

Installation Manual

NAVIGATIONAL ECHO SOUNDER

Model FE-800

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SAFETY INSTRUCTIONS

The installer must read the applicable safety instructions before attempting to install the equipment.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.



Warning, Caution



Prohibitive Action



Mandatory Action



WARNING



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

Only qualified personnel should work inside the equipment.



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

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



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

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



Be sure no water leaks in at the transducer mounting location.

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.



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.



Securely attach protective earth to the ship's body.

The protective earth is required to prevent electrical shock.



Use the proper fuse.

A wrong fuse can cause fire or serious damage to the equipment.



CAUTION



When handling the transducer cable, keep in mind following points:

- Keep the cable away from oil and fuel.
- Keep the cable away from the place where it may be damaged during the installation.
- Do not paint the cable.
- The sheath of the transducer cable is made of chlorophrene rubber (or vinyl chloride). Therefore, do not paint the sheath with organic liquid (such as toluene) since it may harm the sheath.



Observe the following compass safe distances to prevent deviation of a magnetic compass:

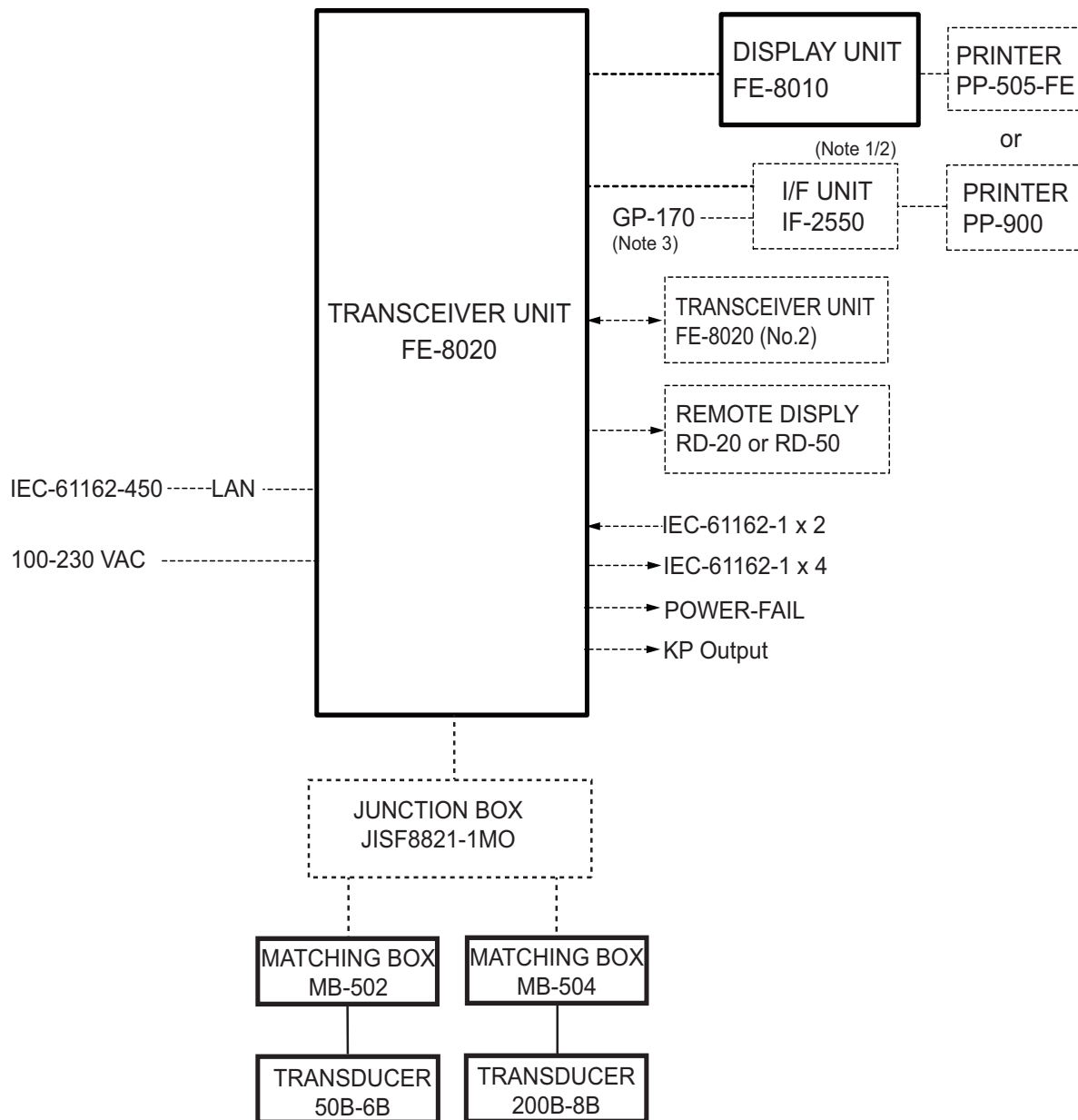
	Standard compass	Steering compass
Display unit FE-8010	0.75 m	0.50 m
Transceiver unit FE-8020	1.50 m	0.95 m
Matching box MB-502	0.80 m	0.50 m
Matching box MB-504	0.65 m	0.40 m



Turn off the POWER switch when the transducer is not in water.

Operating the transducer when it is not in water may damage the transducer.

SYSTEM CONFIGURATION



Equipment category	
Display unit	protected from weather
Transceiver unit	protected from weather

— : Standard supply
 : Optional or local supply

Note 1: Interface unit IF-2550 is required to connect PP-900.

Note 2: IF-2550 should be updated to v01.04.

Note 3: Similarly to the PP-505-FE, in order to print the date and time, latitude/longitude, speed and course data, it is necessary to additionally connect a GP-170 to the IF-2550 connected to the PP-900. If no additional GP-170 is connected, only depth information will be printed.

EQUIPMENT LISTS

Standard Supply

Name	Type	Code No.	Qty	Remarks	
Display Unit	FE-8010	—	1		
Transceiver Unit	FE-8020	—	1		
Matching Box	MB-502	—	1	Select one.	For 50B-6B
	MB-504	—	1		For 200B-8B
Transducer	50B-6B	—	1	Select one.	w/ 15/30/50 m cable
	200B-8B	—	1		w/ 15/30/50 m cable
Transducer Case	TTF-5600 (5K-32A)	—	1	For 50B-6B, w/ flange, select thickness from 20 (std.) /12/25	
	TTF-2000 (5K-32A)	—	1	For 200B-8B, w/ flange select thickness from 20 (std.) /12/25	
Installation Materials	CP12-01101	001-273-980	1	For display unit. Self-tapping screw, 4 pcs. (Type: 5×20 SUS304, Code No.: 000-171-997-10)	
	CP12-01201	001-273-730	1	For transceiver unit	
	CP02-08802	001-106-500	1	For Transducer Case TTF-5600	
	CP02-08801	001-106-490	1	For Transducer Case TTF-2000	
Accessories	FP12-00801	001-273-990	1	For display unit	
Spare Parts	SP12-00801	001-274-790	1	Fuse, 2 pcs. (Type: FGMB 250V 2A PBF, Code No.: 000-157-497-10), for transceiver unit	

Optional Supply

Name	Type	Code No.	Remarks
Transceiver Unit	FE-8020	—	
Junction Box	JISF8821-1MO BTB15C3	—	
Matching Box	MB-502	—	For 50B-6B
	MB-504	—	For 200B-8B
Transducer	50B-6B	—	w/15/30/50 m cable
	200B-8B	—	w/15/30/50 m cable
Transducer Case	TTF-5600 (10K-40A)	—	For 50B-6B, w/ flange
	TTF-2000 (10K-40A)	—	For 200B-8B, w/ flange
Transducer Tank	TTF-5001	—	For 50B-6B, w/o flange
	TTF-2001	—	For 200B-8B, w/o flange
	TTF-5002 (5K-32A)	—	For 50B-6B, w/ flange, T25
	TTF-2002 (5K-32A)	—	For 200B-8B, w/ flange, T25
	TK-052 (5K-32A, T-20/25)	—	For 200B-8B, w/ flange, T25
	TTF-5600 (5K-32A, T-30)	—	For 50B-6B, w/ flange, T30
Gate Valve	GV-50B-6B	—	w/ Installation Materials CP02-07601 (Code No.: 002-891-620)
	GV-200B-8B	—	
Bracket Assembly w/Knobs	OP26-8	000-016-313	For display unit, see page 3 for details.

Name	Type	Code No.	Remarks
Front Fixing Panel	OP26-28	001-247-250	For display unit, change cutout from octagon to square. (See page 2 for details.)
Front Fixing Panel	OP12-1	001-273-660	For display unit, replace FE-680 or FE-680T. (See page 3 for details.)
Printer	PP-505-FE	—	
	PP-900	—	
Data Recording Software for PC	OP12-2	001-273-650	
Installation Materials	CP12-01101(BOX)	001-273-760	For display unit
	CP12-01201(BOX)	001-273-790	For transceiver unit
	CP24-02900(10M)	001-208-050	For transceiver unit, LAN cable
	CP24-02910(20M)	001-208-060	
	CP24-02920(30M)	001-208-070	
Accessories	FP12-00801(BOX)	001-273-770	For display unit
Spare Parts	SP12-00801(BOX)	001-273-780	For transceiver unit
Operator's Manual (CD-ROM)	FE-800 O/M *CD-ROM*	—	
Interface Unit	IF-2550	—	For PP-900

Note: Windows is a registered trademark or trademark of the Microsoft Corporation of the USA and other countries.

1. MOUNTING

NOTICE

Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

1.1 Display Unit

1.1.1 Installation consideration

The display unit can be installed on a desktop or flush mounted in a console or panel. When selecting a mounting location, keep in mind the following points:

- The nominal viewing distance for the display unit is 0.9 m. Select a suitable mounting location considering that distance.
- Locate the unit away from exhaust pipes and vents.
- Select an installation location that is well ventilated.
- Locate the unit where shock and vibration are minimal.
- Locate the unit away from equipment which generates the electromagnetic fields like a motor or generator.
- Allow enough maintenance space at the sides and rear of the unit and leave enough slack in cables to facilitate maintenance and servicing.
- Observe the compass safe distances in the "SAFETY INSTRUCTIONS" (on page i) to prevent interference to a magnetic compass.
- For flush mounting in a panel, the mounting surface must be flat. Do not install the unit on an uneven surface.

1.1.2 How to remove the cover

While pressing the center of the cover with your thumbs as shown in the right figure, pull the cover towards you to remove it.

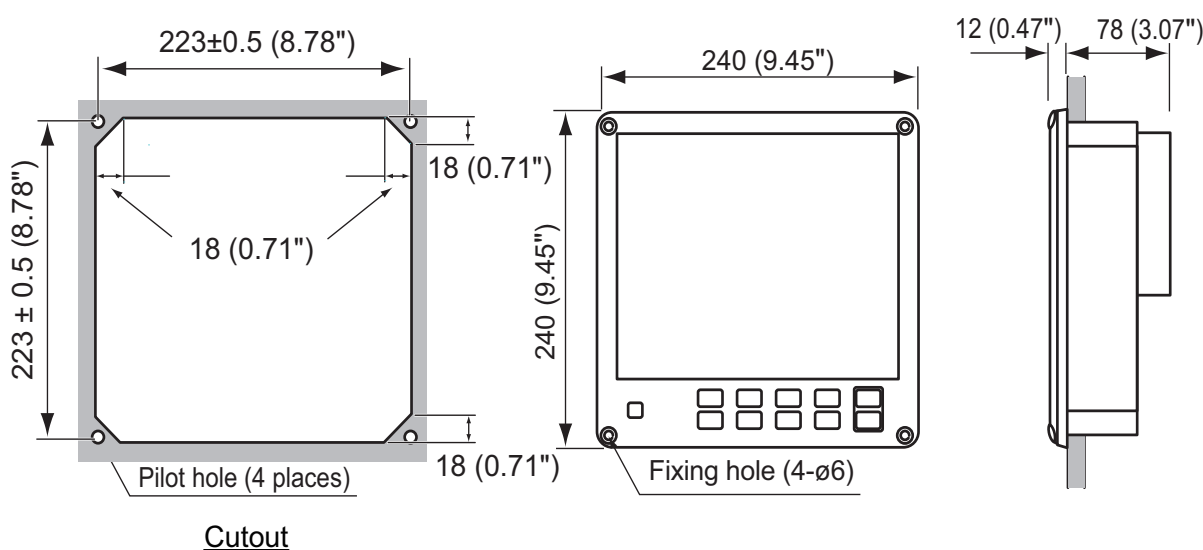


1.1.3 Flush mounting

For details, see the outline diagrams at the back of this manual.

For octagonal cutout

1. Make an octagonal cutout in the mounting location as shown in the illustration below.
2. Make four pilot holes for self-tapping screws in the location indicated in the illustration below.
3. Set the display unit to the cutout and fasten the display unit with four self-tapping screws ($\phi 5 \times 20$).
4. Set a cosmetic cap to each fixing hole on the front panel. (See "How to set the cosmetic cap" on page 4.)



For square cutout

You can install the display unit in a square cutout using with the optional kit OP26-28.

Front Fixing Panel OP26-28 (code no.: 001-247-250)

No.	Name	Type	Code no.	Qty	Remarks
1	Self-tapping screw	5×20 SUS304	000-163-915-10	4	
2	Front fixing panel	26-003-1701	100-382-080-10	1	
3	Binding screw	M5×16 SUSU304	000-163-898-10	4	
4	Manual	C72-01302-*	—		

1. Make a square cutout (239 ± 1 mm) in the mounting location referring to the outline drawing at the back of the manual.
2. Make four pilot holes for self-tapping screws in the location.
3. Attach the front fixing panel to the display unit from the front side with binding screws (M5×16).
4. Set the display unit to the cutout and fasten the display unit with four self-tapping screws ($\phi 5 \times 20$) from the front side.
5. Set a cosmetic cap to each fixing hole on the front panel. (See "How to set the cosmetic cap" on page 4.)

1. MOUNTING

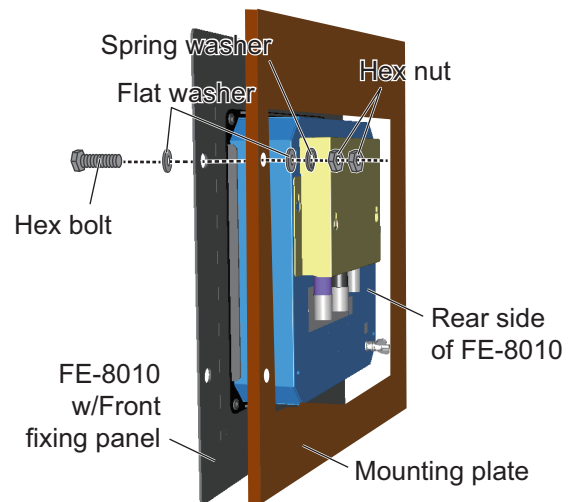
For replacement of FE-680/FE-680T

You can replace FE-680/FE-680T with FE-800, using the optional Front Fixing Panel kit OP12-1.

Front Fixing Panel OP12-1 (code no.: 001-273-660)

No.	Name	Type	Code no.	Qty	Remarks
1	Binding head screw	M5×12 SUS304	000-171-999-10	4	
2	Front fixing panel	12-005-1131-0	100-391-660-10	1	
3	Hexagonal head bolt	M8×35 SUS304	000-164-170-10	4	
4	Spring washer	M8 SUS304	000-167-410-10	4	
5	Flat washer	M8 SUS304	000-167-464-10	8	
6	Hexagonal nut	M8 SUS304	000-167-479-10	8	

1. Remove FE-680/FE-680T from mounting location.
2. Attach the front fixing panel to the display unit from the front side with binding head screws (M5×12).
3. Set the display unit to the original cutout then fasten the display unit as shown in the right figure.



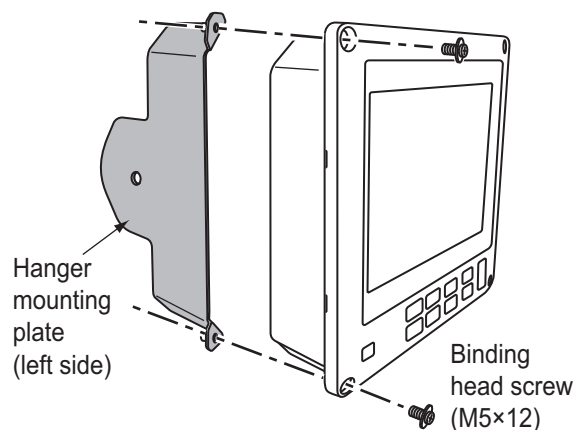
1.1.4 Desktop mounting

The display unit can be mounted on a desktop using the optional hanger. See the outline drawing for details.

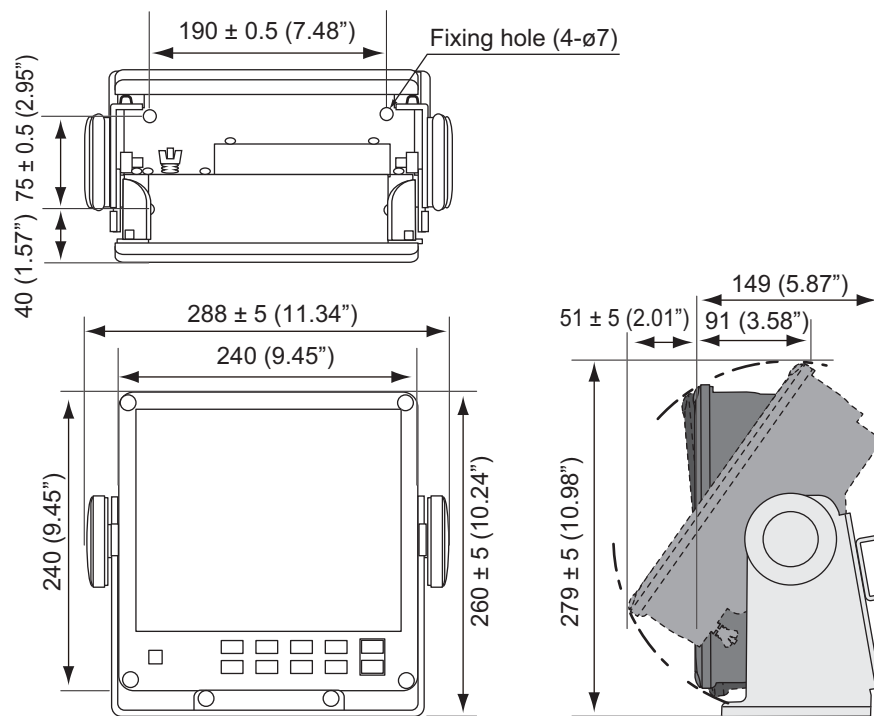
Bracket Assembly with Knobs (Type: OP26-8, Code no.: 000-016-313-00)

Name	Type	Code No.	Qty
Self-tapping screw	5×20	000-171-997-10	4
Binding head screw	M5×12	000-171-999-10	4
Hanger assy.	OP26-8-1	001-081-920-00	1

1. Remove the hanger mounting plate from the hanger assembly.
2. Fasten the hanger mounting plate to the display unit from the left side and right side with four binding head screws (M5×12).

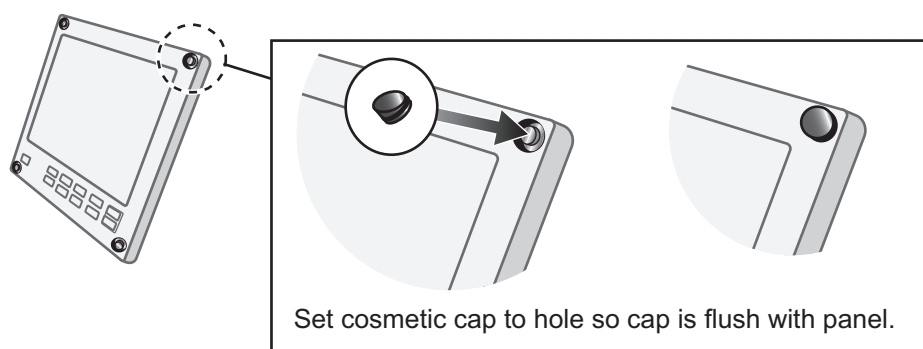


3. Make a four pilot holes for self-tapping screws ($\phi 5 \times 20$) in the mounting location.
4. Fix the hanger to the mounting location with four self-tapping screws ($\phi 5 \times 20$).
5. Insert a washer to each knob (right and left) and fix the washer to the display unit loosely.
6. Set the display unit to the hanger.
7. Tighten the knobs to fasten the hanger to the display unit.
8. Set a cosmetic cap to each fixing hole on the front panel. (See below "How to set the cosmetic cap".)



How to set the cosmetic cap

Set a cosmetic cap to each fixing hole on the front panel as shown in the figure below.



1.2 Transceiver Unit

1.2.1 Installation considerations

Keep in mind the following points when selecting a location.

- Locate the transceiver unit away from heat sources because of heat that can build up inside the cabinet.
- Locate the unit where shock and vibration are minimal.
- Locate the transceiver unit away from places subject to water splash and rain.
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- Be sure to connect the ground wire IV-2sq. (between the earth terminal on the chassis and the ship's earth).
- A magnetic compass will be affected if the transceiver unit is placed too close to the magnetic compass. Observe the compass safe distances in the "SAFETY INSTRUCTIONS" (on page i) to prevent interference to a magnetic compass.
- Install the transceiver unit on the floor, or on a bulkhead.

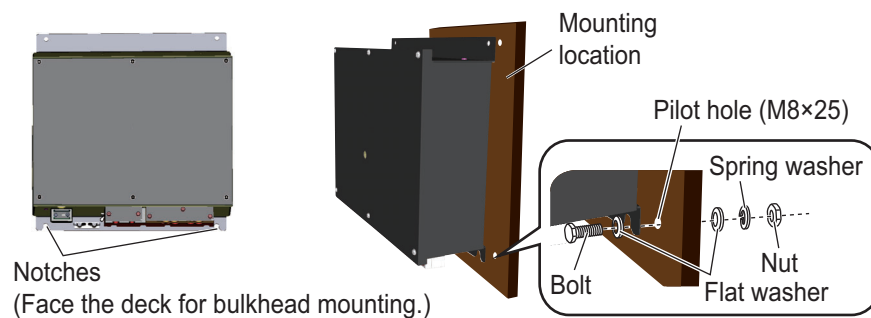
1.2.2 How to install the transceiver unit

The transceiver unit can be mounted on a desktop or a bulkhead. See the outline drawing for details.

Note 1: For desktop mounting, install the unit where it won't get wet from rain or water splash.

Note 2: For bulkhead mounting, fix the unit so that the notches on it are facing the deck.

1. Make four pilot holes for hexagonal nuts (M8×25) in the mounting location.
2. Fasten the transceiver unit as shown below.



1.3 Transducer

The installation of the transducer and the tank should be accomplished by a dockyard referring to the installation drawings at the back of this manual. An example of transducer installation method is also shown in paragraph 1.3.2.

Note: Discussions should be taken place and agreement reached with the dockyard for sufficient reinforcement and watertightness of the hull to comply with the regulations concerned.

1.3.1 Installation considerations

The most important matter is where the transducer is installed. To decide the location of the transducer, the following points should be taken into account.

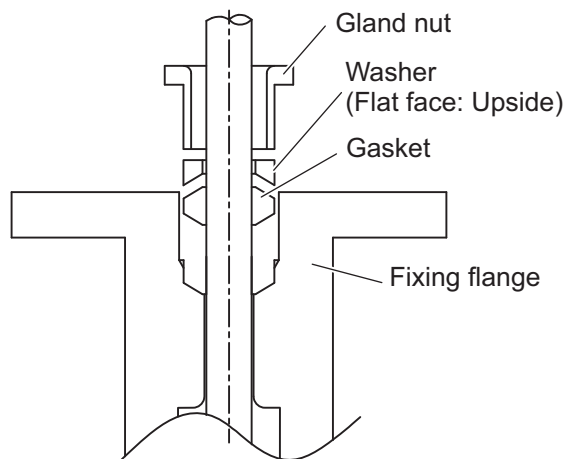
- The position should be free from aeration possibly occurring beneath the hull and also not affected by engine and propeller noise.
- It is known that air bubble streams start approximately from a quarter length of the ship's length from the bow, and spreads over the hull bottom approximately to three quarters. Air bubble streams vary in form and intensity according to ship's speed, draught, trim, shape of bow and hull, as well as sea state.
- Sitting near obstructions such as the forward propeller, bow thruster, water intake pipes and speed log signal should be avoided.
- Select a place giving minimum mechanical vibration.
- Do not lay the transducer cable near or in parallel with other electric cables.

1.3.2 How to install the transducer (Example for TTF-5600)

The transducer tank should be welded to the hull so as to be flush with the hull bottom. This should be done by the shipyard before installing the transducer.

Note: Be sure to remove the transducer and rubber gasket prior to welding the transducer tank to the hull. Further, re-attach the fixing flange temporarily, to avoid heat distortion when welding.

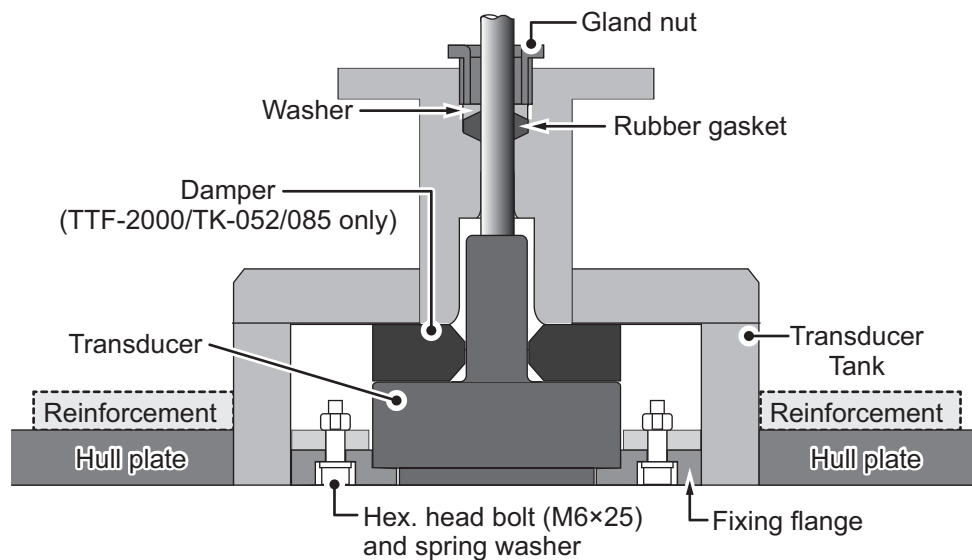
1. Feed the transducer cable through the cable gland.
2. Apply sealing tape to the threads of the gland nut for watertightness.
3. Pass the cable thru the gasket, washer and gland nut.



4. Fix the transducer to the tank with the transducer fixing flange.
5. Coat the thread of gland nut with silicone grease.
6. Tighten the gland nut.
7. It is recommended to enclose the transducer cable in a conduit pipe for waterproofing and electrical shielding as well as for protecting the cable from mechanical damage. The conduit pipe should be fixed to the flange on the transducer tank. The pipe should be of such a length to clear the water level when the ship is fully loaded. The pipe end should be finished with filling compound. It is recom-

1. MOUNTING

mended to fill the pipe with sand between the transducer and the junction box (or matching box). This will protect the transducer from vibration and damage.



1.4 Matching Box

The matching box should be selected based on the transducer type; and should be installed between the transceiver unit and the transducer unit. (A second matching box is optional.)

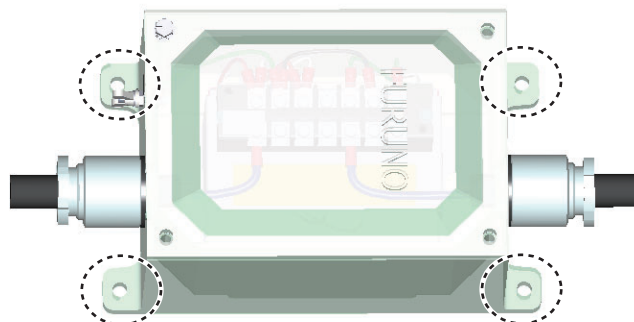
- 50B-6B transducer: MB-502
- 200B-8B transducer: MB-504

1.4.1 Installation considerations

The matching box can withstand minor water splash, however, locate the unit away from places subject to direct water and rain.

1.4.2 How to install the matching Box

Fasten the matching box with four self-tapping screws ($\phi 6 \times 20$, local supply). Observe the compass safe distances in the "SAFETY INSTRUCTIONS" (on page i) to prevent interference to a magnetic compass.



1.5 Gate Valve GV-50B-6B, GV-200B-8B (option)

Assemble the gate valve as shown below. Refer to the drawing at the end of this manual.

1. Disassemble the gate valve assembled tentatively: spacer, gasket1, gate valve, gasket 2, seachest cap and shaft assembly.

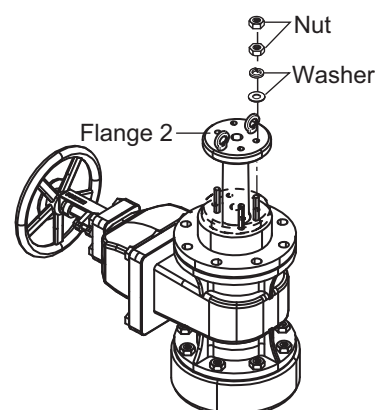
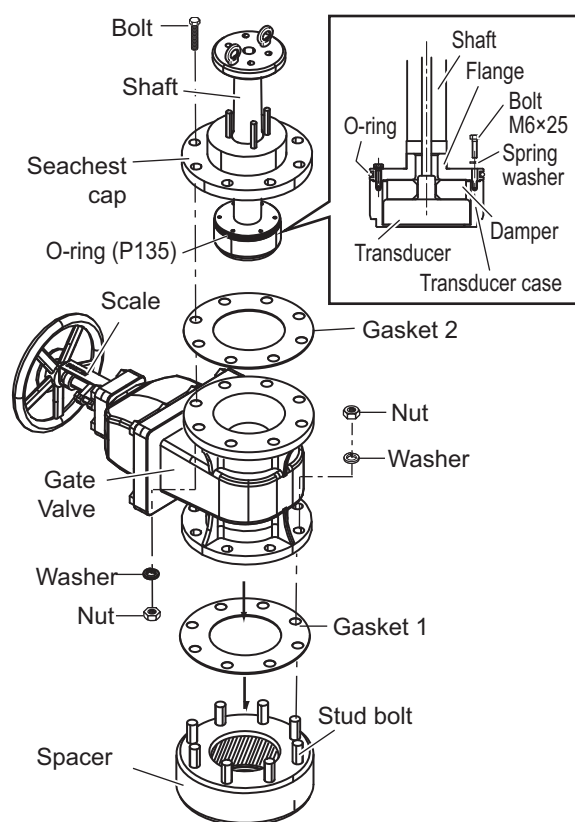
When assembling the gate valve, use original washers, bolts and nuts. Keep the bottom of the seachest cap and the shaft free of dust and be careful not to damage them.

2. Weld the spacer to the hull bottom.

The hull side of the spacer should be flush with the hull bottom. Be careful not to damage the side fixed to the gate valve.

3. Clean the side of the spacer to be fixed to the gate valve.
4. Grease (supplied) both sides of the gasket 1 and the inner side of the spacer. Place the gasket 1 onto the spacer.
5. Clean the flange side of the gate valve, and place it on the gasket 1. The scale side of the gate valve should be up.
6. Fix stud bolts of the spacer with washers and bolts loosely.
7. Keep seachest cap and shaft assembly free of dirt and dust.
8. Grease (supplied) both sides of the gasket 2 and place it onto the gate valve.
9. Place seachest cap and shaft assembly onto the gasket 2.
10. Fix the assembly with bolts, nuts and washers loosely.
11. Unscrew nuts from flange 2, and confirm that shaft can be moved up and down smoothly by hand.
You will feel some resistance because of the O-ring (P135).
12. Fasten the gate valve with bolts, nuts and washers above and below.

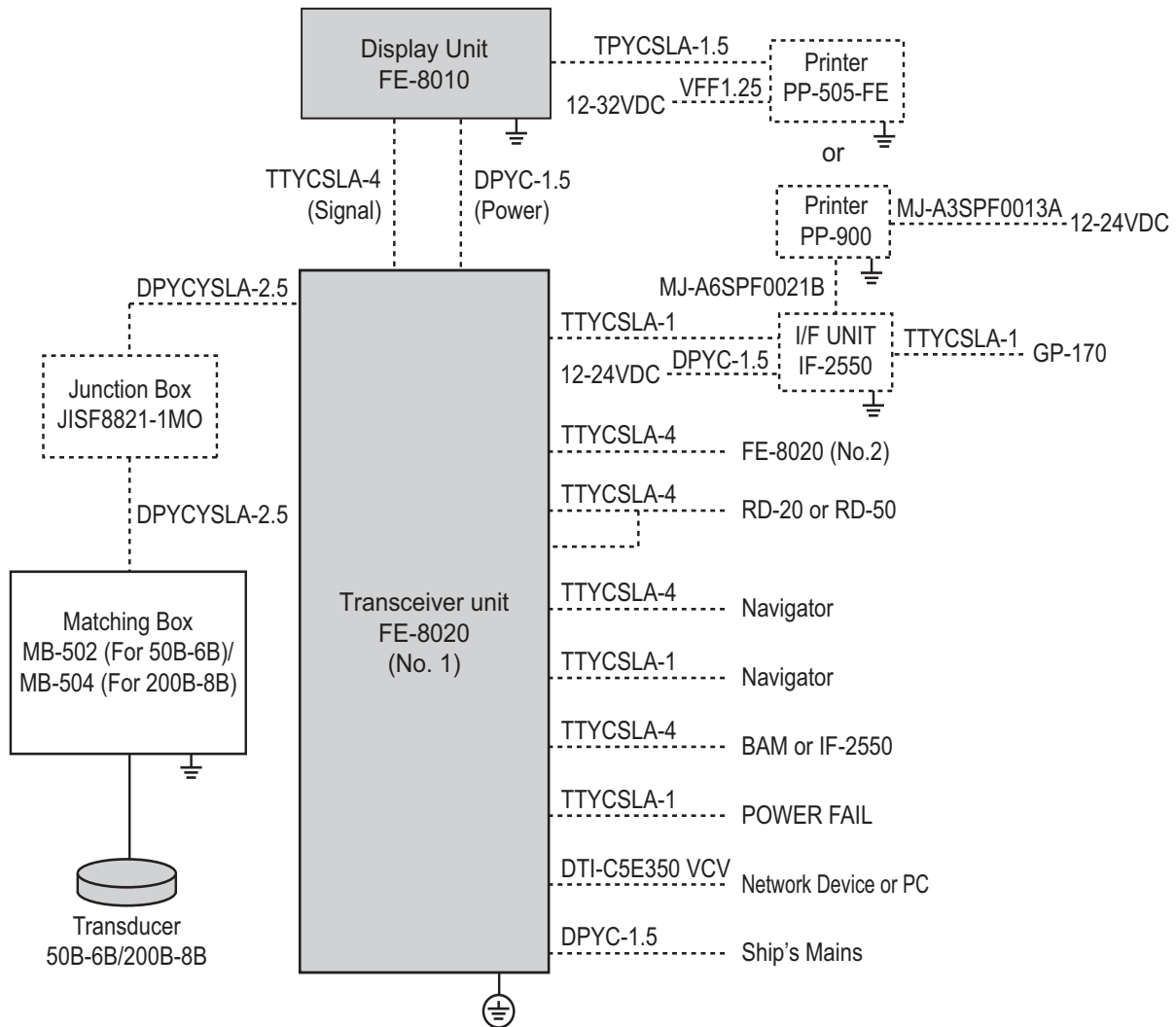
Note: When installing a transducer, do it before step 7 or after removing the seachest cap and the shaft assembly.



2. WIRING

2.1 Wiring

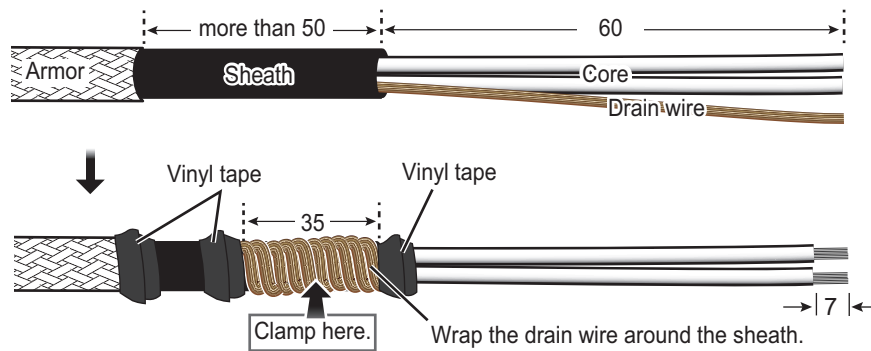
The illustration below shows the cables to use to connect the units of the system. See the interconnection diagram at the back of the manual for details. The cables shown with dashed line are local supply.



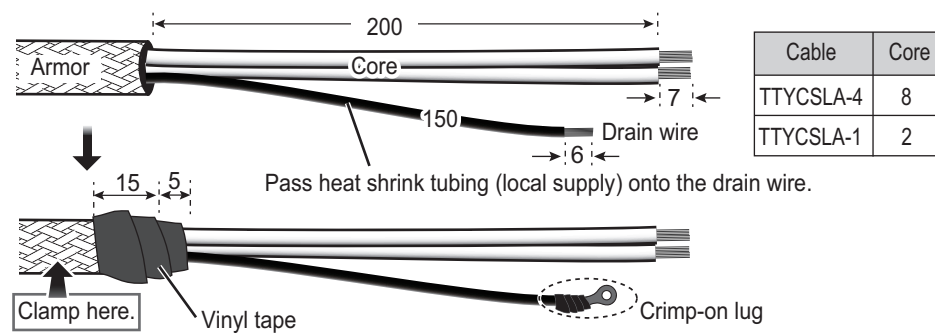
2.2 Cable Fabrication

TTYCSLA-1/TTYCSLA-4

<Side: Display unit>

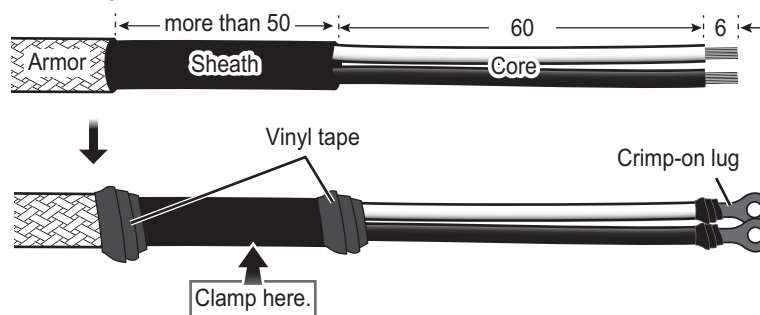


<Side: Transceiver unit>

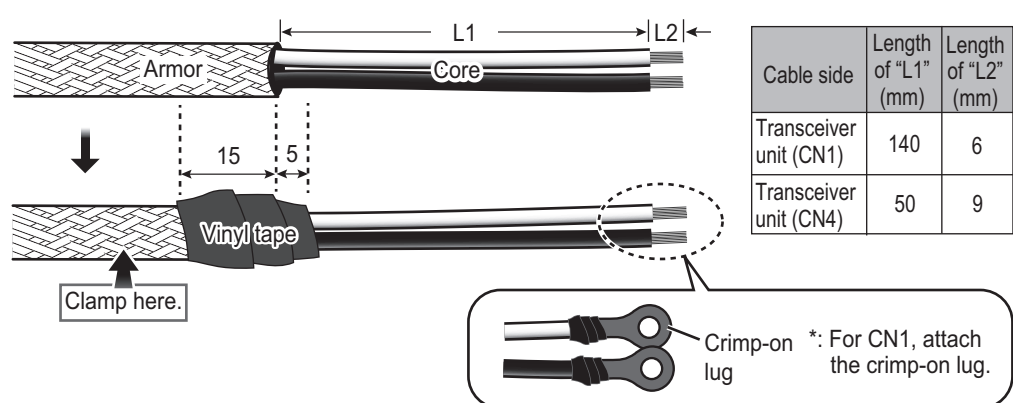


DPYC-1.5

<Side: Display unit>

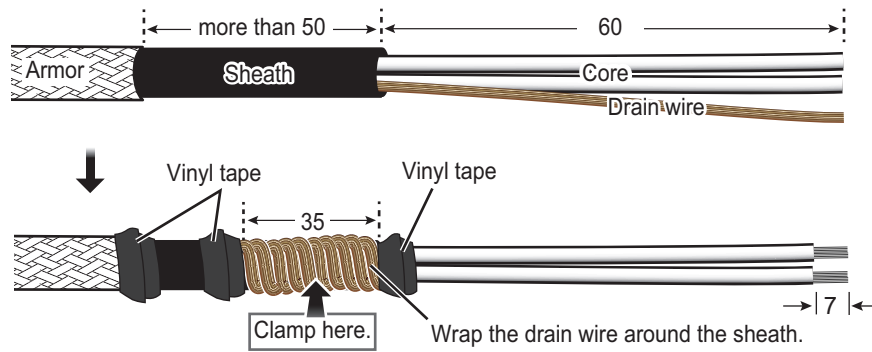


<Side: Transceiver unit>



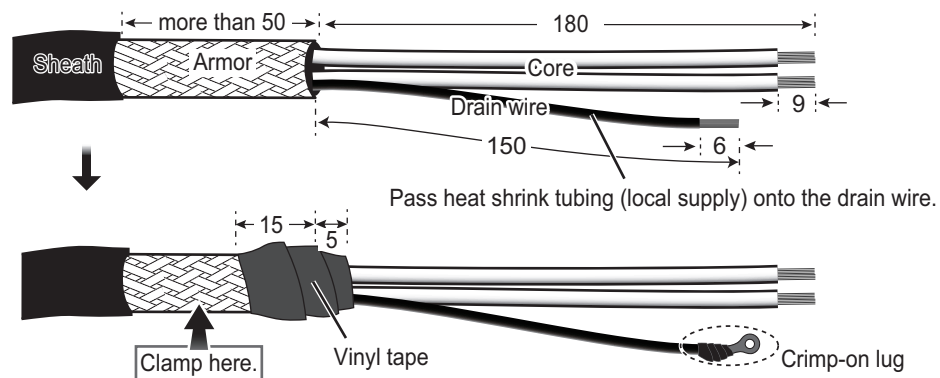
TPYCSLA-1.5

<Side: Display unit>

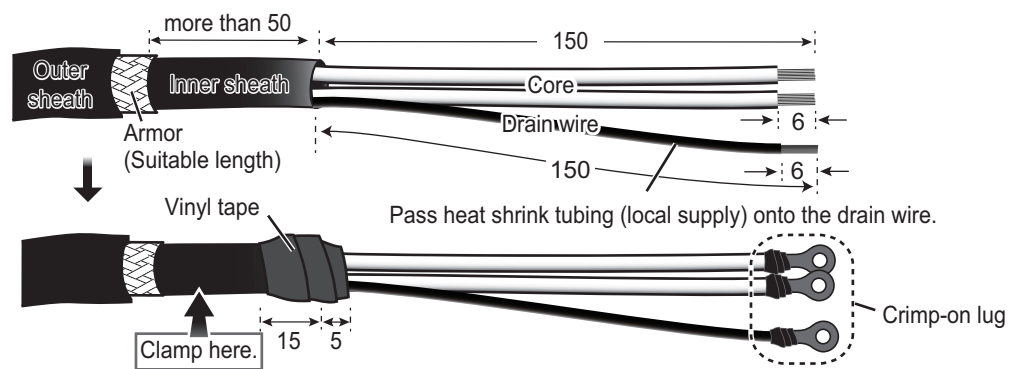


DPYCYSLA-2.5

<Side: Transceiver unit>

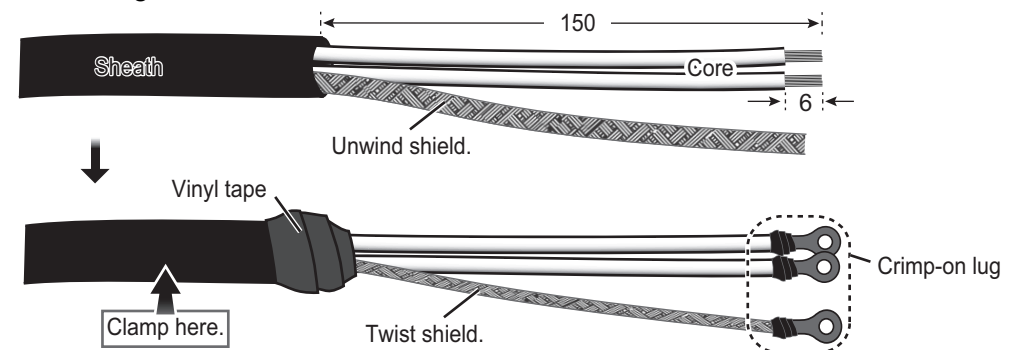


<Side: Matching box>



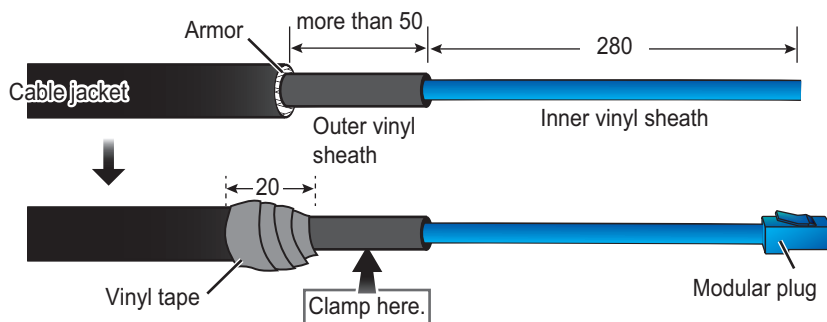
2RNCT-SB 2Cx1.4

<Side: Matching box>

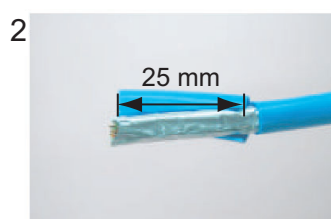


DTI-C5E350 VCV

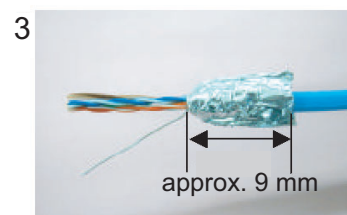
Note: Do not use an optical fiber cable.

**How to fabricate the LAN connector**

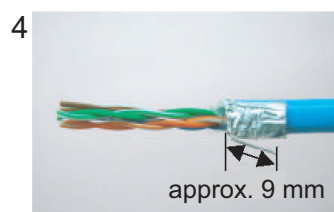
Expose inner vinyl sheath.



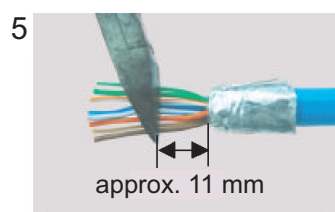
Remove the outer sheath by approx 25 mm. Be careful not to damage inner shield and cores.



Fold back the shield, wrap it onto the outer sheath and cut it, leaving 9 mm.



Fold back drain wire and cut it, leaving 9 mm.



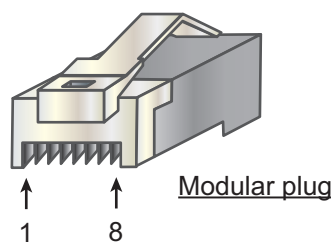
Straighten and flatten the core in order and cut them, leaving 11 mm.



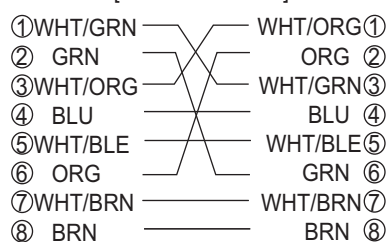
Insert the cable into the modular plug so that the folded part of the shield enters the modular plug. The drain wire must be on the tab side of the jack.



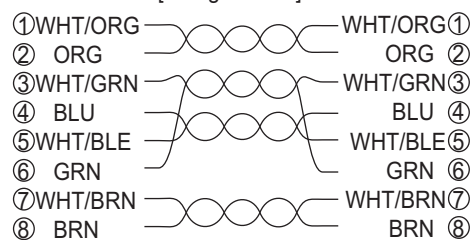
Using the special crimping tool MPT5-8 (PANDUIT CORP.), crimp the modular plug. Finally, check the plug visually.



[Cross-over cable]

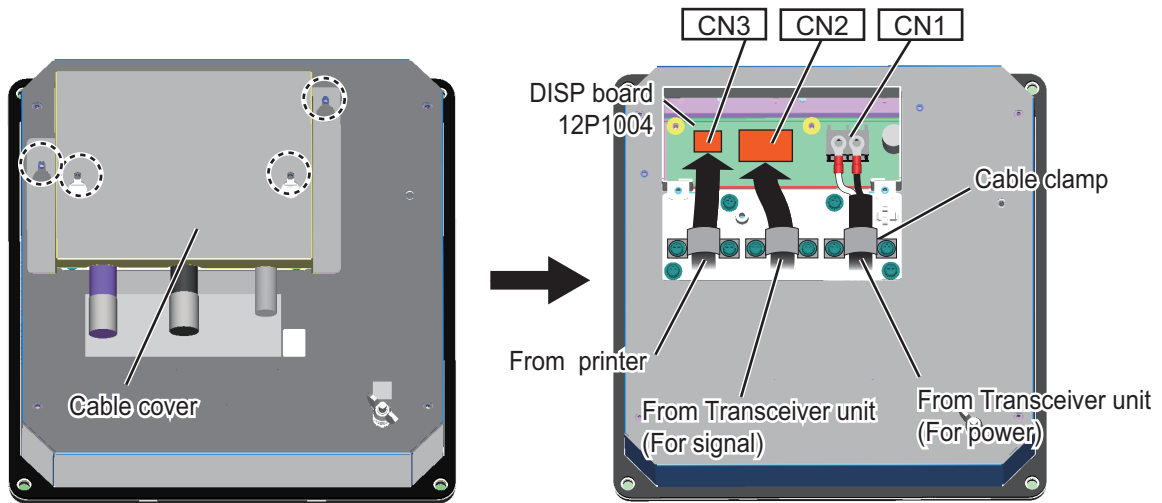


[Straight cable]



2.3 Display Unit

Remove four screws to remove the rear cable cover. Remove the cable clamps to connect the cables.



Rear view of the display unit

Three cables are connected to the display unit. After connecting cables, close the cable cover.

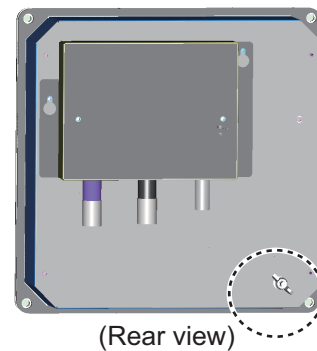
- Cable for the transceiver unit (DPYC-1.5): To CN1
- Cable for the transceiver unit (TTYCSLA-4): To CN2
Connect the ground wire with the wing nut as shown the below.
- Cable from the printer (TPYCSLA-1.5): To CN3

Grounding

Shorten the ground wire as much as possible.

Note 1: Ground the equipment to prevent mutual interference.

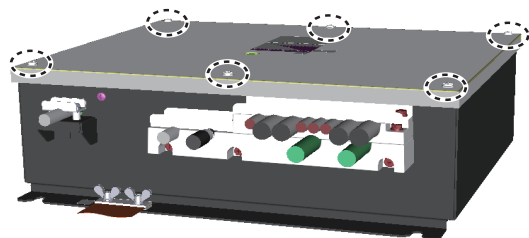
Note 2: Use “closed-type” lugs to make the ground connection at the display unit and the matching box. Do not use “open-type” lugs when a crimp-on lugs are supplied locally.



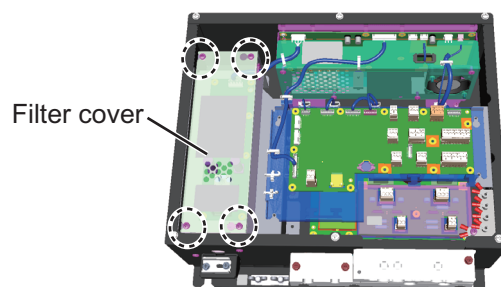
(Rear view)

2.4 Transceiver Unit

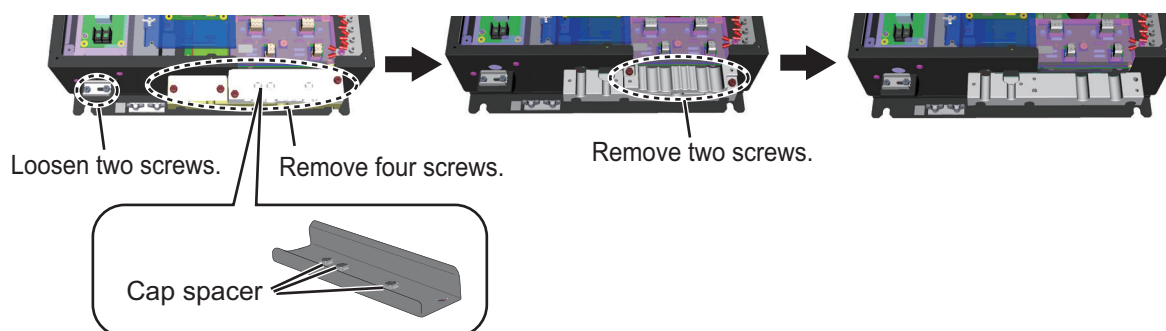
1. Remove six screws to open the cover of the transceiver unit.



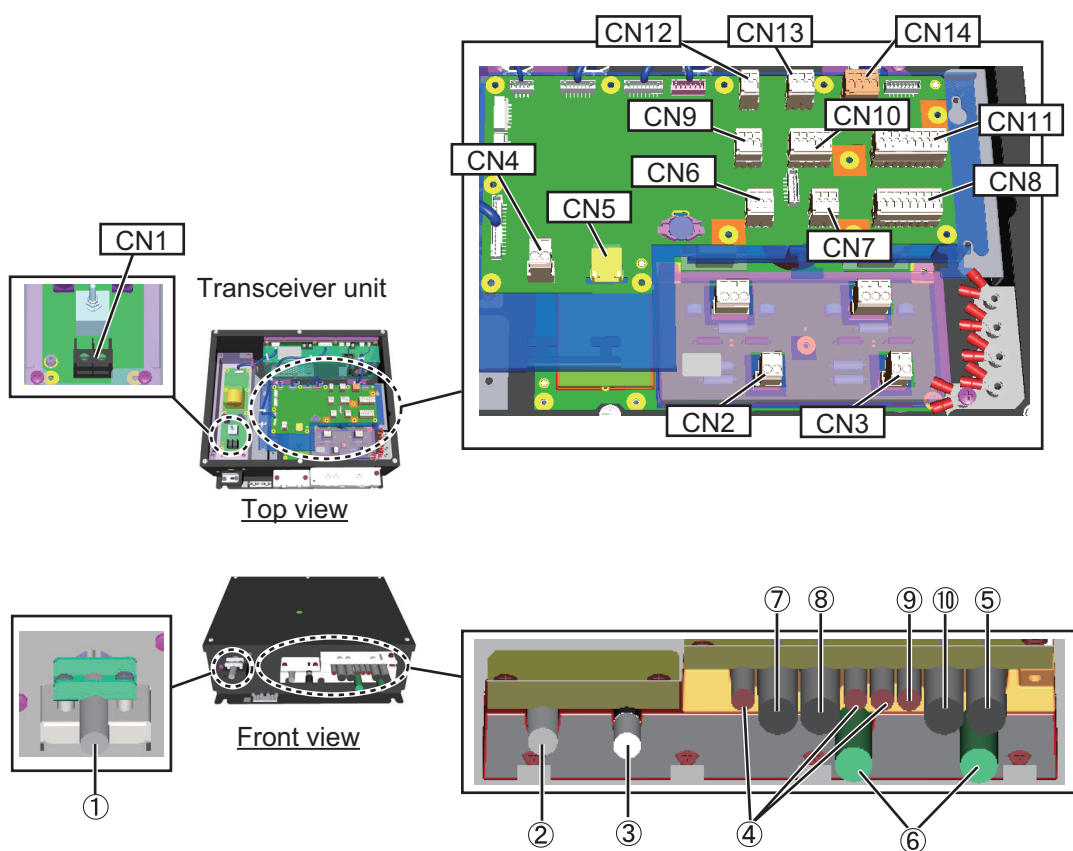
- Loosen four screws to open the filter cover.



- Loosen or remove the cable entrance assembly as shown below.
To connect CN8, CN10, CN12 and CN13, remove the cap spacers from the cable clamp.



- There is a plastic sheet on the inside of the cable entrance. Before passing the cables, tear the plastic sheet by hand to pass the cables.
- Connect cables as shown below.

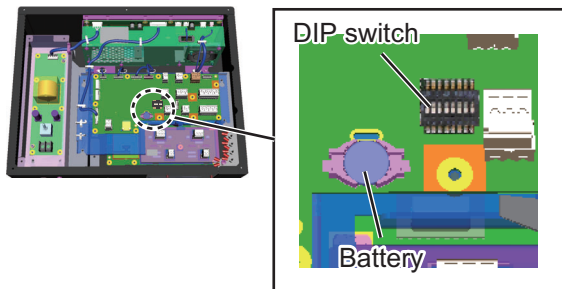


Top and front views of the Transceiver unit

2. WIRING

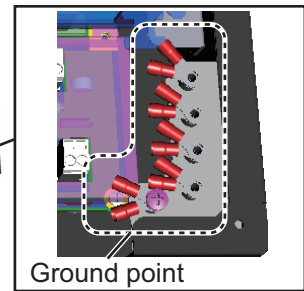
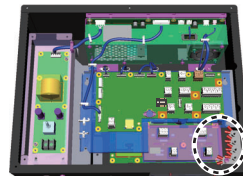
Cable entrance No.	Cable	Connector (on 12P1000)	Grounding
1: For ship's mains	DPYC-1.5	CN1	—
2: For display unit (power)		CN4	
3: LAN for INS or PC (Recording software)	DTI-C5E350 VCV (φ13.5 mm) Note: Do not use other cable.	CN5	Needed
4: For external equipment	TTYCSLA-1	CN6, CN7, CN9	
5: For display unit (signal)	TTYCSLA-4	CN8	
6: For matching box	DPYCYSLA-2.5	CN2, CN3	
7: For display unit (RD-20 or RD-50)	TTYCSLA-4	CN12, CN13	
8: For BAM		CN10	
9: For BAM	TTYCSLA-1	CN14	
10: For transceiver unit (No. 2)	TTYCSLA-4	CN11	

6. Set the DIP switch on MAIN board 12P1000 referring to the descriptions below.



DIP SW	Function	
1	1: ON (Restore default settings.) 0: OFF (Default setting, for normal use)	Note: When FE-800 starts up with “ON”, The “FA” mark appears at the top-left corner of the screen.
2	1: ON (Start the transceiver unit independently.) 0: OFF (Default setting, for normal use)	
3	1: ON (Don't back up settings.) 0: OFF (Default setting, for normal use)	
4	Turn output to port 2 of IF-2550 [ON] or [OFF]. [ON] outputs a contact signal when the Depth-below-Keel alarm occurs.	
5	Turn output to port 3 of IF-2550 [ON] or [OFF]. [ON] outputs a contact signal when any of the following errors occur. • Bottom lost • TX Volt Error • TCVR High Temperature	
6	Setting of the transceiver unit. ON: No. 2, OFF: No. 1	
7 to 8	No use.	

7. Connect ground wires with the pre-attached crimp-on lugs shown right. The cables that require grounding are shown in the column "Grounding" in the table at the top of this page.
8. Refasten the cable entrance assembly.
9. Turn on the power switch.



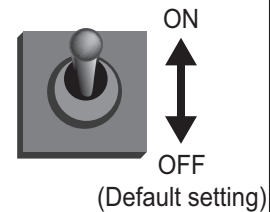
Power switch

Set the power switch to On to activate the Transceiver unit. The default setting is Off.

Note: For maintenance, the power switch should be Off.



Power switch (toggle)

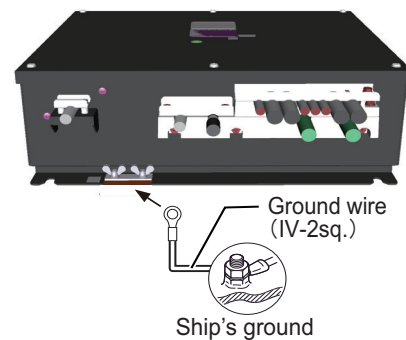


10. Close the covers.

Grounding

Attach a ground wire (1V-2sq.) between the earth terminal and the ship's ground.

Note: Ground the equipment to prevent mutual interference.

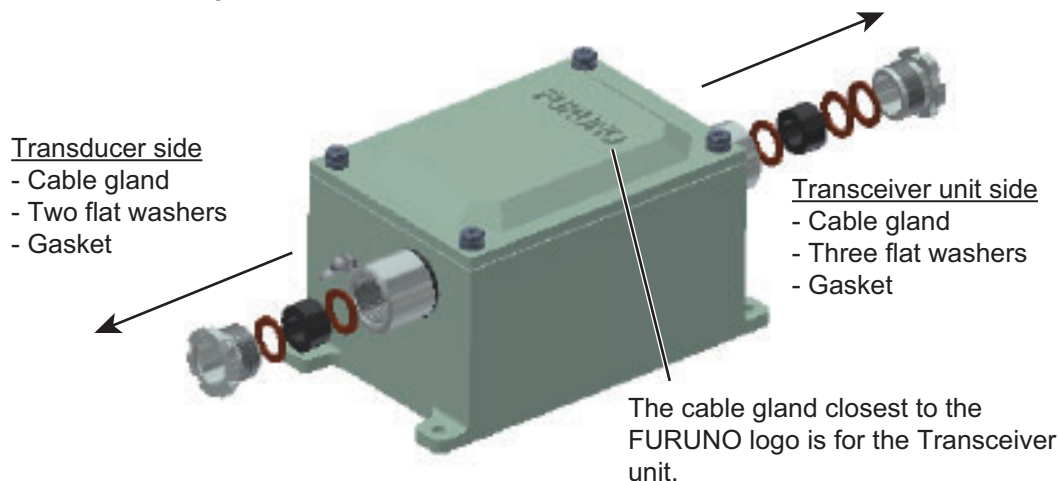


2.5 Matching Box

The Matching box should be selected depending on the transducer type;

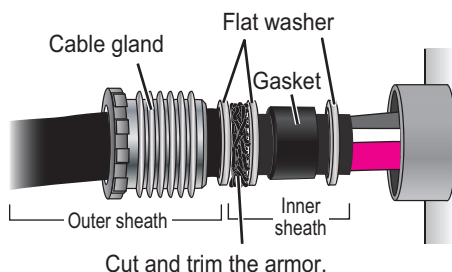
- 50B-6B transducer: MB-502
- 200B-8B transducer: MB-504

1. Remove four screws to open the top cover.
2. Unfasten the cable glands for both the transceiver unit and the transducer, then remove the gaskets and washers.

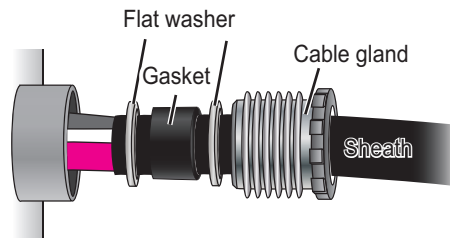


3. Slide the cable gland, the gasket and the flat washers onto the cable as shown below.

Side: **Transceiver unit** (DPYCYSLA-2.5)



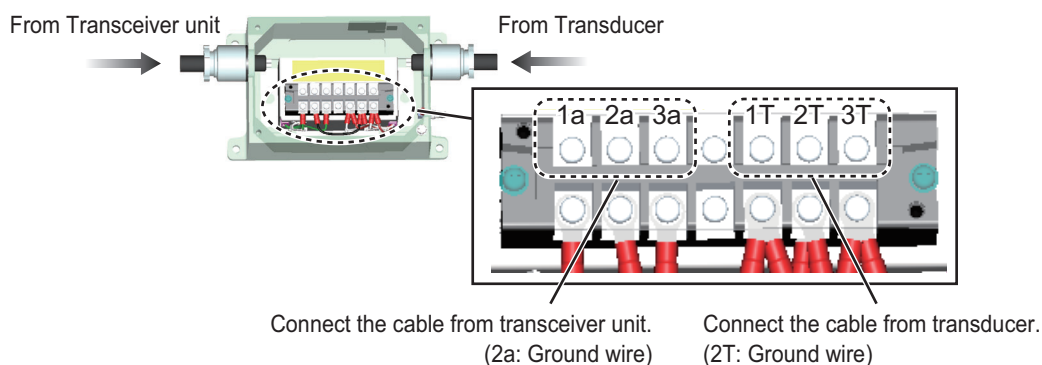
Side: **Transducer** (2RNCT-SB 2C×1.4)



4. For the cable connected to transceiver unit, push the flat washer against the armor. Then trim the armor so that it does not extend past the flat washers, then pass the cable through the cable entrance.
5. Tighten the cable glands with the hook spanner wrench.

Note: Use the wrench of the correct size. If you do not have the hook spanner wrench, contact our dealer.

6. Connect the cables to terminal inside.



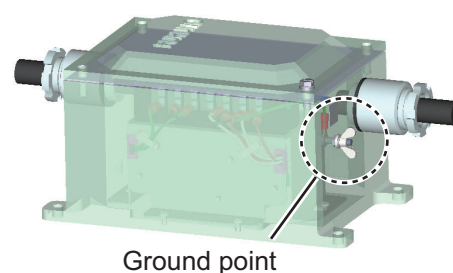
7. Close the top cover.

Grounding

Shorten the ground wire as much as possible.

Note 1: Ground the equipment to prevent mutual interference.

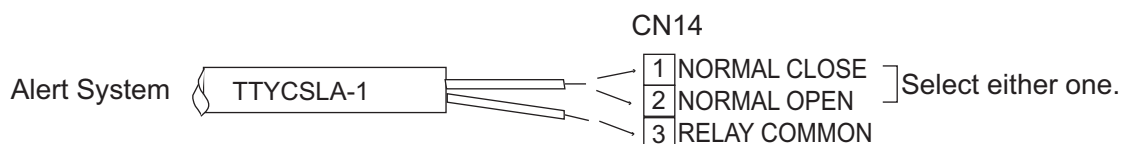
Note 2: Use “closed-type” lugs to make the ground connection at the display unit and the matching box. Do not use an “open-type” lugs.



2.6 Bridge Alert Management (BAM) Connection

The power fail alarm can be output by connecting the Transceiver unit to the ship's alert system or switchboard that can generate this type of alarm.

Connect the TTYCSLA-1 cable between CN14 in the transceiver unit and the alert system of the ship referring to the schematic diagram at the end of this manual.



	CN14 terminals 1 & 3	CN14 terminals 2 & 3
Power supplied	Close	Open
Power not supplied	Open	Close

2.7 Junction Box (Option)

Junction boxes are connected between the Transceiver unit and the Matching box as necessary.

3. ADJUSTMENTS

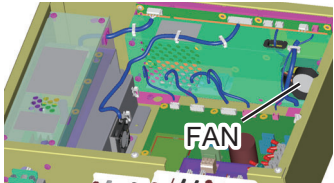
This section provides the procedures for initial set up of the equipment.

3.1 Service Menu

This [Service Menu] settings should be properly set before operating the equipment. Press the **POWER** key while pressing any key to open the [Service Menu]. An aural alert indicates that the [Service Menu] is now available and the [Service Menu] appears.



Service Menu

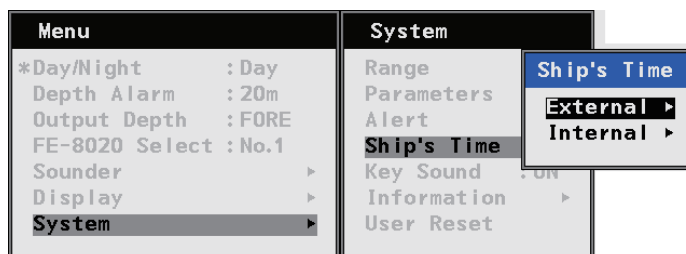
Menu	Contents
[FE-8010 Serial No.]	The serial no. for FE-8010 is shown.
[FE-8020 CONFIG]	When the second transceiver unit is connected, select [No.1 only] or [No.1&No.2]. After changing the setting, the window shown below appears. Select [Exit] to apply the changes then the transceiver unit restarts. To apply the setting changes, select Exit. Note: Be sure to select [Exit] to correctly apply the changes.
[FE-8020 No.1 Setup], [FE-8020 No.2 Setup]	The setting for the transceiver unit. [Serial No.]: The serial no. of selected transceiver unit is shown. [FORE], [AFT]: [XDR]: Set the frequency. Note: When [N/A] is selected on both [FORE] and [AFT] of each transceiver unit, the service menu is started at the restart. [KEEL]: Set the distance from the transducer to the keel. Note: For configurations with a PP-505FE or PP-900 connected, this setting is calculated to the draft value as an offset in printed readings. [Bottom Detect]: Set the depth from which to start detection of the bottom. [Tx Count Reset]: Reset the TX count to zero. [FAN0]: [FAN Limit]: Enter half of the fan rotation speed. [FAN Reset]: Reset the working hours of the fan. 

Menu	Contents
[DISP Order]	For dual frequency display, select the transducer to display in the left and right displays.
[External KP]	Select [ON] to output the external KP to the other device.
[Random KP]	Reduces interference. Turn [ON] in normal use.
[TX Mode]	To take soundings properly the setting must be set to [ON]. Note: TX OFF appears at the bottom-right corner of the screen when FE-800 is turned on with the [OFF] setting.
[B Volt]	Set the voltage for B voltage. Select [Low] for normal use.
[Depth Accuracy]	Select the method for measuring depth, [Normal] or [High]. [High] provides depth with higher resolution.
[Alert]	<u>[Alert Mode Select]</u> : Select the alert mode among [Legacy], [Alert I/F 1] and [Alert I/F 2]. If IF-2550 is connected to FE-800, select [Legacy]. • [Legacy]: Use Ilalr and Ilals sentences. • [Alert I/F 1]: Use ALR and ACK sentences. • [Alert I/F 2]: Use ALF and ACN sentences. <u>[Bottom Lost Priority]</u> : Select the priority for the "Bottom Lost alert". • [Warning]: Bottom Lost alert is output as a warning level alert. • [Caution]: Bottom Lost alert is output as a caution level alert.
[Time Adjust]	Select the source for time, internal clock or external equipment.
[I/O]	<u>[EXT EQUIP]</u> : Select the source of position data, among [DE], [GA], [GL], [GN], [GP], [II], [IN], [LA], [LC] or [ALL] (default setting: [GP]). Note: [ALL], which selects the source in priority order, does not comply with IEC standards. <u>[Port1], [Port4]</u> : Set the IEC standard to use for input and output signals. See section 3.4. <u>[Port Monitor]</u> : Show the port monitor. <u>[Ethernet]</u> : Set up the Ethernet. See section 3.5.
[Network]	<u>[IP ADD]</u> : Set the [IP address], [Subnet Mask] and [Default Gateway]. Note: Select [Settings Reset] to reset [IP address], [Subnet Mask] and [Default Gateway] to default settings. <u>[SFI]</u> : Set the System function ID (SFI) of FE-800 and the external equipment connected. This SFI must be unique on network IEC61162-450. Enter the four-digit number that follows "SD". SD0001:  Note: The ID must include "SD" to comply with IEC standards.
[EXT Setting Device]	<u>[EXT Device Port]</u> : Set the port for receiving settings from external equipment. Select from PORT1, PORT4 and LAN. The default setting is LAN. <u>[EXT IP Address]</u> : Input the IP address. <u>[EXT Port]</u> : Set the port number for LAN connection.
[Dimmer Setting]	<u>[Dimmer Mode]</u> : Set whether the brightness setting is received from the other equipment. FE-800: Ignore external equipment's brightness settings. ECDIS: Receive brightness setting from other equipment. The default setting is FE-800. <u>[Dimmer Control Port]</u> : Set the port to use for receiving brightness settings. Select from PORT1, PORT4 and LAN. The default setting is LAN. When LAN is selected, the IP address is automatically set to the same IP address as set at [Navigation]. (See section 3.5.)
[LCD Reset]	Reset the working hours of LCD.

Menu	Contents
[TEST]	[Self TEST]: Show the self test screen. [LCD TEST]: Show the LCD test screen. [Buzzer TEST]: Select this menu then the buzzer sounds if it is working properly. To stop the buzzer, press the ENT key.
[DEMO]	Activate the demonstration mode. SIM appears at the bottom-right corner of the screen when the demonstration mode is turned on. Note: The demonstration mode is not available with the No.2 transceiver unit. Turning on the mode from the No.2 transceiver unit activates the mode at the No.1 transceiver unit. After stopping the demonstration mode, the No.1 transceiver is activated.
[Service Reset]	Reset the menu settings to the default settings. The confirmation message appears then select [Yes] to reset the settings.
[Exit]	Exit the [Service Menu] then restart the system.

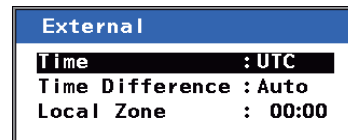
3.2 How to Set the Time

On the [Menu] window, select [System] → [Ship's Time] to set the time.



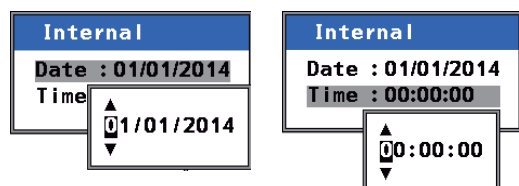
Select [External] to use time data which the external equipment outputs.

- [Time]: Select the source of time, [UTC] or [Local].
- [Time Difference]: If [Local] is selected in [Time], select [Auto] or [Manual] for setting method.
- [Local Zone]: If [Manual] is selected in [Time Difference], set the time difference.



Select [Internal] to use the internal clock. Select [Date] or [Time] to adjust and then set the value with the ▲ or ▼ key.

Note: The internal clock continues to operate when an external time source is used.



Battery

The battery installed on the circuit board 12P1000 inside the transceiver unit preserves data when the power is turned off. The life of the battery is about five years. When the battery voltage is low, the warning message "Displayed time may be incorrect. Please re-set the clock." appears after the self-test. When this happens, contact your dealer to request replacement of the battery. Press any key to proceed to the main display screen.

Note: The message "Displayed time may be incorrect. Please re-set the clock." appears when the FE-800 is turned on for the first time or after changing the battery. In this case, the battery does not need replacement, however the clock must be set.

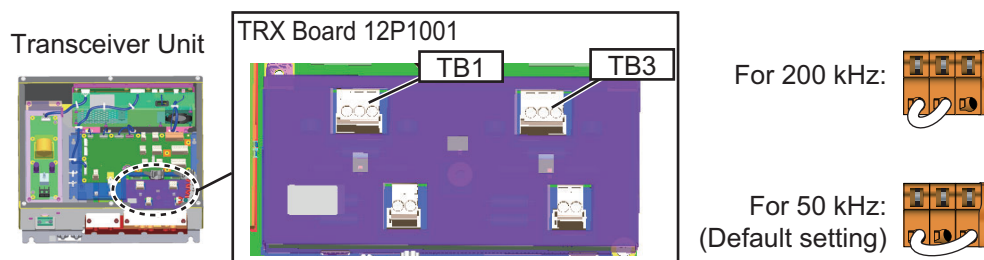
Item	Type	Code Number	Qty
Lithium Battery	BR-1225-A/BK	000-178-989-10	1

3.3 How to Set the Frequency

Set the transducer frequency with TB1 and TB3, according to the frequency setting on the [Service Menu]. To set frequency on the [Service Menu], select [FE-8020 No.1 (No.2) Setup] → [FORE] (or [AFT]) → [XDR].

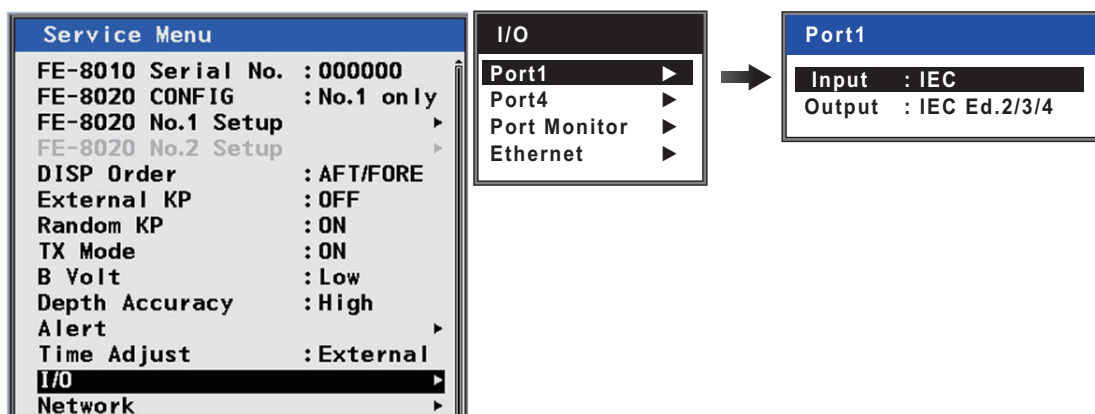
The default tap setting on the TRX Board 12P1001 is for 50 kHz. For 200 kHz, set TB1 and TB3 as follows.

Note: Incorrect setting can affect performance and damage the transducer.



3.4 How to Set the Port

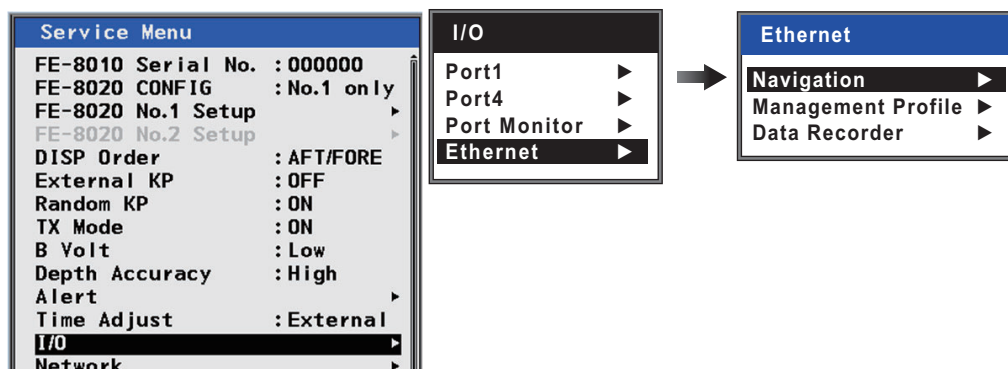
On the [Service Menu], select [I/O] → [Port1] (or [Port4]). [Port1] is for IN1 (CN9) and OUT1/2/3 (CN6/CN7/CN13). [Port4] is for CN10.



Menu	Contents
[Input]	Select standard for the input signal, [IEC] (default) or [NMEA].
[Output]	Select the standard for the output signal, [NMEA V1.5], [IEC Ed.1] or [IEC Ed.2/3/4] (default). Note: [NMEA V1.5] does not comply with SOLAS standards.

3.5 How to Set the Ethernet

To set up the Ethernet for the LAN setting, select [I/O] → [Ethernet] on the [Service Menu],



Menu	Contents														
[Navigation]	Set the destination terminal. [DEST IP Address]: Set IP address of the destination terminal. Available range: 239.192.0.1 to 239.192.0.64. Note: The IP address must be within the available range to comply with the IEC standards. [DEST Port]: Set the port of the destination terminal. [Data Source]: Set the source data. [Error Counter]: Show the LAN error log. LAN Error Counter <table> <tr> <td>1. UDP Checksum Error</td> <td>---</td> </tr> <tr> <td>2. Invalid Header</td> <td>---</td> </tr> <tr> <td>3. Incorrect TAG Block</td> <td>000</td> </tr> <tr> <td>4. TAG Block Checksum Error</td> <td>000</td> </tr> <tr> <td>5. TAG Block Syntax Error</td> <td>000</td> </tr> <tr> <td>6. TAG Block Framing Error</td> <td>000</td> </tr> <tr> <td>7. Incorrect Sentence</td> <td>000</td> </tr> </table> [MENU/ESC]: Exit	1. UDP Checksum Error	---	2. Invalid Header	---	3. Incorrect TAG Block	000	4. TAG Block Checksum Error	000	5. TAG Block Syntax Error	000	6. TAG Block Framing Error	000	7. Incorrect Sentence	000
1. UDP Checksum Error	---														
2. Invalid Header	---														
3. Incorrect TAG Block	000														
4. TAG Block Checksum Error	000														
5. TAG Block Syntax Error	000														
6. TAG Block Framing Error	000														
7. Incorrect Sentence	000														
[Management Profile]	Set the Management Profile. [Management Profile]: Set [OFF] for normal use. Set [ON] to activate Management Profile. [DEST IP Address]: Set the IP address of the Management Profile. [DEST Port]: Set the port of the Management Profile.														
[Data Recorder]	Set the Data recording software. [DEST IP Address]: Set the IP address of the Data recording software. [DEST Port]: Set the port of the Data recording software.														

APPX. 1 JIS CABLE GUIDE

Cables listed in the manual are usually shown as Japanese Industrial Standard (JIS). Use the following guide to locate an equivalent cable locally.

JIS cable names may have up to 6 alphabetical characters, followed by a dash and a numerical value (example: DPYC-2.5).

For core types D and T, the numerical designation indicates the *cross-sectional Area (mm²)* of the core wire(s) in the cable.

For core types M and TT, the numerical designation indicates the *number of core wires* in the cable.

1. Core Type

D: Double core power line

T: Triple core power line

M: Multi core

TT: Twisted pair communications
(1Q=quad cable)

2. Insulation Type

P: Ethylene Propylene Rubber

3. Sheath Type

Y: PVC (Vinyl)

4. Armor Type

C: Steel

5. Sheath Type

Y: Anticorrosive vinyl sheath

6. Shielding Type

SLA: All cores in one shield, plastic tape w/aluminum tape

-SLA: Individually shielded cores, plastic tape w/aluminum tape



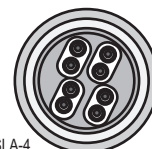
DPYC



TPYC



MPYC-4



TTYCSLA-4

EX: ¹TT³⁴⁵⁶YCSLA - 4
Designation type # of twisted pairs

¹MPYC²³⁴ - 4
Designation type # of cores

The following reference table lists gives the measurements of JIS cables commonly used with Furuno products:

Type	Area	Core Diameter	Cable Diameter	Type	Area	Core Diameter	Cable Diameter
DPYC-1.5	1.5mm ²	1.56mm	11.7mm	TTYCSLA-1	0.75mm ²	1.11mm	9.4mm
DPYC-2.5	2.5mm ²	2.01mm	12.8mm	TTYCSLA-1T	0.75mm ²	1.11mm	10.1mm
DPYC-4	4.0mm ²	2.55mm	13.9mm	TTYCSLA-1Q	0.75mm ²	1.11mm	10.8mm
DPYC-6	6.0mm ²	3.12mm	15.2mm	TTYCSLA-4	0.75mm ²	1.11mm	15.7mm
DPYC-10	10.0mm ²	4.05mm	17.1mm	TTYCY-1	0.75mm ²	1.11mm	11.0mm
DPYCY-1.5	1.5mm ²	1.56mm	13.7mm	TTYCY-1T	0.75mm ²	1.11mm	11.7mm
DPYCY-2.5	2.5mm ²	2.01mm	14.8mm	TTYCY-1Q	0.75mm ²	1.11mm	12.6mm
DPYCY-4	4.0mm ²	2.55mm	15.9mm	TTYCY-4	0.75mm ²	1.11mm	17.7mm
MPYC-2	1.0mm ²	1.29mm	10.0mm	TTYCY-4SLA	0.75mm ²	1.11mm	19.5mm
MPYC-4	1.0mm ²	1.29mm	11.2mm	TTYCYSLA-1	0.75mm ²	1.11mm	11.2mm
MPYC-7	1.0mm ²	1.29mm	13.2mm	TTYCYSLA-4	0.75mm ²	1.11mm	17.9mm
MPYC-12	1.0mm ²	1.29mm	16.8mm	TTPYCSLA-1	0.75mm ²	1.11mm	9.2mm
TPYC-1.5	1.5mm ²	1.56mm	12.5mm	TTPYCSLA-1T	0.75mm ²	1.11mm	9.8mm
TPYC-2.5	2.5mm ²	2.01mm	13.5mm	TTPYCSLA-1Q	0.75mm ²	1.11mm	10.5mm
TPYC-4	4.0mm ²	2.55mm	14.7mm	TTPYCSLA-4	0.75mm ²	1.11mm	15.3mm
TPYCY-1.5	1.5mm ²	1.56mm	14.5mm				
TPYCY-2.5	2.5mm ²	2.01mm	15.5mm				
TPYCY-4	4.0mm ²	2.55mm	16.9mm				

APPX. 2 DIGITAL INTERFACE

I/O Sentences

Note 1: ACK and ALR sentences are available when [Mode] in the [Alert] menu is set to [Alert I/F 1].

Note 2: ACN, ALC, ALF, ARC and HBT sentences are available when [Mode] in the [Alert] menu is set to [Alert I/F 2].

Note 3: ACK, ALR, ACN, ALC, ALF, ARC and HBT sentences are not available when [Mode] in the [Alert] menu is set to [Legacy].

- **Input sentences**

ACK, ACN, DDC*³, GGA, GLL, HBT, RMA, RMC, SRP*⁴, VTG, ZDA

- **Output sentences**

ALC, ALF, ALR, ARC, DBK, DBS, DBT*², DDC*³, DPT, HBT, SRP*⁴, Pfec SDmsi*¹

*1: Mandatory, for multiple (more than one) transducer installation.

*2: Only use if transducer and keel have the same level.

*3: Output when [Dimmer Control] is ON.

*4: The SRP sentence is only input/output in IEC61162-450 format (LAN networks).

- **Transmission interval**

1 s for any sentence other than ALC, ARC and HBT (At 30 seconds interval for ALC, at 25 seconds interval for HBT)

Note: ALF, ARC, ALR and DDC*³ are transmitted when an event occurs. ALR can be transmitted at 30 seconds intervals and DDC*³ can be transmitted at 60 seconds intervals.

- **Data transmission**

Data is transmitted in serial asynchronous form in accordance with the standard referenced in 2.1 of IEC 61162-1. The first bit is a start bit and is followed by data bits, least-significant-bit as illustrated below.



The following parameters are used:

- Baud rate: 4800
- Data bits: 8 (D7 = 0), parity none
- Stop bits: 1

Data sentences: Input

Data format is IEC 61162-1 Edition 5 unless noted otherwise.

ACK: Acknowledge alarm

\$**ACK,xxx *hh<CR><LF>
1

1. Unique alarm number (identifier) at alarm source

ACN: Alert command

\$**ACN,hhmmss.ss,aaa,x.x,x.x,c,a*hh<CR><LF>
1 2 3 4 5 6

1. No use
2. Manufacturer mnemonic code (3 digit alphanumeric code), null
3. Alert identifier (0 to 9999999)
4. Alert Instance (1 to 999999)
5. Alert command (A=ACK from ext. equipment, Q=Request from ext. equipment, O=Responsibility transfer, S=Silence from ext. equipment)
6. Sentence status flag (C should not be null field. Sentence without C is not a command.)

DDC: Display Dimming Control

\$**DDC,a,xx,a,a*hh<CR><LF>
1 2 3 4

1. Display dimming preset
2. Brightness percentage 00 to 99
3. Color palette
4. Sentence Status Flag

GGA: Global positioning system (GPS) fix data

\$ ** GGA, hhmmss.ss, llll.ll, a, yyyy.yy, a, x, xx, x.x, x.x, M, x.x, M, x.x, xxxx *hh <CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14

1. UTC (no use)
2. Latitude
3. N/S
4. Longitude
5. E/W
6. Quality index
7. Satellites used (no use)
8. DOP (no use)
9. Antenna height above the sea level (no use)
10. Unit (M) (no use)
11. Geoid height (no use)
12. Unit (M) (no use)
13. Age of differential GPS date (no use)
14. Differential reference station ID (no use)

GLL: Geographic position. Latitude/longitude

\$ ** GLL, llll.ll, a, yyyyy.yyy, a, hhmmss.ss, A, a *hh <CR><LF>
 1 2 3 4 5 6 7

1. Latitude
2. N/S
3. Longitude
4. E/W
5. No use
6. Status (A: Data valid)
7. Mode indicator (A: Autonomous, D: Differential mode)

HBT: Heartbeat supervision sentence

\$**HBT,x.x,A,x*hh<CR><LF>
 1 2 3

1. Configured repeat interval (1 to 999)
2. Equipment status (A=Normal V=System fail)
3. Sequential sequence identifier (0 to 9)

RMA: Recommended minimum specific LORAN-C data

\$**RMA,A,lll.ll,a,yyyyy.yy,a,x.x,x.x,x.x,x.x,x.x,a*hh <CR><LF>
 1 2 3 4 5 6 7 8 9 10 11 12

1. Status: A=Data valid
2. Latitude, degrees (0.0000 to 9000.0000)
3. N/S
4. Longitude, degrees (0.0000 to 18000.0000)
5. E/W
6. No use
7. No use
8. Speed over ground, knots
9. Course over ground, degrees true
10. Magnetic variation, degrees
11. E/W
12. Mode indicator (A= Autonomous D= Differential mode)

RMC: Recommended minimum specific GNSS data

\$ ** RMC, hhmmss.ss A, llll.ll, a, yyyyy.yy, a, x.x, x.x, xxxxxx, x.x, a, a, a *hh <CR><LF>
 1 2 3 4 5 6 7 8 9 10 11 12 13

1. UTC of position fix
2. Status: A=data valid
3. Latitude
4. N/S
5. Longitude
6. E/W
7. Speed over ground, knots
8. Course over ground, degrees true
9. Date: dd/mm/yy
10. Magnetic variation, degrees E/W
11. E/W
12. Mode indicator (A=Autonomous mode, D=Differential mode)
13. Navigational status indicator (S=Safe, C=Caution)

SRP: System function ID resolution protocol

\$--SRP,x,hhhhhhhhhhh,c--c,*hh<CR><LF>
 1 2 3

1. Instance number (No use)
2. MAC address, NULL
3. IP address, NULL

VTG: Course over ground and ground speed

\$ ** VTG, x.x, T, x.x, M, x.x, N, x.x, K, a *hh <CR><LF>
 1 2 3 4 5 6 7 8 9

1. Course over ground, degrees true
2. T
3. Course over ground, degrees magnetic
4. M
5. Speed over ground, knots
6. N
7. Speed over ground, km/h
8. K
9. Mode indicator
 (A=Autonomous, D=Differential)

ZDA: Time and date

\$ ** ZDA, hhmmss.ss, xx, xx, xxxx, xx, xx *hh <CR><LF>
 1 2 3 4 5 6

1. UTC
2. Day
3. Month
4. Year
5. Local zone hours
6. Local zone minutes

Data sentences: Output

ALC: Cyclic alert list

\$**ALC,xx,xx,xx,x.x, aaa,x.x,x.x,x.x, """" *hh<CR><LF>
 1 2 3 4 5 6 7 8 9

1. Total number of sentences this message (01 to 99)
2. Sentence number (01 to 99)
3. Sequential message identifier (00 to 99)
4. Number of alert entries (0 to n)
5. Manufacturer mnemonic code (null)
6. Alert identifier (000 to 999999)
7. Alert instance (1 to 999999, null)
8. Revision counter (1 to 99)
9. Additional alert entries (same as 5 and 8. When #4=0, #5 to #9 are deleted.)

ALF: Alert sentence

\$**ALF,x,x,x,hhmmss.ss,a,a,a,aaa,x.x,x,x,x,x,c--c *hh<CR><LF>
 1 2 3 4 5 6 7 8 9 10 11 12 13

1. Total number of ALF sentences this message (1, 2)
2. Sentence number (1, 2)
3. Sequential message identifier (0 to 9)
4. Time of last change (hh=00 to 23, mm=00 to 59, ss.ss=00.00 to 59.99), null
5. Alert category (A=Alert category A, B=Alert category B, null)
6. Alert priority (A=Alarm, W=Warning, C=Caution), null when #2 is 2.
7. Alert state (V=Not ACKed, S=Silence, A=ACKed, O/U=Resolved, Not ACKed, N=Normal state), null when #2 is 2.
8. Manufacturer mnemonic code (null)
9. Alert identifier (000 to 999999)
10. Alert instance (1 to 999999, null)
11. Revision counter (1 to 99)
12. Escalation counter (0 to 9)
13. Alert text (max. 16 characters for the 1st sentence, maximum length of the field for the 2nd sentence later)

ALR: Set alarm state

\$**ALR,hhmmss.ss,xxx,A,A,c--c *hh<CR><LF>
 1 2 3 4 5

1. Time of alarm condition change, UTC
2. Unique alarm number (identifier) at alarm source
3. Alarm condition (A=threshold exceeded, V=not exceeded)
4. Alarm acknowledge state (A=acknowledged, V=unacknowledged)
5. Alarm's description text

ARC: Alert command refused

\$**ARC,hhmmss.ss,aaa,x.x,x,x,c*hh<CR><LF>
 1 2 3 4 5

1. Release time of the alert command refused (hh: 00 to 23, mm: 00 to 59, ss.ss: 00.00 to 59.99)
2. Used for proprietary alerts, defined by the manufacturer (FEC, null)
3. Alert identifier (000 to 999999)
4. Alert instance (1 to 999999, null)
5. Refused alert command (A, Q, O, S)
 A=acknowledge
 Q=request/repeat information
 O=responsibility transfer
 S=silence

DBK: Depth below keel

\$**DBK,x.x,f,x.x,M,x.x,F *hh<CR><LF>
 1 2 3 4 5 6

1. Water depth
2. feet
3. Water depth
4. Meters
5. Water depth
6. Fathom

DBS: Depth below surface

\$**DBS,x.x,f,x.x,M,x.x,F *hh<CR><LF>
 1 2 3 4 5 6

1. Water depth
2. feet
3. Water depth
4. Meters
5. Water depth
6. Fathom

DBT: Depth below transducer

\$ ** DBT, x.x, f, x.x, M, x.x, F *hh <CR><LF>
 1 2 3 4 5 6

- 1, 2 Water depth, feet
- 3, 4 Water depth, m
- 5, 6 Water depth, fathom

DDC: Display Dimming Control

\$**DDC,a,xx,a,*hh<CR><LF>
 1 2 3 4

1. Display dimming preset
2. Brightness percentage 00 to 99
3. Color palette
4. Sentence Status Flag

DPT: Depth

\$ ** DPT, x.x, x.x, x.x *hh <CR><LF>
 1 2 3

1. Water depth relative to transducer, in meters
2. Offset from transducer, in meters
3. Maximum range scale in use

HBT: Heartbeat supervision sentence

\$**HBT,x.x,A,x*hh<CR><LF>
 1 2 3

1. Configured repeat interval (25s)
2. Equipment status (A=Normal)
3. Sequential sequence identifier (0 to 9)

SRP: System function ID resolution protocol

\$--SRP,x,hhhhhhhhhhh,c--c,*hh<CR><LF>
 1 2 3

1. Instance number (No use)
2. MAC address, NULL
3. IP address, NULL

SDmsi: Multiple Sounding Information

\$PFEC,SDmsi,x.x,x.x,a,a,c--c,x.x,x.x,x.x,x.x,x.x,x *hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13

- 1. Number of sounding information
- 2. Total number of sounding information
- 3. Depth Unit (M: meter, f: feet)
- 4. Reference for reading depth
- 5. Transducer information (F: Fore, A: Aft)
- 6. Transmission frequency
- 7. Water depth
- 8. Offset from transducer to surface
- 9. Offset from transducer to keel
- 10. Number of sounding information
- 11. Depth Alarm
- 12. Number of transceiver unit
- 13. Total number of transceiver unit

APPX. 3 ALERT MESSAGES

The alert modes Alert I/F1, Alert I/F2 and Legacy settings are set during the initial installation. Consult a FURUNO technician to change these settings.

Alert I/F2

Alert Title	Alert Description Text	Priority/Category	Alert ID, Instance	Meaning	Measures
SHALLOW DEPTH	TCVR1 FORE depth below keel alarm.	Alarm/A	3031, 1	Depth at fore transducer is shallower than that set for the alarm.	Check the depth visually.
	TCVR1 AFT depth below keel alarm.	Alarm/A	3031, 2	Depth at aft transducer is shallower than that set for the alarm.	
	TCVR2 FORE depth below keel alarm.	Alarm/A	3031, 3	Depth at fore2 transducer is shallower than that set for the alarm.	
	TCVR2 AFT depth below keel alarm.	Alarm/A	3031, 4	Depth at aft2 transducer is shallower than that set for the alarm.	
LOST MEAS	TCVR1 TX voltage ERR stopped MEAS.	Warning/B	3008, 1	Transceiver 1 PWR board or TRX board may be damaged. Voltage is not within safe guidelines	Consult a FURUNO technician.
	TCVR2 TX voltage ERR stopped MEAS.	Warning/B	3008, 4	Transceiver 2 PWR board or TRX board may be damaged. Voltage is not within safe guidelines.	
	TCVR1 RX voltage ERR stopped MEAS.	Warning/B	3008, 2	Transceiver 1 PWR board or TRX board may be damaged. Voltage is not within safe guidelines.	
	TCVR2 RX voltage ERR stopped MEAS.	Warning/B	3008, 5	Transceiver 2 PWR board or TRX board may be damaged. Voltage is not within safe guidelines.	
	TCVR1 temperature ERR stopped MEAS.	Warning/B	3008, 3	Transceiver 1 Temperature is above safe guidelines.	
	TCVR2 temperature ERR stopped MEAS	Warning/B	3008, 6	Transceiver 2 Temperature is above safe guidelines.	

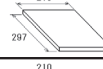
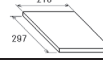
Alert Title	Alert Description Text	Priority/Category	Alert ID, Instance	Meaning	Measures
BOTTOM LOST *	TCVR1 FORE bottom losts.	Warning/B (Caution/B)	3055, 1(3056, 1)	Seabed at fore transducer cannot be detected	Check that the seabed is within range. If the problem recurs, consult a FURUNO technician.
	TCVR1 AFT bottom losts.	Warning/B (Caution/B)	3055, 2(3056, 2)	Seabed at aft transducer cannot be detected.	
	TCVR2 FORE bottom losts.	Warning/B (Caution/B)	3055, 3(3056, 3)	Seabed at fore2 transducer cannot be detected.	
	TCVR2 AFT bottom losts.	Warning/B (Caution/B)	3055, 4(3056, 4)	Seabed at aft2 transducer cannot be detected.	
LOST DISP	DISP COM ERR stops display update.	Caution/B	3003, 1	Communication error between display unit and transceiver 1.	Consult a FURUNO technician.
LOST TCVR	TCVR2 COM ERR stops MEAS.	Caution/B	3003, 2	Communication error between display unit and transceiver 2.	
FAN SPEED LOW	TCVR1 fan ERR may stop MEAS.	Caution/B	3079, 1	Fan No.1 speed lower than minimum speed on transceiver 1.	
	TCVR2 fan ERR may stop MEAS.	Caution/B	3079, 2	Fan No.2 speed lower than minimum speed on transceiver 2.	
BOTTOM LOST	TCVR1 FORE bottom outs of range.	Caution/B	3056, 5	Seabed at fore transducer is out of range and cannot be detected	
	TCVR1 AFT bottom outs of range.	Caution/B	3056, 6	Seabed at aft transducer is out of range and cannot be detected.	
	TCVR2 FORE bottom outs of range.	Caution/B	3056, 7	Seabed at fore2 transducer is out of range and cannot be detected.	
	TCVR2 AFT bottom outs of range.	Caution/B	3056, 8	Seabed at aft2 transducer is out of range and cannot be detected.	

*: Depending on setting for [Bottom Lost Priority] selected at installation, BOTTOM LOST may be output as a Category B Caution, with the ID 3056.

Alert I/F1, Legacy

Alert Title	Alert Text	Priority/Category	Alert ID	Meaning	Measures
SHAL-LOW DEPTH	Depth below keel alarm.	Alarm/A	230	Depth below the Keel is too shallow.	Check the depth visually.
LOST MEAS	TCVR1 TX voltage ERR stopped MEAS.	Warning/B	101	Transceiver 1 PWR board or TRX board may be damaged. Voltage is not within safe guidelines.	Consult a FURUNO technician.
	TCVR1 RX voltage ERR stopped MEAS.	Warning/B	102	Transceiver 1 PWR board or TRX board may be damaged. Voltage is not within safe guidelines.	
	TCVR1 temperature ERR stopped MEAS.	Warning/B	103	Transceiver 1 Temperature is above safe guidelines.	
	TCVR2 TX voltage ERR stopped MEAS.	Warning/B	111	Transceiver 2 PWR board or TRX board may be damaged. Voltage is not within safe guidelines.	
	TCVR2 RX voltage ERR stopped MEAS.	Warning/B	112	Transceiver 2 PWR board or TRX board may be damaged. Voltage is not within safe guidelines.	
	TCVR2 temperature ERR stopped MEAS.	Warning/B	113	Transceiver 2 Temperature is above safe guidelines.	
BOTTOM LOST *	Bottom losts.	Warning/B (Caution/B)	001 (003)	Seabed at fore transducer cannot be detected	Check that the seabed is within range. If the problem recurs, consult a FURUNO technician.
LOST DISP	DISP COM ERR stops display update.	Caution/B	301	Communication error between display unit and transceiver 1.	Consult a FURUNO technician.
LOST TCVR	TCVR2 COM ERR stops MEAS.	Caution/B	302	Communication error between display unit and transceiver 2.	
FAN SPEED LOW	CVR1 fan ERR may stop MEAS.	Caution/B	104	Fan No.1 speed lower than minimum speed on transceiver 1.	
	TCVR2 fan ERR may stop MEAS.	Caution/B	114	Fan No.2 speed lower than minimum speed on transceiver 2.	
BOTTOM LOST	Bottom outs of range.	Caution/B	002	Seabed is out of range and cannot be detected.	

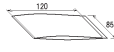
*: Depending on setting for [Bottom Lost Priority] selected at installation, BOTTOM LOST may be output as a Category B Caution, with the ID 003.

PACKING LIST		12AF-X-9851 -5	1/1
FE-8010-J,FE-8010-J-HK,FE-8010-E,FE-8010-E-HK		A-1	
NAME	UNIT	OUTLINE	DESCRIPTION/CODE No. Q'TY
指示器 DISPLAY UNIT		FE-8010* 000-025-189-00 **	1
付属品 ACCESSORIES		FP12-00801 001-273-710-00	1
工事材料 INSTALLATION MATERIALS		CP12-01101 001-273-700-00	1
図書 DOCUMENT		OM*-23840-* 000-179-825-1* **	1
取扱説明書 OPERATOR'S MANUAL		IM*-23840-* 000-201-196-1* **	1
装備要領書 INSTALLATION MANUAL			
コード番号末尾の(**)は、選用品の代表コードを表します。 CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.			
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)			
C2384-Z01-F			

A-2

FURUNO

CODE NO.	001-273-710-00	12AF-X-9501 -0
TYPE	FP12-00801	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	フィルター LCD CLEANING CLOTH		02-155-1082-2 CODE NO. 100-332-852-10	1	
2	おしキャップ CAP		26-003-1508-1 CODE NO. 100-356-091-10	4	

型式/コード番号が2段の場合、下段より上段に代わる適置商品であり、どちらが入っています。なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

C2384-F01-A

PACKING LIST		12AF-X-9853 -0	1/1
FE-8020, FE-8020-HK		A-3	
NAME	UNIT	OUTLINE	DESCRIPTION/CODE No. Q'TY
送受信機 TRANSCIVER UNIT		FE-8020* 000-025-197-00 **	1
予備品 SPARE PARTS		SP12-00801 001-273-720-00	1
工事材料 INSTALLATION MATERIALS		CP12-01201 001-273-730-00	1
コード番号末尾の(**)は、選用品の代表コードを表します。 CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.			
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)			
C2384-Z03-A			

A-4

FURUNO

CODE NO.	001-273-730-00	12AF-X-9402 -1
TYPE	CP12-01201	1/1

工事材料表					
INSTALLATION MATERIALS					
番号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ケーブルタイ CABLE TIE		CV-150N CODE NO. 100-162-186-10	6	
2	バネ座金 SPRING WASHER		M8 SUS304 CODE NO. 100-167-410-10	4	
3	皿状丸平座金 FLAT WASHER		M8 SUS304 CODE NO. 100-167-464-10	8	
4	六角ナット 13 HEX. NUT		M8 SUS304 CODE NO. 100-167-479-10	4	
5	六角ヘッド HEXAGONAL HEAD BOLT		M8X25 SUS304 CODE NO. 100-162-679-10	4	

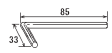
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

C2384-M02-B

FURUNO

CODE NO.	001-106-490-00	02F1-X-9407 -1
TYPE	CP02-08801	1/1

工事材料表		TTF-2000			
INSTALLATION MATERIALS					
番号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	gland 用締付 CABLE GLAND NIPPLE		JIS F8801 2027 CODE NO. 000-171-874-10	1	
2	電線貫通金座金 WASHER		TPB-11-07 ROHS CODE NO. 270-100-270-10	1	
3	貫通金物用パッキン RUBBER PACKING		TPB-11-08 ROHS CODE NO. 270-100-230-10	1	
4	振動子押えゴム DAMPER		TTF-2000-03 ROHS CODE NO. 250-820-030-10	1	
5	六角レンチ SOCKET SCREW WRENCH		対応5.0MM CODE NO. 000-177-316-10	1	

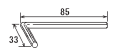
型式/コード番号が2段の場合、下段より上段に代わる通設部品であり、どちらが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO.,LTD.

C2366-M10-B

FURUNO

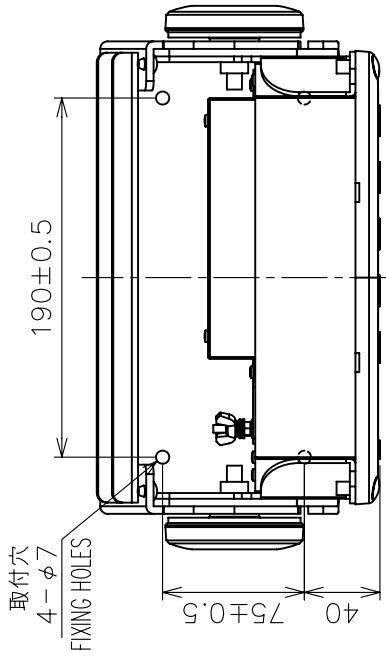
CODE NO.	001-106-500-00	02F1-X-9408 -1
TYPE	CP02-08802	1/1

工事材料表		TTF-5600			
INSTALLATION MATERIALS					
番 号 No.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ケーブル用締付 CABLE GLAND NIPPLE		JIS F8801 2027 CODE NO. 000-171-874-10	1	
2	電線貫通金座金 WASHER		TPB-11-07 ROHS CODE NO. 270-100-270-10	1	
3	貫通金物用パッキン RUBBER PACKING		TPB-11-08 ROHS CODE NO. 270-100-230-10	1	
4	六角レンチ SOCKET SCREW WRENCH		対 32.5.0MM CODE NO. 000-177-316-10	1	

型式/コード番号が2段の場合、下段より上段に代わる通設部品であり、どちらが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

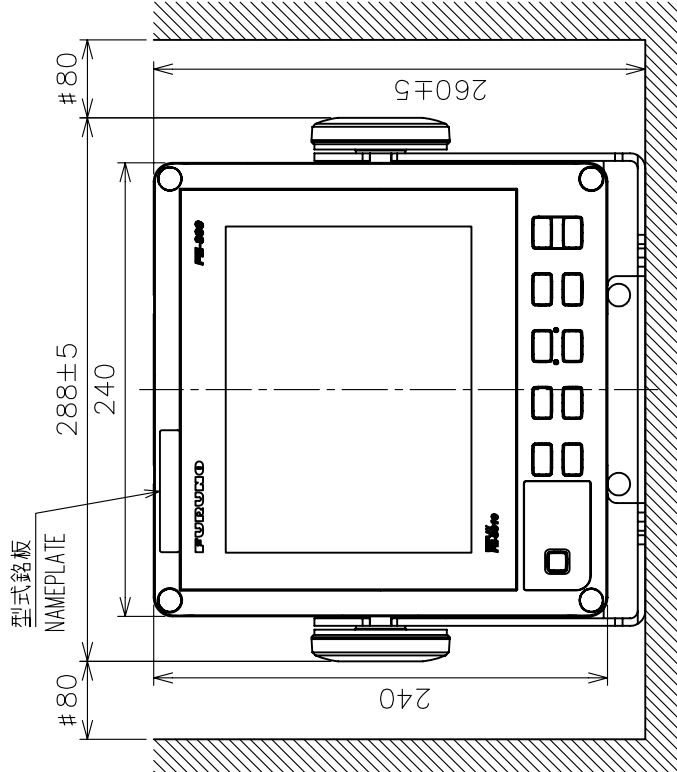
FURUNO ELECTRIC CO.,LTD.

C2366-M11-B



190±0.5

取付穴
4-φ7
FIXING HOLES

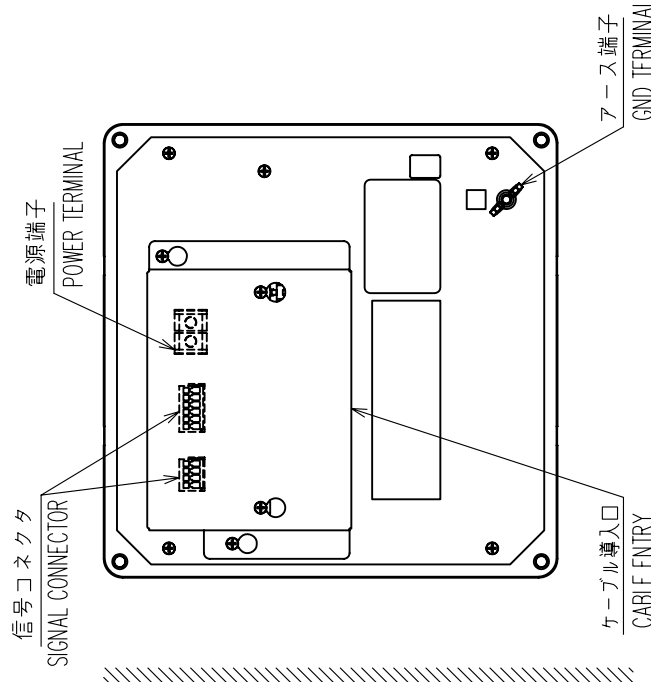
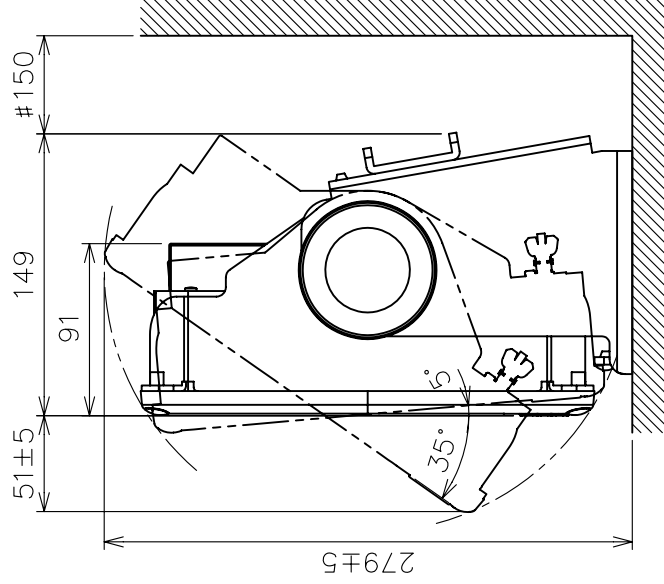


型式銘板
NAMEPLATE

表1 TABLE 1

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

取付部詳細 (尺度: 1/1)
DETAIL FOR FIXING (SCALE: 1/1)



注 記 1) 指定外の寸法公差は表 1 による。

2) # 印寸法は最小サービスクリアランスとする。

3) 取付用ネジはバイネジ呼び径 5 × 2.0 を使用のこと。

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

2. #: MINIMUM SERVICE CLEARANCE.

3. USE TAPPING SCREWS $\phi 5 \times 2.0$ FOR FIXING THE UNIT.

DRAWN	7/Jan/2014 T.YAMASAKI	TITLE	FE-8010
CHECKED	7/Jan/2014 H.MAKI	名称	指示器 (卓上装備)
APPROVED	10/Jan/2014 H. MAKI	外寸図	
SCALE	1/4 WSS 3.4 #10Z kg	NAME	DISPLAY UNIT (TABLETOP MOUNT)
DWG.No.	C2384-G01-A	REF.No.	12-005-100G-2

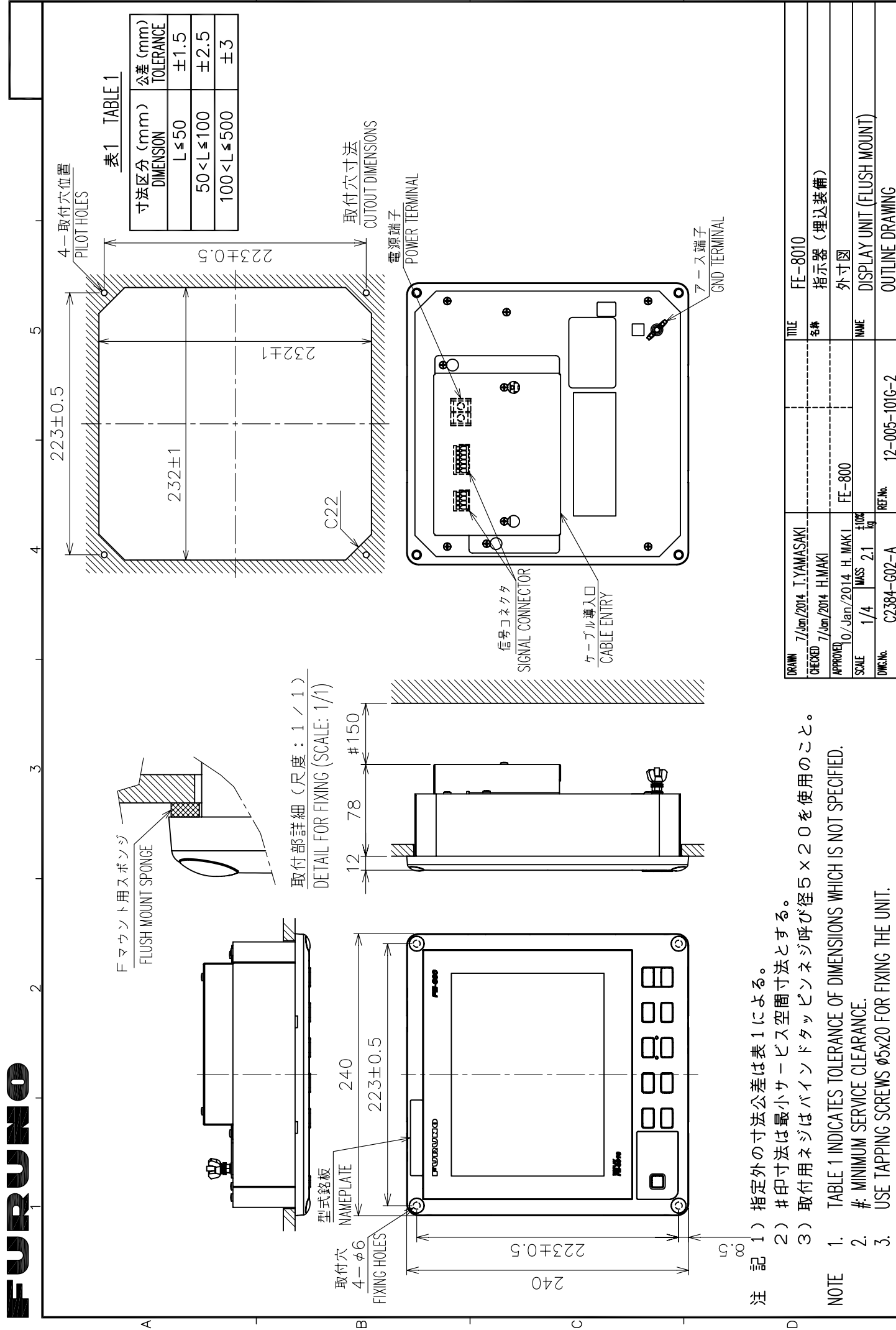
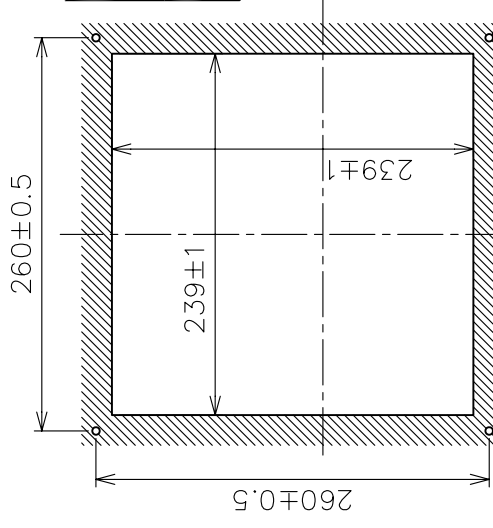


表1 TABLE 1

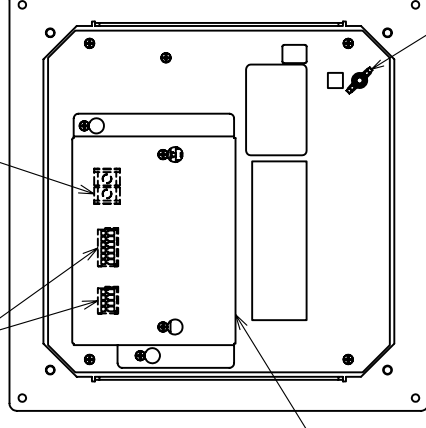
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 3



取付穴寸法
CUTOUT DIMENSIONS

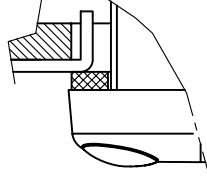
電源端子
POWER TERMINAL

信号コネクタ
SIGNAL CONNECTOR

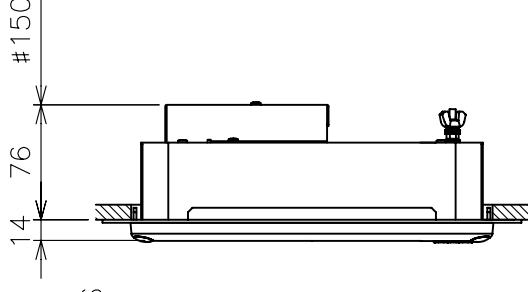


ケーブル導入口
CABLE ENTRY

アース端子
GND TERMINAL

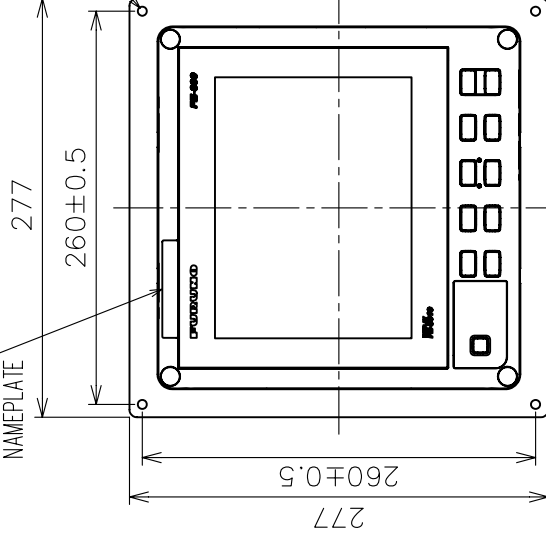


取付部詳細 (尺度: 1/1)
DETAIL FOR FIXING (SCALE: 1/1)



取付穴
4-φ6
FIXING HOLES

型式銘板
NAMEPLATE

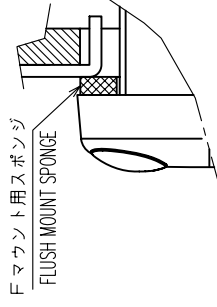


- 注 記 1) 指定外の寸法公差は表1による。
2) #印寸法は最小サービスクリアランスとする。
3) 取付用ネジはバイネジ呼び径5×20を使用のこと。
- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ5x20 FOR FIXING THE UNIT.

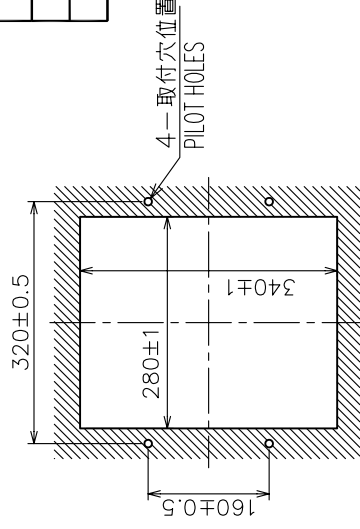
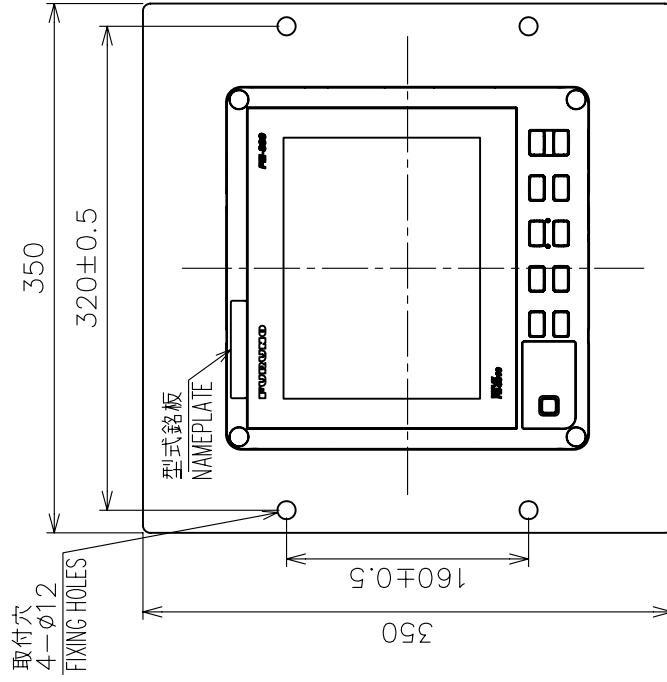
DRAWN	7/Jan/2014	T. YAMASAKI	TITLE	FE-8010
CHECKED	7/Jan/2014	H. MAKI	名称	指示器 (埋込パネル装備)
APPROVED	10/Jan/2014	H. MAKI	図面	外寸図
SCALE	1/5	WSS 2.3 kg	NAME	DISPLAY UNIT (FLUSH MOUNT PANEL)
DWG.No.	C2384-G03-A	REF.No.	12-005-102G-2	OUTLINE DRAWING

表1 TABLE 1

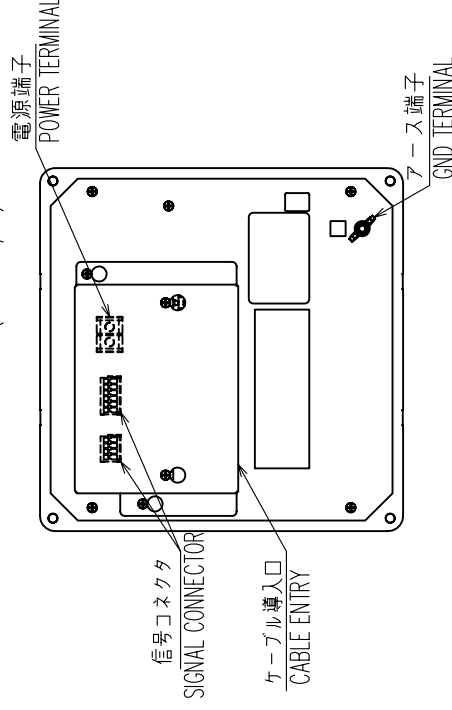
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 3



取付部詳細 (尺度: 1/1)
DETAIL FOR FIXING (SCALE: 1/1)



取付穴寸法 (尺度: 1/10)
OUTLET DIMENSIONS (SCALE: 1/10)

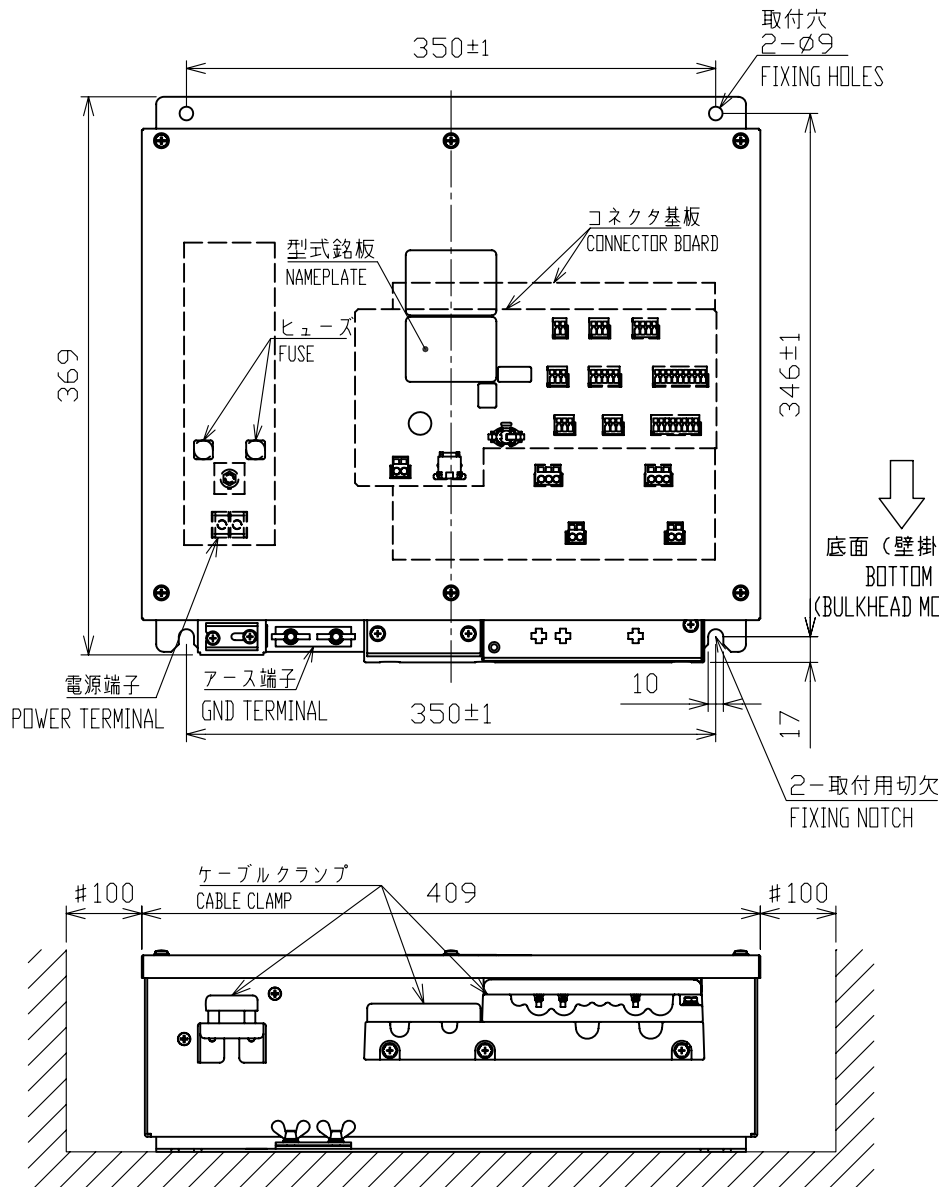


- 注 記 1) 指定外の寸法公差は表 1 による。
 2) # 印寸法は最小サービス空間寸法とする。
 3) 取付用ネジは M8×35 ボルトを使用のこと。
- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 2. # MINIMUM SERVICE CLEARANCE.
 3. USE M8x35 BOLTS FOR FIXING THE UNIT.

DRAWN	8/Jan/2014	I. YAMASAKI	TITLE	FE-8010
CHECKED	8/Jan/2014	H. MAKI	名称	指示器 (埋込パネル、FE-680 換装)
APPROVED	10/Jan/2014	H. MAKI	外寸図	FE-800
SCALE	1/5	WSS 2.5 kg	NAME	DISPLAY UNIT (REMOUNT FROM FE-680)
DMC No.	C2384-G05-A	REF. No.	12-005-103G-2	OUTLINE DRAWING

表1 TABLE 1

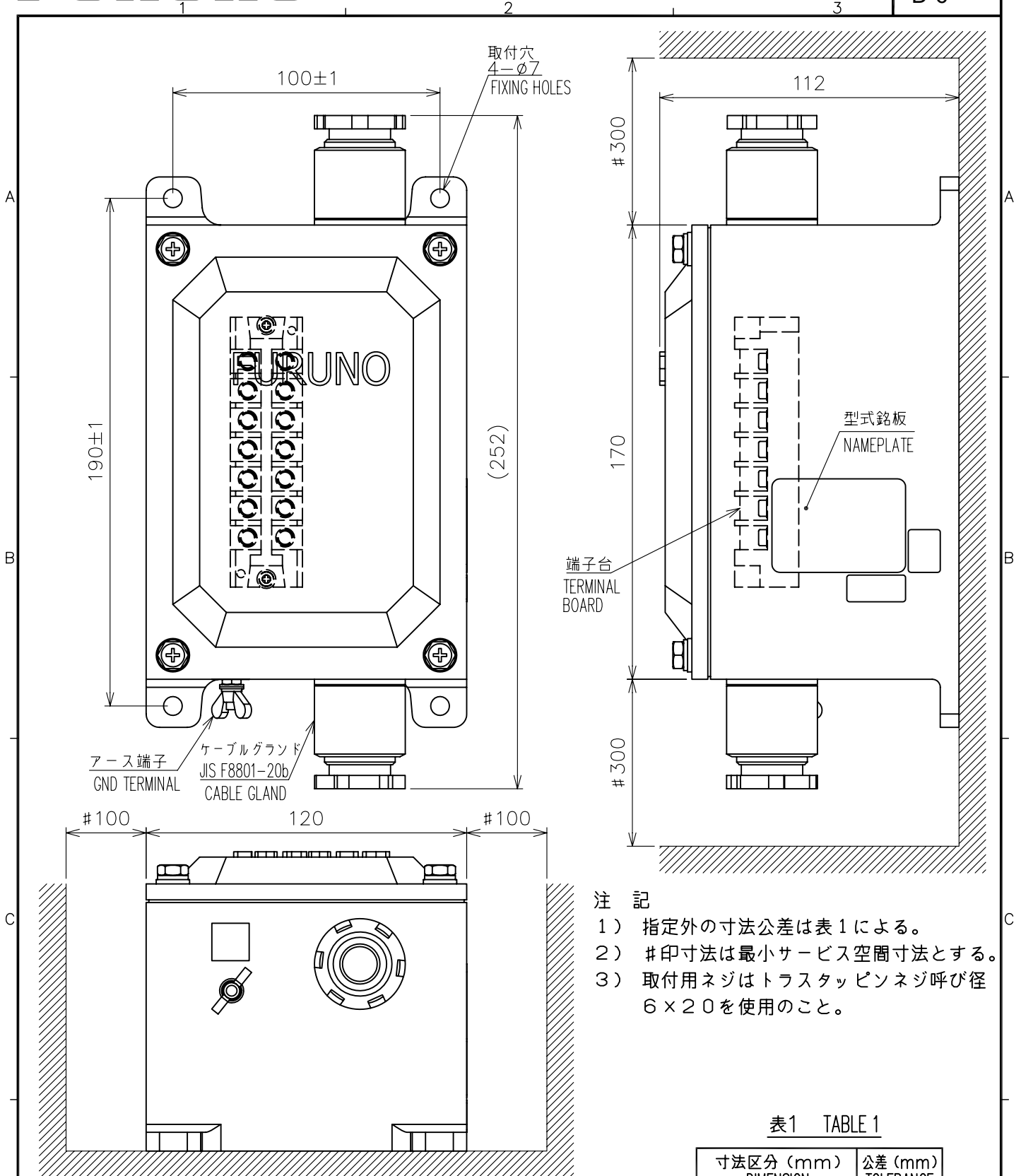
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 3



- 注 記 1) 指定外の寸法公差は表 1 による。
 2) # 印寸法は最小サービス空間寸法とする。
 3) 取付用ネジは M8 ボルト又はコーチボルト呼び 8 を使用のこと。

- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 2. #: MINIMUM SERVICE CLEARANCE.
 3. USE M8 BOLTS OR COACH SCREWS Ø8 FOR FIXING THE UNIT.

DRAWN	7/Jan/2014 T.YAMASAKI	TITLE	FE-8020
CHECKED	7/Jan/2014 H.MAKI	名称	送受信機 (壁掛 / 卓上装備)
APPROVED	8/Jan/2014 H. MAKI		外寸図
SCALE	1/5	MASS	10 ±10% kg
DWG. No.	C2384-G04- A	REF. No.	12-005-200G-2
			TRANSCEIVER UNIT (BULKHEAD/TABLETOP MOUNT) OUTLINE DRAWING



注 記

- 1) 指定外の寸法公差は表1による。
- 2) #印寸法は最小サービス空間寸法とする。
- 3) 取付用ネジはトラスタピンネジ呼び径 6×20 を使用のこと。

表1 TABLE 1

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

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. # MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS $\phi 6 \times 20$ FOR FIXING THE UNIT.

DRAWN 18/Mar/2014 T. YAMASAKI	TITLE MB-502/504
CHECKED 18/Mar/2014 H. MAKI	名称 整合箱
APPROVED 18/Mar/2014 H. MAKI	外寸図
SCALE 1/2	NAME MATCHING BOX
MASS 2.6 $\pm 10\%$ kg	OUTLINE DRAWING
DWG. No. C2006-006-F	REF. No. 12-005-300G-1

A

B

C

D

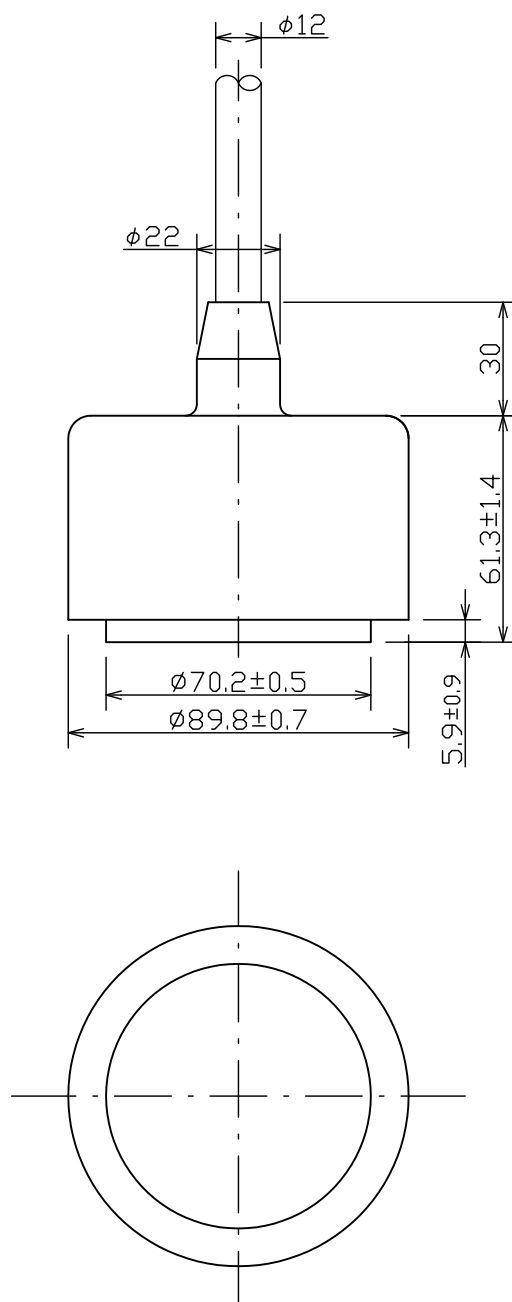


表 1 TABLE 1

型式 TYPE	ケーブル長 CABLE LENGTH (m)	質量 MASS (kg $\pm 10\%$)
50B-6/60B-5S	10	3.1
50B-6B	15	4.1
200B-5S	10	2.5

質量はケーブル重さ (1 m 当り 0.19 kg) を含む。
MASS INCLUDES CABLE (0.19kg PER METER).

DRAWN	2/Oct/2018 T. YAMASAKI		TITLE	50B-6(B), 60B-5S, 200B-5S
CHECKED	2/Oct/2018 H. MAKI		名称	50/60/200 kHz 送受波器
APPROVED	4/Oct/2018 H. MAKI			外寸図
SCALE	1/2	MASS 表 1 参照 SEE TABLE 1	NAME	50/60/200 kHz TRANSDUCER
DWG. No.	C2003-010- H	REF. No.	5431-A023-000-A	OUTLINE DRAWING

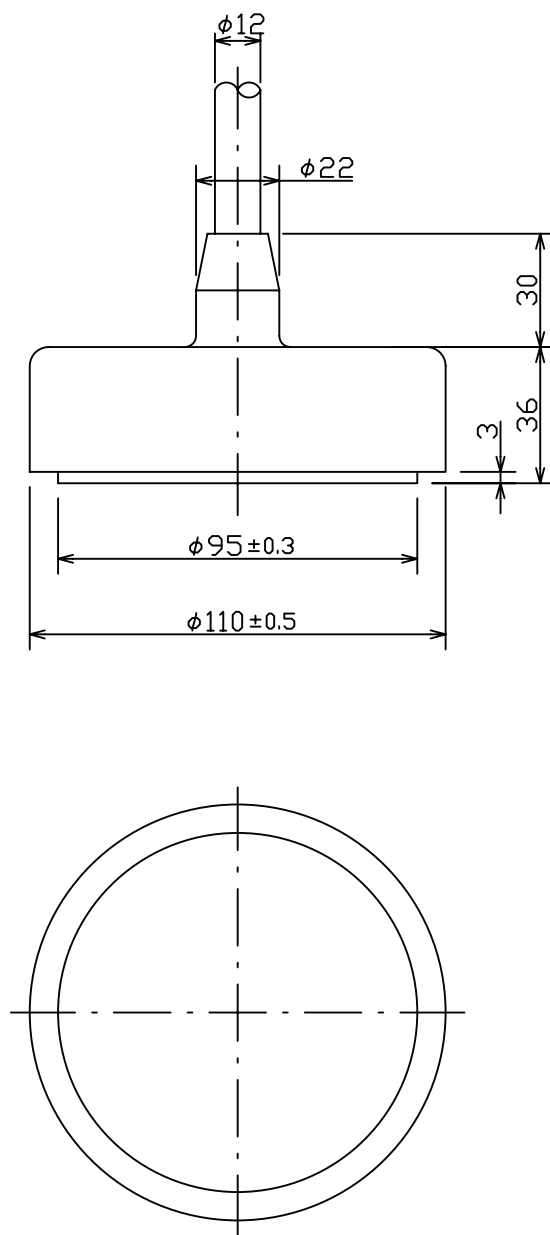
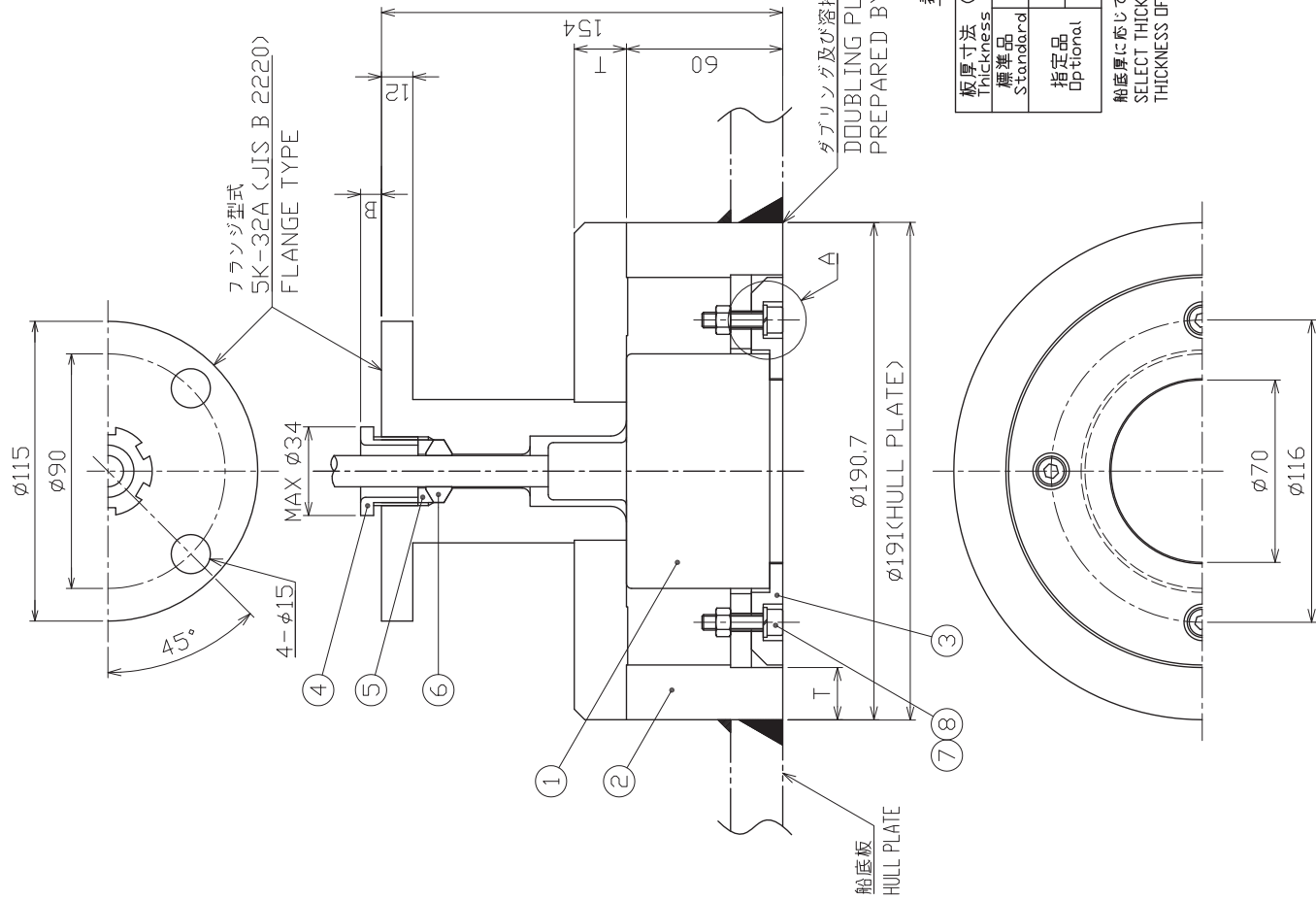


表 1 TABLE 1

型式 TYPE	ケーブル長 CABLE LENGTH (m)	質量 MASS (kg±10%)
200B-8	10	2.6
200B-8B/8N	15	3.6

質量はケーブル重さ(1m当り0.19kg)を含む。
MASS INCLUDES CABLE (0.19kg PER METER).

DRAWN	Oct. 26 '04	I. YAMASAKI	TITLE	200B-8(B)/(N)
CHECKED	Oct. 26 '04	R. SUMI	名称	200 kHz 送受波器
APPROVED	Oct. 28 '04	H. Hayashi		外寸図
SCALE	1/2	MASS 表 1 参照 SEE TABLE 1	NAME	200 kHz TRANSDUCER
DWGNo.	C2003-019-E			OUTLINE DRAWING



- 注記： 1. タンク下面は船底板と面一とし、船底板より凹まないように装備してください。
2. 船底板とタンクを溶接する際は、②タンク本体溶接部分の表面処理を削がし、歪み防止のため
- ① 送受装置⑥ゴムパッキンを取り外し、"③取付フランジ"を必ず取付けて
施行してください。
3. ②タンク本体の材質はNK（日本海事協会）規格のKSTPG370です。
4. タンクにはジンクリッチアプライマー（JIS K 5552 2種）を塗布しています。
5. 塗装する際は、送受装置を塗装しないように注意してください。
6. ④締付けグラウンドは、図中B寸法が7.5〜7.0mmになるように締付けてください。
7. ①送受装置取付け後、A部および②タンク本体と③取付フランジの隙間をシリコン等
で埋めてください。
8. 寸法公差は表1の通りです。

- NOTE: 1. THE TRANSDUCER TANK SHOULD BE WELDED FLUSH WITH SHIP'S HULL PLATE.
2. PEEL OFF SURFACE PLATING OF WELDING PART OF CASING ② BEFORE WELDING.
TO AVOID DISTORTION BY HEAT, PUT *FIXING FLANGE ③* WITHOUT TRANSDUCER ①
AND GASKET ⑥ ONTO CASING ② WHILE WELDING.
3. MATERIAL OF CASING② MEETS NK (NIPPON KAIJI KYOKAI) STANDARD KSTPG370.
4. THE TRANSDUCER TANK IS FINISHED BY ZINC RICH PRIMER (JIS K 5552 TYPE 2).
5. DO NOT PAINT TRANSDUCER FACE.
6. TIGHTEN GLAND NUT ④ SO THAT DIMENSION 'B' BECOMES BETWEEN 7.0 mm AND 7.5 mm.
7. FILL THE SPACE OF POSITION 'A' AND THE GAP BETWEEN CASING ② AND FIXING FLANGE ⑤
WITH SILICONE AFTER ATTACHING THE TRANSDUCER ①.
8. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

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

表1 (Table1)

8	スプリング SPRING WASHER	SUS316L	4	M6	
7	六角穴付ネジ HEX. S.H.C. SCREW	SUS316L	4	M6 x 25	
6	ガスケット GASKET	CR	1	TPB-11-08	
5	ワッシャー WASHER	C3604(CdL)	1	TPB-11-07	
4	締付ボルト CLAND NUT	C3604(CdL)	1	JIS F8801 20 1a	
3	取付フランジ FLANGING FLANGE	SUS316L	1	TTF-5600-02	
2	ケーシング CASING EPOXY ZINC RICH PRIMER	KSTPG370	1	TTF-5600-05	船級認定材 CLASSIFICATION SOCIETY APPROVED MATERIAL
1	送受波器 TRANSDUCER		1	50B-6B	下記質量には含まず NOT INCLUDED IN MASS.
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DRAWING NO.	備考 REMARKS

板厚寸法 Thickness	指定品 Optional	本体質量(kg±10%) Mass of tank
標準品 Standard	T=20	18
指定品 Optional	T=12	15
	T=25	20

船底厚に応じて板厚Tを選択ください
SELECT THICKNESS "T" ACCORDING TO
THICKNESS OF HULL PLATE.

表2 (Table 2)

DRAWN	DATE	BY	DIFFERENCE	REMARKS
DECED	2/Jun/2020	I.YAMASAKI	TTF-5600 (5K-32A)	
APPROVED	2/Jun/2020	H.WAKI	名称 送受波器タンク	
APPROVED	5/Jun/2020	H.WAKI	送受波器装備図	
SCALE	1/2	WASS 表2参照 Table 2	NAME TRANSDUCER TANK	
FIG. No.	C2001-T46-R	REF. No. J2-TTF-565G-5	TRANSDUCER INSTALLATION	

周波数 FREQUENCY	200 kHz
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表1 (Table1)

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

- 注記： 1. タンク下面は船底板と面とし、船底板より凹まないように装着してください。
 2. 船底板とタンクを溶接する際は、②タンク本体溶接部分の表面処理を削がし、至り防止のため①送受波器ノ④押えゴムノ⑦ゴムパッキンを取り外し、"③取付フランジ"を必ず取付けで施行してください。
 3. ②タンク本体の材質はNK (日本海事協会) 規格のKSTPG370です。
 4. タンクにはジンクリッチプライマー (JIS K 5552 2種) を塗布しています。
 5. 塗装する際は、送受波器面を塗装しないように注意してください。
 6. ⑤溶付けグラウンドは、図中B寸法が7.5~7.0mmになるように溶付けしてください。
 7. ①送受波器取付け後、A部および②タンク本体と③取付フランジの隙間をシリコン等で埋めてください。
 8. 寸法公差は表1の通りです。

- NOTE: 1. THE TRANSDUCER TANK SHOULD BE WELDED FLUSH WITH SHIP'S HULL PLATE.
 2. PEEL OFF SURFACE PLATING OF WELDING PART OF CASING ② BEFORE WELDING.
 TO AVOID DISTORTION BY HEAT, PUT "FIXING FLANGE ③" WITHOUT TRANSDUCER ①
 DAMPER ④ AND GASKET ⑦ ONTO CASING ② WHILE WELDING.
 3. MATERIAL OF CASING ② MEETS NK (NIPPON KAIJI KYOKAI) STANDARD KSTPG370.
 4. THE TRANSDUCER TANK IS FINISHED BY ZINC RICH PRIMER (JIS K 5552 TYPE 2).
 5. DO NOT PAINT TRANSDUCER FACE.
 6. TIGHTEN GLAND NUT ⑤ SO THAT DIMENSION 'B' BECOMES BETWEEN 7.0 mm AND 7.5 mm.
 7. FILL THE SPACE OF POSITION 'A' AND THE GAP BETWEEN CASING ② AND FIXING FLANGE ③
 WITH SILICONE AFTER ATTACHING THE TRANSDUCER ①.
 8. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

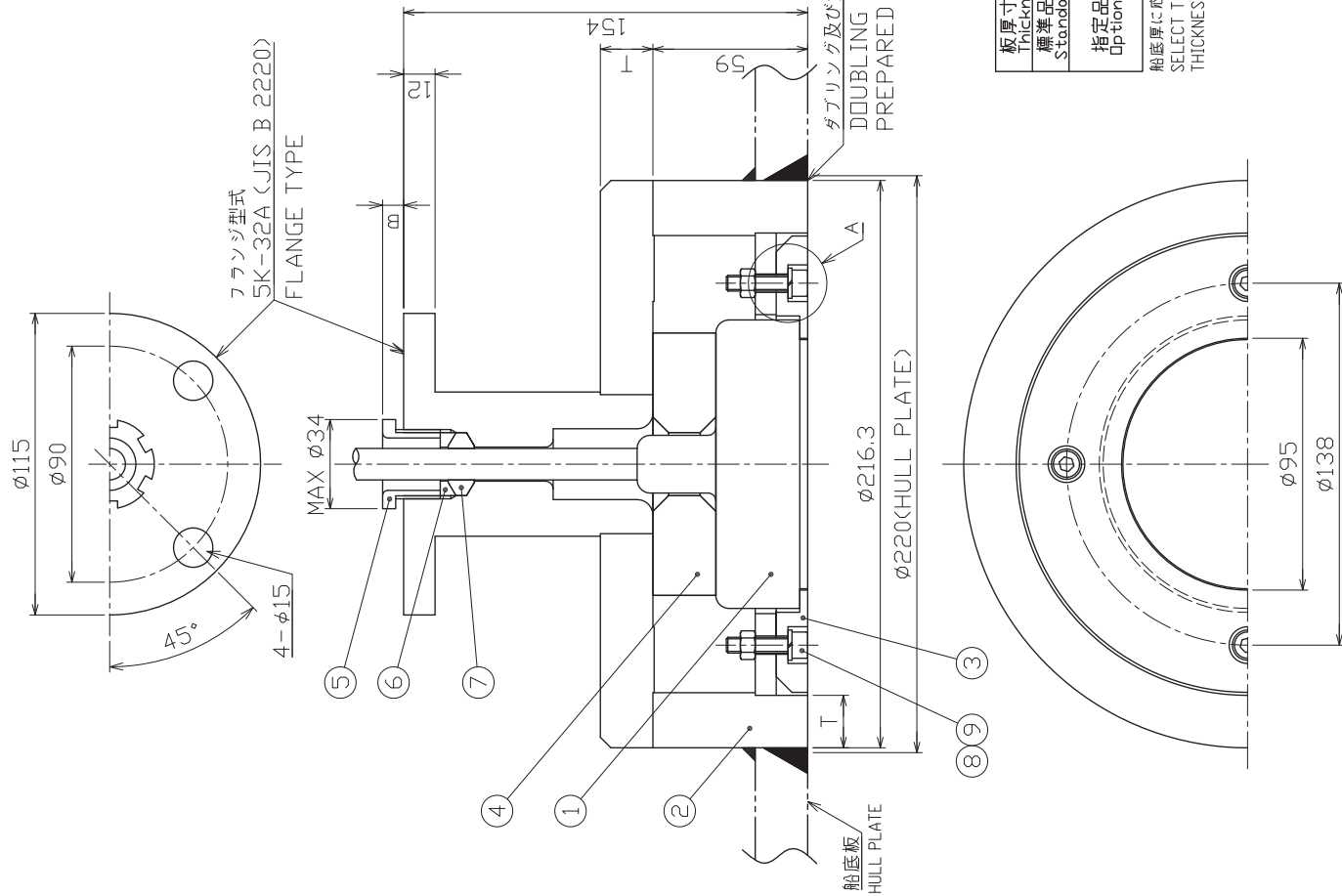


表2 (Table 2)

板厚寸法 (mm) Thickness	本体質量 (kg) (10%) Mass of tank
標準品 Standard T=20	20
指定品 Optional T=12	16
T=25	22

船底厚に於いて板厚Tを選択してください
 SELECT THICKNESS "T" ACCORDING TO
 THICKNESS OF HULL PLATE.

9	バネ鋼金 SPRING WASHER 六角穴付きボルト HEX.S.H.C.SCREW	SUS316L	4	M6	
8	六角穴付きボルト HEX.S.H.C.SCREW	SUS316L	4	M6×25	
7	ゴムパッキン GASKET	CR	1	TPB-11-08	
6	鋼金 WASHER	C3604B	1	TPB-11-07	
5	溶付けグラウンド GLAND NUT	C3604B	1	JIS F8801 20 1a	
4	押えゴム DAMPER	CR	1	TTF-2000-03	
3	取付フランジ FIXING FLANGE	SUS316L	1	TTF-2000-02	
2	タンク本体 CASING EPOXY ZINC RICH PRIMER	KSTPG370	1	TTF-2000-05	船級認定材 CLASSIFICATION SOCIETY APPROVED MATERIAL
1	送受波器 TRANSDUCER		1	200B-8B	下記質量には含まず NOT INCLUDED IN MASS.
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	備考 REMARKS
DRAWN	1/Jan/2020	I.YAMASAKI		TTF-2000 (5K-32A)	
CHECKED	1/Jan/2020	H.MAKI		送受波器タンク	
APPROVED	5/Jun/2020	H.MAKI		送受波器装備図	
APPROVED	1/2	MSS 第2巻 Table 2		TRANSDUCER TANK	
DWG No.	C2001-T48-A			TRANSDUCER INSTALLATION	



ダブルソング及び溶接方法については造船所一任
DOUBLING PLATE AND WELDING
PREPARED BY SHIPYARD.

6	周波数 FREQUENCY	50 kHz
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NOTE: 1. THE TRANSDUCER TANK SHOULD BE WELDED FLUSH WITH SHIP'S HULL PLATE.
2. PEEL OFF SURFACE PLATING OF WELDING PART OF CASING ② BEFORE WELDING.
TO AVOID DISTORTION BY HEAT, PUT 'FIXING FLANGE ③' WITHOUT TRANSDUCER ①
AND GASKET ⑥ ONTO CASING ② WHILE WELDING.
3. MATERIAL OF CASING ② MEETS NK (NIPPON KAIJI KYOKAI) STANDARD KA.
4. THE TRANSDUCER TANK IS FINISHED BY ZINC RICH PRIMER (JIS K 5552 TYPE 2)
5. DO NOT PAINT TRANSDUCER FACE.
6. TIGHTEN GLAND NUT ④ SO THAT DIMENSION 'B' BECOMES BETWEEN 7.0 mm AND 7.5 mm.
7. FILL THE SPACE OF POSITION 'A' AND THE GAP BETWEEN CASING ② AND FIXING FLANGE ③
WITH SILICONE AFTER ATTACHING THE TRANSDUCER ①.
8. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

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

DRAWN	2/Jun/2020	I.YAMASAKI	TITLE	
CHECKED	2/Jun/2020	H.MAKI	名称	TTF-5600 (5K-32A)
APPROVED	5/Jun/2020	H.MAKI		送受波器タンク
SCALE	1/2	MASS	質量は送受波器を含みます。	送受波器装備図
UNIT	kg	REF. No.	TRANS-DUCER TANK	
			TRANS-DUCER INSTALLATION	



NOTE: 1. THE TRANSDUCER TANK SHOULD BE WELDED FLUSH WITH SHIP'S HULL PLATE.
2. PEEL OFF SURFACE PLATING OF WELDING PART OF CASING ② BEFORE WELDING.
TO AVOID DISTORTION BY HEAT, PUT 'FIXING FLANGE ③' WITHOUT TRANSDUCER ①,
DAMPER ④ AND GASKET ⑦ ONTO CASING ② WHILE WELDING.
3. MATERIAL OF CASING ② MEETS NK (NIPPON KAIJI KYOUKAU) STANDARD KA.
4. THE TRANSDUCER TANK IS FINISHED BY ZINC RICH PRIMER (JIS K 5552 TYPE 2).
5. DO NOT PAINT TRANSDUCER FACE.
6. TIGHTEN GLAND NUT ⑤ SO THAT DIMENSION 'B' BECOMES BETWEEN 7.0 mm AND 7.5 mm.
7. FILL THE SPACE OF POSITION 'A' AND THE GAP BETWEEN CASING ② AND FIXING
FLANGE ③ WITH SILICONE AFTER ATTACHING THE TRANSDUCER ①.
8. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

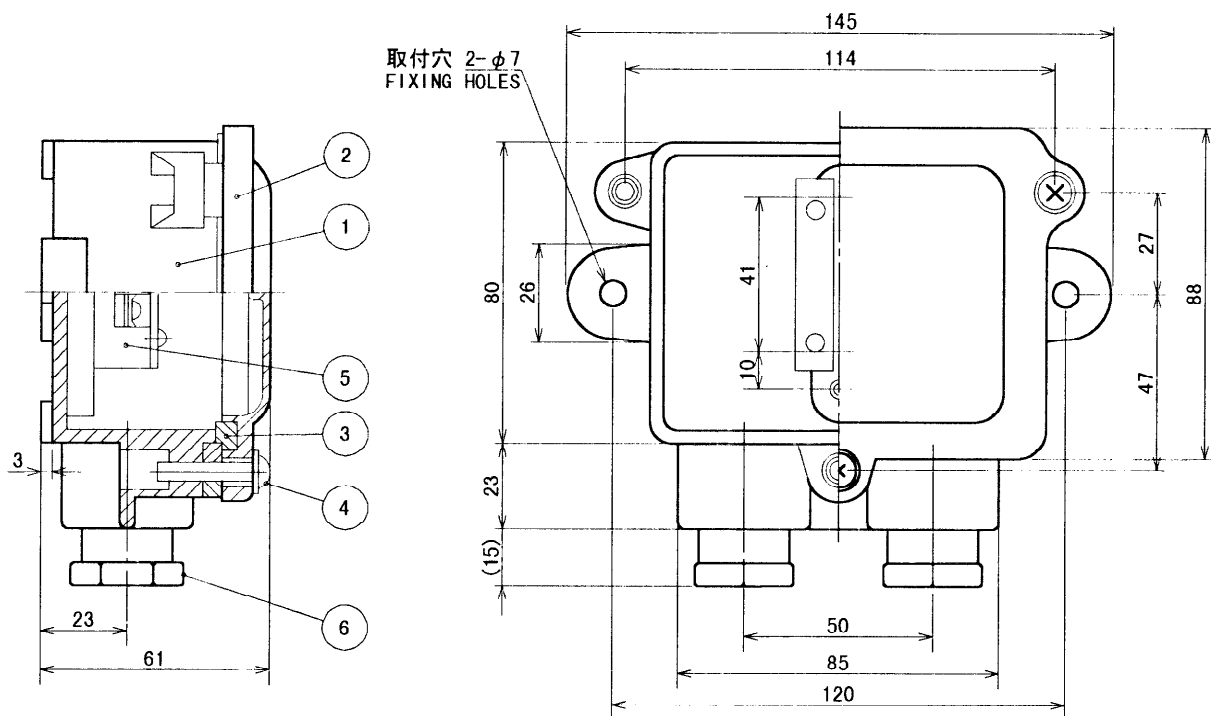
公差 (mm) Tolerance	寸法区分 (mm) Dimension
±1.5	L ≤ 50
±2.5	50 < L ≤ 100
±3	100 < L ≤ 500

板厚寸法 (mm)		T=30		指定品 Optional	
DRAW	9/Jun/2020	I.YAMASAKI			
CHECKED	9/Jun/2020	H.MAKI			
APPROVED	9/Jun/2020	H.MAKI			
SCALE	1/2	WSS	100%		
TWC No.	C2001-149-A				

FURNÒ ELECTRIC CO., LTD.

表 1 TABLE 1

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



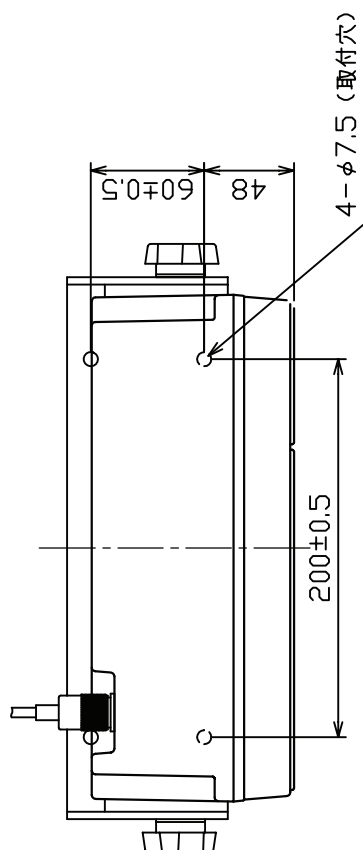
6	電線貫通金物 CABLE GLAND	P. B. T. 樹脂 RESIN	2		JIS F8801-20
5	端子盤 TERMINAL BOARD		1		JIS F8812-020-3
4	締付ねじ CLAMPING SCREW	真鍮 BRASS	3		
3	ガスケット GASKET	ネオプレン NEOPRENE	1		
2	蓋 COVER	P. B. T. 樹脂 RESIN	1		
1	箱 体 BOX	P. B. T. 樹脂 RESIN	1		
品番 ITEM	品 名 NAME	材 質 MATERIAL	数 量 Q'TY	図 番 DWG. NO.	摘 要 REMARKS

DRAWN
July 5 '00 T. YAMASAKI
CHECKED
July 6 '00 Y. Kuma
APPROVED
July 6 '00 Y. Kuma
SCALE 1/2 MASS ±10%
0.4 kg
DWG. No. C0002-G01- B

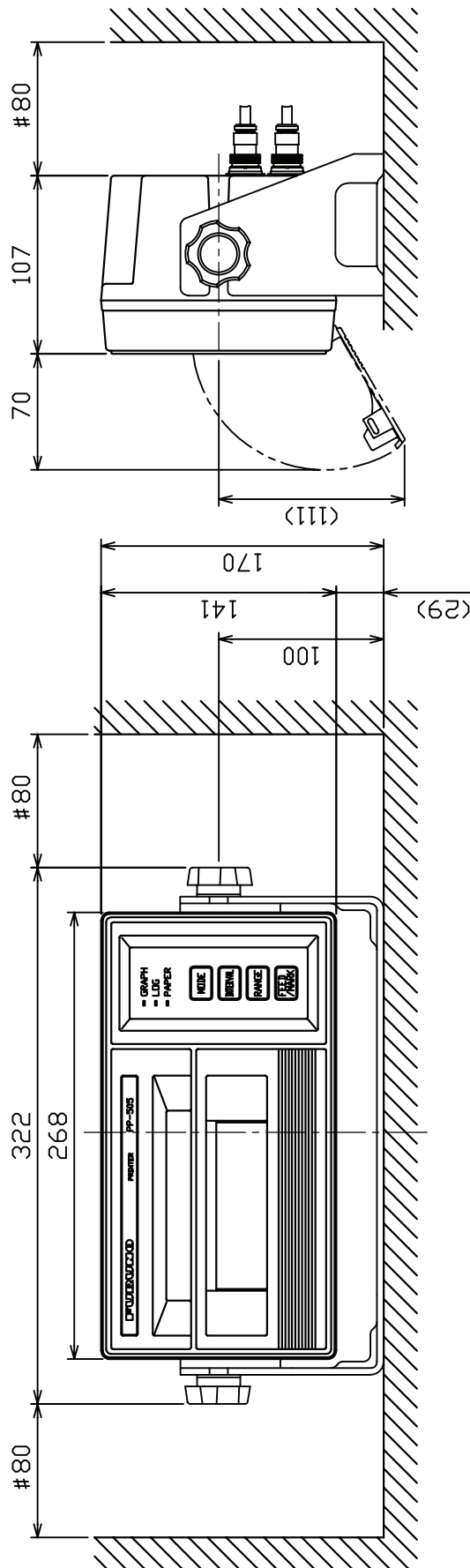
TITLE
名称 JIS F8821-1
防水型船用小型接続箱
外寸図
NAME
WATERTIGHT JUNCTION BOX
OUTLINE DRAWING

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

表 1 TABLE 1



FIXING HOLES



注 記 1) # 印寸法は最小サービス空間寸法とする。

2) 指定外の寸法公差は表 1 による。

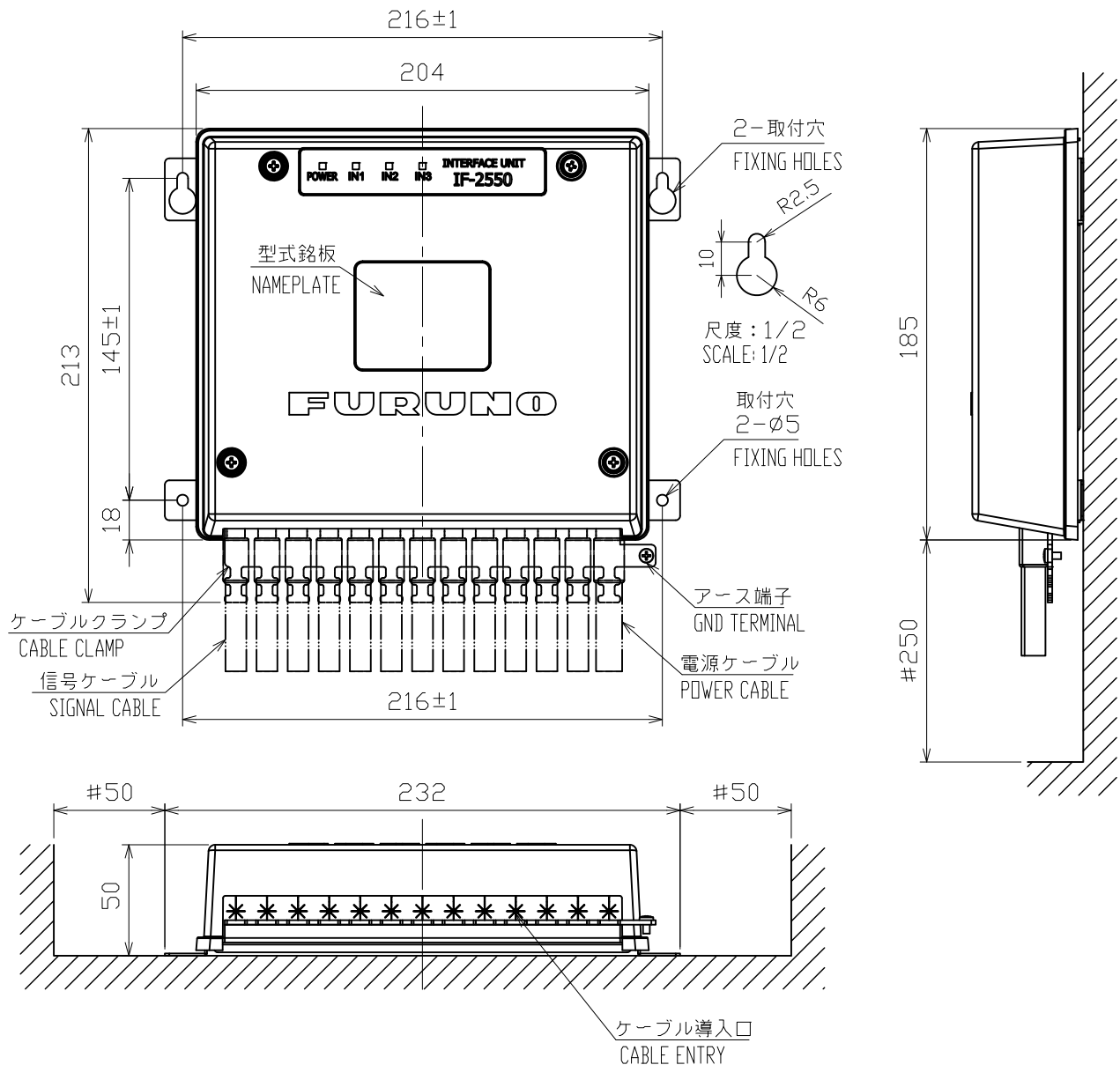
NOTE 1. # RECOMMENDED SERVICE CLEARANCE.

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

DRAWN	Dec. 5 '03	T. Shishido	TITLE	PP-505-FE
CHECKED	Dec. 5 '03	T. Takano	名称	プリンタ
APPROVED	Dec. 08 '03	T. Masaguchi	外寸図 (卓上装備)	
SCALE	1/4	1/4	NAME	PRINTER (TABLETOP MOUNT)
FIG.No.	C2366-G10-B	16-010-005G-0	OUTLINE DRAWING	

表1 TABLE 1

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



注記

- 1) 指定なき寸法公差は表1による。
- 2) #印寸法は最小サービス空間寸法とする。
- 3) 取付ネジはトラスタッピンネジ呼び径4×16を使用のこと。

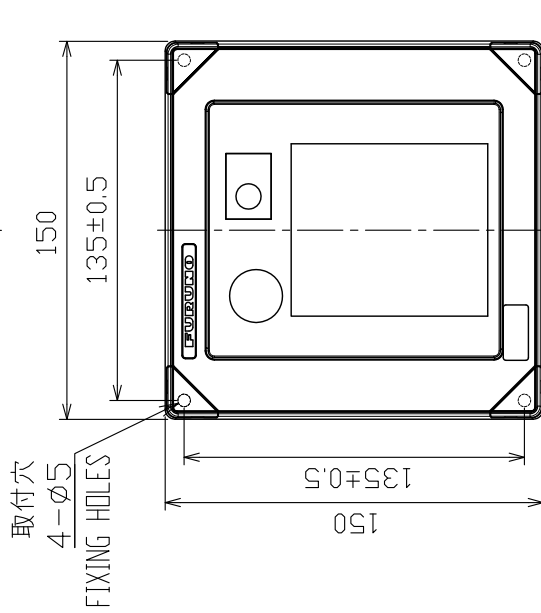
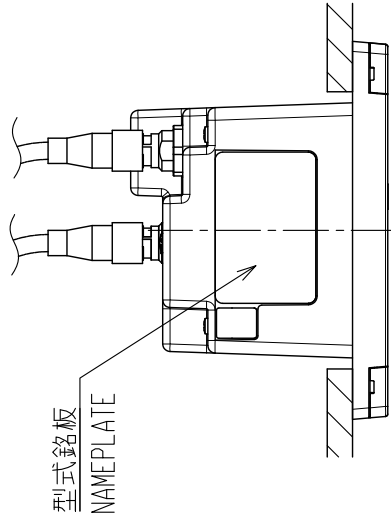
NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS $\phi 4 \times 16$ FOR FIXING THE UNIT.

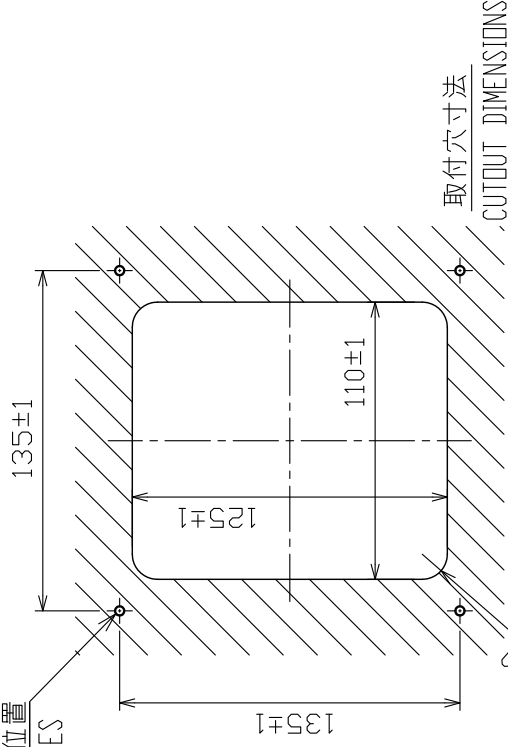
DRAWN	19/Jun/2023 T.YAMASAKI	TITLE	IF-2550
CHECKED	19/Jun/2023 H.MAKI	名称	インターフェイスユニット (壁掛装備)
APPROVED	19/Jun/2023 H.MAKI	外寸図	
SCALE	1/3	MASS	0.9 $\pm 10\%$ kg
DWG. No.	C4482-G06-D	REF. No.	78-020-210G-2
		NAME	INTERFACE UNIT (BULKHEAD MOUNT)
			OUTLINE DRAWING

表1 TABLE 1

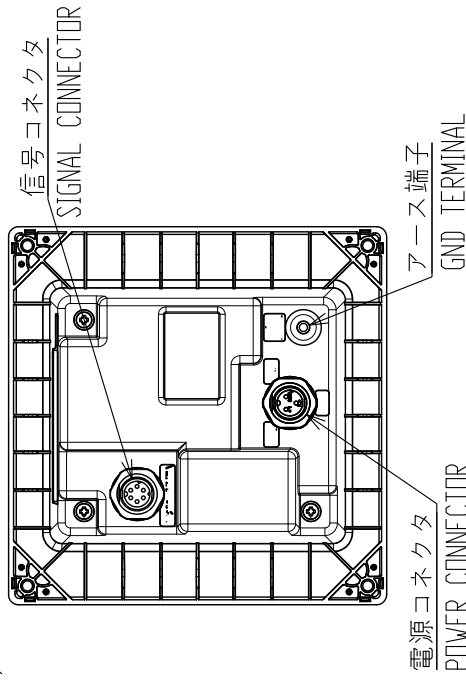
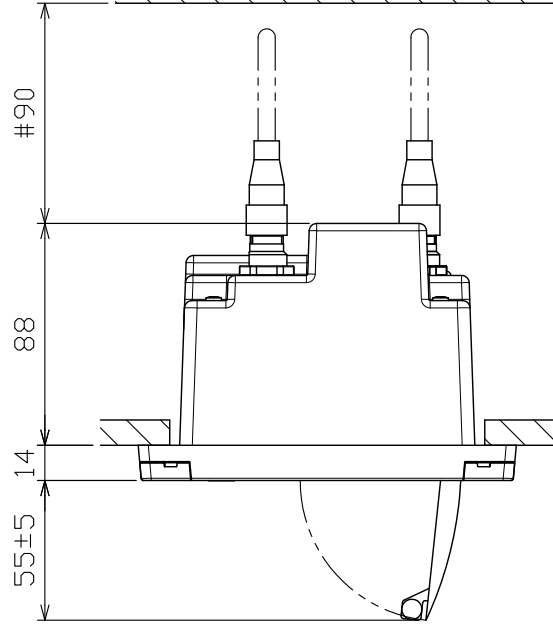
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 3



4-取付穴位置
PILOT HOLES



取付穴寸法
CUTOUT DIMENSIONS



注 記

- 1) 指定外の寸法公差は表 1 による。
- 2) # 印寸法は最小サービス空間寸法とする。
- 3) 取付用ネジは+トラスタッピングネジ呼び径 4×20 を使用のこと。

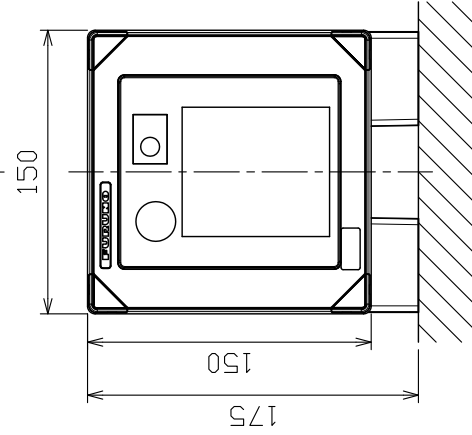
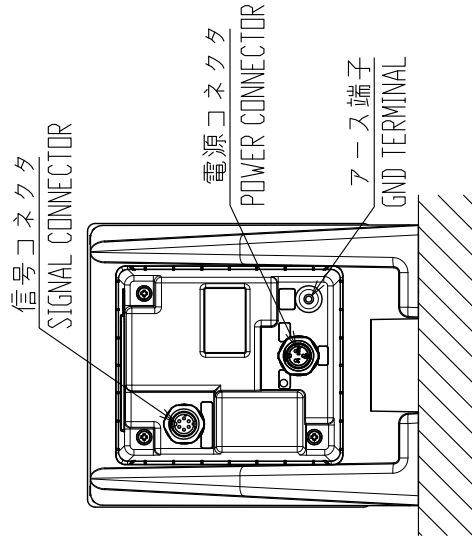
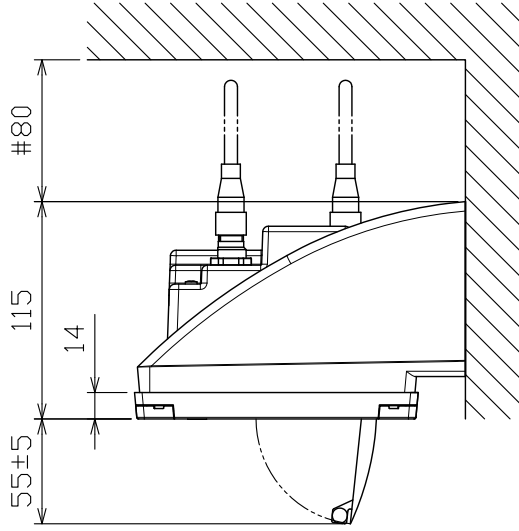
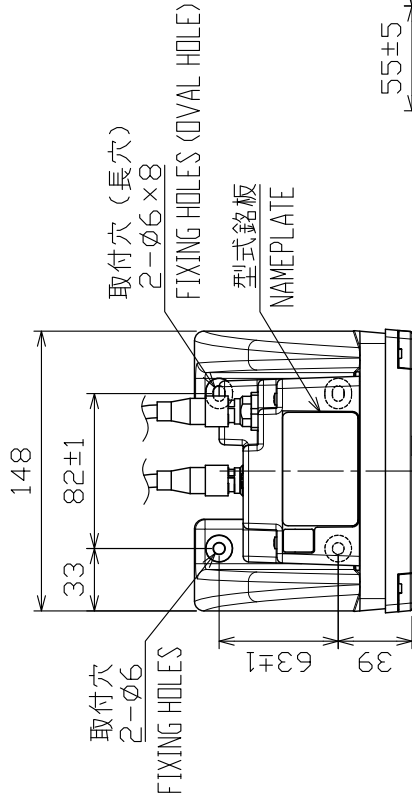
NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS $\phi 4 \times 20$ FOR FIXING THE UNIT.

DRAWN	25/Oct/2023	S.HAN	TITLE	PP-900
CHECKED	25/Oct/2023	T.YAMASAKI	名称	プリンタ(埋込装備)
APPROVED	25/Oct/2023	H.MAKI	外寸図	
SCALE	1/3	MASS 0.53 kg	NAME	PRINTER (FLUSH MOUNT)
IMG/No.	C5715-604-E	REF.No.	08-025-551G-4	OUTLINE DRAWING

表1 TABLE 1

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



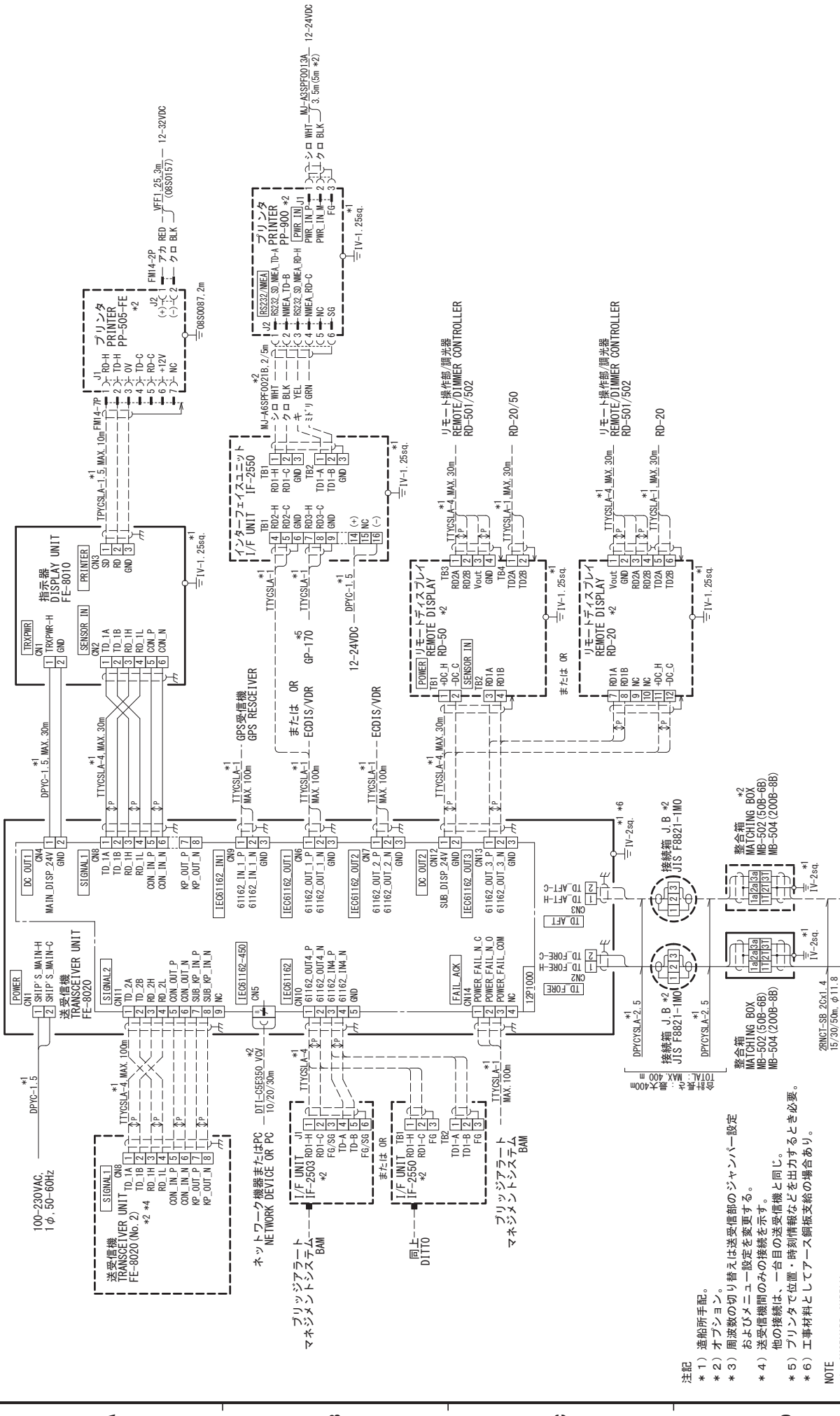
注 記

- 1) 指定外の寸法公差は表 1 による。
- 2) # 印寸法は最小サービスクリアランスとする。
- 3) 取付用ネジは+トラスチックピンネジ呼び径5×20を使用のこと。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. # MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS $\phi 5 \times 20$ FOR FIXING THE UNIT.

DRAWN	25/Oct/2023	SHAN	TITLE	PP-900
CHECKED	25/Oct/2023	T.YAMASAKI	名称	プリンタ (卓上装備)
APPROVED	25/Oct/2023	H.MAKI	外寸図	
SCALE	1/4	100% MASS 0.76 kg	NAME	PRINTER (TABLETOP MOUNT)
FIG.No.	C5715-605-E	08-025-550G-4	OUTLINE DRAWING	



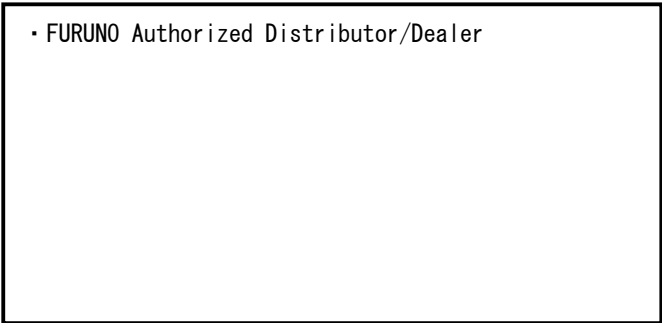
DRAWN		TITLE	
27/Feb/2024 T. YAMASAKI		FE-800	
CHECKED		名称	
27/Feb/2024 H. MAKI		音響測深機	
APPROVED		相互結線図	
27/Feb/2024 H. MAKI		NAME	
SCALE		NAVIGATIONAL ECHO SOUNDER	
DWG No.		INTERCONNECTION DIAGRAM	
C2384-C01-L		REF. No.	
12-005-0001-1		12-005-0001-1	

- 注記
- *1) 造船所手配。
 - *2) オプション。
 - *3) 周波数の切り替えは送受信部のジャンパー設定およびメニュー設定を変更する。
 - *4) 送受信機間のみの接続を示す。
 - *5) プリンタで位置・時刻情報などを出力するとき必要。
 - *6) 工事材料としてアース銅板支給の場合あり。
- NOTE
- *1: SHIPYARD SUPPLY.
 - *2: OPTION
 - *3: CHANGE THE JUMPER SETTING IN THE TRANSCIEVER UNIT AND THE MENU SETTING FOR EXCHANGING THE FREQUENCIES.
 - *4: THIS CONNECTION INDICATES BETWEEN TRANSCIEVERS ONLY.
 - *5: REQUIRED FOR PRINTING LOCATION/CLOCK INFORMATION.
 - *6: A COPPER STRAP MAY BE SUPPLIED IN INSTALLATION MATERIALS.

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FURUNO ELECTRIC CO., LTD.

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



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