FURUNO

INSTALLATION MANUAL

COLOR SCANNING SONAR

MODEL **CSH-83/84**

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NISHINOMIYA, JAPAN

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CSH-83/84
(HIMA)

00080806800

SAFETY INSTRUCTIONS

⚠ WARNING

Do not open the cover unless totally familiar with electrical circuits and service manual.

High voltage exists inside the equipment, and a residual charge remains in capacitors several minutes after the power is turned off. Improper handling can result in electrical shock.

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.

If a steel tank is installed on a wooden or FRP vessel, take appropriate measures to prevent electrolytic corrosion.

Electrolytic corrosion can damage the hull.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or equipment damage. The voltage rating of the equipment appears on the label above the power connector.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

Observe the following compass safe distances:

	Standard	Steering
Display unit for CSH-83	0.9 m	0.68 m
Display unit for CSH-84	1.7 m	1.3 m

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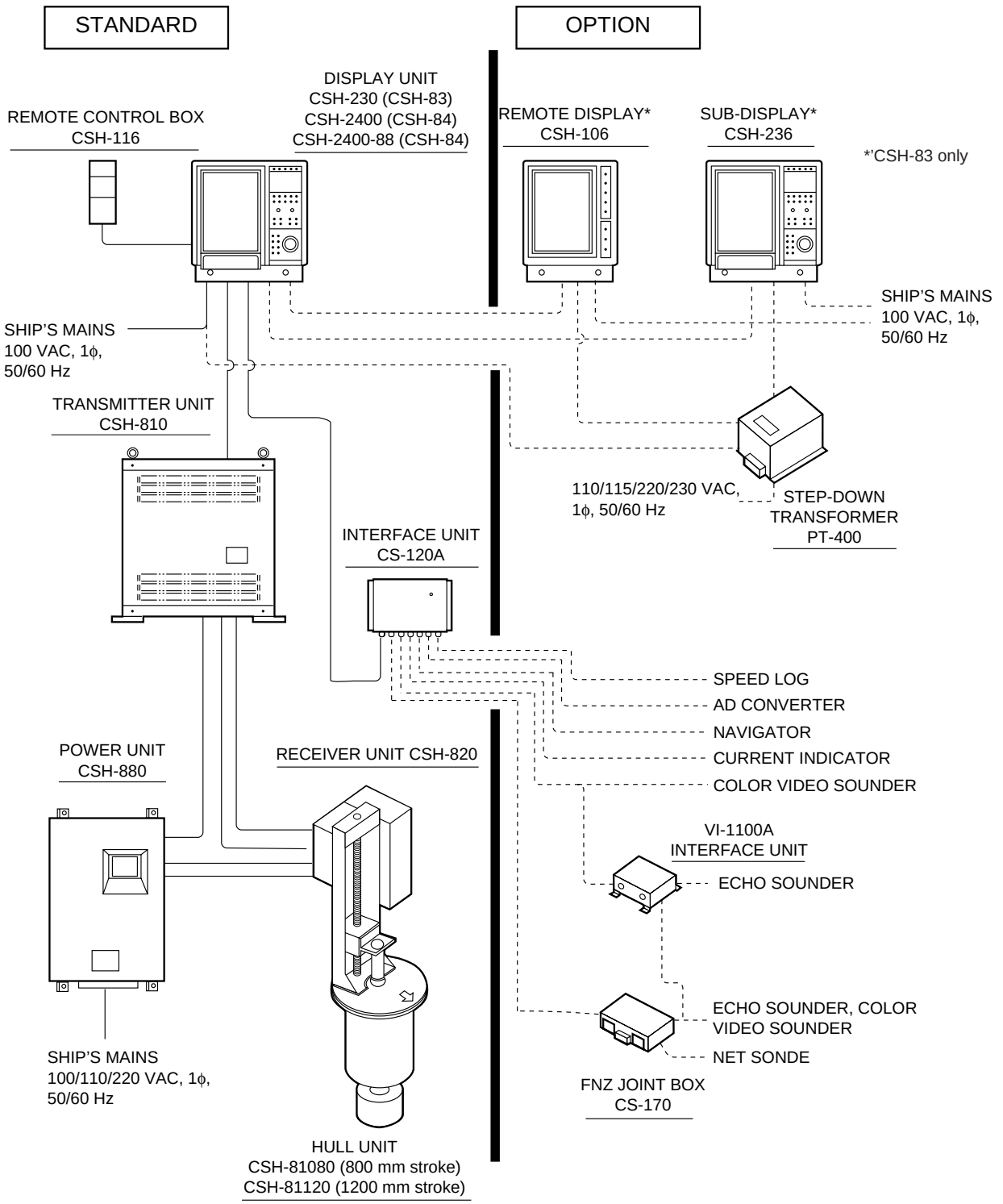
8. WHEN SHIP'S MAINS IS 24 VDC

1. SYSTEM CONFIGURATION



2. EQUIPMENT LISTS

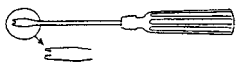
Standard Supply

Name	Type	Qty	Mass (kg)	Dimensions	Remarks Remarks	
Display Unit	CSH-230	1	35	437x442x525	For CSH-83	
	CSH-2400		66	545x601x652	For CSH-84	
	CSH-2400-88			545x601x652	For CSH-84	
Transmitter Unit	CSH-810	1	82	630x644x380		
Receiver Unit	CSH-820	1	26	465x525x300	w/hull unit	
Hull Unit	CSH-81080	1	375	515x2070x824	stroke 800mm	
	CSH-81120		390	515x2470x824	stroke 1200mm	
Power Unit	CSH-880	1	56	335x600x275		
Remote Control Box	CSH-116	1	0.4	72x180x18		
Interface Unit	CS-120A	1	3	320x190x75		
Installation Materials	CP10-03000	1 set		CP10-03010	For CSH-83	See back of manual.
				6 pair cable		
	CP10-03600	1 set		CP10-03610	For CSH-84	See back of manual.
				6 pair cable		
Accessories	FP10-02100	1 set		FP10-01801 FP10-01201 FP10-01203	For CSH-83	See back of manual.
				Nylon cover		10-051-1031 (Code no. 000-803-289)
	FP10-01900	1 set		FP10-01201 FP10-01203 FP10-01901	For CSH-84	See back of manual.
				Nylon cover		10-051-1021 (Code no. 000-804-936)
Spare Parts	SP10-02000	1 set			See back of manual.	

Optional Equipment

Name	Type	Code No.	Remarks
Sub-Display Unit	CSH-236	—	CSH-83 only
Remote Display	CSH-106	—	CSH-83 only
Inverter	TR-2435	—	
TR Inverter	TR-24100	—	
Step-down Transformer	PT-400	—	200-230 VAC
37-core Cable	10S1258	000-101-006	Specify length
7-core Cable	10S1259	000-101-007	Specify length
16 Twisted Pair Cable	C0-SPEV-SB-C 0.5 x 16P	000-101-008	Specify length
E/S Interface Unit	VI-1100A	—	
FNZ Joint Box	CS-170	—	
Mounting Fixture	OP10-9	006-990-040	For CSH-116
Current Limiter Box	CSH-1400	—	See page 8-1.
Extension Cable Set	CSH-1300	000-069-996	For extending transceiver cable
FRP Retraction Tank	OP10-1	000-068-861	
Retraction Tank	SHG-0001	006-904-340	
Hood	FP10-01801	006-027-830	For CSH-83
Filter	OP10-11	006-997-710	For CSH-83
Filter	FP10-02000	000-908-560	For CSH-84

Optional 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		

3. MOUNTING THE EQUIPMENT

3.1 Mounting the Hull Unit and Receiver Unit

Location of hull unit

Determine the mounting location through consultation with the shipyard and shipowner. When deciding the location, consider the following points:

- Select an area where propeller noise, cruising noise, air bubbles and interference from turbulence are minimal. 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.

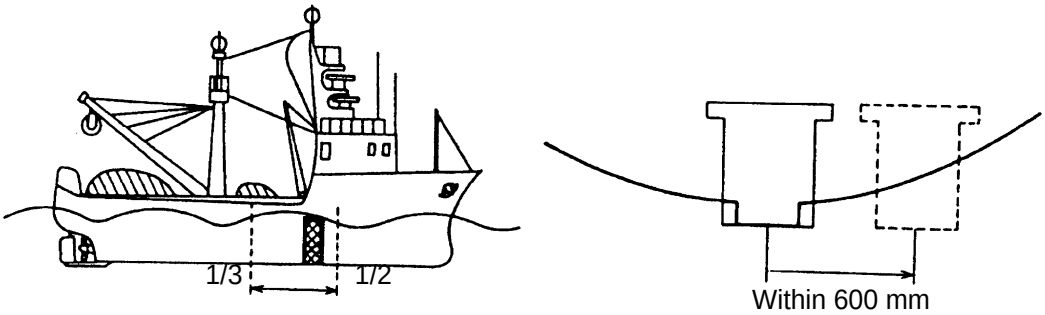


Figure 3-1 Hull unit mounting location

- 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. Locate the hull unit 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.
- Secure sufficient space for wiring and maintenance. Refer to the hull unit outline drawing for recommended wiring and maintenance space.
- If the ambient temperature of the hull unit is below 0°C, provide the sonar compartment with a heater to keep the temperature above 0°C.

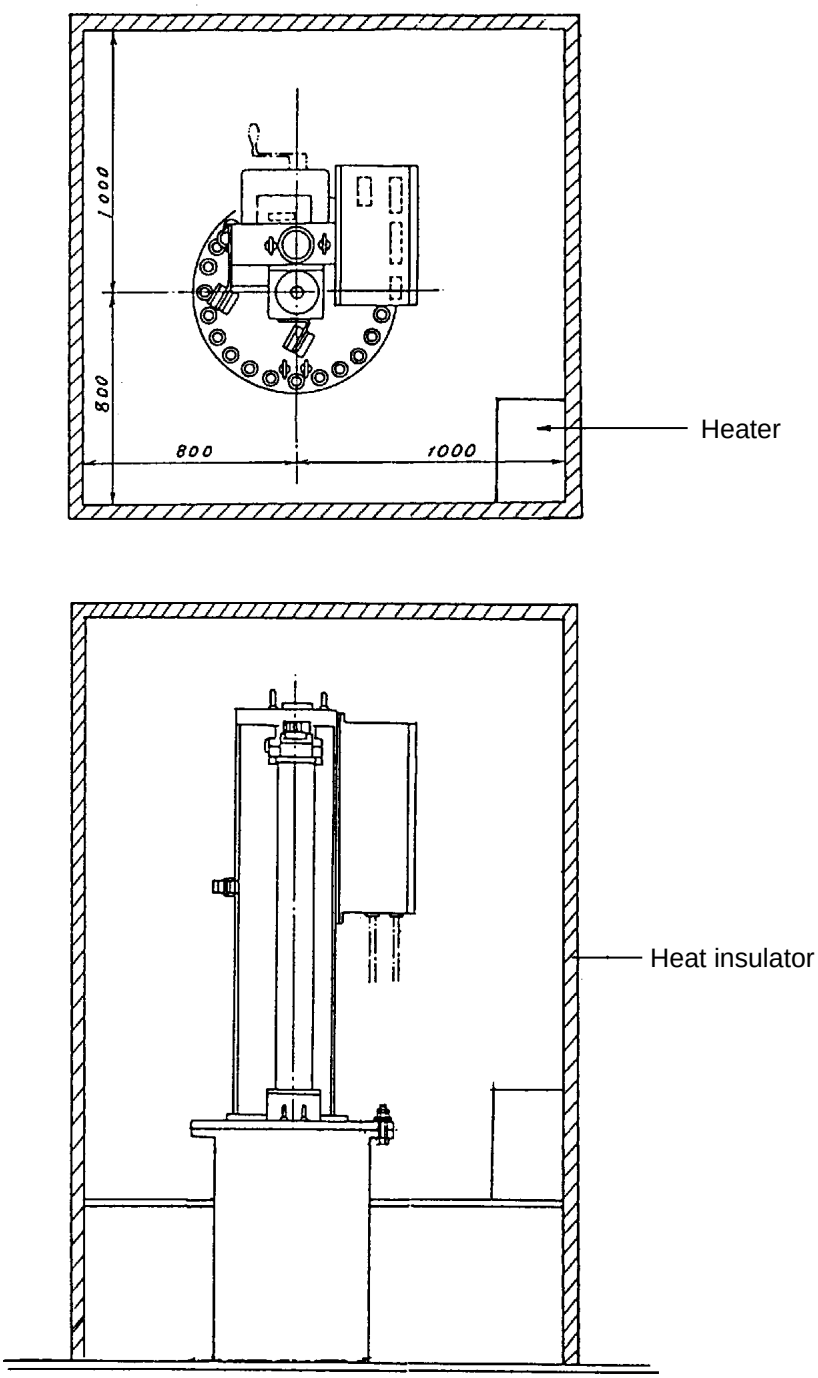


Figure 3-2 Typical sonar compartment

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.

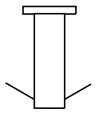
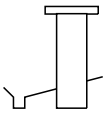
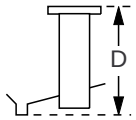
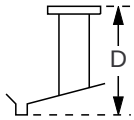
Installation Method **XDCR Travel**				
800 mm	Remove 0 to 50 mm from bottom.	Same as left	Remove 0 to 50 mm from bottom. Length D must be less than 1150 mm.	Same as left
1200 mm	Remove 0 to 50 mm from bottom.	Same as left	Remove 0 to 50 mm from bottom. Length D must be less than 1350 mm.	Same as left

Figure 3-3 Guidelines for shortening the retraction tank

Note: When 50 mm is removed and “D” is minimum, the effect of air foam is minimized when the transducer is fully protruding in water.

Remarks on installation of retraction tank

- If possible, the installation location should be of double bottom structure.
- If possible, install the tank on the keel, where the tank can be most firmly fixed.
- Install the reinforcement rib as near as possible to the top of the retraction tank, allowing space for tightening bolts and nuts.

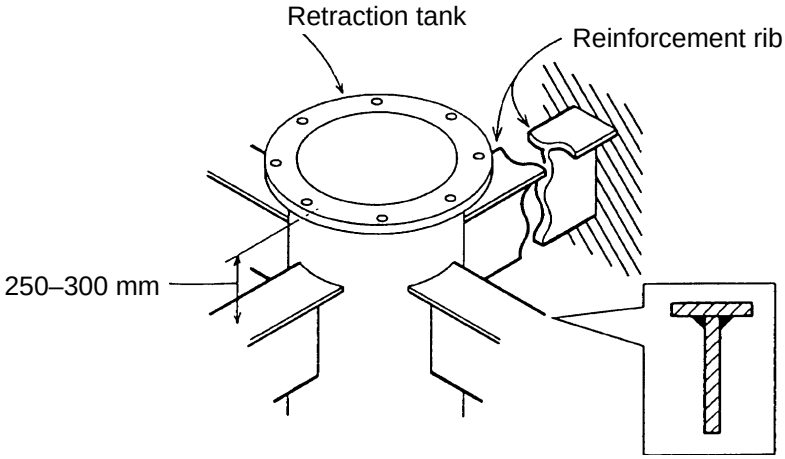


Figure 3-4 Installation of reinforcement ribs

- When an attachment flange is used, install reinforcement ribs to the attachment flange.

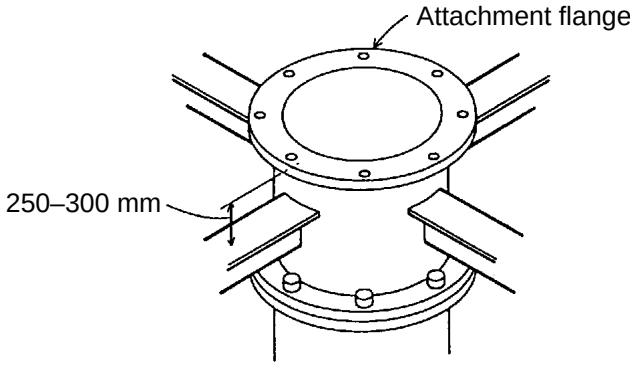


Figure 3-5 Attachment flange

- Add a doubling plate where the retraction tank is welded to the hull bottom. The size of the doubling plate is normally 1200 to 1300 mm in diameter so it lies across two bottom frames.

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 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 arrow on its flange points toward the ship's bow.
4. 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 seven 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.
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.

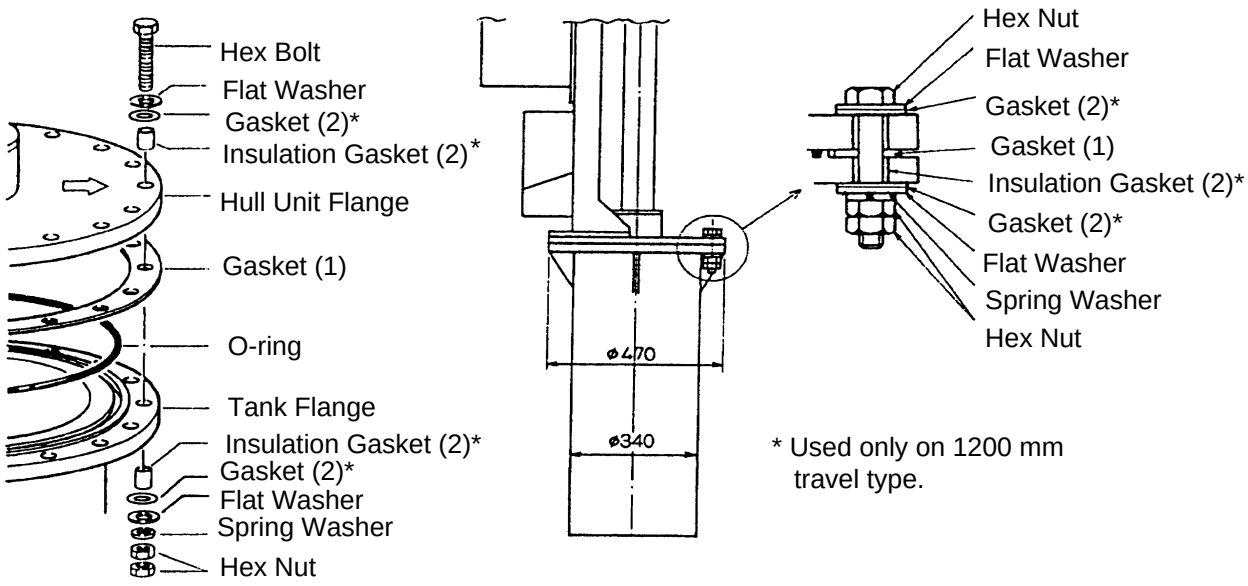


Figure 3-6 Installation of hull unit

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. If possible, install two more stays in ship's transverse direction.

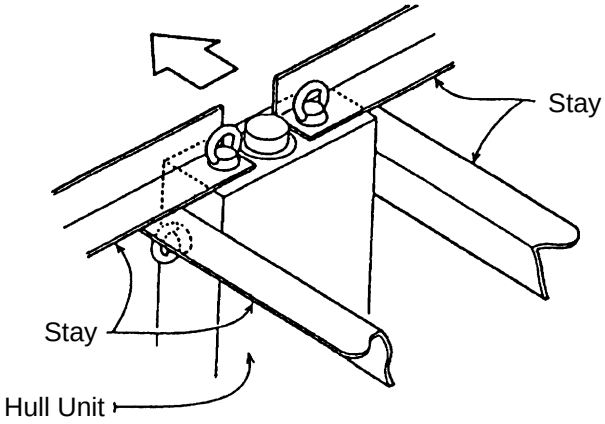


Figure 3-7 How to install stays

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

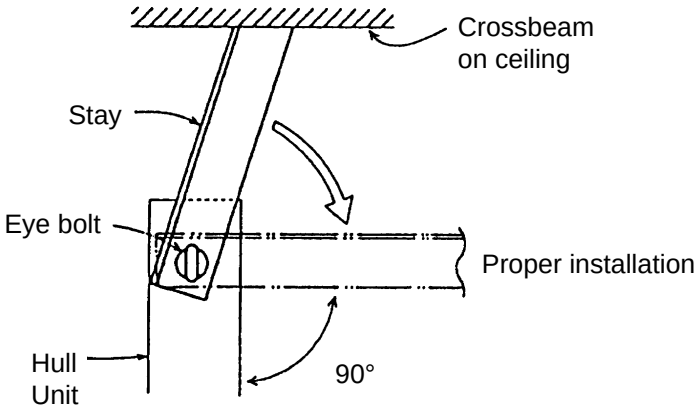


Figure 3-8 Proper and improper installation of stays

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.

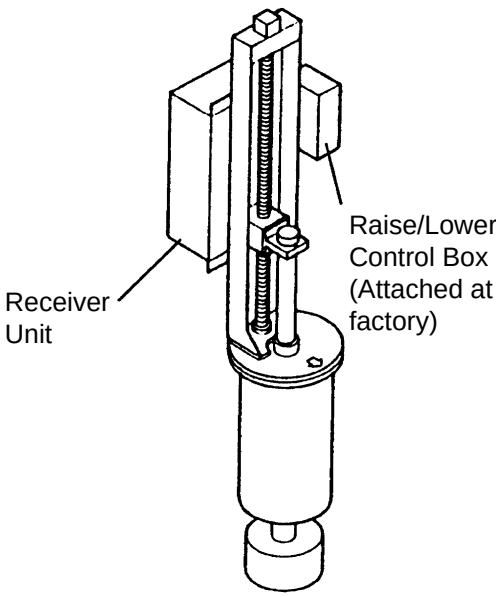


Figure 3-9 Fastening the receiver unit to the hull unit

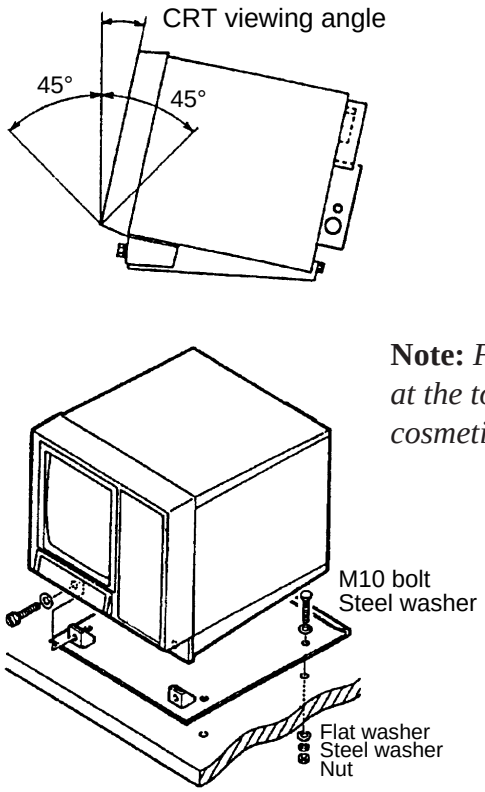
3.2 Mounting the Display Unit and Sub-Display Unit (option)

The display unit and sub-display unit are designed for tabletop mounting. When selecting a mounting location, consider 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 a magnetic compass and equipment which have a magnet (radar magnetron, loudspeaker, high power transformer, etc.).
- 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 ±45° from vertical.

Mounting the display unit/sub-display unit

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 absorb 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.



Note: *For the CSH-84, remove eye bolts at the top of the display unit and set cosmetic screws to eye bolt holes.*

Figure 3-10 Mounting the display unit and sub-display 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.

Reinforce the transmitter unit against vibration by stays extending from the eyebolts on the top of the unit.

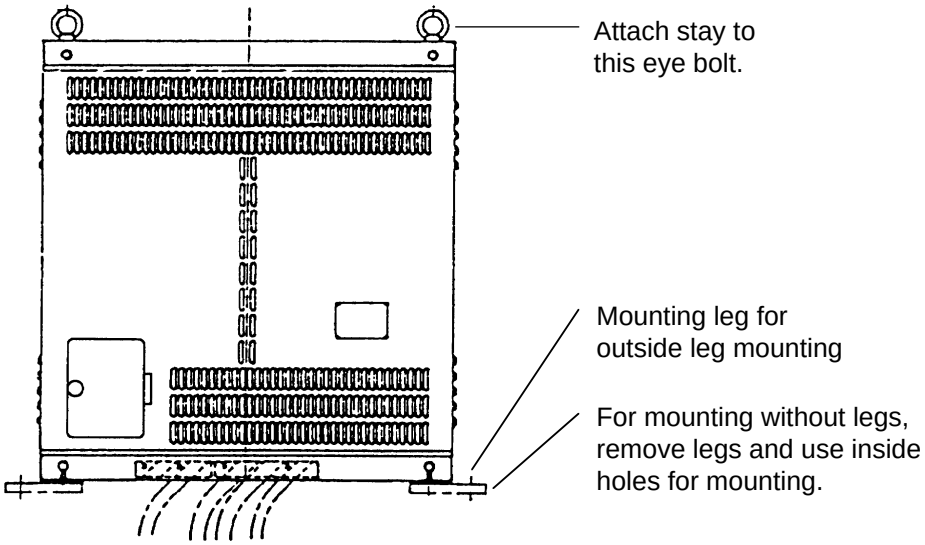


Figure 3-11 Transmitter unit

3.4 Mounting the Power Unit

The power unit can be installed in any dry, well-ventilated place.

3.5 Mounting the Interface Unit

The interface unit connects with several navigation and fishing equipment, so determine the installation site with the wiring to them taken into account. Furthermore, the unit incorporates a data selector and self-check switch, therefore select a place where they can be easily operated.

3.6 Mounting the FNZ Joint Box

The FNZ joint box interchanges both Tx trigger and sounder marker pulses from the echo sounder and the net sonde. Therefore, install it as close as possible to the net-sonde indicator.

3.7 Grounding the Equipment

Ground all units with a suitable copper strap or ground wire. The location of the ground terminal on each unit is shown below.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

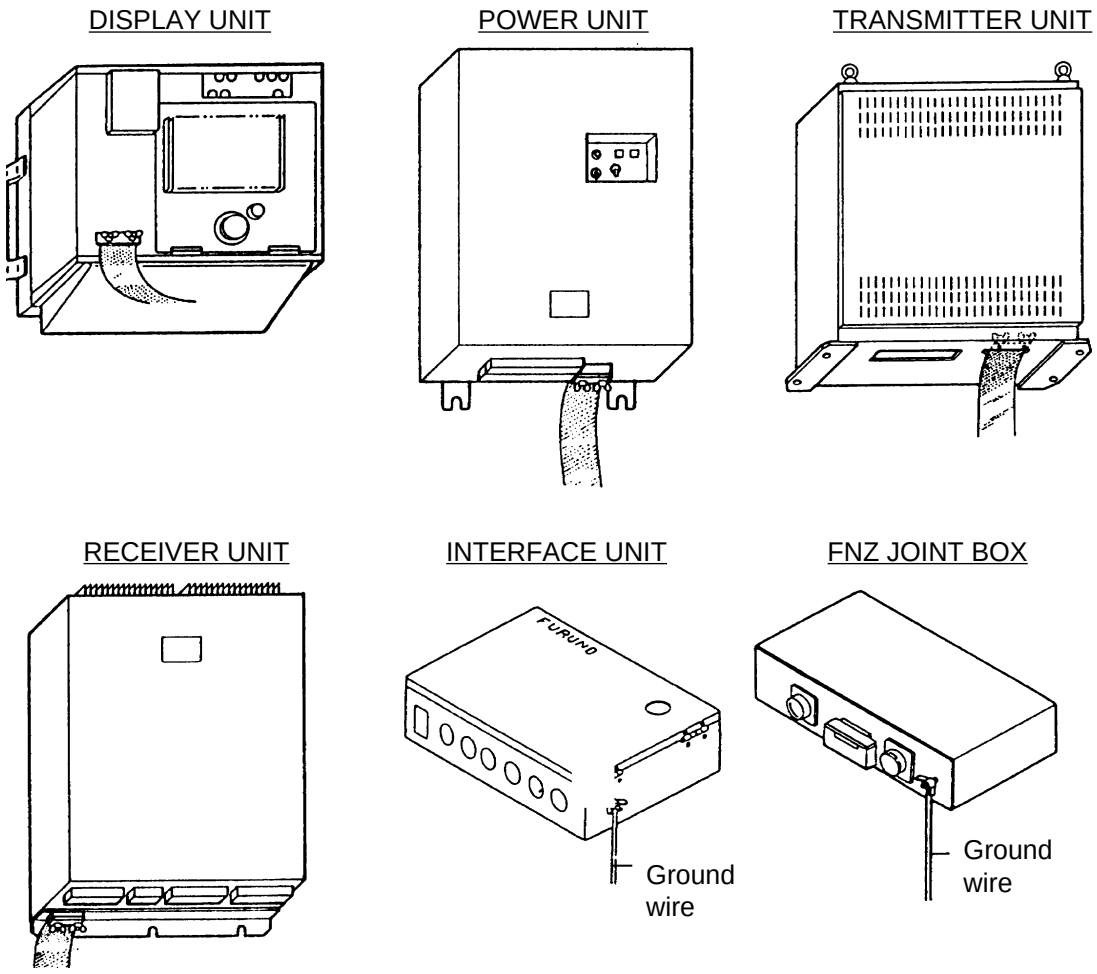
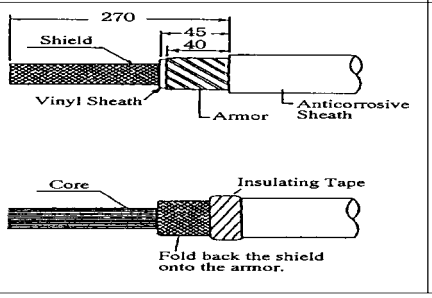
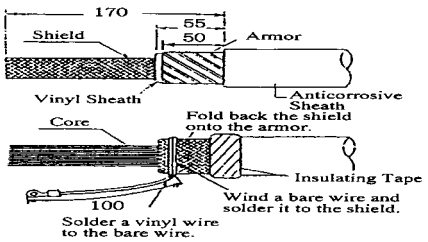


Figure 3-12 Location of ground terminals on equipment

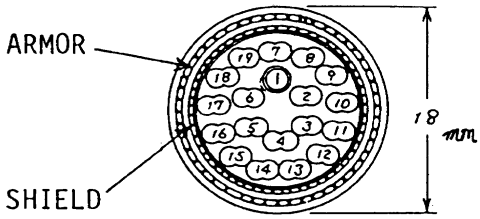
4. WIRING

This chapter provides the information necessary for wiring the CSH-83/84. Wire the equipment referring to the drawings shown in the table below.

Display Unit CN-A5	Interface Unit J201
	

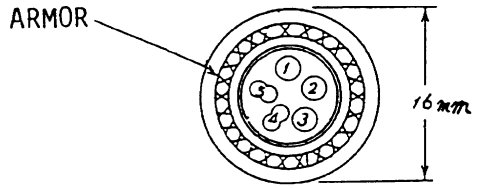
4.1 Cable Configuration

10S1258



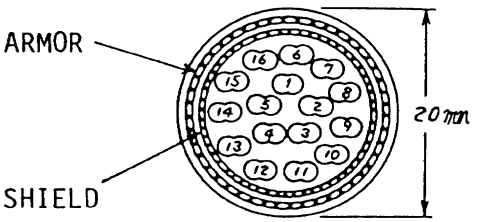
NO.	COLOR	NO.	COLOR	NO.	COLOR
2	BLK/BRN	8	BLK/PPL	14	BRN/GRN
3	BLK/RED	9	BLK/GRY	15	BRN/BLU
4	BLK/ORG	10	BLK/WHT	16	BRN/PPL
5	BLK/YEL	11	BRN/RED	17	BRN/GRY
6	BLK/GRN	12	BRN/ORG	18	BRN/WHT
7	BLK/BLU	13	BRN/YEL	19	RED/ORG

10S1259-1



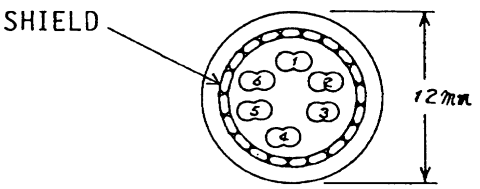
NO.	COLOR
1	BLK
2	WHT
3	RED
4	BRN/BLK
5	WHT/RED

10S1260



NO.	COLOR	NO.	COLOR	NO.	COLOR
1	YEL/BLK	7	RED/WHT	13	YEL/PPL
2	BLU/BLK	8	GRN/WHT	14	BLU/PPL
3	RED/BLK	9	YEL/GRY	15	RED/PPL
4	GRN/BLK	10	BLU/GRY	16	GRN/PPL
5	YEL/WHT	11	RED/GRY		
6	BLU/WHT	12	GRN/GRY		

10S1261



NO.	COLOR	NO.	COLOR
1	BRN/BLK	5	GRN/BLK
2	RED/BLK	6	BLU/BLK
3	ORG/BLK		
4	YEL/BLK		

Figure 4-1 Cable configuration

4.2 How to Use the Crimping Tool and Pin Extractor

A crimping tool is necessary for connection of wires to the contact pins of the 38P connector. The pin extractor removes the contact pin from the connector body. This paragraph describes how to crimp and extract a contact pin.

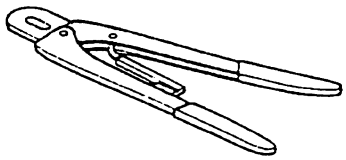
		
Crimping Tool 06-1001-016	Contact Pin 60-8017-0313-00-339	Pin Extractor 06-1877-04

Figure 4-2a 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. (Place the wire 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 the pin is fastened tightly.

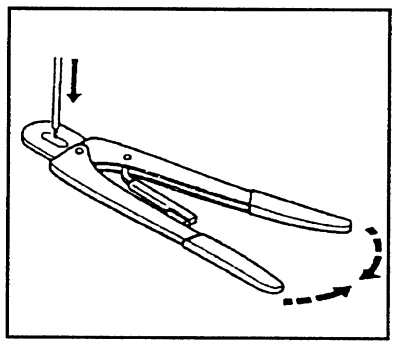


Figure 4-2b Crimping tool

How to use the pin extractor

If a contact pin is inserted into an incorrect hole on the connector body, remove it with 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.

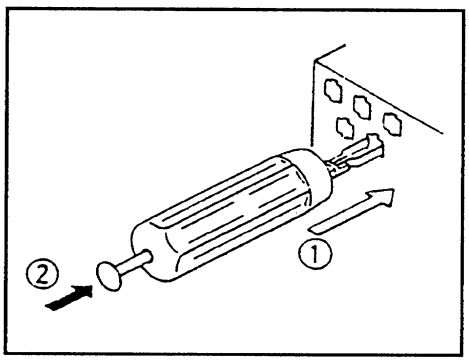


Figure 4-2c Crimping tool

4.3 Location of Connectors

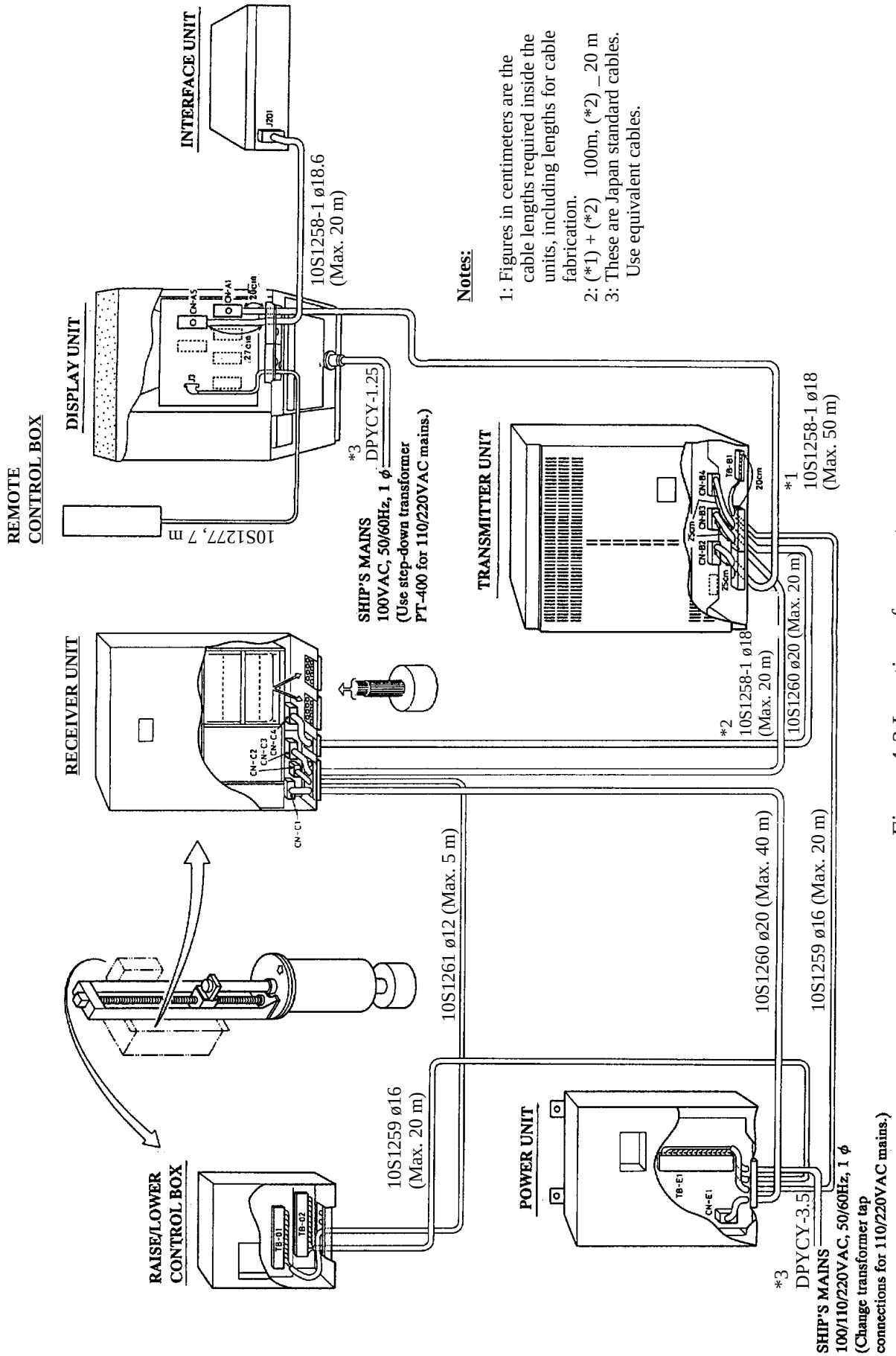


Figure 4-3 Location of connectors

4.4 Cable Fabrication and Connector Assembling in Display and Interface Units

Assembling 38P connector (CN-A1, CN-A5, J201)

Fabrication of cable 10S1258-1

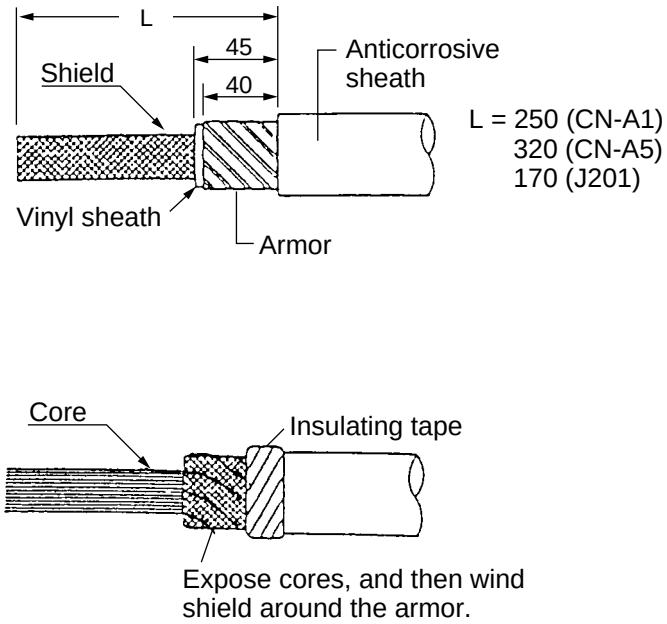


Figure 4-4 Fabrication of cable 10S1258-1

Assembling the 38P connector

Shorten unused wires and wrap their ends with vinyl tape to prevent short circuit.

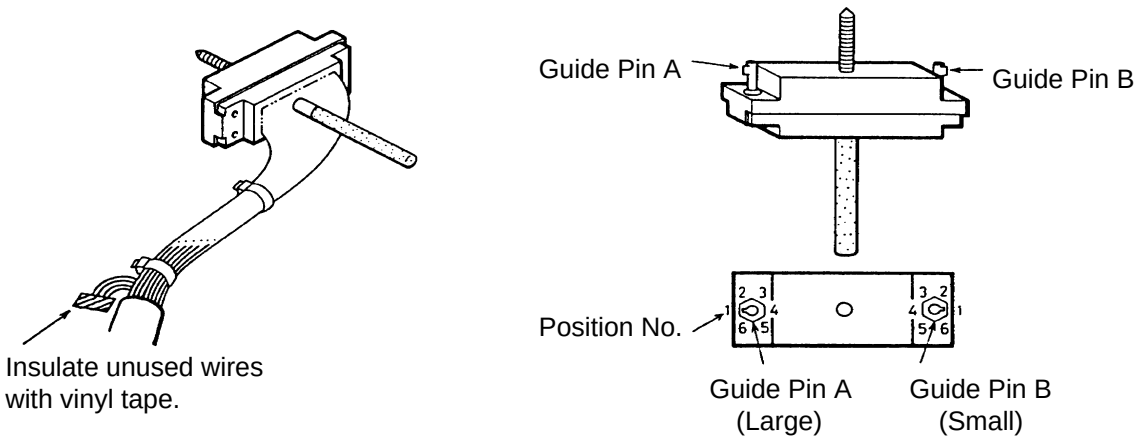
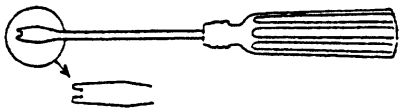


Figure 4-5 How to assemble the 38P connector

Positioning guide pins

The guide pins of the connector identify the mating receptacle. Position them as shown in the table below.

Table 4-1 Connectors CN-A1, CN-A5, J201 and guide pins

Connector / Guide Pin	CN-A1	CN-A5	J201	Guide Pin Setting Tool
Guide Pin A (Large)	1	5	1	 Type 10-910-0179-0
Guide Pin B (Small)	1	1	1	

Clamping the cable

Fix the cable in the clamp where shield is folded back onto the armor.

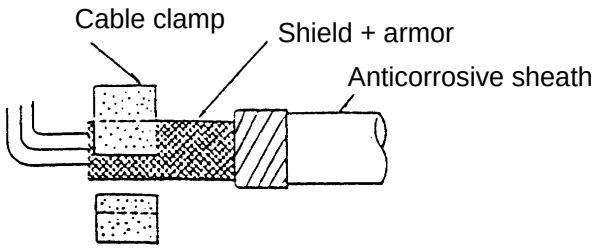


Figure 4-6 Clamping the cable

Assembling connector NCS-253P (CN-A15)

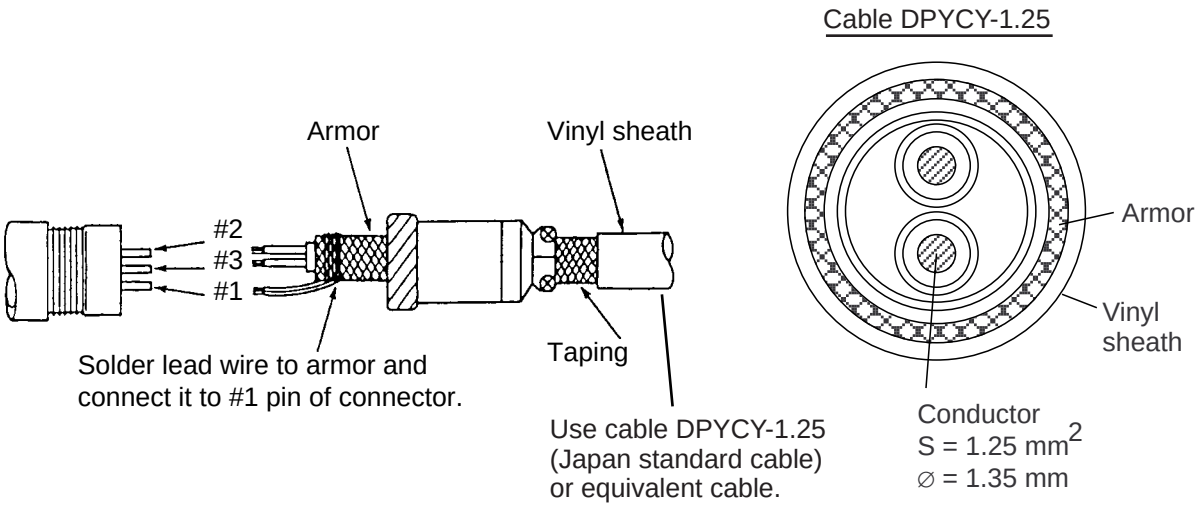
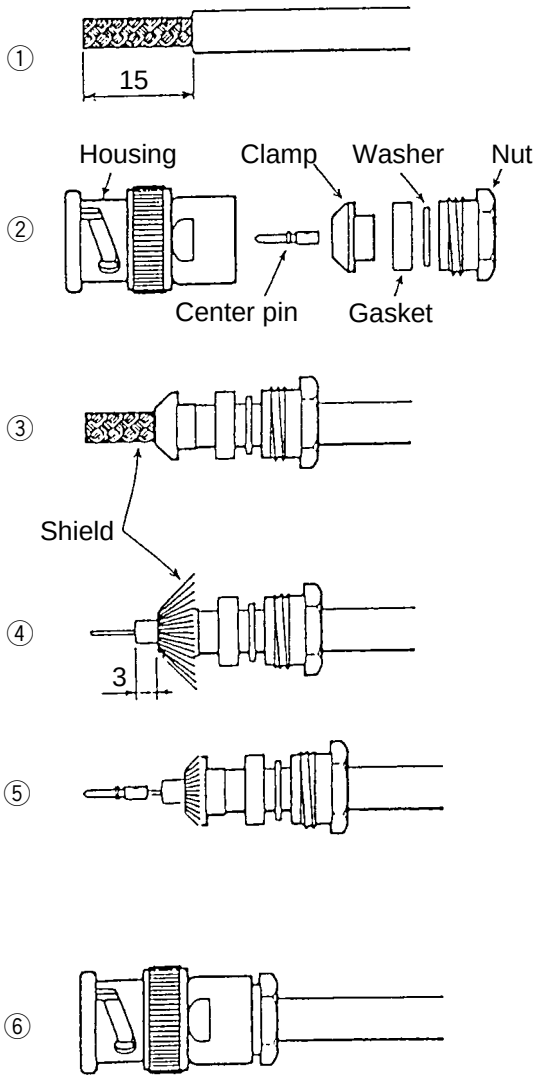


Figure 4-7 Assembling connector NCS-253P

Assembling BNC connector (CN-A7, CN-A8, CN-A9, CN-A10, CN-A11, CN-A12)



1. Remove vinyl sheath of the cable by 15 mm.
2. Pass the cable through the nut, washer, gasket and clamp.
3. Unravel the shield and fold it back onto the clamp.
4. Shorten the insulator, leaving 3 mm.
5. Trim the shield as shown in the drawing. Solder the center pin to the conductor of the cable.
6. Pass the cable through the housing and tighten the nut.

Figure 4-8 Assembling BNC connector

4.5 Cable Fabrication and Connector Assembling in Power Unit

Assembling 38P connector (CN-E1)

Fabrication of cable 10S1260

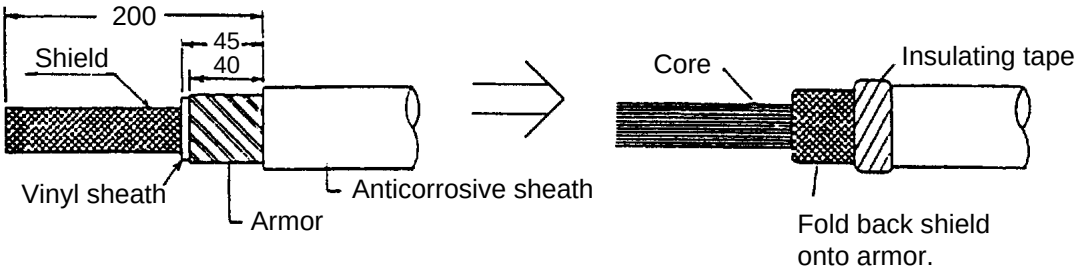
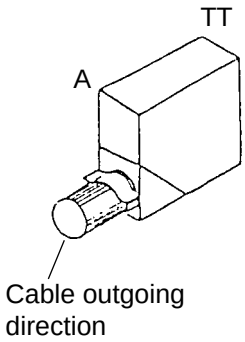


Figure 4-9 Fabrication of cable 10S1260

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.

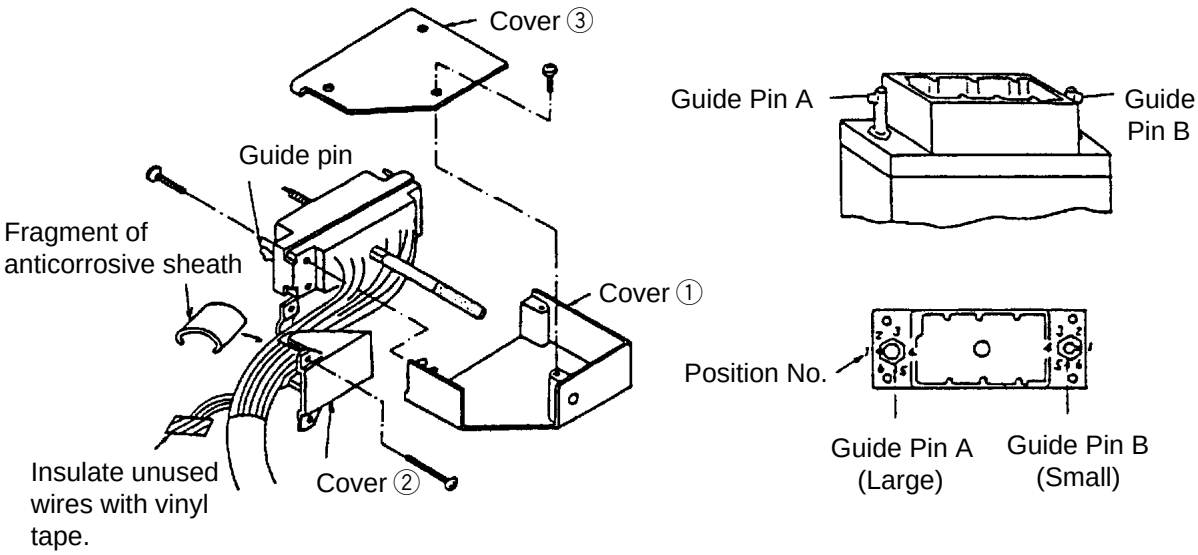
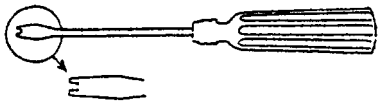


Figure 4-10 How to assemble the 38P connector

Positioning guide pins

The guide pins of the connector identify the mating receptacle. Position them as shown in the table below.

Table 4-2 Guide pins and connector CN-E1

Connector / Guide Pin	CN-E1	Guide Pin Setting Tool
Guide Pin A (Large)	2	 Type 10-910-0179-0
Guide Pin B (Small)	1	

Clamping the cable

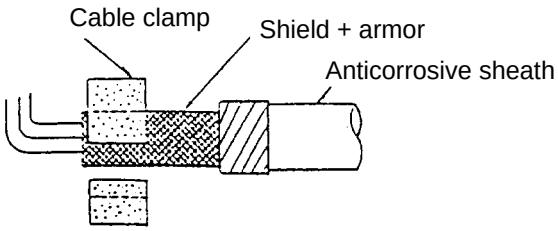


Figure 4-11 Clamping the cable

Fabrication of cable 10S1259 (connected to terminal board TB-E1)

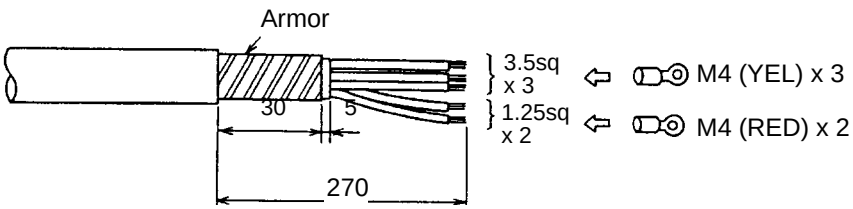
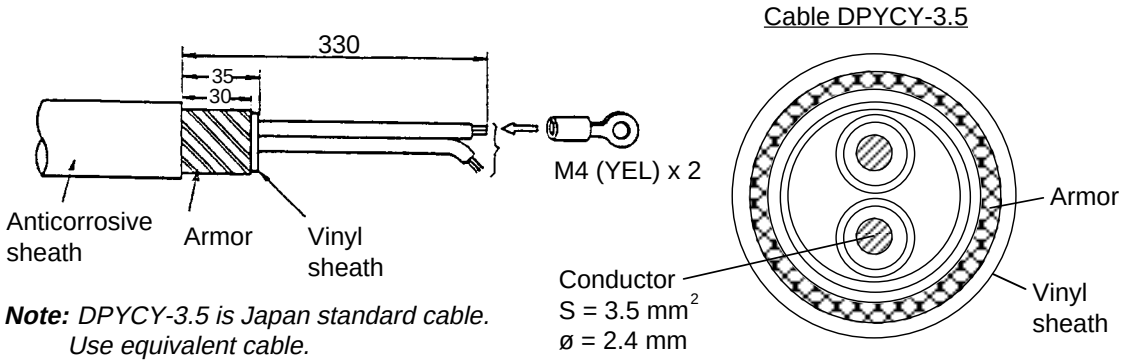


Figure 4-12 Fabrication of cable 10S1259

Fabrication of cable DPYCY-3.5 (connected to terminal board TB-E1)



Note: *DPYCY-3.5 is Japan standard cable. Use equivalent cable.*

Figure 4-13 Fabrication of cable DPYCY-3.5

4.6 Cable Fabrication and Connector Assembling in Transmitter Unit

Assembling 38P connector (CN-B2, CN-B3, CN-B4)

Fabrication of cables 10S1258-1, 10S1260

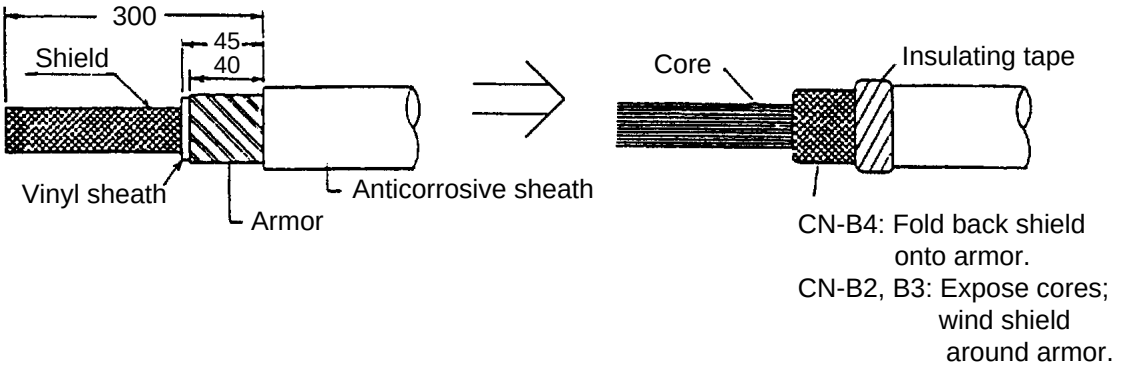
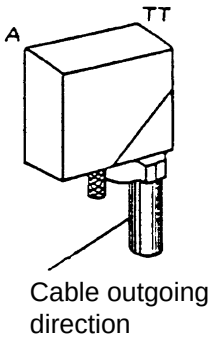


Figure 4-14 Fabrication of cables 10S1258-1, 10S1260

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.

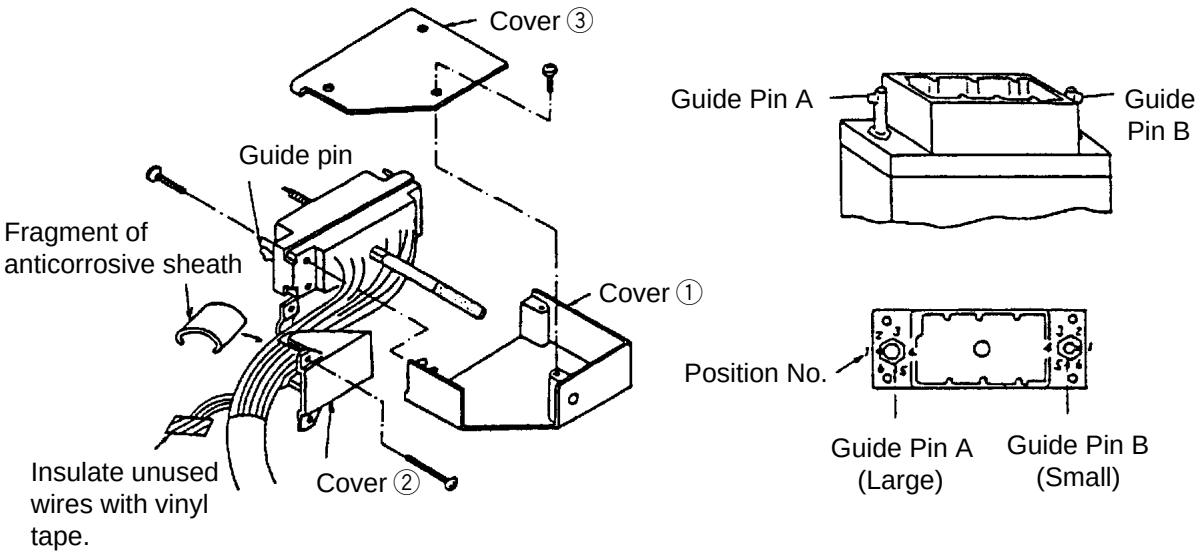
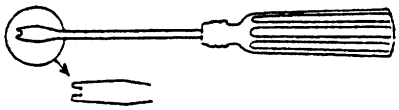


Figure 4-15 How to assemble the 38P connector

Positioning guide pins

Guide pins of the connector are used to identify the mating receptacle. Position them as shown the table below.

Table 4-3 Connectors CN-B2, CN-B3, CN-B4 and guide pins

Connector / Guide Pin	CN-B2	CN-B3	CN-B4	Guide Pin Setting Tool
Guide Pin A (Large)	1	1	3	 Type 10-910-0179-0
Guide Pin B (Small)	1	1	1	

Clamping the cable

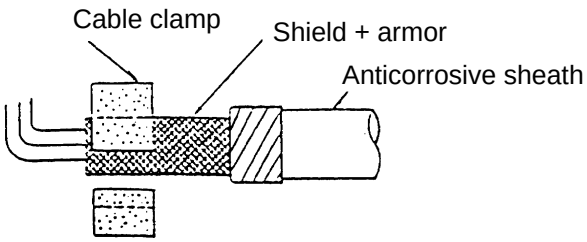


Figure 4-16 Clamping the cable

Fabrication of cable 10S1259 (connected to terminal board TB-B1)

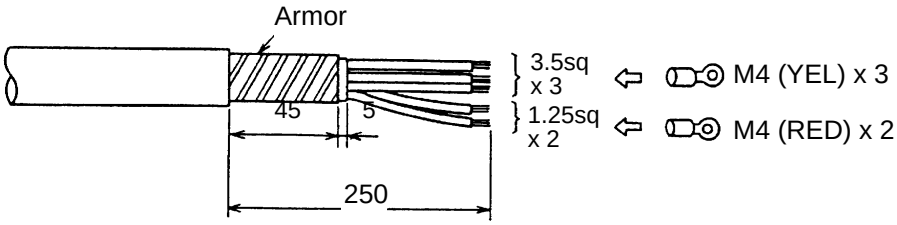


Figure 4-17 Fabrication of cable 10S1259

4.7 Cable Fabrication and Connector Assembling in Hull Unit (incl. receiver unit)

Assembling 38P connector (CN-C1, CN-C3, CN-C4) 20P connector (CN-C2)

Fabrication of cable for 38P and 20P connectors

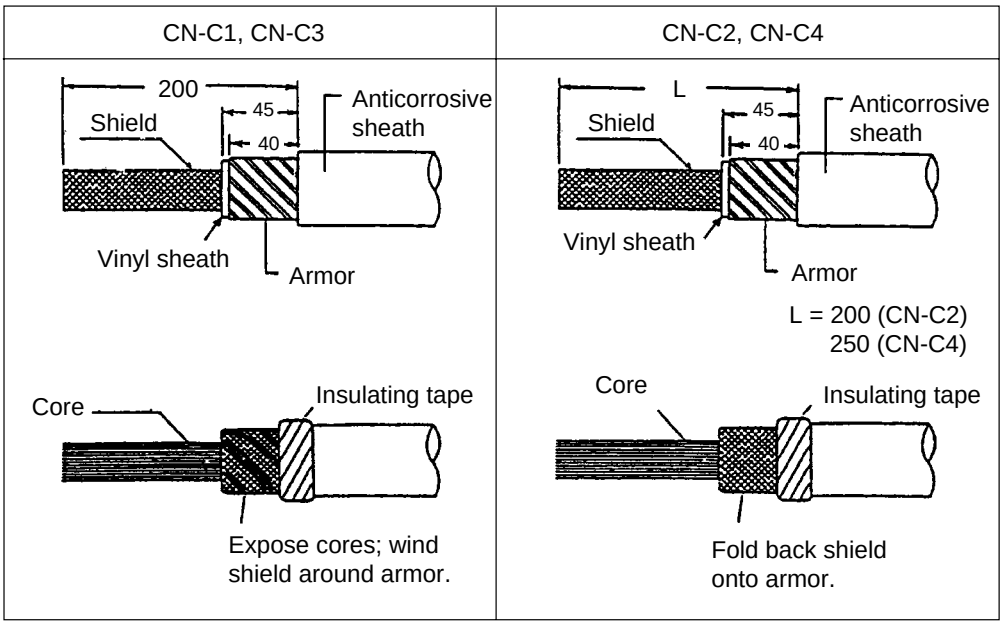
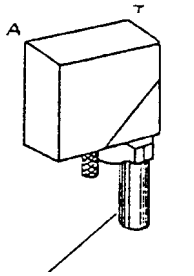


Figure 4-18 Fabrication of cable for 38P and 20P connectors

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.

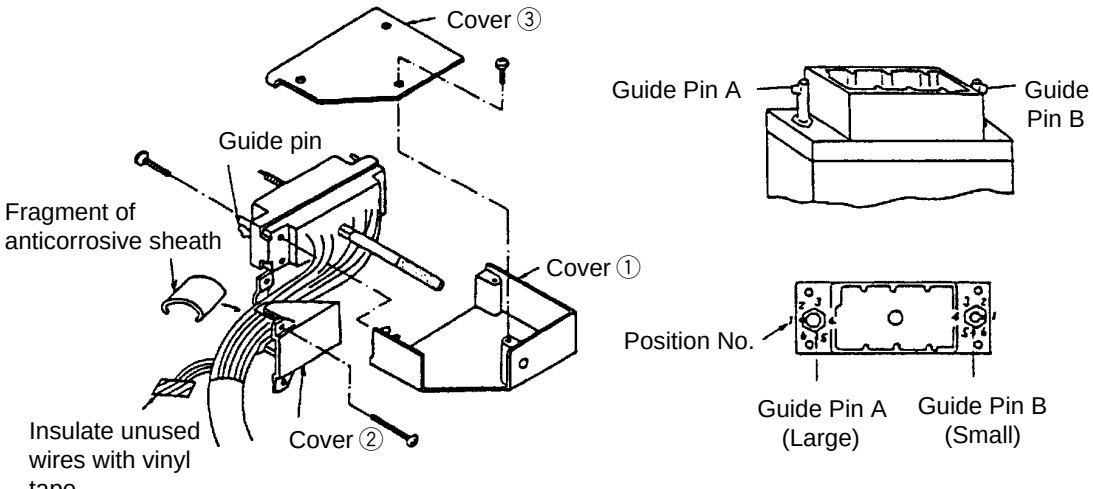
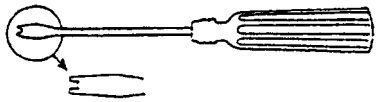


Figure 4-19 How to assemble the 38P connector

Positioning guide pins

The guide pins of the connector identify the mating receptacle. Position them as shown in the table below.

Table 4-4 Connectors CN-C1, CN-C2, CN-C3, CN-C4 and guide pins

Connector / Guide Pin	CN-C1	CN-C2	CN-C3	CN-C4	Guide Pin Setting Tool
Guide Pin A (Large)	2	1	1	3	 Type 10-910-0179-0
Guide Pin B (Small)	1	1	1	1	

Clamping the cable

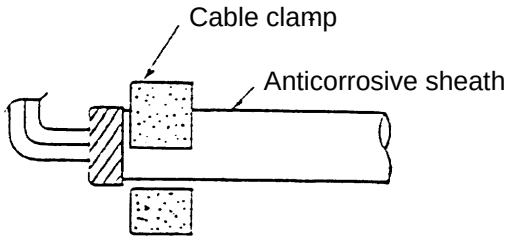


Figure 4-20 Clamping the cable

Fabrication of cable 10S1261 (connected to terminal board TB-D1 in raise/lower control box)

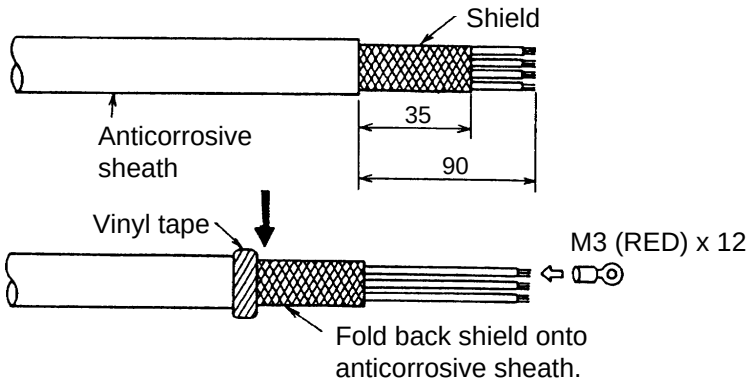


Figure 4-21 Fabrication of cable 10S1261

Fabrication of cable 10S1259 (connected to terminal board TB-D2 in raise/lower control box)

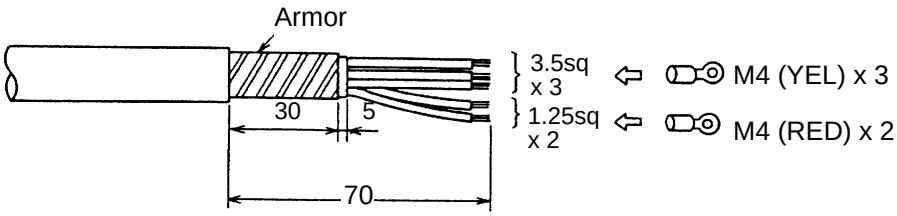
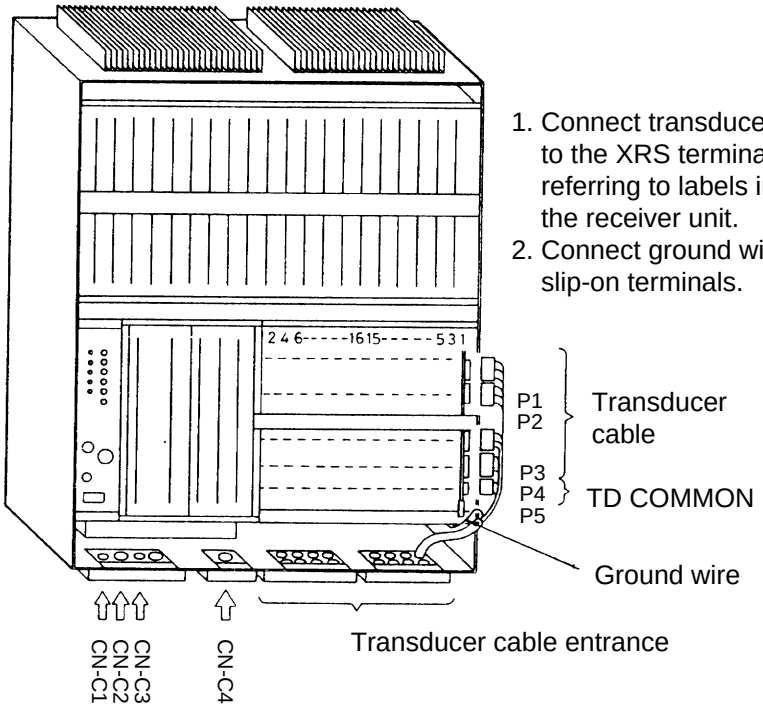
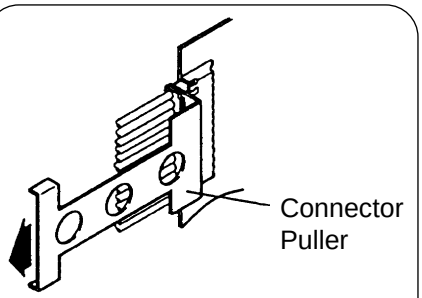


Figure 4-22 Fabrication of cable 10S1259

4.8 Connection of Transducer Cables

The transducer cables come with connectors attached. Plug the connectors into the proper receptacles on the receiver unit, referring to the labels on the cables.





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

Lead the cables into the receiver unit and clamp them as shown below.

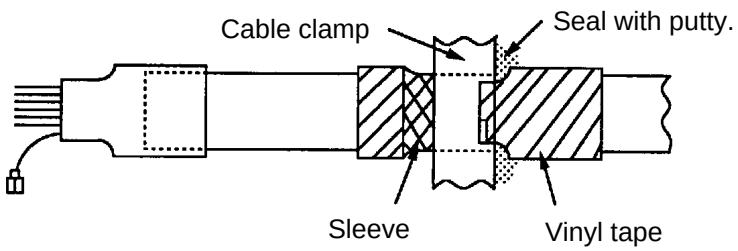


Figure 4-23 Receiver unit, rear view

4.9 Connection of Interface Unit

With connection of a navigator, the Interface Unit CS-120A and fishing equipment, the function of the CSH-83/84 is expanded to include true motion presentation, target lock, echo sounder picture, FNZ marker presentation and digital indication of position, water temperature and depth. This chapter provides the information for interfacing the CSH-83/84 with external equipment.

Connections for true motion and target lock

True motion and target lock functions require heading (digital) and speed (200 pulses/nm) data, 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.

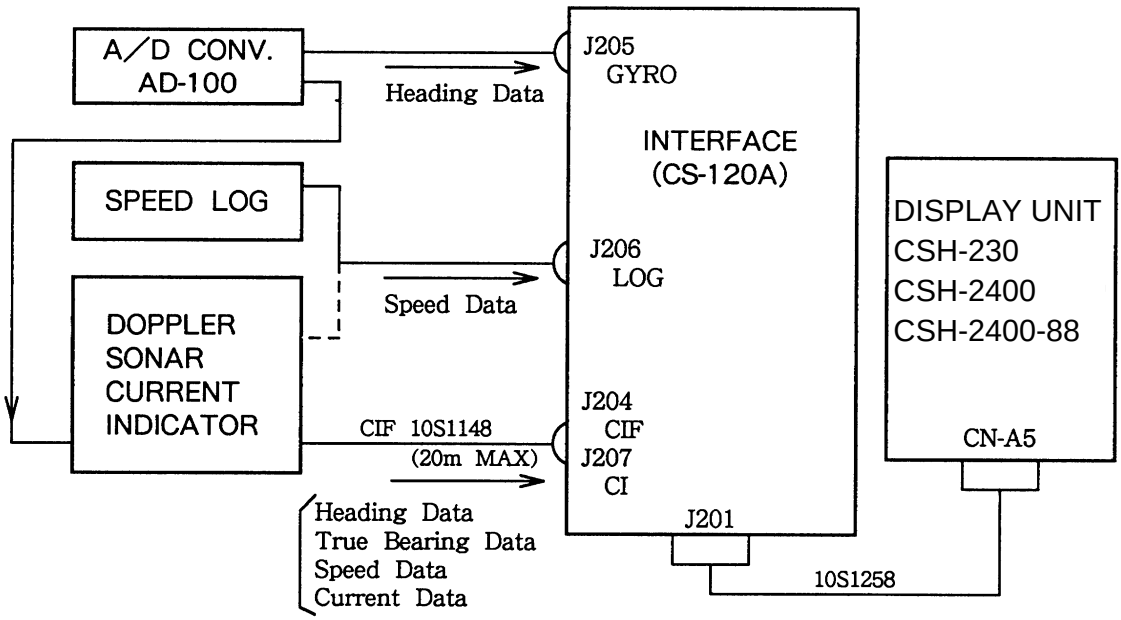


Figure 4-24 Connection of external equipment to Interface Unit CS-120A

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.

Connections for echo sounder picture and FNZ markers

You may display 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 the next page 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

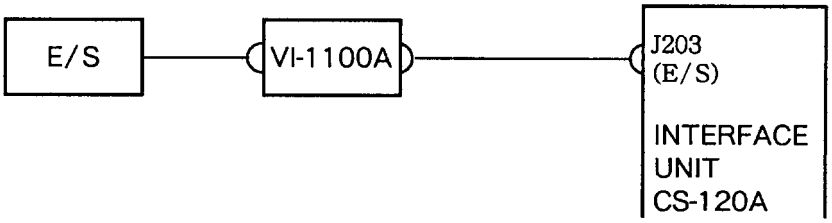


Figure 4-25 Connections for displaying echo sounder picture

Connection 2: Displaying echo sounder picture and FNZ markers 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.

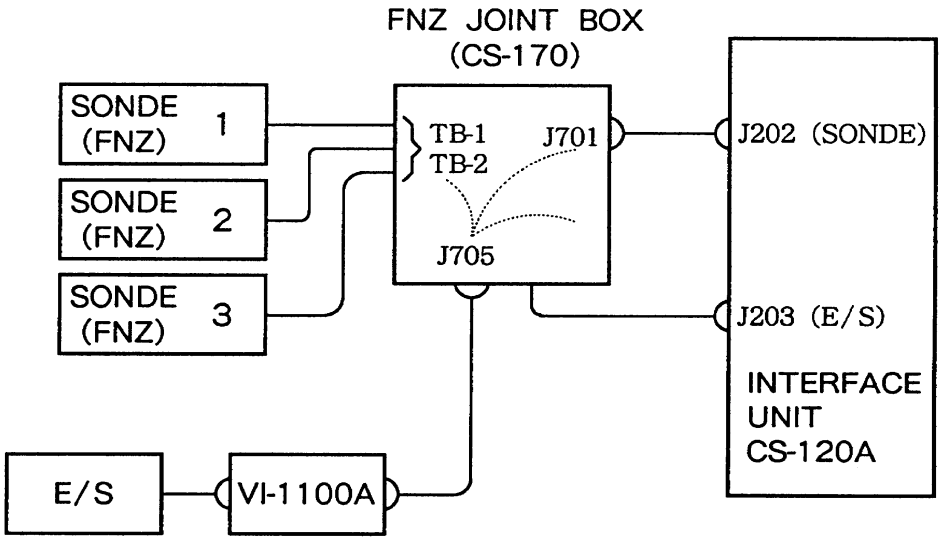


Figure 4-26 Connections for echo sounder picture and FNZ marker by one echo sounder

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

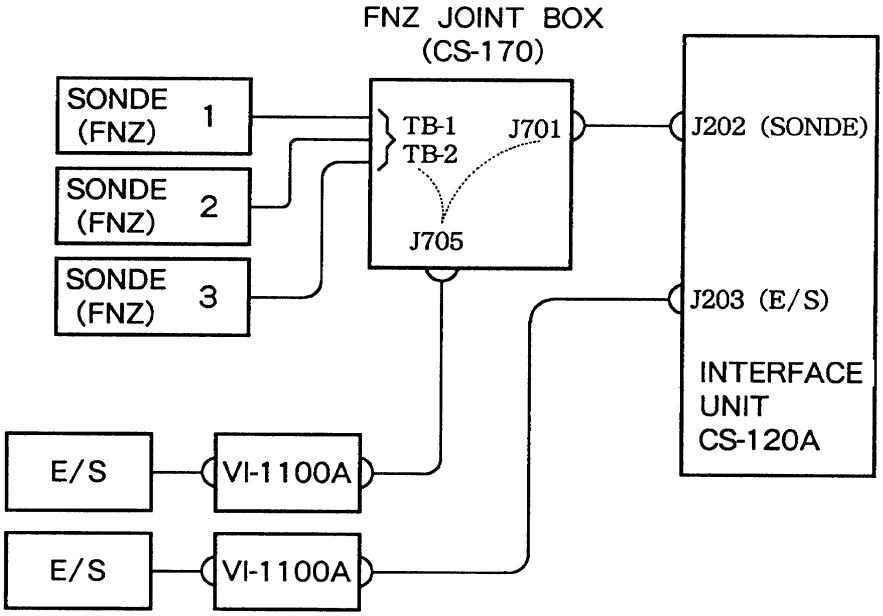


Figure 4-27 Connections for echo sounder picture and FNZ markers by separate echo sounders

Connections for digital indication of position, water temperature and depth

The data for the above 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 4-5 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 having digital depth data output is not available, the white line signal of a paper-type echo sounder can provide digital depth readout. Connect the echo sounder as shown below or as shown in connection 2 or 3 (page 4-15, 4-16) and operate the echo sounder front panel controls so that the white line is effected on the seabed contour.

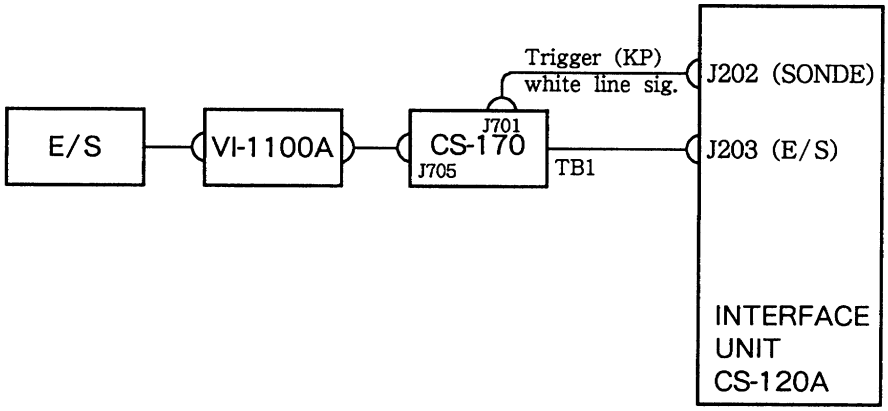


Figure 4-28 How to output white line signal of paper-type echo sounder

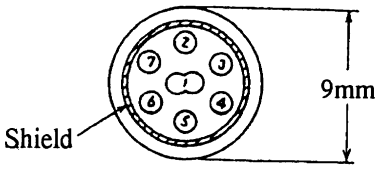
Wiring

Connect equipment referring to the interconnection diagram at the back of this manual.

Cable configuration

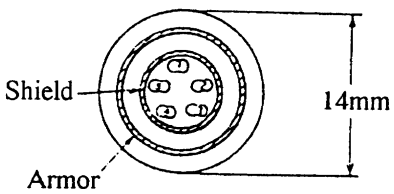
Wire Symbol	Meaning
◯	Vinyl sheath wire
◎	Shielded wire
⊂⊃	Twisted pair wire

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

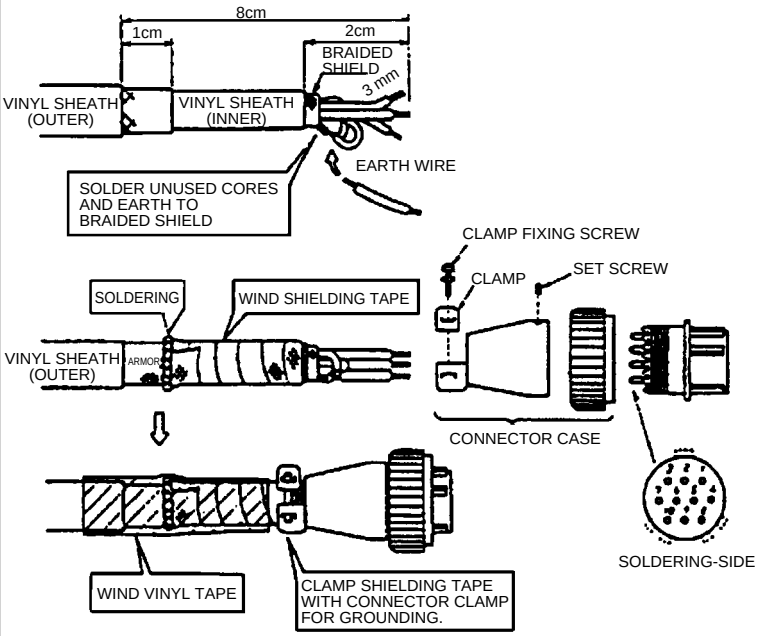


No.	Color
1	YEL/BLK
2	YEL/WHT
3	YEL/RED
4	YEL/BLU
5	YEL/GRN

Figure 4-29 Cable configuration

Assembling 10P and 7P connectors

10P Connector (SRCN6A16-10P)	J202 (FNZ), J204 (CIF), J205 (GYRO), J207 (CI)



7P Connector (SRCN6A16-7P)	J203 (E/S)

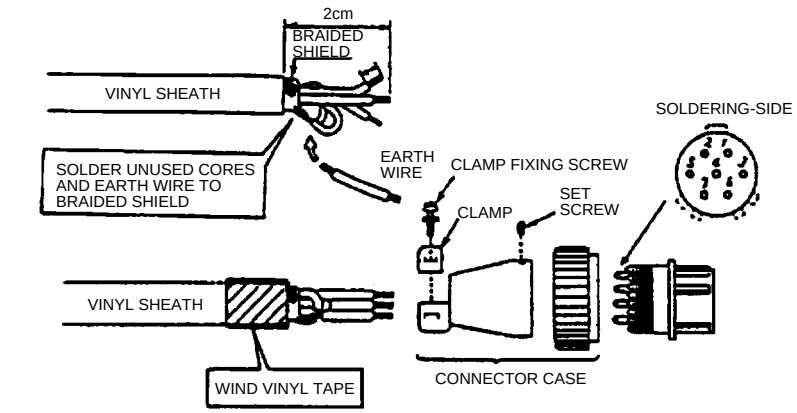


Figure 4-30 Assembling 10P and 7P connectors

4.10 Connection of Sub-Display Unit (option)

The Sub-Display Unit CSH-236 controls the sonar from a remote location, and its outline dimensions and control panel layout are identical to the display unit. One sub-display unit can be connected to three display units.

Note: The Sab-Display Unit can be connected to CSH-83 only.

Connections

Refer to the interconnection diagram on page S-1 and the connector assembling/cable fabrication procedure on page 4-4.

Note: A sub-display unit may not be connected to different models (for example, CSH-73 and CSH-24).

DIP switch setting

Set DIP switch S1 on RDCB board 10P6724 in the sub-display unit referring to the figure and table below.

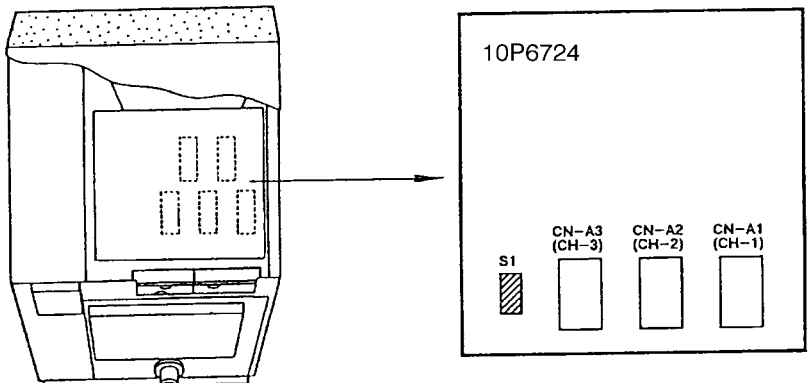


Figure 4-31 Sub-display unit, cover opened

Table 4-6 DIP switch S1 setting on RDCB board

SW No.	Used for	Description
1 2 3	Display unit on CH-1 Display unit on CH-2 Display unit on CH-3	ON: Turning on the sub-display unit automatically turns on the display unit.
4 5 6	Display unit on CH-1 Display unit on CH-2 Display unit on CH-3	ON: Turning on the display unit automatically turns on the sub-display unit. OFF: Sub-display unit is turned on.
7	Remote ON/OFF	Used in remote display unit. Set to ON in sub-display unit.
8	Not used	

Note: You may wish to have both the display unit and a sub-display unit turn on when one is turned on. To do this turn on both #1 and #4.

4.11 Connection of Remote Display Unit (option)

Three display units may be connected to one remote display unit. Operating controls provided on the remote display are power on/off switch, brilliance control and channel selector, which selects a display unit.

Note: The Remote-Display Unit can be connected to CSH-83 only.

Connections

Refer to interconnection diagram on page S-1 and cable fabrication/connector assembling procedure on page 4-11.

Note: The display unit has two ports: one for sub-display unit and the other for remote display unit. When there is no sub-display unit, both ports can be connected to remote display units.

Set DIP switch S1 on RDCB board 10P6724 in the remote display unit referring to the table and figure below.

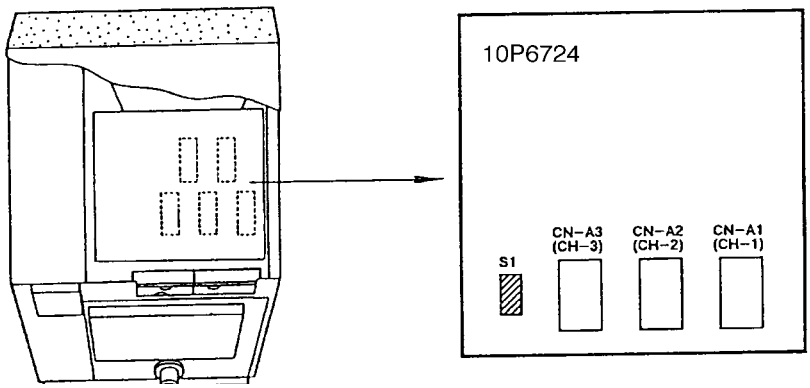


Figure 4-32 Remote display unit, cover opened

Table 4-7 DIP switch S1 setting on the remote display unit

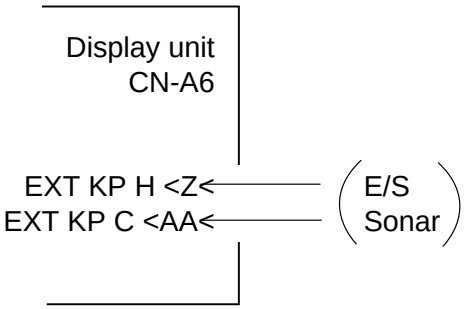
SW No.	Used for	Description
1 2 3	Display unit on CH-1 Display unit on CH-2 Display unit on CH-3	Not used.
4 5 6	Display unit on CH-1 Display unit on CH-2 Display unit on CH-3	Turn on when display unit is connected; turn OFF when not connected.
7	Remote ON/OFF	ON: Remote display unit turns on when a display unit is turned on. Remote display turns off when all display units are turned off. OFF: Remote display is turned on/off by its ON/OFF switch. **Note:** The remote display cannot be turned on unless a display unit is turned on.
8	Not used	

4.12 Synchronizing Transmission with Other Sonars or Echo Sounders

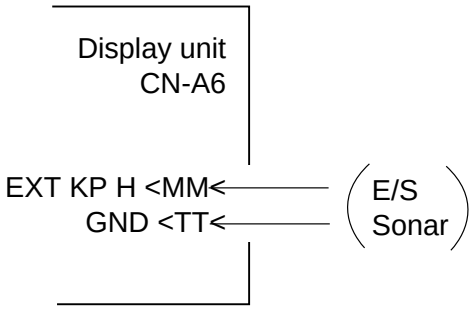
You may synchronize transmission with other sonars or echo sounders.

Connections

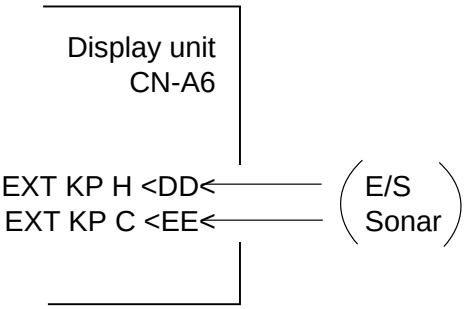
a) For current driven KP



b) For voltage driven KP



a) Current driven KP output



b) Voltage driven KP output

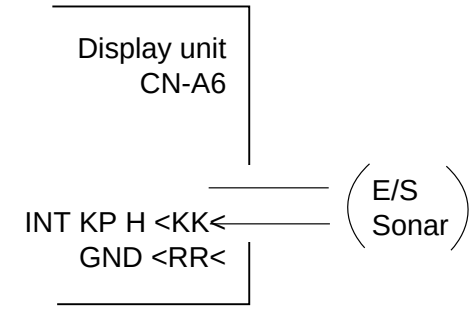


Figure 4-33 Connections for synchronizing transmission with other sonars or echo sounders

Menu setting

Set polarity of the KP on the INIT/SET menu. Set transmission cycle to “0” on data setting window. Refer to the operator’s manual for further details.

4.13 Interlocking Operation with Other Sonars

Functions (range, tilt, fish marks, etc.) and remote control may be mutually interlocked with those on other sonars (CSH-23/24/73/83/84). For example, if the range is interlocked, changing the range in one sonar automatically sets the other sonar to the same range. The functions to be interlocked can be selected on the SYSTEM menu. See the operator's manual for further details.

Connections for interlocking functions

Two sonars

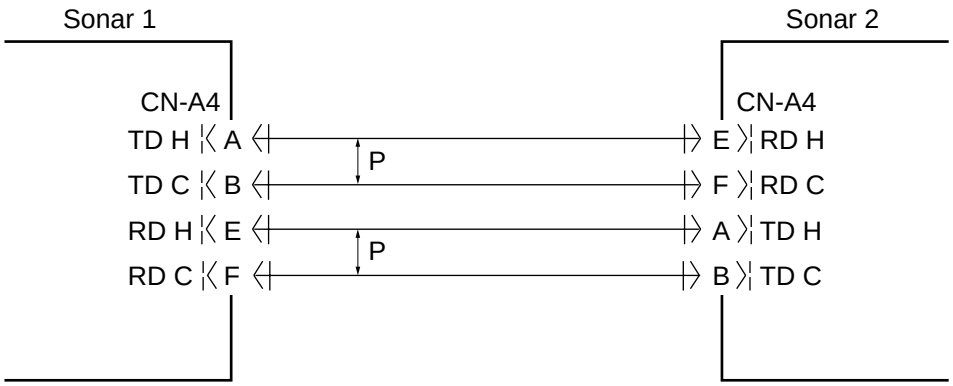


Figure 4-34 Connections for interlocking two sonars

Three sonars

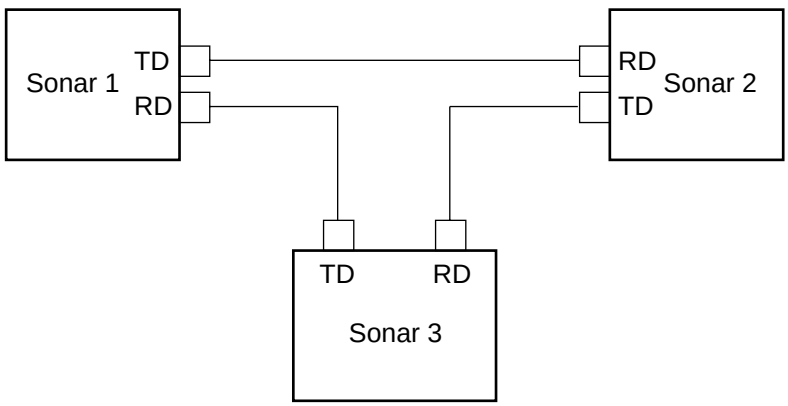


Figure 4-35 Connections for interlocking three sonars

DIP switch setting

Set ID code with DIP switches #1 thru #3 on the display unit. Any code is acceptable, provided that it is not the same as that set on the other sonar. For how to access the DIP switches see page 7-3.

Connections for interlocking remote control

A single remote control box can control three display units. Connect it to the display units as shown below.

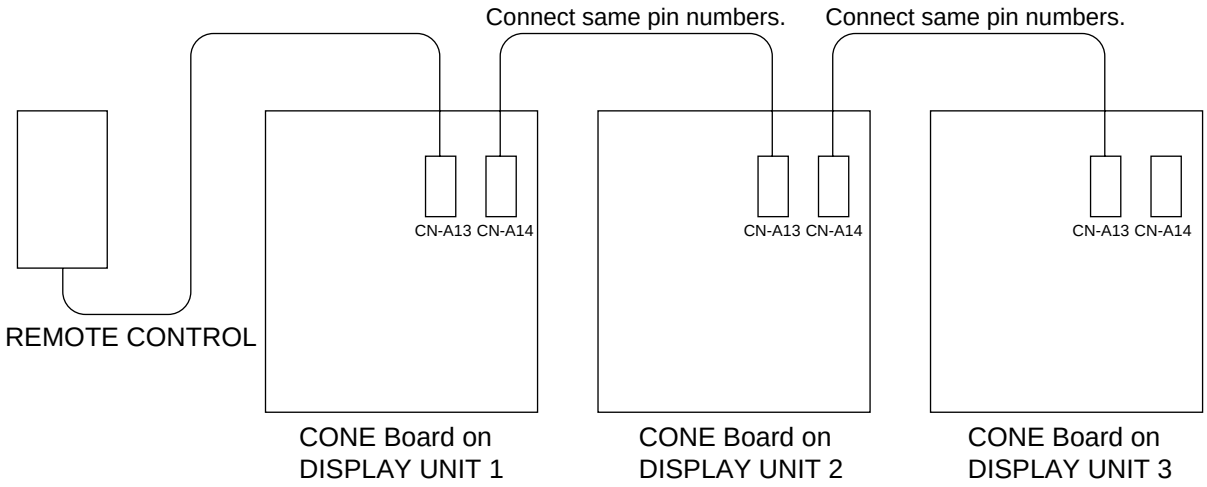


Figure 4-36 Connections for remote control of multiple display units

5. CHANGING POWER SPECIFICATIONS

The display unit is set at the factory for connection to ship's mains of 100 VAC. To power it by 110 VAC or 220 VAC, use step-down transformer PT-400, change the transformer taps on the power unit as below and connect the ship's mains directly.

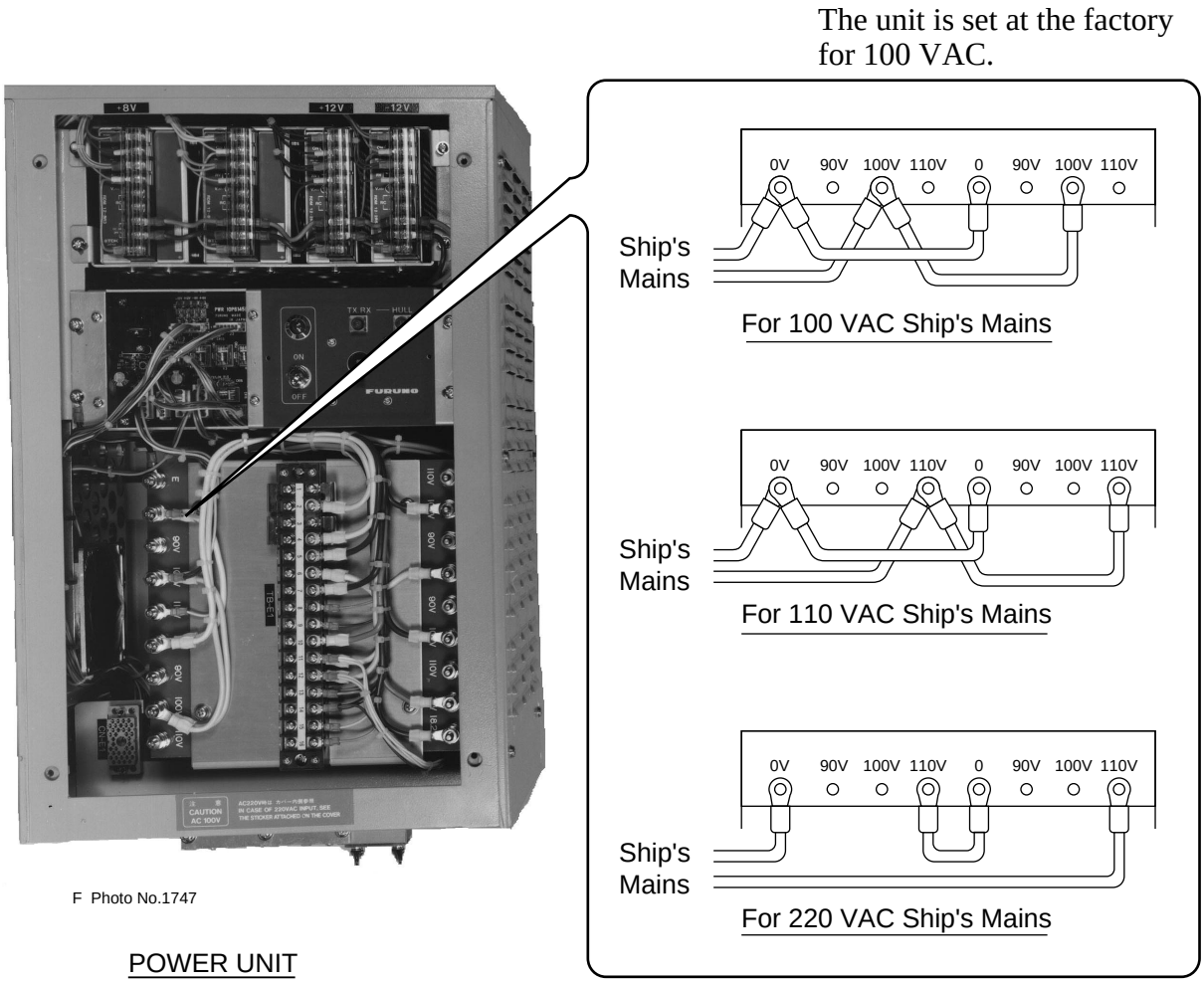


Figure 5-1 Changing tap connections on the power unit

6. INSTALLATION OF FRP RETRACTION TANK

6.1 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. If the shipyard supplies the FRP tank, do the following:
  - The finished surface of the tank flange must be within 0.5 mm of horizontal.
  - Use sealant recommended by shipyard.

Table 6-1 Contents of FRP retraction tank installation kit

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

6.2 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.

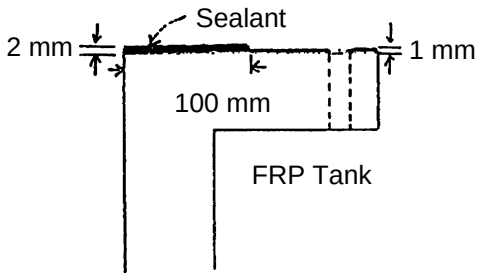


Figure 6-1 Coating the tank flange with sealant (supplied)

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

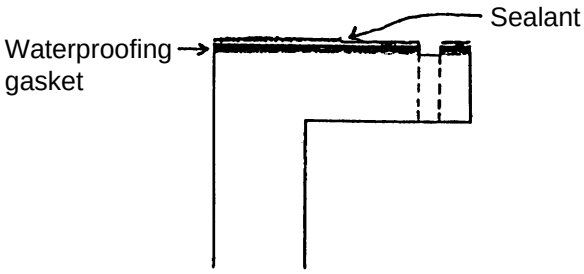


Figure 6-2 Laying the waterproofing gasket on the tank flange

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.)

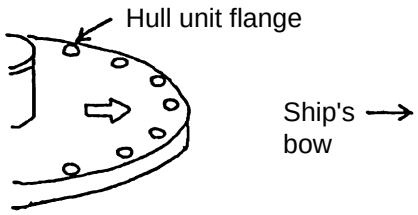


Figure 6-3 Orienting hull unit flange toward ship's bow

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.)

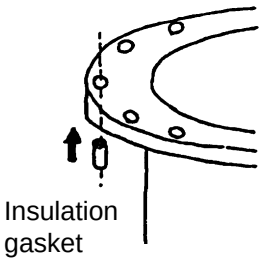


Figure 6-4 Inserting insulation gasket in tank flange

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 has fallen into the retraction tank.
   - Confirm that waterproofing gasket is in place.

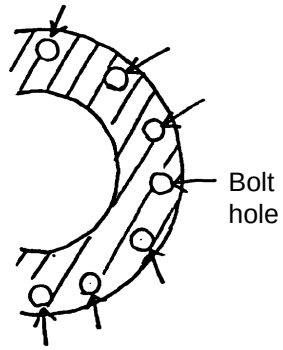


Figure 6-5 Tank flange

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 gasket, flat washer, spring washer and nut, in the order shown in the figure below.

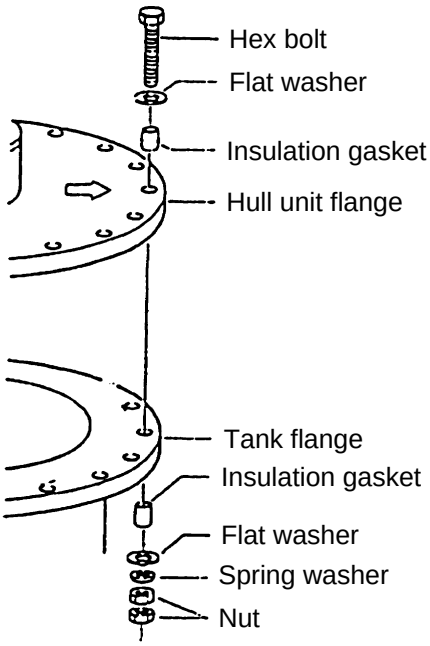


Figure 6-6 Fastening the hull unit to the retraction tank

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

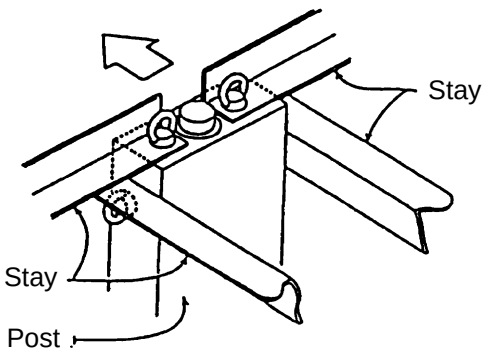


Figure 6-7 Installing stays on the hull unit

7. ADJUSTMENT AND CHECK

7.1 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 ② – ③ ① – ③	100 VAC 100 VAC 200 VAC

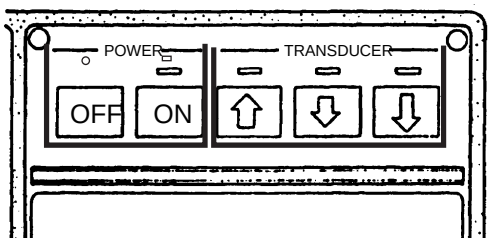


Figure 7-1 Display unit front panel

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.

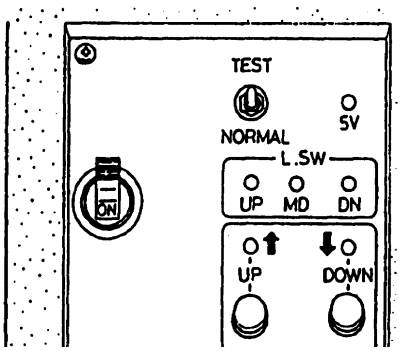


Figure 7-2 Raise/Lower control box

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.

7.2 Heading Adjustment

When the arrow 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 and no further adjustment is necessary. If it is not go to step 2.

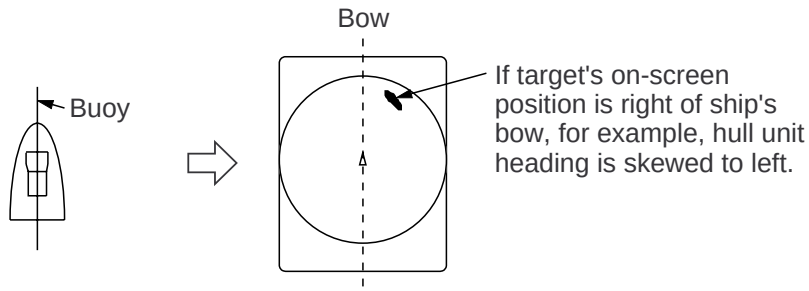


Figure 7-3 Heading adjustment

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

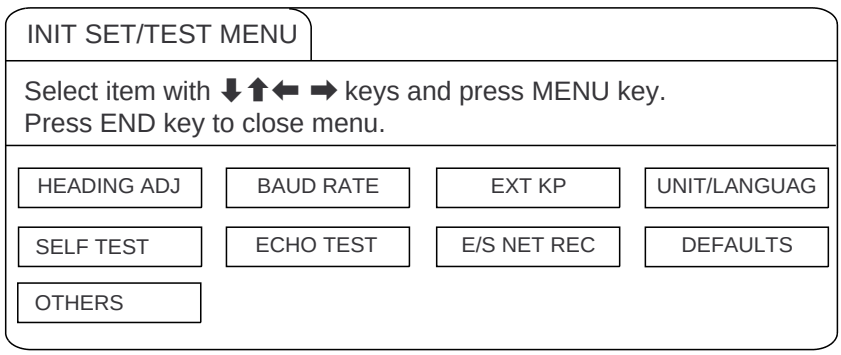


Figure 7-4 INIT SET/TEST menu

3. Select HEADING ADJ.

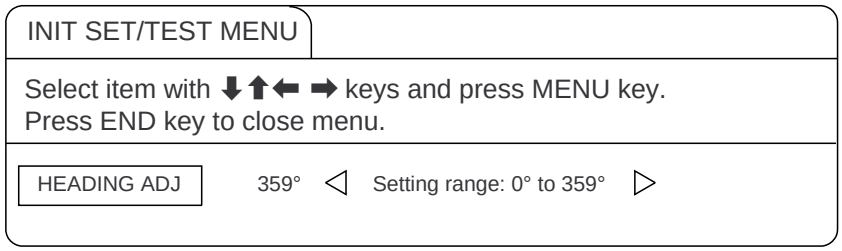


Figure 7-5 HEADING ADJ menu

4. Enter heading correction with ⬅ or ➡, referring to the example in 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°.

7.3 DIP Switch Setting in the Display Unit

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

1. Unfasten six screws on the main panel.
2. Draw out the main panel and unplug four connectors.
3. Set DIP switch referring to the table below.

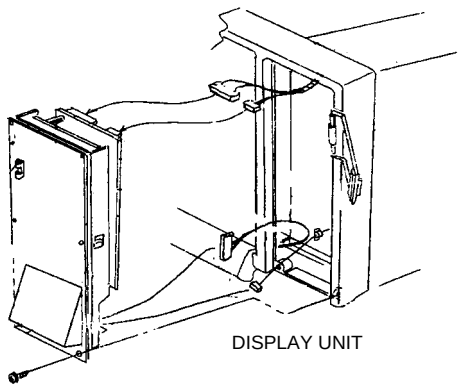


Figure 7-6 Dismounting the main panel

TPIF Board (10P6713)

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

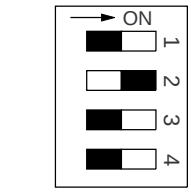
PND Board (10P6714)

Item	SW No.	Setting	
Display unit setting	3	OFF	For 21" CRT display unit (CSH-24/24F/24FL/84)
		ON	For 15" CRT display unit (CSH-23F/23FL/24F/24FL)

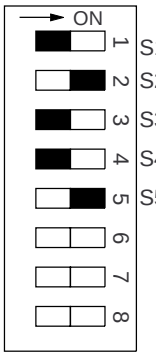
7.4 Setting and Adjustment in the Interface Unit

DIP switch setting

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



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 measuredwith 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 using white line pulse when 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).

Figure 7-7 DIP switch settings in the interface unit

Adjustments

If the echo sounder picture color does not have the desired coloration, adjust the appropriate potentiometers on the I/O board.

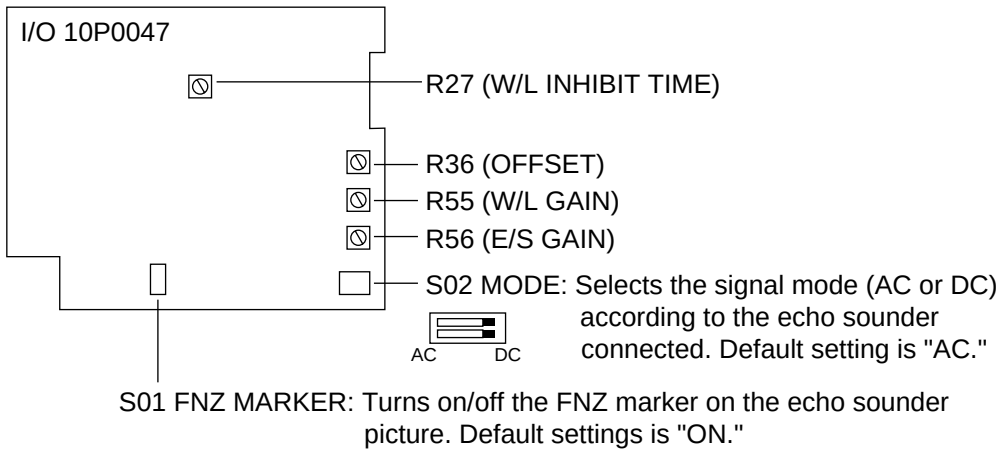


Figure 7-8 I/O board

Adjustment of signal level (potentiometer R36, R56)

Verify that the output level of E/S Interface VI-1100A satisfies the following ratings.

Figure 7-9 E/S interface unit output level

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 the echo sounder picture appears similar to the intensity gradation of the combined echo sounder echogram.

Case A: The echo sounder picture on the CSH-83/84 is comparatively higher in sensitivity than that of the paper echogram. In this case, turn the E/S OFFSET potentiometer so that weak signals painted in blue or light blue are displayed in deep blue.

Case B: The echo sounder picture on the CSH-83/84 is comparatively lower in sensitivity than that of the paper echogram. In this case, turn the E/S GAIN potentiometer clockwise until the picture is even in quality.

Adjustment of white line inhibit time (potentiometer R27)

When no digital depth data is input to the interface unit, the white line signal from the echo sounder is used for depth information.

The 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 potentiometer R27 is required as long as the CSH-83/84 indicates the correct depth. If the depth is wrong, turn R27 clockwise about 90 degrees.

Adjustment of white line output level (potentiometer R55)

Improper setting of potentiometer 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.

8. WHEN SHIP'S MAINS IS 24 VDC

When the ship's mains is 24 VDC, use DC/AC inverter unit TR-2435, TR-24100 and current limiter box CSH-1400. (All units are optional supply.) The system diagram and interconnection diagram are as follows.

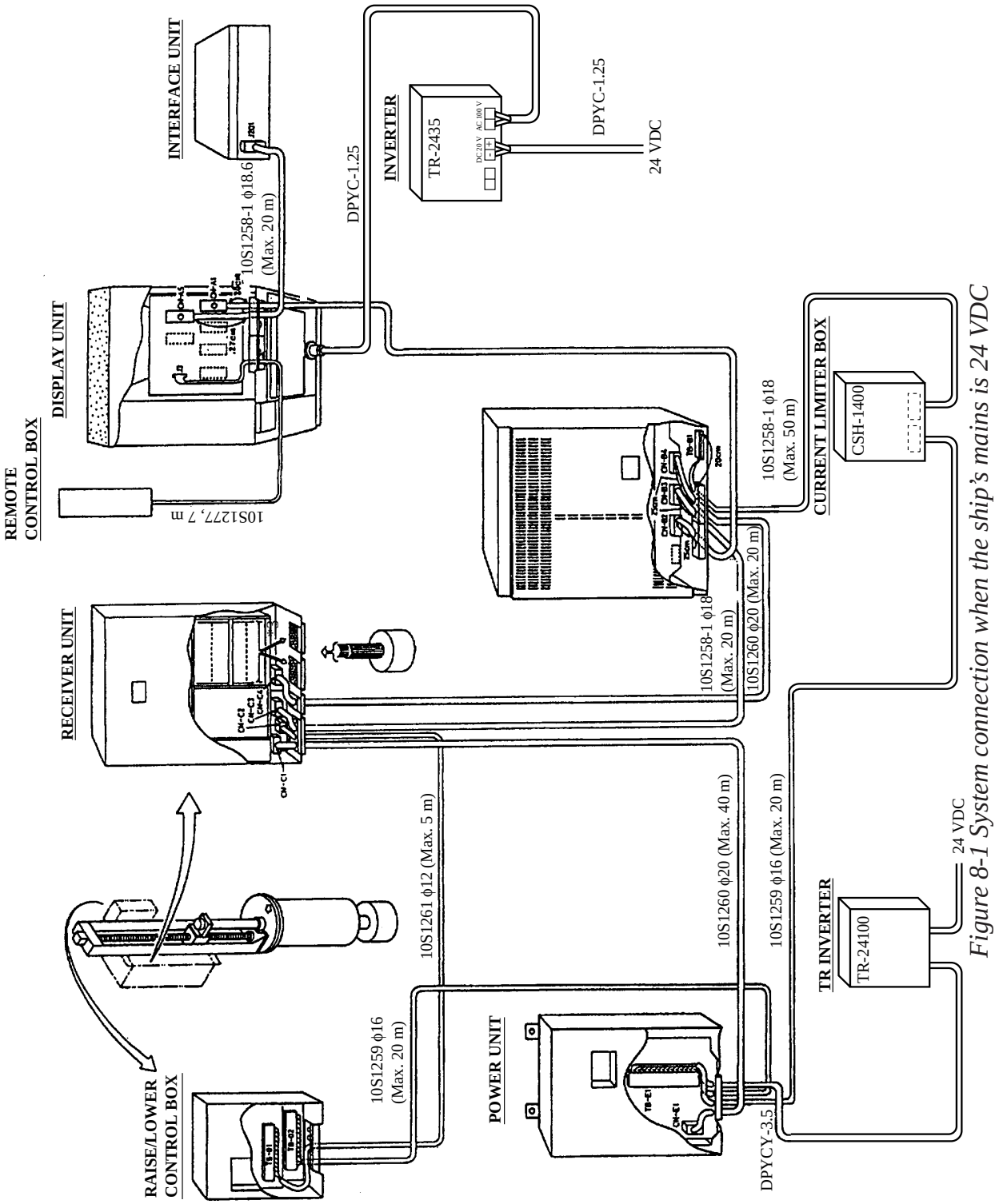


Figure 8-1 System connection when the ship's mains is 24 VDC

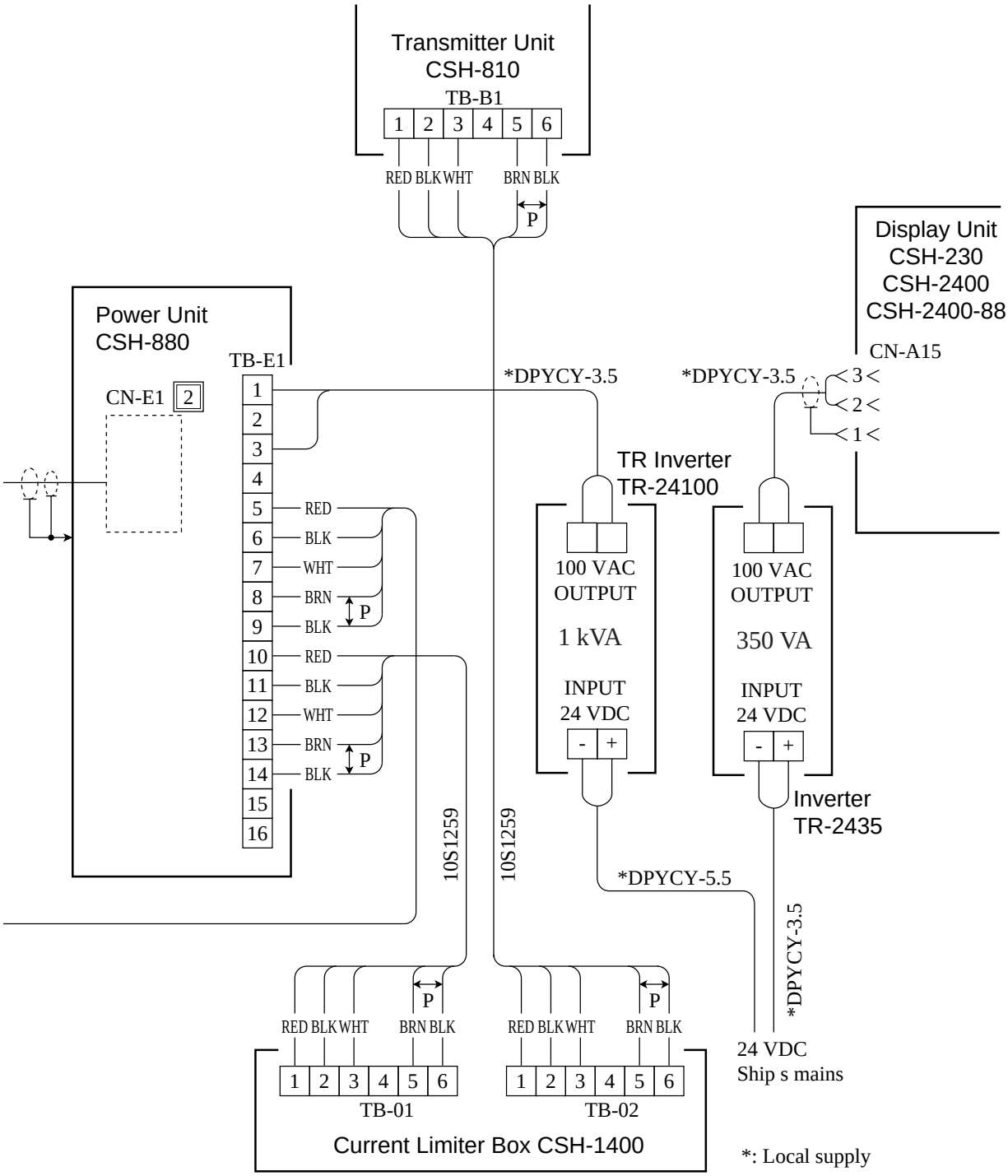
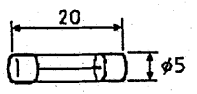
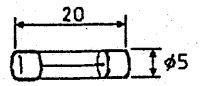
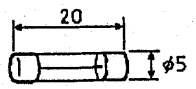
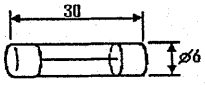
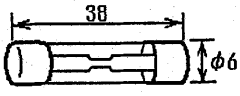
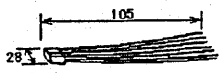
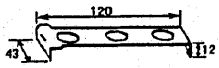
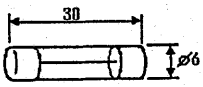


Figure 8-2 Connection with 24 VDC ship's mains

FURUNO

CODE NO.	000-066-918	10BY-X-9301 -7
TYPE	SP10-02000	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL
	CSH-81/88/82/83 281W/288W 281S/84 カラースキャニングソナー COLOR SCANNING SONAR		

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
1	ヒューズ FUSE		FGMA 3A 125V(UL)	1		2	指示装置用 FOR DISPLAY UNIT 000-111-848
2	ヒューズ FUSE		FGMA 1A AC125V	1		2	指示装置用 FOR DISPLAY UNIT 000-126-840
3	ヒューズ FUSE		FGMA 2A AC125V	2		4	指示装置用 FOR DISPLAY UNIT 000-126-841
4	ヒューズ FUSE		FGAO 10A AC125V	1		5	指示装置用 FOR DISPLAY UNIT 000-126-852
5	管入りヒューズ FUSE		F-7165 20A AC250V	1		2	指示装置用 FOR DISPLAY UNIT 000-547-022
6	XHコネクタ組品 XH. CONNECTOR ASSY.		10-285(10P)	1		1	受信装置用 FOR RECEIVER UNIT 006-902-740
7	コネクタ抜き工具 CONNECTOR PULLER		10-038-3901-0		1		受信装置用 FOR RECEIVER UNIT 100-075-230
8	ヒューズ FUSE		FGBO-A 2A AC125V	16		20	送信装置用 FOR TRANSMITTER UNIT 000-549-062

MFR'S NAME	FURUNO ELECTRIC CO., LTD	DWG NO.		1/1

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

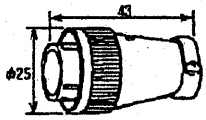
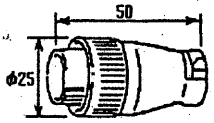
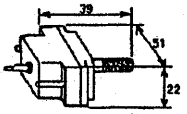
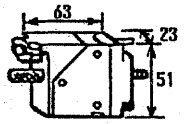
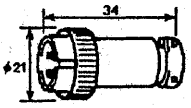
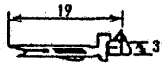
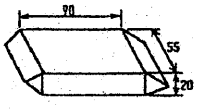
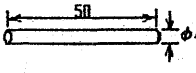
C1290-P01- H

FURUNO

CODE NO.	006-934-000	10BY-X-9401 -6
TYPE	CP10-03010	1/4

工事材料表
INSTALLATION MATERIALS

CSH-81/82/83
281W/281S
ｶﾗｰｽｷｬﾆﾝｸﾞｿﾅｰ
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	ｺﾈｸﾀ CONNECTOR		SRCN6A16-7P CODE NO. 000-508-662	1	外部ｲﾝﾀｰﾌｪｰｽ工材用 FOR INTERFACE UNIT
2	ｺﾈｸﾀ CONNECTOR		SRCN6A16-10P CODE NO. 000-508-663	4	外部ｲﾝﾀｰﾌｪｰｽ工材用 FOR INTERFACE UNIT
3	ｺﾈｸﾀ CONNECTOR		00-8016-038-313761HV CODE NO. 000-127-234	1	外部ｲﾝﾀｰﾌｪｰｽ工材用 FOR INTERFACE UNIT
4	ｺﾈｸﾀ CONNECTOR		54-038-000-601/SC CODE NO. 000-132-081	1	外部ｲﾝﾀｰﾌｪｰｽ工材用 FOR INTERFACE UNIT
5	ｱｰｽ線組品 GROUNDING WIRE		CS-120-C CODE NO. 006-937-990	1	外部ｲﾝﾀｰﾌｪｰｽ工材用 FOR INTERFACE UNIT
6	貼りﾏｰｸ. J201. STICKER. J201.		10-018-5022 CODE NO. 181-850-220	1	外部ｲﾝﾀｰﾌｪｰｽ工材用 FOR INTERFACE UNIT
7	ｺﾈｸﾀ CONNECTOR		RM15TP-2PA CODE NO. 000-503-314	1	外部ｲﾝﾀｰﾌｪｰｽ工材用 FOR INTERFACE UNIT
8	ｺﾝﾀｸﾄ CONTACT PIN		60-8017-0313-00-339 CODE NO. 000-519-542	38	外部ｲﾝﾀｰﾌｪｰｽ工材用 FOR INTERFACE UNIT
9	ｸｰﾗｰﾊﾟﾃ COOLER PUTTY		200Gｲﾘ ｼﾛｲﾛ CODE NO. 000-807-621	2	指示装置工材用 FOR DISPLAY UNIT
10	ｲﾗｯｸｽﾁｭｰﾌﾞ(A) INSULATION TUBE		4.0X0.3 ｷｲﾛ *5CM* CODE NO. 000-100-923	1	指示装置工材用 FOR DISPLAY UNIT

C1290-M01- G

FURUNO ELECTRIC CO., LTD

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

FURUNO

CODE NO.	006-934-000	10BY-X-9401 -6
TYPE	CP10-03010	2/4

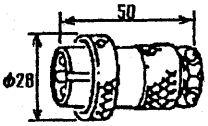
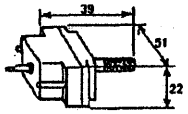
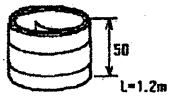
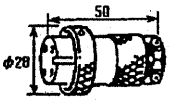
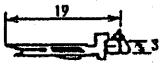
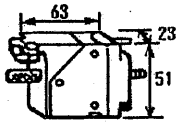
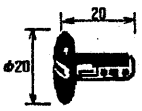
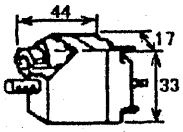
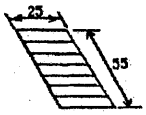
工事材料表

INSTALLATION MATERIALS

CSH-81/82/83
281W/281S

カラースキャニングソナー

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
11	コネクタ CONNECTOR		NCS-252-P CODE NO. 000-506-501	1	指示装置工材用 FOR DISPLAY UNIT
12	コネクタ CONNECTOR		00-8016-038-313761HV CODE NO. 000-127-234	1	指示装置工材用 FOR DISPLAY UNIT
13	アース板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040	1	指示装置工材用 FOR DISPLAY UNIT
14	コネクタ CONNECTOR		NCS-253-P CODE NO. 000-506-503	1	指示装置工材用 FOR DISPLAY UNIT
15	コンタクト CONTACT PIN		60-8017-0313-00-339 CODE NO. 000-519-542	114	受信装置工材用 FOR RECEIVER UNIT
16	アース板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040	1	受信装置工材用 FOR RECEIVER UNIT
17	コネクタ CONNECTOR		54-038-000-601/SC CODE NO. 000-132-081	3	受信装置工材用 FOR RECEIVER UNIT
18	ホールプラグ HOLE PLUG		NO. 4567 CODE NO. 000-800-729	4	受信装置工材用 FOR RECEIVER UNIT
19	コネクタ CONNECTOR		00-8016-020-313-703V CODE NO. 000-111-143	1	受信装置工材用 FOR RECEIVER UNIT
20	P貼りマーク. 11. P STICKER 11.		10-026-0619-0 CODE NO. 100-014-880	1	受信装置工材用 FOR RECEIVER UNIT

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FURUNO ELECTRIC CO., LTD

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

FURUNO

CODE NO.	006-934-000	10BY-X-9401 -6
TYPE	CP10-03010	3/4

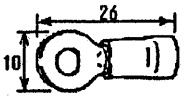
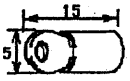
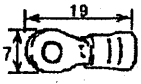
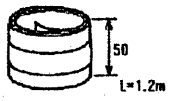
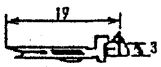
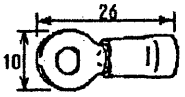
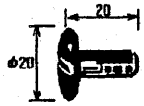
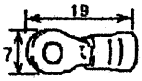
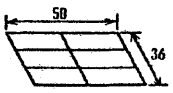
工事材料表

INSTALLATION MATERIALS

CSH-81/82/83
281W/281S

カラースキャニングソナー

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
21	シールドスリーブ SHIELD SLEEVE		ZS-06H *0.055M*		20	受信装置工材用 FOR RECEIVER UNIT
			CODE NO.	000-807-634		
22	圧着端子 CRIMP-ON LUG		FV5.5-4		5	上下装置用 FOR HULL UNIT
			CODE NO.	000-538-123		
23	圧着端子 CRIMP-ON LUG		FV1.25-3.7 7カ		15	上下装置用 FOR HULL UNIT
			CODE NO.	000-108-699		
24	圧着端子 CRIMP-ON LUG		FV1.25-M4 7カ		5	上下装置用 FOR HULL UNIT
			CODE NO.	000-536-715		
25	アース板 COPPER STRAP		WEA-1004-0		1	送振装置工材用 FOR TRANSMITTER UNIT
			CODE NO.	500-310-040		
26	コンタクト CONTACT PIN		60-8017-0313-00-339		120	送振装置工材用 FOR TRANSMITTER UNIT
			CODE NO.	000-519-542		
27	圧着端子 CRIMP-ON LUG		FV5.5-4		5	送振装置工材用 FOR TRANSMITTER UNIT
			CODE NO.	000-538-123		
28	ホールプラグ HOLE PLUG		NO.4567		4	送振装置工材用 FOR TRANSMITTER UNIT
			CODE NO.	080-800-729		
29	圧着端子 CRIMP-ON LUG		FV1.25-M4 7カ		5	送振装置工材用 FOR TRANSMITTER UNIT
			CODE NO.	000-536-715		
30	貼りマーク STICKER		10-026-5002-0		1	送振装置工材用 FOR TRANSMITTER UNIT
			CODE NO.	100-004-870		

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FURUNO ELECTRIC CO., LTD

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

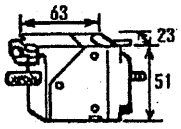
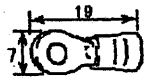
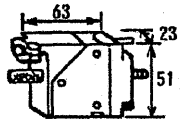
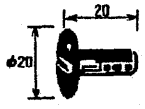
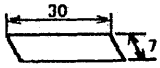
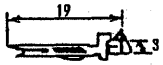
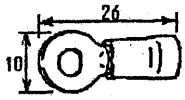
FURUNO

CODE NO.	006-934-000	10BY-X-9401 -6
TYPE	CP10-03010	4/4

工事材料表
INSTALLATION MATERIALS

CSH-81/82/83
281W/281S

カラースキャニングソナー
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
31	コネクタ CONNECTOR		54-038-000-601/SC CODE NO. 000-132-081	3	送振装置工材用 FOR TRANSMITTER UNIT
32	圧着端子 CRIMP-ON LUG		FV1.25-M4 アカ CODE NO. 000-536-715	6	電源装置用 FOR POWER UNIT
33	コネクタ CONNECTOR		54-038-000-601/SC CODE NO. 000-132-081	1	電源装置用 FOR POWER UNIT
34	アース板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040	1	電源装置用 FOR POWER UNIT
35	ホールプラグ HOLE PLUG		NO.4567 CODE NO. 000-800-729	4	電源装置用 FOR POWER UNIT
36	貼りマーク.1. STICKER.1.		10-026-7018-0 CODE NO. 100-008-630	1	電源装置用 FOR POWER UNIT
37	コンタクト CONTACT PIN		60-8017-0313-00-339 CODE NO. 000-519-542	38	電源装置用 FOR POWER UNIT
38	圧着端子 CRIMP-ON LUG		FV5.5-4 CODE NO. 000-538-123	15	電源装置用 FOR POWER UNIT

C1290-M04- E

FURUNO ELECTRIC CO . , LTD

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

FURUNO

CODE NO.		10BW-X-9405 -3
TYPE		1/1

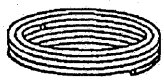
工事材料表

INSTALLATION MATERIALS

CSH-21/K/F・22/F
23/F/FL/K・24/F/FL
53・55・80・81・82・83
84・88・288W

カラースキャニングソナー

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	6ツイストケーブル 6P TWISTED PAIR CABLE	 L=5m	CO-SPEV-SB 0.3X6P		1	
			CODE NO.	000-100-992		

C1286-M05- D

FURUNO ELECTRIC CO., LTD

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

FURUNO

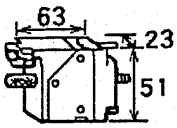
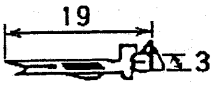
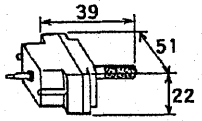
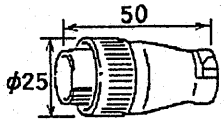
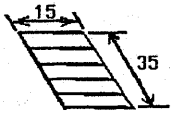
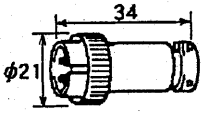
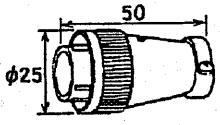
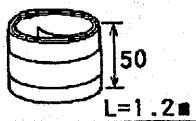
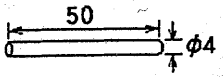
CODE NO.	006-959-830	10CE-X-9401 -0
TYPE	CP10-03610	1/4

工事材料表

INSTALLATION MATERIALS

CSH-82/84 カラースキャニングソナー

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	アース線組品 GROUNDING WIRE		CS-120-C CODE NO. 006-937-990	1	外部インターフェイス用 FOR DATA INTERFACE UNIT
2	コネクタ CONNECTOR		54-038-000-601/SC CODE NO. 000-132-081	1	外部インターフェイス用 FOR DATA INTERFACE UNIT
3	コンタクト CONTACT PIN		60-8017-0313-00-339 CODE NO. 000-519-542	38	外部インターフェイス用 FOR DATA INTERFACE UNIT
4	コネクタ CONNECTOR		00-8016-038-313761HV CODE NO. 000-127-234	1	外部インターフェイス用 FOR DATA INTERFACE UNIT
5	コネクタ CONNECTOR		SRCN6A16-10P CODE NO. 000-508-663	4	外部インターフェイス用 FOR DATA INTERFACE UNIT
6	貼りマーク. J201. STICKER. J201.		10-018-5022 CODE NO. 181-850-220	1	外部インターフェイス用 FOR DATA INTERFACE UNIT
7	コネクタ CONNECTOR		RM15TP-2PA CODE NO. 000-503-314	1	外部インターフェイス用 FOR DATA INTERFACE UNIT
8	コネクタ CONNECTOR		SRCN6A16-7P CODE NO. 000-508-662	1	外部インターフェイス用 FOR DATA INTERFACE UNIT
9	アース板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040	1	指示装置用 FOR DISPLAY UNIT
10	イラックスチューブ (A) INSULATION TUBE		4.0X0.3 キイロ *5CM* CODE NO. 000-100-923	1	指示装置用 FOR DISPLAY UNIT

C1296-M01- A

FURUNO ELECTRIC CO., LTD

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

FURUNO

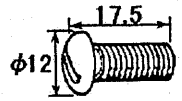
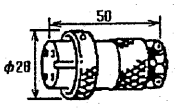
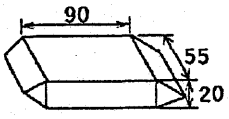
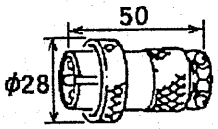
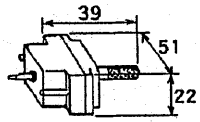
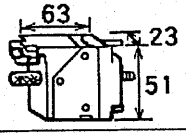
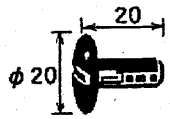
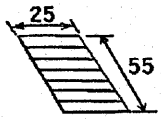
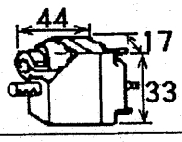
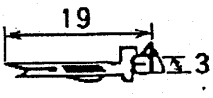
CODE NO.	006-959-830	10CE-X-9401 -0
TYPE	CP10-03610	2/4

工事材料表

INSTALLATION MATERIALS

CSH-82/84 カラースキャニングソナー

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
11	M8化粧ビス PANEL SCREW		10-054-1144-0 CODE NO. 100-195-970	4	指示装置用 FOR DISPLAY UNIT
12	コネクタ CONNECTOR		NCS-253-P CODE NO. 000-506-503	1	指示装置用 FOR DISPLAY UNIT
13	クーラーパテ COOLER PUTTY		200Gイリ シロイロ CODE NO. 000-807-621	2	指示装置用 FOR DISPLAY UNIT
14	コネクタ CONNECTOR		NCS-252-P CODE NO. 000-506-501	1	指示装置用 FOR DISPLAY UNIT
15	コネクタ CONNECTOR		00-8016-038-313761HV CODE NO. 000-127-234	1	指示装置用 FOR DISPLAY UNIT
16	コネクタ CONNECTOR		54-038-000-601/SC CODE NO. 000-132-081	3	受信装置用 FOR RECEIVER UNIT
17	ホールプラグ HOLE PLUG		NO. 4567 CODE NO. 000-800-729	4	受信装置用 FOR RECEIVER UNIT
18	P貼りマーク. 11. P STICKER. 11.		10-026-0619-0 CODE NO. 100-014-880	1	受信装置用 FOR RECEIVER UNIT
19	コネクタ CONNECTOR		00-8016-020-313-703V CODE NO. 000-111-143	1	受信装置用 FOR RECEIVER UNIT
20	コンタクト CONTACT PIN		60-8017-0313-00-339 CODE NO. 000-519-542	114	受信装置用 FOR RECEIVER UNIT

C1296-M02- A

FURUNO ELECTRIC CO., LTD

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

FURUNO

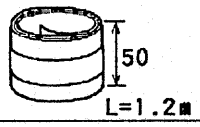
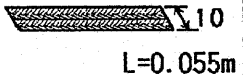
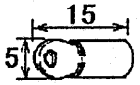
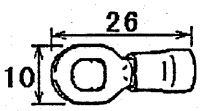
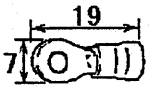
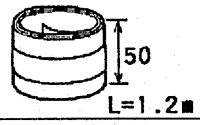
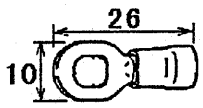
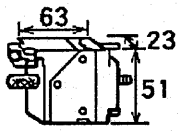
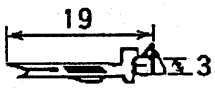
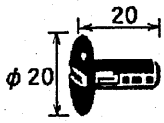
CODE NO.	006-959-830	10CE-X-9401 -0
TYPE	CP10-03610	3/4

工事材料表

INSTALLATION MATERIALS

CSH-82/84 カラースキャニング 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
21	アース板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040	1	受信装置用 FOR RECEIVER UNIT
22	シールド スリーブ SHIELD SLEEVE		ZS-06H *0.055M* CODE NO. 000-807-634	20	受信装置用 FOR RECEIVER UNIT
23	圧着端子 CRIMP-ON LUG		FV1.25-3.7 アカ CODE NO. 000-108-699	15	上下装置用 FOR HULL UNIT
24	圧着端子 CRIMP-ON LUG		FV5.5-4 CODE NO. 000-538-123	5	上下装置用 FOR HULL UNIT
25	圧着端子 CRIMP-ON LUG		FV1.25-M4 アカ CODE NO. 000-536-715	5	上下装置用 FOR HULL UNIT
26	アース板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040	1	送振装置用 FOR TRANSMITTER UNIT
27	圧着端子 CRIMP-ON LUG		FV5.5-4 CODE NO. 000-538-123	5	送振装置用 FOR TRANSMITTER UNIT
28	コネクタ CONNECTOR		54-038-000-601/SC CODE NO. 000-132-081	3	送振装置用 FOR TRANSMITTER UNIT
29	コンタクト CONTACT PIN		60-8017-0313-00-339 CODE NO. 000-519-542	120	送振装置用 FOR TRANSMITTER UNIT
30	ホールプラグ HOLE PLUG		NO.4567 CODE NO. 000-800-729	4	送振装置用 FOR TRANSMITTER UNIT

C1296-M03- A

FURUNO ELECTRIC CO., LTD

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

FURUNO

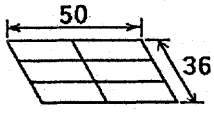
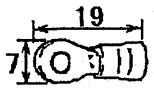
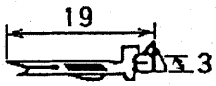
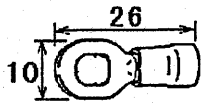
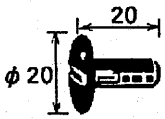
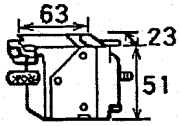
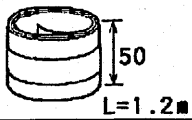
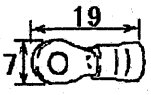
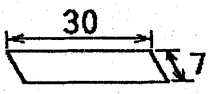
CODE NO.	006-959-830	10CE-X-9401 -0
TYPE	CP10-03610	4/4

工事材料表

INSTALLATION MATERIALS

CSH-82/84 カラースキャニングソナー

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
31	貼りマーク STICKER		10-026-5002-0 CODE NO. 100-004-870	1	送振装置用 FOR TRANSMITTER UNIT
32	圧着端子 CRIMP-ON LUG		FV1.25-M4 アカ CODE NO. 000-536-715	5	送振装置用 FOR TRANSMITTER UNIT
33	コンタクト CONTACT PIN		60-8017-0313-00-339 CODE NO. 000-519-542	38	電源装置用 FOR POWER SUPPLY UNIT
34	圧着端子 CRIMP-ON LUG		FV5.5-4 CODE NO. 000-538-123	15	電源装置用 FOR POWER SUPPLY UNIT
35	ホールプラグ HOLE PLUG		NO.4567 CODE NO. 000-800-729	4	電源装置用 FOR POWER SUPPLY UNIT
36	コネクタ CONNECTOR		54-038-000-601/SC CODE NO. 000-132-081	1	電源装置用 FOR POWER SUPPLY UNIT
37	アース板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040	1	電源装置用 FOR POWER SUPPLY UNIT
38	圧着端子 CRIMP-ON LUG		FV1.25-M4 アカ CODE NO. 000-536-715	6	電源装置用 FOR POWER SUPPLY UNIT
39	貼りマーク.1. STICKER.1.		10-026-7018-0 CODE NO. 100-008-630	1	電源装置用 FOR POWER SUPPLY UNIT

C1296-M04- A

FURUNO ELECTRIC CO., LTD

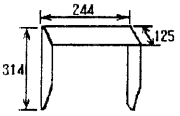
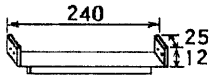
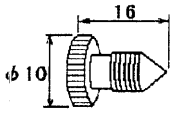
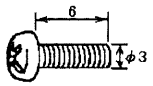
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	006-027-830	10CI-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	ﾌｰﾄﾞ HOOD		10-062-1601-0 CODE NO. 100-250-550	1	
2	ﾌｰﾄﾞ取り付け金具 HOOD MOUNTING PLATE		16-062-1602-0 CODE NO. 100-250-560	1	
3	ﾌｨﾙﾀｰﾋﾞｽ FILTER MOUNTING SCREW		66-007-1222-0 CODE NO. 860-712-220	1	
4	+ﾊﾞｲﾝﾄﾞ小ﾈｼﾞ BINDING HEAD SCREW		M3X6 C2700Wﾎﾞﾘｼｰﾙ ｸﾛ ﾅｲﾛﾝﾜｯｼｬﾂｷ CODE NO. 000-800-582	4	

DWG NO.
C1307-F01- B

FURUNO ELECTRIC CO . , LTD.

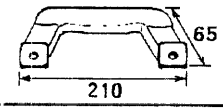
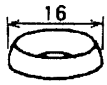
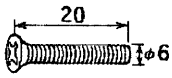
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	006-989-020	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 CODE NO. 840-211-252	2	
2	ローゼット座金 ROSETTE WASHER		M6 C2700W ﾎﾟﾘｼｰﾙ ｸﾛ CODE NO. 000-864-910	4	
3	+丸皿小ﾈｼﾞ OVAL COUNTERSUNK HEAD SCREW		M6X20 C2700W ﾎﾟﾘｼｰﾙ ｸﾛ CODE NO. 000-861-475	4	
4	波座金 WAVE WASHER		WW-6 SUS CODE NO. 000-864-350	4	

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

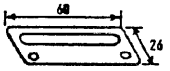
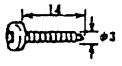
CODE NO.	006-989-040	10CF-X-9501 -1
TYPE	FP10-01203	1/1

付属品表

ACCESSORIES

(SH-55/53/23・F・K 73/83 リモート掛け具

REMOTE HOOK

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 CODE NO. 100-008-801	1	
2	ナベPタイトネジ SCREW		3X14 SWCH18A MFZN-2-C CODE NO. 000-800-172	2	

C1297-F01- A

FURUNO ELECTRIC CO . . LTD

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

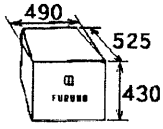
FURUNO

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	用途／備考 REMARKS
1	ﾅｲﾛﾝｶﾊﾞｰ PLASTIC COVER		10-051-1031 CODE NO. 000-803-289	1	

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.)

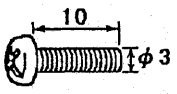
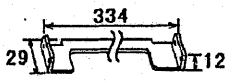
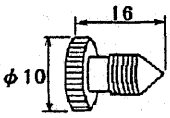
FURUNO

CODE NO.	006-908-550	10CM-X-9501 -1
TYPE	FP10-01901	1/1

付属品表

ACCESSORIES

CSH-24/24F/24FL/84　カラースキャニングソナー　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	+バインドビス BINDING HEAD SCREW		M3X10 C2700Wポリシール クロ ナイロンワッシャツキ CODE NO. 000-800-923	4	
2	フード取付金具 HOOD FIXTURE		10-064-1602-0 CODE NO. 100-253-720	1	
3	フィルタービス FILTER MOUNTING SCREW		66-007-1222-0 CODE NO. 860-712-220	1	

C1310-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.		10CB-X-9501 -2
TYPE		1/1

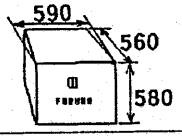
付属品表

ACCESSORIES

CSH-288W/88/22/22F
72/82/24/24F/24FL
84

カラースキャニング 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	ナイロンカバー PLASTIC COVER		10-054-1021 CODE NO. 000-804-936	1	

C1310-F03- A

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

付属品表

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	数量 Q'TY	用途／備考 REMARKS
1	RAMカード組品 RAM CARD		00RAM256C-001 CODE NO. 004-321-070	1	

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.)

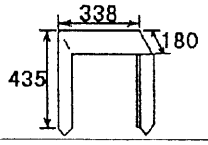
FURUNO

CODE NO.		10CM-X-9502 -0
TYPE		1/1

付属品表

ACCESSORIES

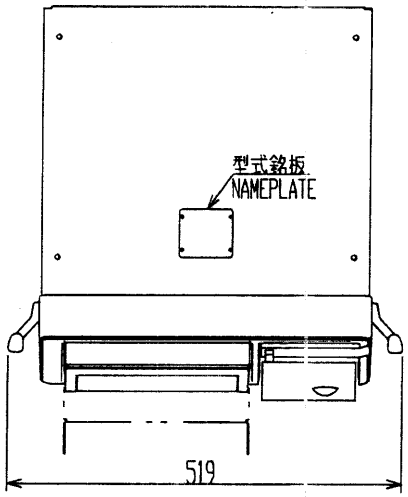
CSH-24/24F/24FL/84　カラースキャニングソナー　COLOR SCANNING SONAR

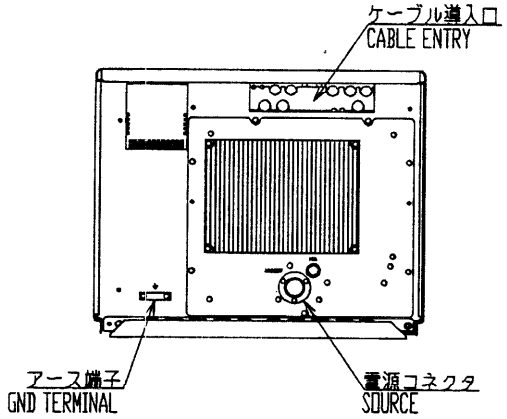
番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	フード HOOD		10-064-1601-0 CODE NO. 100-253-710	1	

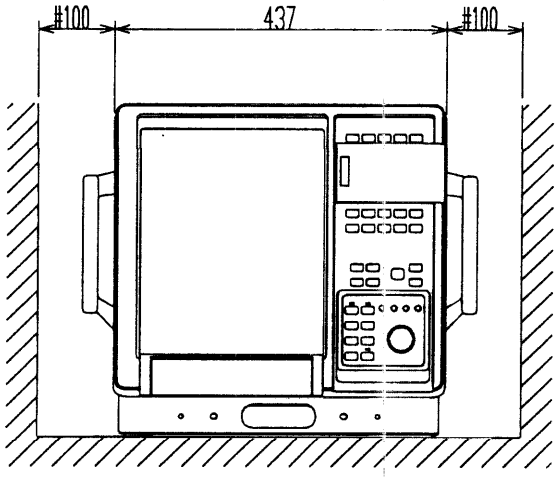
C1310-F04- A

FURUNO ELECTRIC CO., LTD

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







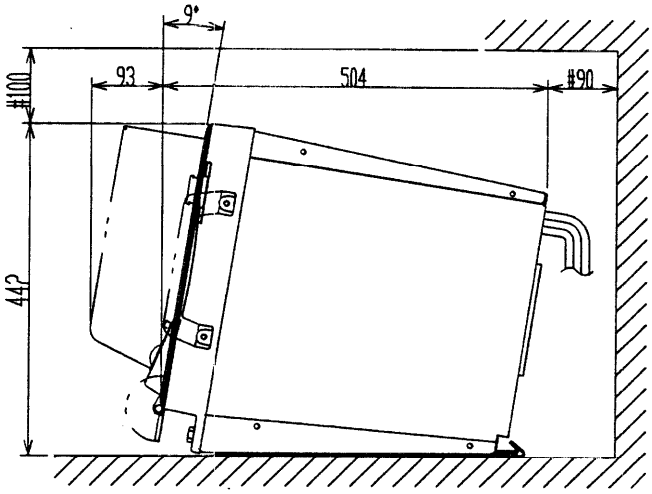
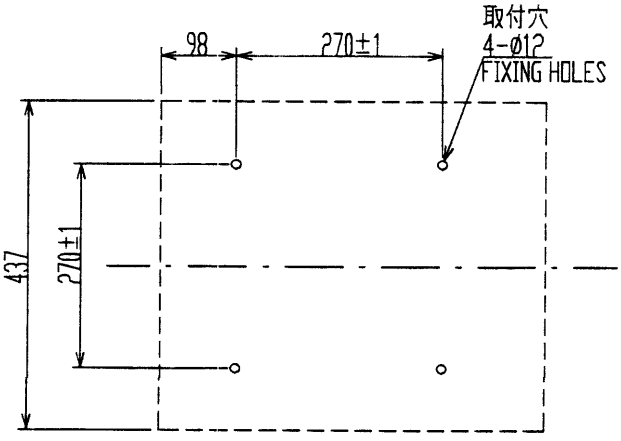


表1 TABLE 1

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



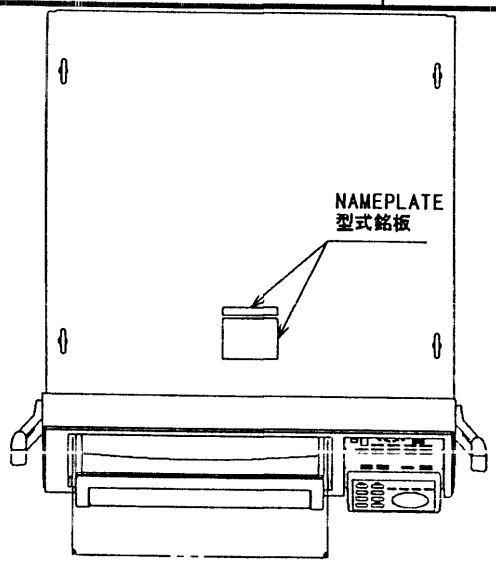
注記
1）#印寸法は最小サービス空間寸法とする
2）指定なき寸法公差は表1による。

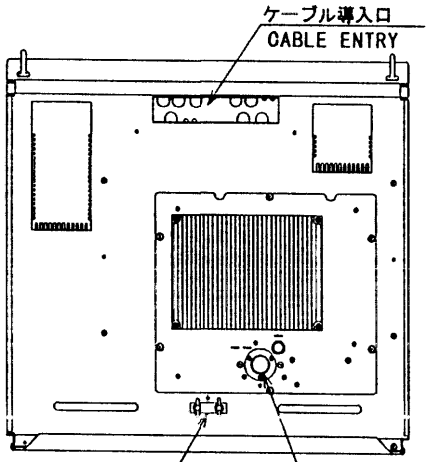
NOTE
1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

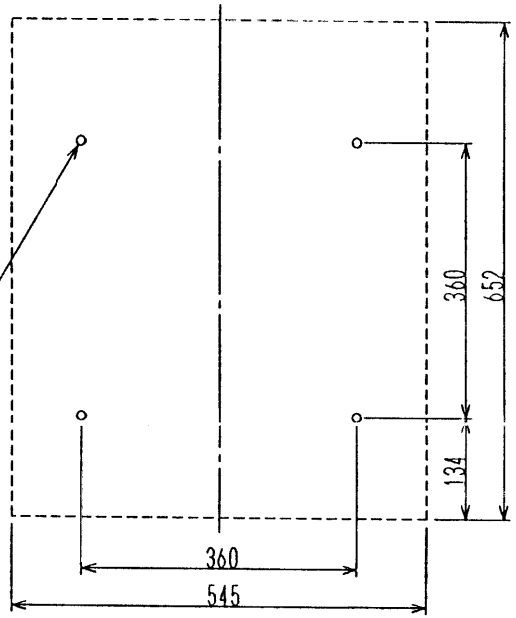
DRAWN Jun.12'01 T.YAMASAKI		TITLE	CSH-230/236/530/536/731/736/580/586/830
CHECKED June 12'01 T.K		名称	指示装置
APPROVED June 12'01 S.Y	CSH-53/73/83/58 CSH-23/F/K		外寸図
SCALE 1/10 MASS 35 ±10% kg	CSH-230/236 INCLUDE -F/K CSH-230/236は-F/Kをさす。	NAME	DISPLAY UNIT
DWG.No. C1307-G01- E	10-062-1000-G0		OUTLINE DRAWING

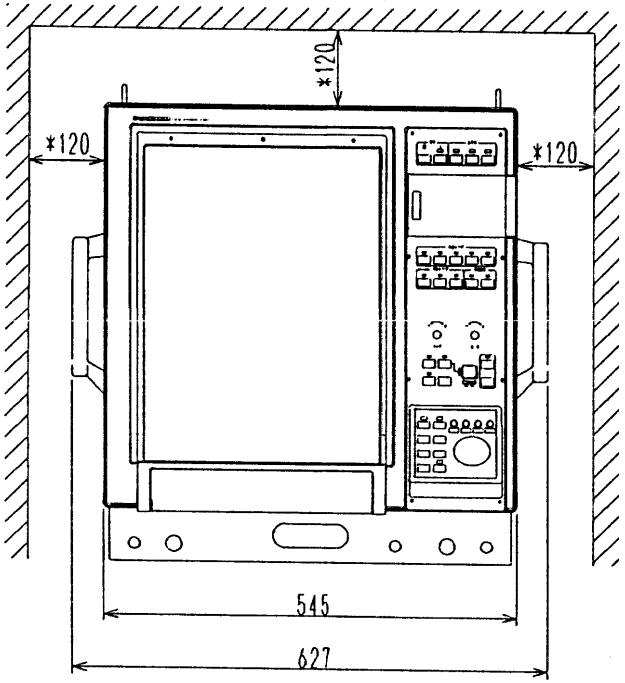
FURUNO ELECTRIC CO., LTD.

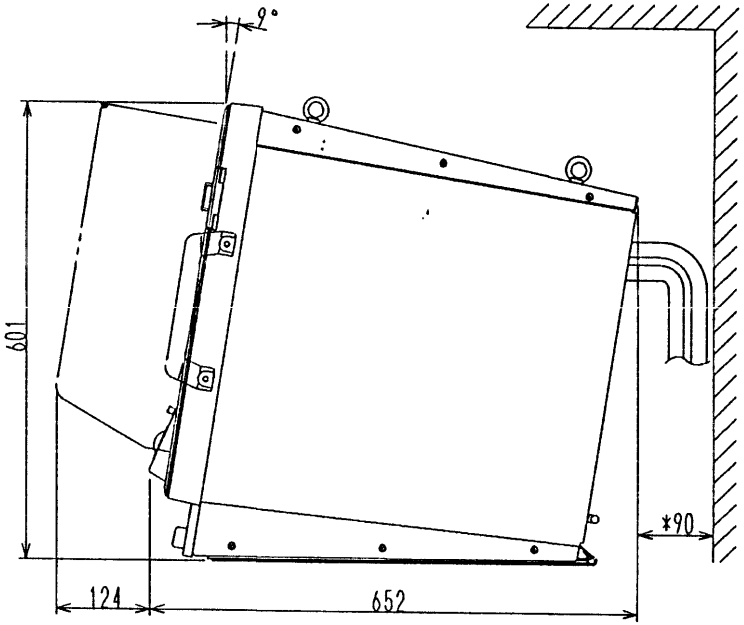
FURUNO











注記
1) ＊印寸法は最小サービス空間寸法とする．

NOTE
1. *: RECOMMENDED SERVICE CLEARANCE DIMENSION.

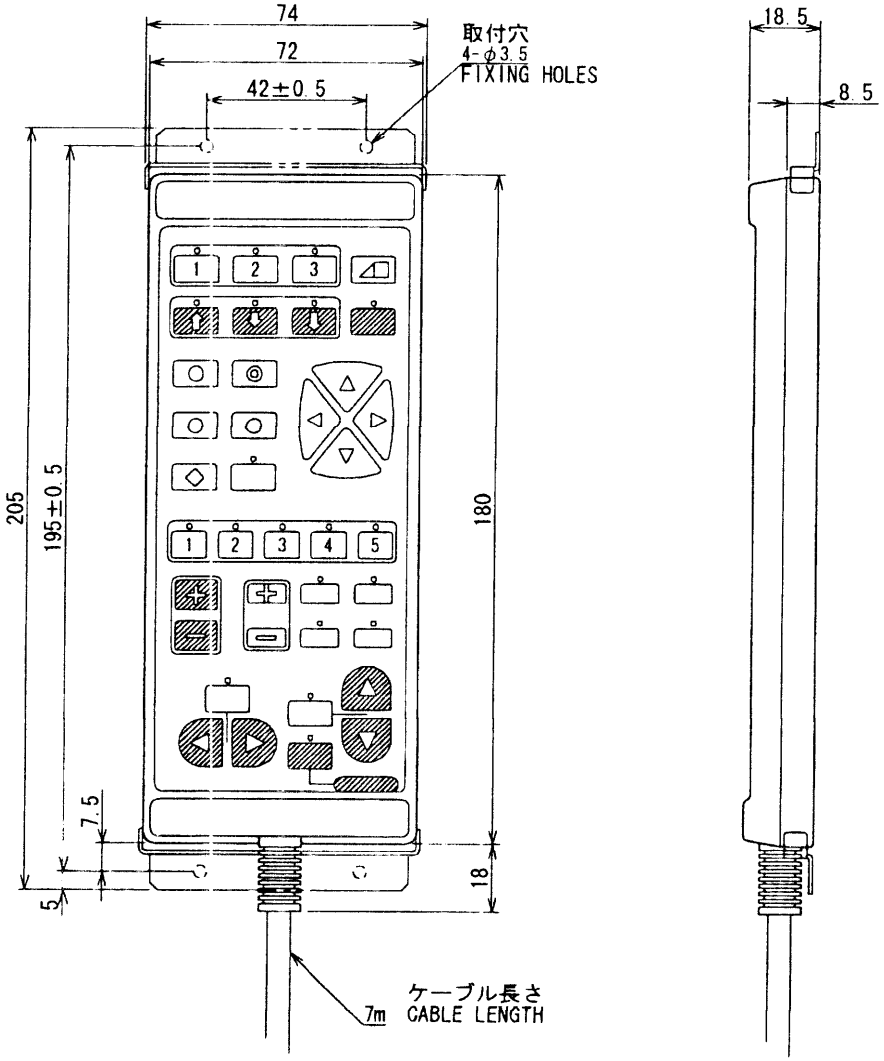
DRAWN Jan.16'98 T.Yamazaki		TITLE	CSH-2400
CHECKED Jan 19 '98 K.Kishinoki	CSH-84 CSH-24FL	名称	指示装置
APPROVED Jan 19 '98 T.Yamazaki	CSH-24F CSH-24		外寸図
SCALE 1/10 MASS 66 kg		NAME	DISPLAY UNIT
DWG. No. C1310-G01- A	10-064-1000-G2		OUTLINE DIAGRAM

FURUNO ELECTRIC CO., LTD.

D-1a

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.

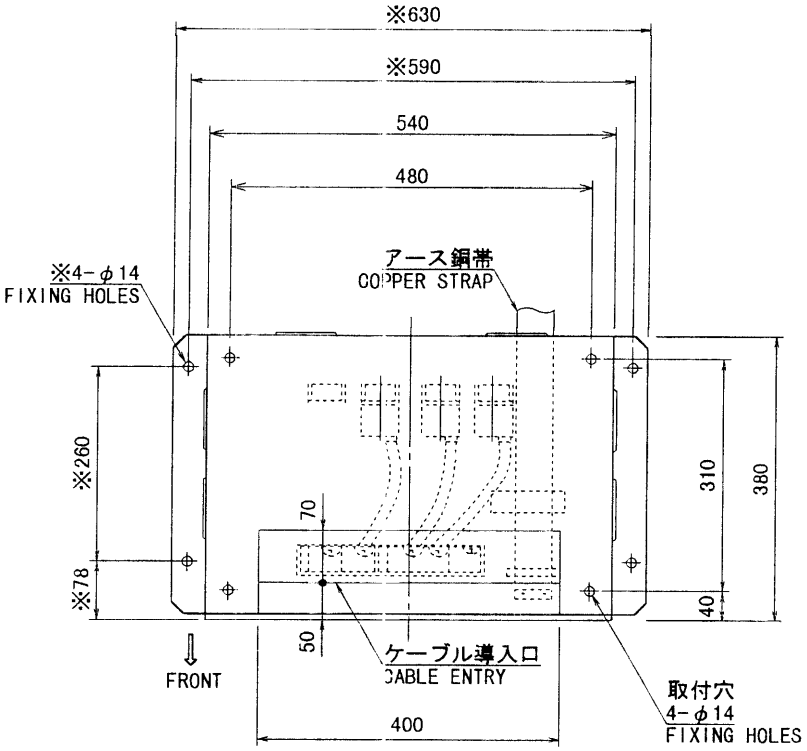
DRAWN Dec. 26 '00 T. YAMASAKI		TITLE CSH-116/135
CHECKED Dec 27 '00 T.K		名称 リモート箱
APPROVED Dec 27 '00 T.K	CSH-53/33/73/58 CSH-21/22/23/23F	外寸図
SCALE 1/2 MASS 1.5 kg ±10%		NAME REMOTE CONTROL BOX
DWG No. C1286-G02- D		OUTLINE DRAWING

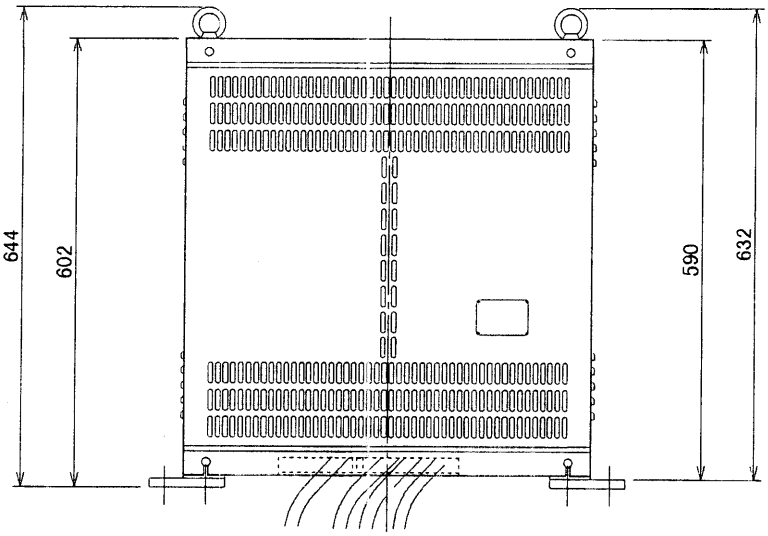
FURUNO ELECTRIC CO., LTD.

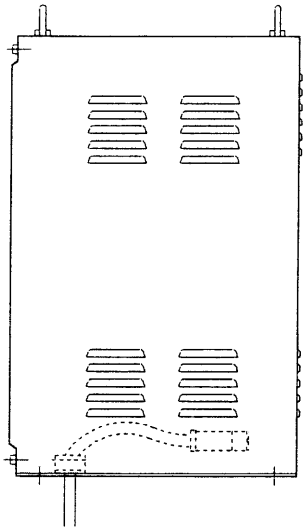
FURUNO

注記
1．※印は外足取付時の寸法（取外し可）。
2．他の機器や壁との間を前方300mm
　その他は100mm以上あけること.

NOTES
1．ASTERISK' ※' SHOWS OUTSIDE LEG
　(REMOVABLE) MOUNTING DIMENSIONS.
2．MINIMUM MAINTENANCE AND
　VENTILATION SPACE IS 300 mm
　ON FRONT SIDE AND 100 mm
　ON THE OTHER SIDES.



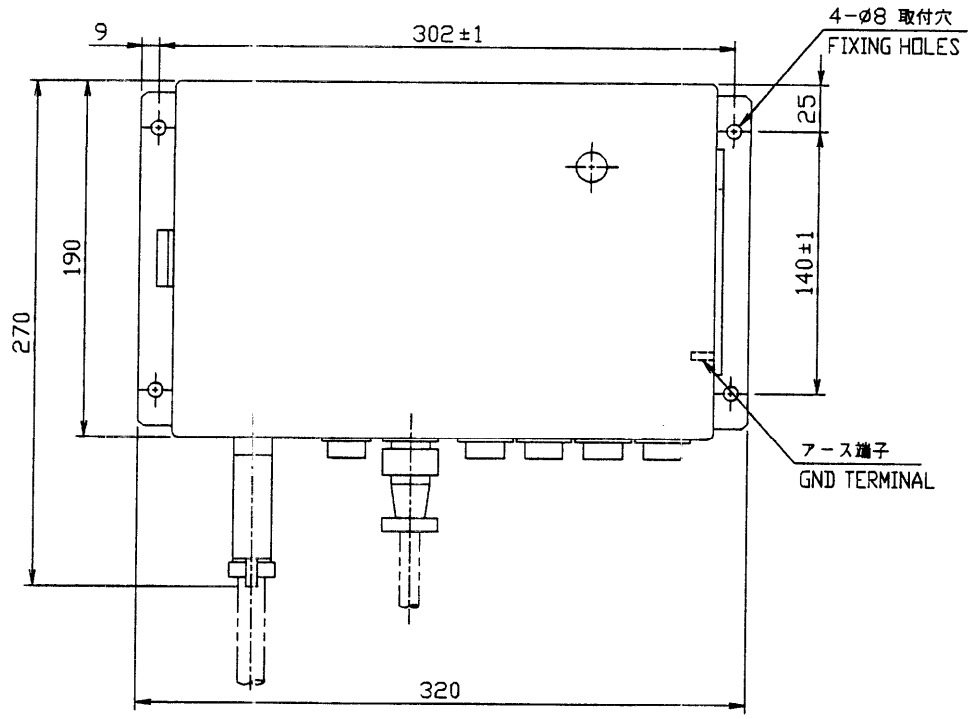




質量 MASS (kg)
CHS-310: 96
CHS-810: 82

DRAWN June 26 '00 T. YAMASAKI		TITLE	CSH-310/K, CSH-810
CHECKED June 26 '00 Y. Kimura		名称	送振装置
APPROVED June 26 '00 Y. Kimura			外寸図
SCALE 1/10 MASS kg		NAME	TRANSMITTER UNIT
DWG. No. C1257-018- F			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.



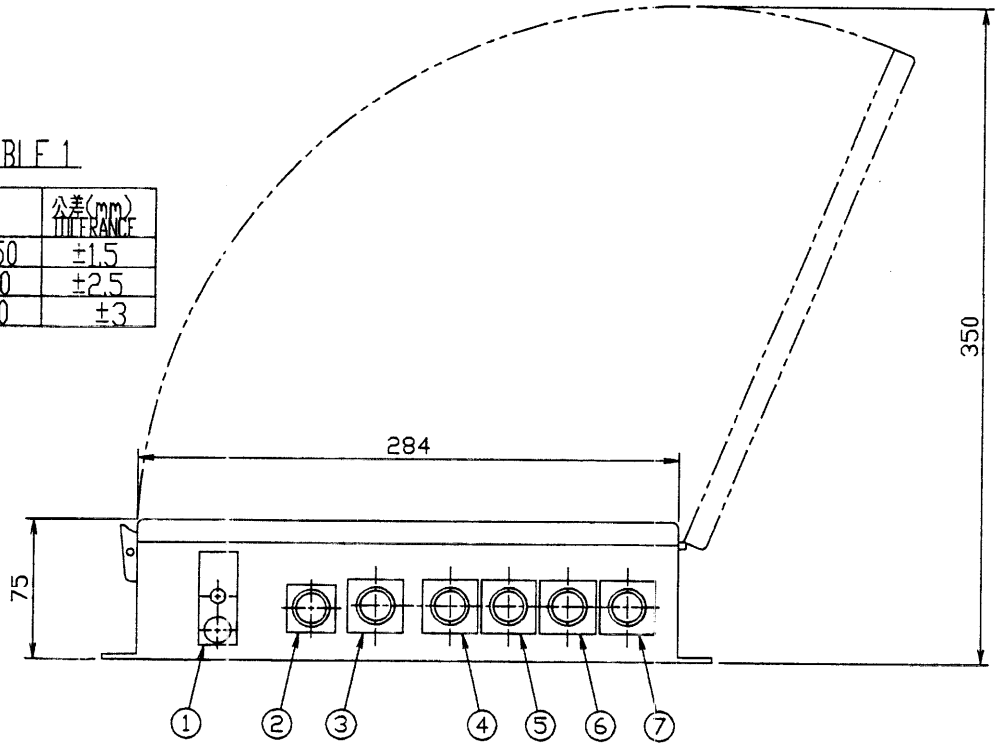


表1 TABLE 1

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

品番 ITEM	品名 NAME	数量 QTY	図番 DWG.NO
7	魚探レセプタクル RECEPTACLE FOR ECHO SOUNDER	1	
6	潮流計レセプタクル 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	ネットゾンデレセプタクル RECEPTACLE FOR NET ZONDE	1	
2	ログレセプタクル RECEPTACLE FOR SPEED LOG	1	
1	カラー魚群ディスプレイ指示器レセプタクル RECEPTACLE FOR COLOR SCANNING SONAR DISPLAY	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 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	MASS 3 ±10% kg	NAME	INTERFACE UNIT
DWG.No. C1233-005-F			OUTLINE DRAWING

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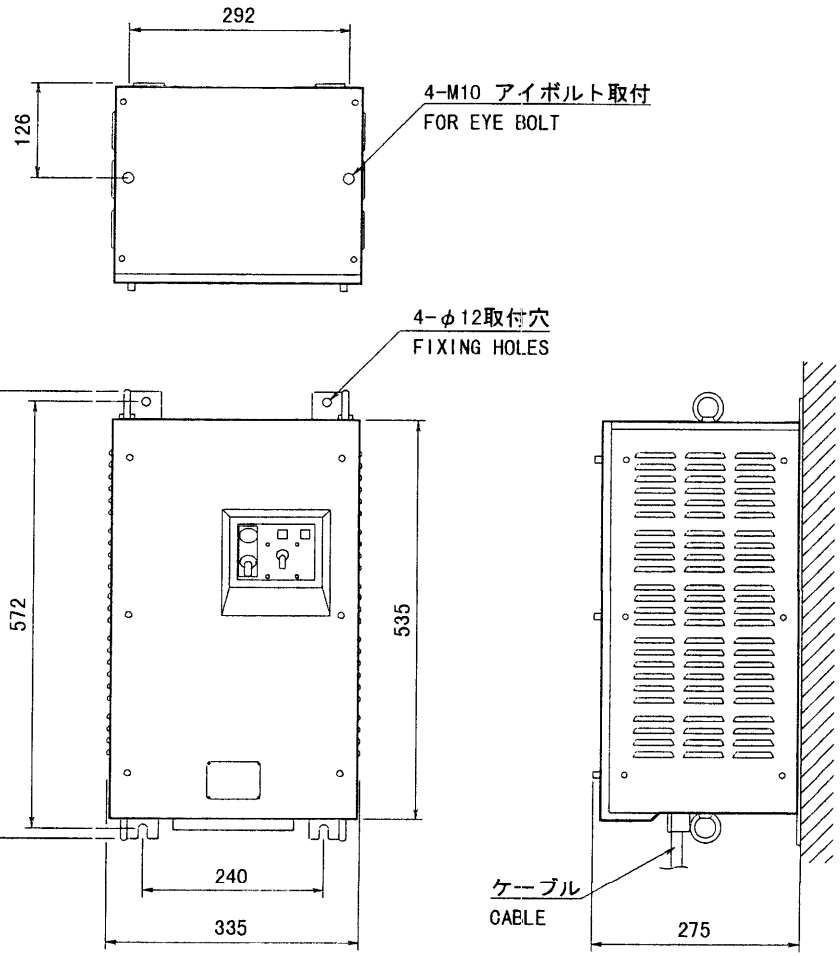

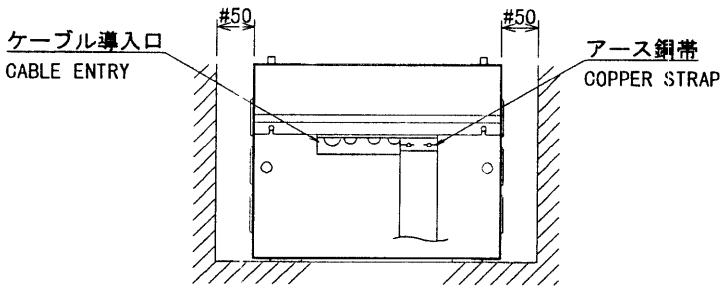

#：推奨するサービス空間寸法。
#: RECOMMENDED SERVICE CLEARANCE.

DRAWN June 26 '00 TYAMASAKI			TITLE CSH-880
CHECKED June 26 '00 Y.Kimura			名称 電源装置
APPROVED June 26 '00 Y.Kimura			外寸図
SCALE 1/10 MASS 56 kg			NAME POWER UNIT
DWG. No. C1265-011- B			OUTLINE DRAWING

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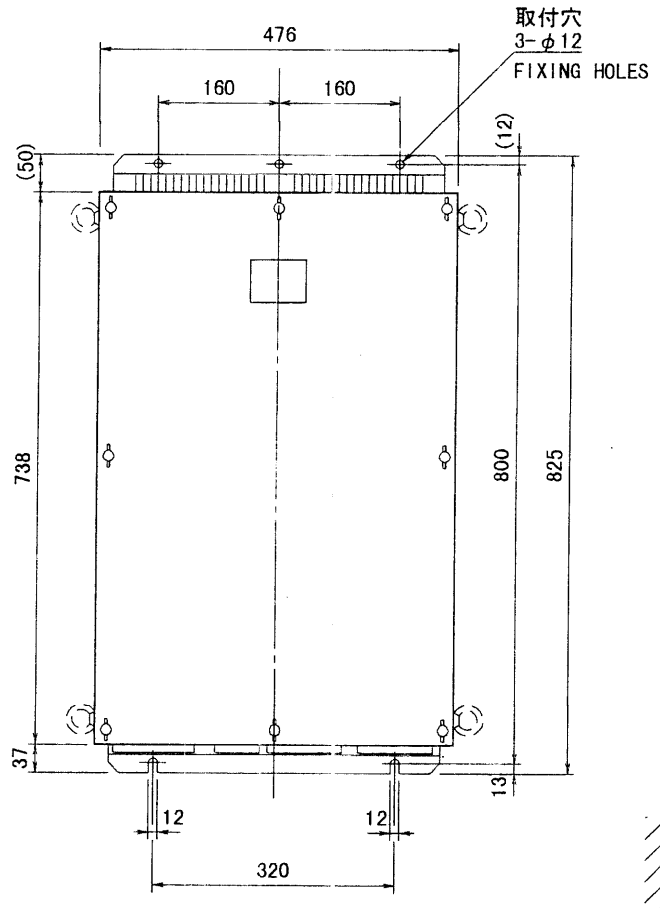

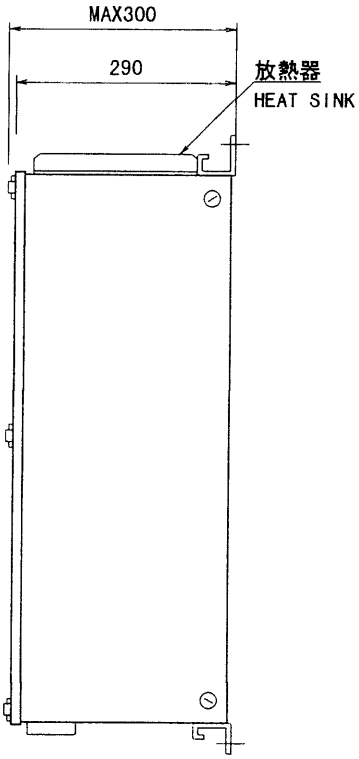

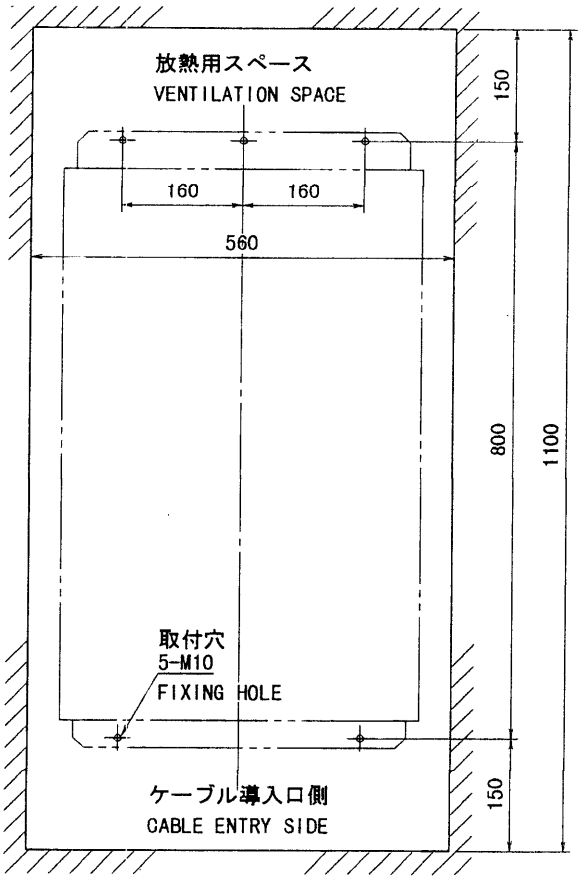

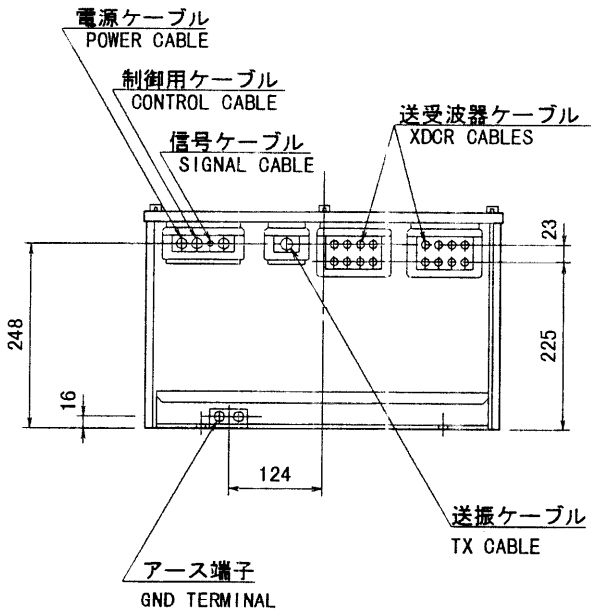

取付寸法
MOUNTING DIMENSION

DRAWN Jun 26'00 T.YAMASAKI			TITLE CSH-820
CHECKED Jun 26 '00 T.Kim			名称 受信装置
APPROVED Jun 26 '00 T.Kim			外寸図
SCALE 1/10 MASS 50 kg			NAME RECEIVER UNIT
DWG. No. C1265-010- B			OUTLINE DRAWING

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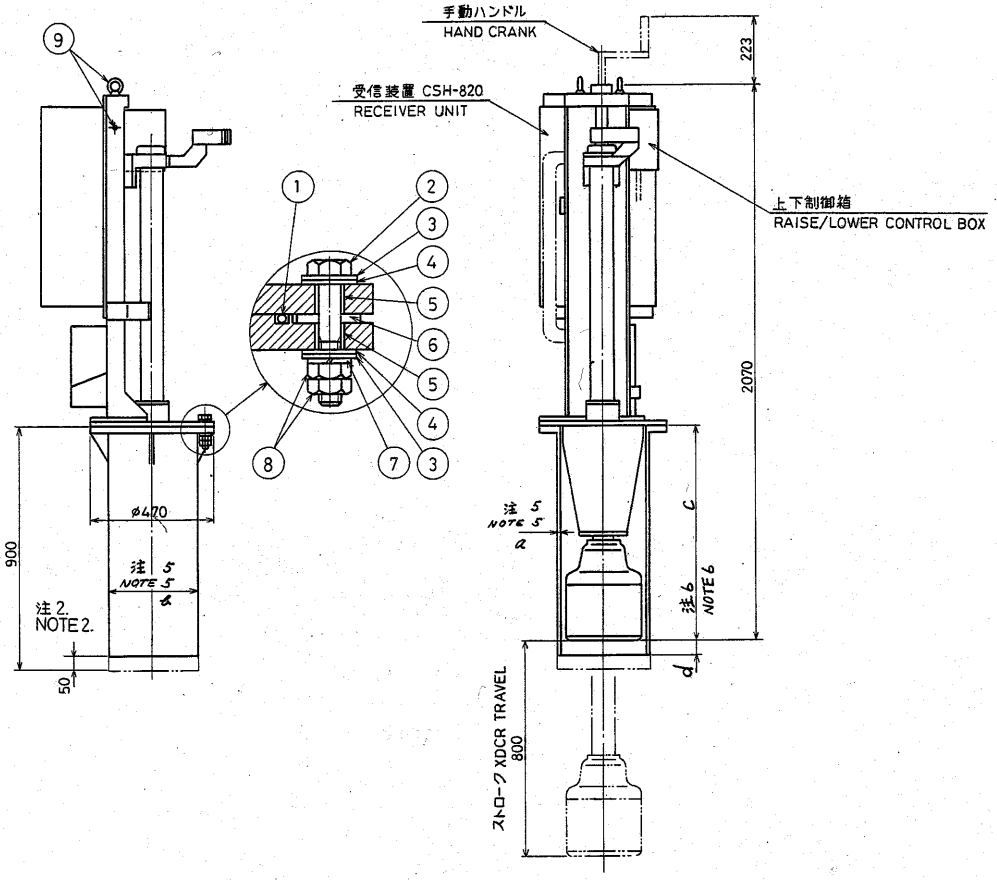
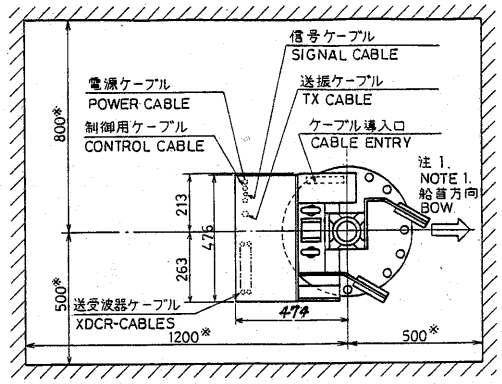
FURUNO





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 HOLE ⑨ AFTER INSTALLATION.

ITEM	NAME	MATERIAL	Q'TY	DWG.NO.	REMARKS
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	M20×120	
1	Oリング O-RING		1	JISB2401 P355	

注5 NOTE 5

タンク肉厚 THICKNESS OF TANK	a	b
9mm (オプション) OPTION	9±0.4	φ334
12mm (標準) STANDARD	12±1.0	φ340

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.

承認 APPROVED	JULY.10.'87 T.NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	上下装置外寸図
検図 CHECKED	July.10.'87 T.KODA	尺度 SCALE		CSH-8080 / CSH-81080	HULL UNIT (ストローク XDCR TRAVEL 800mm)
製図 DRAWN	July.3.'87 T.MIYOSHI	重量 WEIGHT	375 kg	図番 DWG.NO.	C1265-007-H

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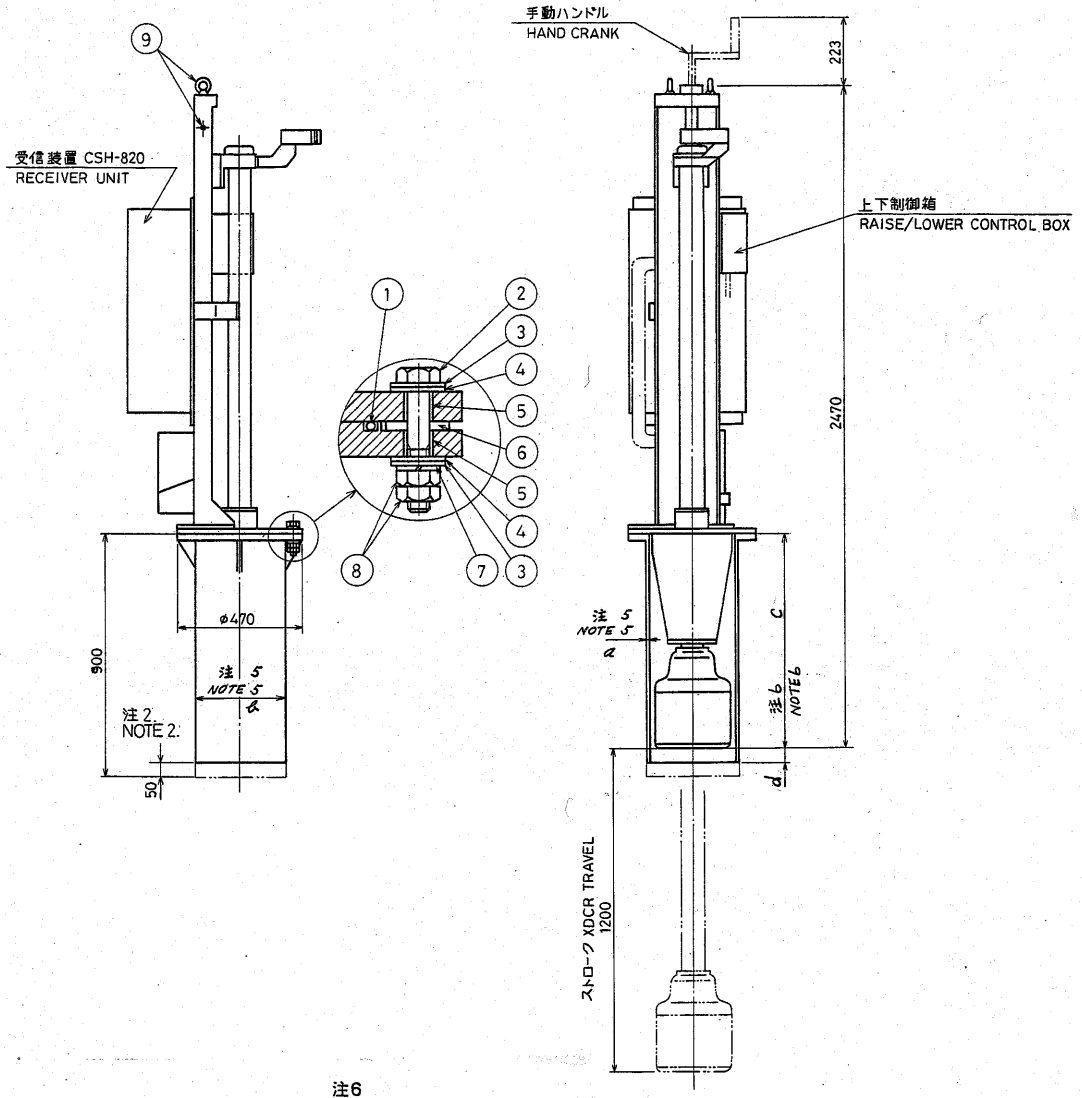

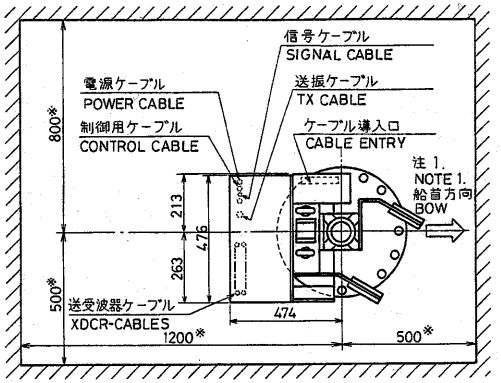

注 1. 架台フランジ上の矢印⇨を船首方向に一致させる事。これが出来ない時は、装備後、指示装置での船首線調整が必要。
2. 装備位置に応じて 50mm 以内で切断の事。
3. 保守点検のため最小限 図中※印のスペースを設ける事。
4. 装備後、アイナット及び架台上部側面穴⑨を利用して振れ止め用ステーを張る事。

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.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
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	M20×120	
1	Oリング O-RING		1	JIS B2401 P355	

注5 NOTE 5

タンク肉厚 THICKNESS OF TANK	a	b
9mm (オプション) OPTION	9±0.4	φ334
12mm (標準) STANDARD	12±1.0	φ340

注6 NOTE 6

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

重量390kgは受信装置を含まない。
Weight 390kg does not include the weight of receiver unit.

承認 APPROVED	JULY.10.'87 T.NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	上下装置外寸図
検図 CHECKED	July.10.'87 T.Kondo	尺度 SCALE			CSH-8120 HULL UNIT CSH-81120 (ストローク XDCR TRAVEL 1200mm)
製図 DRAWN	July.3.'87 T.MIYOSHI	重量 WEIGHT	390 kg	図番 DWG.NO.	C1265-008-H

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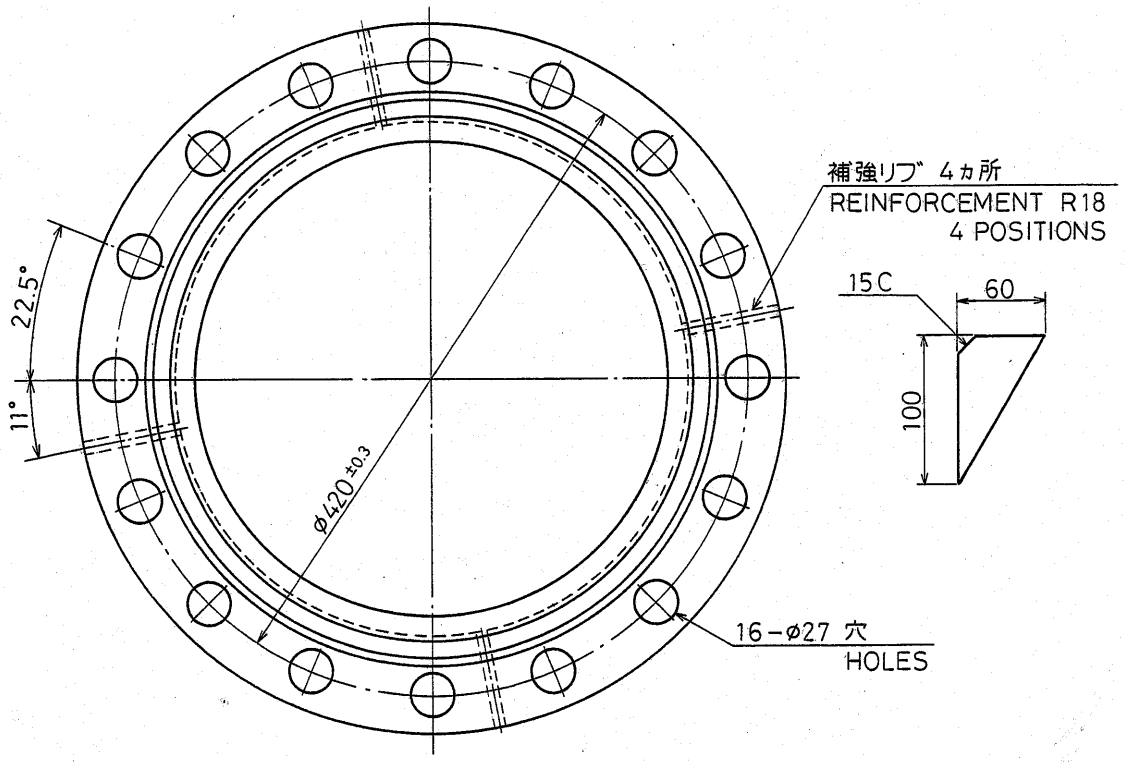

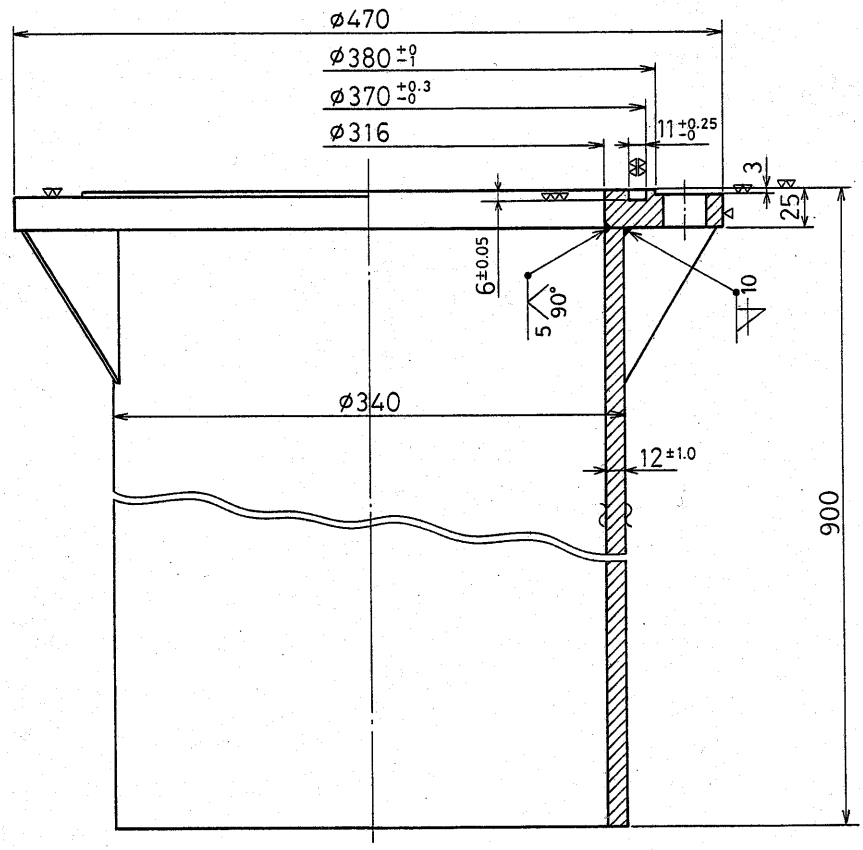

CSH-70/80/50/60	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

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. KODA	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

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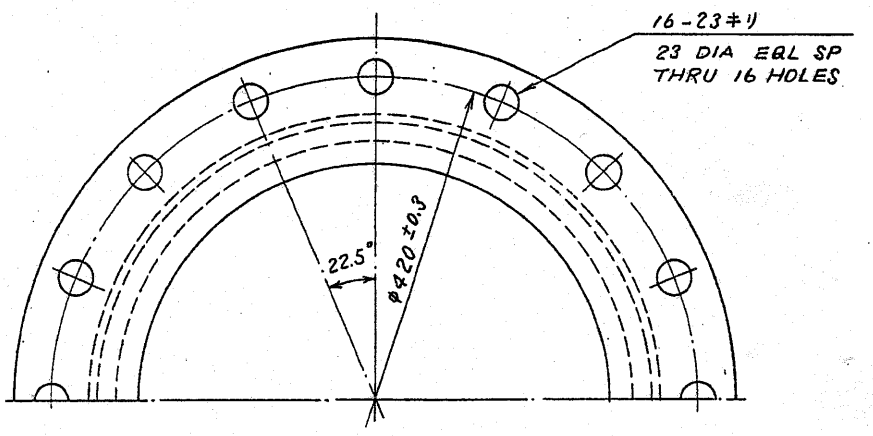

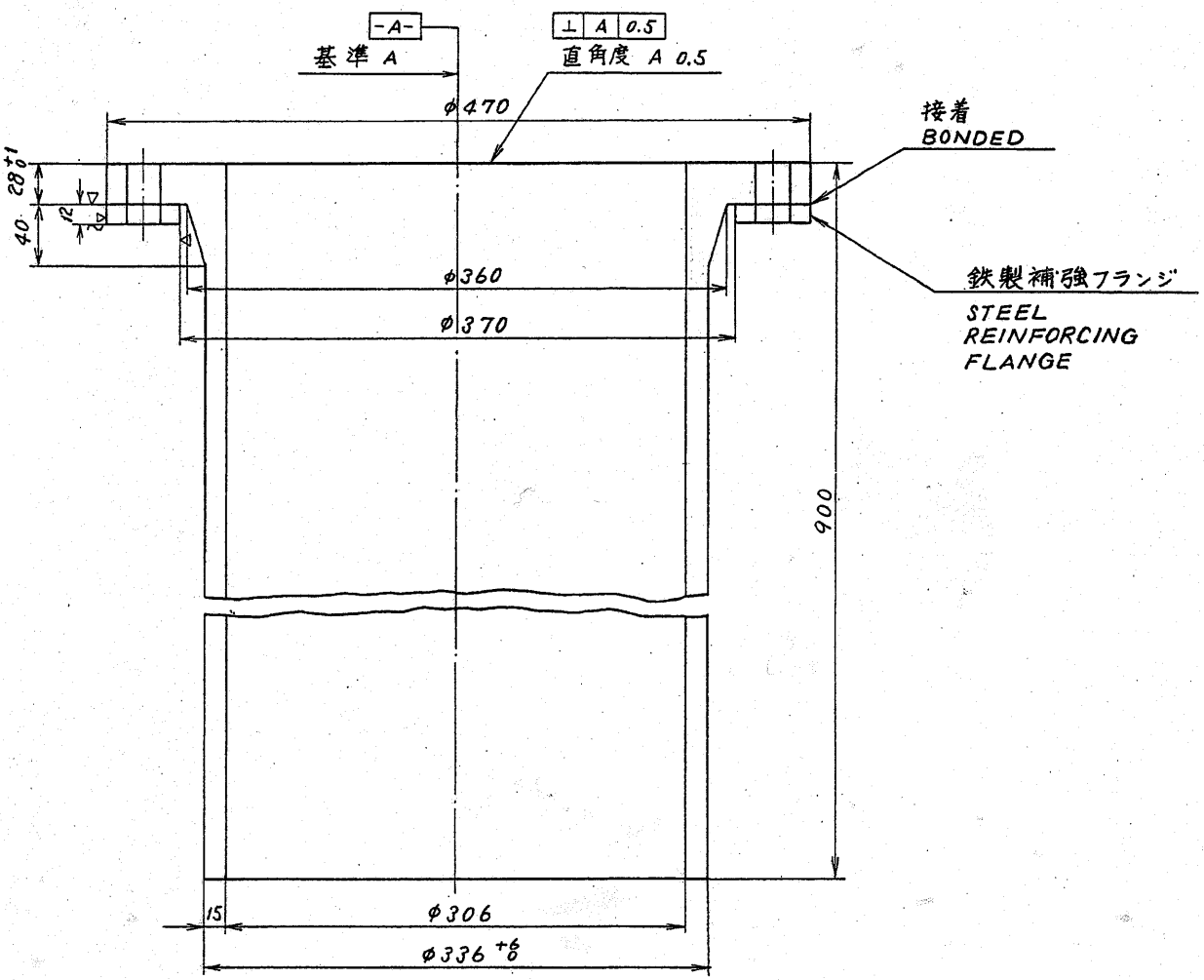

小型上下装置用
SH-754B/884B
SH-164B CSH-7080

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

承認 APPROVED	MAY. 30. '80	三角法 THIRD ANGLE PROJECTION		名称 TITLE	FRP 格納タンク外観図 FRP RETRACTION TANK
検図 CHECKED	MAY. 30. '80	尺度 SCALE	1/5		
製図 DRAWN	May. 26 '80	重量 WEIGHT	30 kg	図番 DWG.NO.	C1217-086-C

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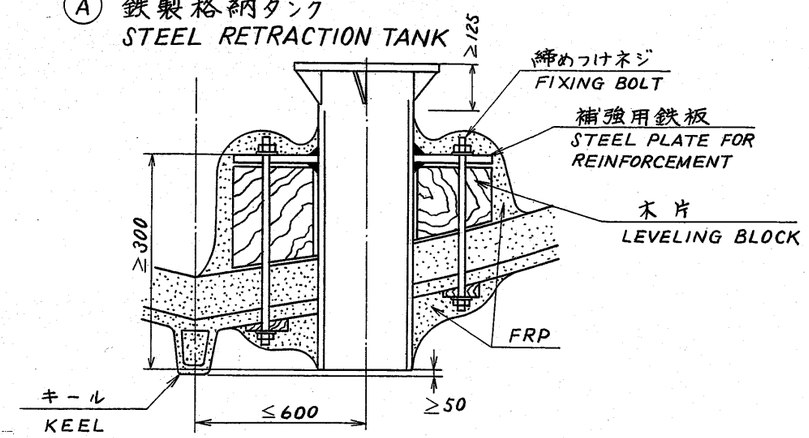
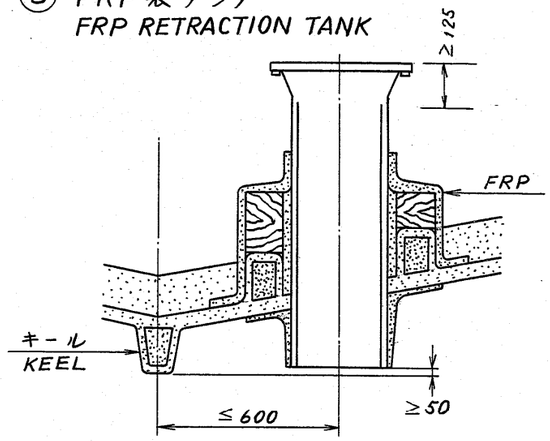
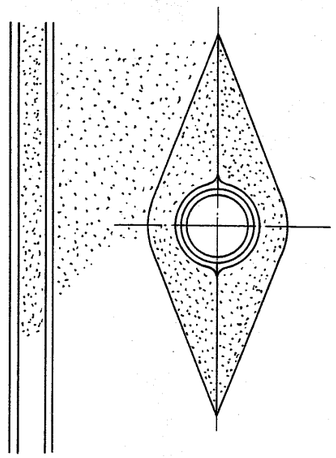
Ⓐ 鉄製格納タンク
STEEL RETRACTION TANK



Ⓑ FRP製タンク
FRP RETRACTION TANK





1. 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600mm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125mm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. Ⓐの場合、補強用鉄板は溶接、締め付けボルトは、φ12～20mmを8本以上使用の事。

3. 浸水を防ぐため充分にFRPで必要個所を塗り固める。特にタンク回りは流線型に成型し水による抵抗及び気泡発生を最少限におさえる様努めること。

4. 上下装置本体は上部で振れ止め対策を行なうこと。

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.
   2) WITHIN 600mm FROM KEEL LINE.
   3) ALLOW CLEARANCE OF MORE THAN 125mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
   4) KEEP LOWEST END OF TANK 50mm ABOVE BOTTOM OF KEEL.
   5) TANK FLANGE SHOULD BE EXACTLY HORIZONTAL WHEN SHIP IS NORMALLY TRIMMED.

2. IN INSTALLATION Ⓐ, STEEL PLATE FOR REINFORCEMENT SHOULD BE WELDED AND USE MORE THAN 8 FIXING BOLTS (φ12 - 20mm).

3. 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.

4. IT IS ADVISABLE TO PROVIDE REINFORCEMENT ANGLES BETWEEN THE HULL UNIT 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.

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 格納タンク船底装備図（FRP船） RETRACTION TANK INSTALLATION ON FRP HULL
検図 CHECKED	・ ・	尺度 SCALE 1/20	
製図 DRAWN	16/80	重量 WEIGHT kg	図番 DWG.NO. C1217-092-B

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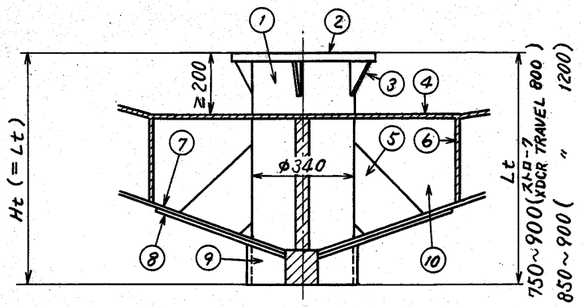
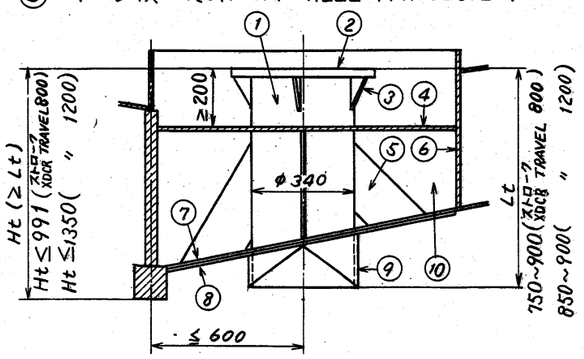
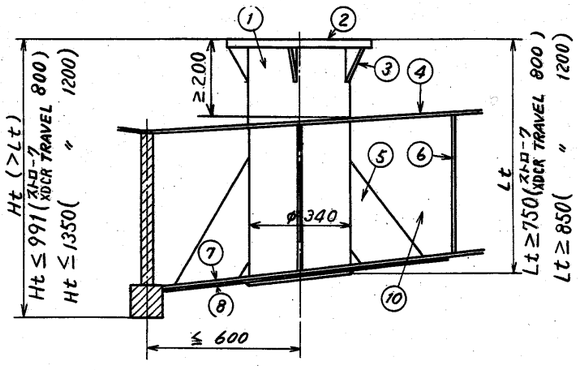
Ⓐ キール上（突出） ON KEEL (PROJECTED)



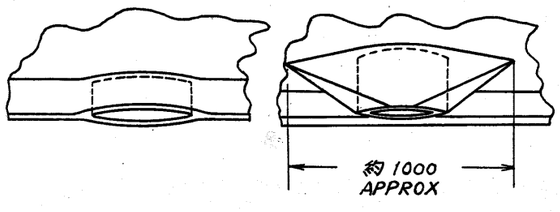
Ⓑ キール横（突出） OFF KEEL (PROJECTED)



Ⓒ キール横（非突出） OFF KEEL (NOT PROJECTED)



Ⓓ 整流覆 FAIRING PLATE



装備手順

1. 船底板及び二重船底板に φ340 の穴を明ける。
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事。
   * フランジ面のボルト穴の中心が船首方向になる事。
   * 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にタンクの長さ"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 900mm）
3. 格納タンクの周囲に外径 φ1000 以上のダブリング⑧を取り付ける。又、突出装備（Ⓐ Ⓑ）の場合には整流覆⑨（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。
4. 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⑩を設ける事。
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するのに必要なスペースとして、フランジ面の位置が2重船底板より 200 mm 以上離す。2重船底が高い船にはⒷ図の方法で2重船底板を下げ、スペースを確保すること。

INSTALLATION METHOD OF RETRACTION TANK

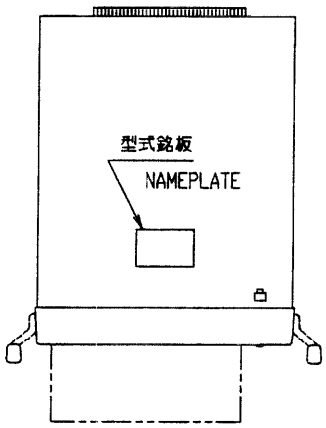
1. Cut out ∅340 hole on hull and inner hull plate.
2. Install tank to hull plate with fillet welding taking the following points into account.
   * Flange face is exactly horizontal at normal Ship's trim.
   * One of 24 bolt holes on flange is faced dead ahead.
   * Allow height of flange face from keel bottom "Ht" mentioned in the drawings, otherwise 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 900 mm long as standard.)
3. Fit doubling plate ⑧ of outer dia. ∅1000 around the tank on hull plate. Fit fairing plate ⑨ referring to the drawing Ⓓ for installation method Ⓐ and Ⓑ. Use same material and thickness of 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 pcs. of reinforcement plates between the tank and the hull plate.
6. Allow clearance of more than 200mm below the flange face for easy bolting. Sink the inner hull plate as shown in the drawing Ⓑ for high inner hull plate.

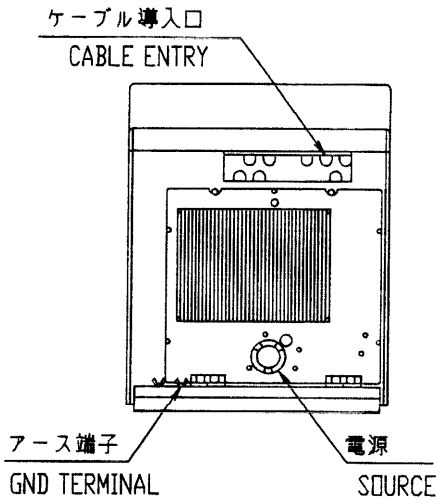
ITEM 品番	NAME 品名	MATERIAL 材質	Q'TY 数量	DWG. NO. 図番	REMARKS 摘要
10	コファダム COFFERDAM				
9	整流覆 FAIRING PLATE				
8	ダブリング DOUBLING				
7	船底板 HULL PLATE				
6	油槽隔壁 BULKHEAD				
5	補強板 REINFORCEMENT PLATE				
4	二重船底板 INNER HULL PLATE				
3	補強リブ REINFORCEMENT RIB				
2	タンクフランジ TANK FLANGE				
1	格納タンク RETRACTION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

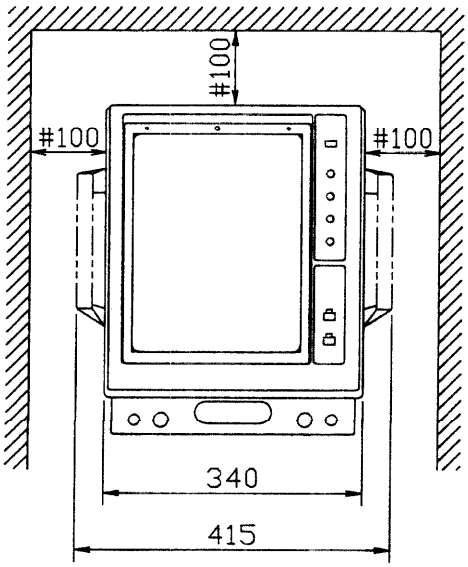
CSH-70

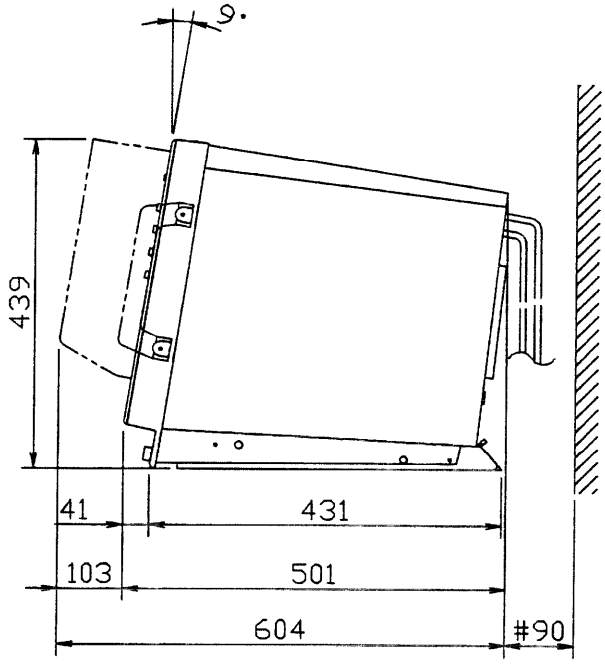
承認 APPROVED	NOV. 12, '85 K. Hashimoto	三角法 THIRD ANGLE PROJECTION	名称 TITLE	格納タンク装備要領図（鋼船） INSTALLATION METHOD OF RETRACTION TANK(STEEL HULL)
検図 CHECKED	NOV. 12, '85 D. Ccondo	尺度 SCALE /		
製図 DRAWN	12TH Nov. '85 Y. Ito	重量 WEIGHT kg	図番 DWG. NO.	C1260-008-E

FURUNO ELECTRIC CO., LTD.



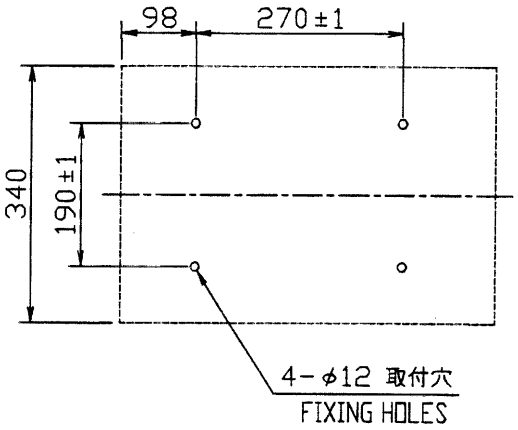






寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
0<L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3
500<L≦1000	±4

表1 TABLE 1



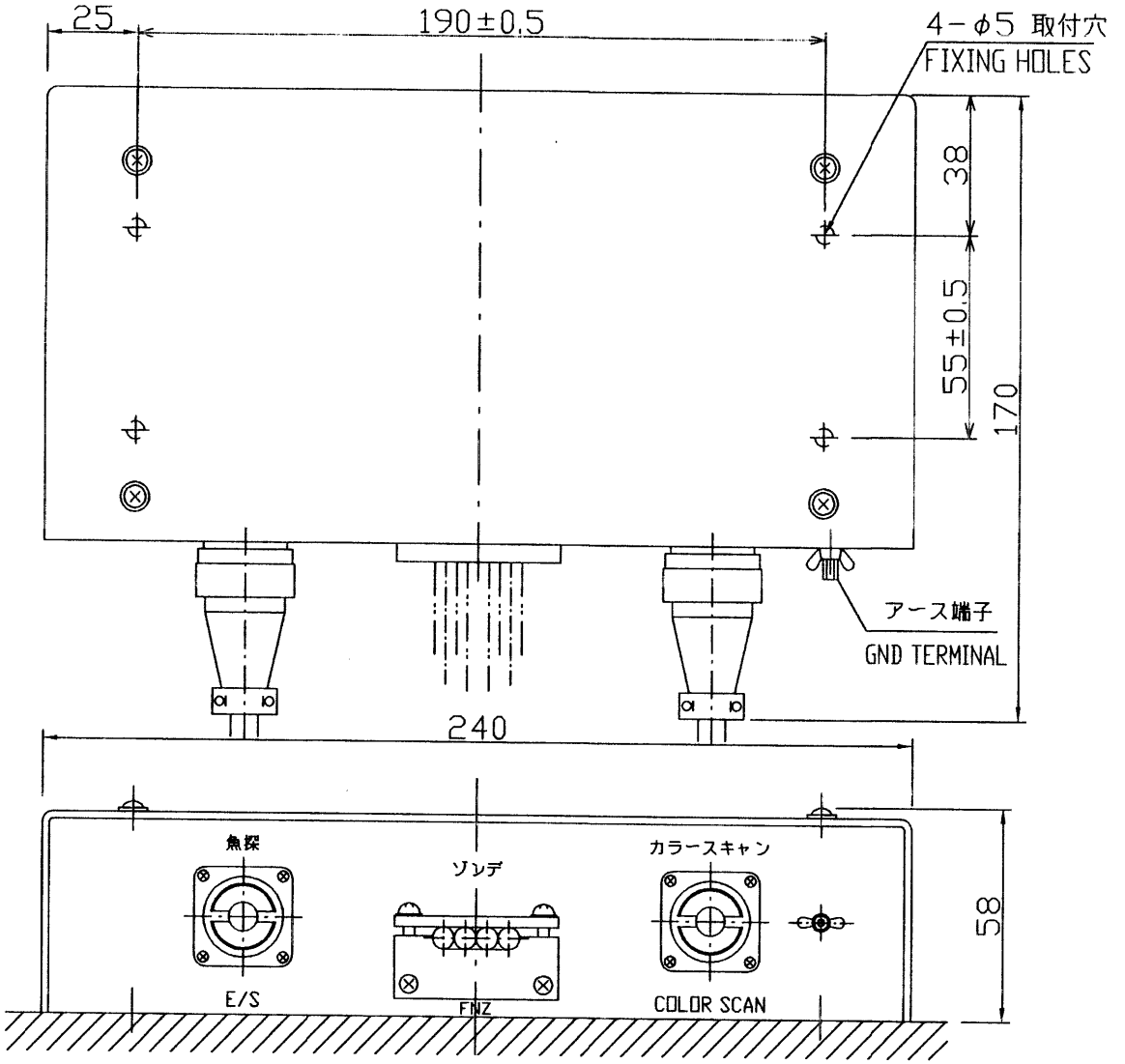
注記
1）#：推奨する最小サービス空間寸法。
2）指定なき寸法公差は表1による。

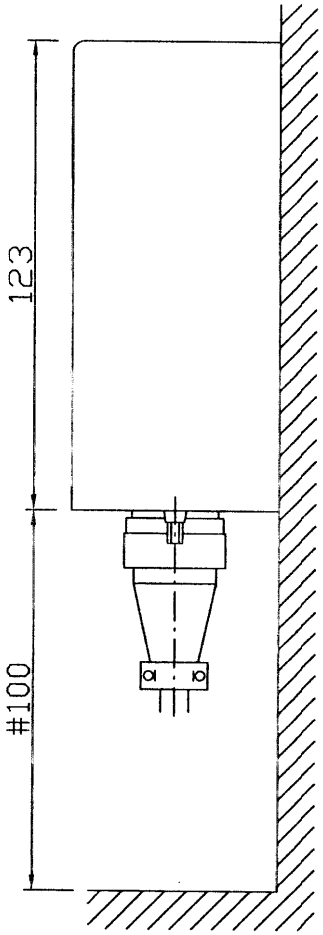
NOTE
1. #: RECOMMENDED SERVICE CLEARANCE
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN Jul. 11 '01 T.YAMASAKI			TITLE CSH-106
CHECKED July/6'01 Y.K			名称 リモートディスプレイ
APPROVED July/6'01 Y.K			外寸図
SCALE 1/10	MASS 25 ±10% kg		NAME REMOTE DISPLAY UNIT
DWG.No. C1286-G03- D			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO





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

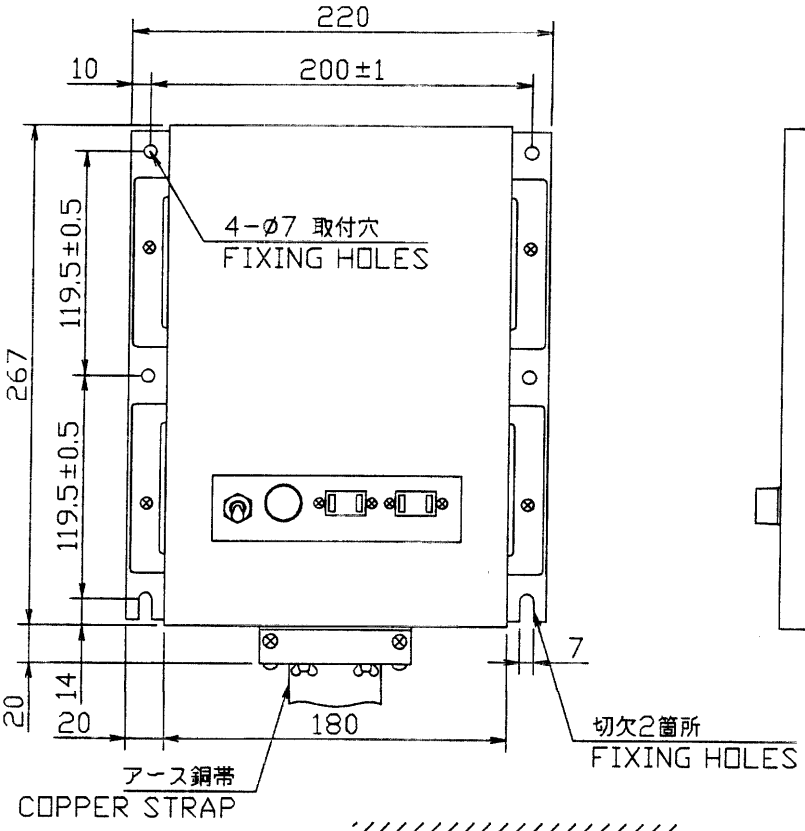
表1 TABLE 1

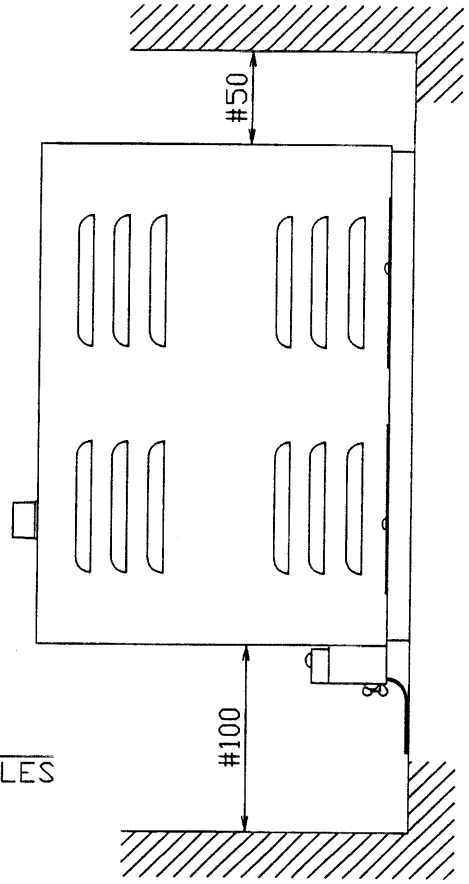
注記
1）#：推奨する最小サービス空間寸法。
2）指定なき寸法公差は表1による。

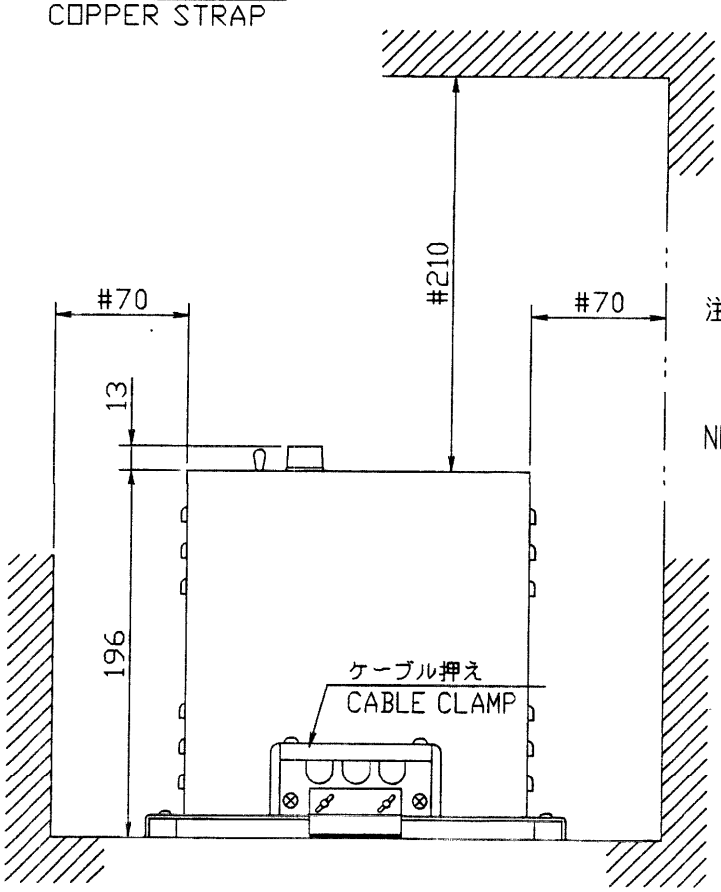
NOTE
1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN Jul. 11 '01 T. YAMASAKI		TITLE CS-170
CHECKED Jul. 16 '01 Y. K		名称 ネットゾンデ接続箱
APPROVED Jul. 16 '01 Y. K		外寸図
SCALE 1/2 MASS 2 ±10% kg		NAME NET JOINT BOX
DWG.No. C1233-007- D		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.





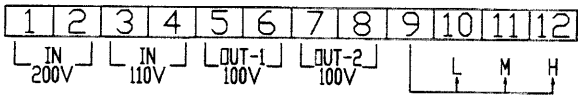


寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

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 2 INDICATES TOLERANCE OF DIMENSIONS.



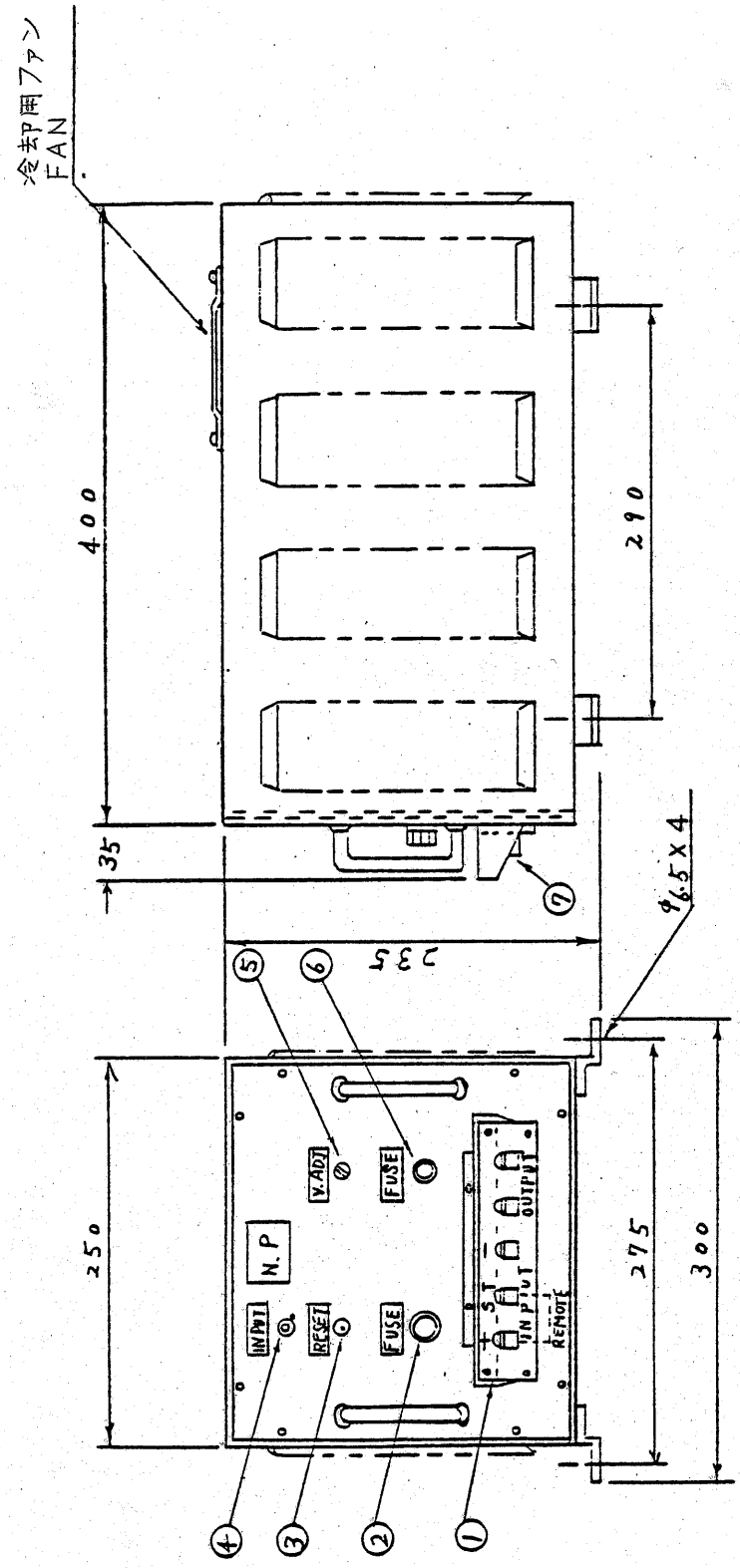
□UT-1または2の出力がAC100Vになるように、10,11または12番端子にジャンパー線をつなぐ。

CONNECT JUMPER WIRE TO 11,12 OR 13 TERMINAL SO THAT 100VAC COMES OUT AT OUT-1 OR 2 TERMINALS.

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

FURUNO

D-16



番号 No.	品名 NAME
①	入出力端子板 (5端子) TERMINAL BOARD (5P)
②	ヒューズ F1 (入力用) FUSE (FOR INPUT)
③	入力標示ランプ PILOT LAMP
④	過電圧保護回路リセットスイッチ RESET SWITCH FOR OVERVOLT PROTECTOR
⑤	出力電圧調整ボリウム OUTPUT VOLTAGE ADJUSTOR POT.
⑥	ヒューズ F2 (出力用) FUSE (FOR OUTPUT)
⑦	端子カバー TERMINAL BOARD COVER

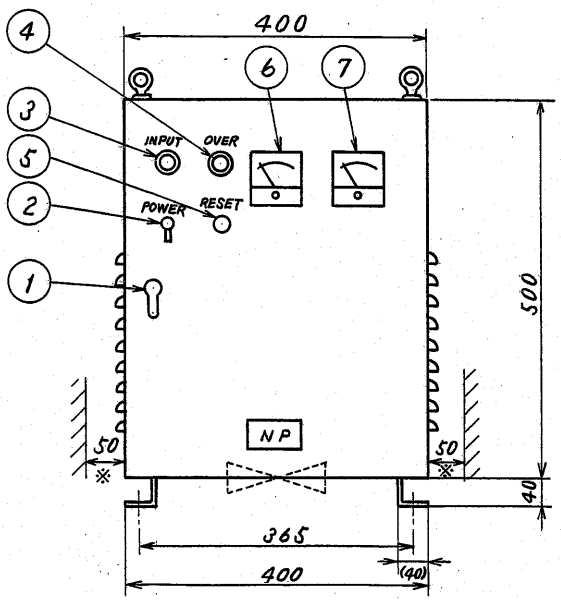
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

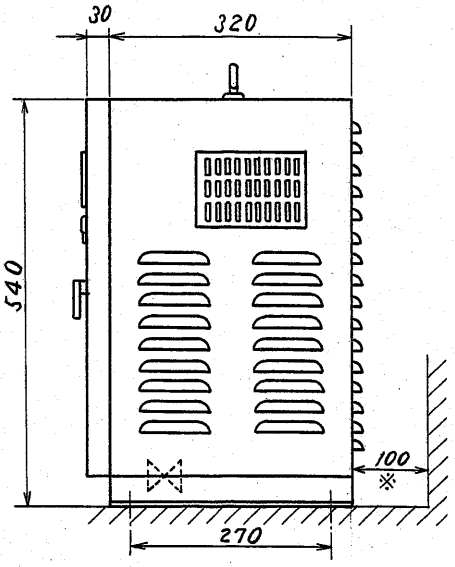
承認 APPROVED	AUG・26・'86 T. NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	トランジスターインバーター
検図 CHECKED	Aug. 26. '86 T. KODA	尺度 SCALE	1/5	TR2435 350VA	TRANSISTORIZED INVERTER
製図 DRAWN	AUG・26・'86 Tomita	重量 WEIGHT	19 kg	図番 DWG.NO.	C2007-015-C

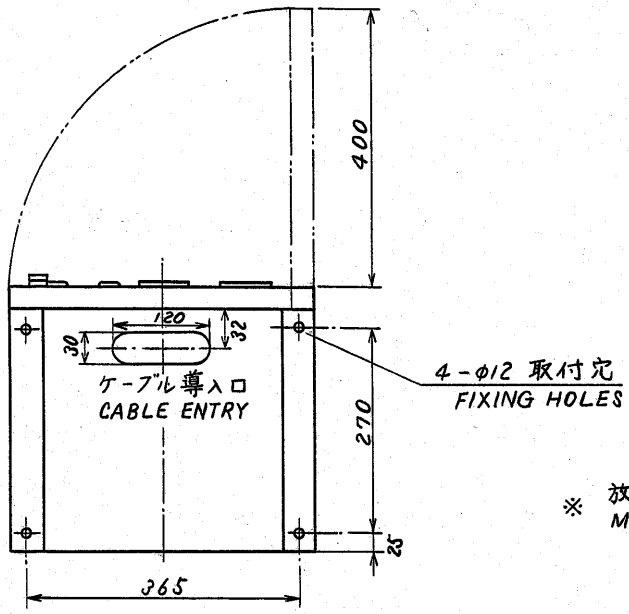
FURUNO ELECTRIC CO., LTD.

FURUNO

D-17







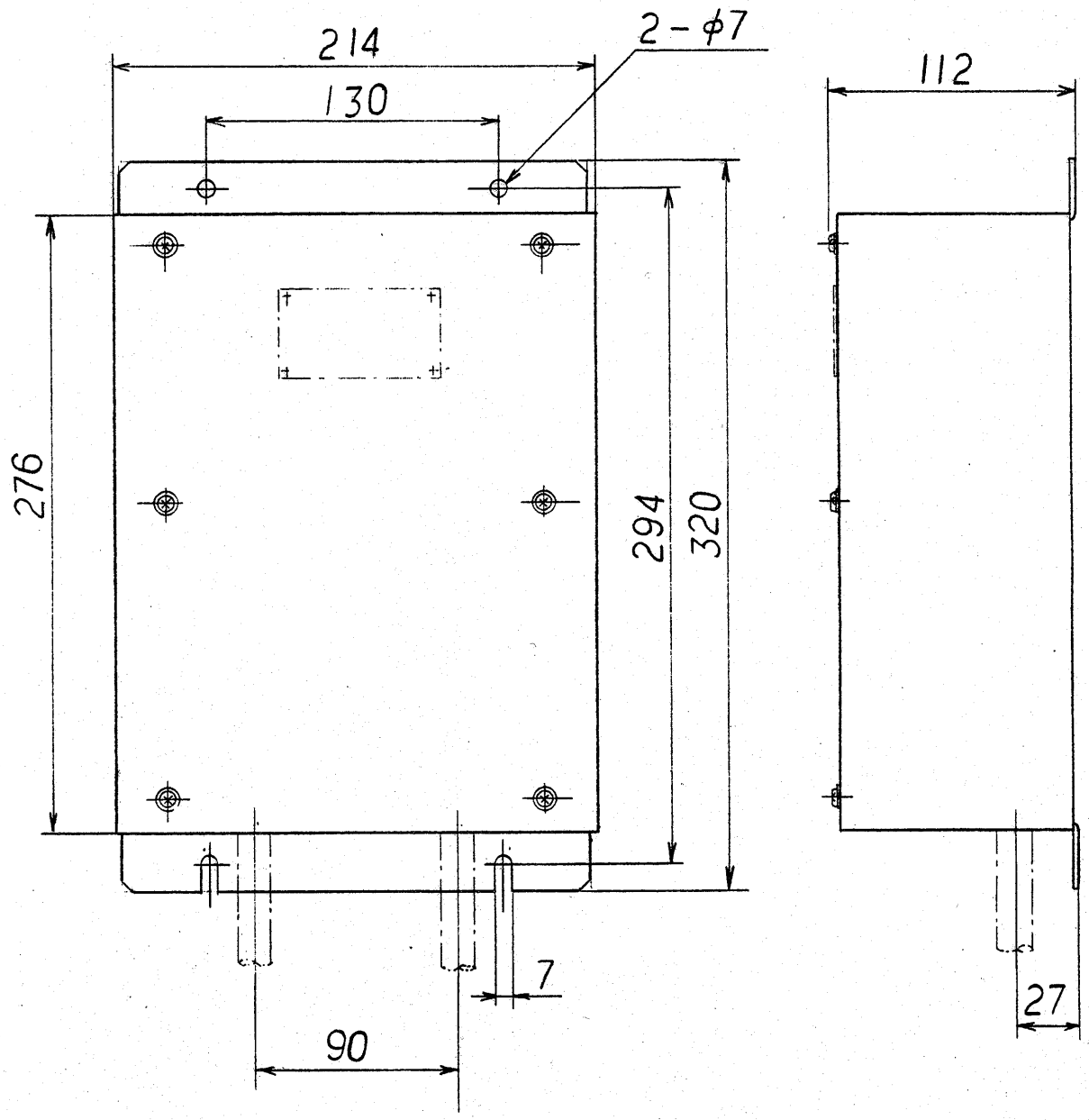
※ 放熱用最小スペース。
MINIMUM SPACE FOR VENTILATION.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
7	交流出力電流計 AC AMMETER				
6	交流出力電圧計 AC VOLTMETER				
5	復帰スイッチ RESET SWITCH				
4	過電圧表示ランプ OVER VOLT LAMP				
3	入力標示ランプ PILOT LAMP				
2	電源スイッチ POWER SWITCH				
1	取手 DOOR HANDLE				

TR32100
TR10100
TR24100

承認 APPROVED	JUL. 14. '82	三角法 THIRD ANGLE PROJECTION	名称 TITLE 1kVA トランジスターインバーター外観図 STATIC INVERTER
検図 CHECKED	June. 29. '82	尺度 SCALE 1/10	
製図 DRAWN	June. 29. '82	重量 WEIGHT 54 kg	図番 DWG.NO. C2007-005-C

FURUNO ELECTRIC CO., LTD.



CSH-80	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

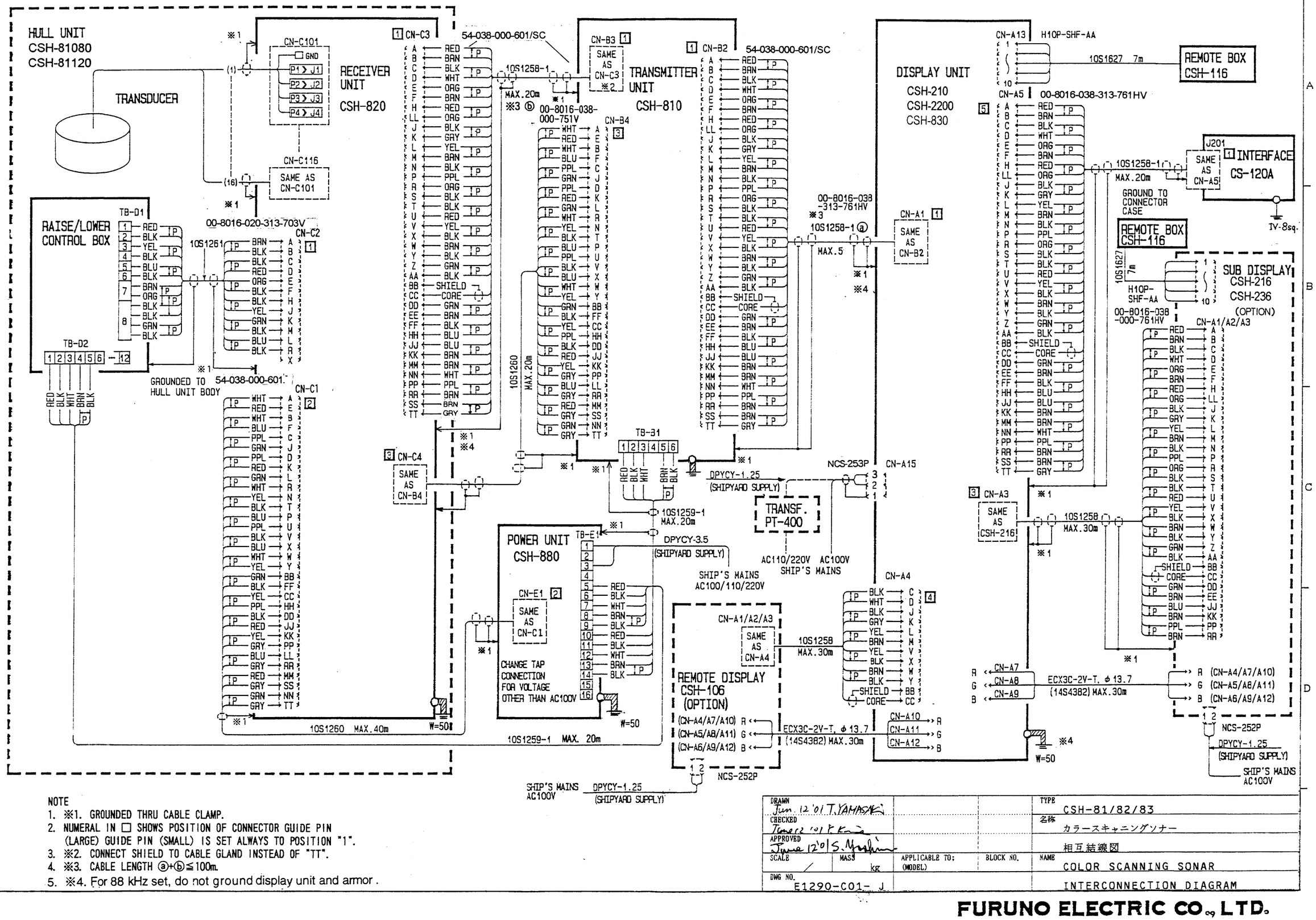
承認 APPROVED	Mar. 1.'89 S. Takijama	三角法 THIRD ANGLE PROJECTION		名称 TITLE	CSH-1400 電流制限箱 SURGE CONTROL BOX
検図 CHECKED	Mar 1.'89 T. Tomoda	尺度 SCALE	1/3		
製図 DRAWN	Mar 1.'89 K. Takano	重量 WEIGHT	3 kg	図番 DWG.NO.	C1265-G02-A

No. 001

FURUNO ELECTRIC CO., LTD.

FURUNO

S - 1



NOTE
1. ※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. ※2. CONNECT SHIELD TO CABLE GLAND INSTEAD OF "TT".
4. ※3. CABLE LENGTH ⓐ+ⓑ≦100m.
5. ※4. For 88 kHz set, do not ground display unit and armor .

DRAWN Jun. 12 '01 T.YAMASAKI			TYPE CSH-81/82/83
CHECKED Jun 12 '01 K.			名称 カラースキャニングソナー
APPROVED June 12'01 S.			相互結線図
SCALE /	MASS kg	APPLICABLE TO; (MODEL) / BLOCK NO.	NAME COLOR SCANNING SONAR
DWG NO. E1290-C01- J			INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO

S - 2

魚群探知機
ECHO SOUNDER

インターフェース
INTERFACE
VI-1100A

NH-8P
1 シロ WHT
2 アオ BLU
3 キ YEL
4 ミドリ GRN
5 モモ PNK
6 ダイ アカ ORG RED
7 クロ BLK

02S8040

VCTS-2×0.75

TB1
TB2
TB-2

ネットゾンデ NET SONDE FNZ-
同上 DITTO
同上 DITTO

J705 SRCN6A16-7P
ES SIG H 1 シロ WHT
ES SIG C 2 アオ BLU
KP 3 キ YEL
SONDE 4 ミドリ GRN
WL 5 モモ PNK
SHIELD 6 ダイ アカ ORG RED
GND 7 クロ BLK

CO-SPEVV-SB-C 0.2SQ, 5P

J701
1 アカ RED
2 キ YEL
3 ミドリ GRN
4 キ YEL
5 アオ BLU
6 キ YEL
7 シロ WHT
8 キ YEL
9 クロ BLK
10 キ YEL
*2

SRCN6A16-10P

J202
SRCN6A16-10P
1 SONDE 1 H
2 SONDE 1 C
3 SONDE 2 H
4 SONDE 2 C
5 SONDE 3 H
6 SONDE 3 C
7 KP H
8 KP C
9 WL H
2 WL C
*2

ゾンデ接続箱
FNZ JOINT BOX
CS-170

TB-1
1 シロ WHT
2 アオ BLU
3 モモ PNK
4
TB-2
3 キ YEL
6 クロ BLK

02S-8040

SRCN6A16-7P
J203
シロ WHT 1 ES SIG H
アオ BLU 2 ES SIG C
キ YEL 3 KP
4 NC
モモ PNK 5 WL
ダイ アカ ORG RED 6 SHIELD
クロ BLK 7 GND

ネットゾンデを使用しない場合
WHEN NET SONDE IS UNUSED.

魚群探知機
ECHO SOUNDER

インターフェース
INTERFACE
VI-1100A

NH-8P
1 シロ WHT
2 アオ BLU
3 キ YEL
4
5 モモ PNK
6 ダイ アカ ORG RED
7 クロ BLK

指示装置へ
TO DISPLAY UNIT

J201
A
TT

外部インターフェース
INTERFACE UNIT
CS-120A

CIF

J204 SRCN6A16-10P
TD-H 1
TD-C 2
RD-H 3 ミドリ GRN
RD-C 4 キ YEL
DTR-H 5
DTR-C 6
DSR-H 7
DSR-C 8
NC 9
GND 10 ヨビセン SPARE WIRE
*2

CO-SPEVV-SB-C 0.2SQ, 5P

J102
ミドリ GRN 1
キ YEL 2
3
4
10

潮流計
CURRENT INDICATOR
CI-610

CO-SPEVV-SB-C 0.2SQ, 5P

FNZ

CI

J207 SRCN6A16-10P
TD-H 1 アカ RED
TD-C 2 キ YEL
RD-H 3 ミドリ GRN
RD-C 4 キ YEL
DTR-H 5 アオ BLU
DTR-C 6 キ YEL
DSR-H 7 シロ WHT
DSR-C 8 キ YEL
NC 9
GND 10 クロ BLK
キ YEL
*2

DA-15P
ミドリ GRN 1
キ YEL 2
アカ RED 3
キ YEL 4
シロ WHT 5
キ YEL 6
アオ BLU 7
キ YEL 8
キ YEL 9
クロ BLK 15
*1

CIF SIG OUT (CI-30/50)
DATA OUT (CI-20)

潮流計
CURRENT INDICATOR
CI-20/30/50

GYRO

J205 SRCN6A16-10P
GYRO-DATA-H 1 アカ RED
GYRO-DATA-C 2 キ YEL
GYRO-CLK-H 3 ミドリ GRN
GYRO-CLK-C 4 キ YEL
GND 10 ヨビセン SPARE WIRE
*2

CO-SPEVV-SB-C 0.2SQ, 5P

E/S

J7-J12
アカ RED 1
キ YEL 2
ミドリ GRN 3
キ YEL 4
ヨビセン SPARE WIRE 5

AD コンバータ
AD CONV.
AD-100

潮流計 CURRENT INDICATOR
スピードログ SPEED LOG

LOG

J206 RM15TP-2P
LOG-H 1 シロ WHT
LOG-C 2 クロ BLK

250V DPYC-1.25

造船所支給
SHIPYARD SUPPLY

J206
シロ WHT 3
クロ BLK 4

CI-310

TB2
シロ WHT 11 (13)
クロ BLK 12 (14)

CI-610

TB3
シロ WHT 1
クロ BLK 2

DS-700

RADAR
シロ WHT
クロ BLK

ML-20/21

GPIF
ミドリ GRN 1
キ YEL 2
10

GPS
GP-300

DATA OUT

GPS
GP-500

GPIF
ミドリ GRN 1
キ YEL 2
3
4
5
6
7
8
9
10

ロラン
LORAN

LC-3000
LA-3000
LAC-3000
LC-70/55
LC85*
LC-90/88*
LC-880/90 MK2*

* NOTE : LC-90/88/85の場合ジャンパは
接続しなくてよい。
FOR LC-90/88/85
JUMPER WIRES ARE NOT NECESSARY.

J2
* (CIF-B 又は OR C)
1
2
3
4
5
6
7
8

ハイブリット
インターフェース/NNSS
HYBRID INTERFACE
SATNAV etc
IF-5000/2000/7000

*FSN-70
FP-70 (IF-5001)

DATA IN/OUT
ミドリ GRN 1 GPSプロッタ
キ YEL 2 ロランCプロッタ
13 GPS PLOTTER
14 LORAN C PLOTTER
15 GP-1500, LP-1000/1200/1250/1300

OUTPUT 1
OUTPUT 5

分配器
MULTI-DISTRIBUTOR
MD-500
ミドリ GRN 1
キ YEL 2
10
*2

*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.Kusunoki			名称 外部インターフェイス
APPROVED Nov 22'99 K.Kusunoki			相互結線図
SCALE / MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME INTEFACE UNIT
DWG NO. C1238-003- K			INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO

S - 3

CSH-236 FOR CSH-23/23K/73/83
CSH-236F FOR CSH-23F/23FL

副指示器CSH-236はCSH23/23K/73/83用、
CSH-236FはCSH-23F用とする。

★: OPTION オプション
▨: PATTERN ONLY パターンのみ (コネクタ実装なし)

SUB DISPLAY 副指示器
CSH-236/236F

REMOTE CONTROL
リモート箱
CSH-116

REMOTE DISPLAY
リモートディスプレイ
CSH-106

SPEAKER
スピーカ
EAS-10P133S

CRT (モニタ)
QA1507
10S1916-0

※2, ※3

MODEL	CSH-23/23F/23K/23FL/83	CSH-73
P PND	10P6714	10P6714 A
P MPNL	10P6715	10P6720

CONE 10P6711

パワーサプライ QSR-M0601A POWER SUPPLY

FAN ファンモータ 109-210

(組)パネル Ⓐ PANEL

PIF 10P6713

CARD 10P6718 MEMORY CARD

PND 10P6714 ※2

MPNL 10P6715 操作パネル 1 ※3

LED 10P6721

DSW 10P6722 F

SPNL 10P6716

トラックボール SUA-FTF814 9357678

PANEL 2 操作パネル 2

VR 10P6719 A

SW 10P6717 操作パネル 3

(組)電源 Ⓐ POWER

POW 10P6712

DCON 10P6701

DMB 10P6710

DRAW 10P6702

DUAL 10P6703

SCAN 10P6704

Heat Sync 10S1624

Heat Sync 10S1625

Ship's Main
AC100V 1φ 50/60Hz
DPYCY-1.25
NCS-253-P
NCS-253-R
CN-A15 ヒューズ
F1 FH-001 10A
NF1 ZHC2203-11 ノイズフィルタ

DRAWN Jun. 12 '01 T.YAMASAKI				TYPE CSH-230/K/F, CSH-731/830
CHECKED June 12 '01 Y.K	CSH-73/83 CSH-23FL CSH-23K/F CSH-23			名称 指示装置(総合)
APPROVED June 12 '01				回路図
SCALE /	MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME DISPLAY UNIT(GENERAL)
DWG NO. C1304-K01- C		10-065-0013- 5		SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO

S - 3a

★印はオプション
斜線印のコネクタは
非実装とする
★: OPTION
▨: PATTERN ONLY

21inch CRT (モニタ)
CDMC-21CH311

SM-R2P SM-P2P
スピーカ
EAS-10P133S
SPEAKER
10S1258 "MAX50m"
10S1258 "MAX20m"
TRANSCEIVER 1 送受信装置-1
EXT. INTERFACE 外部インターフェース CS-120A
TRANSCEIVER 2 送受信装置-2
予備 AUX.
10S1627 "7m"
REMOTE BOX リモート箱 CSH-116

XH-5P J25
Ⓟ CONE 10P6711
VII-9P J26
J24 Extend DHD-100P
SONAR-1 CN-A1
SONAR-2 CN-A2
AUX-2 CN-A4
CN-A5
AUX-1 CN-A6
Remote Box CN-A13 CN-A14
for PC J25 D-SUB-25P
SUB-Display CN-A3
CN-A7 CN-A10 CN-A8 CN-A11 CN-A9 CN-A12
XII-4P J22
Dsub-9P J21
XH-10P J19
VH-9P J18
DHD-50P J20
DHD-80P J15
XH-20P J16
XH-15P J17

V/DG
NII-10P
NII-6P
CRT
FBT
POWER BOARD 電源基板
MAIN BOARD メイン基板

FAN ファンモータ 109-210109-210
SM-R2P SM-R2P SM-P2P SM-P2P

10S1654
10S1653

組パネル
Ⓐ PANEL
VH-6P J1
DHD-50P J2
Ⓟ PIF 10P6713
DHB-68P J5
DHB-68P J5
Ⓟ CARD 10P6718
MEMORY CARD J2
J1
J4 XH-20P
J6 XH-15P
J3 DHD-80P
10S1630
DHD-80P J1
Ⓟ PND Ⓑ 10P6714
J2 XH-10P
J4 XH-11P J7 XH-7P J3 XH-8P J5 DHB-100P
DHB-100P
Ⓟ MPNL Ⓐ 10P6731 操作パネル 1
PANEL J1
XII-9P
XH-9P
Ⓟ TSW J1 10P6733
Ⓟ LED 10P6721
XH-15P J1 Ⓟ DSW 10P6722 Ⓕ
XH-11P J1 XH-7P J2 Ⓟ SPNL 10P6716
NH-6P J1 トラックボール
PANEL 2 操作パネル 2
XH-10P J1 Ⓟ VR J2 Ⓐ 10P6719
XII-11P
XH-20P 操作パネル 3
J1 PANEL 3 J2
Ⓟ SW 10P6732
XII-2P

XII-20P J17
DHD-80P J16
XII-15P J18
VH-10P J19

Ⓟ DMB 10P6710
J1 J2 J3 J4 J5 J6 J7 J8 J9 J10 J11 J12 J13 J14 J15

P1 Ⓟ DCON 10P6701 P2 P3
P1 Ⓟ DRAW 10P6702 P2 P3 J1 Dsub-25P For Debug PC
P1 Ⓟ DUAL 10P6703 P2 P3
P1 Ⓟ SCAN 10P6704 P2 P3

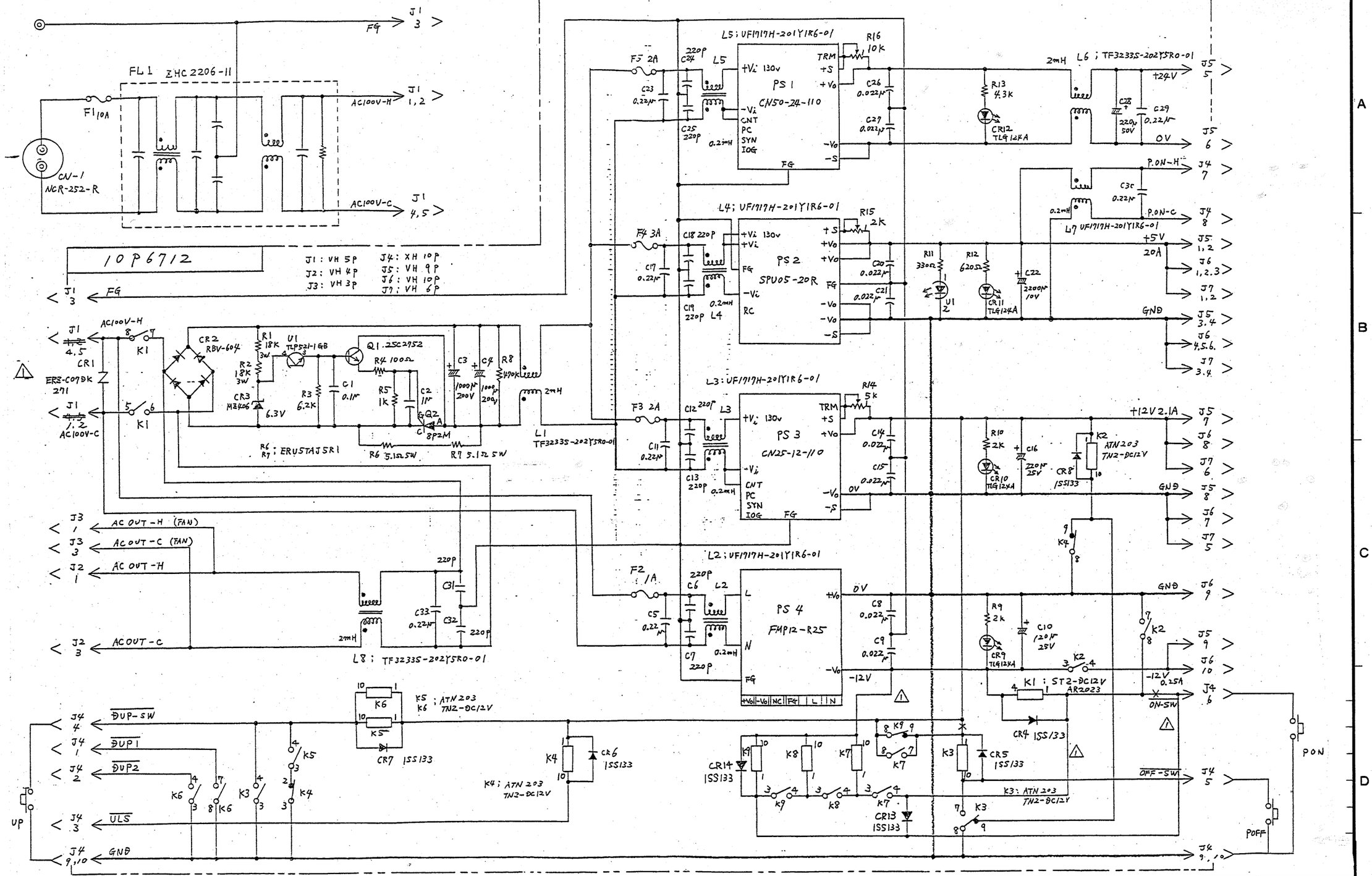
組電源
Ⓟ POW 10P6712
VII-4P J2
VII-3P J3
VII-9P J5
VII-6P J7
VII-10P J6
XII-10P J4
Heat Sync 10S1624
Heat Sync 10S1625
J1 VH-5P

Ship's Main
AC100V 1φ 50/60Hz
DPYCY-1.25
NCS-253-P
CN-A15 ヒューズ
NCS-253-R
F1 FH-001 10A FUSE
NF1 ZHC2203-11 NOISE FILTER
ノイズフィルタ

DRAWN Apr.8'98 T.YAMASAKI			TYPE CSH-2400/F/FL, CSH-8400
CHECKED Apr.8'98 K.Kusunoki	CSH-84 CSH-24FL CSH-24F CSH-24		名称 指示装置
APPROVED Apr.8'98 K.Kusunoki			回路図
SCALE / MASS kg	APPLICABLE TO: (MODEL)	BLOCK NO.	NAME DISPLAY UNIT
DWG NO. C1310-K01- B	10-064-0001- 2		SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.

済

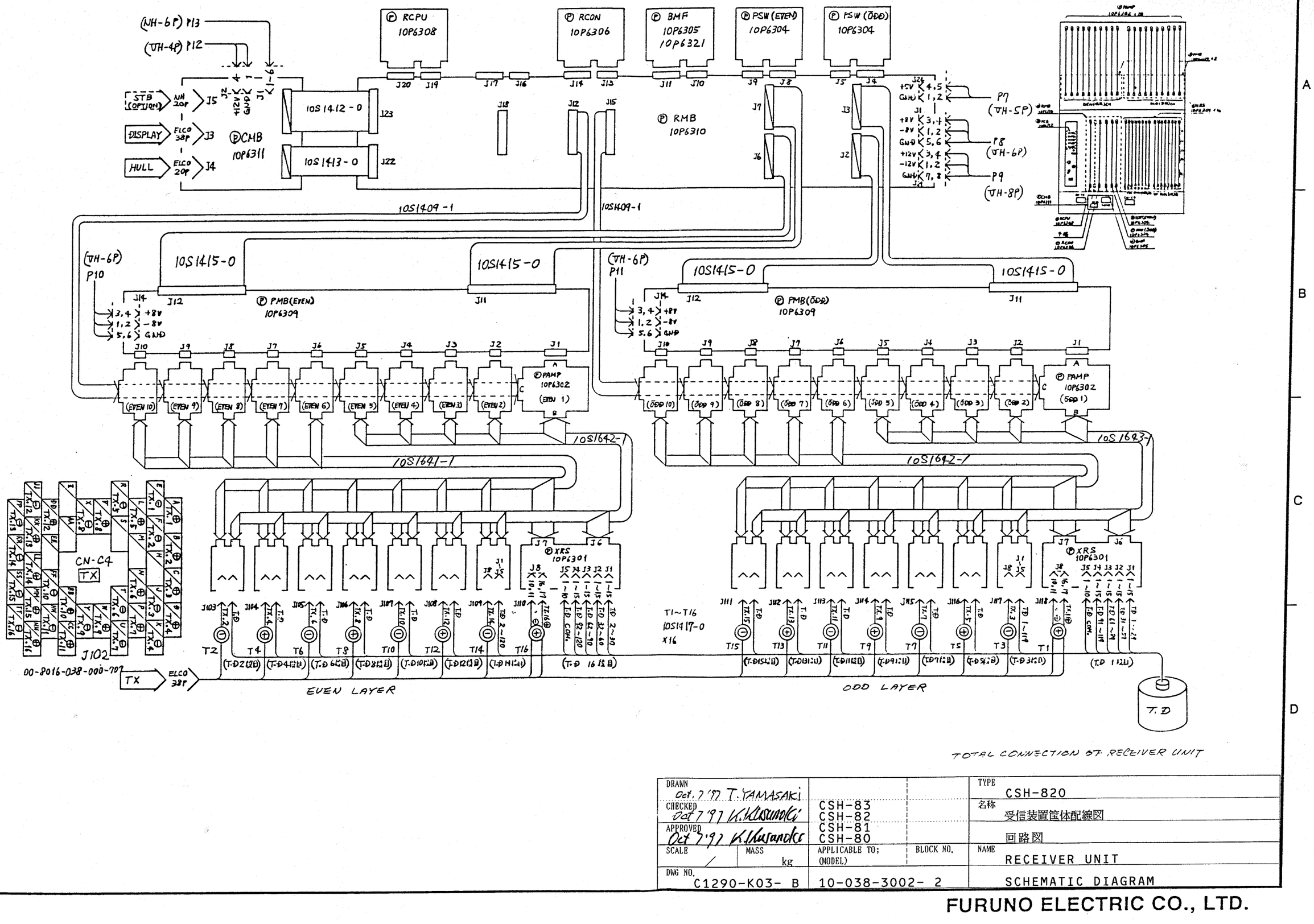


REMARKS	CSH72 CSH71 CSH22F CSH22 CSH21F CSH21		TYPE 10P6712
			名称 POW基板
DRAWN M.USUDA			NAME POW BOARD
SCALE / MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	DWG NO. C1286-K03- A

FURUNO ELECTRIC CO., LTD.

FURUNO

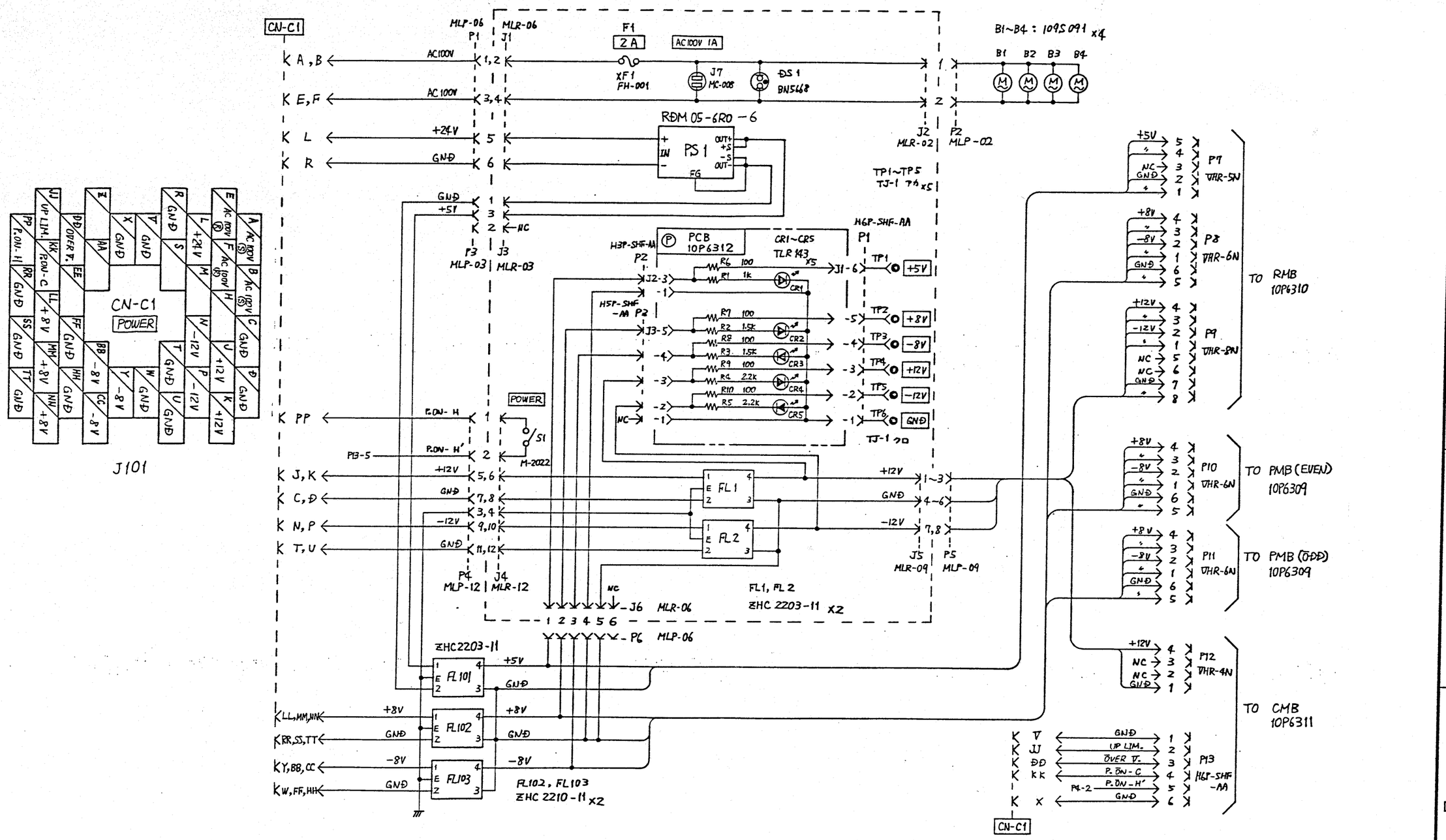
S - 5



TOTAL CONNECTION OF RECEIVER UNIT

DRAWN Oct. 7 '97 T. YAMASAKI				TYPE CSH-820
CHECKED Oct 7 '97 K. Matsumoto	CSH-83 CSH-82			名称 受信装置筐体配線図
APPROVED Oct 7 '97 K. Kusunoki	CSH-81 CSH-80			回路図
SCALE /	MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME RECEIVER UNIT
DWG NO. C1290-K03- B		10-038-3002- 2		SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.



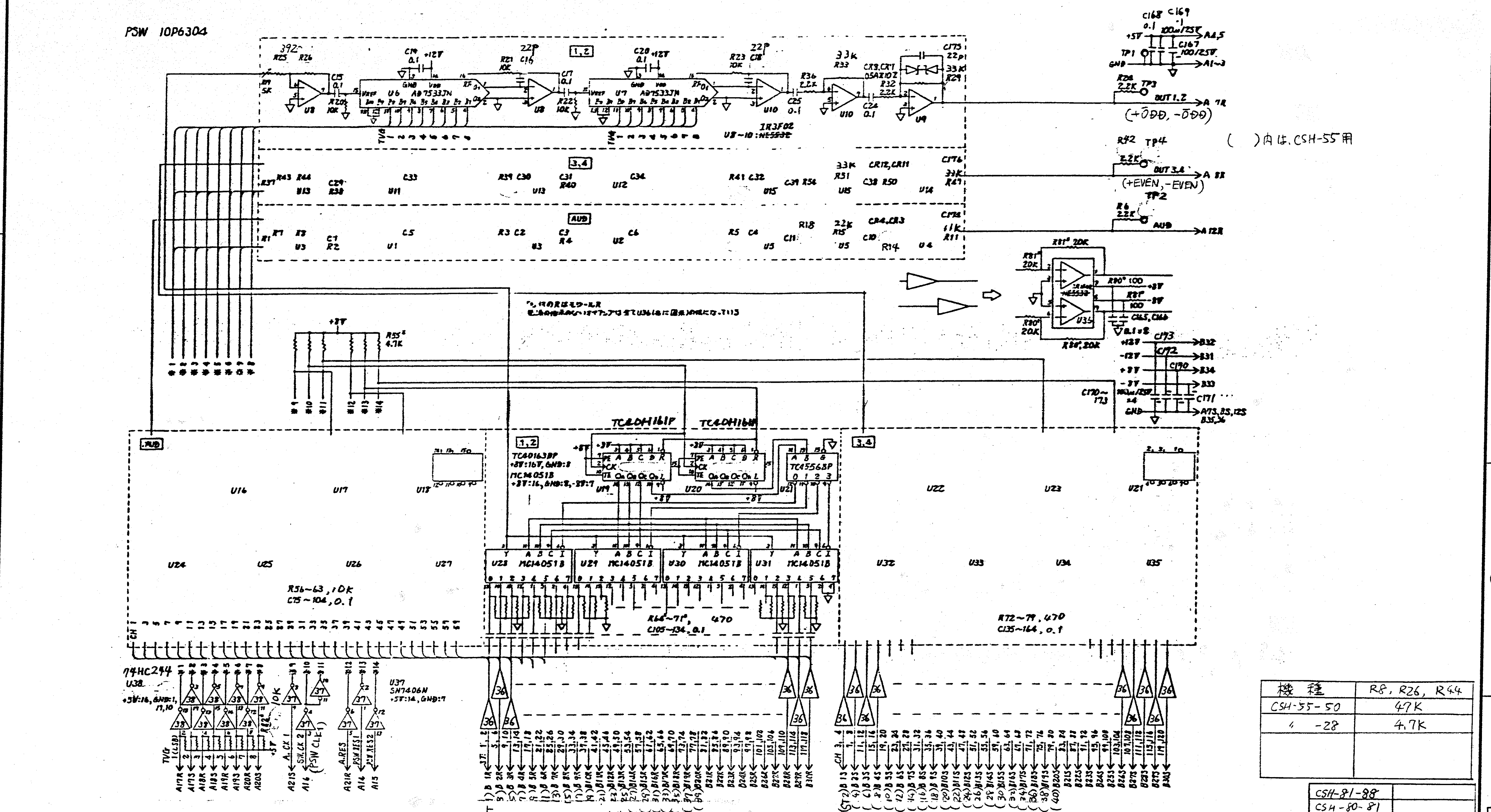
Applicable Types

CSH-80-81	
CSH-80-75	
CSH-80-107	
CSH-80-94	CSH-81
共通機種	

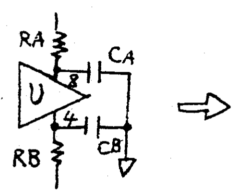
DRAWN: oct 7 '97 T.YAMASAKI		CSH-55 CSH-83 CSH-82 CSH-81 CSH-80		TYPE: CSH-820
CHECKED: oct 7 '97 K.Kusunoki				名称: 受信装置筐体配線図2／6
APPROVED: oct 7 '97 K.Kusunoki				回路図
SCALE: /	MASS: kg	APPLICABLE TO; (MODEL): 10-038-3003- 3	BLOCK NO.	NAME: RECEIVER UNIT 2/6
DWG NO.: C1290-K04- B				SCHEMATIC DIAGRAM

FURUNO

S - 7



C43 ~ C50 ⇒ +8Vパスコン
C51, C53, C55 … C73 ⇒ +8Vパスコン
C52, C54, C56 … C74 ⇒ −8Vパスコン



	U8	U10	U9	U13	U15	U14	U3	U5	U4
RA = 100Ω	R27	R34	R30	R45	R52	R48	R9	R16	R12
RB = 100Ω	R28	R35	R31	R46	R53	R49	R10	R17	R13
CA = 0.1μ	C26	C28	C27	C40	C42	C41	C12	C14	C13
CB = 0.1μ	C21	C23	C22	C35	C37	C36	C7	C9	C8

機 種	R8, R26, R44
CSH-55-50	47K
〃 -28	4.7K

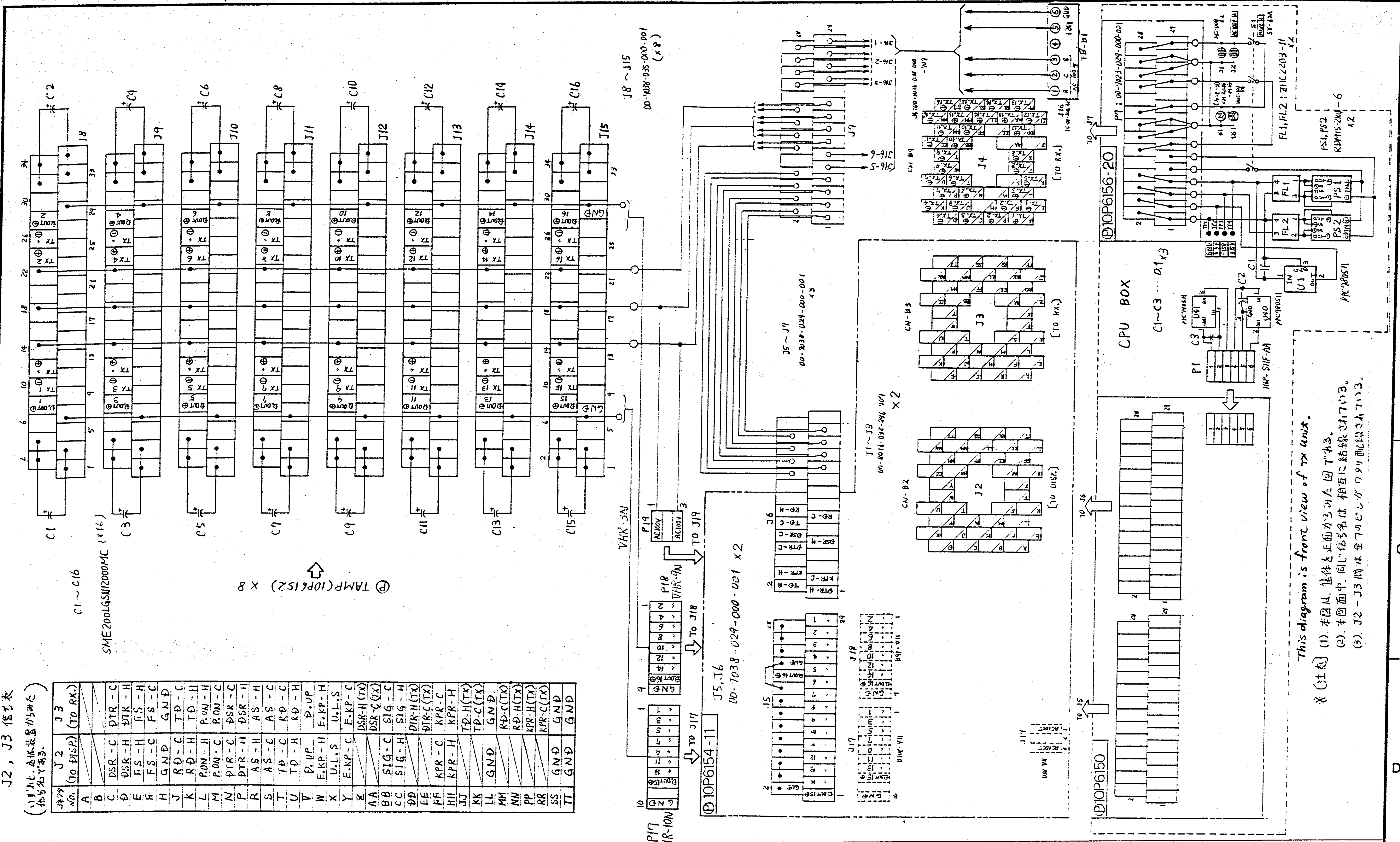
CSH-81-88	
CSH-80-81	
CSH-80-75	
CSH-80-107	CSH-55
CSH-80-94	CSH-81
共 通 機 種	

Applicable Types

DRAWN Oct. 7 '97 T. YAMASAKI			TYPE 10P6304
CHECKED Oct 7 '97 K. Kusunoki			名称 PSW基板
APPROVED Oct 7 '97 K. Kusunoki	CSH-820		回路図
SCALE / MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME PSW BOARD
DWG NO. C1290-K13- B	10-038-3009- 4		SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO



J2，J3 信号表

（いずれも送信装置から見た信号名である。）

コネクタ No.	J2 (TO DISP.)	J3 (TO RX.)
A		
B		
C	DSR－C	DTR－C
D	DSR－H	DTR－H
E	F.S－H	F.S－H
F	F.S－C	F.S－C
H	GND	GND
J	RD－C	TD－C
K	RD－H	TD－H
L	P.ON－H	P.ON－H
M	P.ON－C	P.ON－C
N	DTR－C	DSR－C
P	DTR－H	DSR－H
R	AS－H	AS－H
S	AS－C	AS－C
T	TD－C	RD－C
U	TD－H	RD－H
V	D.UP	D.UP
W	E.KP－H	E.KP－H
X	U.L.S	U.L.S
Y	E.KP－C	E.KP－C
Z		DSR-H(TX)
AA		DSR-C(TX)
BB	SIG－C	SIG－C
CC	SIG－H	SIG－H
DD		DTR-H(TX)
EE		DTR-C(TX)
FF	KPR－C	KPR－C
HH	KPR－H	KPR－H
JJ		TD-H(TX)
KK		TD-C(TX)
LL	GND	GND
MM		RD-C(TX)
NN		RD-H(TX)
PP		KPR-H(TX)
RR		KPR-C(TX)
SS	GND	GND
TT	GND	GND

This diagram is front view of TX unit.

※(注意)
(1). 本図は、筐体を正面から見た図である。
(2). 本図面中、同じ信号名は 相互に結線されている。
(3). J2－J3 間は 全てのピンがワタリ配線されている。

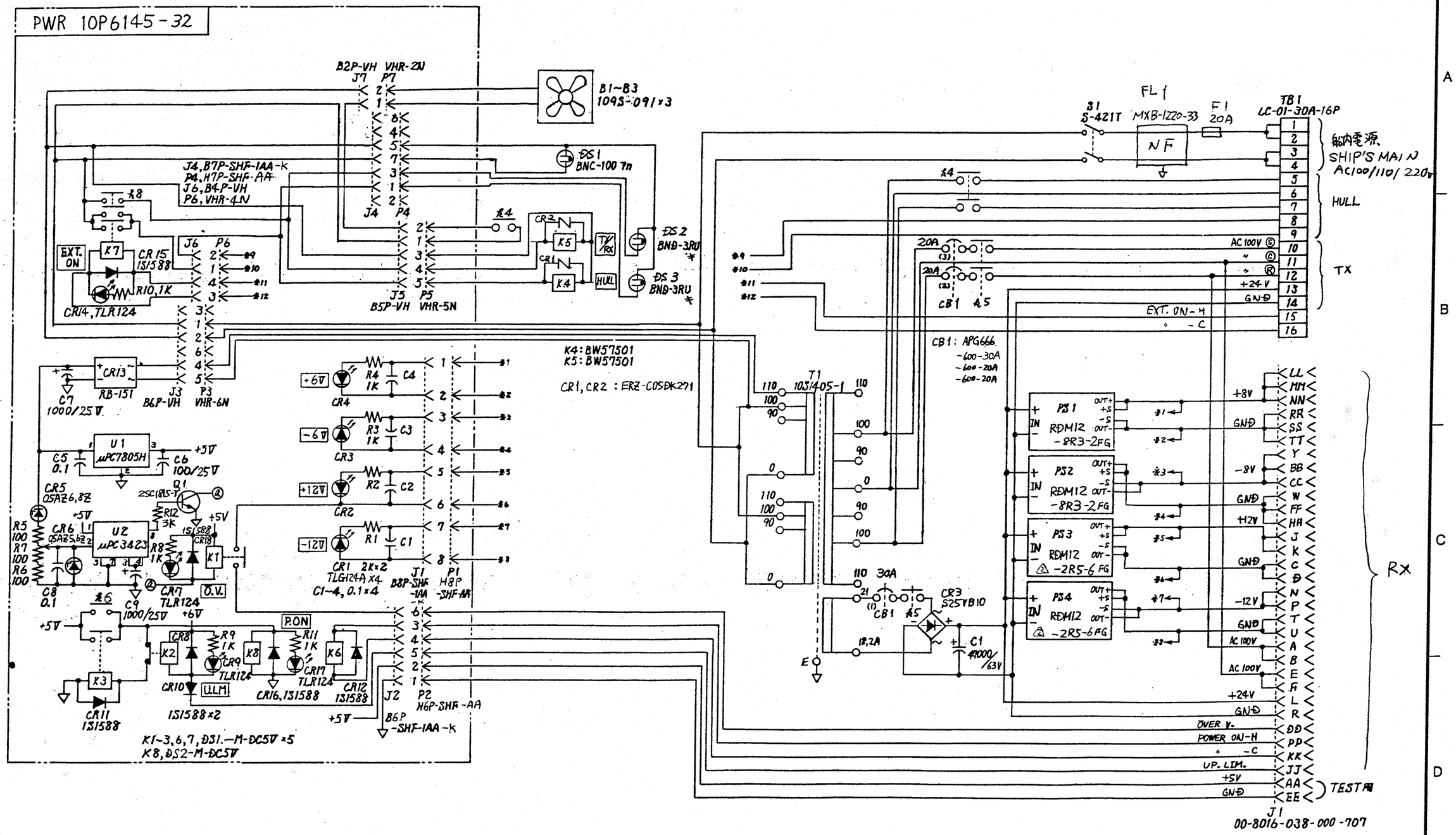
Applicable Models

CSH-80-81	
CSH-80-75	
CSH-80-107	
CSH-80-94	CSH-81
共通機種	

DRAWN Oct. 7 '97 T. YAMASAKI	CSH-55	TYPE	CSH-810
CHECKED Oct 7 '97 K. Kusunoki	CSH-83 CSH-82	名称	送振装置筐体
APPROVED Oct 7 '97 K. Kusunoki	CSH-81 CSH-80		回路図
SCALE ／ MASS kg	APPLICABLE TO; (MODEL) BLOCK NO.	NAME	TRANSMITTER UNIT
DWG NO. C1290-K18- B	10-038-2001- 3		SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO



DRAWN Oct. 7 '97 T.YAMASAKI				TYPE CSH-880
CHECKED Oct 7 '97 K.Hasunoki	CSH-83 CSH-82 CSH-81 CSH-80			名称 電源装置
APPROVED Oct 7 '97 K.Furundi				回路図
SCALE /	MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME POWER SUPPLY UNIT
DWG NO. C1290-K23- B		10-038-4001- 4		SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.