# FURURO Installation manual

# **COLOR SCANNING SONAR**

MODEL CSH-23/23F/24/24F



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\*IME13040G00\*

# ▲ SAFETY INSTRUCTIONS

# MARNING



#### 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.

# 



Ground the equipment to prevent electrical shock and mutual interference.

Observe the following compass safe distances:

	Standard	Steering
Display unit for CSH-23	0.9 m	0.68 m
Display unit for CSH-24	1.7 m	1.3 m

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# **1. SYSTEM CONFIGURATION**



Figure 1-1 System configuration

# 2. EQUIPMENT LISTS

### Standard Supply

Name	Туре	Qty	Mass (kg)	Remarks
Display Unit	CSH-230			CSH-23
1 5	CSH-230F	-		CSH-23F
	CSH-2400	1		CSH-24
	CSH-2400F			CSH-24F
Transmitter Unit	CSH-310	1	96	CSH-23/24
	CSH-310FII		110	CSH-23F/24F
Receiver Unit	CSH-220A	1	47	CSH-23/24
Power Supply Unit	CSH-220FII		4/	CSH-23F/24F
	CSH-380B	1	50	CSH-23/24
	CSH-380S		50	CSH-23F/24F
Hull Unit	CSH-21080		673	Stroke 800 mm*
	CSH-21120	1	812	Stroke 1200 mm
	CSH-21160	1	873	Stroke 1600 mm
Remote Control Box	CSH-116	1	0.4	
Interface Unit	CS-120A	1	3	
Installation Materials	CP10-02700			6 pairs cable CSH-23/23F
	CP10-03400	- 1		CP10-02710
				6 pairs cable CSH-24/24F
				CP10-03410
Spare Parts	SP10-01700	1		CSH-23/24
	SP10-01800			CSH-23F/24F
Accessories	FP10-02100			FP-10-01801 CSH-23 See end of this
				FP10-01201 book.
				FP10-01203
				Nyron cover
		1		10-051-1031
	FP-01900			FP10-01201 CSH-24
			FP10-01203	
				FP10-01901
				Nyron cover
				10-054-1021

\*CSH-23/24 only

## **Optional Equipment**

Name	Туре	Mass (kg)	Code No.	Remarks	
FNZ Joint Box	CS-170	2	-		
Step-down Transformer	PT-400	22	2 _		
E/S Interface Unit	VI-1100A	2	-		
Sub-Display Unit	CSH-236	33	-	CSU 22/22E only	
	CSH-236F	33	-	CSII-25/251, Olly	
Hood	FP10-01801		006-027-830	For CSH-23/24	
Hood	FP10-01901		000-690-855	For CSH-24/24F	
Filter	OP10-11		006-997-710	For CSH-23/2F	
Filter	FP10-02000		000-690-856	For CSH-24/24F	
Extension Cable Set	CSH-1600		000-068-165	For CSH-23/23F	
(with first. materials)	CSH-1500		000-068-927	For CSH-24/24F	
37C Cable	10S1258		000-101-006	Specify length	
7C Cable	10S1259		000-101-007		
16P Cable	10S1260		000-101-008		
Handle Assembly	OP10-3		006-949-950		
Mounting Fixture	OP10-9		006-990-040	For CSH-116	
Automatic Raise Modification Kit	CSH-1500		000-068-927		
ROM Option Kit A	OP10-15		006-998-620		
ROM Option Kit B	OP10-18		006-998-650		
Hull Unit	CSH-21081-1			Stroke 800mm,	
			-	24 kHz	
	CSH-21081-2			Stroke 800mm,	
			-	28 kHz	
	CSH-21121-1			Stroke 1200mm,	-
			-	24 kHz	Anti-slaming
	CSH-21121-2			Stroke 1200mm,	type
			-	28 kHz	
	CSH-21161-1			Stroke 1600mm,	-
			-	24 kHz	
	CSH-21161-2			Stroke 1600mm,	
			-	28 kHz	
Anti- slaming Kit	OP10-21		-		

\* CSH-23/24 only

# **3. MOUNTING THE EQUIPMENT**

### 3.1 Mounting the Hull Unit and Receiver Unit

#### Location of hull unit

Decide the location of the hull unit through consultation with the dockyard and shipowner. When deciding the location, the following points should be taken into account.

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



Figure 3-1 Hull unit mounting location

- Select a place where the hull bottom is flat and the draft is sufficiently deep. Normally, the transducer should protrude at least 500 mm beyond the keel to minimize the effect of air foam and bubbles.
- Select a place where interference from other equipment is minimal. The hull unit should be at least 2.5 m away from the transducers of other equipment.
- No obstacle should be in the fore direction since it causes a shadow zone and aerated water, resulting in poor sonar performance.
- The space shown in the figure on the next page is required around the hull unit for wiring and maintenance.
- If the ambient temperature of the unit is below 0°C, provide the sonar compartment with a heater to keep the temperature above 0°C.



Figure 3-2 Maintenance space, example sonar compartment

#### Shortening the retraction tank

The retraction tank is 1300 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 297 thru 382 mm from the bottom.	Same as left	Remove 297 thru 382 mm from the bottom. Note that the length "D" must be less than 1003 mm.	Same as left
1200 mm	Remove 97 thru 382 mm from the bottom.	Same as left	Remove 97 thru 382 mm from the bottom. Note that the length "D" must be less than 1203 mm.	Same as left
1600 mm	Remove within 282 mm from the bottom.	Same as left	Remove within 282 mm from the bottom. Note that the length "D" must be less than 1703 mm.	Same as left

Figure 3-3 Guidelines for shortening the retraction tank

**Note 1:** In the 800 mm type hull unit, more than 297 mm must be removed from the bottom so that the transducer fully protrudes from the tank. If more than 382 mm is removed, the transducer cannot be retracted into the tank.

**Note 2:** In the 1200 mm type hull unit, the transducer will not fully protrude unless 97 mm is removed from the bottom, and cannot be fully retracted if more than 382 mm is removed.

**Note 3:** In the 1600 mm type hull unit, the transducer cannot be fully retracted if more than 282 mm is removed.

**Note 4:** When 382 mm (282 mm for 1600 mm type) is removed and "D" is minimum, the effect of air foam is minimized because the transducer fully protrudes in water.

#### **Remarks for installation of retraction tank**

- 1. Make, if possible, the installation location a double bottom structure.
- 2. Install, if possible, the tank on the keel where the tank can be most firmly fixed.
- 3. Install the reinforcement ribs as near as possible to the top of the retraction tank, allowing space for tightening of bolts and nuts.



Figure 3-4 How to install reinforcement ribs

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



Figure 3-5 Installing reinforcement ribs to the attachment flange

5. Add a doubling plate at the location where the retraction tank is welded to the hull bottom. The size of the doubling plate is normally 1200 mm to 1300 mm in diameter so that 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 hull unit flange, the O-ring and O-ring groove and coat them with a slight amount of grease. Place the O-ring in position on the tank flange.
- 2. Lay the gasket (1) on the top of the tank flange.
- 3. Orient the hull unit so that the bow mark (arrow) on its flange points toward the ship's bow. Note that heading adjustment in the display unit is required if the bow mark does not face the ship's bow.
- 4. For the 1200 mm transducer travel type, 11 of the 24 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 11 bolts are fitted. Note that it is difficult to fit them after the hull unit has been placed on the tank.
- 5. Confirm that the O-ring and the gasket (1) are in position. Place the hull unit on the tank.
- 6. Coat every bolt, washer and nut with slight amount of grease to ease removal. Fit the insulation gasket (2) into the bolt holes of both the tank and hull unit flanges. Fasten the hull unit to the retraction tank with gasket (2), flat washers, spring washers and hex bolts. (Insulation gasket (2) and gasket (2) are used on the 1200 mm transducer travel type only.)
- 7. Reinforce the hull unit against vibration by extending stays to the ship's hull from the two eye bolts at the top of the hull unit, referring to figure at the top of the next page.



Figure 3-6 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. Install if possible, two more stays in ship's transverse direction.



Figure 3-7 Proper installation of stays

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



Figure 3-8 Proper and wrong installation of stay

#### Fastening receiver unit to hull unit

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

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



Figure 3-9 Mounting of receiver unit

### 3.2 Mounting the Display Unit/Sub-display Unit

The display unit/sub-display unit is designed for tabletop mounting. When selecting as 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 components 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  $\pm 45^{\circ}$  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 with 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-24, remove eye bolts at the top of the display unit and set cosmetic screws (supplied with installation materials) to eye bolt holes.





Figure 3-10 Mounting the display unit, 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.

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



Figure 3-11 Transmitter unit

### 3.4 Mounting the Interface Unit

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

### 3.5 Mounting the FNZ Joint Box

The FNZ joint box is used for interchanging both TX trigger and sonde marker pulses from the echo sounder and the net sonde, therefore it should be installed as close as possible to the net-sonde indicator.

# 3.6 Grounding the Equipment

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



Figure 3-12 Location of ground terminals on equipment

### 4.1 Cable Configuration

Wire Symbol	Name	
0	Vinyl Sheath Wire	
0	Shielded Wire	
O	Twisted Pair Wire	



Figure 4-1 Cable configuration

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

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



Figure 4-2a Crimping tool, contact pin, pin extractor

#### How to use the crimping tool



Figure 4-2b

#### 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

### 4.3 Location of Connectors



### 4.4 Fabricating Cables, Assembling Connectors

# Fabricating cable 00-8016-038-313-761HV (CN-A1, CN-A5 and J201)



Figure 4-4 Fabricating cable 00-8016-038-313-761HV

#### Assembling 38P connector

Shorten the unused wires appropriately and treat their ends with vinyl tape to prevent short circuit.



Figure 4-5 Assembling 38P connector

#### Positioning guide pins

Guide pins of the connector identify the mating receptacle. Position them as shown below.

Connector Guide Pin	CN-A1	CN-A5	J201	Positioning Tool
Guide Pin A (Large)	1	5	1	
Guide Pin B (Small)	1	1	1	Турс : 10-910-0179-0

Table 4-1 Guide pins and connectors CN-A1, CN-A5, J201

#### **Clamping the cable**

Clamp the cable where the shield is folded back onto the armor.



*Figure 4-6 Clamping the cable* 

#### Assembling connector NSC-253P (CN-A15)



Figure 4-7 Assembling connector NSC-253P

#### Assembling BNC connector (CN-A7, CN-A8, CN-A9, CN-A10, CN-A11 and 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. Remove the insulator, leaving 3 mm.
- 5. Trim the shield as shown in the drawing. Solder the center chip to (a) the conductor of the cable.
- 6. Pass the cable through the housing and tighten the nut.



Figure 4-8 Assembling BNC connector

(5)

#### Fabricating cable 54-038-000-601/SC (CN-E1)



Figure 4-9 Fabricating cable 54-038-000-601/SC

#### Assembling 38P connector

- 1. Bundle the unused wires outside the connector case.
- 2. Fix the cover ①, taking heed of the cable outgoing direction.
- 3. Dress the wires and fix the cover (2) and (3). Use a fragment of cable sheath to secure the wires at the connector clamp.
- 4. Shorten unused wires appropriately and treat their ends with vinyl tape to prevent short circuit.



Figure 4-10 Assembling 38P connector

#### Positioning guide pins

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

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

Table 4-2 Guide pins and connector CN-E1

#### Clamping the cable (side at power supply unit)

Clamp the cable as shown in below.



Figure 4-11

#### Fabricating cable 10S1259 (connected terminal board TB-E1)



Figure 4-12 Fabricating cable 10S1259

# Fabricating cable DPYCY-3.5 (connected to terminal board TB-E1)



Figure 4-13 Fabricating cable DPYCY-3.5

#### Fabricating cable 54-038-000-601/SC (CN-B2, CN-B3, CN-B4)



Figure 4-14 Fabricating cable 54-038-000-601/SC

#### Assembling 38P connector

- 1. Bundle the unused wires outside the connector case.
- 2. Fix the cover (1), taking heed of the cable outgoing direction.
- 3. Dress the wires and fix the cover (2) and (3). Use a fragment of cable sheath to secure the wires at the connector clamp.
- 4. Shorten unused wires appropriately and treat their ends with vinyl tape to prevent short circuit.



Figure 4-15 Assembling 38P connector

#### **Positioning guide pins**

Guide pins of the connector identify the mating receptacle. Position them as shown below.

Connector Guide Pin	CN-B2	CN-B3	CN-B4	Positioning Tool
Guide Pin A (Large)	1	1	3	
Guide Pin B (Small)	1	1	1	Туре : 10-910-0179-0

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

#### **Clamping the cable**

Secure the cable with the cable clamp.



Figure 4-16 Clamping the cable

#### Fabricating cable 10S1259 (connected to terminal board TB-B1)



Figure 4-17 Fabricating cable 10S1259

# Fabricating cable 54-038-000-601/SC (CN-C2, CN-C3 and CN-C5), 00-8016-020-313-703V (CN-C4)



*Figure 4-18 Fabricating cable 54-038-000-601/SC, 00-8016-020-000-703V* 

#### Assembling 38P connector

- 1. Bundle the unused wires outside the connector case.
- 2. Fix the cover (1), taking heed of the cable outgoing direction.
- 3. Dress the wires and fix the cover (2) and (3). Use a fragment of cable sheath to secure the wires at the connector clamp.
- 4. Shorten unused wires appropriately and treat their ends with vinyl tape to prevent short circuit.



Figure 4-19 Assembling 38P connector

#### Positioning guide pins

Guide pins of the connector identify the mating receptacle. Position them as below.

Connector Guide Pin	CN- C2	CN-C3	CN- C4	CN- C5	Positioning Tool
Guide Pin A (Large)	1	2	1	3	
Guide Pin B (Small)	1	1	1	1	Type : 10-910-0179-0

Table 4-4 Guide pins and connectors CN-C2, CN-C3, CN-C4, CN-C5

#### **Clamping the cable**

Clamp the anticorrosive sheath of the cable.



Figure 4-20 Clamping the cable

#### Fabricating cable connected to terminal board TB-D1 in Raise/ Lower Control Box



Figure 4-21 Fabricating cable connected to terminal board TB-D1 in Raise/Lower Control Box

#### Fabricating cable 10S1259 (connected to terminal board TB-D2 in Raise/Lower Control Box)



Figure 4-22 Fabricating cable 10S1259

### 4.5 Connection of Transducer Cables

The transducer cables are supplied with connectors. Plug them into the receptacles in the receiver unit, referring to the stickers on the cables.



Figure 4-23 Receiver unit, rear view

Lead the cable into the receiver unit and clamp it as follows.



1. Use the connector puller (supplied) to unplug connectors.



2. When one or some of the lead wires are severed near a connector, cut off all lead wires connected to the connector and solder the "XH connector assembly" (type 10-145 (13P), supplied as spare parts).

### 4.6 Connection of Interface Unit CS-120A

With connection of navigator, the Interface Unit CS-120A and electronic fishing equipment, the function of the CSH-23/24 series 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-23/24 series with external equipment.

#### Connections for true motion and target lock

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

Basically, there are two methods to feed the data:

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

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



Figure 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 ES picture and FNZ markers**

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

- J202: Net sonde signal and trigger signal (keying pulse of echo sounder). A white line signal from an echo sounder may be additionally applied as described on 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 ES 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 displaying 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 displaying echo sounder picture and FNZ markers by separate echo sounders

# Connections for digital indication of position, water temperature and depth

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

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

Table 4-5	Data	and	source
-----------	------	-----	--------

**Note:** When a color video sounder which has digital depth data output is not available, the white line signal of a paper recording echo sounder can be used to provide digital depth readout.

Connect the echo sounder as shown below or as shown in connection 2 or 3 in paragraph 5.2 and operate the echo sounder front panel controls so that the white line is effected on the seabed contour.



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

#### Wiring

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



Figure 4-29 Configuration of cables 02S8040, CO-SPEVV-SB-C 0.2 sq. 5P

#### Fabrication, assembling 10P and 7P connectors



Figure 4-30 Fabrication of 10P, 7P connectors

### 4.7 Connection of Sub-display Unit CSH-236/236F (Option)

The Sub-Display Unit CSH-236/236F is the same as the Display Unit CSH-230/230F in terms of outline dimension and control panel layout. It controls the sonar at a place remote from the display unit while observing picture on the screen. One sub-display unit can be connected to three display units.

Note: The Sub-Display Unit can be connected to CSH-23/23F only.

#### Connections

Refer to the interconnection diagram at the end of this manual.

**Note:** One sub-display unit can be connected to three sonars, but different models cannot be connected.

#### **DIP** switch setting

Set DIP switch S1 on the RDCB Board (10P6724) in the sub-display unit as follows:



SW No.	Used for	Function
1 2 3	Display unit on CH-1 Display unit on CH-2 Display unit on CH-3	<b>ON:</b> Turning on sub-display unit automatically turns on display unit. (Don't set OFF because the system doesn't work.)
4 5 6	Display unit on CH-1 Display unit on CH-2 Display unit on CH-3	<b>ON:</b> Turning on display unit automatically turns on sub-display unit. <b>OFF:</b> Sub-display unit is not turned on when display unit is turned on.
7	Not used.	Used in remote display unit. Set to ON in sub-display unit.
8	Not used.	

Figure 4-31 DIP switch setting on RDCB board in the sub-display unit

**Note:** To have both the display unit and sub-display unit turned on when either unit is turned on, turn on SW #1 and #4.

### 4.8 Connection of Remote Display Unit CSH-106 (Option)

The remote display unit can be connected to three display units, and one of them is selected on the remote display unit. Operating controls provided on the remote display unit are power on/ off switch, brilliance control and channel selector, which selects one of the three display units.

Note: The remote-Display Unit can be connected to CSH-23/23F only.

#### Connections

For connection of both display and remote display units, refer to interconnection diagram at the end of this manual.

**Note:** The display unit has two ports: one for sub-display unit and the other for remote display unit. When the remote-display unit is not used, both ports can be connected to remote display units.

#### **DIP switch setting**

Set DIP switch S1 on the RDCB board 10P6724 in 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 and OFF when there is no display unit.
7	Remote ON/OFF.	<ul> <li>ON: Remote on/off of remote display unit from display unit. When one of all of the connected display units is turned on/off, remote display unit turns on/off.</li> <li>OFF: Remote display is turned on/off by its ON/OFF switch.</li> </ul>
		Note: The remote display can not be turned on unless display unit is on.
8	Not used.	

Figure 4-32 DIP switch setting on the RDCB board

### 4.9 Synchronizing Transmission with Other Sonars, Echo Sounders

To synchronize the transmission of the CSH-23/24 series sonars to that of other sonars or echo sounders, wire units as follows.

#### Connections



Figure 4-33 Connections for synchronizing transmission with echo sounder having current driven KP, voltage driven KP

Note: To output KP to other sonar or echo sounder, wire units as follows.



Figure 4-34 Connections for outputting KP to other sonar or echo sounder

#### Menu setting

Set polarity of the KP on the INIT SET/TEST menu. Set transmission cycle to 0 on data setting window. Refer to the operator's manual for operation on the menu.
# 4.10 Interlocking Operation with Other Sonar

Functions (range, tilt, fish mark, 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**

Sonar 1		Sonar 2
CN-A4 TD H <a< TD C <b< RD H <e< RD C <f<< td=""><td>‡ P ↓ P</td><td>CN-A4  &gt;E&gt; RD H  &gt;F&gt; RD C  &gt;A&gt; TD H  &gt;B&gt; TD C</td></f<<></e< </b< </a< 	‡ P ↓ P	CN-A4  >E> RD H  >F> RD C  >A> TD H  >B> TD C

Figure 4-35 connections for interlocking function of two sonars

#### **Three sonars**



Figure 4-36 Connections for interlocking functions of three sonars

## **DIP** switch setting

Set ID code on DIP switch #1 to #3 on main panel. Any code is acceptable, provided that it is not the same as that set on the other sonar.

## **Connections for interlocking remote control**

To control multiple display units by one remote control box, wire units as follows.



Figure 4-37 Connections for interlocking remote control

# **5. CHANGING POWER SPECIFICATIONS**

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



Figure 5-1 Tap connections on the transformer in the power unit

# 6. ADJUSTMENT AND CHECK

# 6.1 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)	180 VAC 180 VAC 360 VAC

4. In the raise/lower control box, turn the TEST/NOR-MAL 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 6-1 Display unit front panel



Figure 6-2 Raise/Lower control box

- 5. Press and release the  $\clubsuit$  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  $\uparrow$  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 1 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.

# 6.2 Heading Adjustment

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

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



Figure 6-3 Heading adjustment

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



Figure 6-4 INIT SET/TEST menu

3. Select HEADING ADJ.

INIT SET/TEST MENU	
Select item with <b>I + + + + + + + + + +</b>	➡ keys and press MENU key. menu.
HEADING ADJ 359°	Setting range: 0° to 359° $\triangleright$

Figure 6-5 HEADING ADJ menu

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

Target Loca	Correction Setting	
Target displaced 30°	to port	Set to $30^\circ$ .
Target displaced 30°	to starboard	Set to $330^\circ$ .

# 6.3 DIP Switch Setting in the Display Unit

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

- 1. Remove six screws from the main panel.
- 2. Unplug four connectors.
- 3. Set DIP switch.
- 4. Reassemble display unit.



Figure 6-6 How to remove main panel from display unit

ltem	SW No.	Setting							
ID Code for Interlock	1	Set ID code for int	Set ID code for interlock operation of CSH-21/71/81/82/53/23/73/83 sonar. Any code						
T unction	2	is acceptable unles			u sonars.				
	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.							

## **<u>PIF Board (10P6713)</u>**

## **PND Board (10P6714)**

ltem	SW No.	Setting				
Display unit	0	OFF	For 21" CRT display unit (CSH-24/24F/24FL/84)			
setting	5	ON	For 15" CRT display unit (CSH-23F/23FL/24F/24FL)			

# 6.4 Setting and Adjustment of the Interface Unit CS-120A

## **DIP** switch setting

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



Standard Setting



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

Own ship's speed and bearing (for courseline plotting, true motion, target lock, etc.)

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

> **NOTE1:** GPS has priority. Switched automatically from GPS to DR when GPS is absent for more than 61 seconds or ship's speed measured with GPS is 0.2 kts or less.

If DR is not available when switched from GPS to DR, heading readout is fixed at 9 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 kt, 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. NormallyDR 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.

#### $\rightarrow$ Own ship's position (L/L or TD)

Input Device	<b>S</b> 3	S4
Loran C	OFF	OFF
GPS or DR (See NOTE)	ON	OFF

**NOTE:** Use this position for GPS or DR. The GPS data has priority.

#### Depth (Echo Sounder, Color Video Sounder, etc.)

Input Device	<b>S</b> 5
Echo Sounder (NOTE 1)	OFF
CIF format (NOTE 2)	ON

**NOTE 1:** Use this position for white line pulse when the depth data is taken from an echo sounder which has no digital depth output.

**NOTE 2:** Use this position when the depth data is taken from an echo sounder with digital data output (FE-822, FCV, ED-202) or IF-3000/IF-5000.

## Interface unit adjustment

If the E/S picture on the screen does not have the desired coloration, perform the adjustment as follows with the preset potentiometers on the I/O board in the interface unit.



Figure 6-7 I/O board

S02 Mode: Selects the signal mode (AC or DC) according to the combined echo sounder connected.



S01 FNZ Marker: The FNZ marker is plotted on the echo sounder picture with this switch turned on. Factory setting is the "ON" position.



## Adjustment of signal level (R36, R56)

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



Figure 6-8 AC/DC input signal

If not, adjust the potentiometers in the VI-1100A referring to the installation manual for FCV series. S02 is usually set to the "AC" position at the factory.

#### Procedure

- (A) Set the MODE switch to "E/S".
- (B) Turn the E/S gain and E/S offset potentiometers (R56 and R36) so that the color gradation of the E/S picture on the screen appears similar to the intensity gradation of the combined E/S echogram.
- Case (A) The E/S picture on the CSH-23/24 series is comparatively higher in sensitivity than that of the paper echogram.
- Remedy: Turn E/S offset potentiometer so that weak signals painted in blue or light blue are displayed in deep blue.
- Case (B) The E/S picture on the CSH-23/24 series is comparatively lower in sensitivity than that of the paper echogram.

Remedy: Turn the E/S gain potentiometer CW until a picture of even quality is obtained.

## Adjustment of white line inhibit time (R27)

In case digital depth data is not combined with the CS-120A, the white line signal from the echo sounder is used for depth information.

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

Readjustment of potentiometer R27 is not required as long as CSH-23/24 series indicates the correct depth. If does not, however turn R27 CW about 90 degrees.

## Adjustment of white line output level (R55)

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

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		ndah je ga		TYPE	SF	210-01	700	BOX NO P
				 	SETS PER			
	NU.	SPAK	E PARIS LISI FUR	0011 04 14 /00 /0	0 5	E		VESSEL
COLOR SCANNING SONAR				271W/281W/281				
					۵۱	JANTIT	Y	REMARKS/CODE NO.
TEN	NAM	E OF		DWG. NO. OR	WORK	ING		an a
NU.	PAR	T	VUILIME	TYPE NO.	PER SET	PER VES	SPARE	
1	管入り FUSE	:1-7*		FGB01 30A AC250V	1		2	指示装置用 FOR DISPLAY UNIT
								000-549-086
	£1-7		• <u>20</u>	FGMA 3A 125V(UL)				指示装置用
2	FUSE		<u>()</u> ¢5				2	FOR DISPLAY UNIT
	+1-7*							000-111-848 指示装置用
3	FUSE			AC125V			2	FOR DISPLAY UNIT
· · ·	L 7*					en la compositione en la compositione de la compositio		000-126-840
4	FUSE		<u>−−−20</u> −+   1) <u>−−−+</u> ] ≠5	FGMA 2A AC125V	2		4	宿示装直用 FOR DISPLAY UNIT
								000-126-841
	£1-7		1 <u>e30</u>	FGAO 10A				指示装置用
5	FUSE			AC125V	1		5	FOR DISPLAY UNIT
	W1-1-6	<del>40 0</del>						000-126-852
6	XH CON ASSY,	相击 NECTOR		10-145(13P)	1		1	交信装置用 FOR RECEIVER UNIT
								006-947-380
7	コネクタ抜 CONNEC	き工具 TOR		10-026-6901-0				受信装置用 FOR RECEIVER UNIT
	FULLER							100-008-460
·····	£1-7		30 5	FGBO-A 2A		<u>`</u>		送振装置用
8	FUSE			AC125V	16		20	FOR TRANSMITTER UNIT
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						·		a second s
		د در د منه می بردند و منه می بردند و از م						
IFR'	S NAM	E	FURUNO ELECTRIC	CO., LTD	DWG N	10.		1



	CODE NO. 000-068-910		310	10BW-X-9302 -4						
			TYPE	S	P10-01	800	00 BOX NO.		P	
HIP	NO.	SPAF	RE PARTS LIST FOR	USE				SETS PER VESSEL		
	CSH-21F・22F カラースキャニング ソナー 23F・24F/FL COLOR SCANNING SONAR		22F カラースキャニング ソナー FL   COLOR SCANNING SONAR							
				DWG. NO.	0	UANTIT	Y	REMA	RKS/CODE	NO.
TEN No.	PAF	IE OF RT	OUTLINE	OR TYPE NO.	WORKING PER PER SET VES		PER SPARE			
1	tı-7 FUSE		<u>20</u> <u>1</u> <u>1</u> <u>↓</u> <u>↓</u> <u>↓</u> <u>↓</u> <u>↓</u> <u>↓</u> <u>↓</u> <u>↓</u> <u>↓</u>	FGMA 3A 125V(UL)	1		2	指示装 FOR DIS	置用 PLAY UNIT	
								000-11	1-848	
2	FUSE		<u>+ 20</u> →   1) <u>+</u> ↓ ≠ ø5	FGMA 1A AC125V	1		2	指示装i	■用 PLAY UNIT	
	1-7							000-12	6-840 署用	
3	FUSE			AC125V	2		4	FOR DIS	PLAY UNIT	
								000-12	6-841	
4	E1-X			FGAO 10A AC125V	1		5	指示装i FOR DIS	重用 SPLAY UNIT	
		1. 1. 1.						000-12	6-852	
5	管入り FUSE	£1-7,	<del> </del>	FGB01 30A AC250V	1		2	指示装 FOR DI	置用 SPLAY UNIT	
								000-54	9-086	
6	XH⊐≵⊅5 XH CON ASSY,	v組品 INECTOR		10-145(13P)	1		1	受信装 FOR RE	置用 CEIVER UNIT 	
	コネクタ技	き工具	•••	10-026-6901-0				受信装	置用	
7	CONNEC	TOR					1	FOR RE	EIVER UNIT	•
	1-1-7							100-00	8-460 罢田	
8	FUSE			AC250V	16		20	FOR TR	ANSMITTER	
	ļ	- <sup>1</sup> 3			-			000-54	9-022	
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FURUI			CODE NO.	006-989-010	)	10BW-X-9401 -5		
			TYPE	TYPE CP10-02710		1/4		
	.事材料表 ALLATION MATERIALS	CSH-21 •K •F/22 •F 23 •K •F/251W/261W 271W/281W/281S/288W	カラースキャニンク・ソナ COLOR SCANNII	- Ng sonar				
番 号 NO.	名称 NAME	略 図 OUTLINE	型: DESC	名/規格 RIPTIONS	数量 0' TY	用途/備考 REMARKS		
1	7-ス線組品 GROUNDING WIRE		CS-120-C CODE NO.	CS-120-C CODE NO. 006-937-990		CS-120-C CODE NO. 006-937-990		外部インターフェース工材 FOR INTERFACE UNIT
2	コネクタ CONNECTOR	+21	RM15TP-2P	A 000-503-314		外部インターフェース工材 FOR INTERFACE UNIT		
3	コネクタ CONNECTOR	¢25	SRCN6A16- CODE NO.	10P 000-508-663	4	外部インターフェース工材 FOR INTERFACE UNIT		
4	⊐≯⁄9 CONNECTOR		54-038-00 CODE NO.	0-601/SC 000-132-081		外部インターフェース工材 FOR INTERFACE UNIT		
5	コネクタ CONNECTOR	#25	SRCN6A16- CODE NO.	7P 000-508-662		外部インターフェース工材 FOR INTERFACE UNIT		
6	שליל CONTACT PIN		60-8017-0 CODE NO.	313-00-339 000-519-542	38	外部インターフェース工材 FOR INTERFACE UNIT		
7	貼りィーク. J201. STICKER. J201.	215 ]35	10-018-50 CODE NO.	22 181-850-220		外部インターフェース工材 FOR INTERFACE UNIT		
8	コネクタ CONNECTOR	39	00-8016-0 CODE NO.	000-127-234		外部インターフェース工材 FOR INTERFACE UNIT		
9	コネクタ CONNECTOR	628	NCS-252-P CODE NO.	000-506-501	1 1 1 1 1 1	指示装置工材 FOR DISPLAY UNIT		
10	コネクタ CONNECTOR	39	00-8016-0 CODE NO.	000-127-234	1	指示装置工材 FOR DISPLAY UNIT		

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FURUI			CODE NO.	006-989-010	)	10BW-X-9401 -5
			TYPE	CP10-02710	·····	2/4
T INST	事材料表 ALLATION MATERIALS	CSH-21 •K •F/22 •F 23 •K •F/251 W/261 W 271 W/281 W/281 S/288W	カラースキャニンク <sup>*</sup> ソナー 8W COLOR SCANNING SONAR			
番 号 NO.	名称 NAME	略 図 OUTLINE	型 DESC	型名/規格 DESCRIPTIONS		用途/備考 REMARKS
11	2-∋-∧* <sup>∓</sup> COOLER PUTTY		200G19	9070 000-807-621	2	指示装置工材 FOR DISPLAY UNIT
12	イラックスチューフ <sup>*</sup> (A) INSULATION TUBE		4. 0X0. 3 #4 CODE NO.	1 ‡1□ ¥5CM¥ 000-100-923	1	指示装置工材 FOR DISPLAY UNIT
13	7-2板 COPPER STRAP	50 L=1.2m	WEA-1004- CODE NO.	500-310-040		指示装置工材 FOR DISPLAY UNIT
14	ב≱לא CONNECTOR	¢ 28	NCS-253-F	000-506-503		指示装置工材 FOR DISPLAY UNIT
15	コネクタ CONNECTOR		54-038-00 CODE NO.	00-601/SC 000-132-081	3	受信装置工材 FOR RECEIVER UNIT
16	7-ス板 COPPER STRAP	50 L=1.2m	WEA-1004- CODE NO.	-0 500-310-040	1	受信装置工材 FOR RECEIVER UNIT
17	שעלי CONTACT PIN		60-8017-0 CODE NO.	0313-00-339 000-519-542	114	受信装置工材 FOR RECEIVER UNIT
18	ミガ‡平座金 FLAT ₩ASHER	<b>6</b> 22	M10 SS41 CODE NO.	MFZN2-B 000-864-191	2	受信装置工材 FOR RECEIVER UNIT
19	ジールト エリーフ SHIELD SLEEVE	<b>₹</b>	ZS-06H ±0 CODE NO.	0. 055M≭ 000-807-634	20	受信装置工材 FOR RECEIVER UNIT
20	コネクタ CONNECTOR		00-8016-0 CODE NO.	20-313-703V 000-111-143	1 1 1	受信装置工材 FOR RECEIVER UNIT

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	URUI		CODE NO.	006-989-010 CP10-02710		10BW-X-9401 -5	
Т INST	事材料表 ALLATION MATERIALS	CSH-21 •K•F/22 •F 23 •K •F/251W/261W 271W/281W/281S/288W	カラースキャニング ソナ COLOR SCANNI	אַזָּרָגאָרָגיין אָרָאָרָאָרָאָרָאָדיין אָרָאָראָראָראָדיין אָזיין אָזיין אָראָראָראָ			
番 号 NO.	名称 NAME	略 図 OUTLINE	型 DESC	型名/規格 DESCRIPTIONS		用途/備考 REMARKS	
21	77ቱ ቶኑ EYE-BOLT		0 M10 SS41 CODE NO.	MFZ12 000-862-506	2	受信装置工材 FOR RECEIVER UNIT	
22	P貼りマーク.11. P STICKER 11.	1-25-s-1 	10-026-06 CODE NO.	19-0 100-014-880		受信装置工材 FOR RECEIVER UNIT	
23	圧着端子 CRIMP-ON LUG		FV5. 5-4 CODE NO.	000-538-123	5	上下装置工材 FOR HULL UNIT	
24	圧着端子 CRIMP-ON LUG		FV1. 25-3.	7 7h 000-108-699	15	上下装置工材 FOR HULL UNIT	
25	圧着端子 CRIMP-ON LUG	7 <u>(0∃11)</u>	FV1. 25-M4 CODE NO.	7ħ 000-536-715	5	上下装置工材 FOR HULL UNIT	
26	7-ス板 COPPER STRAP	50 L=1.2m	WEA-1004- CODE NO.	0 500-310-040		送振装置工材 FOR TRANSMITTER UNIT	
27	圧着端子 CRIMP-ON LUG		FV5. 5-4 CODE NO.	000-538-123	5	送振装置工材 FOR TRANSMITTER UNIT	
28	⊐ネクタ CONNECTOR		54-038-00 CODE NO.	0-601/SC 000-132-081	3	送振装置工材 FOR TRANSMITTER UNIT	
29	圧着端子 CRIMP-ON LUG	710 11	FV1. 25-M4 CODE NO.	7ħ 000-536-715	5	送振装置工材 FOR TRANSMITTER UNIT	
30	J7991 CONTACT PIN		60-8017-0 CODE NO.	313-00-339 000-519-542	120	送振装置工材 FOR TRANSMITTER UNIT	

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	ORUI		CODE NO. 006-989-010			108W-X-9401 -5	
			TYPE	TYPE CP10-02710		4/4	
Т INST	事材料表 ALLATION MATERIALS						
番号 NO.	名称 NAME	略図 OUTLINE	型 DES	型名/規格		ーーーーー 用途/備考 REMARKS	
31	貼りマーク STICKEP		10-026-5002-0			送振装置工材 FOR TRANSMITTER UNIT	
	OTICAEN		CODE NO.	100-004-870			
32	\$−₽7° <del>7</del> 2´		NO. 4567			送振装置工材 FOR TRANSMITTER UNIT	
02	HOLE PLUG		CODE NO.	000-800-729	4		
33	圧着端子		FV1. 25-M	4 7カ	ß	電源装置工材 FOR POWER UNIT	
	CRTMP-UN LUG	10.11	CODE NO.	000-536-715			
34	ホールフ <sup>°</sup> ラク <sup>*</sup>		NO. 4567	67		電源装置工材 FOR POWER UNIT	
			CODE NO.	000-800-729			
35	ጋንሳሳት CONTACT PIN	<u> </u>	60-8017-	60-8017-0313-00-339		電源装置工材 FOR POWER UNIT	
			CODE NO.	000-519-542			
36	コネクタ CONNECTOR		54-038-0	00-601/SC	1	電源装置工材 FOR POWER UNIT	
			CODE NO.	000-132-081			
37	7-2板 COPPER STRAP	50	WEA-1004	-0	1 1 1	電源装置工材 FOR POWER UNIT	
		L=1.2m	CODE NO.	500-310-040			
38	貼りマーク.1.  STICKER 1	30	10-026-7	018-0	1	電源装置工材 FOR POWER UNIT	
			CODE NO.	100-008-630			
39	<b>圧着端子</b>	26	FV5. 5-4		15	電源装置工材 FOR POWER UNIT	
	CRIMP-ON LUG		CODE NO.	000-538-123			

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

FURU		ODE NO.		10BW-X-9405 -3
	an Arrange. An an Arrange.	YPE		
工事材料表	CSH-21/K/F •22/F 23/F/FL/K •24/F/FL 53 • 55 • 80 • 81 • 82 • 83 84 • 88 • 288₩ COI	-z‡+=>5°y+- Lor scanning sonar	A	
INSTALLATION MATERIALS				
番号 名称 NO. NAME	略 図 OUTL I NE	型名/規格 DESCRIPTIONS	数量 0' TY	用途/備考 REMARKS
6777.14 1 6P TWISTED PAIR CABLE	L=5#	CO-SPEV-SB 0. 3X6P 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.)



- URUI			CODE NO.	CODE NO. 006-959-800		10CC-X-9401 -0
		TYPE CP10-03410			1/4	
工事材料表		CSH-22/22F/24/24F 24FL				
番 号 NO.	名 称 NAME	略図 OUTLINE	型 DESC	型名/規格 DESCRIPTIONS		用途/備考 REMARKS
1	בעאלי Contact Pin		60-8017-	0313-00-339	38	外部インターフェイスユニット用 FOR DATA INTERFACE UNIT
	]\$79	50	SRCN6A16	-10P		外部インターフェイスュニット用
2	CONNECTOR	¢25	CODE NO.	000-508-663	4	FOR DATA INTERFACE UNIT
3	コネクタ CONNECTOR	¢25	SRCN6A16	-7P		外部インターフェイスコニット用 FOR DATA INTERFACE UNIT
4	コネクタ CONNECTOR	39 51	00-8016-	000-506-662 038-313761HV	1	外部インターフェイスユニット用 FOR DATA INTERFACE UNIT
5	7-z線組品 GROUNDING WIRE		CS-120-C	006-937-990	1	外部インターフェイスユニット用 FOR DATA INTERFACE UNIT
6	貼りァーク. J201. STICKER. J201.		10-018-5 CODE NO.	022		外部インターフェイスコニット用 FOR DATA INTERFACE UNIT
1	コネクタ CONNECTOR	¢21	RM15TP-2	PA 000-503-314	1	外部インターフェイスコニット用 FOR DATA INTERFACE UNIT
8	コネクタ CONNECTOR		54-038-0 CODE NO.	00-601/SC		外部インターフェイスコニット用 FOR DATA INTERFACE UNIT
9	7-2板 COPPER STRAP		WEA-1004 CODE NO.	1 -0 500-310-040	1	指示装置用 FOR DISPLAY UNIT
10	<pre>/テゥウスチュ−ブ(Å) INSULATION TUBE</pre>		4. 0X0. 3 4. OX0. 3 CODE NO.	+10 *5CM*	1	指示装置用 FOR DISPLAY UNIT

C1292-M01- A

FURUNO ELECTRIC CO., LTD

(略図の寸法は、参考値です。

DIMENSIONS IN DRAWING FOR REFERENCE ONLY. )

U	R	U	O

		CODE NO.         006-959-800           TYPE         CP10-03410			10CC-X-9401 -0	
					2/4	
工事材料表 INSTALLATION MATERIALS		CSH-22/22F/24/24F カラ-スキ+=ンヴンナ- 24FL 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	M8fと粧ビス PANEL SCREW	¢12	10-054-11 CODE NO.	44-0 100-195-970	4	指示装置用 FOR DISPLAY UNIT
12	コネクタ CONNECTOR	¢28	NCS-253-F	000-506-503		指示装置用 FOR DISPLAY UNIT
13	2-5-^*7 COOLER PUTTY	<u>90</u> 155 20	200G19 5	/□1□ 000-807-621	2	指示装置用 FOR DISPLAY UNIT
14	コネクタ CONNECTOR	¢28	NCS-252-F	000-506-501	1	指示装置用 FOR DISPLAY UNIT
15	コネクタ CONNECTOR	39 51 222	00-8016-0 CODE NO.	000-127-234	1	指示装置用 FOR DISPLAY UNIT
16	ጋሪዓሳት Contact Pin		60-8017-0 CODE NO.	000-519-542	114	受信装置用 FOR RECEIVER UNIT
17	シーホト・スリーフ・ SHIELD SLEEVE	<b>₩₩₩₩₩₩₩₩₩</b> L=0.055m	ZS-06H *(	). 055M* 000-807-634	20	受信装置用 FOR RECEIVER UNIT
18	P貼りマーク.11. P STICKER.11.	55	10-026-06 CODE NO.	519-0 100-014-880	1	受信装置用 FOR RECEIVER UNIT
19	71# #F EYE-BOLT	42 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	M10 SS41 CODE NO.	MFZ12 000-862-506	2	受信装置用 FOR RECEIVER UNIT
20	コネクタ CONNECTOR		00-8016-0 CODE NO.	020-313-703V	1	受信装置用 FOR RECEIVER UNIT

<u>C1292-M02- A</u> FURUNO ELECTRIC CO., LTD

(略図の寸法は、参考値です。

DIMENSIONS IN DRAWING FOR REFERENCE ONLY. )



	URUP		CODE NO.	006-959-800		10CC-X-9401 -0
	and a second second Second second second Second second		TYPE	CP10-03410		3/4
	.事材料表 ALLATION MATERIALS	CSH-22/22F/24/24F 24FL	カラースキャニンク <sup>・</sup> ソナ COLOR SCANNI	- Ng sonar		
番 号 NO.	名称 NAME	略 図 OUTLINE	型 DESC	名/規格 CRIPTIONS	数量 0' TY	用途/備考 REMARKS
21	ミガキ平座金 FLAT WASHER	¢ 22	M10 SS41 CODE NO.	MFZN2-B	2	受信装置用 FOR RECEIVER UNIT
22	コネクタ CONNECTOR		54-038-0 CODE NO.	00-601/SC	3	受信装置用 FOR RECEIVER UNIT
23	7-ス板 COPPER STRAP	50 L=1.2	WEA-1004 CODE NO.	-0 500-310-040	1	受信装置用 FOR RECEIVER UNIT
24	圧着端子 CRIMP-ON LUG	71(0 11)	FV1. 25-M CODE NO.	4 7ħ 000-536-715	5	上下装置用 FOR HULL UNIT
25	圧着端子 CRIMP-ON LUG		FV1. 25-3	.7 7ħ	15	上下装置用 FOR HULL UNIT
26	圧着端子 CRIMP-ON LUG		FV5. 5-4 CODE NO.	000-538-123	5	上下装置用 FOR HULL 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	72板 COPPER STRAP	50 L=1.2	WEA-1004	-0 500-310-040	1	送振装置用 FOR TRANSMITTER UNIT
29	בינק Contact Pin		60-8017-	0313-00-339	120	送振装置用 FOR TRANSMITTER UNIT
30	k−#7° ラク″ HOLE PLUG		NO. 4567 CODE NO.	000-800-729	4	送振装置用 FOR TRANSMITTER UNIT

C1292-M03- A

C1292-MO3- A FURUNO ELECTRIC CO ., LTD

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



			CODE NO. 006-959-800			10CC-X-9401 -0
		TYPE CP10-03410			4/4	
	.事材料表 ALLATION MATERIALS	CSH-22/22F/24/24F カラースキャニング ソナー 24FL COLOR SCANNING SONAR				
番 号 NO.	名称 NAME	略 図 OUTLINE	型 DES	名/規格 CRIPTIONS	数量 0' TY	用途/備考 REMARKS
31	圧着端子 CRIMP-ON LUG		FV1. 25-M	4 7ħ 000-536-715	5	送振装置用 FOR TRANSMITTER UNIT
32	コネクタ CONNECTOR		54-038-0 CODE NO.	00-601/SC	3	送振装置用 FOR TRANSMITTER UNIT
33	貼りマーク STICKER		10-026-5 CODE NO.	002-0	1	送振装置用 FOR TRANSMITTER UNIT
34	コネクタ CONNECTOR		54-038-0 CODE NO.	00-601/SC	1	電源装置用 FOR POWER SUPPLY UNIT
35	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
36	ホールフ <sup>°</sup> ラク <sup>°</sup> HOLE PLUG	¢ 20	NO. 4567 CODE NO.	000-800-729	4	電源装置用 FOR POWER SUPPLY UNIT
37	7-2板 COPPER STRAP	50	WEA-1004 CODE NO.	500-310-040	1	電源装置用 FOR POWER SUPPLY UNIT
38	圧着端子 CRIMP-ON LUG	71(011)	FV1. 25-M CODE NO.	4 7 <sup>1</sup> 000-536-715	6	電源装置用 FOR POWER SUPPLY UNIT
39	貼りァーク. 1. STICKER. 1.	<u>30</u> <u>7</u>	10-026-7 CODE NO.	018-0	1	電源装置用 FOR POWER SUPPLY UNIT
40	בילאלי Contact Pin		60-8017- CODE NO.	0313-00-339	_ 38	電源装置用 FOR POWER SUPPLY UNIT

C1292-M04- A

FURUNO ELECTRIC CO., LTD

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

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	URUI		CODE NO.	006-027-830	)	10CI-X-9501 -2	
			TYPE	FP10-01801	······	1	1/1
付 ACCE	「属品表 SSORIES						
番号 NO.	名称 NAME	略 図 OUTLINE	型 DES(	名/規格 CRIPTIONS	数量 Q' TY	用途/備考 REMARKS	
1	7-1. HOOD		10-062-16 CODE NO.	501–0 100–250–550	1		
2	フード取り付け金具 HOOD MOUNTING PLATE		16-062-16 CODE NO.	100-250-560	1		
3	フィルタービス FILTER MOUNTING SCREW	φ 10	66-007-12 CODE NO.	222-0 860-712-220	1		
4	+バインド /トネジ BINDING HEAD SCREW		M3X6 C270 ローナイロンワッ CODE NO.	0Wポリシール ク シャツキ 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.)

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			CODE NO.	006-989-020	)	10BW-X-9505 -1
			TYPE	FP10-01201		1/1
付 ACCE	· <b>属品表</b> SSORIES					
番号 NO.	名称 NAME	略 図 OUTLINE	型 DES(	名/規格 CRIPTIONS	数量 Q' TY	用途/備考 REMARKS
1	取手 HANDLE		14-002-1 CODE NO.	125–2 840–211–252	2	
2	ローセ <sup>*</sup> ット座金 ROSETTE WASHER		M6 C2700V CODE NO.	V 木 <sup>-</sup> リシール クロ 000-864-910	4	
3	+丸皿小ネジ OVAL COUNTERSUNK HEAD SCREW		M6X20 C27 ・リシール クロ CODE NO.	700W <b>*</b> 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.)

			CODE NO. 006-989-040			10BW-X-9504 -1	
			TYPE	FP10-01203		1/1	
付属品表							
ACCE	SSORIES						
番 号 NO.	名 称 NAME	略 図 OUTLINE	型: DESC	名/規格 RIPTIONS	数量 Q' TY	用途/備考 REMARKS	
1	掛具 H00K		10-026-82 CODE NO.	100-008-801	1		
2	+t^`P911*>" SCREW	$\int_{1}^{\frac{14}{14}} \frac{14}{10} \phi 3$	3X14 SWCH	18A MFZN-2-C 000-800-172	2		

DWG NO. C1286-F04- B FURUNO ELECTRIC CO , LTD. (略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO			CODE NO.			10BW-X-9501 -5	1/1
付属品表 ACCESSORIES		CSH-21/F/K/216/216F CSH-53, 58 CSH-71, 73 CSH-81, 83	F, CSH-23/	΄F/K/FL			
番号 NO.	名称 NAME	略 図 OUTLINE	型 4 DESC	名/規格 RIPTIONS	数量 Q' TY	ーーーーーーーーーーーーーーーーーーーーーーーーーーーーーーーーーーーー	
1	ナイロンカハ <sup>-</sup> - PLASTIC COVER	4 <u>90</u> 525 	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.)

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FURUN			CODE NO.	CODE NO.         006-908-550           TYPE         FP10-01901		10CM-X-9501 -1
			TYPE			1/1
付属品表		CSH-24/24F/24FL/84	カラースキャニング「ソナー			
ACCE	SSORIES		COLO	R SCANNING SO	<b>IA</b> R	
番 号 NO.	名称 NAME	略 図 OUTLINE	型名/規格 DESCRIPTIONS		数量 0' TY	用途/備考 REMARKS
. 1	+ ベインドノトネジ BINDING HEAD SCREW		M3X10 C2700₩★* リシール クロー ナイロンワッシャツキ		4	
			CODE NO.	000-800-923		
2	7-h'取付金具 HOOD FIXTURE		10-064-1602-0		1	
		29 <u>1</u> 12	CODE NO.	100-253-720		
3	7149-L° X		66-007-1222-0			
	FILTER MOUNTING SCREW \$ 10		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.)

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FURUM		CODE NO.			10CB-X-9501 -2	
			TYPE			1/1
付属品表		CSH-288W/88/22/22F 72/82/24/24F/24FL 84	5-2‡+=>9 >>+	-		
		COLOR SCANNING SONAR				
ACCE	SSORIES					
番号 NO.	名称 NAME	略 図 OUTLINE	型名/規格 DESCRIPTIONS		数量 0' TY	用途/備考 REMARKS
. 1	ナイロンカハーー PLASTIC COVER	590,	10-054-1021		1	
		, main 580	CODE NO.	000-804-936		

C1310-F03- A FURUNO ELECTRIC CO ., LTD (略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUR			CODE NO.			10CP-X-9501 -0	
<b></b>			TYPE				1/1
付属品表 ACCESSORIES		CSH-23/23F/24/24F/5	CSH-23/23F/24/24F/53/58/73/83/84/				
番号 NO.	名称 NAME	略 図 OUTLINE	型 DESC	名/規格 RIPTIONS	数量 Q' TY	用途/備考 REMARKS	
1	RAMカート 組品 RAM CARD		OORAM256C-001 CODE NO. 004-321-070		1		

DWG NO. C1307-FO2- 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	1	····	10CH X 0502 0	
			TYPE			10Cm-x-9502 -0	1/1
付属品表 ACCESSORIES		CSH-24/24F/24FL/84	カラーフ	 、キャニング、ソナー			
		COLOR SCANNING SONAR					
番 号 NO.	名称 NAME	略 図 OUTL I NE	型: DESC	名/規格 RIPTIONS	数量 0' TY	用途/備考 REMARKS	
1	7-F		10-064-1601-0 CODE NO. 100-253-710		1		

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C13<u>10-</u>F04- A FURUNO ELECTRIC CO ., LTD (略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)



FURUNO ELECTRIC CO., LTD.

DUTLINE DRAWING

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C1307-G01- E

10-062-1000-G0



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FURUNO ELECTRIC CO., LTD.



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OUTLINE DRAWING FURUNO ELECTRIC CO., LTD.



FURUNO ELECTRIC CO., LTD.



## FURUNO ELECTRIC CO., LTD.






FURUNO ELECTRIC CO., LTD.



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<sup>Dwg No.</sup> C1257-014- F



## FURU

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		······································			
NCE SPACE					
	20001 1 150 1 150 1 150 1 008 008				
	00			E	
5向に一致させ 5切断のこと。 5るときは、ま 10T FACE SHI 10T FACE SHI 10 LENGTH UCER MAY BI SED.	まることだ き干形状・ PLAY UNI P' S BOW ACCORE E CHANG	ができないときは ・ 寸法が異なりま IT IF THE ARROV / DING TO INSTAL ED SLIGHTLY W	t、指示 ミす。 V MARK LATION HEN AN		
SUS 304	13	M20 × 120			
	37	MS-1000-68		_	
	48	MS-1000-67		4	
SUS304	37	MS-1000-69		-	
<i>SUS</i> 304	24	FOR M20			
SUS304	48	M20 JISB2401		-	
材質 MATERIAL (PE CSH-30)	1 数量 Q´TY 80/21080	V 585 ⊠ ∰ DWG.NO.	摘 要 REMARKS		
桥 上下装	置(スト)	コーク800mm)		- <b> </b> ·	
外寸図					
HULL UNIT (SUUMM TRAVEL)					
			LTD.	1	



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				A A		/ Proje Settingen Stitegen and
	雅奕小和千八八天角× RECOMMENDED MA	N-X INTENANCE SPACE				
		÷	000			A
			注1 NOTE 船首方向 BOW			
	RAISE/LOWER CONTROL BOX		800			
	<u>ケーブル 導入口</u> CABLE ENTRY 100	0 8	00			в
				V V		
	* * * * * * * * * * * * * *	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	<i>``</i> / / /			and the second second
2) 3) N( 1. 2. 3.	装置内で船首線を調整 装備位置に応じて 382m オプションの送受波器 OTE HEADING ADJUSTMEN ON GALLOWS FLANGE CUT THE TANK WITHIN SITE. THE DIMENSIONS OF T OPTIONAL TRANSDUCI	のこと。 m 以内で切断のこと。 を使用するときは、若 DOES NOT FACE SHIF N 382 mm IN LENGTH RANSDUCER MAY BE ER IS USED.	于形状 PLAY UN P'S BOV ACCORI	・寸法が異なりま IIT IF THE ARROW V. DING TO INSTALL GED SLIGHTLY WH	す。 / MARK _ATION HEN AN	
	~ 六角ボルト					
	/ HEX. BOLT , 絶縁パッキン()	<i>SUS304</i> 2)	13	MZU × 120		
	6 INSULATION PACK た絶縁パッキン(	(ING(2)	37	MS-7000-60		
	5 INSULATION PAC ,平 座 金	<u>KING(1)</u>	48	MS-1000-67		- Hereit
	4 FLAT WASHER - バネ座 金	505304	37	MS-1000-67	,	
	<u>3</u> SPRING WASHE	P 505304	24	FORMZU		- D
	$\frac{2}{HEX!} \frac{hEX!}{NUT}$	<i>SUS304</i>	48	M20 JISB2401		
	1 <u>O-RÍNĠ</u> 品番 品	名 材 質	<u>1</u> 数量	V 5 8 5 図番		
DRAWN	ITEM NAME	MATERIAL	Q'TY	DWG.NO.	REMARKS	1
02/06/20 1. YAMASAKI		CSH-312 名称 上工計算	20/2112 聖(フロ			
APPROVED	CSH-23/24	<u> エト装</u> メナ 図		$\mu = \gamma 1200 \text{mm})$		
SCALE NASS	MODEL BLOCK	No. NAME HILLIN	UT (12)	Omm TRAVEL)		
<sup>Dwg No.</sup> C1257-015- G			DRAWI			
<u></u>	F	URUNO EL	ECT	RIC CO.,	LTD.	е .











FURUNO ELECTRIC CO., LTD.



## 装備手順

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船底板及び二重船底板に0586の穴を明ける。

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- 次の点に注意して格納タンクを船包板に連続スミ肉溶接する。 \* タンクのフランジ面が標準定航時に水平になる事。 \* フランジ面のボルト元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。且っ、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1300mm)
- 格納タンクの周囲に外径<u>タ1300</u>以上のダブリング⑧を取り付ける。 ス.突出装備((A)(B)の場合には整流覆(9(D図)を取り付ける。 ダブリングと整流層には、船底板と同じ村質、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、隔壁のをめぐらせ、 コファダムのを設ける事。
- 5. タンク周囲4ヶ所以上に補強板⑤を溶接する。
  - 上下装置本体を格納タンクにボルト諦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250 mm以上離す。 2重船底が高い船には(3)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

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1. Cut out  $\emptyset$  586 hole on hull and inner hull

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- 2. Install tank to hull plate with fillet we into account.
  - \* Flange face is exactly horizontal at no
  - \* One of 24 bolt holes on flange is faced \* Allow height of flange face from keel be drawings, otherwise transducer beam is
  - ducer is fully lowered.
    \* Tank's length "Lt" should be less than tank is placed below keel level. "Lt" drawings so that the transducer can be tank is supplied with 1300mm long as st
- 3. Fit doubling plate  $\textcircled{0}{8}$  of outer dia.  $\oiint{0}{2}$  13 plate. Fit fairing plate  $\textcircled{0}{9}$  referring to tion method  $\textcircled{0}{8}$  and  $\textcircled{0}{8}$ . Use same materia fairing plate as hull plate.
- 4. Provide cofferdam around the tank in orde oil tank.
- 5. Install 4 pcs. of reinforcement plates be plate.
- 6. Allow clearance of more than 250mm below Sink the inner hull plate as shown in the plate.

	FOR 1300 mm TANK	製 図 DRAWN	Dec. 17, '84	重 WEIG	量    kg	図番 DWG.NO.
300	主) CSH-20S/20F/21Fでは 1200/1600ストロークのみ。	検 図 CHECKED	Jan 12, 85 n. Cur da	尺 SCAI	度 LE	IN OF
		承認 APPROVED	THE .	THIRD	三 角 法 ANGLE PROJECTION	名称 TITLE 格
		CSH-20/21	SINGLE freq.	品番 ITEM	RETRACTION TANK 品名 NAME	材質 MATERIA
OFF REEL				2	TANK FLANGE 格納タンク	·····
				3	補 5虫リフ <u>REINFORCEMENT RIB</u> タンクフランジ	
				4	二重船底板 INNER HULL PLATE	· .
<u>v</u>				5	補 強 板 REINFORCEMENT PLA	TE
10 8 8 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				6	nocc PLAIE 油槽隔壁 BULKHEAD	
~ 100.				7	DOUBLING 船底板	
				9	FAIRING PLATE	
Travel 1				10	コファタム <u>COFFERDAM</u> 整流費	
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plate.			· · · ·		
lding taki	ing the f	following poi	nts	A	
ormal Ship I dead ahea oottom "Ht' blocked by	's trim. ad. ' mentior / the kee	ed in the 1 when trans			
"Ht". If is also l fully retu andard.)	not so, imited as racted ir	bottom end o shown in th tank. (The	f e		
300 around to the draw al and th	d the tar wing D ickness c	nk on hull for installa of doubling a	- nd		
er to isola	ate the t	ank from the		В	
etween the	tank and	the hull			
the flange drawing	e face fo B for H	or easy bolti nigh inner hu	ng. 11		
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		yayan ya		-	
材 質 MATERIAL	数量 Q′TY	図番 DWG.NO.	摘要 REMARKS		
<sup>称</sup> 格納タンク装備要領図(鋼船) INSTALLATION METHOD OF RETRACTION TANK(STEEL HULL)					
G.NO. C1257−082−C					
NO EL	ECT	RIC CO	., LTD.	- - 	





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FURUNO ELECTRIC CO., LTD.







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