: mm

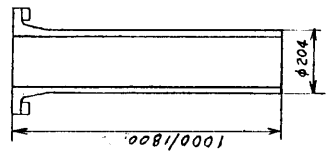
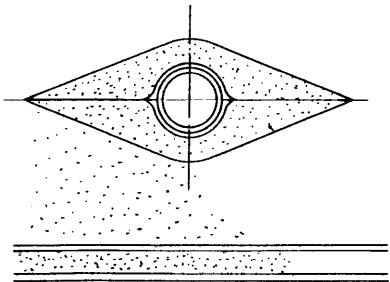
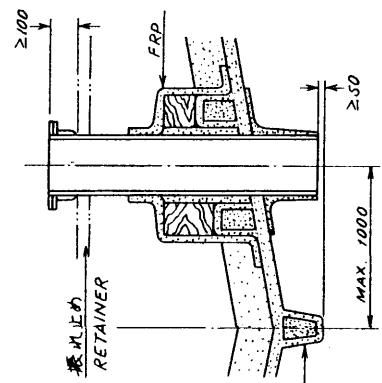
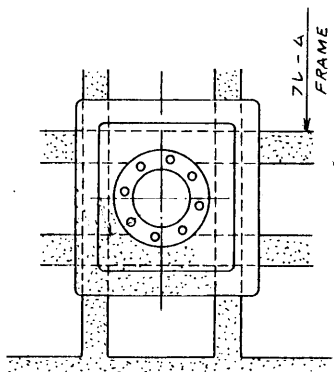


- 格納タンクの設備は次の条件を満たすこと。  
 1) 取付位置は船首から1/3 (小型船の場合は1/2)程度。  
 2) キールより1m以内。  
 3) フランジのボルト締めのためフランジ下面と障害物 (二重船底等)との間に100mm以上のスペースが必要であること。  
 4) タンクの底端はキールの先端より50mm上であること。  
 5) タンクのフランジ面は標準走航時に水平であること。
- 浸水を防ぐため充分にFRPで必要箇所を塗り固める。特にタンク面は流線型に成型し水による飛泥及び気泡発生を最少限におさえる様努めること。
- 必要に応じてタンクのフランジ面下部100mmの位置より隔壁等に向けて撤止めを設けること。

注: 強度及び水密性について、船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

- SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
  - ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW.
  - WITHIN 1000mm FROM KEEL LINE.
  - ALLOW CLEARANCE OF MORE THAN 100mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
  - KEEP LOWEST END OF TANK 50mm ABOVE BOTTOM OF KEEL.
  - TANK FLANGE SHOULD BE EXACTLY HORIZONTAL WHEN SHIP IS NORMALLY TRIMMED.
- APPLY FRP AROUND THE PARTS OF THE TANK PROTRUDING FROM THE HULL BOTTOM FOR SUFFICIENT REINFORCEMENT. MAKE A FAIRING BLOCK WITH FRP AROUND THE PROTRUDING PARTS OF THE TANK TO MINIMIZE THE EFFECT OF AERATION.
- IT IS ADVISABLE TO PROVIDE REINFORCEMENT ANGLES BETWEEN THE TANK AND THE ADJACENT BULKHEAD OR CEILING.

CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.



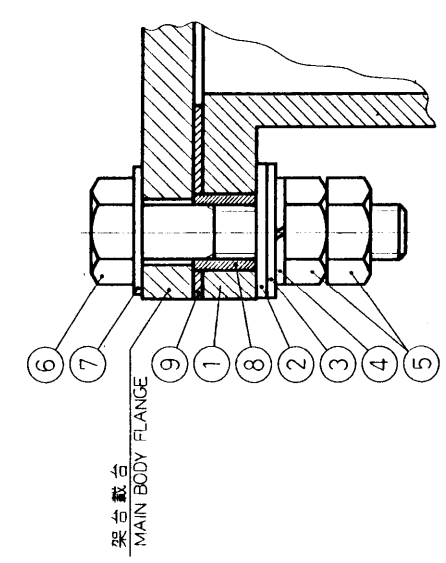
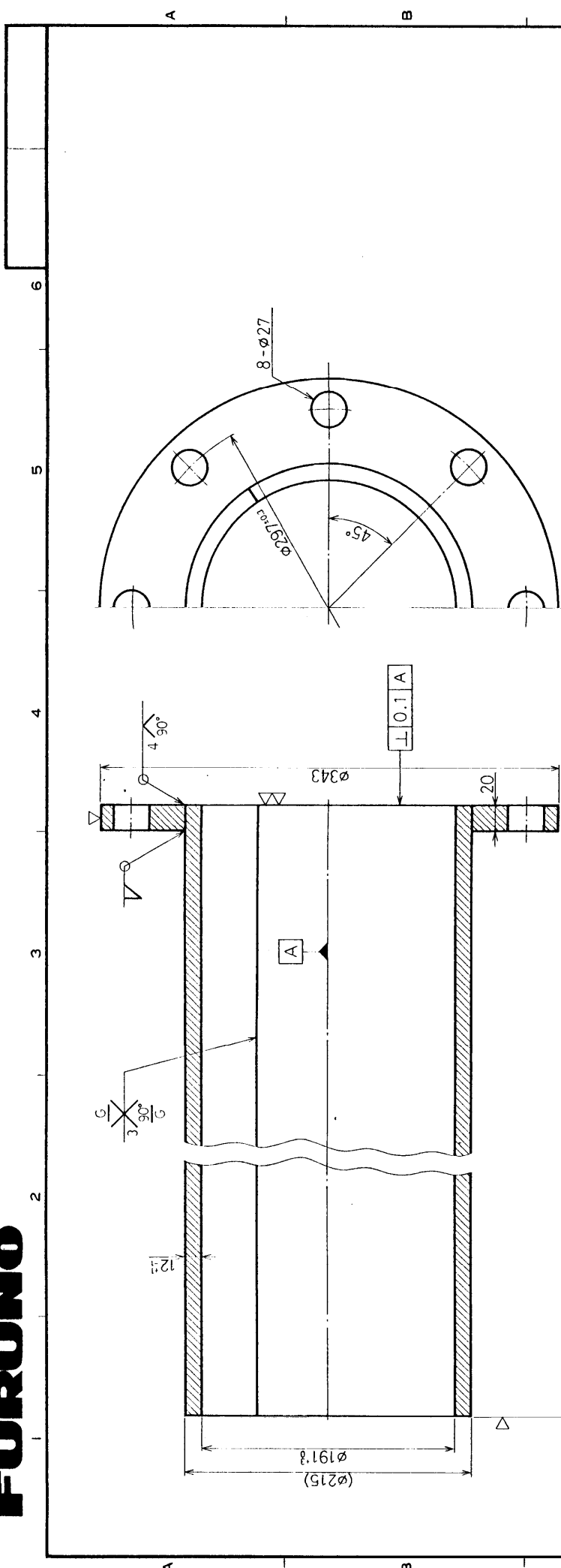
FRP製格納タンク外観図  
FRP RETRACTION TANK  
OUTLINE DRAWING

承認 APPROVED	検査 CHECKED	製図 DRAWN	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q.TY	図番 DWG.NO.	備考 REMARKS
				三角法 THIRD ANGLE PROJECTION				
				尺 SCALE				
				重量 WEIGHT				
				kg				
				図番 DWG.NO.				

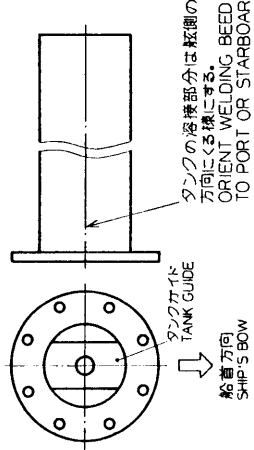
CSH-5  
CSH-5 MARK-2  
CH-12/14/16/24/26

C1220-038-F





α) 格納タンク装備要領  
ORIENTATION OF TANK



(注) 架台、格納タンクに他の電気機器のアースを取らないこと。  
NOTE: DO NOT CONNECT GROUNDING WIRE OF OTHER EQUIPMENT TO RETRACTION TANK.

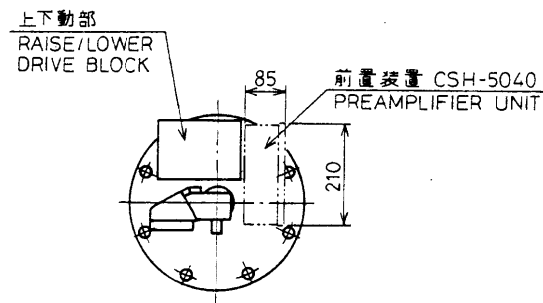
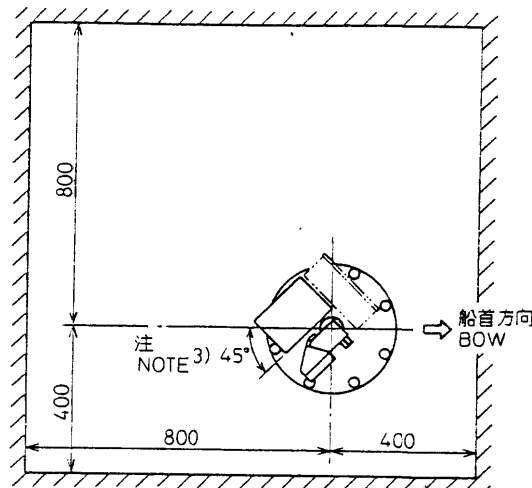
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG.NO.	備要 REMARKS
9	フランジパッキン GASKET	CR	1	SHJ-0009-1	
8	絶縁パッキン (2) INSULATION PACKING (2)	CR	8	MS-1000-68	
7	皿座金 FLANGE WASHER	SUS304	8	M20 用	
6	六角ボルト HEX. BOLT	SUS304	8	M20 x 100	
5	六角ナット HEX. NUT	SUS304	8	M20	
4	スプリングワッシャー SPRING WASHER		8		
3	ワッシャー WASHER	SUS304	8	SHG-0002	
2	絶縁板 (2) INSULATION WASHER (2)	CR	8	SHG-0004	
1	格納タンク (アルミ) RETRACTION TANK	A5083	1	10-044-26011	

承認 APPROVED	DEC. 27. '90 T. UJAKAWA	三 THIRD	角 ANGLE	法 PROJECTION	名 TITLE
検 CHECKED	DEC. 27. '90 T. Miyoshi	R	度 SCALE	/	格納タンク(アルミ)外寸図 RETRACTION TANK (ALUMINIUM)
製 DRAWN	DEC. 27. '90 H. USUDA	重 WEIGHT	3.5 kg	図 DWG. NO.	C1273-G09-A

CSH-5

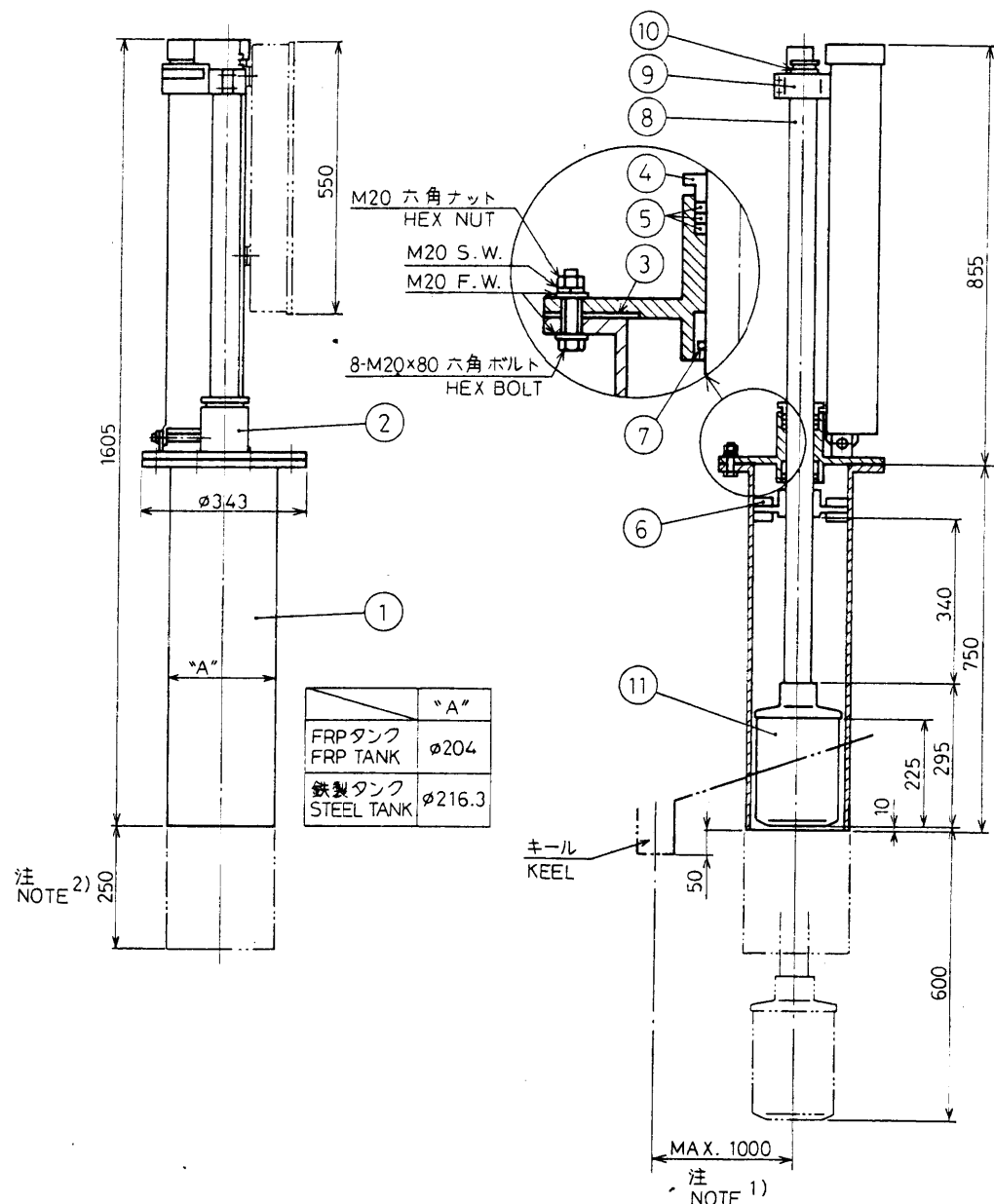
This page is intentionally left blank.

推奨保守点検用スペース (尺度 1/20)  
RECOMMENDED SERVICE SPACE (SCALE 1/20)



- 注 1) 装備位置は船首から1/3 (小型船では1/2) 程度でキールから1m以内とする。  
 2) 格納タンクは装備位置に応じて250mm以内で切断する。  
 3) 左図の如く船首-船尾ラインと上下動部の角度が約45°となるよう装備する。  
 図では上下動部は左舷船尾側に位置しているが、右舷船尾側、左舷船首側  
 又は、右舷船首側でもよい。  
 4) 装備後は装備要領書を参照し船首線調整を行うこと。

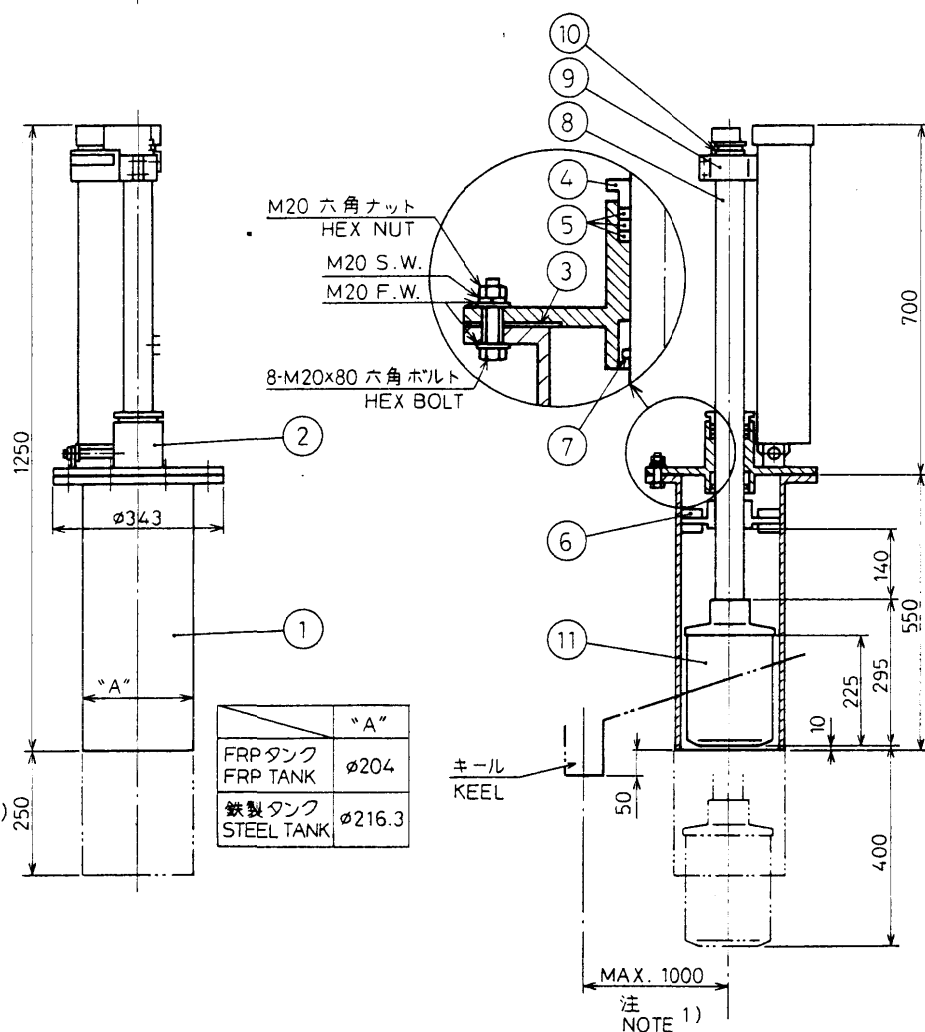
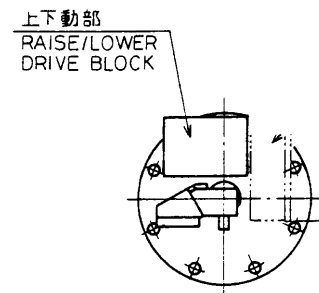
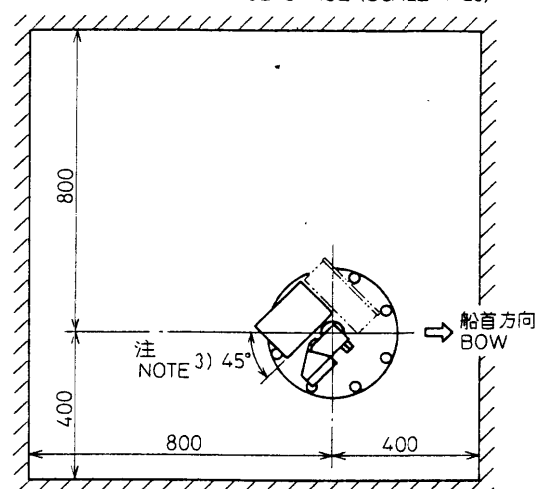
- NOTE 1) THE HULL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF THE SHIP'S LENGTH FROM THE BOW ON THE FORE-AFT LINE AND BESIDE THE KEEL LINE (LESS THAN 1000mm FROM KEEL LINE).  
 2) CUT THE TANK WITHIN 250MM IN LENGTH ACCORDING TO INSTALLATION METHOD.  
 3) THE HULL UNIT SHOULD BE ORIENTED SO THAT THE SHIP'S FORE-AFT LINE CROSSES THE RAISE LOWER DRIVE BLOCK AT AN ANGLE OF APPROXIMATELY 45° AS SHOWN AT LEFT. NOTE THAT POSITIONS WHICH ARE ROTATED IN 90°-STEPS FROM THE SHOWN POSITION ARE ALSO ALLOWED.  
 4) HEADING ADJUSTMENT SHOULD BE PERFORMED AFTER INSTALLATION, REFERRING TO THE INSTALLATION MANUAL.



11	送受波器 TRANSDUCER		1		
10	止め金具 STOPPER		1		
9	パイプ取付金具 SHAFT RETAINER		1		
8	上下シャフト(1) MAIN SHAFT (1)		1		
7	O-リング O-RING	JISB2401 CLASS 1A	1		
6	タンクガイド TANK GUIDE		1		
5	グリスコットン GREASE COTTON		3		
4	グリスコットン押え台 GREASE COTTON RETAINER		1		
3	フランジパッキン GASKET		1		
2	架台 載台 MAIN BODY FLANGE		1		
1	格納タンク RETRACTION TANK	STPG38 SS41P	1		
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

承認 APPROVED	OCT. 4. 89 TKAKANO	三角法 THIRD ANGLE PROJECTION	名称 TITLE	上下装置外寸図 HULL UNIT	
検図 CHECKED	OCT. 4. 89 T. Koda	尺度 SCALE	1/15	CSH-5040 (ストローク XDCR TRAVEL 600mm)	
製図 DRAWN	OCT. 4. 89 M. YOSHIDA	重量 WEIGHT	75 kg	図番 DWG. NO.	C1273-G05-B

推奨保守点検用スペース (尺度 1/20)  
RECOMMENDED SERVICE SPACE (SCALE 1/20)

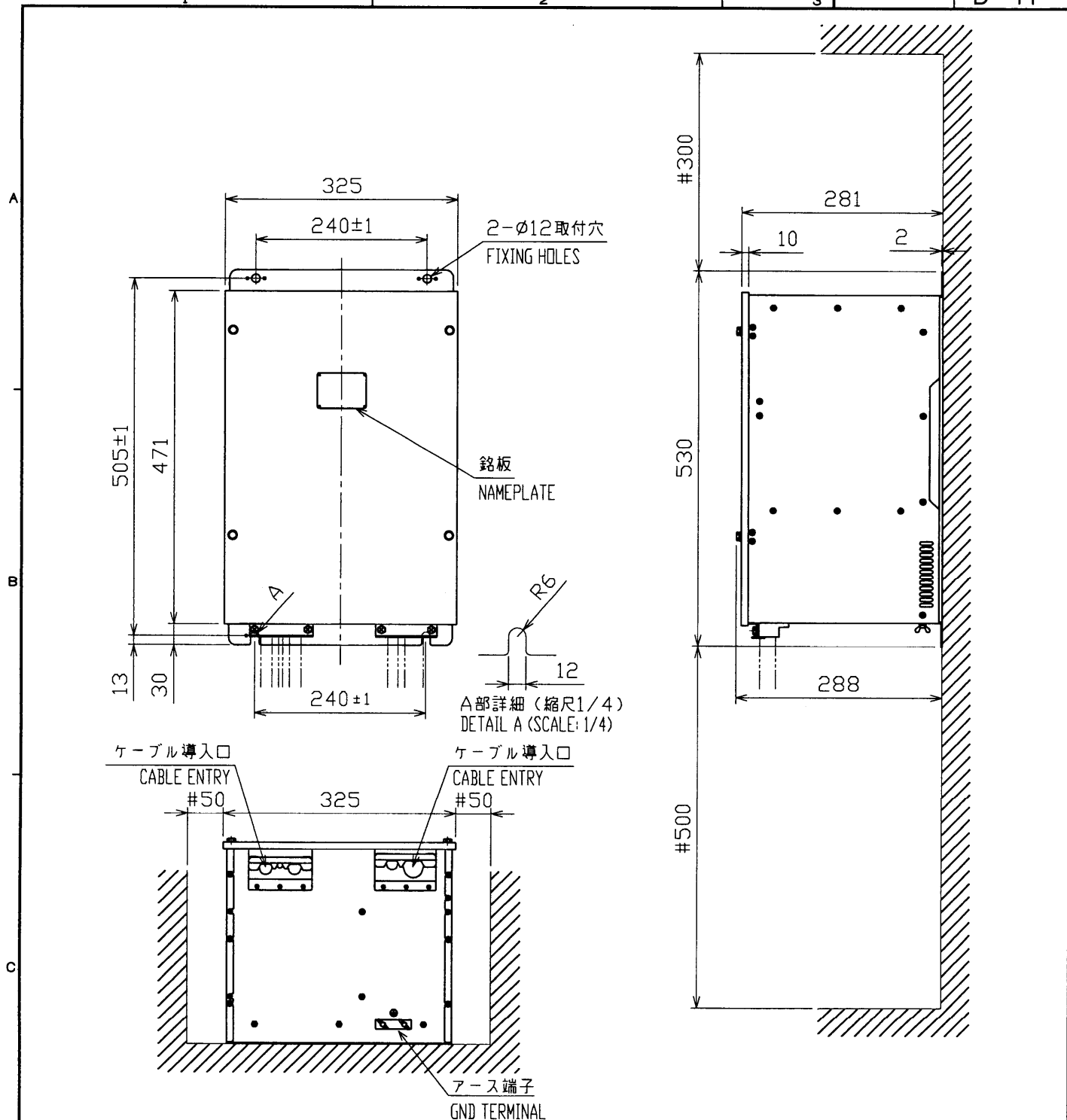


- 注 1) 装備位置は船首から1/3 (小型船では1/2) 程度でキールから1m以内とする。  
 2) 格納タンクは装備位置に応じて250mm以内で切断する。  
 3) 左図の如く船首-船尾ラインと上下動部の角度が約45°となるよう装備する。  
 図では上下動部は左舷船尾側に位置しているが、右舷船尾側、左舷船首側  
 又は、右舷船首側でもよい。  
 4) 装備後は装備要領書を参照し船首線調整を行うこと。

- NOTE 1) THE HULL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF THE SHIP'S LENGTH FROM THE BOW ON THE FORE-AFT LINE AND BESIDE THE KEEL LINE (LESS THAN 1000mm FROM KEEL LINE).  
 2) CUT THE TANK WITHIN 250MM IN LENGTH ACCORDING TO INSTALLATION METHOD.  
 3) THE HULL UNIT SHOULD BE ORIENTED SO THAT THE SHIP'S FORE-AFT LINE CROSSES THE RAISE LOWER DRIVE BLOCK AT AN ANGLE OF APPROXIMATELY 45° AS SHOWN AT LEFT. NOTE THAT POSITIONS WHICH ARE ROTATED IN 90° STEPS FROM THE SHOWN POSITION ARE ALSO ALLOWED.  
 4) HEADING ADJUSTMENT SHOULD BE PERFORMED AFTER INSTALLATION, REFERRING TO THE INSTALLATION MANUAL.

11	送受波器 TRANSDUCER		1		
10	復止め金具 STOPPER		1		
9	パイプ取付金具 SHAFT RETAINER		1		
8	上下シャフト(1) MAIN SHAFT (1)		1		
7	O-リング O-RING	JISB2401 CLASS 1A	1		
6	タンクガイド TANK GUIDE		1		
5	グリスコットン GREASE COTTON		3		
4	グリスコットン押え台 GREASE COTTON RETAINER		1		
3	フランジパッキン GASKET		1		
2	架台載台 MAIN BODY FLANGE		1		
1	格納タンク RETRACTION TANK	STPG38 SS41P	1		
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED	OCT. 4. 89 T. YAKAHO	三角法 THIRD ANGLE PROJECTION	名称 TITLE	上下装置外寸図 HULL UNIT	
検図 CHECKED	Oct. 4. 89 T. Koda	尺度 SCALE	1/15	CSH-5041 (ストローク XDCR TRAVEL 400mm)	
製図 DRAWN	OCT. 4. 89 M. USUDA	重量 WEIGHT	70 kg	図番 DWG.NO.	C1273-G06-B



**注 記**

- 1) #印寸法は最小サービス空間寸法とする。
- 2) 指定外の寸法公差は表1による。
- 3) 取付用ネジはM10ボルト、またはコーチボルト呼び径9を使用のこと。

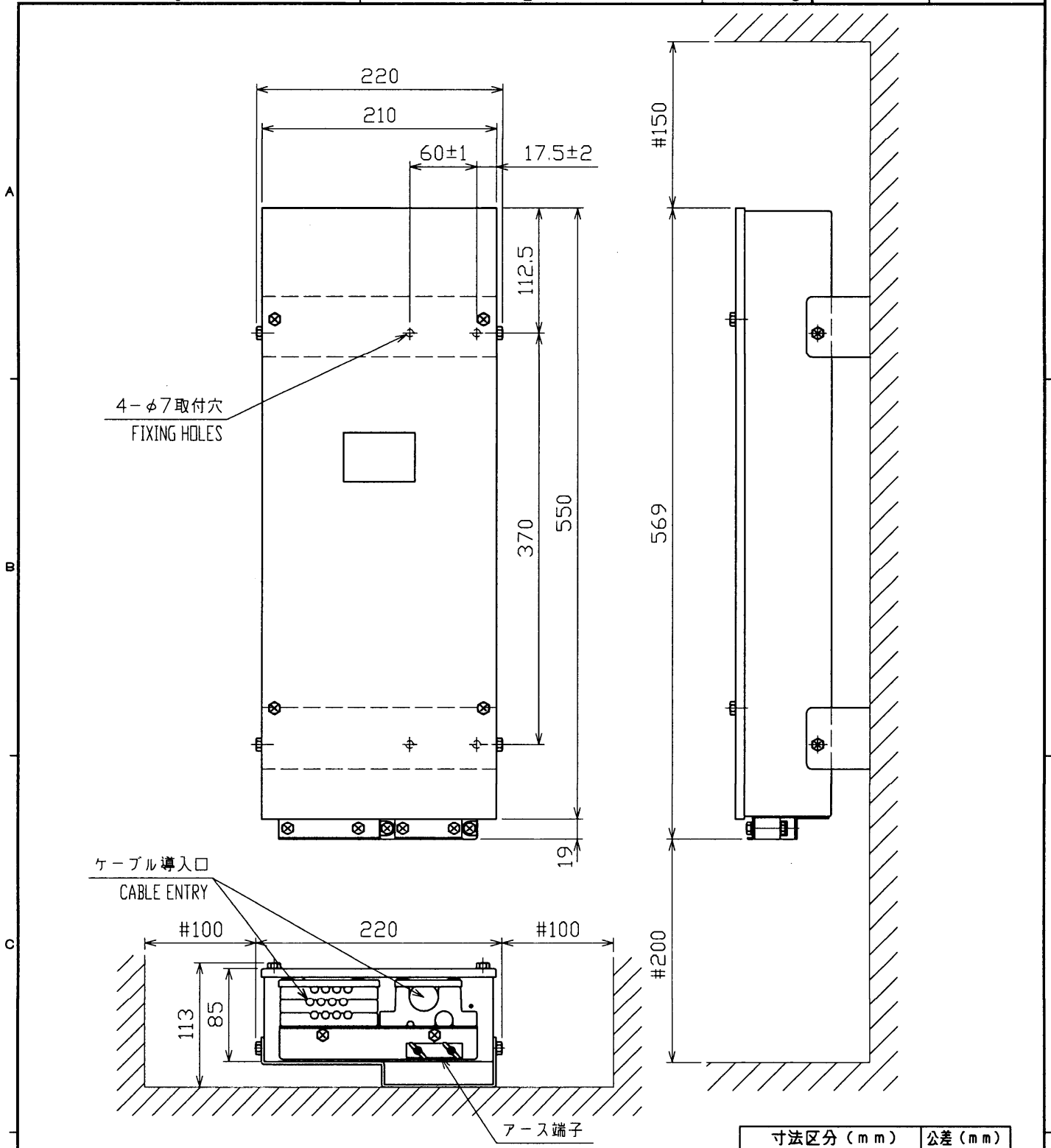
**NOTE**

1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE M10 BOLTS OR COACH SCREWS φ9 FOR FIXING THE UNIT.

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
L ≤ 50	± 1.5
50 < L ≤ 100	± 2.5
100 < L ≤ 500	± 3
500 < L ≤ 1000	± 4

表 1 TABLE 1

DRAWN Dec. 13 '02 T. YAMASAKI	TITLE CSH-5030/5130
CHECKED Dec. 13 '02 Y. KIMURA	名称 送受信装置
APPROVED Dec. 16, '02 Y. Kimura	外寸図
SCALE 1/8 MASS 20 ±10% kg	NAME TRANSCEIVER UNIT
DWG.No. C1273-G07-D	10-044-410G-1 OUTLINE DRAWING



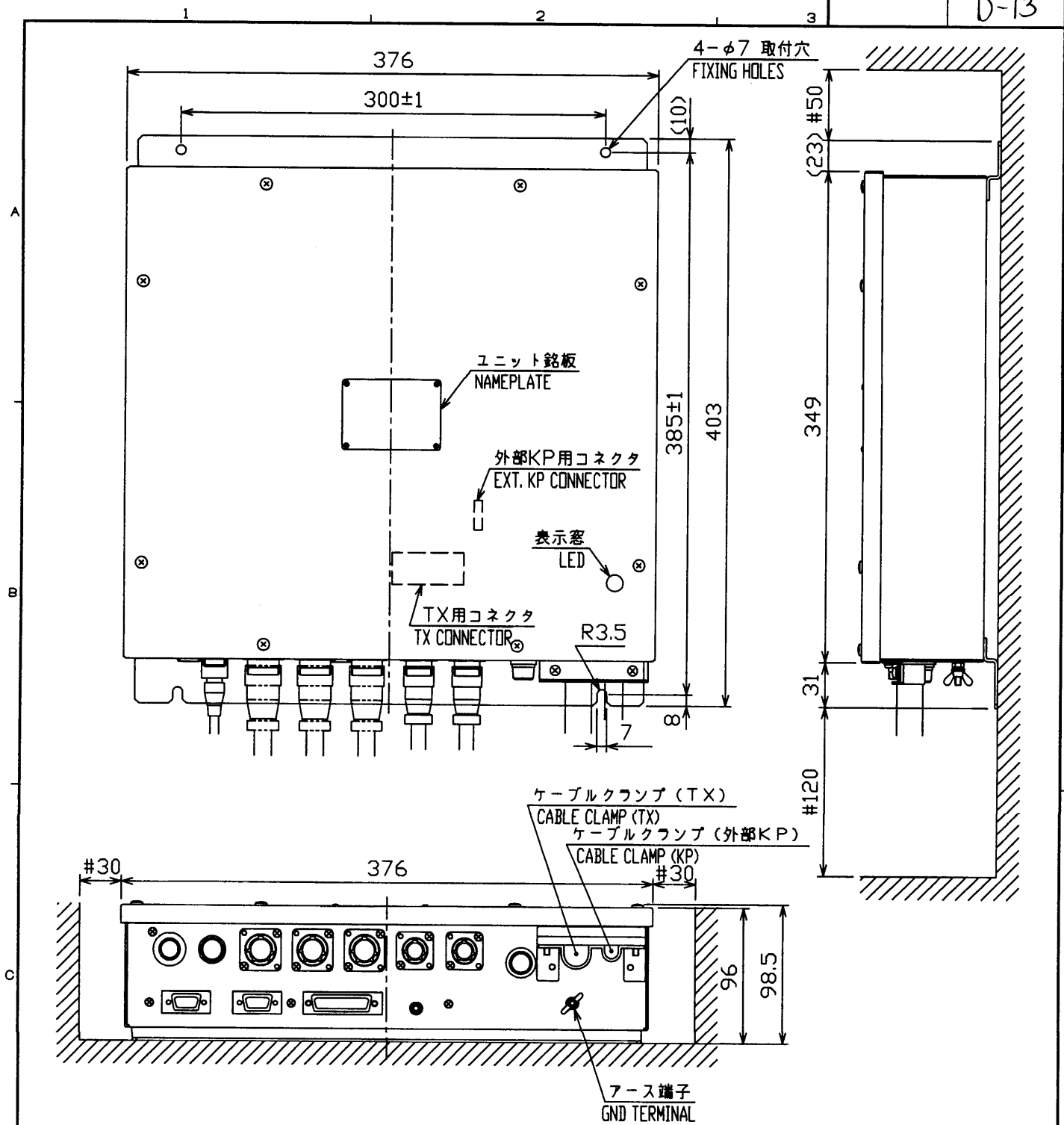
- 注 記 1) #印寸法は最小サービス空間寸法とする。  
 2) 指定外の寸法公差は表1による。  
 3) 取付用ネジはM6ボルトを使用のこ。

- NOTE 1. #: RECOMMENDED SERVICE CLEARANCE.  
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.  
 3. USE M6 BOLTS FOR FIXING THE UNIT.

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 3
$500 < L \leq 1000$	± 4

表 1 TABLE 1

DRAWN Dec. 13 '02 T.YAMASAKI		TITLE CSH-5020
CHECKED Dec. 13 '02 Y.KIMURA		名称 前置装置
APPROVED Dec. 16, '02 <i>Y. Kimura</i>	CSH-5L CSH-5/ 5MARK-2	外寸図
SCALE 1/5	MASS 6.5 ±10% kg	NAME PREAMPLIFIER UNIT
DWG.No. C1273-G04- D	10-044-200G-2	OUTLINE DRAWING



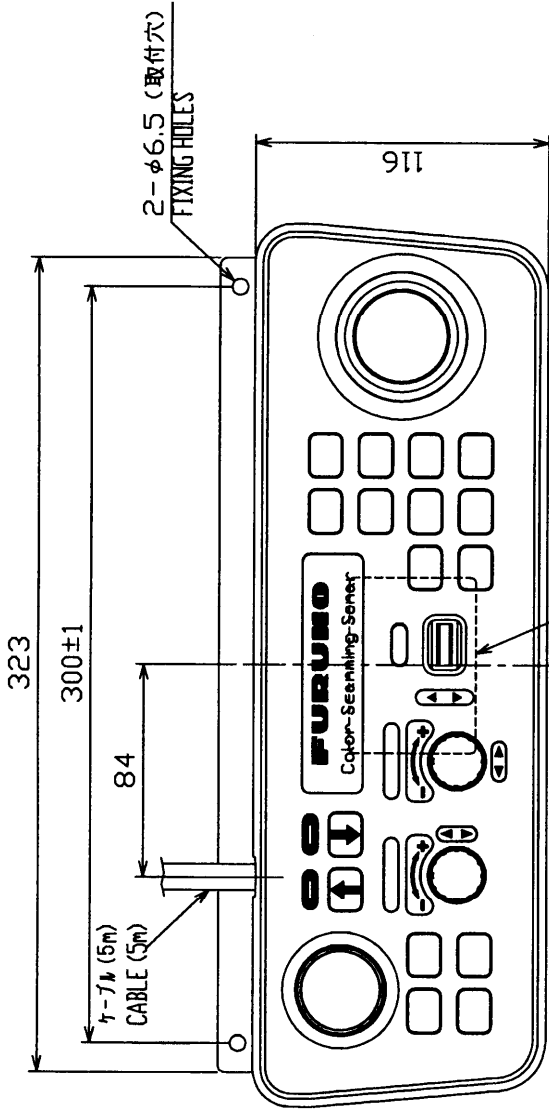
- 注 記 1) #印寸法は最小サービス空間寸法とする。  
 2) 指定外の寸法公差は表1による。  
 3) 取付用ネジはM6ボルト、またはコーチボルト呼び径6を使用

- NOTE 1. #: RECOMMENDED SERVICE CLEARANCE.  
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.  
 3. USE M6 BOLTS OR COACH SCREWS  $\phi 6$  FOR FIXING THE UNIT.

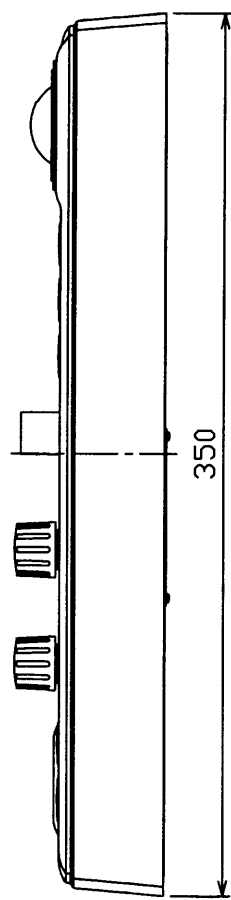
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$

表1 TABLE 1

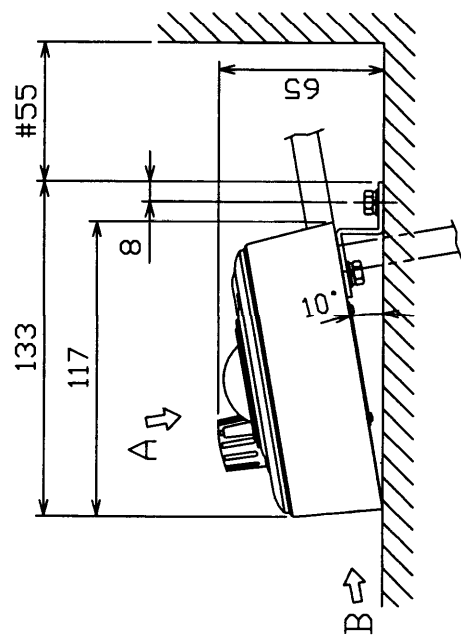
DRAWN Dec. 5 '02 I. YAMASAKI	CHECKED Dec. 5 '02 Y. KIMURA	APPROVED Dec. 5 '02 Y. Kimura	TITLE CSH-5210
SCALE 1/4	MASS 3.4 kg	CSH-5L/8L	名称 制御部
DWG. No. C1319-G01-B	10-078-300G-1		外寸図 NAME PROCESSOR UNIT
			OUTLINE DRAWING



矢視 A VIEW A  
 ユニット銘版 (50x70 t=2)  
 NAMEPLATE (50x70, t=2)



矢視 B VIEW B



寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
L ≤ 50	± 1.5
50 < L ≤ 100	± 2.5
100 < L ≤ 500	± 3

表 1 TABLE 1

- 注 記 1) # 印寸法は最小サービス空間寸法とする。  
 2) 指定外の寸法公差は表 1 による。  
 3) 取付用ネジはトラスタップピンネジ呼び径 5、または M5 ボルトを使用のこと。

- NOTE 1. # RECOMMENDED SERVICE CLEARANCE.  
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.  
 3. USE M5 BOLTS OR TAPPING SCREWS φ5 FOR FIXING THE UNIT.

DRAWN	Dec.13 '02 IYAMASAKI	TITLE	CSH-5211
CHECKED	Dec.16 '02 YKIMURA	名称	操作部 (卓上装備、金具付)
APPROVED	Dec.16 '02 Y. Kimura	外寸図	
SCALE	1/3 MASS 3.5 kg	質量はケーブル位置を含む。 MASS W/ CABLE.	
DMG No.	C1319-G02-B		10-078-200G-1
			OUTLINE DRAWING



寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
L ≤ 50	± 1.5
50 < L ≤ 100	± 2.5
100 < L ≤ 500	± 3

表 1 TABLE 1

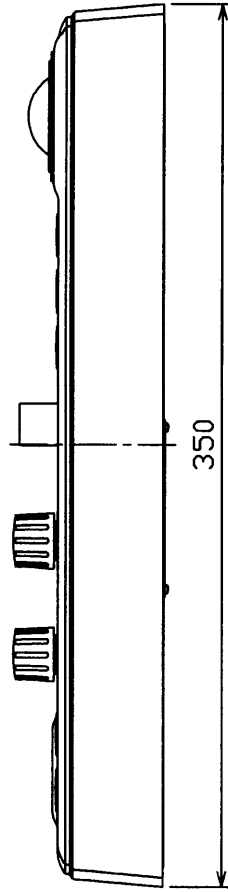
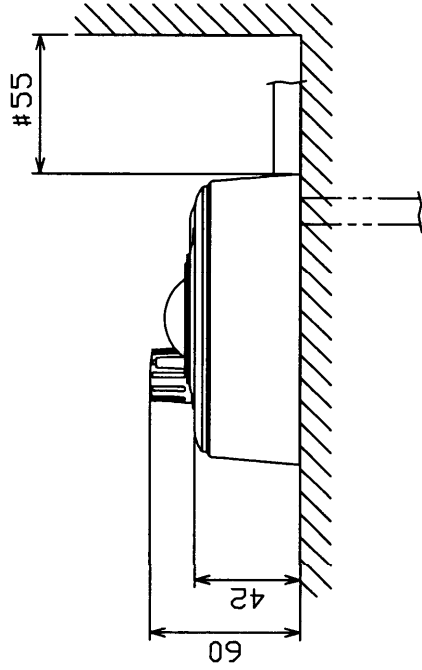
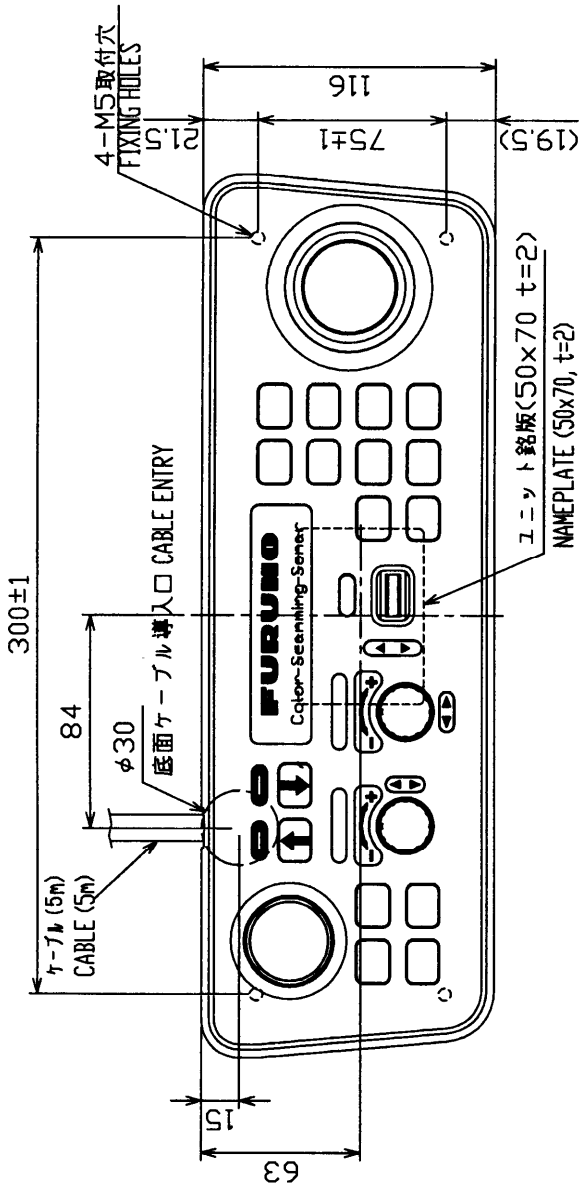
5

4

3

2

1

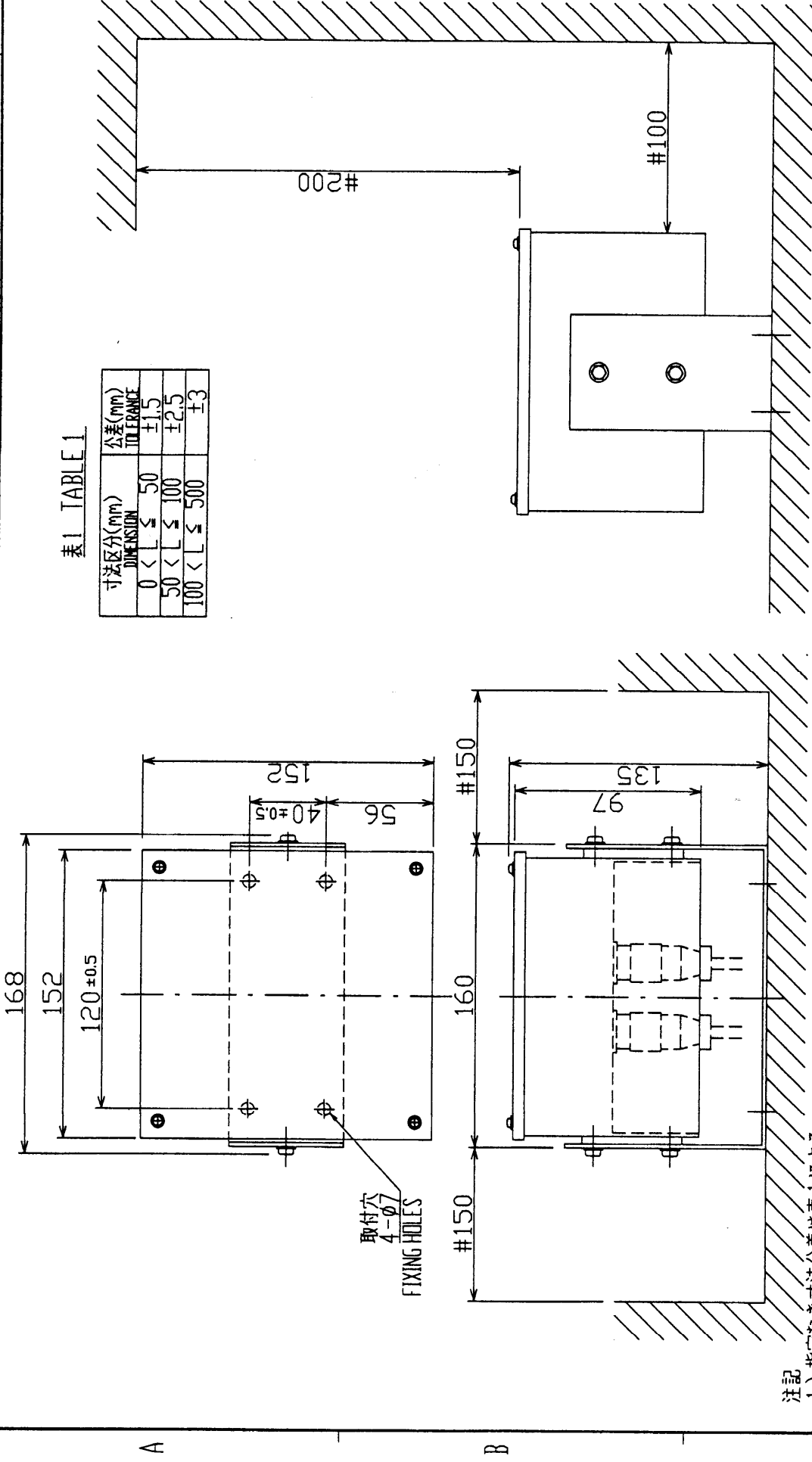


- 注 記
- 1) #印寸法は最小サービス空間寸法とする。
  - 2) 指定外の寸法公差は表 1 による。
  - 3) 取付用ネジは M5 ボルトを使用のこと。  
ボルトが内部に 12 mm 以上入り込まないこと。

- NOTE
1. # RECOMMENDED SERVICE CLEARANCE.
  2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
  3. USE M5 BOLTS FOR FIXING THE UNIT.  
DO NOT FASTEN BOLTS INTO UNIT 12 mm OR MORE.

DRAWN	Dec. 13 '02	I. YAMASAKI	TITLE	CSH-5211
CHECKED	Dec. 16 '02	Y. KITAJIMA	名称	操作部 (卓上装備)
APPROVED	Dec. 16, '02	Y. Kamezono	外寸図	外寸図
SCALE	1/3	質量 3.2 kg	質量はケーブル置きを含む。 MASS W/ CABLE	NAME CONTROL UNIT (TABLETOP MOUNT)
DWG No.	C1319-G03-B	10-078-201G-1	OUTLINE DRAWING	

2 3 4



取付穴  
4-φ7  
FIXING HOLES

- 注記
- 1) 指定なき寸法公差は表1による。
  - 2) #: 推奨する最小サービス空間寸法。
  - 3) 船首マーク(FORE)を船首方向に向けて、きょう体を水平に取り付けること。

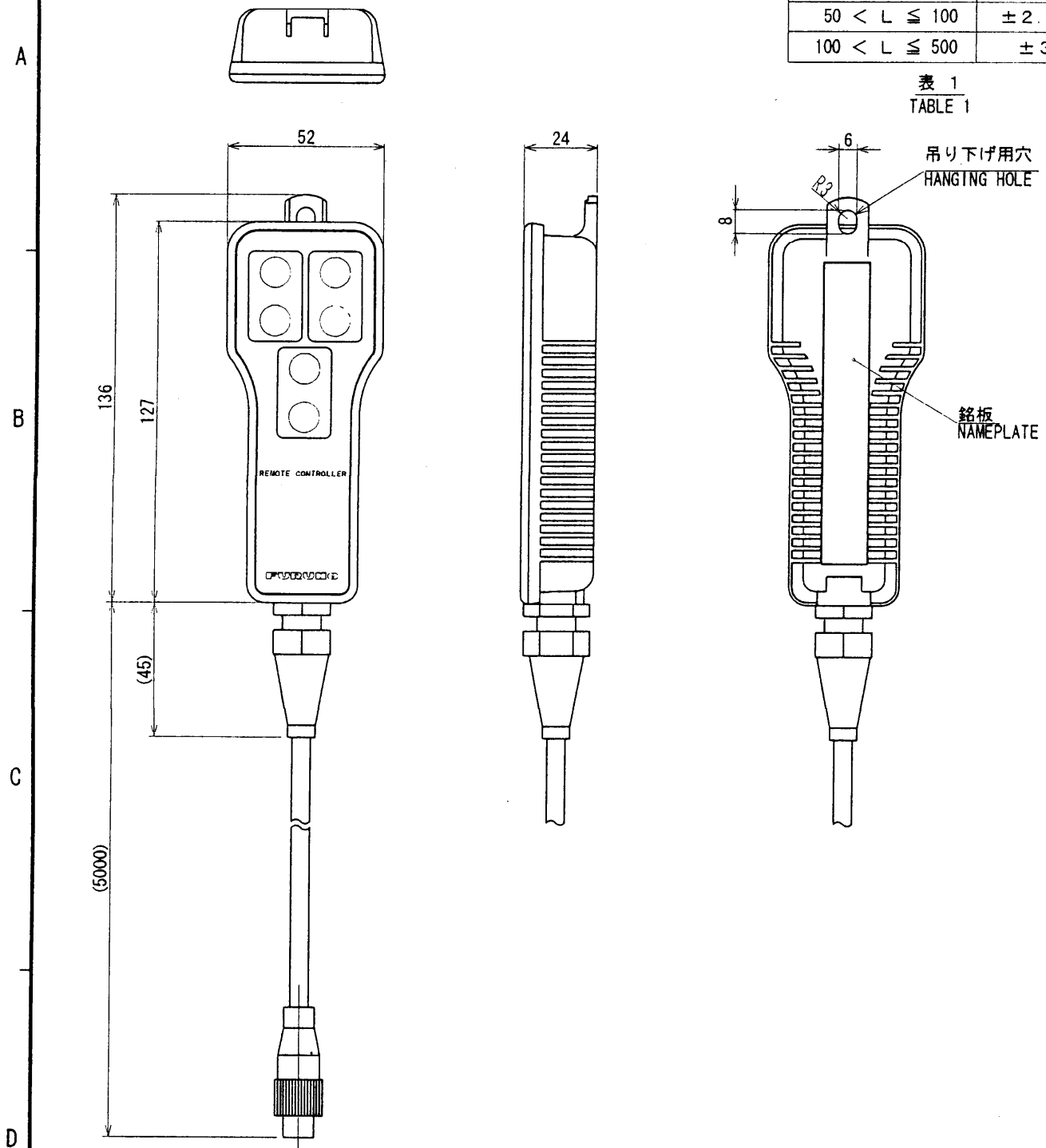
NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: RECOMMENDED SERVICE CLEARANCE.
3. ORIENT THE 'FORE' MARK ON THE UNIT TOWARD SHIP'S BOW AND MOUNT THE UNIT LEVEL IN PARALLEL WITH SURFACE.

DRAWN NO. 601 I YAMASAKI	TITLE MS-100
CHECKED I YAMASAKI	名称 動揺検出器
APPROVED I YAMASAKI	外寸図
SCALE 1/3	NAME MOTION SENSOR
MASS 1.1 kg	OUTLINE DRAWING
DWG. No. C1278-G01-B	

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$0 < L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$

表 1  
TABLE 1



注記 1) 指定なき寸法公差は表 1 による。

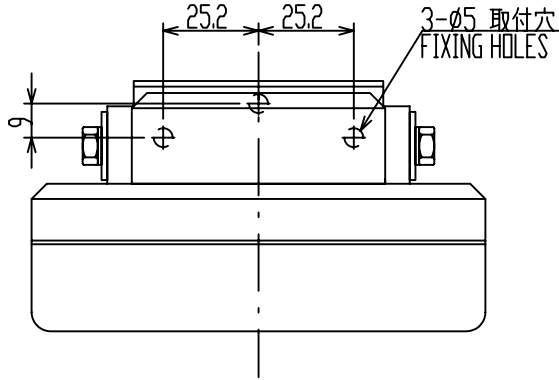
NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN <i>Sept 21 '00 T. YAMASAKI</i>	TITLE CSH-7040
CHECKED <i>Sept 16 '00 T. K...</i>	名称 リモートコントローラ
APPROVED <i>Sept 16 '00 T. K...</i>	外寸図
SCALE 1/2	NAME REMOTE CONTROLLER
MASS ±10% 0.25 kg	質量はケーブル重さを含む MASS W/ CABLE
DWG. No. C1302-G05- B	10-061-5000- G1 OUTLINE DRAWING

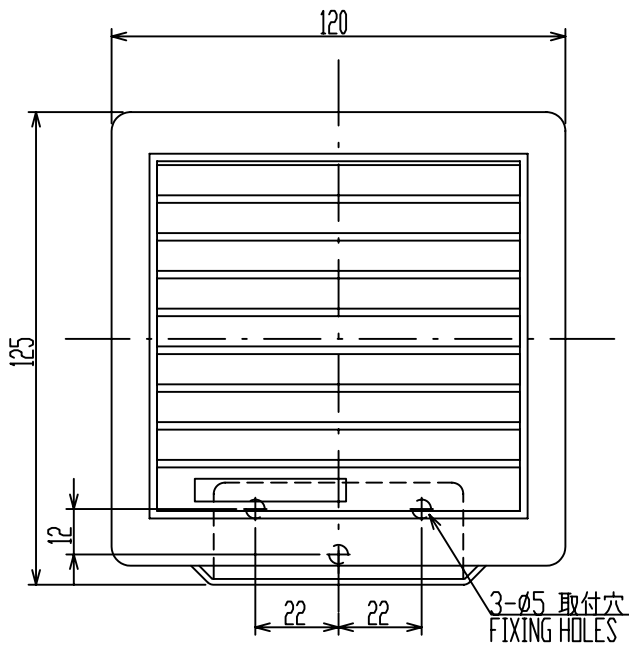
表1 TABLE 1

寸法区分(mm) DIMENSIONS	公差(mm) TOLERANCE
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3

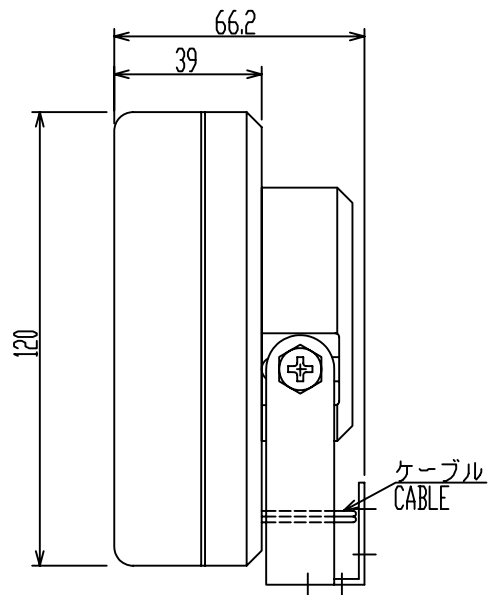
A



B



C

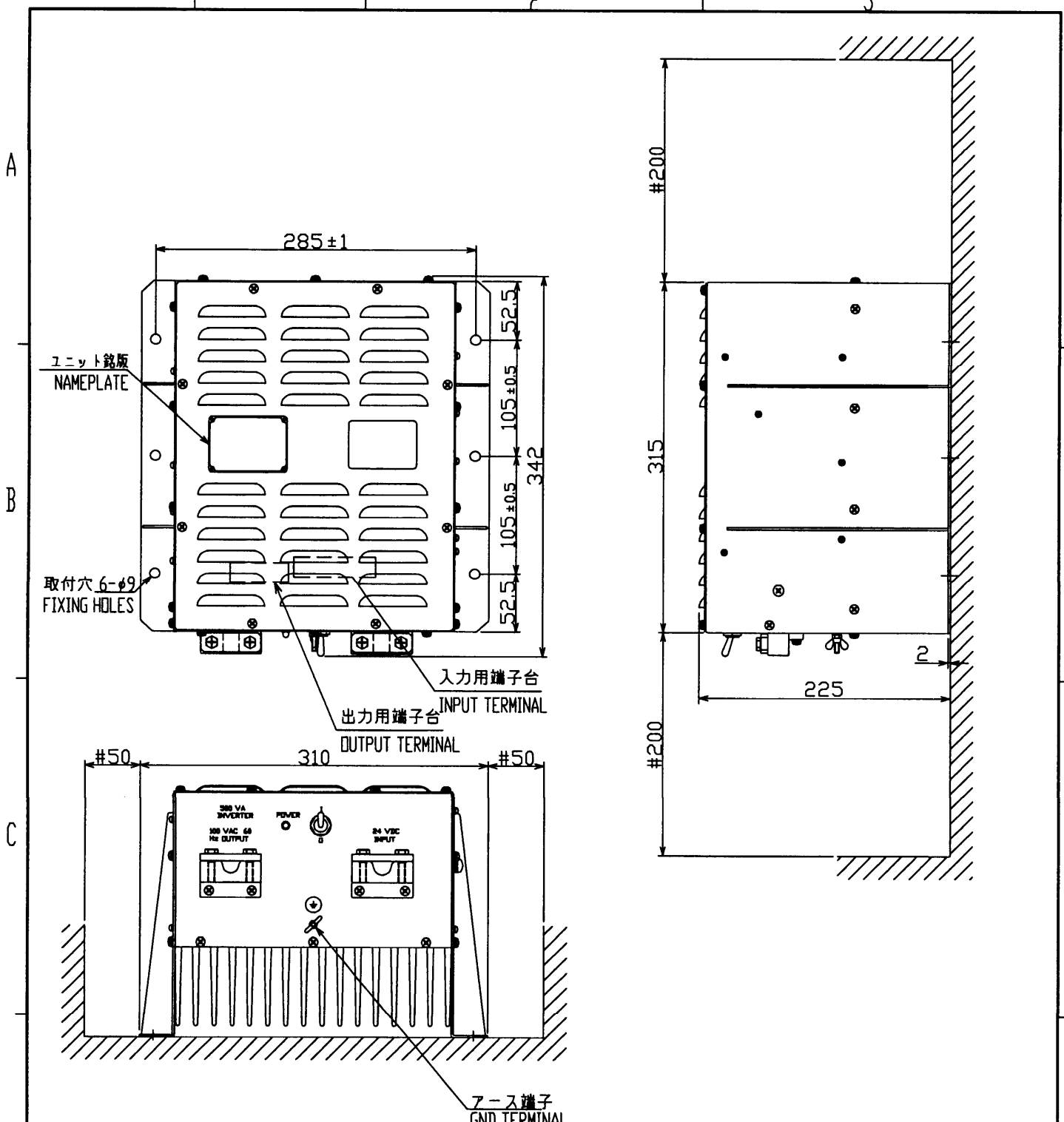


D

注記 1) 指定外寸法公差は表1による。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN	Nov. 25, '06	E. MIYOSHI	TITLE	SEM-21Q
CHECKED		TAKAHASHI, T	名称	スピーカ
APPROVED		Y. Hatai		外寸図
SCALE	1/2	MASS 0.54 ±10% kg	質量は2.8mケーブルを含む MASS W/ 2.8m CABLE	NAME
DWG.No.	C5016-G07-C	REF.No.		LOUDSPEAKER
				OUTLINE DRAWING



注記

- 1) 指定なき寸法公差は表1による。
- 2) #: 推奨するサービス空間寸法。
- 3) 取付けにはM8ボルトまたはコーチボルト呼び径8を使用のこと。

NOTE

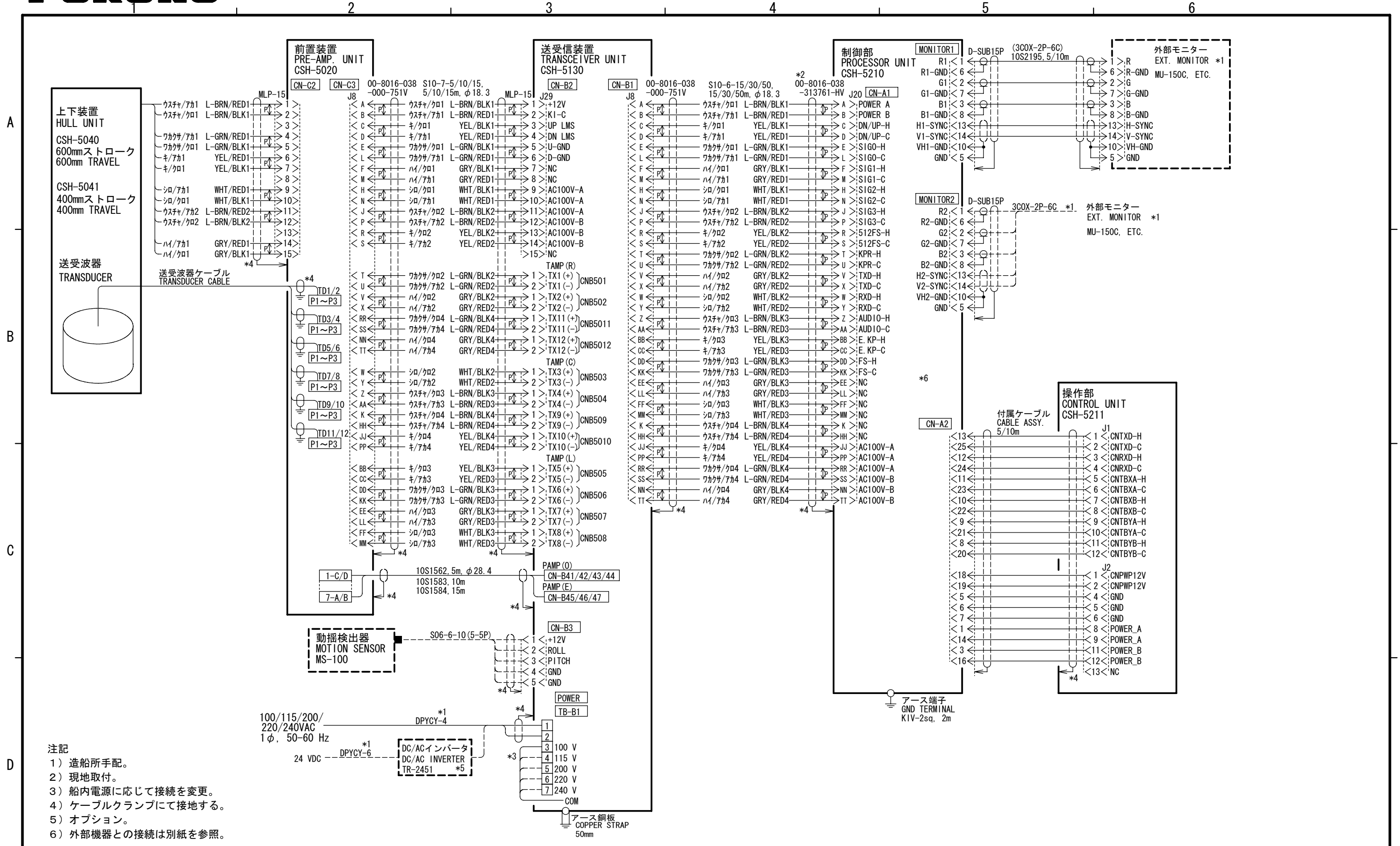
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: RECOMMENDED SERVICE CLEARANCE.
3. USE M8 BOLTS OR COARCH SCREWS  $\phi 8$  FOR FIXING THE UNIT.

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
$0 < L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$

表1 TABLE 1

DRAWN	Dec. 13 '02 T.YAMASAKI	TITLE	TR-2451
CHECKED	Dec. 16 '02 Y.KIMURA	名称	DC/ACインバータ
APPROVED	Dec. 16, '02 <i>Y. Kimura</i>		外寸図
SCALE	1/5	NAME	DC/AC INVERTER
DWG.No.	C1319-G04-B		OUTLINE DRAWING

This page is intentionally left blank.



- 注記
- 1) 造船所手配。
  - 2) 現地取付。
  - 3) 船内電源に応じて接続を変更。
  - 4) ケーブルクランプにて接地する。
  - 5) オプション。
  - 6) 外部機器との接続は別紙を参照。

- NOTE
- \*1: SHIPYARD SUPPLY.
  - \*2: FITTED LOCALLY.
  - \*3: CHANGE WIRE CONNECTION AS POWER SOURCE.
  - \*4: GROUND THRU CABLE CLAMP.
  - \*5: OPTION.
  - \*6: REFER TO ANOTHER DIAGRAM FOR EXTERNAL CONNECTIONS.

DRAWN	MAY 18, '06 E. MIYOSHI	TITLE	CSH-5L
CHECKED	TAKAHASHI. T	名称	カラースキャニングソナー
APPROVED	Y. Hatai		相互結線図
SCALE	MASS kg	NAME	COLOR SCANNING SONAR
DWG. No.	C1319-C01- C		INTERCONNECTION DIAGRAM

1

2

3

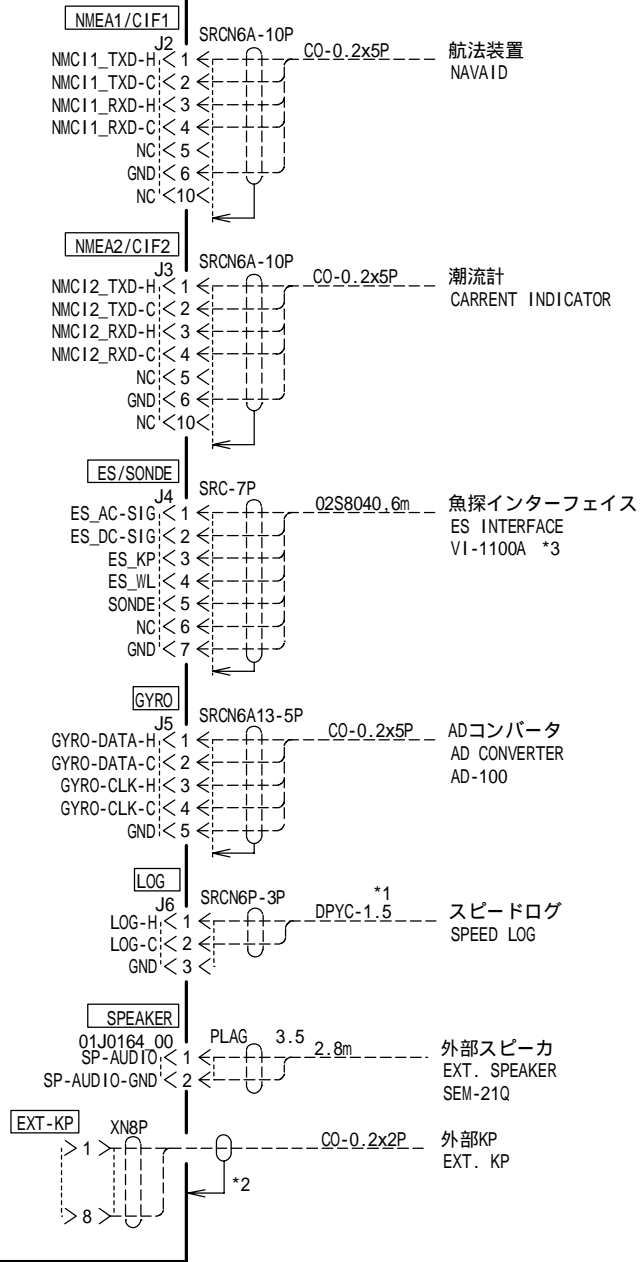
A

B

C

D

**制御部  
PROCESSOR UNIT  
CSH-5210**



**注記**

- 1) 造船所手配。
- 2) ケーブルクランプにて接地する。
- 3) 魚探接続はリニアアンプ信号のみ可。

**NOTE**

- \*1: SHIPYARD SUPPLY.
  - \*2: GROUND THRU CABLE CLAMP.
  - \*3: E/S CONNECTABLE BY LINEAR AMP SIGNAL ONLY.
- CO-0.2x2P: CO-SPEVV-SB-C 0.2x2P, 10.5  
 CO-0.2x5P: CO-SPEVV-SB-C 0.2x5P, 13.5

DRAWN Dec. 5 '02 T. YAMASAKI	TITLE CSH-5210
CHECKED Dec. 5 '02 Y. KIMURA	名称 制御部
APPROVED Dec. 5, 02 <i>Y. Kimura</i>	相互結線図
SCALE MASS kg	NAME PROCESSOR UNIT
DWG. No. C1319-C02- B	INTERCONNECTION DIAGRAM



This page is intentionally left blank.