

# FURUNO

# INSTALLATION MANUAL

COLOR SCANNING SONAR

MODEL CSH-53



**FURUNO ELECTRIC CO., LTD.**  
NISHINOMIYA, JAPAN

© **FURUNO ELECTRIC CO., LTD.**

9-52, Ashihara-cho,  
Nishinomiya, Japan

Telephone: 0798-65-2111  
Telefax: 0798-65-4200

•Your Local Agent/Dealer

All rights reserved.

Printed in Japan

FIRST EDITION : JUL. 1997  
E : OCT. 23, 2001

(HIMA)

PUB. No. IME-13070-E  
CSH-53



\* 00080807500 \*



\* IME13070E00 \*



# SAFETY INSTRUCTIONS



## WARNING



**Do not open the cover unless totally familiar with electrical circuits.**

Hazardous voltage which will cause death or serious injury exists inside the equipment.



**Turn off the power at the mains switchboard before beginning the installation. Post a sign near the switch to indicate it should not be turned on while the equipment is being installed.**

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.



## CAUTION



**Ground the equipment to prevent electrical shock and mutual interference.**

### **Use the proper fuse.**

Use of a wrong fuse can result in fire or permanent equipment damage.

### **Confirm that the power supply is compatible with the voltage rating of the equipment.**

Connection to a wrong power supply can cause fire or equipment damage. Voltage rating appears on the label at the rear of the display unit.

### **Do not exceed 15 knots when raising or lowering the transducer or 18 knots when operating the equipment.**

The transducer may become damaged.

### **Keep the following compass safe distance.**

	Standard	Steering
Display Unit	0.90 m	0.68 m

# TABLE OF CONTENTS

---

<b>1. SYSTEM CONFIGURATION .....</b>	<b>1</b>
<b>2. EQUIPMENT LISTS .....</b>	<b>2</b>
<b>3. MOUNTING THE EQUIPMENT</b>	
3.1 Mounting the Hull Unit .....	4
3.2 Mounting the Display Unit .....	9
3.3 Mounting the Transmitter Unit .....	10
3.4 Mounting the Interface Unit .....	10
3.5 Grounding the Equipment .....	11
<b>4. WIRING</b>	
4.1 How to Use the Crimping Tool, Pin Extractor .....	12
4.2 Location of Connectors, Terminal Boards .....	13
4.3 Assembling Connectors at Transmitter Unit .....	14
4.4 Connection of Transducer Cable .....	16
4.5 Attaching Power Cable Connector NCS-253P .....	17
4.6 Synchronizing Transmission with Other Sonars, Echo Sounders .....	17
<b>5. CONNECTION OF INTERFACE UNIT CS-120A</b>	
5.1 Connections for True Motion and Target Lock .....	18
5.2 Connections for ES Picture and FNZ Markers .....	19
5.3 Connections for Digital Readout of Position, Water Temperature and Depth .....	20
5.4 Wiring .....	21
<b>6. CHANGING POWER SPECIFICATIONS .....</b>	<b>24</b>
<b>7. INSTALLATION OF FRP RETRACTION TANK</b>	
7.1 Before Beginning the Installation .....	25
7.2 Installation of the FRP Retraction Tank .....	26
<b>8. ADJUSTMENT AND CHECK</b>	
8.1 Hull Unit Check .....	28
8.2 Heading Adjustment .....	29
8.3 DIP Switch Setting .....	30
8.4 Setting and Adjustment on the Interface Unit CS-120A .....	31
<b>9. WHEN SHIP'S MAINS IS 24 VAC .....</b>	<b>34</b>
<b>ACCESSORIES/SPARE PARTS/INSTALLATION MATERIALS .....</b>	<b>A-1</b>
<b>OUTLINE DRAWINGS .....</b>	<b>D-1</b>
<b>SCHEMATIC DIAGRAMS .....</b>	<b>S-1</b>

\_\_\_\_\_



## 2. EQUIPMENT LISTS

### Standard Supply

Name	Type	Qty	Wt (kg)	Dimensions	Remarks
Display Unit	CSH-530	1	35	437 x 442 x 525	Tabletop mtg.
Transmitter Unit	CSH-551-	1	82	630 x 651 x 390	
Receiver Unit	CSH-552-	1	26	476 x 525 x 300	w/hull unit
Hull Unit	CSH-5508	1	239	515 x 1861 x 824	stroke 800mm
	CSH-5512-		270	515 x 2470 x 824	stroke 1200mm
	CSH-5508F				stroke 800mm Reinforce type
Remote Control Box	CSH-135	1	0.4	72 x 180 x 18	
External Interface	CS-120A	3		320 x 75 x 190	
Installation Materials	CP10-04300	1 set			CP10-04301
					CP10-03702
					5 Cables
Spare Parts	SP10-02400	1 set			SP10-02401
					SP10-02220
					SP10-02230

### Optional Equipment

Name	Type	Wt (kg)	Code No.	Remarks
FNZ Joint Box	CS-170	2		
Step-down Transformer	PT-400	22		
E/S Interface Unit	VI-1100A	2		
Remote Display Unit	CSH-106	25		
Sub Display Unit	CSH-536	33		
Extension Cable Set	CSH-1600		000-068-165	w/inst. materials
FRP Retraction Tank	OP10-1		000-068-861	
Retraction Tank	SHG-0001	100	006-904-340	
TR Inverter	TR-24100		000-067-351	
TR Inverter	TR-2435		000-018-414	
Hood	FP10-01801		006-027-830	

(Continued on next page)

## Optional Equipment (con't)

Name	Type	Code No.	Remarks
Filter	OP10-11	006-997-710	
Nylon Cover	10-051-1031	000-803-289	
Handle	FP01201	006-989-020	
Signal Cable	S10-10-5 (38P)	006-972-240	5 m, display—transmitter
Signal Cable	S10-10-10 (38P)	006-972-250	10 m, display—transmitter
Signal Cable	S10-10-15 (38P)	006-972-260	15 m, display—transmitter
Signal Cable	S10-11-5 (38P)	006-972-270	5 m, transmitter—receiver
Signal Cable	S10-11-10 (38P)	006-972-280	10 m, transmitter—receiver
Signal Cable	S10-11-15 (38P)	006-972-290	15 m, transmitter—receiver
Signal Cable	S10-12-5 (38P)	006-972-300	5 m, transmitter—receiver
Signal Cable	S10-12-10 (38P)	006-972-310	10 m, transmitter—receiver
Signal Cable	S10-12-15 (38P)	006-972-320	15 m, transmitter—receiver
Signal Cable	S10-14-5	006-972-330	5 m, transmitter—hull unit
Signal Cable	S10-14-10	006-972-340	10 m, transmitter—hull unit
Signal Cable	S10-14-15	006-972-350	15 m, transmitter—hull unit
Signal Cable	CP10-03800	006-972-370	Max. 50 m, display—transmitter
T20 Attachment Flange Set	OP10-12	000-068-166	
T228 Attachment Flange Set	OP10-13	006-983-960	
Mounting Hardware	OP10-9	006-990-040	For remote display

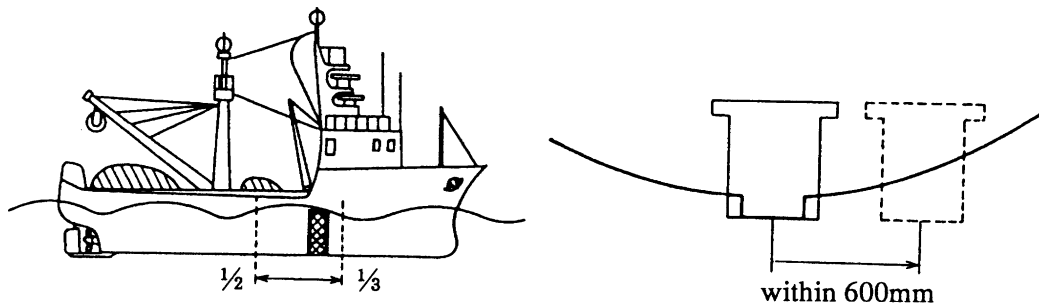
# 3. MOUNTING THE EQUIPMENT

## 3.1 Mounting the Hull Unit

### Location of hull unit

Discussion and agreement are required with the dockyard and the shipowner in deciding the location of the hull unit. When deciding the location, the following points should be taken into account.

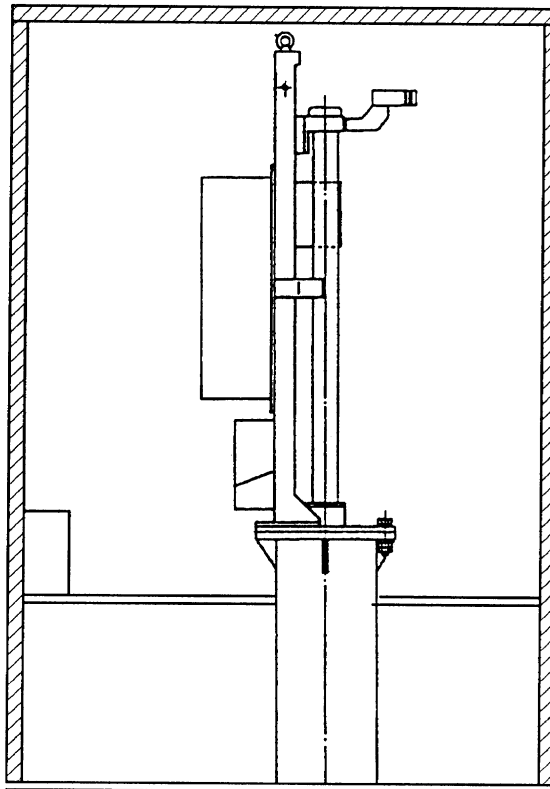
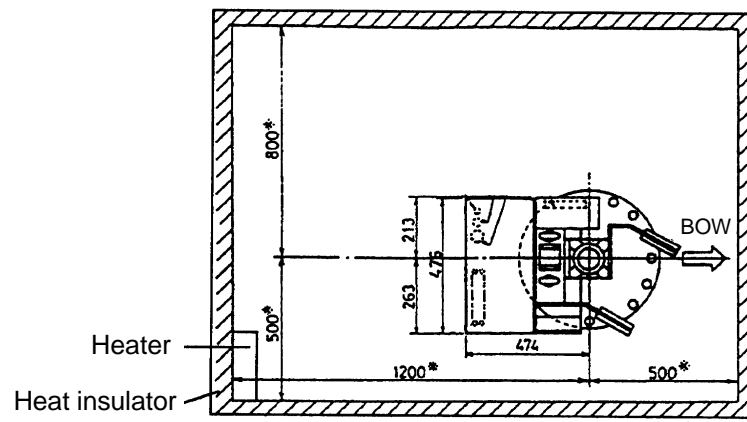
- Select an area where propeller noise, cruising noise, air bubbles and interference from turbulence are at a minimum. Generally, the point at  $1/3$  to  $1/2$  of the ship's length from the bow on or near the keel is optimum. On-the-keel installation is advantageous for minimizing oil consumption in comparison with off-the-keel. If the hull unit can not be installed on the keel, the center of the retraction tank should be within 600 mm of the keel to prevent a rolling effect.



*Figure 3-1 Hull unit mounting location*

- Select a place where the hull bottom is flat and the draft is sufficiently deep. Normally, the transducer should protrude at least 500 mm beyond the keel to minimize the effect of air foam and bubbles.
- 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.
- No obstacle should be in the fore direction since it causes a shadow zone and aerated water, resulting in poor sonar performance.
- The space shown in the figure on the next page 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 to keep the temperature above  $0^{\circ}\text{C}$ .

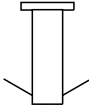
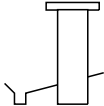
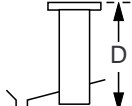
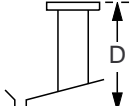




*Figure 3-2 Maintenance space, example sonar compartment*

## Shortening the retraction tank

The retraction tank is 900 mm in length when supplied. Shorten the tank as necessary so that the transducer is placed well below the keel when it is lowered. The following table provides guidelines for shortening the tank. Refer also to the retraction tank installation drawing at the back of this manual.

Installation Method XDCR Travel				
800 mm	Remove 0 to 220 mm from bottom.	Same as left	Remove 0 to 220 mm from bottom. Length D must be less than 1180 mm.	Same as left
1200 mm	Remove 0 to 50 mm from bottom.	Same as left	Remove 0 to 50 mm from bottom. Length D must be less than 1750 mm.	Same as left

*Figure 3-3 Guidelines for shortening the retraction tank*

**Note 1:** In the 800 mm type hull unit, when 2220 mm is removed and “D” is minimum, the effect of air foam is minimized when the transducer is fully protruding in water.

**Note 2:** In the 1200 mm type hull unit, when 50 mm is removed and “D” is minimum, the effect of air foam is minimized when the transducer is fully protruding in water.

## Installing hull unit on retraction tank

After welding the retraction tank and allowing sufficient time for cooling, install the hull unit as follows:

1. Clean the hull unit flange, the O-ring and O-ring groove and coat them with a slight amount of grease. Place the O-ring in position on the tank flange.
2. Lay the gasket (1) on the top of the tank flange.
3. Orient the hull unit so that the bow mark (arrow) on its flange points toward the ship's bow. Note that heading adjustment in the display unit is required if the bow mark does not face the ship's bow.
4. For the 1200 mm transducer travel type. 7 of the 16 bolt holes on the hull unit flange have already been fitted with bolts. Insert the gasket (2) into the bolt holes of the tank flange to which these eleven bolts are fitted. Note that it is difficult to fit them after the hull unit has been placed on the tank.
5. Confirm that the O-ring and the gasket (1) are in position. Place the hull unit on the tank.
6. Coat every bolt, washer and nut with slight amount of grease to ease removal. Fit the insulation gasket (2) into the bolt holes of both the tank and hull unit flanges. Fasten the hull unit to the retraction tank with gasket (2), flat washers, spring washers and hex bolts. (Insulation gasket (2) and gasket (2) are used on the 1200 mm transducer travel type only.)
7. Reinforce the hull unit against vibration by extending stays to the ship's hull from the two eye bolts at the top of the hull unit, referring to figure at the top of the next page.

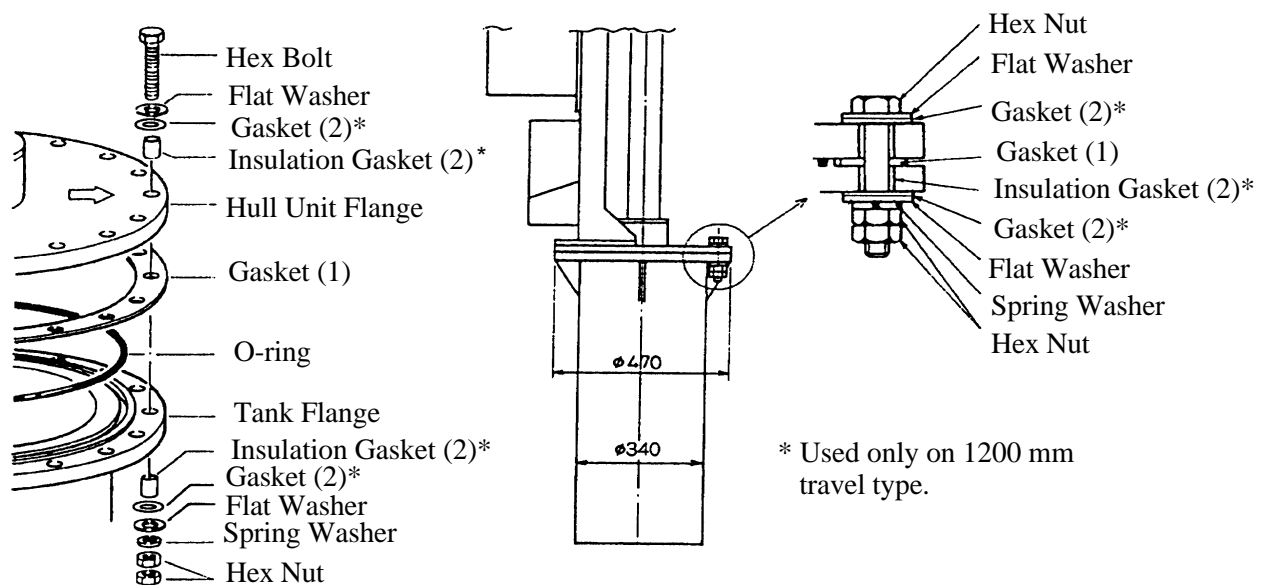
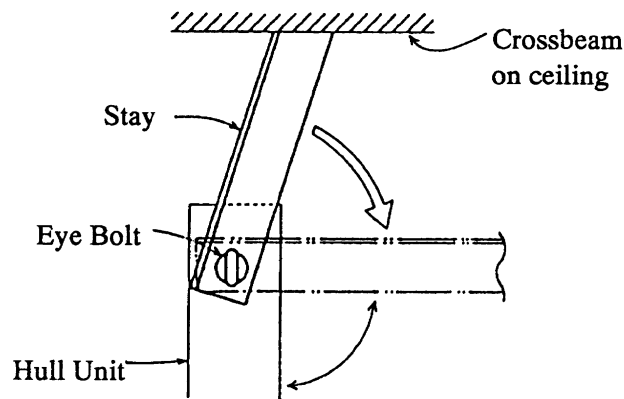


Figure 3-4 Installation of hull unit

## Installing stays (anti-vibration measure)

Install stays from the top of the hull unit to the ship's hull. The stays should be angle iron with a size of 75 x 75 x 9 mm or more and at least two pieces should be used; one each to ship's bow and stern directions. Install if possible, two more stays in ship's transverse direction.

Do not install the stays as shown below. Vibration-resistance effect is reduced since vibration is applied to the stays as rotation force. Install them horizontally.



*Figure 3-8 Wrong installation of stay*

## Fastening receiver unit to hull unit

Fasten the receiver unit to the left side of the hull unit as shown at right.

A transducer cable protection cover has been fitted where the receiver unit is to be fastened to the hull unit. Remove it when mounting the receiver unit.

## 3.2 Mounting the Display Unit

The display unit is designed for tabletop mounting. Mount it in the steering house, considering the following conditions:

- Place where operating personnel are able to control the unit easily while observing the fishing ground or the area surrounding the vessel.
- Place at least 1 m away from magnetic components (radar magnetron, loudspeaker, high power transformer, etc.) and magnetic compass.
- Place not exposed to direct sunlight, water splashes or hot air.
- Place where maintenance and ventilation clearance shown in the outline drawings is ensured.
- Place where the CRT face is within  $\pm 45^\circ$  from vertical.

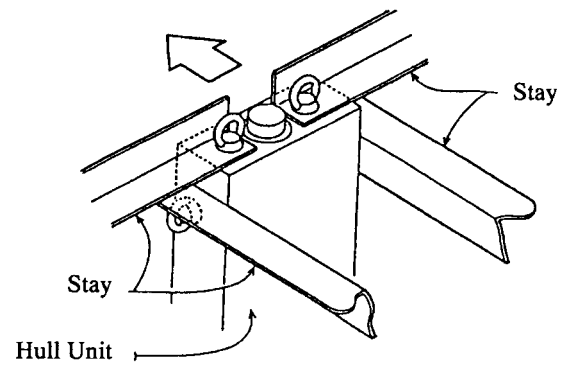


Figure 3-7 Proper installation of stays

### Mounting procedure

1. Remove the mounting base by unscrewing the two bolts at the front bottom.
2. Fix the mounting base to the table by using four M10 bolts, flat washers, spring washers and nuts. It is recommended that a rubber mat be placed under the mounting base to reduce vibration.
3. Fasten the unit to the mounting base with two bolts. When the space around the unit is limited, make wirings to the display unit first and then fasten the unit.

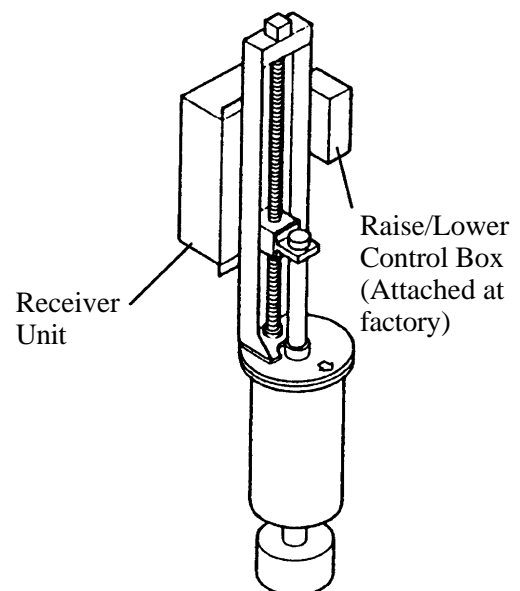
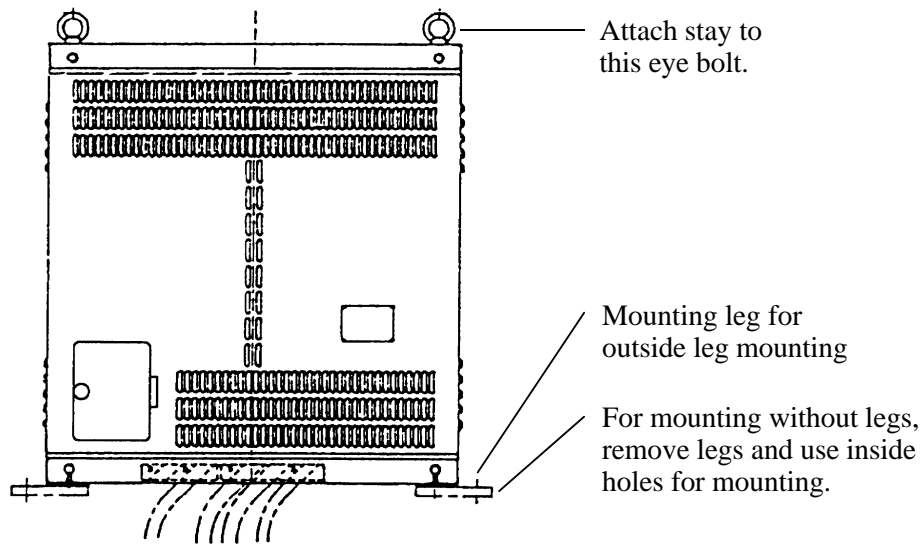


Figure 3-9 Mounting the receiver unit

### 3.3 Mounting the Transmitter Unit

The transmitter unit can be mounted with or without mounting legs. For use without mounting legs remove them and use inside mounting holes.

The transmitter unit should be reinforced against vibration by stays extending from the eye-bolts on the top of the unit.



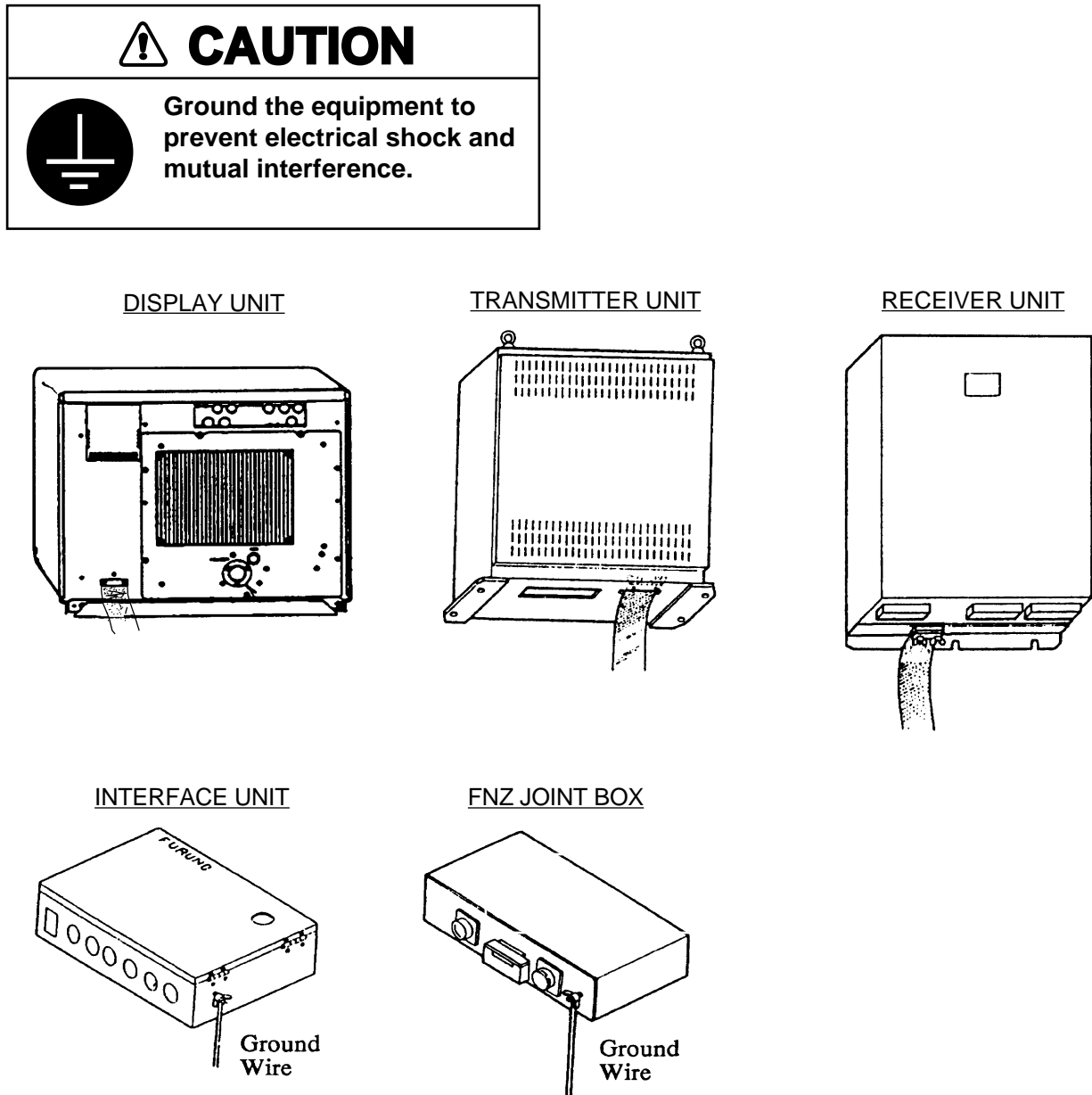
*Figure 3-9 Transmitter unit*

### 3.4 Mounting the Interface Unit

Since the interface unit connects with several navigation and fishing equipment, determine the installation site with the wirings to them taken into account. In addition, since the unit incorporates a data selector and self-check switch, select a place where they can be easily operated.

## 3.5 Grounding the Equipment

Since all units are very sensitive to noise, they should be grounded with a suitable copper strap or ground wire. The location of the ground terminal of each unit is shown below.

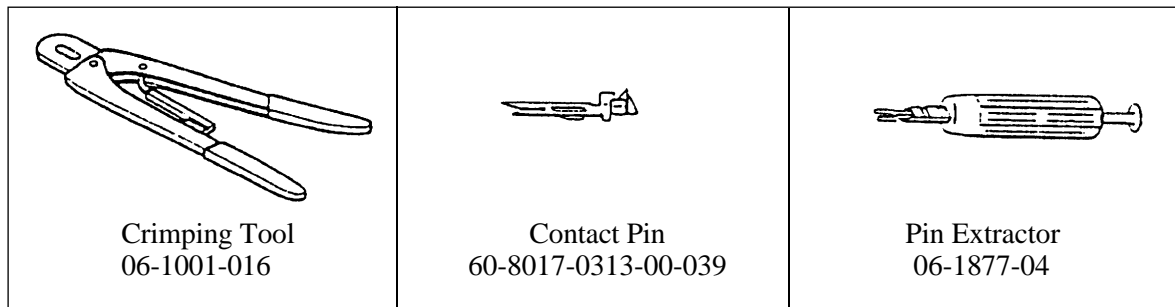


*Figure 3-10 Location of ground terminals on equipment*

## 4. WIRING

### 4.1 How to Use the Crimping Tool, Pin Extractor

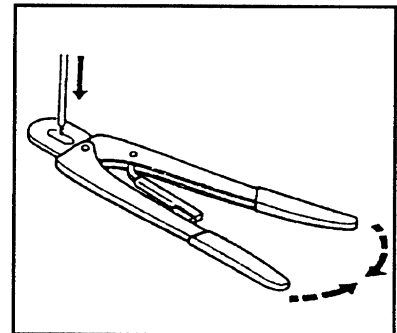
A special crimping tool is necessary for connection of wires to the contact pins of the 38P connector. Also a pin extractor should be used to remove the contact pin from the connector body. This paragraph describes how to crimp and extract the contact pin.



*Figure 4-1 Crimping tool, contact pin, pin extractor*

#### How to use the crimping tool

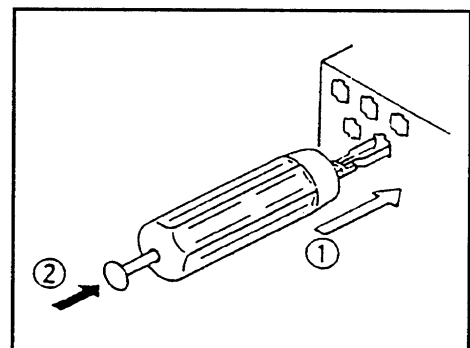
1. Strip the vinyl sheath of the wire to expose the core by 3.2 mm to 4 mm.
2. Hold the crimping tool horizontally and insert the contact pin with its slit facing downward into the crimp hole on the crimping tool.
3. Insert the wire onto the contact pin and squeeze the handle until the ratchet releases. The wire should be placed deep enough into the contact pin so that its end comes in contact with the stopper plate of the crimping tool. With crimping completed, pull the wire while holding the contact pin to make sure that it is fastened tightly.



#### How to use the pin extractor

If a contact pin is inserted into an incorrect hole on the connector body, 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. Push in the head of the pin extractor. The retaining spring comes free and the contact pin can be removed.





## 4.2 Location of Connectors, Terminal Boards

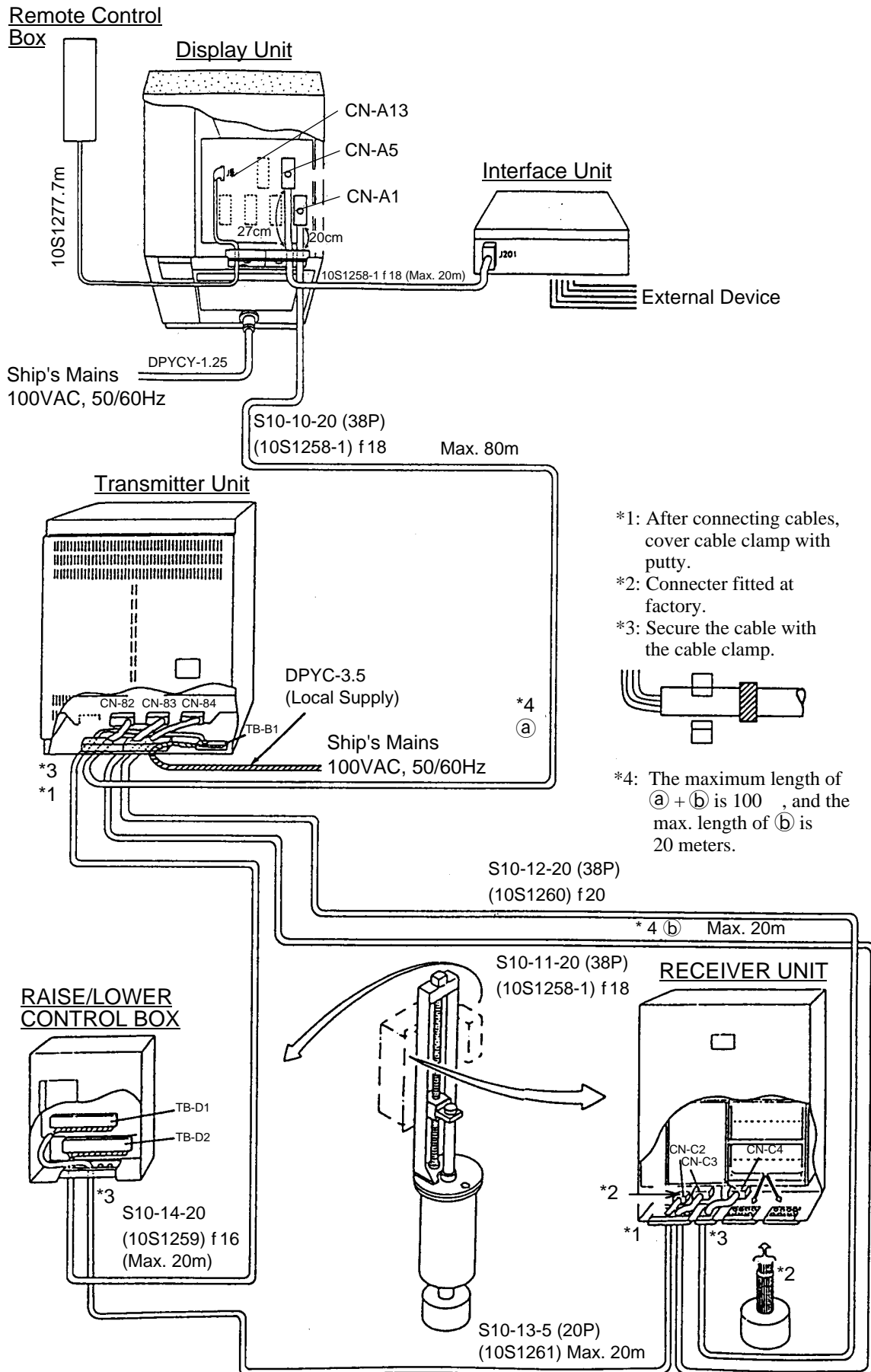


Figure 4-2 Location of onnectors, terminal boards

## 4.3 Assembling Connectors at Transmitter Unit

### Fabricating cable S10-11-20 or S10-12-20

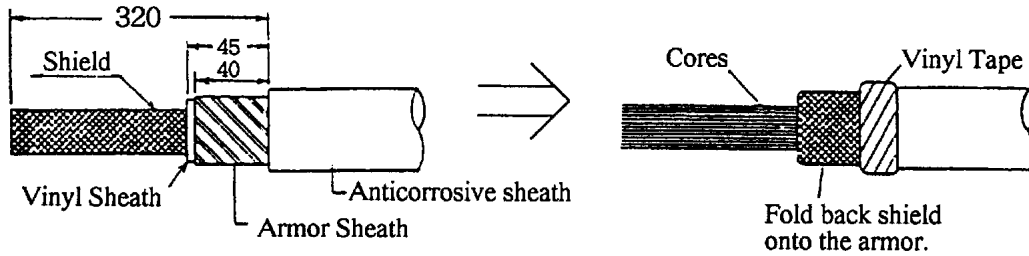


Figure 4-3 Fabrication of cable S10-11-20, S10-12-20

### Assembling the 38P connector

1. Bundle unused wires outside the connector case.
2. Fix the cover ①, noting the cable outgoing direction.
3. Dress the wires and fix the covers ② and ③. Use a fragment of cable sheath to fix the wires at the cable clamp.
4. Shorten unused wires and tape their ends with vinyl tape to prevent short circuit.

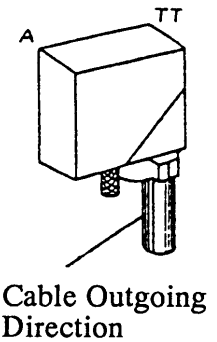


Figure 4-4a 38P connector

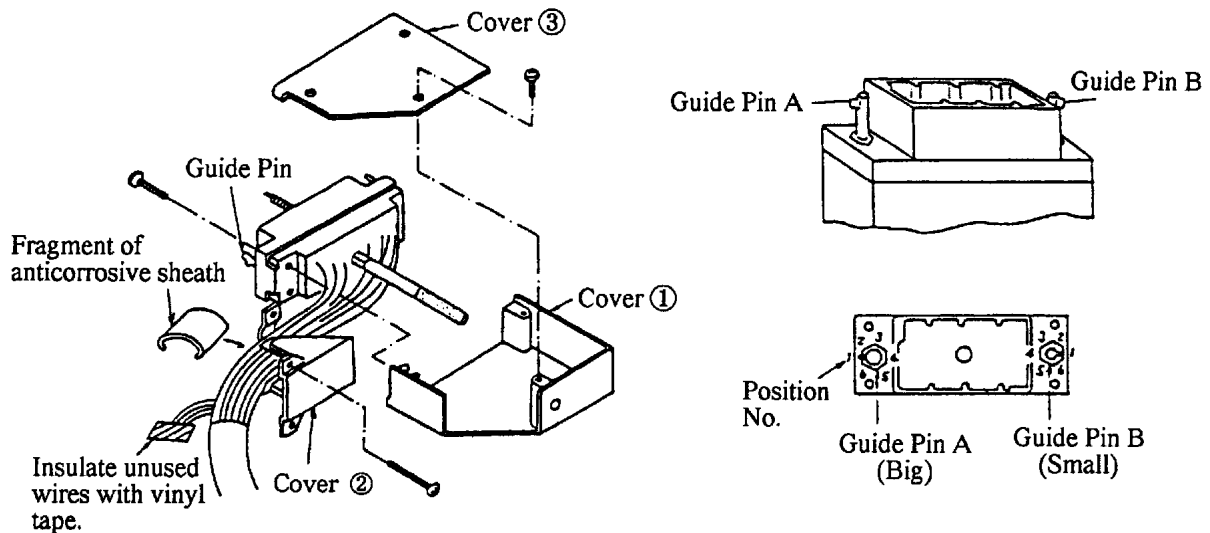


Figure 4-4b How to assemble the 38P connector

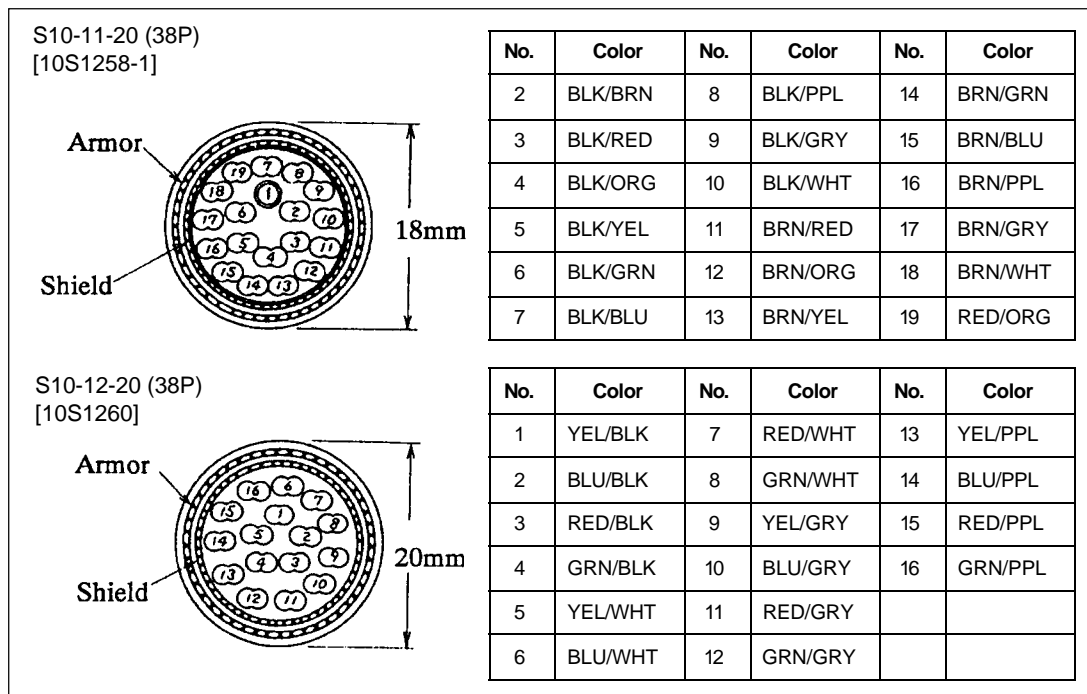


Figure 4-5 Construction of cables S10-11-20 and S10-12-20

## Positioning guide pins

Guide pins of the connector are used to identify the mating receptacle and should be positioned as below.

Table 4-1 Guide pins

Connector	CN-A5	J201	Guide Pin Setting Tool
<b>Guide Pin</b>			<p>Type 10-910-0179-0</p>
Guide Pin A (Large)	5	1	
Guide Pin B (Small)	1	1	

## Fabrication of cable S10-14-20 (10S1259)

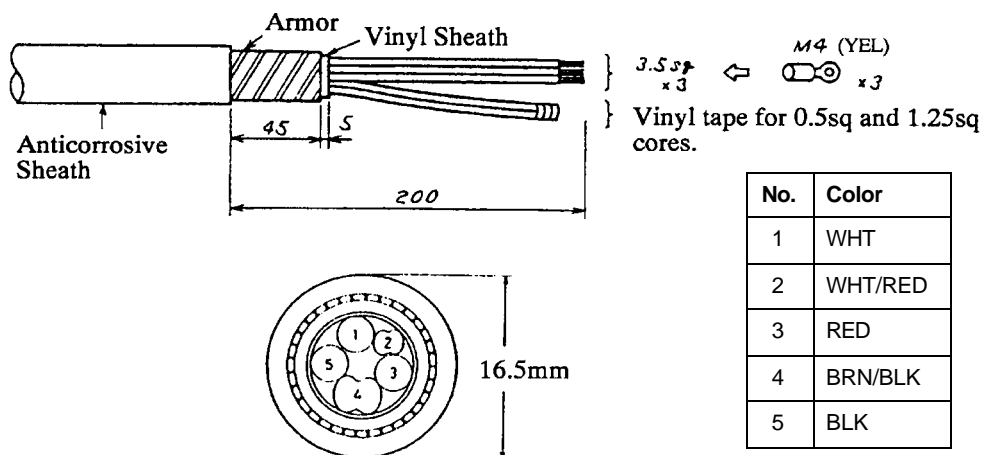


Figure 4-6 Fabrication of cable S10-14-20

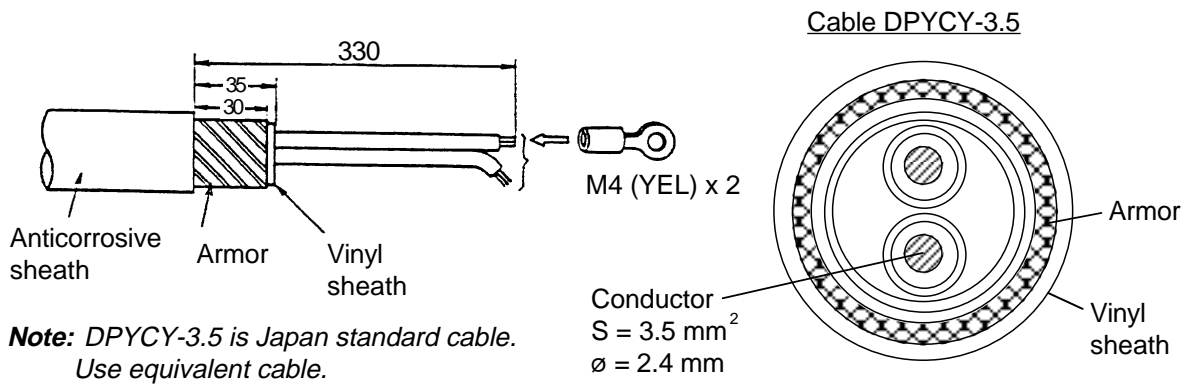
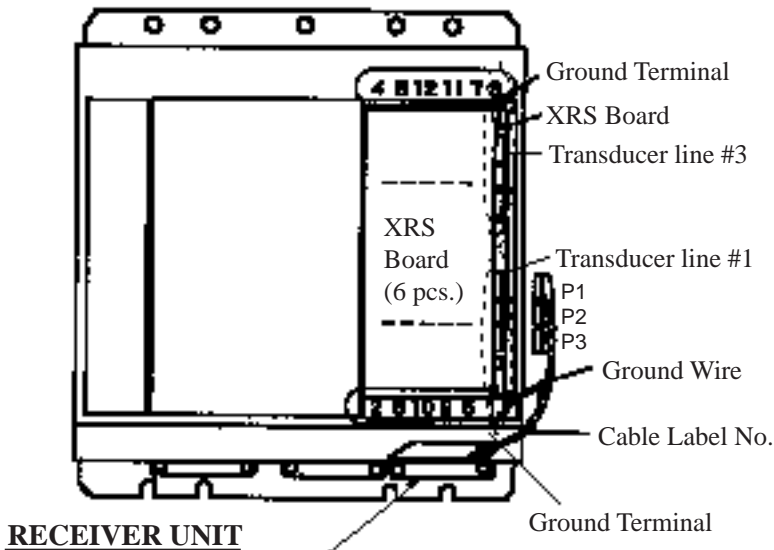


Figure 4-6b Fabrication of cable DPYCY-3.5

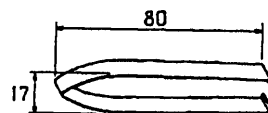
## 4.4 Connection of Transducer Cable

The transducer cables are prefitted with connectors. Plug them into the receptacles, referring to the stickers on the cables.



1. Connect transducer cables to XRS Board terminal by referring to labels inside the receiver unit.
2. Connect ground wires to slip-on terminal.
3. Fix cables to fixing plate on the XRS Board or chassis.

**Note 1:** Use the connector puller (supplied) whenever unplugging connectors.



**Note 2:** When one or some of the lead wires are disconnected near a connector, cut off all lead wires connected to the connector and solder the "XH connector assembly" (supplied) to cable.

Figure 4-7 How to fabricate the transducer cable

## 4.5 Attaching Power Cable Connector NCS-253P

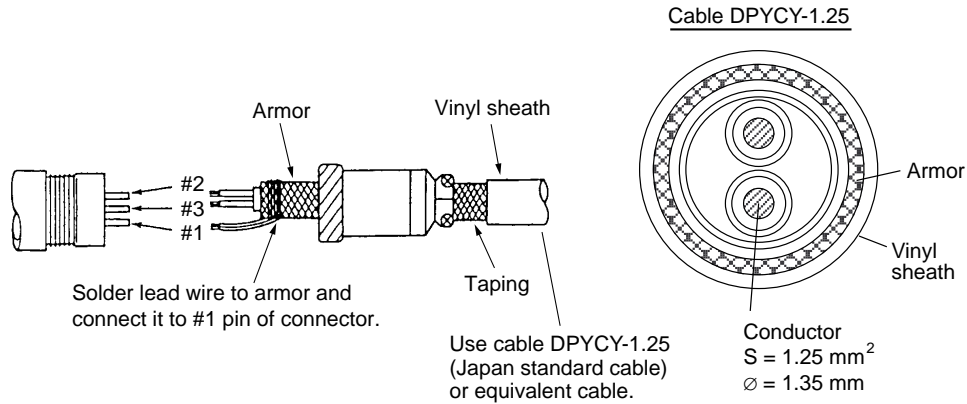


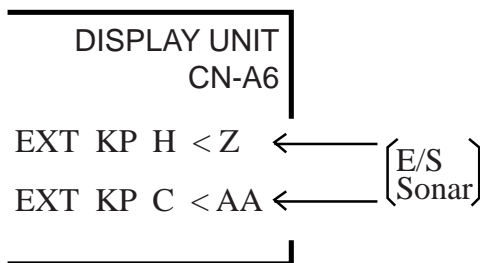
Figure 4-8 Attachment of power supply cable connector

## 4.6 Synchronizing Transmission with Other Sonars, Echo Sounders

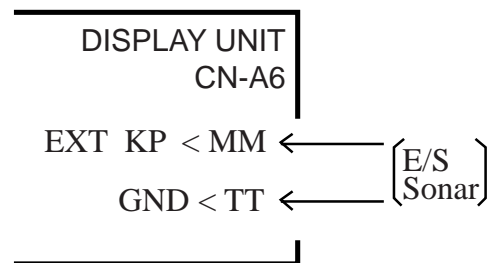
To synchronize the transmission of the CSH-53 with that of other sonars or echo sounders, do the following.

### Wiring

a) For current driven KP

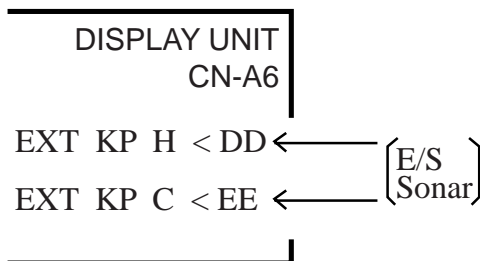


b) For voltage driven KP



**Note:** To output KP to other sonar or echo sounder, do the following:

a) For current driven KP



b) For voltage driven KP

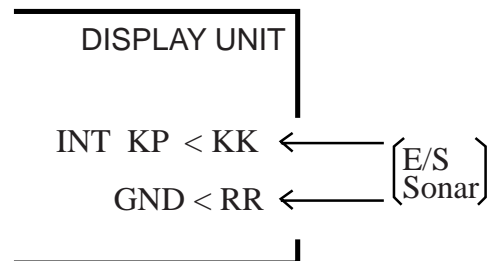


Figure 4-9 Connections for synchronizing transmission with other sonars, echo sounders

### Menu Setting

Set polarity of the KP on the INIT SET/TEST menu. Refer to the operator's manual for operation on the menu.

# 5. CONNECTION OF INTERFACE UNIT

## CS-120A

If the CSH-53 is combined with nav sensor (via Interface Unit CS-120A) and fishing equipment, its function is expanded to include true motion presentation, echo sounder picture, FNZ marker presentation, etc. This chapter provides the methods of interfacing the CSH-53 sonar with other equipment and wiring details.

### 5.1 Connections for True Motion and Target Lock

Heading (digital) and speed (200 pulses/nm) data are required to provide the true motion and target lock functions. Both data are fed to the display unit via Interface Unit CS-120A.

Basically, there are two methods to feed the data:

- Heading data is fed to J205 from A/D Converter AD-100 and the speed data to J206 from the electromagnetic speed log.
- Both heading and speed data are fed to J207 from the CIF line of the CI-30/50/60.

Select one of the methods depending on the equipment installed. When both methods are available, it is recommended to connect both and select one by the DIP switch inside the CS-120A.

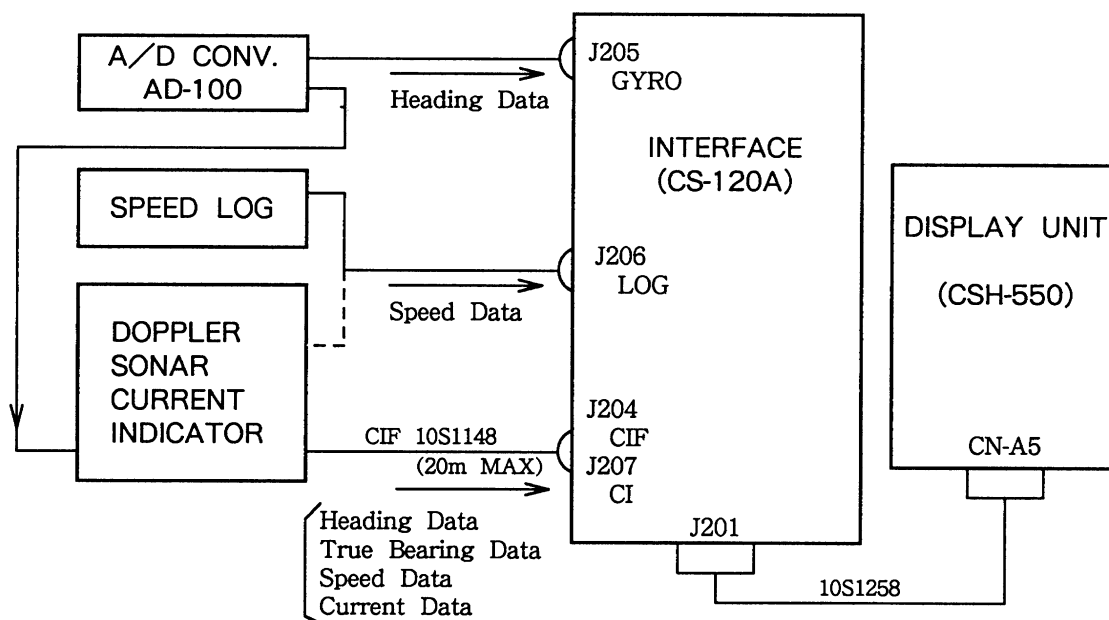


Figure 5-1 Connection of external equipment to Interface Unit CS-120A

**Note 1:** AD-100 outputs two types of data. Do not use data for radars (25 ms interval).

**Note 2:** 200 pulses/mile ship's speed data can be taken from a doppler sonar current indicator.

## 5.2 Connections for ES Picture and FNZ Markers

To provide echo sounder picture and FNZ markers, connect echo sounder to J203 and net sonde to J202. The signals applied to J202 and J203 are

J202: Net sonde signal and trigger signal (keying pulse of echo sounder). A white line signal from an echo sounder may be additionally applied as described on page 4-5 if the digital depth data is not available on J204.

J203: Echo signal and keying pulse from an echo sounder.

### Connection 1: Displaying echo sounder picture

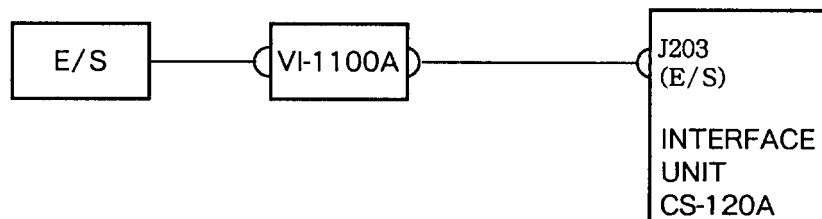


Figure 5-2 Connections for displaying ES picture

### Connection 2: Displaying echo sounder picture and FNZ marker by one echo sounder

This method is used when the net sonde is installed and both echo sounder and net sonde signals are taken from the same echo sounder. The net sonde signal is applied to both J202 and J203.

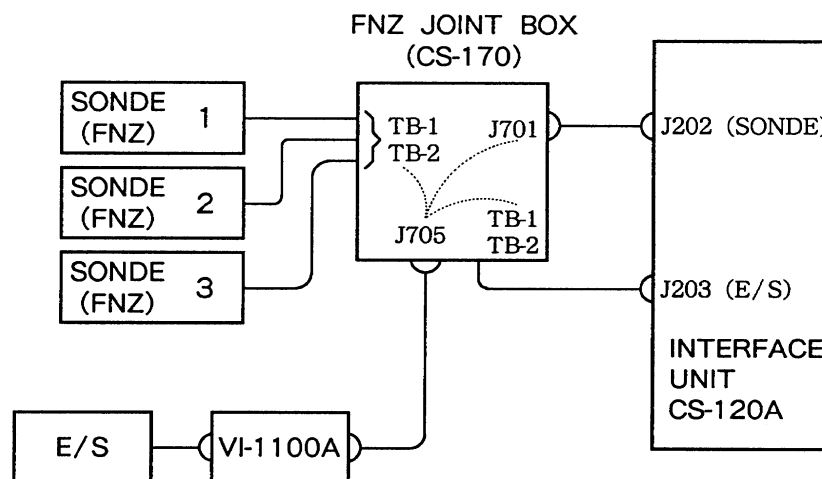


Figure 5-3 Connections for echo sounder picture and FNZ marker by one echo sounder

### Connection 3: Displaying echo sounder picture and FNZ markers by separate echo sounders

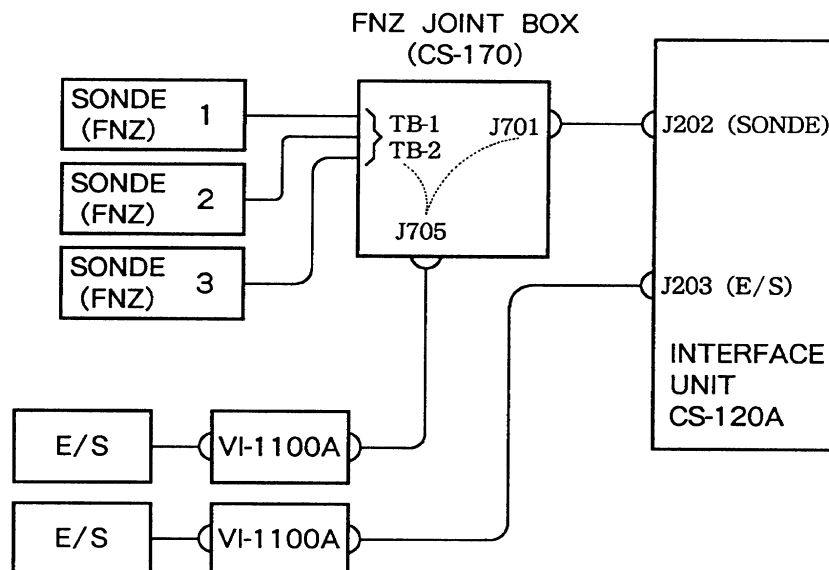


Figure 5-4 Connections for echo sounder picture and FNZ markers by separate echo sounders

## 5.3 Connections for Digital Readout of Position, Water Temperature and Depth

The data for these readouts are taken from the equipment shown in the table below and input to J204. When data from multiple equipment are input, use Hybrid Interface IF-5000 to feed the data serially.

Table 5-1 Data and source

Data	Data Source
Position	Loran C navigator, GPS navigator
Water Temperature	Temperature Indicator T-2000, TI-20, nav equipment connected to temperature sensor
Depth	Color video sounder, Echo Sounder FE-822



**Note:** When a color video sounder which has digital depth data output is not available, the white line signal of a paper recording echo sounder can be used to provide digital depth read-out. Connect the echo sounder as shown below or as shown in connection 2 or 3 in paragraph 5.2 and operate the echo sounder front panel controls so that the white line is effected on the seabed contour.

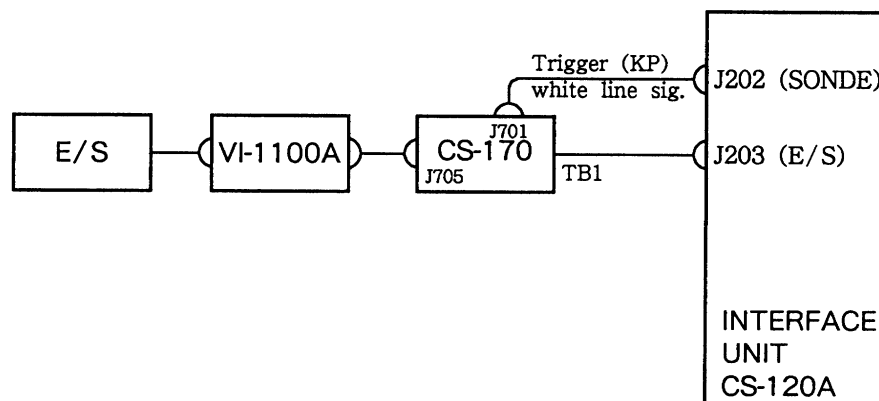


Figure 5-5 How to output white line signal of paper recording echo sounder

## 5.4 Wiring

Connect referring to the Interconnection Diagram at the back of this manual.

### Connection with the display unit

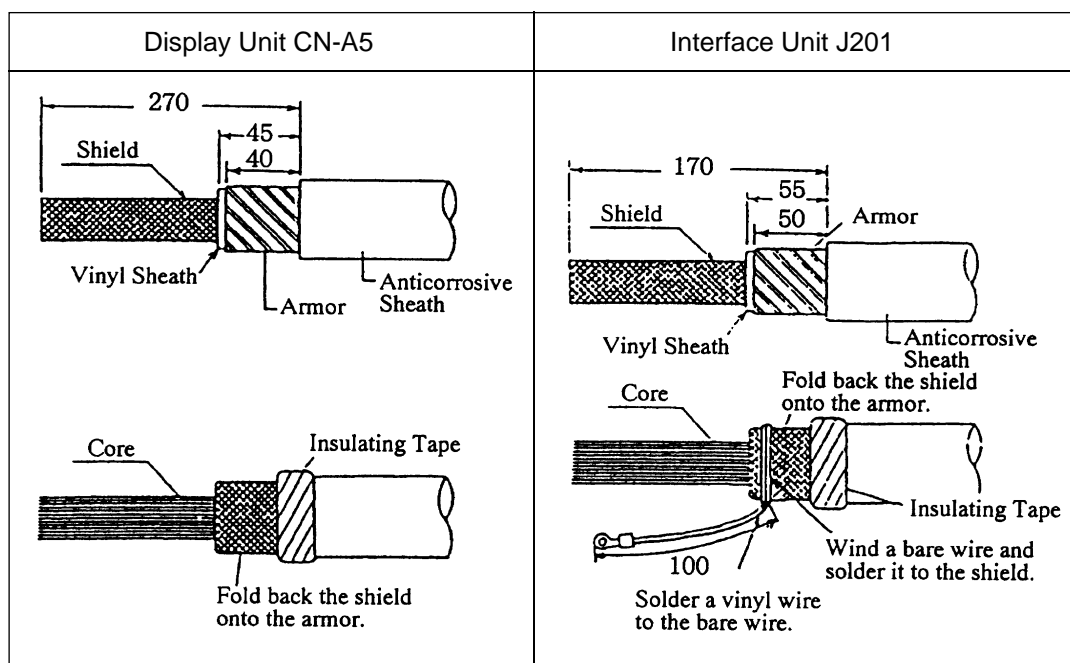


Figure 5-6 Fabricating cables for connection with display unit, interface unit

## Connector

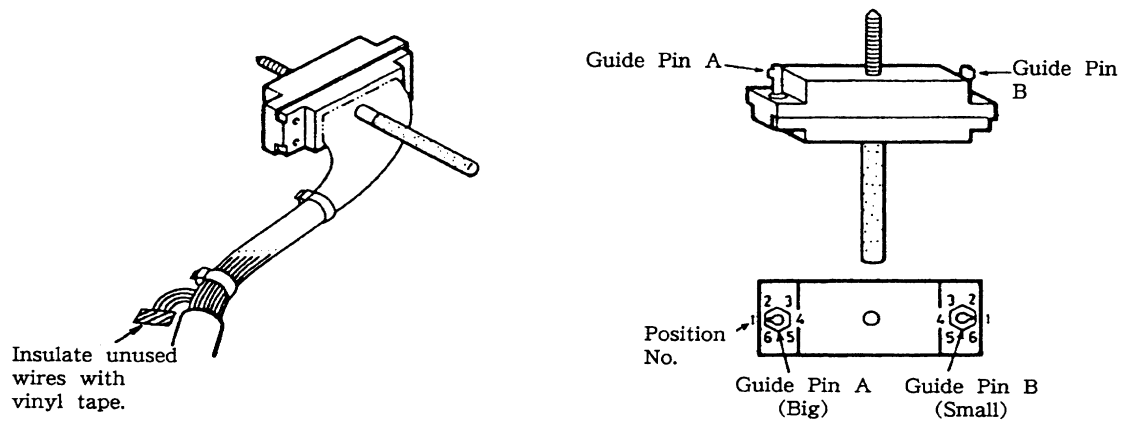


Figure 5-7 Assembling connector

## Positioning guide pins

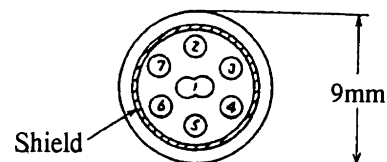
Table 5-2 Guide pins and connector

Connector	CN-A5	J201	Guide Pin Setting Tool
<b>Guide Pin</b>			
Guide Pin A (Large)	5	1	
Guide Pin B (Small)	1	1	
			Type 10-910-0179-0

## Connection with external device

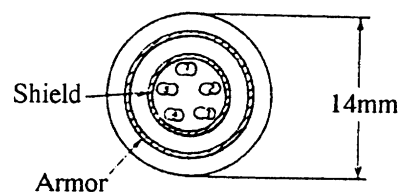
Wire Symbol	Meaning
	Vinyl sheath wire
	Shielded wire
	Twisted pair wire

02S8040



No.	Color
1	WHT/BLK
2	BLK
3	PNK
4	GRN
5	ORG
6	YEL
7	RED

CO-SPEVV-SB-C 0.2 sq. 5P



No.	Color
1	YEL/BLK
2	YEL/WHT
3	YEL/RED
4	YEL/BLU
5	YEL/GRN

Figure 5-8 Connection with external device

## Fabrication, assembling 10P and 7P connectors

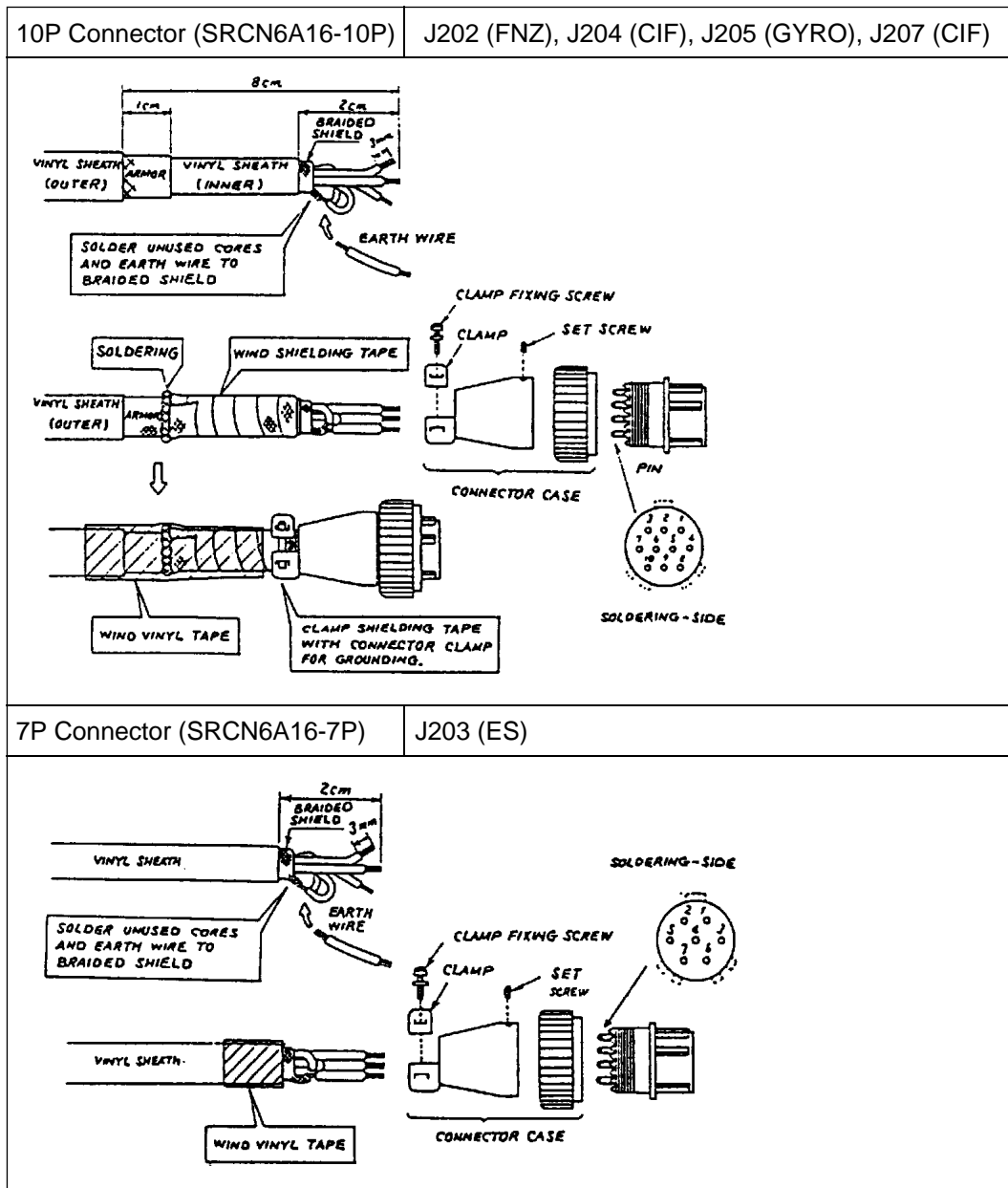


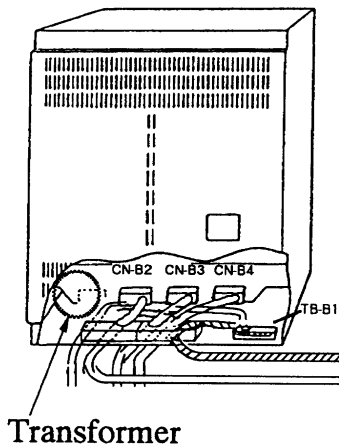
Figure 5-9 Fabrication of 10P, 7P connectors

## 6. CHANGING POWER SPECIFICATIONS

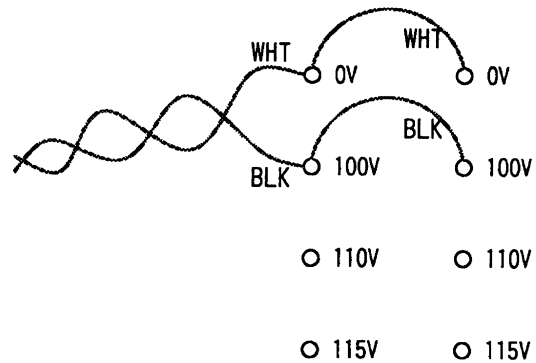
The transmitter unit is shipped ready for connection to ship's mains of 100 VAC. For 110/115/200/220/230 VAC, change transformer taps as shown below.

The display unit is designed for 100 VAC operation only. For 110 VAC or 220 VAC, use step-down transformer PT-400 (optional supply).

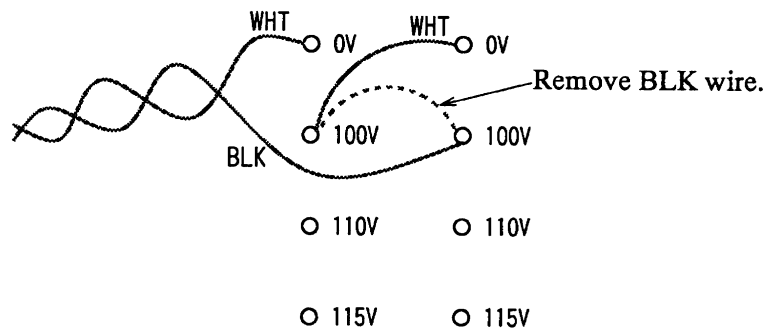
### Transmitter Unit



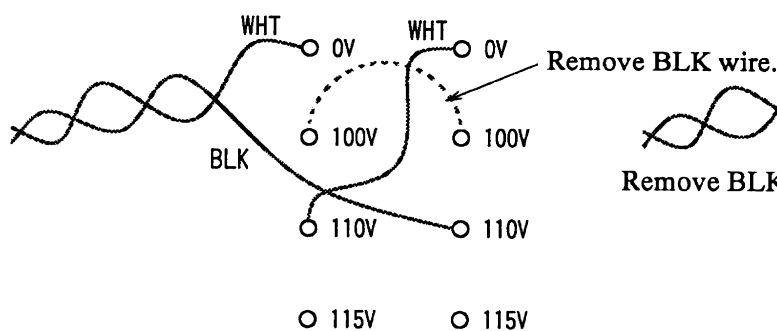
### For 100 VAC (default setting)



### For 200VAC



### For 220VAC



### For 230VAC

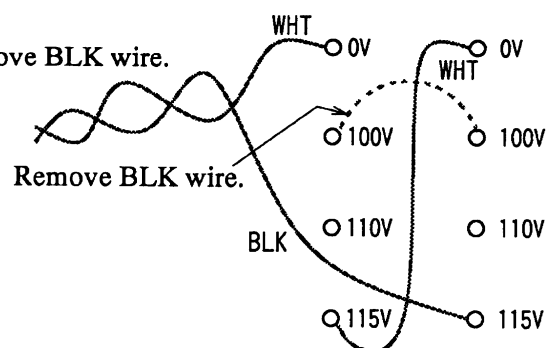


Figure 6-1 Tap connections on the transformer in the transmitter unit

# 7. INSTALLATION OF FRP RETRACTION TANK

---

## 7.1 Before Beginning the Installation

Note the following before installing the FRP tank:

- Use only the tank supplied.
- Follow the instructions in this chapter.
- If the owner of the equipment elects to use a shipyard-prepared FRP tank, FURUNO will assume no responsibility for any damage caused by water leakage. In this case do the following:
  - The finished surface of the tank flange must be within 0.5 mm of horizontal.
  - Use sealant recommended by shipyard.

*Table 7-1 Contents of FRP retraction tank installation kit*

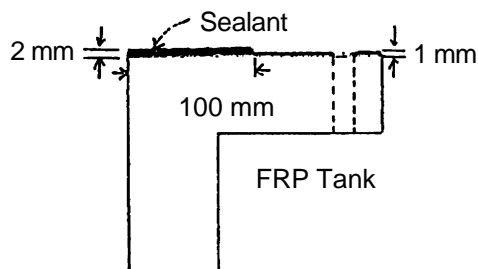
Name	Type	Code No.	Qty
FRP Retraction Tank	SHH-0001-1	660-800-011	1
Waterproofing Gasket	SHH-0003-1	660-800-031	1
Three Bond Sealant	1101 200 g	000-854-101	1

## 7.2 Installation of the FRP Retraction Tank

Fasten the hull unit to the retraction (after installing the retraction tank) as follows.

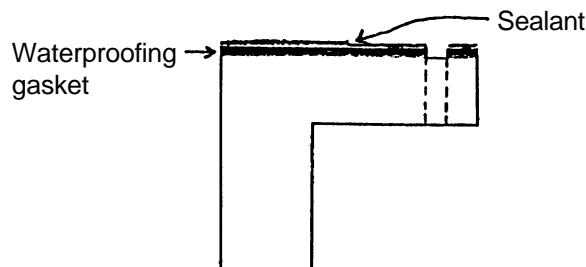
1. Clean the surface of the tank flange. Coat the flange with about 1 mm thickness of sealant (Three Bond 1101, supplied).

**Note:** Use only the sealant supplied.



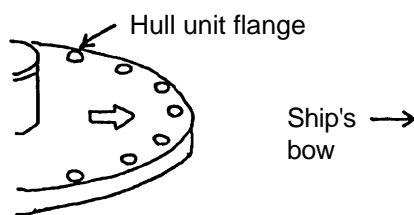
*Figure 7-1 Coating the tank flange with sealant (supplied)*

2. Lay the waterproofing gasket on the tank flange and coat the gasket with about 1 mm thickness of sealant.



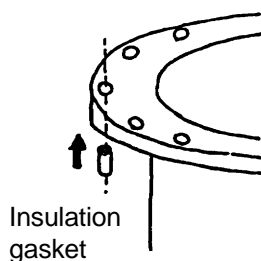
*Figure 7-2 Laying the waterproofing gasket on the tank flange*

3. Orient the bow mark (arrow) on the hull unit flange toward ship's bow. (If the mark cannot be perfectly oriented toward ship's bow adjust heading after installation as shown in the next chapter.)



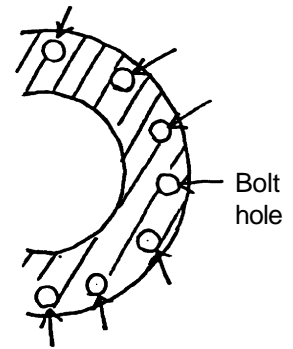
*Figure 7-3 Orienting hull unit flange toward ship's bow*

4. For the 1200 mm stroke hull unit, insert insulation gaskets in each of the 11 holes for stud bolts on the tank flange. (Do this before setting the hull unit to the retraction tank.)



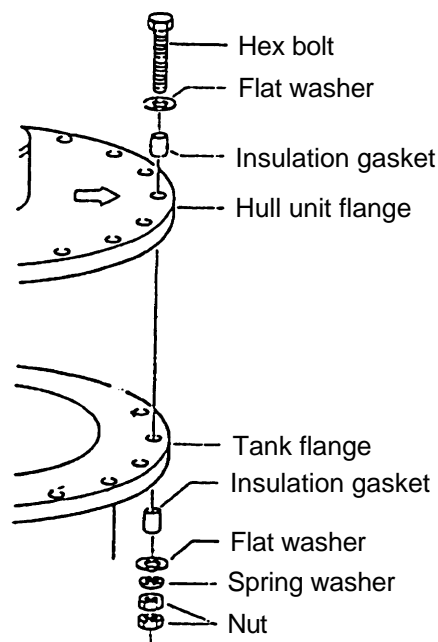
*Figure 7-4 Inserting insulation gasket in tank flange*

5. Before setting the hull unit on top of the retraction tank, observe the following cautions:
- Clean the hull unit flange to make sure no foreign material falls into the retraction tank.
  - Confirm that waterproofing gasket is in place.



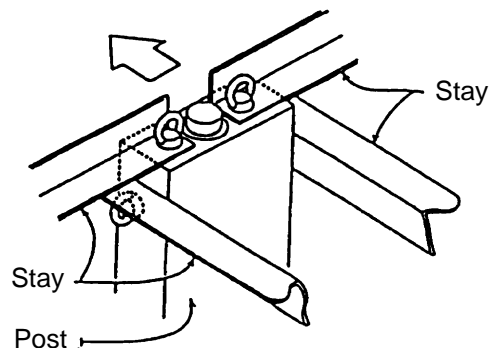
*Figure 7-5 Tank flange*

6. Set the hull unit on top of the retraction tank. Pass flat washer onto hex bolt and insert them in stud bolt hole from the top of the hull unit flange. At the retraction tank, fasten the bolt with insulation packing, flat washer, spring washer and nut, in the order shown in the figure below.



*Figure 7-6 Fastening the hull unit to the retraction tank*

7. Install stays from the top of the hull unit, using the eye bolts.



*Figure 7-7 Installing stays on the hull unit*

# 8. ADJUSTMENT AND CHECK

## 8.1 Hull Unit Check

1. Press the ON switch to turn on the equipment. Confirm that the lamps above the ON and ↑ switches light.
2. Confirm that the 5V and UP lamps on the raise/lower control box are lit.
3. Remove the cover of the raise/lower control box and check the following voltages:

Terminal	Terminal No.	Voltage
TB-D1	⑦ – ⑧	+12 V
TB-D2	① – ②	100 VAC
	② – ③	100 VAC
	① – ③	200 VAC

4. In the raise/lower control box, turn the TEST/NORMAL switch to TEST. Press the ↓ switch to confirm that the transducer lowers. Also, while the transducer is being lowered, check that the MD LED lights when the MD L. SW kicks. Note that the MD L. SW does not stop the transducer when the TEST/NORMAL switch is in the TEST position.

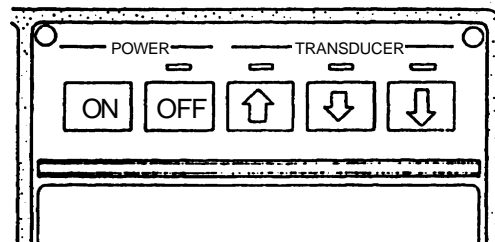


Figure 8-1a Display unit front panel

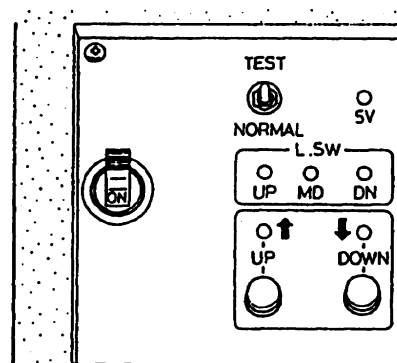


Figure 8-1b Raise/Lower control box

5. Press and release the ↓ switch. Confirm that the transducer stops at the moment the switch is released.
6. Press the ↓ switch again. Confirm that the transducer stops at the moment the lower limit switch kicks.
7. Confirm that the ↑ switch operates in a similar manner.
8. Check that LEDs on the panel of the raise/lower control box light as follows:
  - 1) UP, MD and DN LEDs light when corresponding limit switch kicks.
  - 2) UP and DOWN LEDs light while UP and DOWN switches are pressed and extinguish when switches are released.
9. Set the TEST/NORMAL switch to NORMAL.
10. At the display unit, press the ↓ (mid position) switch. Confirm that the lamp above the switch blinks while the transducer is being lowered, a short beep sounds when the mid limit switch kicks, and the lamp lights when the transducer is fully lowered.

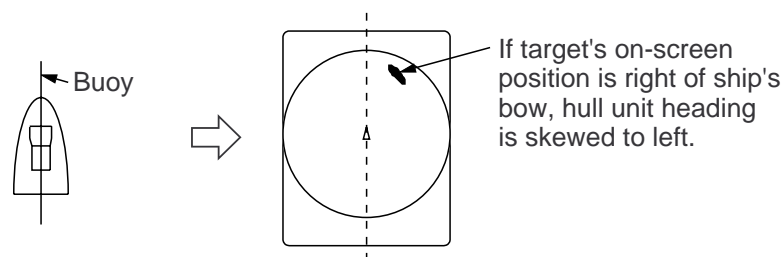


11. Press the **↓** switch. Confirm that the lamp above the switch blinks while the transducer is being lowered, a short beep sounds when the mid limit switch kicks, and the lamp lights when the transducer is fully lowered.
12. Press the **↑** switch. Confirm that the lamp above the switch blinks while the transducer is being raised, a short beep sounds when the mid limit switch kicks, and the lamp lights when the transducer is fully raised.
13. Press the OFF switch. Confirm that the transducer is completely retracted and then the power is turned off.
14. With the transducer lowered, confirm that the transducer is raised when **↑** or OFF is pressed.

## 8.2 Heading Adjustment

When the BOW mark on the flange of the hull unit cannot be directed toward ship's bow adjust the heading so an echo which is dead ahead appears dead ahead on the display.

1. Locate a target in the bow direction (buoy, for example) and display it on a near range. If the target appears at 12 o'clock the heading alignment is correct. If it is not go to step 2.



*Figure 8-2 Heading adjustment*

2. Turn on the power while pressing and holding down the MENU key. The INIT SET/TEST menu appears.

INIT SET/TEST MENU			
Select item with <b>↓↑←→</b> keys and press MENU key. Press END key to close menu.			
HEADING ADJ	BAUD RATE	EXT KP	UNIT/LANGUAG
SELF TEST	ECHO TEST	E/S NET REC	DEFAULTS

*Figure 8-3 INIT SET/TEST menu*

### 3. Select HEADING ADJ.

INIT SET/TEST MENU	
Select item with $\downarrow \uparrow \leftarrow \rightarrow$ keys and press MENU key. Press END key to close menu.	
HEADING ADJ	359° ◀ Setting range: 0° to 359° ▶

Figure 8-4 HEADING ADJ menu

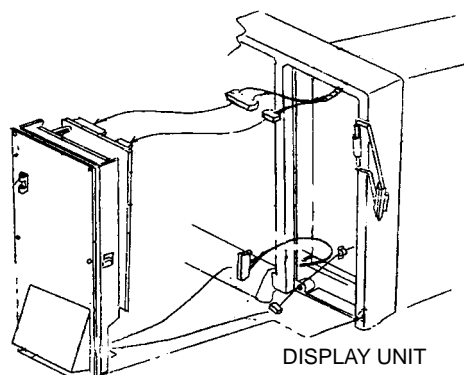
### 4. Enter heading correction with $\leftarrow$ or $\rightarrow$ , referring to the table below for guidance.

Target Location	Correction Setting
Target displaced 30° to port	Set to 30° .
Target displaced 30° to starboard	Set to 330° .

## 8.3 DIP Switch Setting

Set DIP switch on display unit, referring to the table shown below.

1. Remove 6 screws on the main panel.
2. Pull out it and remove 4 connectors.
3. Set dip switch on demand.



PIF Board (10P6713)

Figure 8-5 Removal of main panel

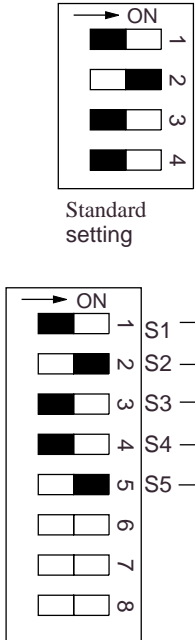
Item	SW No.	Setting				
ID Code for Interlock Function	1	Set ID code for interlock operation of CSH-23/23F/23FL/24/24F/53/58/73/83/84 series sonar. Any code is acceptable unless it is used in other interlocked sonars.				
	2					
	3					
Unit Code	Unit type	CSH-58/CSH53 (28 KHz)	CSH-53 (55 KHz)	CSH-23/24	CSH-73/83/84	CSH-23F/23-FL/24F/24FL
	4	OFF	ON	ON	OFF	ON
	5	OFF	OFF	ON	OFF	ON
	6	OFF	OFF	OFF	ON	ON
EEPROM Check	7	ON	Check OFF	OFF	Check ON	
Stand Alone	8	For factory use. Set to ON always.				

## PND Board (10P6714)

Item	SW No.	Setting			
CRT setting	3	OFF	For 21" CRT (CSH-24/24F, CSH-84)	ON	For 15" CRT (CSH-23/23F/23FL, CSH-53/58/73/83)

## 8.4 Setting and Adjustment on the Interface Unit CS-120A

Nav data and fish data input from external equipment can be turned on or off with DIP switch DP-1 in the Interface Unit CS-120A.



Standard setting

S1  
S2  
S3  
S4  
S5  
6  
7  
8

**Ship's speed and bearing (for track plotting, true motion, target lock, etc.)**

Input Device	S1	S2
Gyrocompass, Speed log	OFF	OFF
GPS or DR (Note 1)	ON	OFF
Current Indicator	OFF	ON
DR or Current Indicator (Note 2)	ON	ON

Select navigation which feeds nav data for drawing ship's track by switch S1 and S2.

**Note 1:** GPS has priority. Switched automatically from GPS to DR when GPS data is absent for more than 61 seconds or ship's speed measured with GPS is 0.2 kts or less. If DR is not available when switched from GPS to DR, heading readout is fixed at 0 degrees and ship's track is plotted by using the last GPS data obtained before switching to DR. If you still require speed, heading data from GPS even though ship's speed is less than 0.2 kts, set the GPS format to DR. Note however that the heading direction becomes erratic if the ship's speed is less than 0.2 kts.

**Note 2:** Use this setting when both DR and current indicator are available. Normally DR data has highest priority, and is switched to current indicator data if the DR data is absent for more than 61 seconds. The heading data for the bearing scale is always provided from the current indicator. When DR data is taken from GPS be sure to set GPS output format to "DR." GPS with no "DR" output format cannot be used.

**Ship's Position**

Input Device	S3	S4
Loran C	OFF	OFF
GPS or DR	ON	OFF

Use this position for GPS or DR. GPS data has priority.

**Depth (echo sounder, color video sounder, etc.)**

Input Device	S5
Echo Sounder (Note 1)	OFF
GPS or DR (Note 2)	ON

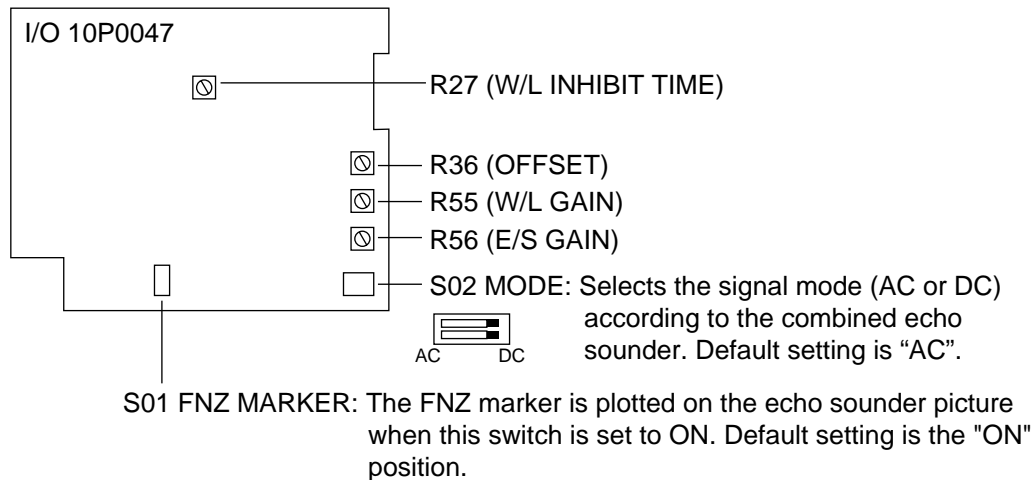
**Note 1:** For white line pulse when the depth data is taken from an echo sounder which does not have digital depth output.

**Note 2:** When the depth data is taken from an echo sounder which has digital echo output (FE-822, FCV, ED-202, IF-3000, or IF-5000).

## Interface Unit Adjustment

E/S LEVEL control on the display unit at allows adjustment of the picture color on the screen.

However, if adjustment of the E/S level control can not get the best coloration, perform fine adjustment with the preset potentiometers on the I/O board in the interface unit as follows.



*Figure 8-6 I/O board*

### Adjustment of signal level (potentiometer R36, R56)

Prior to adjustment, verify that the output level of the E/S Interface VI-1100A satisfies the following ratings.



*Figure 8-7 E/S interface output levels*

If not, adjust the potentiometers in the VI-1100A referring to the installation manual for the FCV series.

### Procedure

Turn the E/S GAIN and E/S OFFSET potentiometers (R56 and R36) so that the color gradation of E/S picture on the screen appears similar to the intensity gradation of the combined E/S echogram.

- Case (A) The E/S picture on the CSH-73 is comparatively higher in sensitivity than that of the paper echogram. Adjust the E/S OFFSET potentiometer so that weak signals painted in blue or light blue is displayed in deep blue.
- Case (B) The E/S picture on the CSH-73 is comparatively lower in sensitivity than that of the paper echogram. Turn the E/S GAIN potentiometer clockwise until the picture is even in quality.

sounder is used for depth information.

Potentiometer R27 cancels the white line pulse for about 10 ms after transmission to avoid false depth indication caused by unwanted noise in short ranges.

No readjustment of R27 is required as long as the CSH-73 indicates the correct depth. If the depth is wrong, turn R27 clockwise.

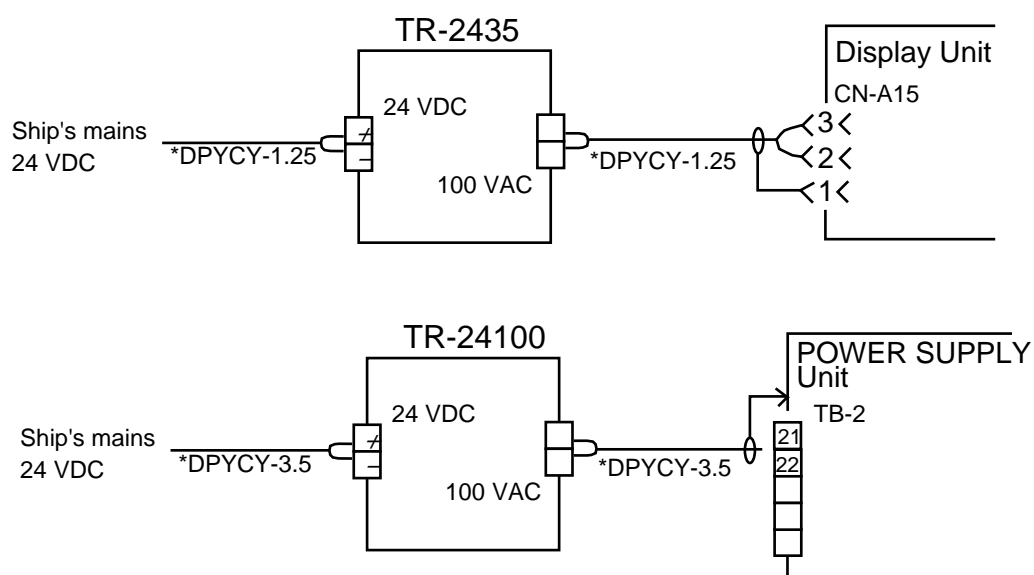
### **Adjustment of white line output level (potentiometer R55)**

Improper setting of R55 causes the seabed line to be painted in deep blue due to the white line pulse. Adjust R55 so that the seabed is painted in reddish brown.

## 9. WHEN SHIP'S MAINS IS 24 VDC

When the ship's mains is 24 VDC, use DC/AC inverter unit TR-2435 and TR-24100 (optional supply). Specifications and interconnections are as follows.

	TR-2435	TR-24100
Input	24 VDC	24 VDC
Output	100 VDC	100 VDC
Power Consumption	350 VA	1 kVA



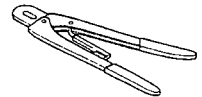
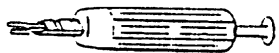
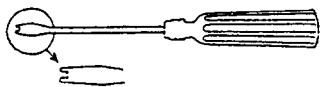
\*: Local supply  
See page 16 and 17 for details.

Figure 8-9 Interconnection with DC/AC inverter units

## Accessories

Name	Type	Code No.	Qty	Remarks
Hook	10-026-8226	100-008-801	1	For remote display
Tapping Screw	3 x 14 SWCH18A MFZN2-C	000-800-172	2	For remote display

## Special Tools

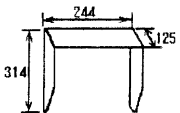
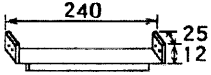
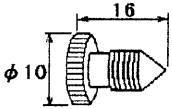
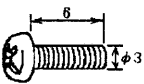
Name	Type	Code No.	Remarks
Crimping Tool	06-1001-016		
Pin Extractor	06-1877-04	000-519-595	
Guide Pin Setting Tool	10-910-0179-0		

## Spare Parts

Name	Type	Code No.	Qty	Remarks
Fuse	F-7165 10A 250VAC	000-547-019	2	
Fuse	FGB0-A 2A 125VAC	000-549-062	10	For trans. unit
Fuse	FGMA 3A 125VAC	000-111-848	2	For display unit
Fuse	FGMA 1A 125VAC	000-126-840	2	
Fuse	FGMA 2A 125VAC	000-126-841	4	
Fuse	FGMA 10A 125VAC	000-126-852	5	
Fuse	FGBO-A 3A 125VAC	000-549-063	10	
Connector Housing	XHP-7	000-105-683	2	For receive unit For receive unit
Connector Housing	XHP-15	000-110-946	2	
Connector Housing	XHP-10	000-110-947	2	
Connector Housing	VHR-3N	000-505-886	2	
Contact Assy.	80-0075	006-979-310	20	
Connector Puller	10-044-2431-0	100-122-480	1	

**FURUNO**

CODE NO.	006-027-830	10C1-X-9501 -2
TYPE	FP10-01801	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	フード HOOD		10-062-1601-0	1	
			CODE NO. 100-250-550		
2	フード 取り付け金具 HOOD MOUNTING PLATE		16-062-1602-0	1	
			CODE NO. 100-250-560		
3	フィルタービス FILTER MOUNTING SCREW		66-007-1222-0	1	
			CODE NO. 860-712-220		
4	+バ イント 小ネジ BINDING HEAD SCREW		M3X6 C2700Wホ リシール ク ロ ナイロンワッシャツキ	4	
			CODE NO. 000-800-582		

DWG NO.  
C1307-F01- B

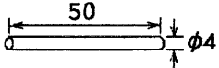
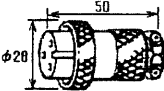
FURUNO ELECTRIC CO., LTD.

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



**FURUNO**

CODE NO.	006-028-050	10C1-X-9401 -1 1/1
TYPE	CP10-04301	

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	イラックスチューブ (A) INSULATION TUBE (A)		4.0X0.3 キロ *5CM*	1	
			CODE NO. 000-100-923		
2	コネクタ (NCS) CONNECTOR (NCS)		NCS-253-P	1	
			CODE NO. 000-506-503		

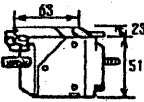
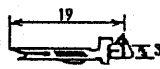
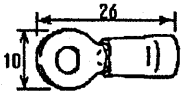
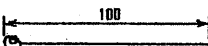
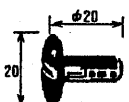
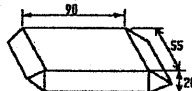
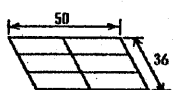
 DWG NO.  
C1307-M01- B

FURUNO ELECTRIC CO., LTD.

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

**FURUNO**

CODE NO.	006-972-400	10CF-X-9402 -3
TYPE	CP10-03702	1/1



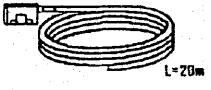

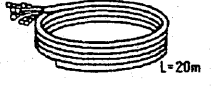
工事材料表 INSTALLATION MATERIALS		CSH-55/53 (CSH-551) カラースキニングソナー 送振装置/TRANSMITTER		COLOR SCANNING SONAR	
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	コネクタ CONNECTOR		54-038-000-601/SC	3	
			CODE NO. 000-132-081		
2	コンタクト CONTACT PIN		60-8017-0313-00-339	120	
			CODE NO. 000-519-542		
3	圧着端子 CRIMP-ON LUG		FV5. 5-4	10	
			CODE NO. 000-538-123		
4	コンベックス PLASTIC BAND		CV-100	20	
			CODE NO. 000-570-322		
5	ホールのプラグ HOLE PLUG		NO. 4567	4	
			CODE NO. 000-800-729		
6	クーラーパテ COOLER PUTTY		200G 41 シロイロ	1	
			CODE NO. 000-807-621		
7	貼りマーク STICKER		10-026-5002-0	1	
			CODE NO. 100-004-870		

C1297-M02- F

FURUNO ELECTRIC CO., LTD

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

**FURUNO**

		CODE NO.		10CF-X-9405 -2	
		TYPE		1/1	
<b>工事材料表</b> INSTALLATION MATERIALS		CSH-55/53		カラースキニング ソナー	
				COLOR SCANNING SONAR	
番号 NO.	名称 NAME	略 図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	信号ケーブル組品 SIGNAL CABLE ASSY.		S10-10-20(38P) (10S1258-1 *20M*)	1	指示装置用 / FOR DISPLAY UNIT
			CODE NO. 006-973-780		
2	信号ケーブル組品 SIGNAL CABLE ASSY.		S10-11-20(38P) (10S1258-1 *20M*)	1	受信装置用 / FOR RECEIVER UNIT
			CODE NO. 006-973-790		
3	信号ケーブル組品 SIGNAL CABLE ASSY.		S10-12-20(38P) (10S1260-0 *20M*)	1	受信装置用 / FOR RECEIVER UNIT
			CODE NO. 006-973-800		
4	信号ケーブル組品 SIGNAL CABLE ASSY.		S10-13-5(20P) (10S1261-0 *5M*)	1	受信装置用 / FOR RECEIVER UNIT
			CODE NO. 006-973-810		
5	信号ケーブル組品 SIGNAL CABLE ASSY.		S10-14-20/ (10S1259-1 *20M*)	1	上下装置用 / FOR HULL UNIT
			CODE NO. 006-973-820		

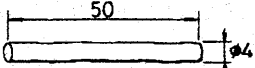
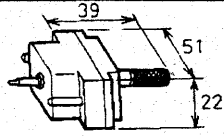
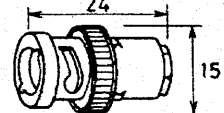
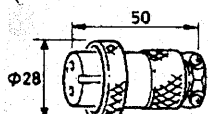
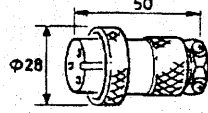
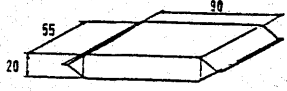
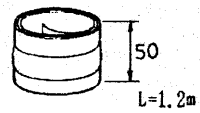
C1297-M06- C

FURUNO ELECTRIC CO., LTD

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

**FURUNO**

CODE NO	006-989-000	10BW-X-9407-2
TYPE	CP10-02801	

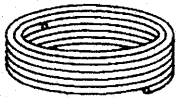
工事材料表 INSTALLATION MATERIALS		CSH-216/216F CSH-106	副指示器 SUB-DISPLAY リモートディスプレイ REMOTE DISPLAY		
番号 No.	名 称 N A M E	略 図 O U T L I N E	型 名 / 規 格 D E S C R I P T I O N S	数量 Q'TY	用途 / 備考 R E M A R K S
1	イラックスチューブ INSULATION TUBE		4MMX5CM # YEL CODE NO 000-100-923	1	
2	コネクタ CONNECTOR		00-8016-038- 313761HV 10S1566-0 CODE NO 000-127-234	2	
3	コネクタ CONNECTOR		BNC-P-3 CODE NO 000-500-396	6	
4	コネクタ CONNECTOR		NCS-252-P CODE NO 000-506-501	1	
5	コネクタ CONNECTOR		NCS-253-P CODE NO 000-506-503	1	
6	クーラーパテ COOLER PUTTY		200Gイリ シロイロ CODE NO 000-807-621	2	
7	アース板 COPPER STRAP		WEA-1004-0 CODE NO 500-310-040	1	
			CODE NO		
			CODE NO		
			CODE NO		

(略図の寸法は、参考値です)

 図 番 (1/1)  
 DWG. NO. C1286-M07-C

**FURUNO**

CODE NO	006-989-000	10BW-X-9408-1
TYPE	CP10-02801	

工事材料表 INSTALLATION MATERIALS		CSH-216/216F CSH-106	副指示器 SUB-DISPLAY リモートディスプレイ REMOTE DISPLAY		
番号 No.	名 称 N A M E	略 図 O U T L I N E	型 名 / 規 格 D E S C R I P T I O N S	数量 Q'TY	用途 / 備考 R E M A R K S
1	同軸ケーブル COAXIAL CABLE		ECX3C-2V-T *( )M	1	CSH-216/F 210/F
			CODE NO	000-122-162	
			CODE NO		
			CODE NO		
			CODE NO		
			CODE NO		
			CODE NO		
			CODE NO		
			CODE NO		
			CODE NO		
			CODE NO		
			CODE NO		
			CODE NO		
			CODE NO		

\*標準長 : 30 m  
STD CABLE LENGTH  
オプション : 10 m、20 m  
OPTION

(略図の寸法は、参考値です。)

図 番 (1/1)  
DWG. NO. C1286-M08-B

**FURUNO**

CODE NO. 006-935-300

TYPE CS-120-C

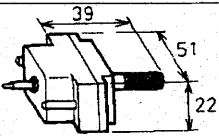
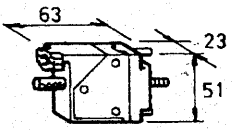
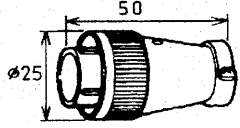
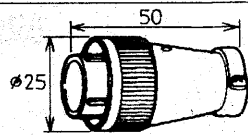
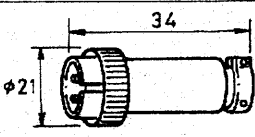
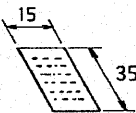
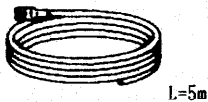
工事材料表 INSTALLATION MATERIALS		CSH-55 カラー スキャニング ソナー (CS-120A COLOR SCANNING SONAR 外部インターフェイス EXTERNAL INTERFACE)			
番号 No.	名称 NAME	略 図 OUTLINE	型 名 / 規 格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	コネクタ CONNECTOR		00-8016-038- 313761HV 10S1566-0 CODE NO. 000-127-234	1	
2	コネクタ CONNECTOR		00-8016-038-313- 751V CODE NO. 000-519-543	1	
3	コネクタ CONNECTOR		SRCN6A16-10P CODE NO. 000-508-663	4	
4	コネクタ CONNECTOR		SRCN6A16-7P CODE NO. 000-508-662	1	
5	コネクタ CONNECTOR		RM15TP-2PA CODE NO. 000-503-314	1	
6	貼りマーク(J201) STICKER (J201)		10-018-5022 CODE NO. 181-850-220	1	
7	アース線組品 GROUNDING WIRE		IV-8.0SQ 70 *5M* BLU CODE NO. 006-937-990	1	
			CODE NO.		
			CODE NO.		
			CODE NO.		

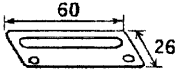
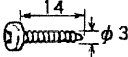
図 番

(1/1)

DWG. NO. C1297-M07-A

# FURUNO

A-9

		CODE NO.	006-989-040	10BW-X-9504 -1	
		TYPE	FP10-01203	1/1	
<b>付属品表</b> 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	掛具 HOOK		10-026-8226-1	1	
			CODE NO. 100-008-801		
2	ナット・ボルト SCREW		3X14 SWCH18A MFZN-2-C	2	
			CODE NO. 000-800-172		

DWG NO.

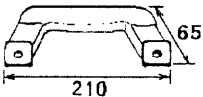
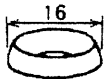
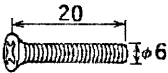

C1286-F04- B

FURUNO ELECTRIC CO., LTD.

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

**FURUNO**

CODE NO.	006-989-020	10BW-X-9505 -1
TYPE	FP10-01201	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	取手 HANDLE		14-002-1125-2		2	
			CODE NO.	840-211-252		
2	ロゼット座金 ROSETTE WASHER		M6 C2700W 六角 リンール クロ		4	
			CODE NO.	000-864-910		
3	六角皿小ネジ OVAL COUNTERSUNK HEAD SCREW		M6X20 C2700W 六角 リンール クロ		4	
			CODE NO.	000-861-475		
4	波座金 WAVE WASHER		WW-6 SUS		4	
			CODE NO.	000-864-350		

DWG NO.  
C1286-F01- F

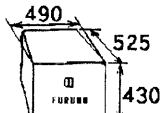
FURUNO ELECTRIC CO., LTD.

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



# FURUNO

A-11


FURUNO		CODE NO.		10BW-X-9501 -5	
		TYPE		1/1	
付属品表 ACCESSORIES		CSH-21/F/K/216/216F, CSH-23/F/K/FL CSH-53, 58 CSH-71, 73 CSH-81, 83			
番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q' TY
1	ナイロンカバー PLASTIC COVER		10-051-1031		1
			CODE NO.	000-803-289	

DWG NO. C1286-F05- B

FURUNO ELECTRIC CO., LTD.

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

**FURUNO**

		CODE NO.		10CP-X-9501 -0	
		TYPE		1/1	
<b>付属品表</b> ACCESSORIES		CSH-23/23F/24/24F/53/58/73/83/84/			
番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS		用途／備考 REMARKS
1	RAMカード 組品 RAM CARD		00RAM256C-001		1
			CODE NO.	004-321-070	

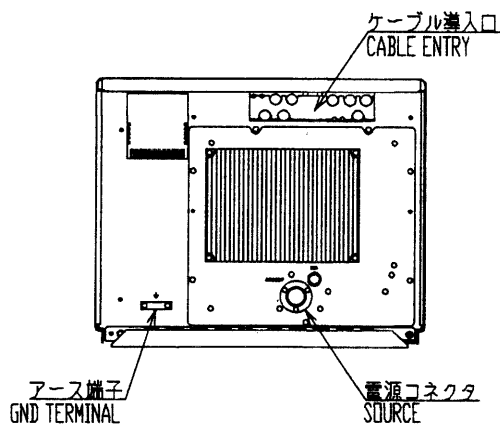
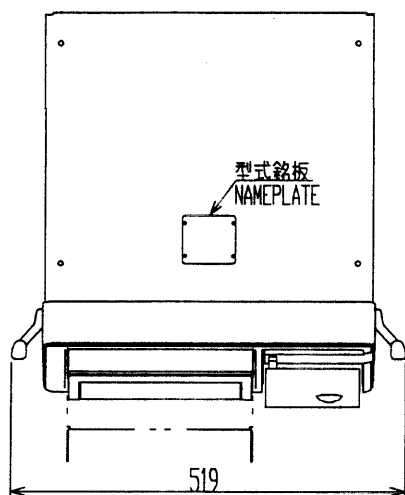
DWG NO.

C1307-F02- A

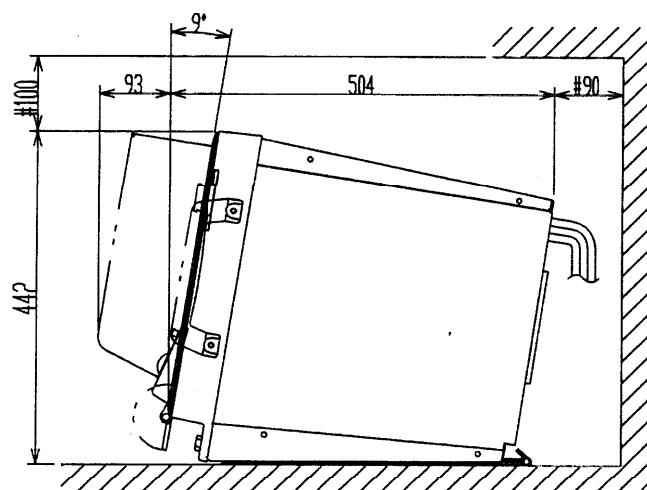
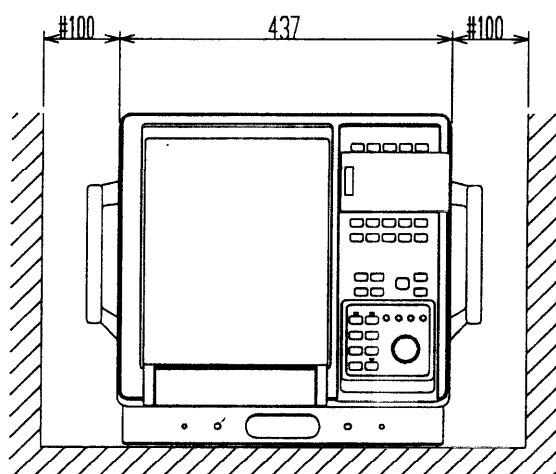
FURUNO ELECTRIC CO., LTD.

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

A



B



C

表1 TABLE 1

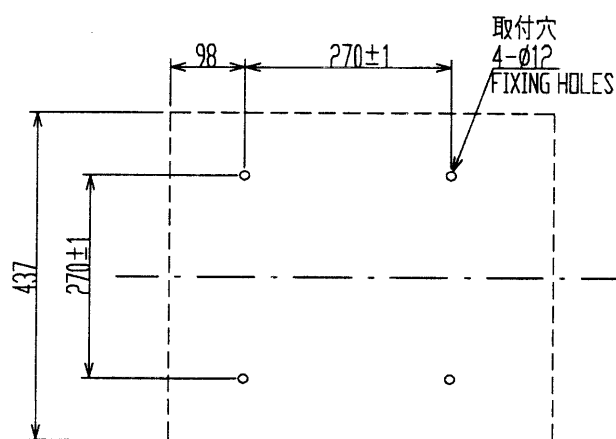
寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
$0 < L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$
$500 < L \leq 1000$	$\pm 4$

## 注記

- 1) #印寸法は最小サービス空間寸法とする
- 2) 指定なき寸法公差は表1による。

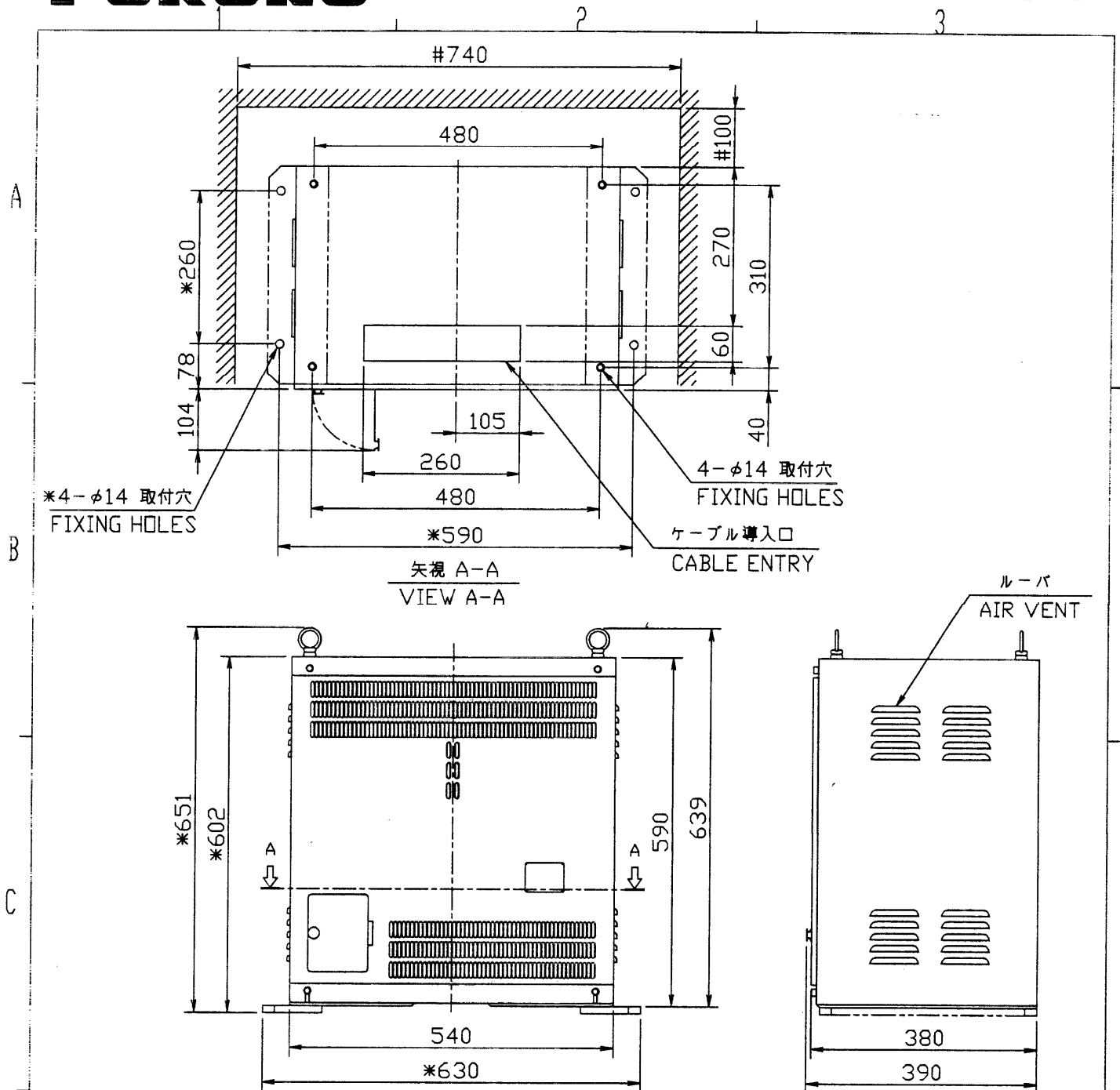
## NOTE

1. # RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.



D

DRAWN Jun 12 '01 T. YAMASAKI		TITLE CSH-230/236/530/536/731/736/580/586/830
CHECKED June 12 '01 T. K.		名称 指示装置
APPROVED June 12 '01 S. Yoshida	CSH-53/73/83/58 CSH-23/F/K	外寸図
SCALE 1/10	MASS 35 ±10% kg	NAME DISPLAY UNIT
DWG.No. C1307-G01-E	10-062-1000-G0	OUTLINE DRAWING



- 注記 1) 装備ケーブルの端末処理は装備要領書参照のこと。  
 2) \*印寸法は外足取付時の寸法とする。(取外し可)  
 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。  
 4) #印寸法は最小サービス空間寸法とする。

NOTE 1) REFER TO INSTALLATION INSTRUCTIONS FOR FABRICATION OF CABLE ENDS.  
 2) \*: OUTSIDE LEGS (REMOVABLE) MOUNTING DIMENSION.  
 3) USE M10 BOLTS OR Ø9 COACH SCREWS FOR FIXING THE UNIT.  
 4) #: RECOMMENDED SERVICE CLEARANCE.

表1 TABLE 1

範囲	DIMENSIONS*	公差 TOL
	$L \leq 50$	$\pm 1\text{mm}$
	$50 < L \leq 100$	$\pm 2\text{mm}$
	$100 < L \leq 500$	$\pm 3\text{mm}$
	$500 < L \leq 1000$	$\pm 4\text{mm}$

DRAWN Apr. 16 '01 T.YAMASAKI		TITLE CSH-551
CHECKED Apr. 16 '01 Y.KIMURA		名称 送信装置
APPROVED Apr. 16 '01 Y.KIMURA		外寸図
SCALE 1/10 MASS 82 ±10% kg		NAME TRANSMITTER UNIT
DWG.No. C1297-G02-C		PUT IN THE DRAWING

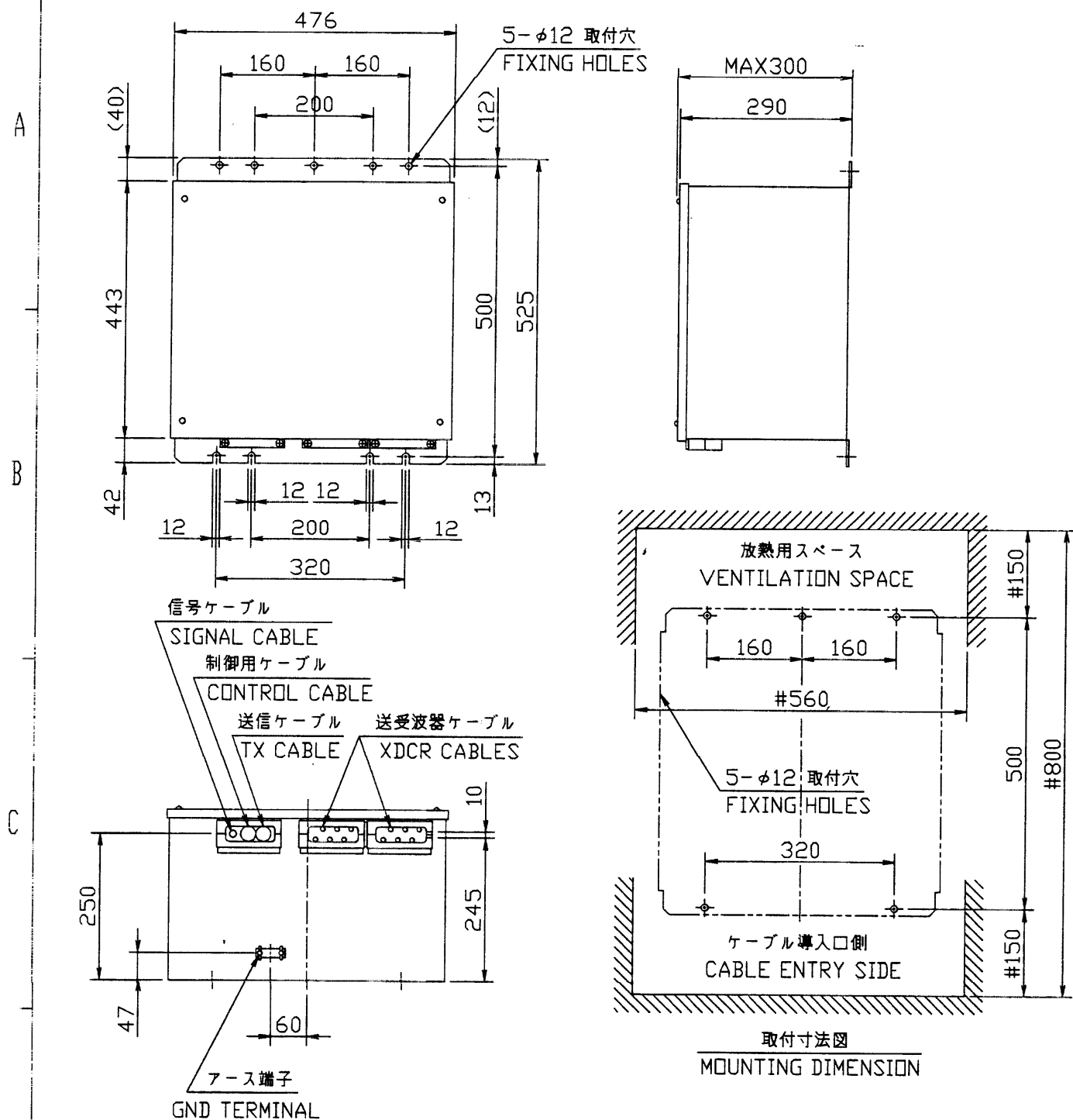


表1 TABLE 1

範囲	DIMENSIONS	公差 TOL
	$L \leq 50$	$\pm 1\text{mm}$
	$50 < L \leq 100$	$\pm 2\text{mm}$
	$100 < L \leq 500$	$\pm 3\text{mm}$
	$500 < L \leq 1000$	$\pm 4\text{mm}$

## 注記

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。  
#印寸法は最小サービス空間寸法とする。

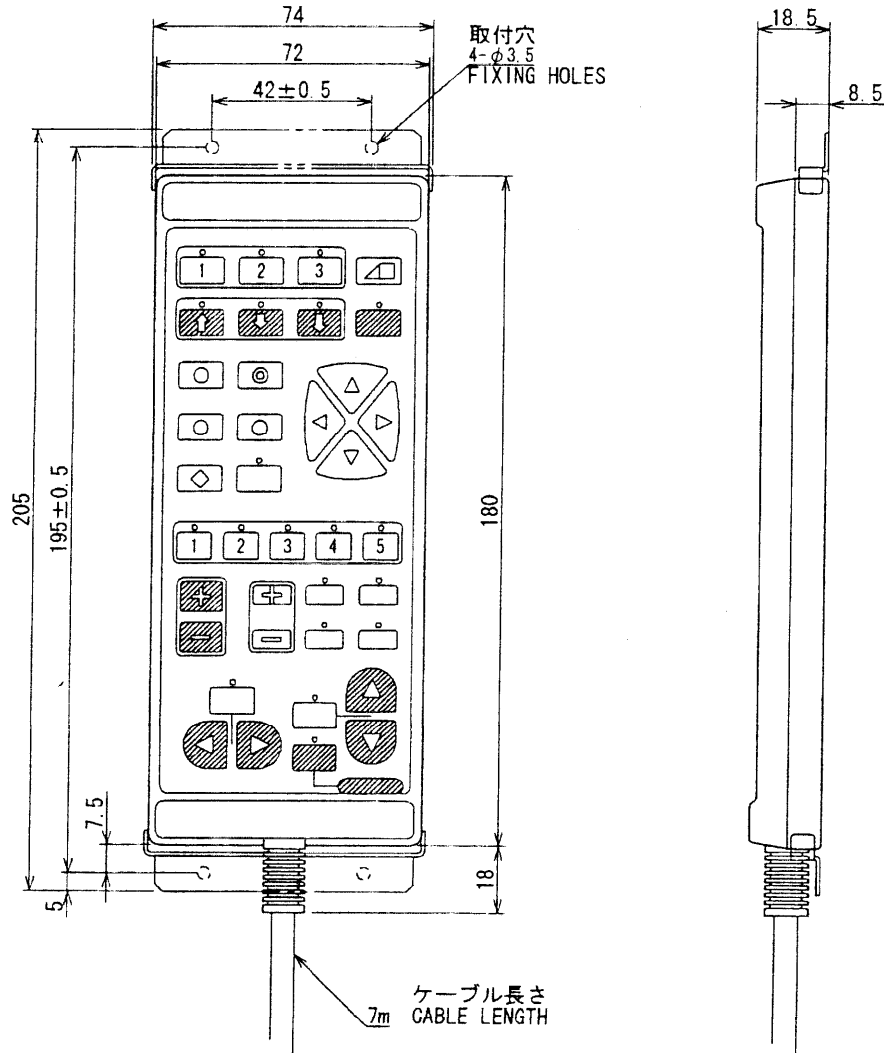
## NOTE

USE M10 BOLTS OR φ9 COACH SCREWS FOR FIXING THE UNIT.  
#: RECOMMENDED SERVICE CLEARANCE.

DRAWN	Apr. 16 '01	T.YAMASAKI	TITLE	CSH-552
CHECKED	Apr. 16 '01	Y.KIMURA	名称	受信装置
APPROVED	Apr. 16 '01	Y.KIMURA	外寸図	
SCALE	1/10	MASS	NAME	RECEIVER UNIT
DWG.No.	C1297-G01-C	26 ±10% kg		OUTLINE DRAWING

表 1 TABLE 1

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



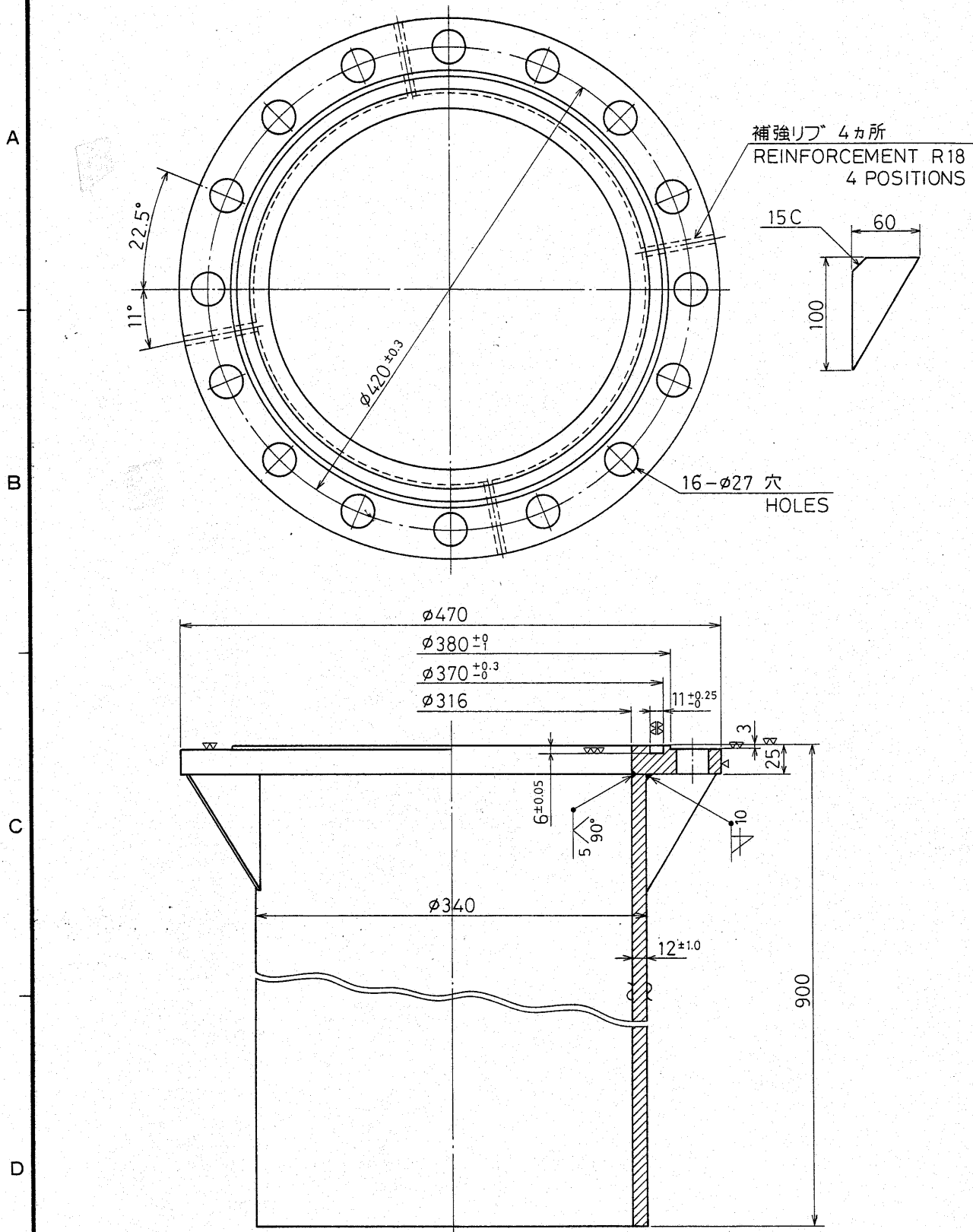
## 注記

1) 指定なき寸法公差は表 1 による。

## NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN Dec. 26 '00 T. YAMASAKI		TITLE CSH-116/135
CHECKED Dec 27 '00 Y. K.		名称 リモート箱
APPROVED Dec 27 '00 Y. K.	CSH-53/83/73/58 CSH-21/22/23/23F	外寸図
SCALE 1/2	MASS 1.5 kg $\pm 10\%$	NAME REMOTE CONTROL BOX
DWG. No. C1286-G02- D		OUTLINE DRAWING



CSH-70/80/50/60		品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	DEC. 1 '87 T. NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE 格納タンク外観図 RETRACTION TANK			
検図 CHECKED	Dec. 1 '87 T. KODI	尺度 SCALE	1/5				
製図 DRAWN	DEC. 1 '87 N. SAITO	重量 WEIGHT	100 kg	図番 DWG.NO.	C1260-048-A		

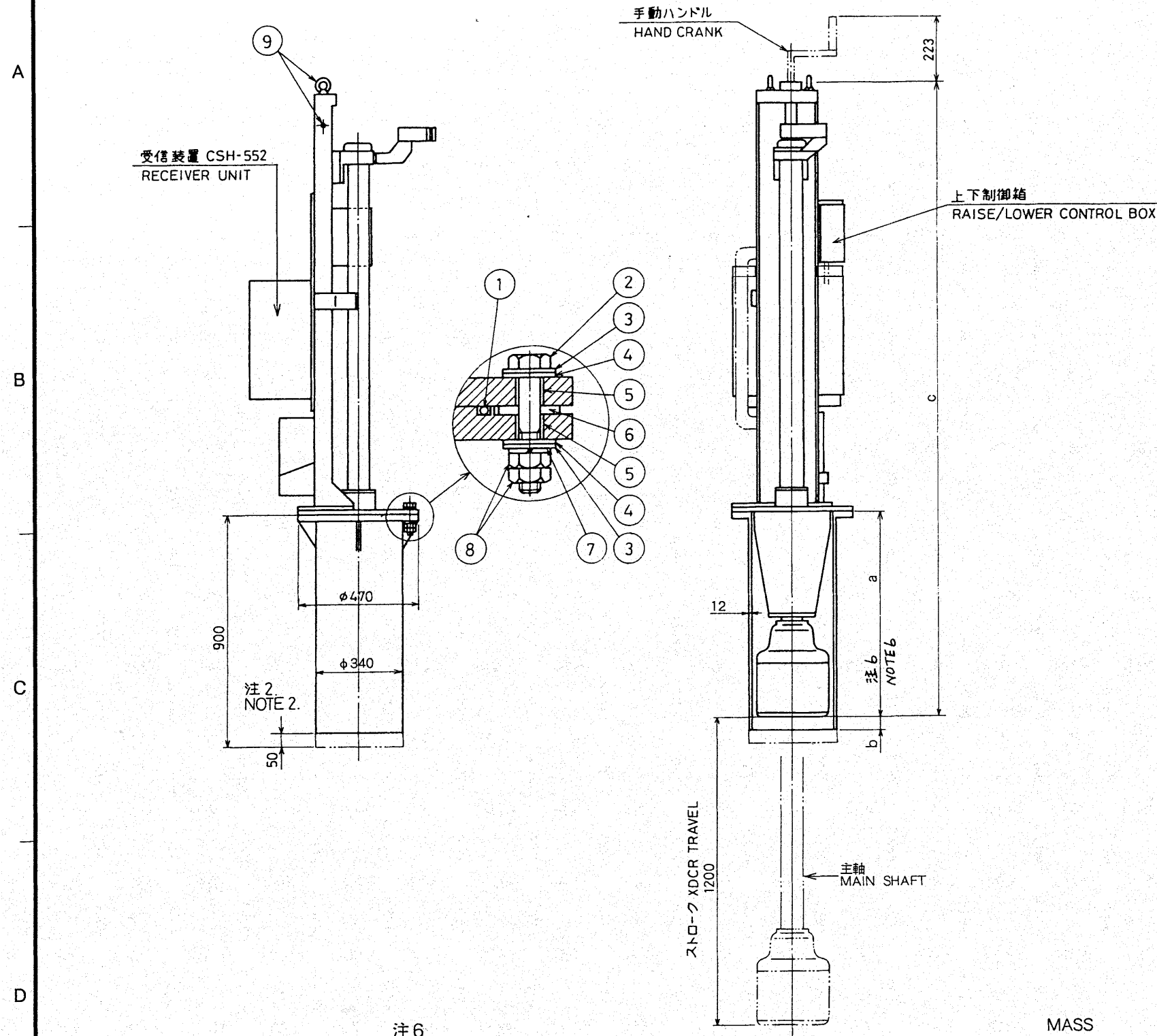


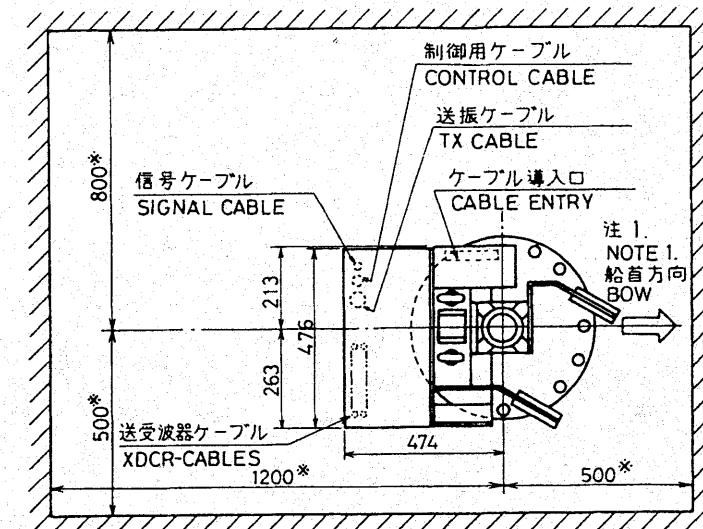
表 1 TABLE 1

範囲 DIMENSIONS	公差 TOL
$L \leq 50$	$\pm 1 \text{ mm}$
$50 < L \leq 100$	$\pm 2 \text{ mm}$
$100 < L \leq 500$	$\pm 3 \text{ mm}$
$500 < L \leq 1000$	$\pm 4 \text{ mm}$
$1000 < L \leq 2000$	$\pm 5 \text{ mm}$
$2000 < L \leq 4000$	$\pm 7 \text{ mm}$

注 6  
NOTE 6

周波数 Freq.	寸法 Dim.	a	b	c
50kHz		800	50	2470
28kHz		768	82	2438

MASS  
50kHz : 289kg  
28kHz : 310kg



注

1. 架台フランジ上の矢印⇒を船首方向に一致させること。これができないときは、装備後、指示装置での船首線調整が必要。
2. 装備位置に応じて50mm以内で切断のこと。
3. 保守点検のため最小限 図中※印のスペースを設けること。
4. 装備後、アイナットおよび架台上部側面穴⑨を利用して振れ止め用のステーを張ること。
5. 走行時、水面に対して主軸が垂直になるように装備のこと。

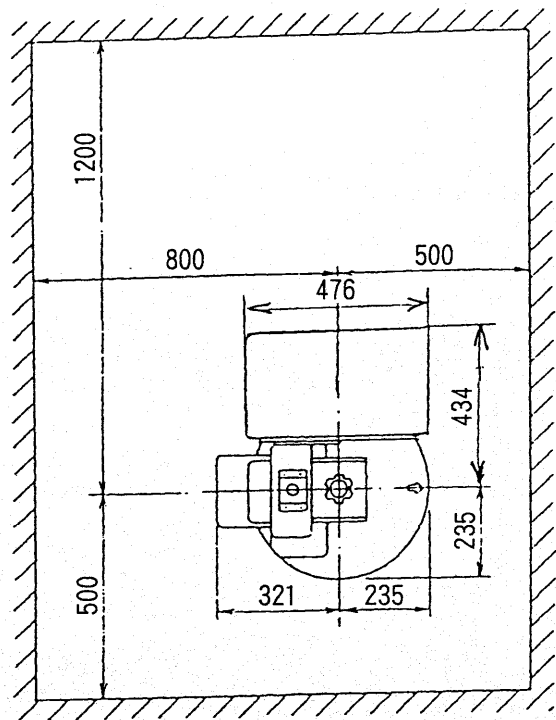
NOTE

1. THE BOW MARK ⇒ ON GALLOWS FLANGE SHOULD FACE SHIP'S BOW. IF NOT, HEADING ADJUSTMENT SHOULD BE MADE AT INSTALLATION.
2. CUT THE TANK WITHIN 50MM IN LENGTH ACCORDING TO INSTALLATION SITE.
3. DIMENSIONS MARKED "※" SHOW MINIMUM MAINTENANCE SPACE.
4. STRETCH STAYS FOR ANTI-VIBRATION BY USING TWO EYE-NUTS AND SIDE HOLE ⑨ AFTER INSTALLATION.
5. INSTALL THE HULL UNIT SO THE MAIN SHAFT IS PERPENDICULAR TO SEA SURFACE WHEN CRUISING.

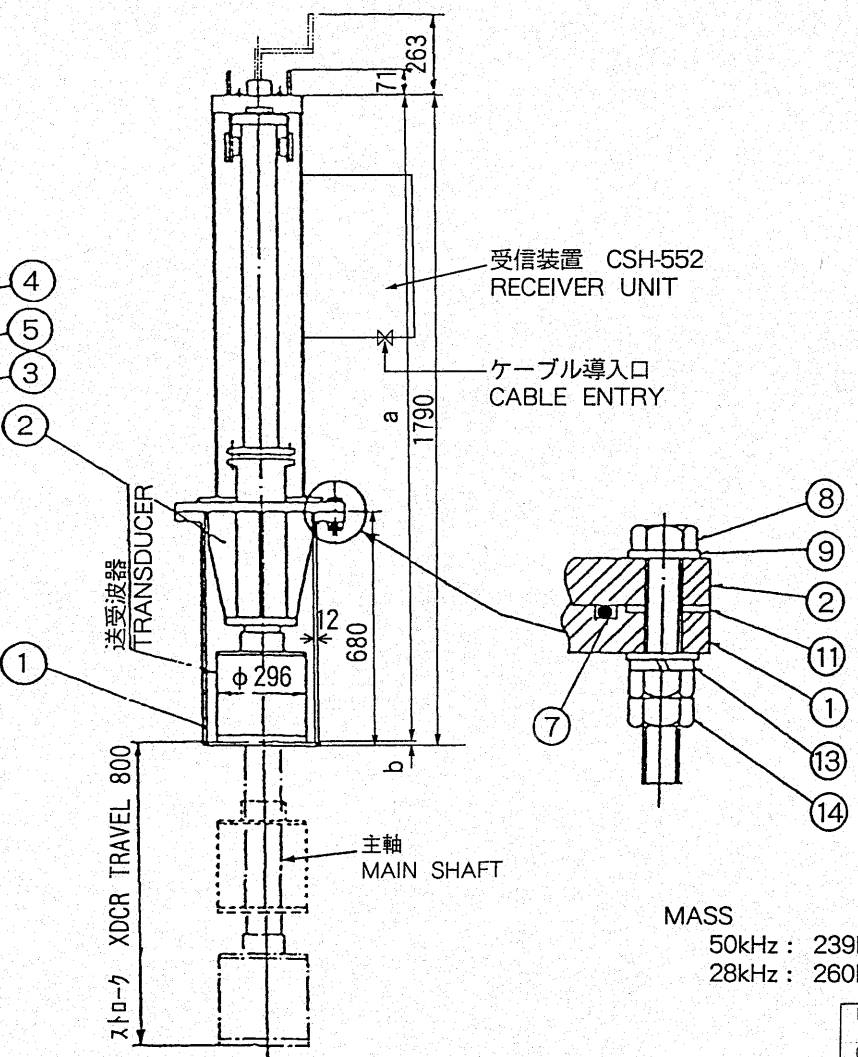
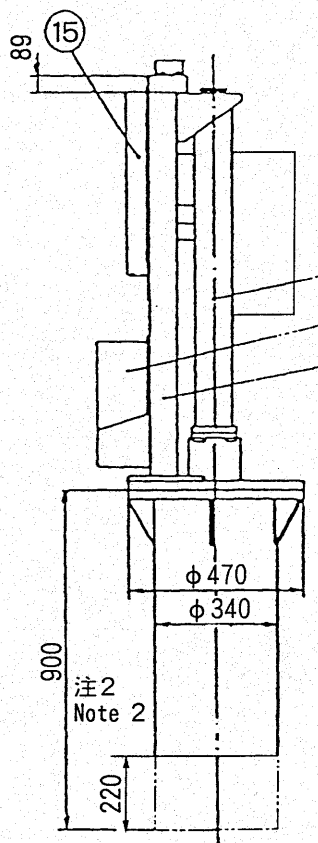
9	アイナット EYE-NUT	SS41	2	M20	
8	六角ナット HEX. NUT	SUS304	32	M20	
7	バネ座金 SPRING WASHER	SUS304	16	FOR M20	
6	絶縁板(1) GASKET(1)	CR	1	SHG-0003	
5	絶縁パッキン(2) INSULATION PACKING(2)		25	MS-1000-68	
4	絶縁板(2) GASKET(2)		25	SHG-0004	
3	平座金 FLAT WASHER	SUS304	25	SHG-0002	
2	六角ボルト HEX. BOLT	SUS304	9	M20 x120	
1	Oリング O-RING		1	JISB2401 P355	
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG.NO.	摘要 REMARKS

DRAWN	Jun 29 '97 T. YAMASAKI	TYPE	CSH-5512
CHECKED	Jun 24 '97 K. Kusumaki	名称	上下装置 (1200mmストローク)
APPROVED	Jun 24 '97 S. Yamaguchi	外寸図	
SCALE	1/20 MASS 270 kg	APPLICABLE TO: (MODEL)	BLOCK NO.
DWG. NO.	C1297-G04-B	NAME	HULL UNIT (TRAVEL 1200MM)
			OUTLINE DRAWING





船首方向  
SHIP'S BOW



MASS  
50kHz : 239kg  
28kHz : 260kg

注.

1. 架台フランジ上の矢印⇒を船首方向に一致させること。これができないときは、上下装置の船首方向を左右45°ステップで変更できますので注文時に指定のこと。
2. 装備位置に応じて220mm以内で切断のこと。
3. 保守点検のため最小限 図中※印のスペースを設けること。
4. 装備後、アイナットおよび架台上部側面穴⑨を利用して振れ止め用のステーを張ること。
5. 走行時、水面に対して主軸が垂直になるように装備のこと。

NOTE

1. THE BOW MARK ⇒ ON GALLOWS FLANGE SHOULD FACE SHIP'S BOW. IF NOT, HEADING DIRECTION OF HULL UNIT CAN BE CHANGED AT 45° INTERVALS. SPECIFY WHEN ORDERING.
2. CUT THE TANK WITHIN 220MM IN LENGTH ACCORDING TO INSTALLATION SITE.
3. DIMENSIONS MARKED "※" SHOW MINIMUM MAINTENANCE SPACE.
4. STRETCH STAYS FOR ANTI-VIBRATION BY USING TWO EYE-NUTS AND SIDE HOLE ⑨ AFTER INSTALLATION.
5. INSTALL THE HULL UNIT SO THE MAIN SHAFT IS PERPENDICULAR TO SEA SURFACE WHEN CRUISING.

表 1 TABLE 1

範囲 DIMENSIONS	公差 TOL
$L \leq 50$	$\pm 1 \text{ mm}$
$50 < L \leq 100$	$\pm 2 \text{ mm}$
$100 < L \leq 500$	$\pm 3 \text{ mm}$
$500 < L \leq 1000$	$\pm 4 \text{ mm}$
$1000 < L \leq 2000$	$\pm 5 \text{ mm}$
$2000 < L \leq 4000$	$\pm 7 \text{ mm}$

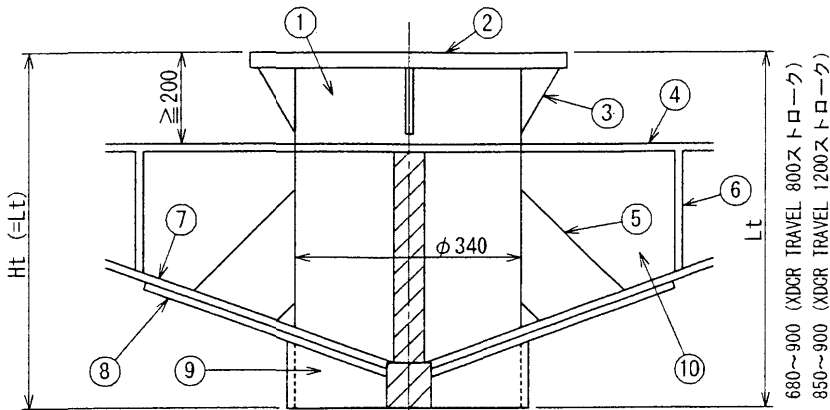
振動子型式 TRANSDUCER TYPE	a (mm)	b (mm)
CSH-55-50	1710	80
CSH-55-28	1742	48

15	接続箱 (1) JUNCTION BOX (1)		1		
14	六角ナット HEX. NUT	SUS304	32	FOR M20	
13	バネ座金 SPRING WASHER	SUS304	16	FOR M20	
12					
11	絶縁板 (1) PACKING (1)	CR	1	SHG-0003	
10					
9	平座金 FLAT WASHER	SUS304	25	M20	
8	六角ボルト HEX. BOLT	SUS304	9	M20 × 120	
7	リング O-RING		1	JIS B2401 P355	
6					
5	ギヤ ボックス GEAR BOX		1	10-014-2200	
4	主 軸 MAIN SHAFT	SUS304 TPS-H	1	10-057-5114	
3	架 台 GALLOWS	SS-41	1	10-057-5113	
2	軸受部 SHAFT SLEEVE		1	10-057-5112	
1	格納タンク RETRACTION TANK	SM41	1	10-057-5103	
品 番 ITEM	品 名 NAME	材 質 MATERIAL	数 量 Q'TY	図 番 DWG. NO.	摘 要 REMARKS

DRAWN Jun. 24 '97 T. YAMASAKI	CSH-23/F/K CSH-73/83 CSH-53 CSH-55	TYPE CSH-5508 名称 上下装置 (800mmストローク) 外寸図
CHECKED Jun 24 '97 K. Kusunoki	APPLICABLE TO: (MODEL)	NAME HULL UNIT (TRAVEL 800MM)
APPROVED Jun 24 '97 T. Yamasaki	SCALE 1/20	BLOCK NO.
DWG NO. C1297-G03- B	MASS 239 kg	OUTLINE DRAWING

A

A. キール上 (突出) ON KEEL (PROJECTED)



装備手順

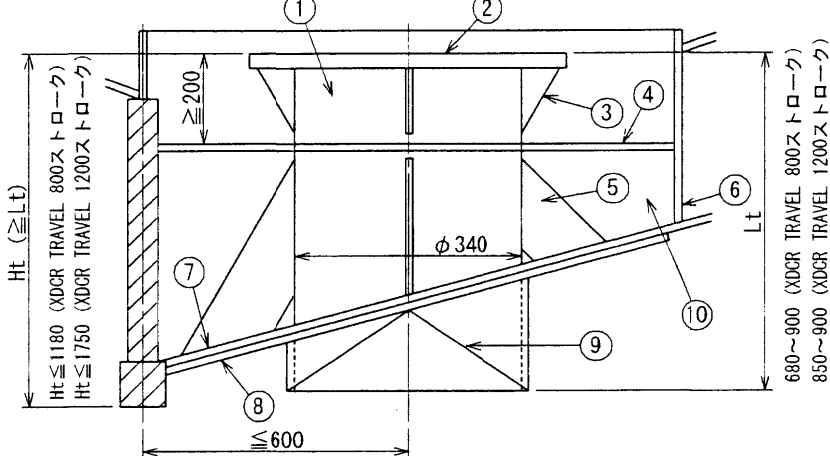
1. 船底板および二重船底板にφ340の穴を開ける。
2. 次の点に注意して、格納タンクを船底板に連続スミ肉溶接する。
  - \* タンクのフランジ面が標準走航時に水平になること。
  - \* フランジ面のボルト穴の中心が船首方向になること。
  - \* 送受波器を突出させたときに送受波ビームがキールで遮られないように、フランジ面のキールよりの高さ“Ht”を図示の範囲内にすること。
  - \* タンク下端がキールより下に出ないようにタンク長さ“Lt”は、“Ht”より短くする。かつ、送受波器がタンク下端より出ないように図示の範囲内にする (標準支給長900mm)
3. 格納タンクの周囲に外径φ1000以上のダブリング⑧を取付ける。また、突出装備 (A・B図) の場合には、整流覆⑨ (D図) を取付ける。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こと。
4. タンク周囲に油槽がある場合には、隔壁を巡らせコファダム⑩を設けること。
5. タンク周囲4ヶ所以上に補強板⑤を溶接する。
6. 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を二重船底板より200mm以上離す。二重船底が高い船にはB図の方法で二重船底板を下げ、スペースを確保すること。

INSTALLATION METHOD OF RETRUCTION TANK

1. Cut out φ340 hole on hull and inner hull plate.
2. Install tank to hull plate with fillet welding taking the following points into account:
  - \* Flange face is exactly horizontal at normal ship's trim.
  - \* One of 24 bolt holes on flange is faced dead ahead.
  - \* Allow height of flange face from keel bottom “Ht” mentioned in the drawings, othewize transducer beam is blocked by the keel. when transducer is fully lowered.
  - \* Tank's length “Lt” should be less than “Ht”. If not so, bottom end of tank is placed below keel level. “Lt” is also limited as shown in the drawings so that the transducer can be fully retracted in tank. (The tank is supplied with 900mm long as standard.
3. Fit doubling plate ⑧ of outer dia. φ1000 around the tank on hull plate. Fit fairing plate ⑨ reffering to the drawing 'D' for installation method 'A' and 'B'. Use same material and ththickness od doubling and fairing plate as hull plate.
4. Provide cofferdam around the tank in order to isolate the tank from the oil tank.
5. Install 4 pieces of reinforcement plates between the tank and the hull plate.
6. Allow clearance of more than 200 mm below the flange face for easy bolting. Sink the inner hull plate as shown in the drawing 'B' for high inner hull plate.

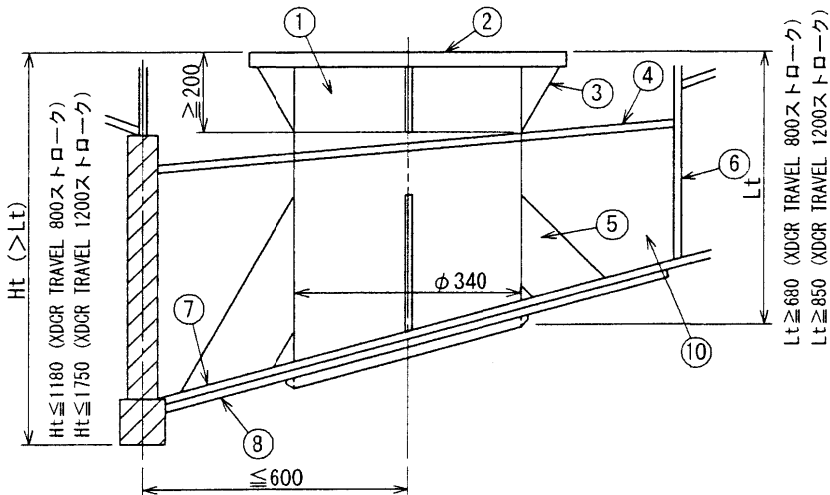
B

B. キール横 (突出) OFF KEEL (PROJECTED)



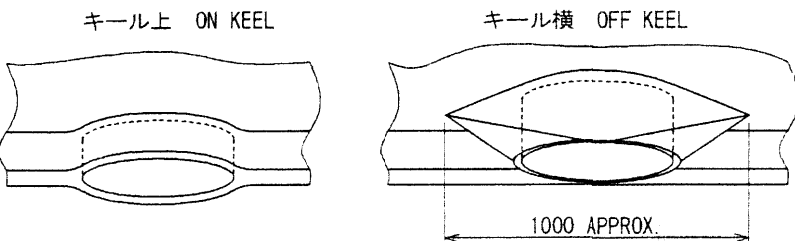
C

C. キール横 (非突出) OFF KEEL (NOT PROJECTED)



D

D. 整流覆 FAIRING PLATE



10	コファダム COFFERDAM				
9	整流覆 FAIRING PLATE				
8	ダブリング DOUBLING				
7	船底板 HULL PLATE				
6	油槽隔壁 BULKHEAD				
5	補強板 REINFORCEMENT PLATE				
4	二重船底板 INNER HULL PLATE				
3	補強リブ REINFORCEMENT RIB				
2	タンクフランジ TANK FLANGE				
1	格納タンク RETRUCTION TANK				
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG NO	備考 REMARKS

DRAWN Jan. 18 '01 T. YAMASAKI		TITLE CSH-55/53
CHECKED Jan 18 '01 Y. Kuni		名称 格納タンク装備要領 (鋼船)
APPROVED Jan 18 '01 Y. Kuni	CSH-53 CSH-55	外寸図
SCALE MASS kg		NAME RETRUCTION TANK INSTALLATION
DWG No. C1297-G05- C		OUTLINE DRAWING

A

B

C

D

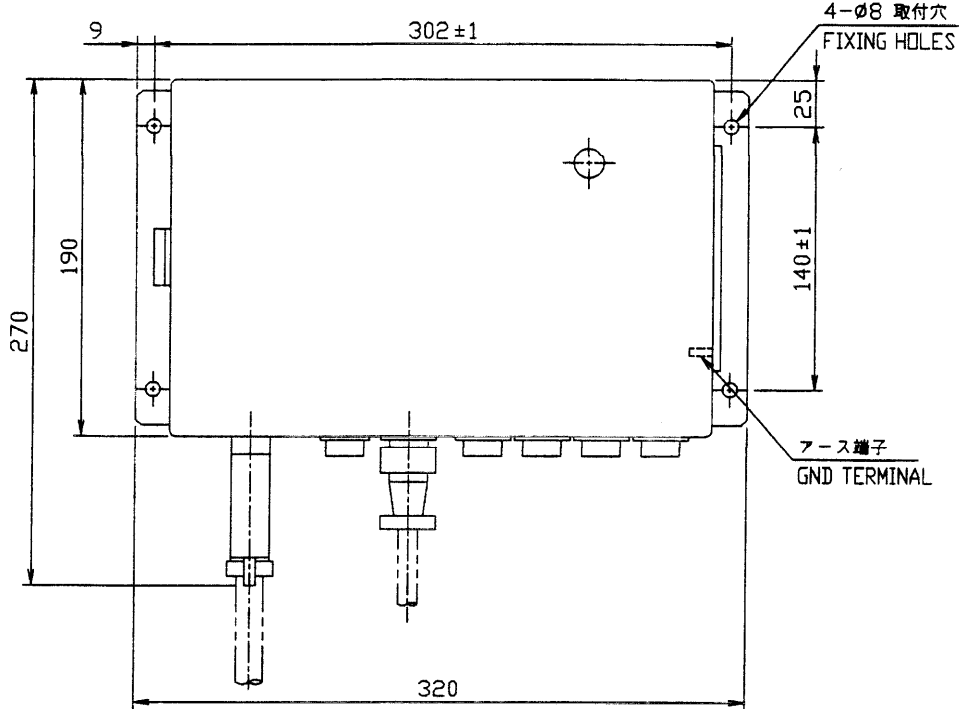
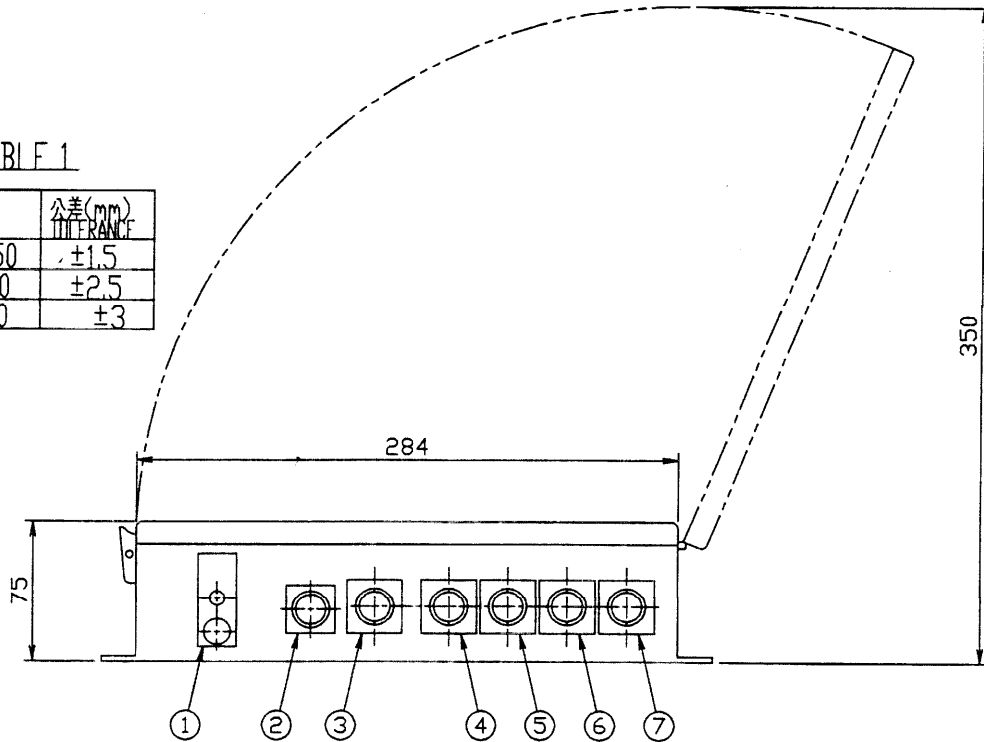


表1 TABLE 1

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



注記

1) 指定なき寸法公差は表1による。

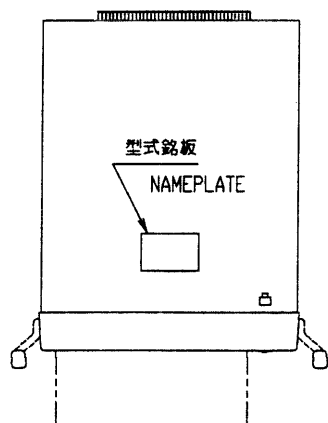
NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

7	魚探レセプタクル RECEPTACLE FOR ECHO SOUNDER	1	
6	測深計レセプタクル RECEPTACLE FOR DOPPLER SONAR CURRENT INDICATOR	1	
5	航法装置レセプタクル RECEPTACLE FOR NAVIGATION SYSTEM	1	
4	ジャイロレセプタクル RECEPTACLE FOR GYRO COMPASS	1	
3	ネットソングレセプタクル RECEPTACLE FOR NET ZONDE	1	
2	ログレセプタクル RECEPTACLE FOR SPEED LOG	1	
1	カラー魚探ディスプレイ指示器レセプタクル RECEPTACLE FOR COLOR SCANNING SONAR DISPLAY	1	
品番 ITEM	品名 NAME	数量 QTY	図番 DWGNO.

DRAWN Apr. 16 '01	T. YAMASAKI			TITLE CS-120A
CHECKED Apr. 16 '01	Y. KIMURA			名称 外部インターフェース
APPROVED Apr. 16 '01	Y. KIMURA			外寸図
SCALE 1/4	WASS 3	±10% kg		NAME INTERFACE UNIT
DWG.No. C1233-005-F				PUTLINE DRAWING

A



ケーブル導入口

CABLE ENTRY

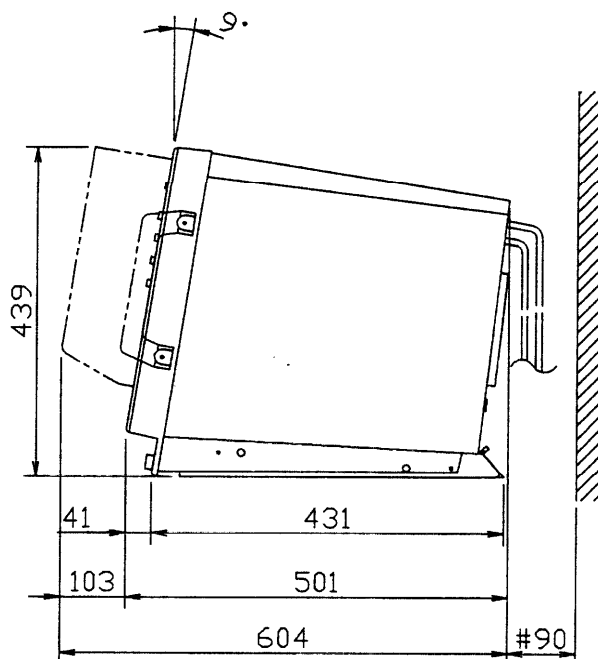
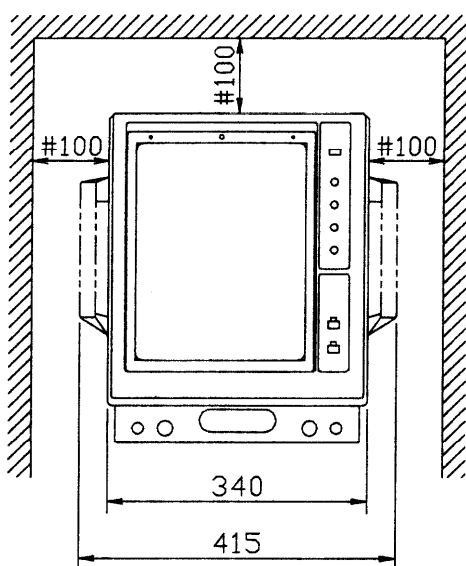
アース端子

GND TERMINAL

電源

SOURCE

B



寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$0 < L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$
$500 < L \leq 1000$	$\pm 4$

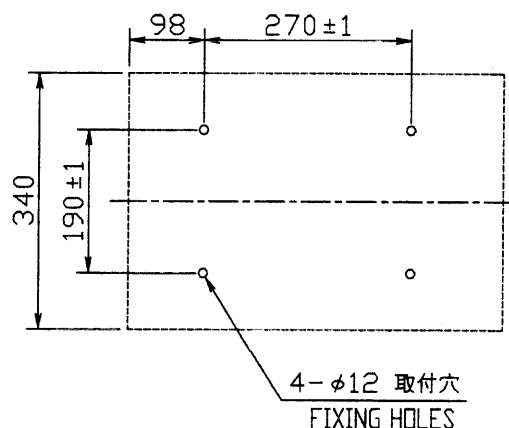
表 1 TABLE 1

## 注記

- 1) #: 推奨する最小サービス空間寸法。
- 2) 指定なき寸法公差は表1による。

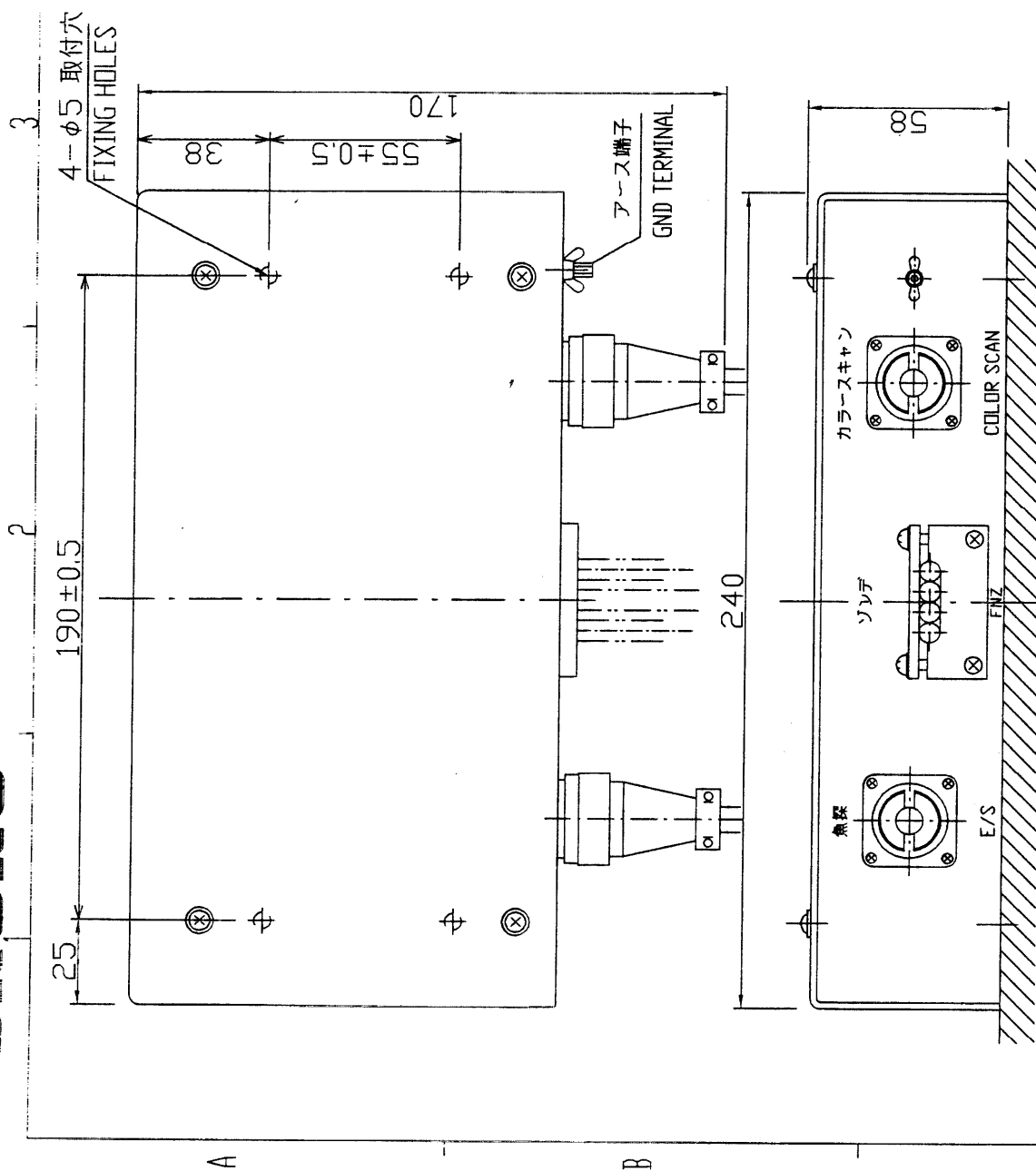
## NOTE

1. #: RECOMMENDED SERVICE CLEARANCE
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.



D

DRAWN Jul. 11 '01 T.YAMASAKI	TITLE CSH-106
CHECKED July 16 '01 Y.K.	名称 リモートディスプレイ
APPROVED July 16 '01 Y.K.	外寸図
SCALE 1/10 MASS ±10% 25 kg	NAME REMOTE DISPLAY UNIT
DWG.No. C1286-G03-D	OUTLINE DRAWING



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

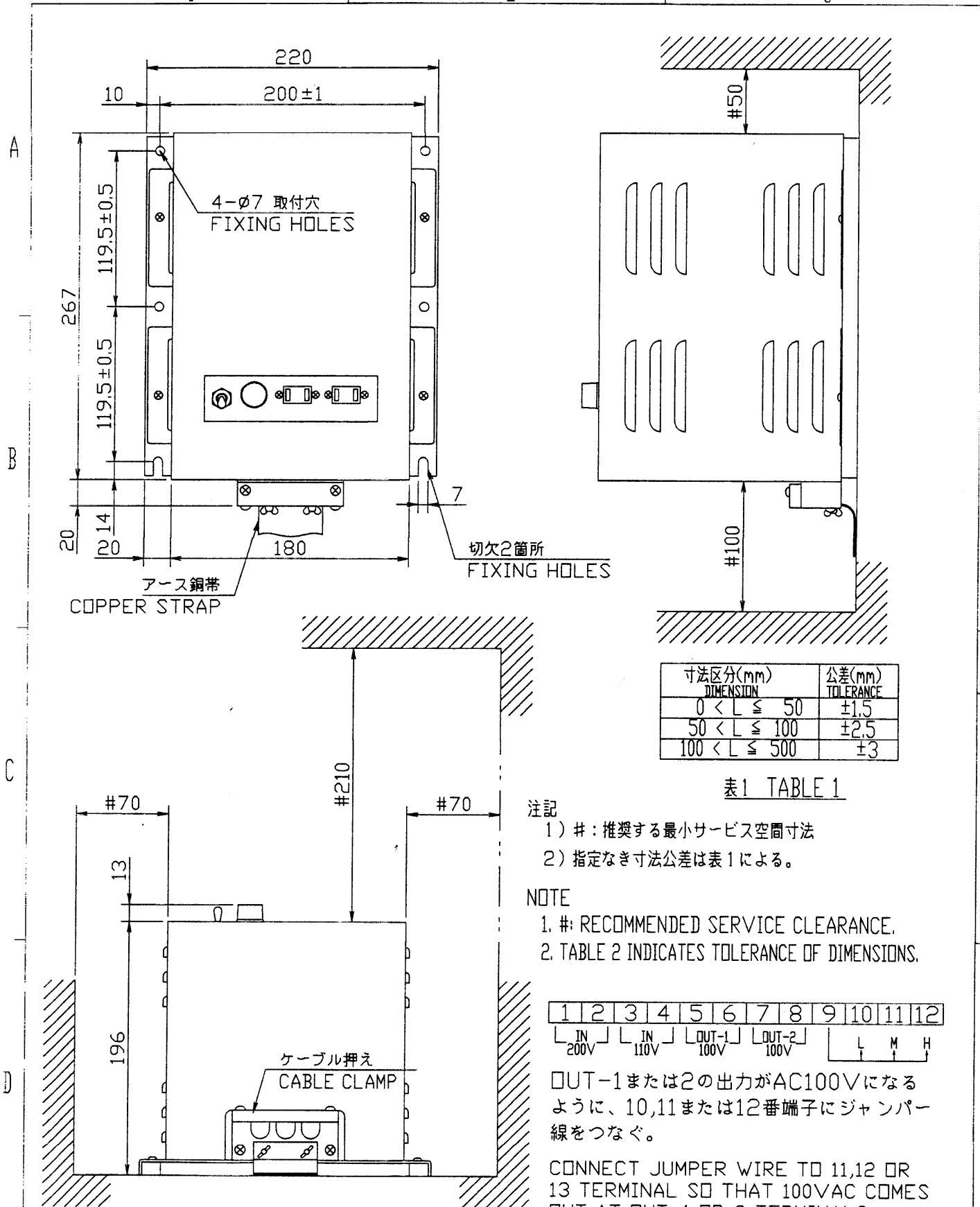
注記

- 1) 推奨する最小サービス空間寸法。
- 2) 指定なき寸法公差は表1による。

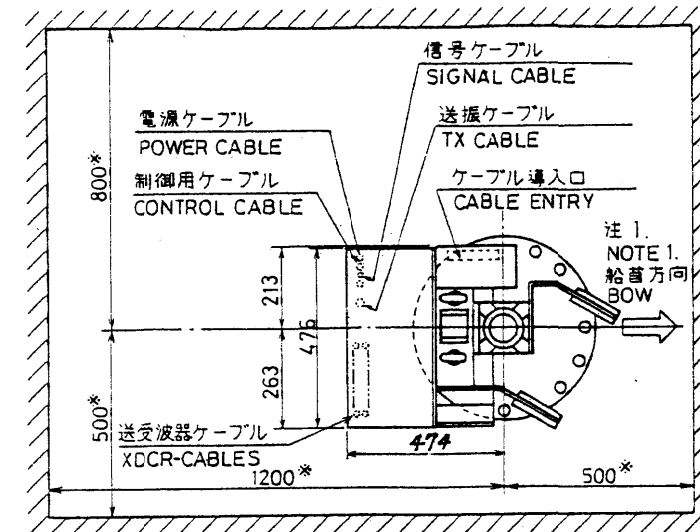
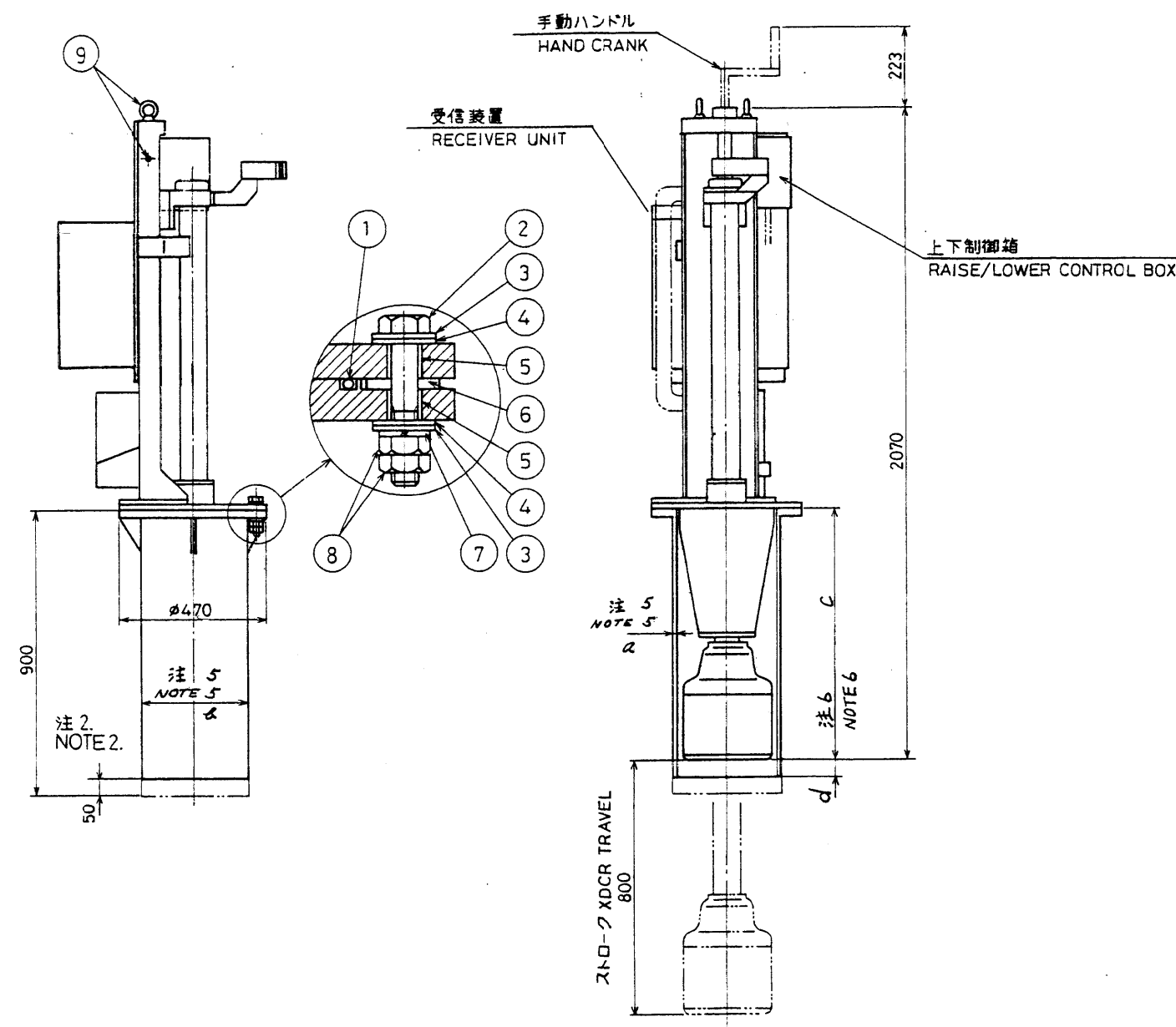
NOTE

1. # RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN	JUL 11 '01	T. YAMASAKI	TITLE	CS-170
CHECKED			名称	ネットゾンデ接続箱
APPROVED			外寸図	
SCALE	1/2	MASS 2 $\pm 10\%$ kg	NAME	NET JOINT BOX
DWG No.	C1233-007-D			OUTLINE DRAWING



DRAWN	Jul. 16 '01 T.YAMASAKI		TITLE	PT-400
CHECKED	July 16 '01 Y.K.		名称	電圧変圧器
APPROVED	July 16 '01 Y.K.			外寸図
SCALE	1/4 MASS 22 ±10% kg	CSH SERIES	NAME	STEP-DOWN TRANSFORMER
DWG.No.	C0005-002-C			OUTLINE DRAWING



- 注 1. 架台フランジ上の矢印⇒を船首方向に一致させる事。これが出来ない時は、装備後、指示装置での船首線調整が必要。
2. 装備位置に応じて 50mm 以内で切断の事。
3. 保守点検のため最小限 図中※印のスペースを設ける事。
4. 装備後、アイナット及び架台上部側面穴⑨を利用して振れ止め用ステーを張る事。

- NOTE 1. THE BOW MARK⇒ ON GALLOWS FLANGE SHOULD FACE SHIP'S BOW. IF NOT, HEADING ADJUSTMENT SHOULD BE MADE AT INSTALLATION.
2. CUT THE TANK WITHIN 50MM IN LENGTH ACCORDING TO INSTALLATION SITE.
3. DIMENSIONS MARKED "※" SHOW MINIMUM MAINTENANCE SPACE.
4. STRETCH STAYS FOR ANTI-VIBRATION BY USING TWO EYE-NUTS AND SIDE HOLE⑨ AFTER INSTALLATION.

9	アイナット EYE-NUT	SS41	2	M20	
8	六角ナット HEX. NUT	SUS304	32	M20	
7	バネ座金 SPRING WASHER	SUS304	16	FOR M20	
6	絶縁板(1) GASKET(1)	CR	1		
5	絶縁パッキン INSULATION PACKING(2)		25	MS-1000-68	
4	絶縁板(2) GASKET(2)		25	SHG-0004	
3	平座金 FLAT WASHER	SUS304	25	SHG-0002	
2	六角ボルト HEX. BOLT	SUS304	9	M20 x120	
1	Oリング O-RING		1	JISB2401 P355	

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

DRAWN Jan. 13 '98 T.YAMASAKI		TYPE CSH-5508F			
CHECKED Jan. 13 '98 K.Kusumaki		名称 上下装置 (800mmストローク)			
APPROVED Jan. 14 '98 H.Yamashita	CSH-55 CSH-53	外寸図			
SCALE 1/20 375 kg	APPLICABLE TO: (MODEL)	BLOCK NO.	NAME HULL UNIT(XDCR TRAVEL 800MM)		
DWG NO. C1307-G02-A			OUTLINE DRAWING		

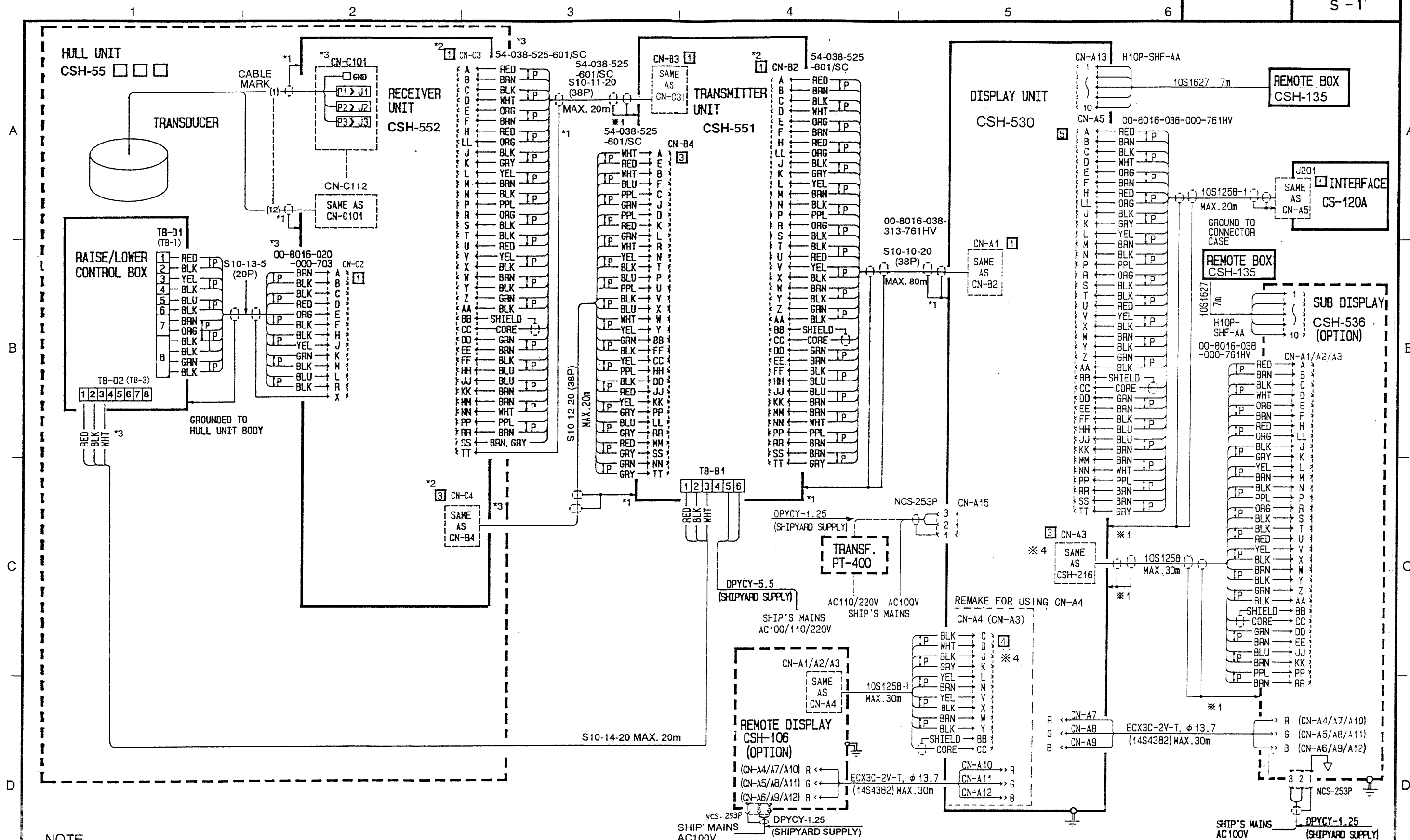
注5  
NOTE 5

タンク肉厚 THICKNESS OF TANK	a	b
9mm (オプション) OPTION	9 ± 0.4	φ 334
12mm (標準) STANDARD	12 ± 1.0	φ 340

注6  
NOTE 6

寸法 周波数	c	d
75/81kHz	800	50
94/107kHz	768	82

重量375kgは受信装置を含まない。  
Weight 375kg does not include the weight of receiver unit.

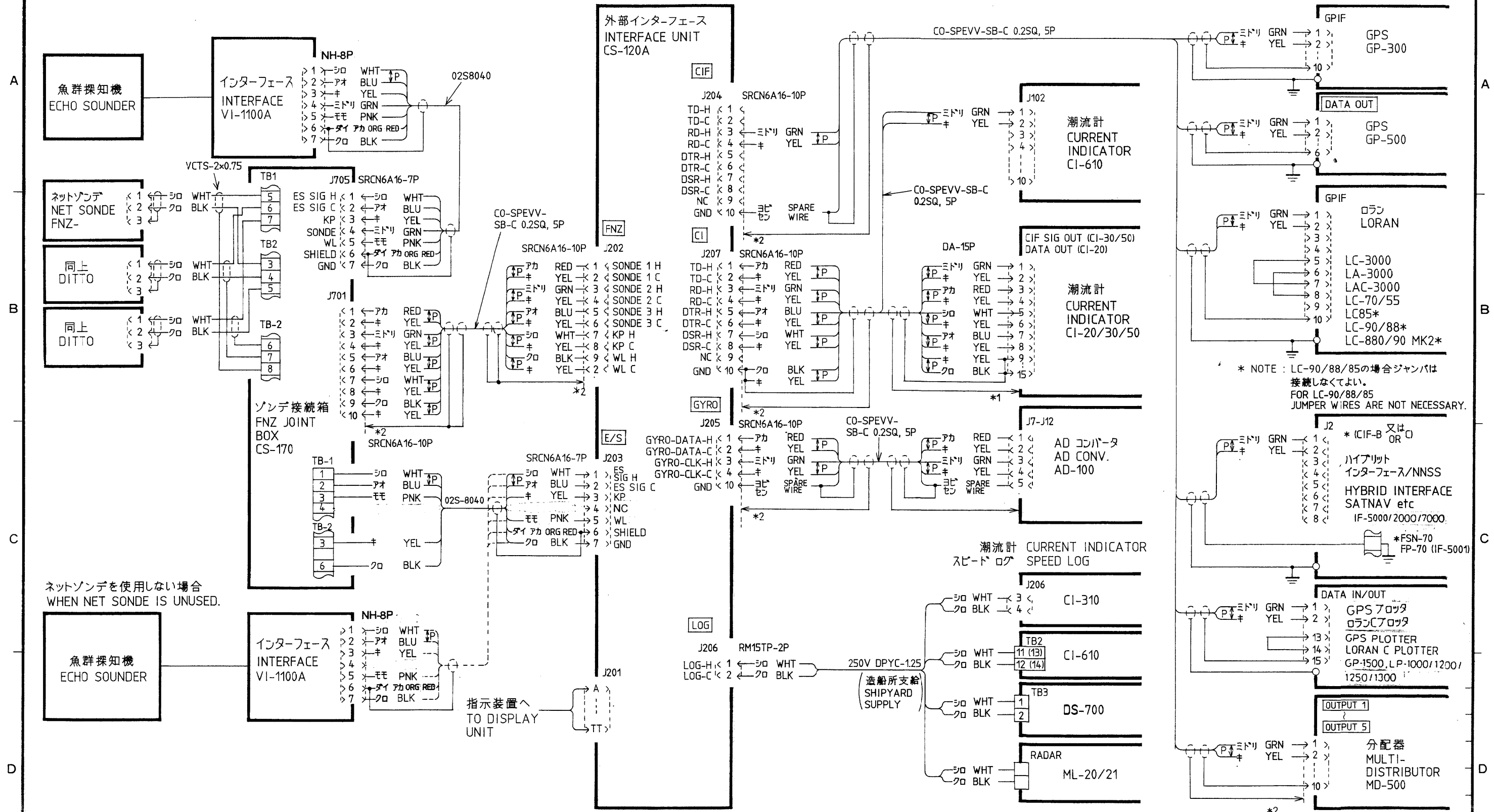


## NOTE

- \*1. GROUNDED THRU CABLE CLAMP.
- \*2. NUMERAL IN ☐ SHOWS POSITION OF CONNECTOR GUIDE PIN (LARGE).  
GUIDE PIN (SMALL) IS SET ALWAYS TO POSITION "1".
- \*3. CONNECTOR FITTED AT FACTORY.
- \*4. DO NOT CONNECT RGB LINE (CONNECTOR FF/HH, MM/NN, SS/TT) OF CABLE 10S1258, OR INTERFERENCE MAY APPEARS ON THE DISPLAY.

DRAWN Dec 6 '89 T. YAMASAKI		TYPE CSH-53
CHECKED Dec 6 '89 K. Kusunoki		名称 カラースキャニングソナー
APPROVED Dec 6 '89 K. Kusunoki		相互結線図
SCALE /	MASS kg	APPLICABLE TO; (MODEL)
DWG NO. E1307-C01-C	BLOCK NO.	NAME COLOR SCANNING SONAR
INTERCONNECTION DIAGRAM		

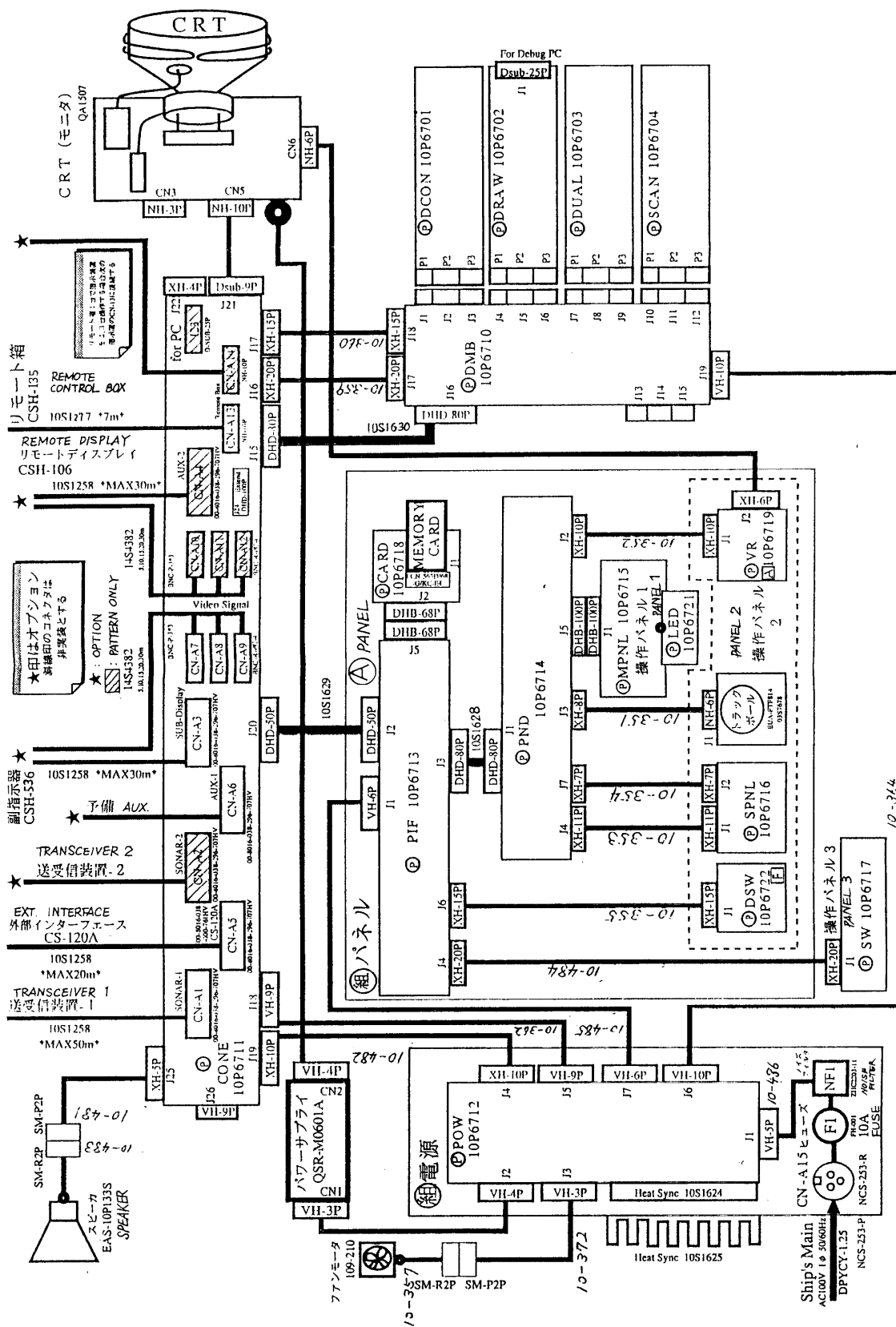




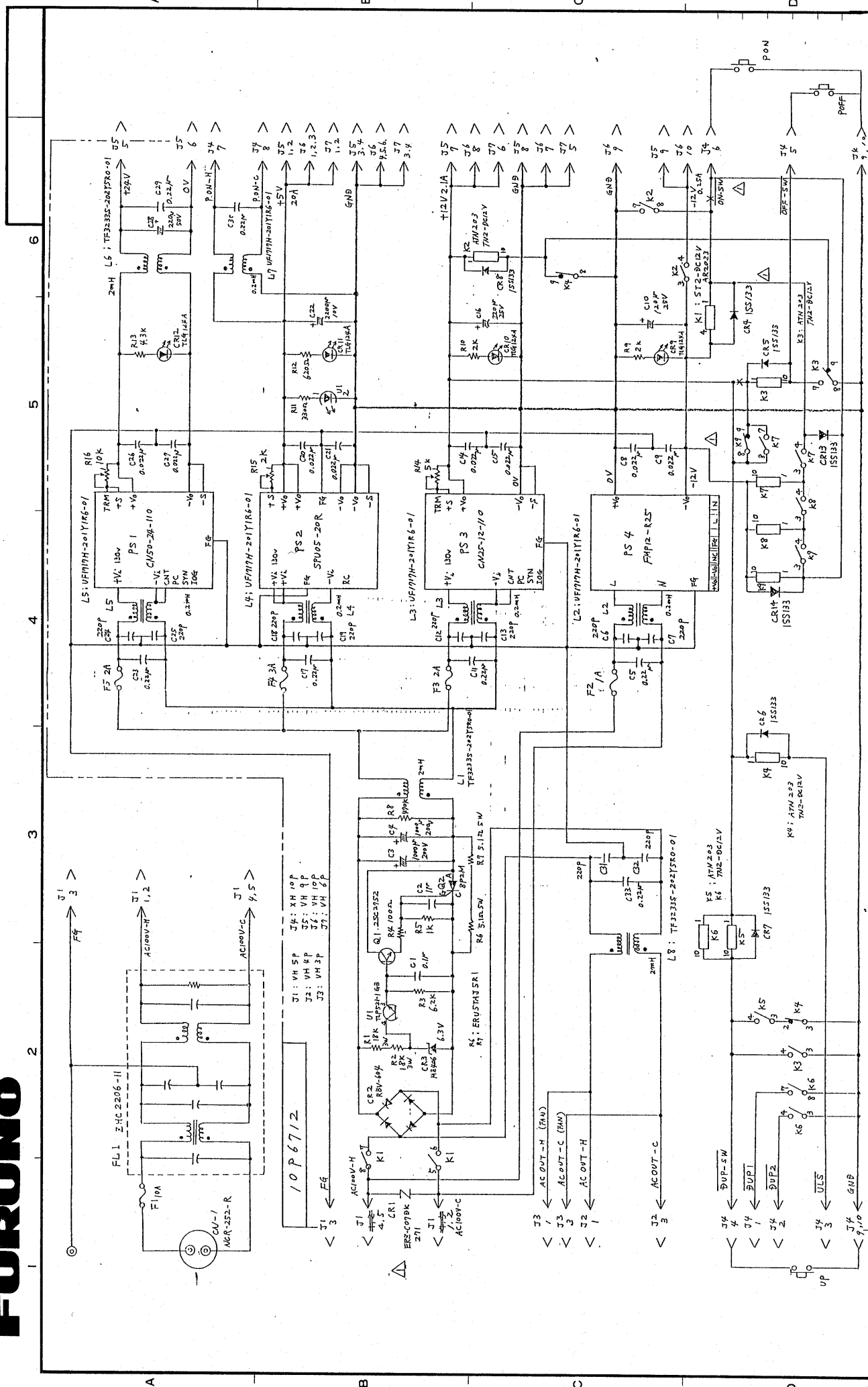
\*1 ケーブルクランプでアースにおとす。  
GROUND THROUGH CABLE CLAMP.

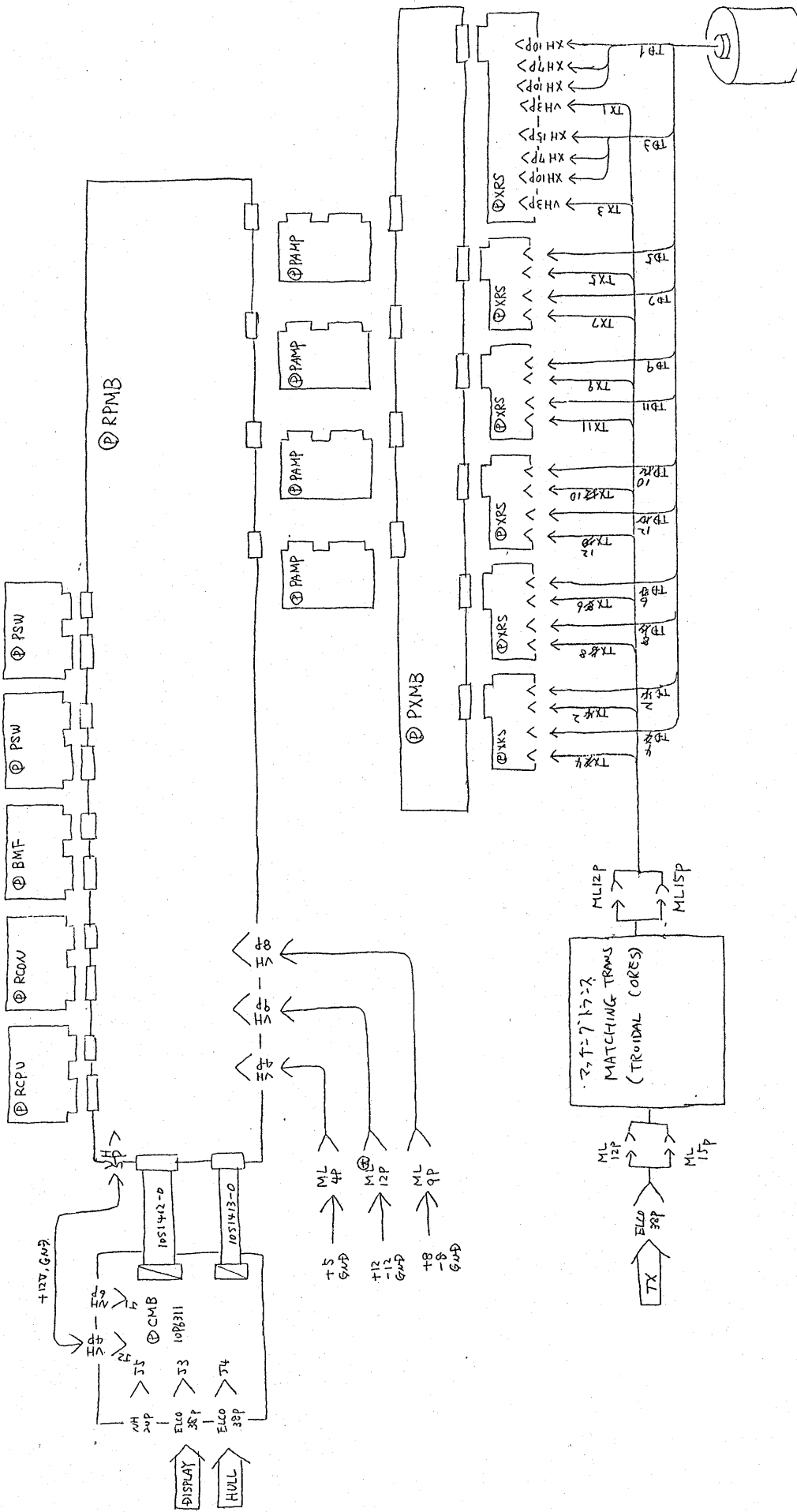
\*2 コネクタケースでアースにおとす。  
GROUND THROUGH CONNECTOR CASE.

DRAWN Nov 22 '99 T. YAMASAKI		TYPE CS-120A
CHECKED Nov 22 '99 K. Kusumoto		名称 外部インターフェイス
APPROVED Nov 22 '99 K. Kusumoto		相互結線図
SCALE MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.
DWG NO. C1238-003- K		NAME INTERFACE UNIT
		INTERCONNECTION DIAGRAM



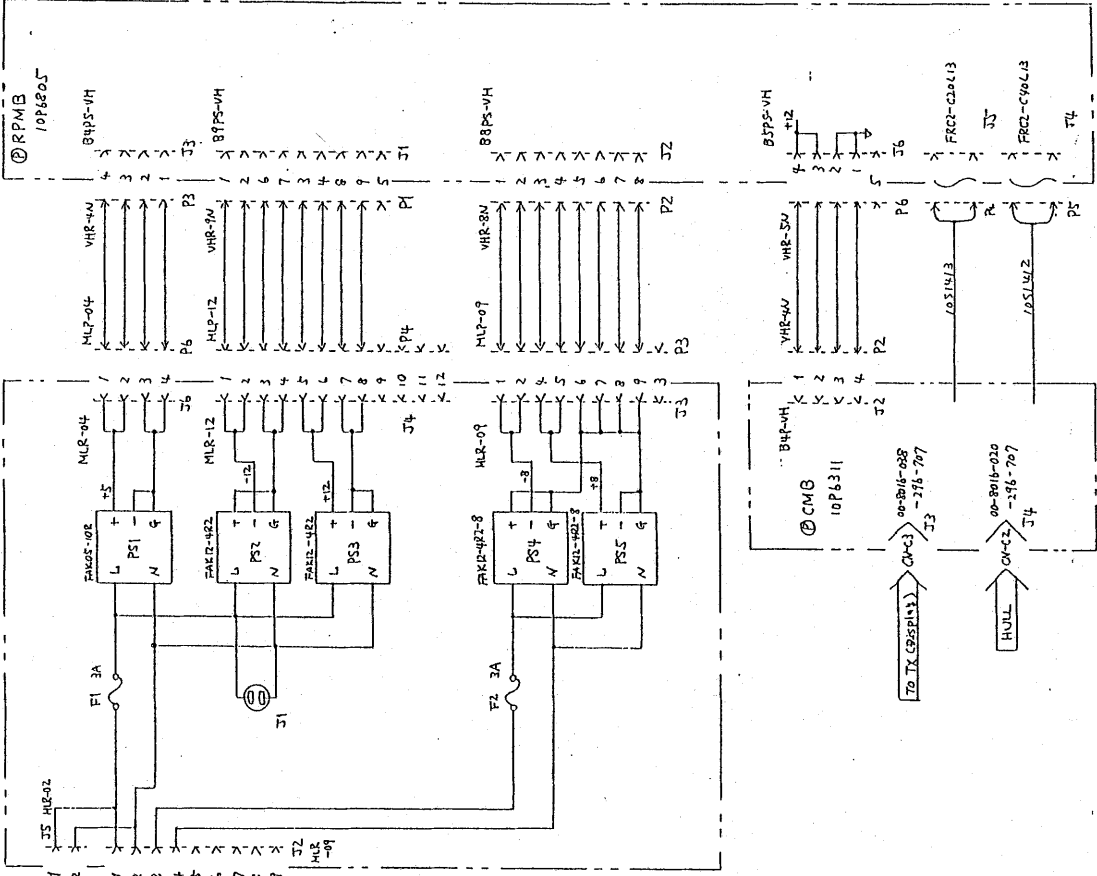
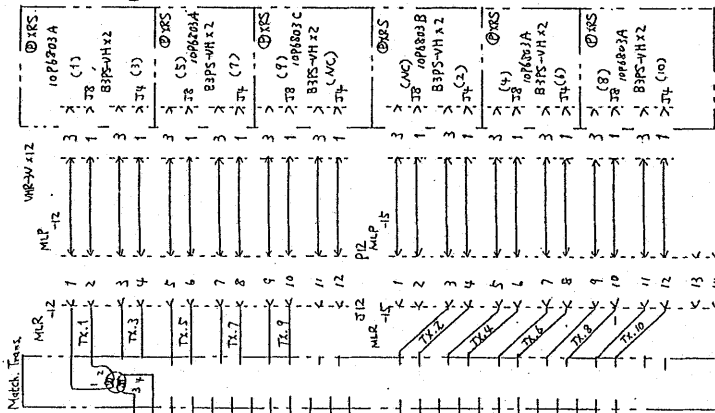
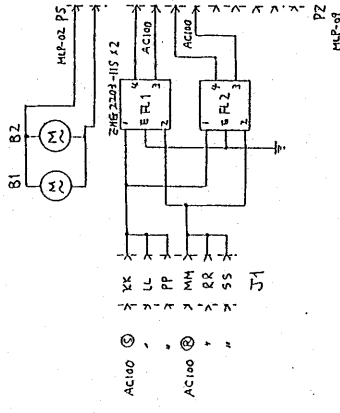
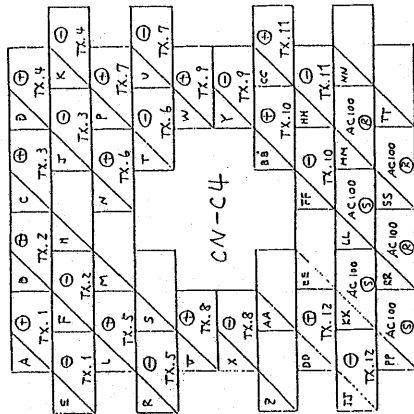
DRAWN P2022'00 TYAMASHA				TYPE	CSH-530/580
CHECKED P2022'00 Y. K.				名称	指示器 (総合)
APPROVED P2022'00 Y. K.				回路図	
SCALE 1 /	MASS kg		BLOCK NO.	NAME	DISPLAY UNIT (GENERAL)
DWG NO. C1307-K01-C			10-065-0011-3		SCHEMATIC DIAGRAM

[illegible]



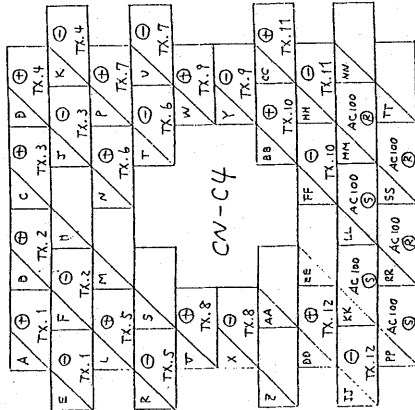
TYPE	CSH-55
名称	受信装置
NAME	回路図
RECEIVER UNIT	
BLOCK NO.	
APPLICABLE TO:	CSH-55
(MODEL)	
SCALE	1/100
DATE	1976.10.10
DWG NO.	C1297-K04-A
10-057-3001-0	
SCHEMATIC DIAGRAM	

J1 00-8016-000-707HV

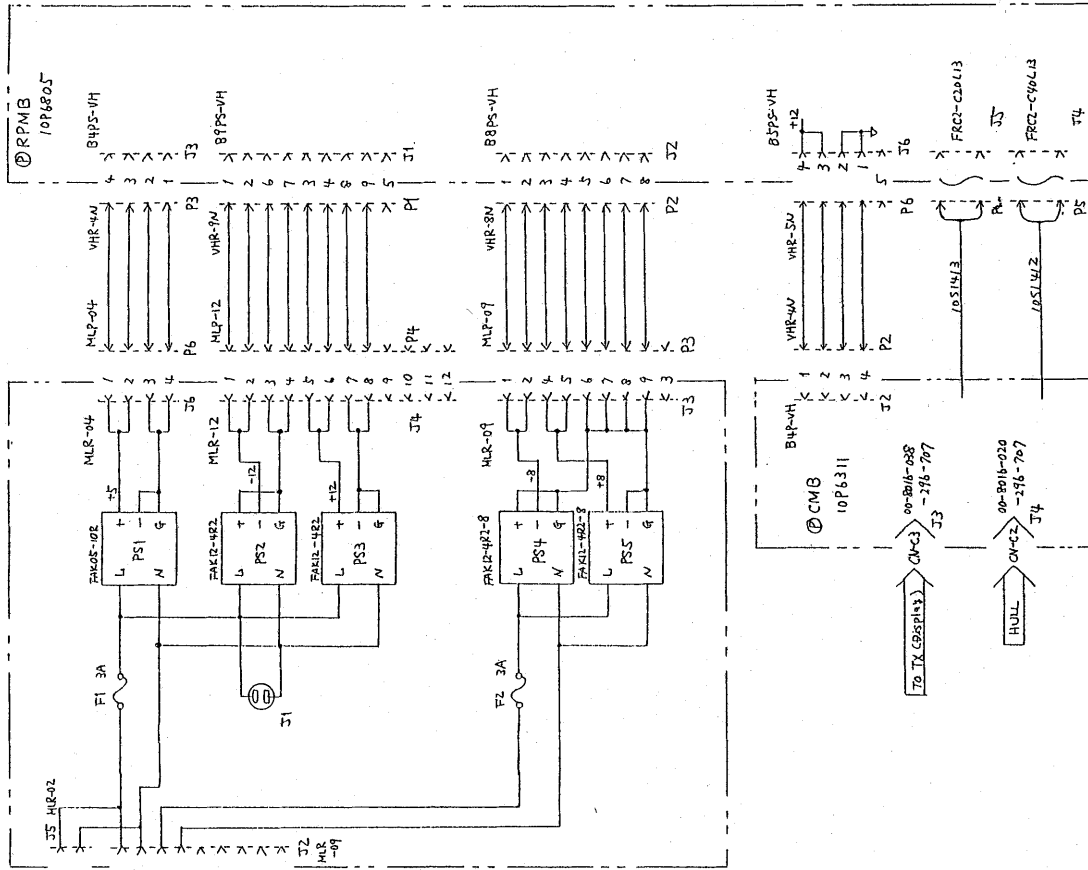
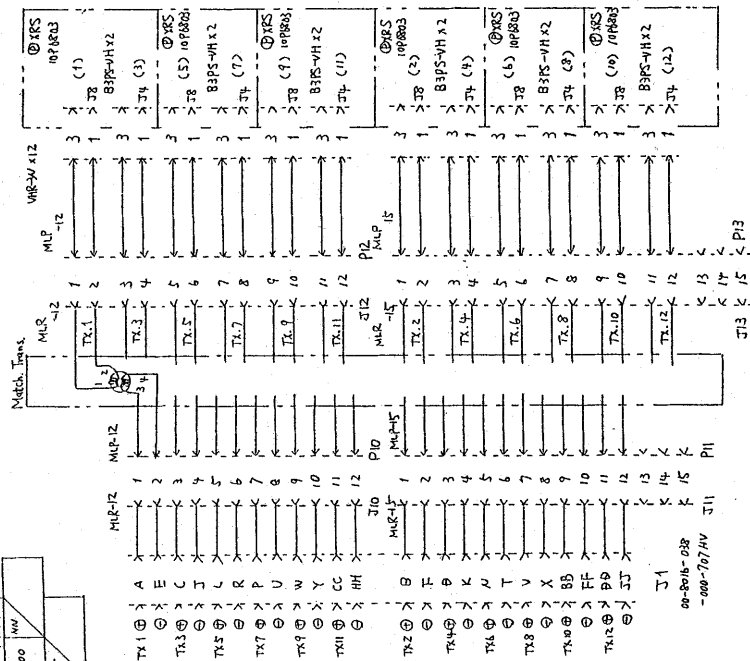
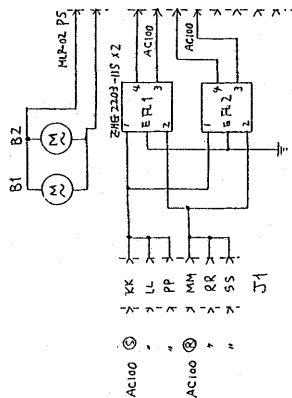
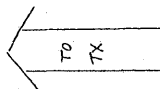


DRAWN	TYPE	NAME	RECEIVER UNIT (POWER BLOCK)
JUN 6 '96	CSH-552	受信装置 電源部	SCHEMATIC DIAGRAM
CHECKED			
TWO 6 '96			
APPROVED			
JUN 8 '96	CSH-55-28	回路図	
SCALE	APPLICABLE TO:	BLOCK NO.	
	MODEL		
DATE			
00-8016-000-707HV			

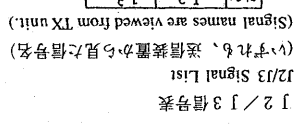
J1 00-8016-000-707HV



CN-C4



TYPE	名称	受信装置	電源部
CSH-552	受信装置	電源部	
NAME	回路図	回路図	回路図
CSH-55-50	回路図	回路図	回路図
APPLICABLE TO:	APPLICABLE TO:	APPLICABLE TO:	APPLICABLE TO:
MODEL	MODEL	MODEL	MODEL
DRWG NO.	DRWG NO.	DRWG NO.	DRWG NO.
C1297-K06-A	10-057-3003-3	10-057-3003-3	10-057-3003-3

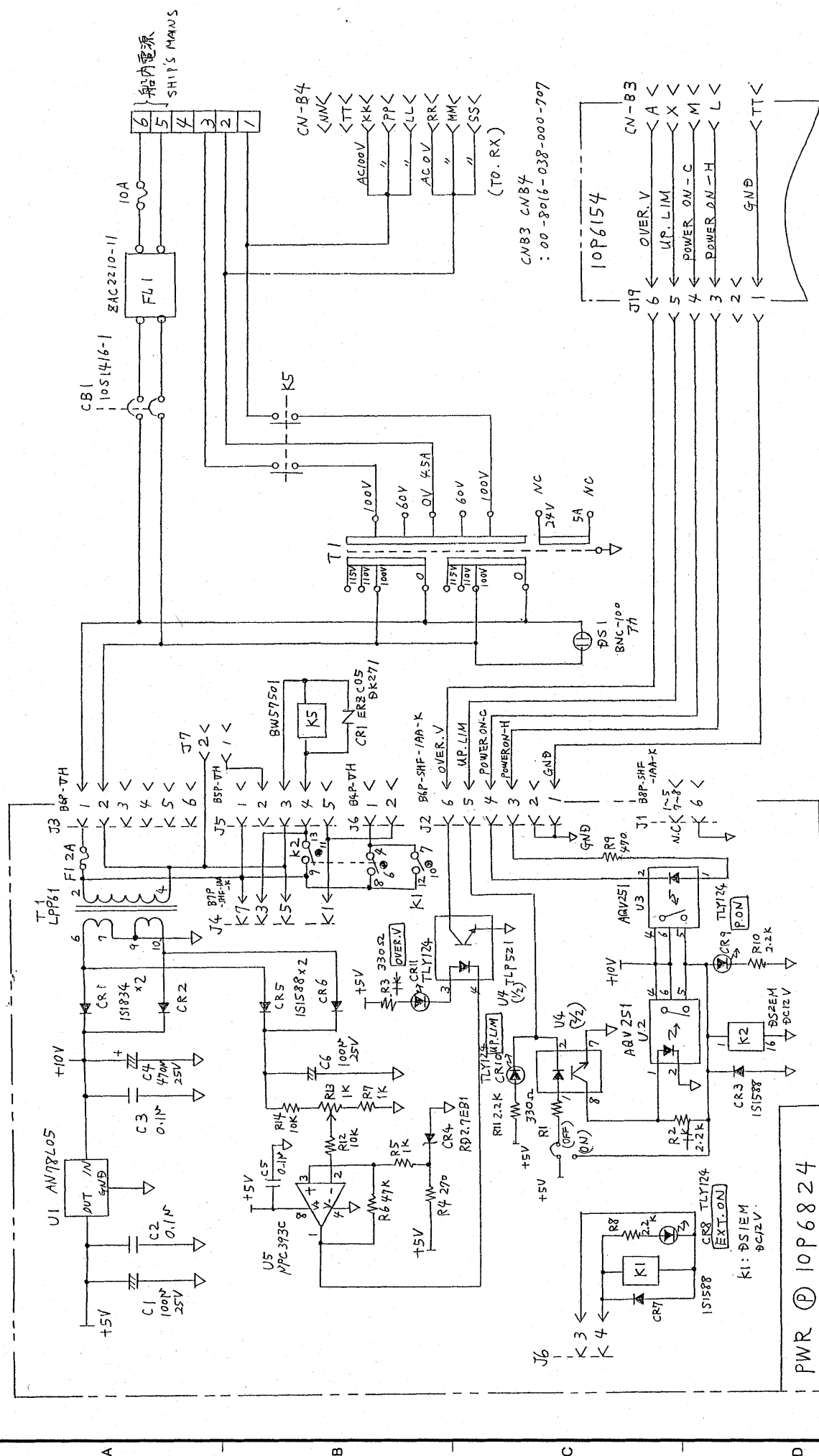


DRAWN	JUN 6 '96	MITSUHI				TYPE	CSH-551
CHECKED						名称	送信装置
APPROVED	JUN 6 '96	TAKAHASHI					回路図
DATE	JULY 8 '96	K. OTTA				NAME	TRANSMITTER UNIT
SCALE	/	MASS				BLOCK NO.	
						APPLICABLE TO:	
						(MODEL)	
DWG NO.	C1297-K03-A						SCHEMATIC DIAGRAM

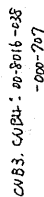
Note: 1. This diagram is from view.  
2. Same diagonal names are mutually connected.  
3. All pins between J2 and J3 are connected.

DRAWN	CHECKED	APPROVED	SCALE	DATE	NAME	TYPE
TUN 6.196 M105H1	TUN 6.196 M105H1	TUN 6.196 M105H1	1/1	1980-07-10	送電装置 電源部	CSH-551
TUN 6.196 M105H1	TUN 6.196 M105H1	TUN 6.196 M105H1	1/1	1980-07-10	回路図	CSH-55
TUN 6.196 M105H1	TUN 6.196 M105H1	TUN 6.196 M105H1	1/1	1980-07-10	TRANSMITTER UNIT (POWER BLOCK)	SCHEMATIC DIAGRAM
10-057-2007-1	10-057-2007-1	10-057-2007-1	10-057-2007-1	10-057-2007-1	10-057-2007-1	10-057-2007-1

FURUNO ELECTRIC CO., LTD.







DRAWN JUN 6 '96 M/YASHI CHECKED JUN 6 '96 TAKAI-51 APPROVED JUN 8 '96 K. OTA SCALE MASS / kg	TYPE CSH-551 名称 送振装置 電源部 回路図	BLOCK NO. CSH-55-50 APPLICABLE TO: (MODEL)	NAME TRANSMITTER UNIT (POWER BLOCK) SCHEMATIC DIAGRAM
Dwg NO. C1297-K02-A	10-057-2001-0		

[illegible]