FURUNO

Installation Manual
NAVIGATIONAL ECHO SOUNDER
Model FE-800

FURUNO ELECTRIC CO., LTD.

www.furuno.com

⚠ 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

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        ┌──────────────────────┐         ┌──────────────────┐     ┌──────────────┐
        │                      │ - - - - │ DISPLAY UNIT     │- - -│ PRINTER      │
        │                      │         │ FE-8010          │     │ PP-505-FE    │
        │                      │         └──────────────────┘     └──────────────┘
        │                      │
        │                      │         ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
        │                      │◄ - - - -  TRANSCEIVER UNIT
        │                      │         │ FE-8020 (No.2)    │
        │                      │         └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
        │  TRANSCEIVER UNIT    │         ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
        │     FE-8020          │- - - - ►  REMOTE DISPLY
        │                      │         │ RD-20 or RD-50    │
        │                      │         └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
        │                      │◄- - - - IEC-61162-1 x 2
        │                      │- - - - ► IEC-61162-1 x 4
IEC-61162-450 - - LAN - - - - │         ► POWER-FAIL
                              │- - - - ► KP Output
100-230 VAC - - - - - - - - - │
        └──────────┬───────────┘
                   ┊
        ┌ ─ ─ ─ ─ ─┴─ ─ ─ ─ ─ ─ ┐
        │  JUNCTION BOX          │
        │  JISF8821-1MO          │
        └ ─ ─ ┬ ─ ─ ─ ─ ─ ┬ ─ ─ ┘
              ┊           ┊
      ┌───────────┐   ┌───────────┐
      │MATCHING BOX│   │MATCHING BOX│
      │ MB-502    │   │ MB-504    │
      └─────┬─────┘   └─────┬─────┘
      ┌───────────┐   ┌───────────┐
      │ TRANSDUCER│   │ TRANSDUCER│
      │ 50B-6B    │   │ 200B-8B   │
      └───────────┘   └───────────┘
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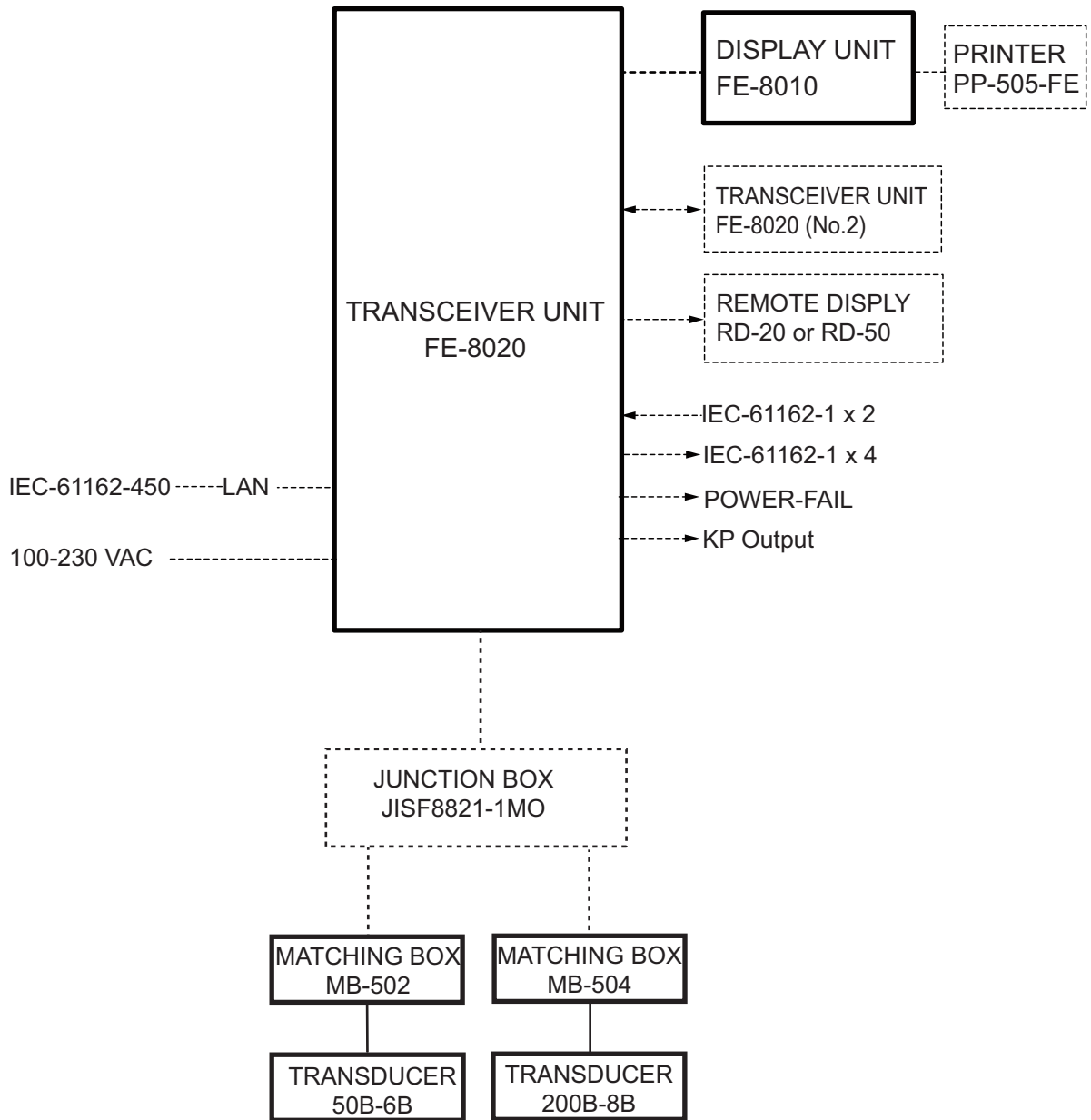
Equipment category	
Display unit	protected from weather
Transceiver unit	protected from weather

———— : Standard supply

- - - - - - - : Optional or local supply

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	001-274-800	1	For transceiver unit	
	CP12-01201	001-288-000	1	Copper strap, 1 pc. (Type: WEA-1004-0, Code No.: 500-310-040-10)	
	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
	TTF-2000 (5K-32A, T-30)	—	For 200B-8B, w/ flange, T30
Gate Valve	GV-50B-6B	—	w/ Installation Materials CP02-07601 (Code No.: 002-891-620)
	GV-200B-8B	—	

Name	Type	Code No.	Remarks
Bracket Assembly w/Knobs	OP26-8	000-016-313	For display unit, see page 3 for details.
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	000-055-892	
Data Recording Software for PC	OP12-2	001-273-650	For Windows 7/8 (PC: local supply)
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	—	

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 (ϕ5×20).

4. Set a cosmetic cap to each fixing hole on the front panel. (See "How to set the cosmetic cap" on page 4.)
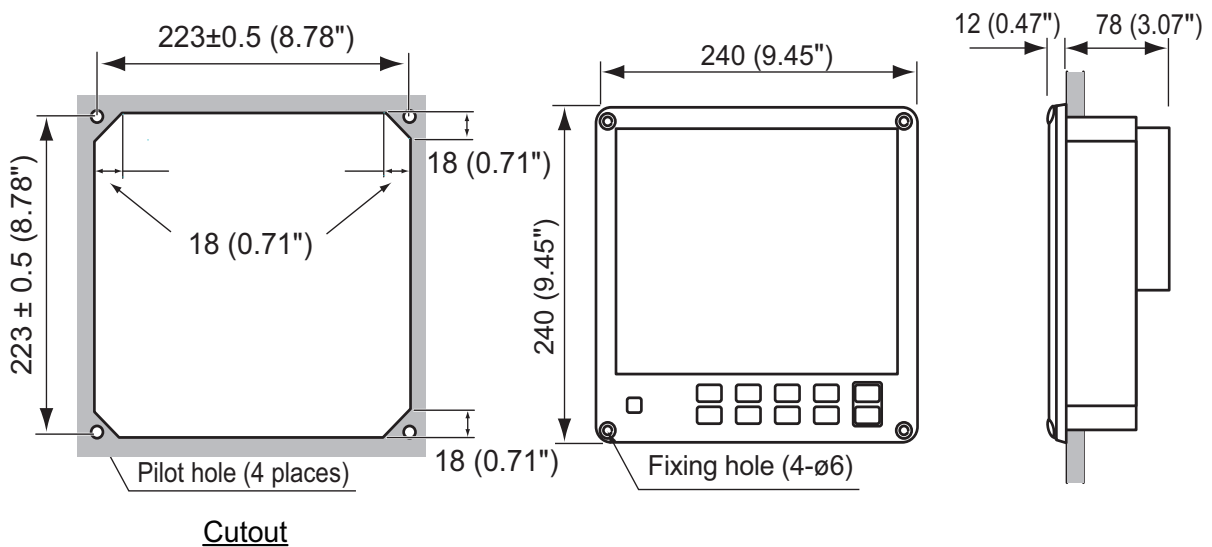
Cutout

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 (ϕ5×20) 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.)

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.
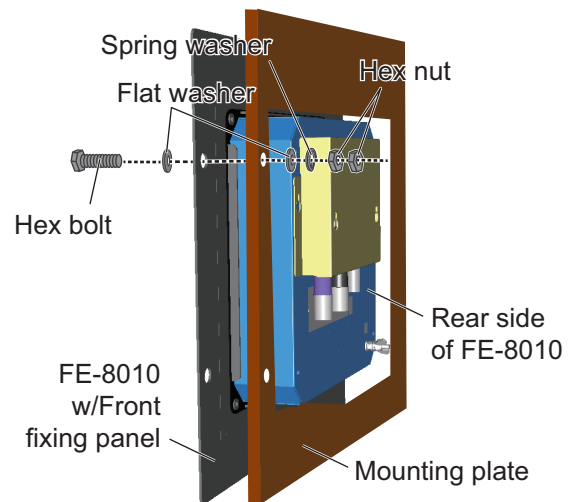
1.1.4 Desktop mounting

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
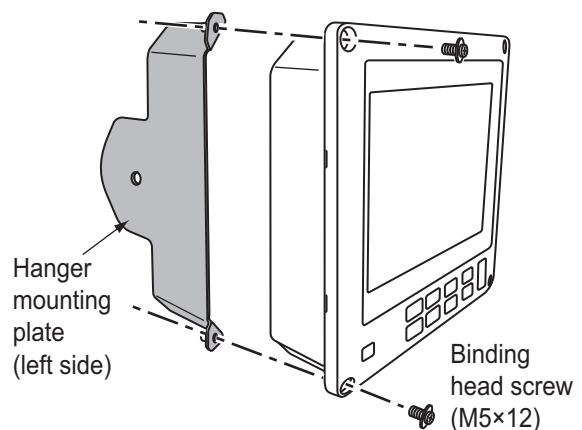
3. Make a four pilot holes for self-tapping screws (φ5×20) in the mounting location.

4. Fix the hanger to the mounting location with four self-tapping screws (φ5×20).

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".)
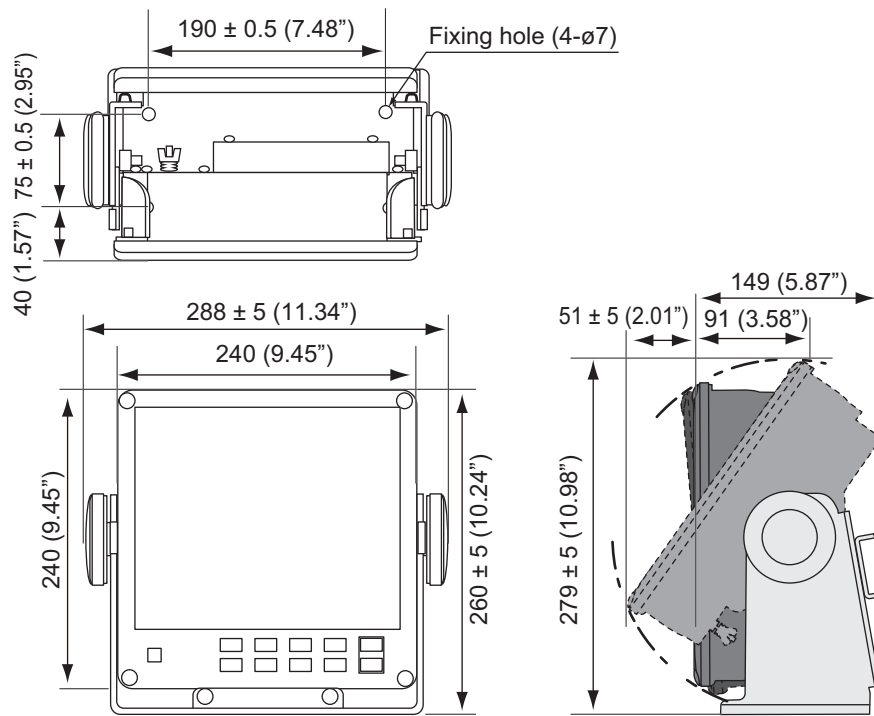
How to set the cosmetic cap

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

Set cosmetic cap to hole so cap is flush with panel.
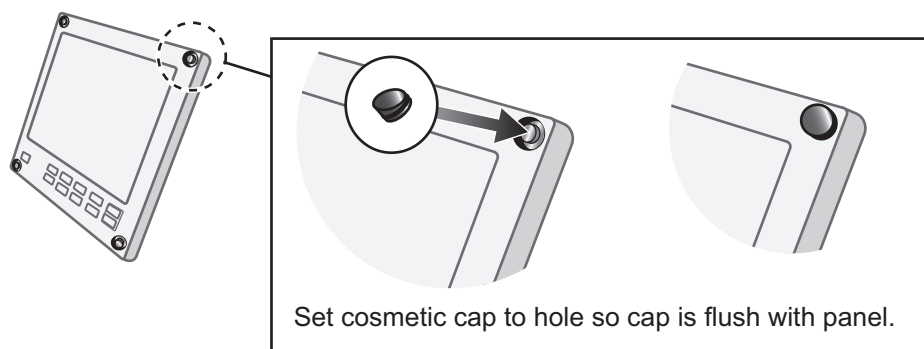
1.2 Transceiver Unit

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 copper strap (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 IN-STRUCTIONS" (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.

Notches
(Face the deck for bulkhead mounting.)

Mounting location

Pilot hole (M8×25)

Spring washer

Bolt

Nut
Flat washer
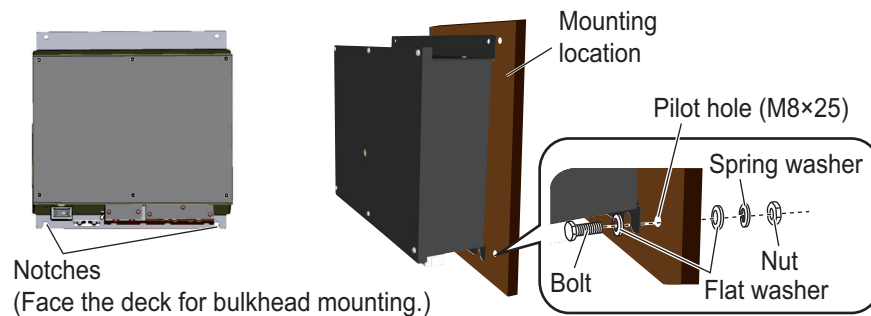
1.3 Transducer

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.
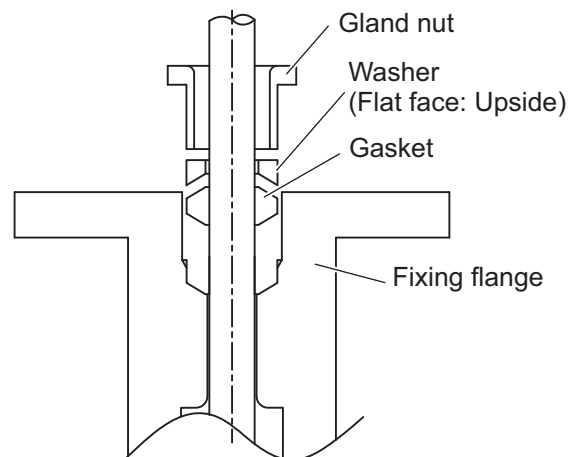
4. Fix the transducer to the tank with the transducer fixing flange.

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-

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.
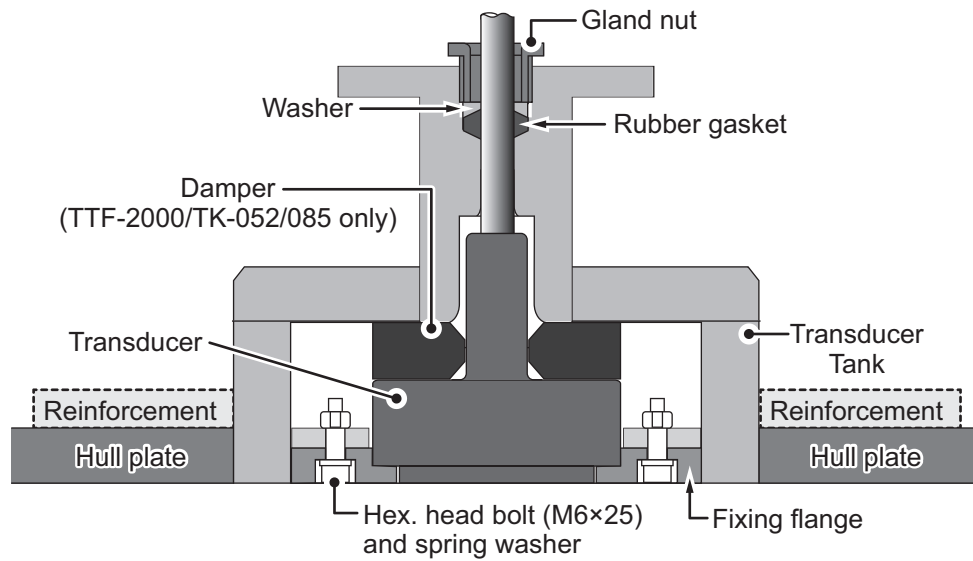
1.4   Matching Box

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 (ϕ6×20, local supply). Observe the compass safe distances in the "SAFETY INSTRUCTIONS" (on page i) to prevent interference to a magnetic compass.
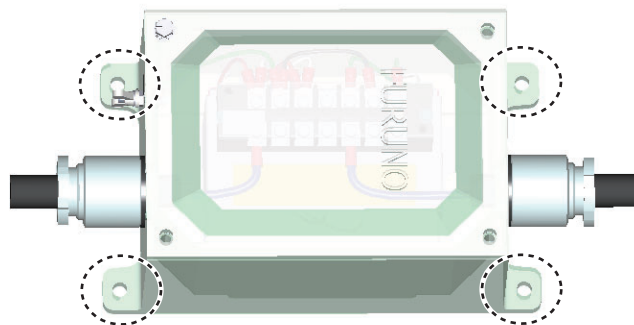
1.5 Gate Valve GV-50B-6B, GV-200B-8B (option)

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).

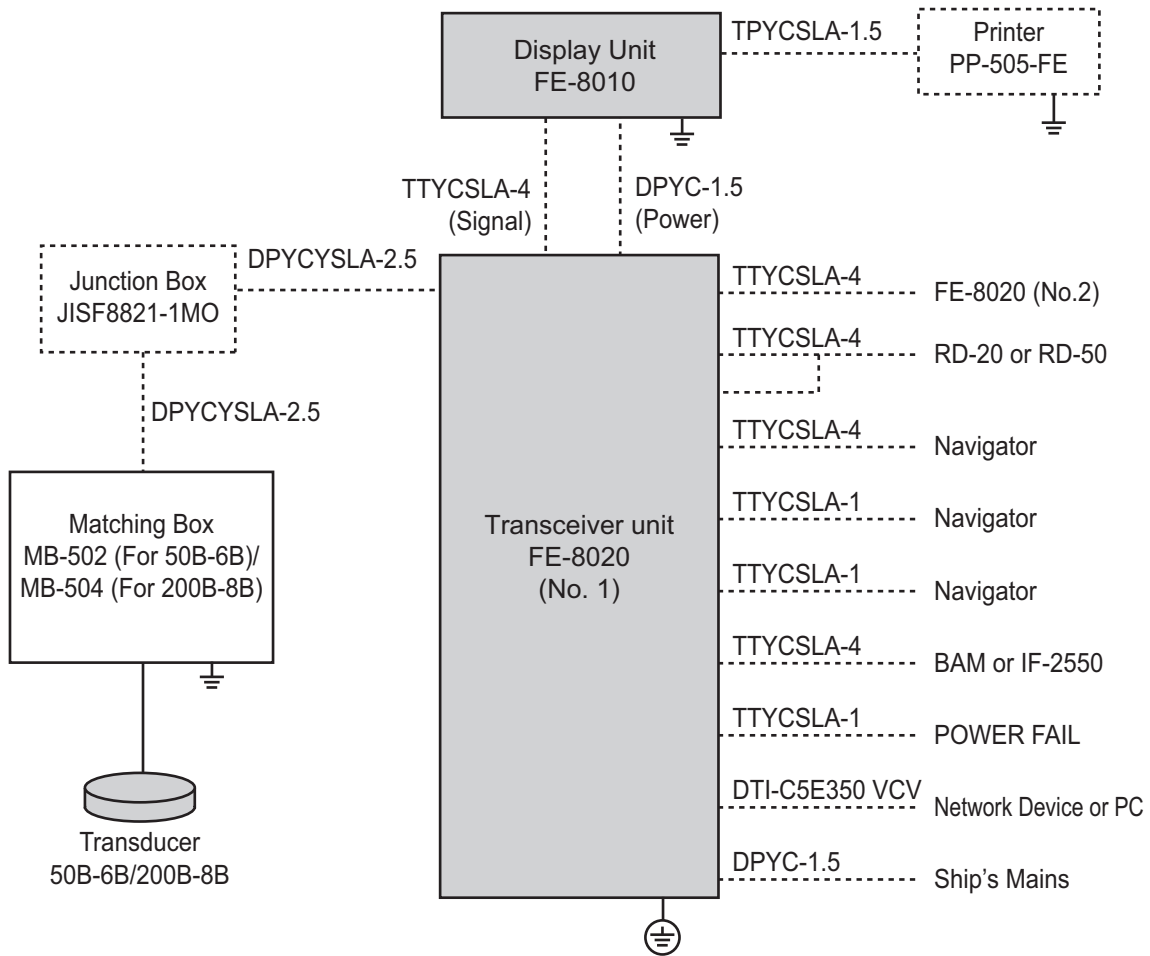12. Fasten the gate valve with bolts, nuts and washers above and below.

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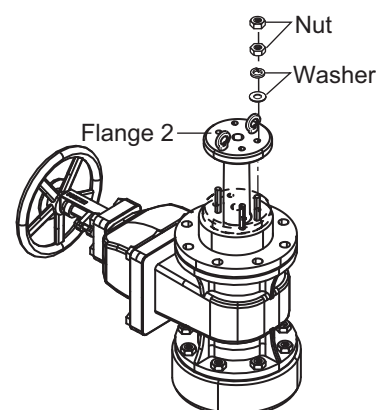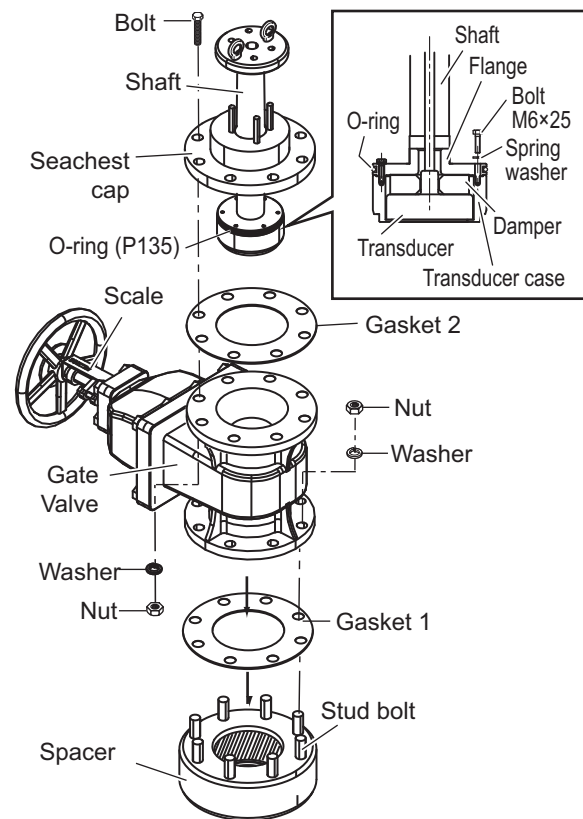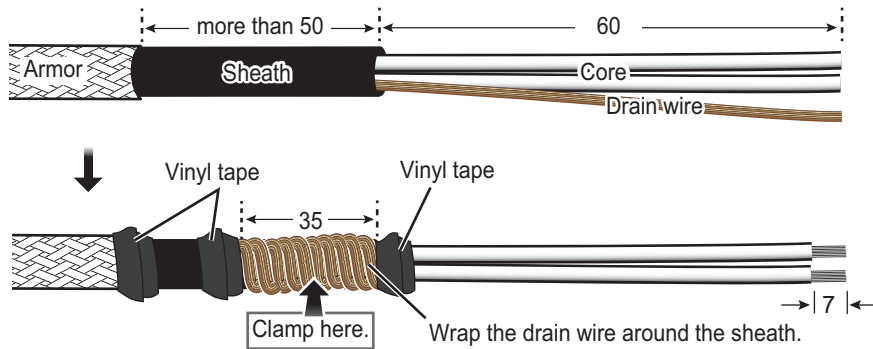
2. WIRING

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>

more than 50 → | ← 60 →

Armor | Sheath | Core
Drain wire

↓

Vinyl tape   Vinyl tape

← 35 →

Clamp here.   Wrap the drain wire around the sheath.

→ | 7 | ←

<Side: Transceiver unit>

← 200 →

Armor | Core
→ | 7 | ←
150   Drain wire
→ | 6 | ←
Pass heat shrink tubing (local supply) onto the drain wire.

Cable	Core
TTYCSLA-4	8
TTYCSLA-1	2

15 | 5

Clamp here.   Vinyl tape   Crimp-on lug

DPYC-1.5

<Side: Display unit>

more than 50 → | ← 60 → | 6 | ←

Armor | Sheath | Core

↓

Vinyl tape   Crimp-on lug

Clamp here.

<Side: Transceiver unit>

← L1 → | L2 | ←

Armor | Core

Cable side	Length of "L1" (mm)	Length of "L2" (mm)
Transceiver unit (CN1)	140	6
Transceiver unit (CN4)	50	9

15 | 5

Vinyl tape

Clamp here.

Crimp-on lug   *: For CN1, attach the crimp-on lug.

10

TPYCSLA-1.5

<Side: Display unit>

DPYCYSLA-2.5

<Side: Transceiver unit>

<Side: Matching box>

2RNCT-SB 2Cx1.4

<Side: Matching box>

11

DTI-C5E350 VCV

Note: Do not use an optical fiber cable.
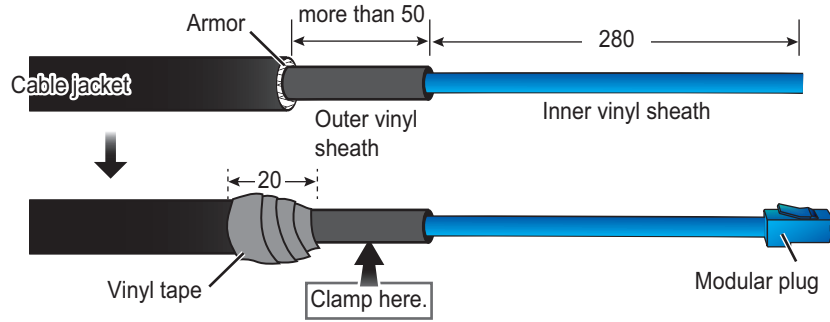
How to fabricate the LAN connector

1

Expose inner vinyl sheath.

2

25 mm

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

3

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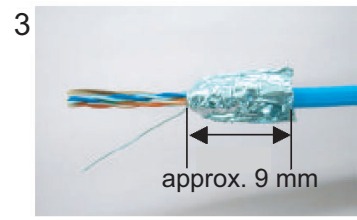
Fold back the shield, wrap it onto the outer sheath and cut it, leaving 9 mm.

4

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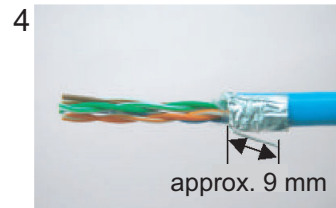
Fold back drain wire and cut it, leaving 9 mm.

5

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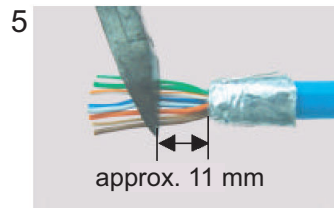
Straighten and flatten the core in order and cut them, leaving 11 mm.

6

Drain wire

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.

7

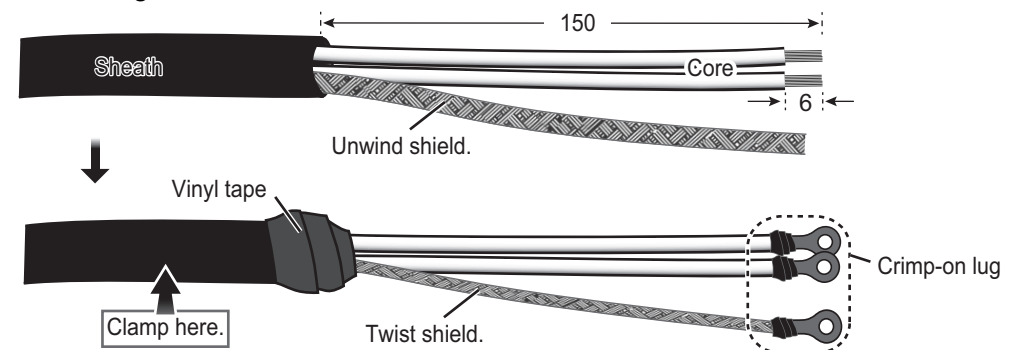Using the special crimping tool MPT5-8 (PANDUIT CORP.), crimp the modular plug. Finally, check the plug visually.

Modular plug

1   8

[Cross-over cable]

① WHT/GRN	WHT/ORG ①
② GRN	ORG ②
③ WHT/ORG	WHT/GRN ③
④ BLU	BLU ④
⑤ WHT/BLE	WHT/BLE ⑤
⑥ ORG	GRN ⑥
⑦ WHT/BRN	WHT/BRN ⑦
⑧ BRN	BRN ⑧

[Straight cable]

① WHT/ORG	WHT/ORG ①
② ORG	ORG ②
③ WHT/GRN	WHT/GRN ③
④ BLU	BLU ④
⑤ WHT/BLE	WHT/BLE ⑤
⑥ GRN	GRN ⑥
⑦ WHT/BRN	WHT/BRN ⑦
⑧ BRN	BRN ⑧
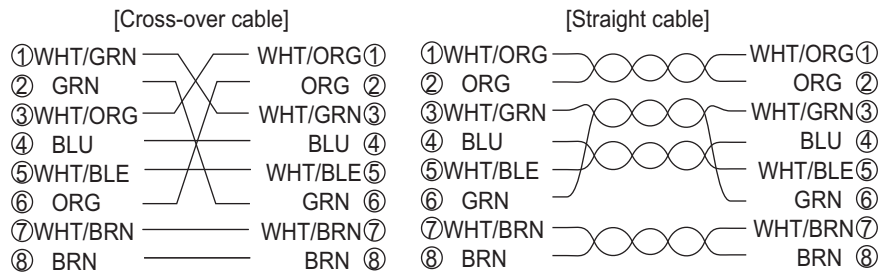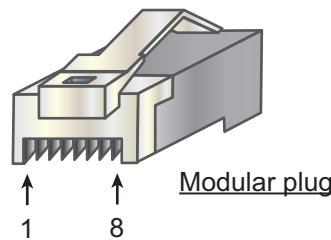
2.3   Display Unit

Remove four screws to remove the rear cable cover. Remove the cable clamps to connect the cables.
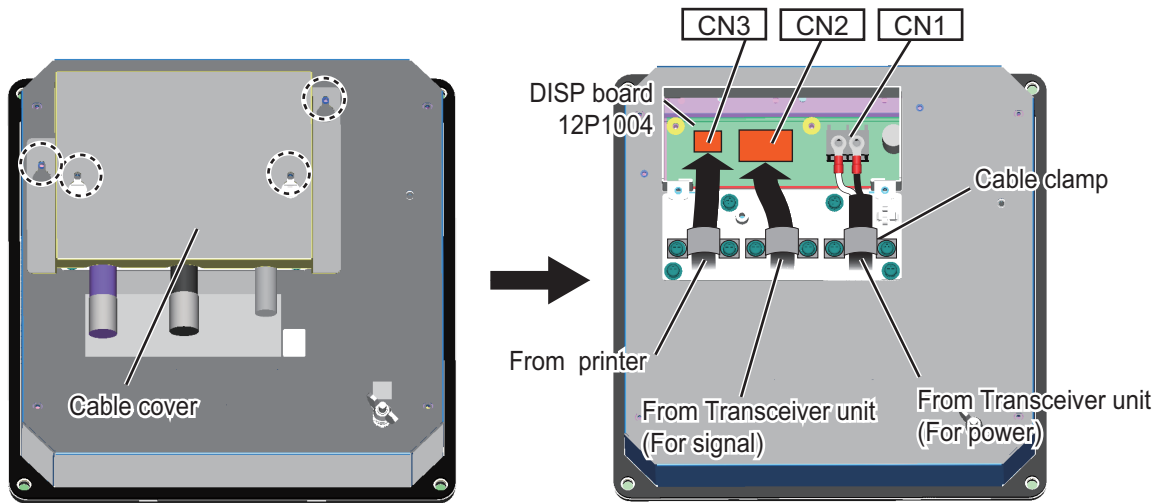
Rear view of the display unit

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)
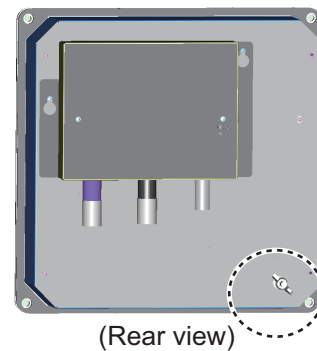
2.4   Transceiver Unit

1. Remove six screws to open the cover of the transceiver unit.
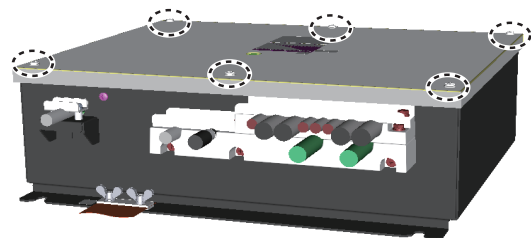
2. Loosen four screws to open the filter cover.

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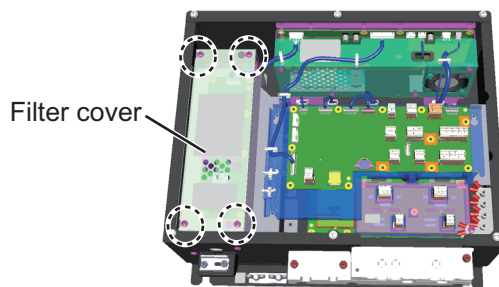
3. Loosen or remove the cable entrance assembly as shown below.
    To connect CN8, CN10, CN12 and CN13, remove the cap spacers from the cable clamp.

Loosen two screws.　　Remove four screws.　　　Remove two screws.

Cap spacer
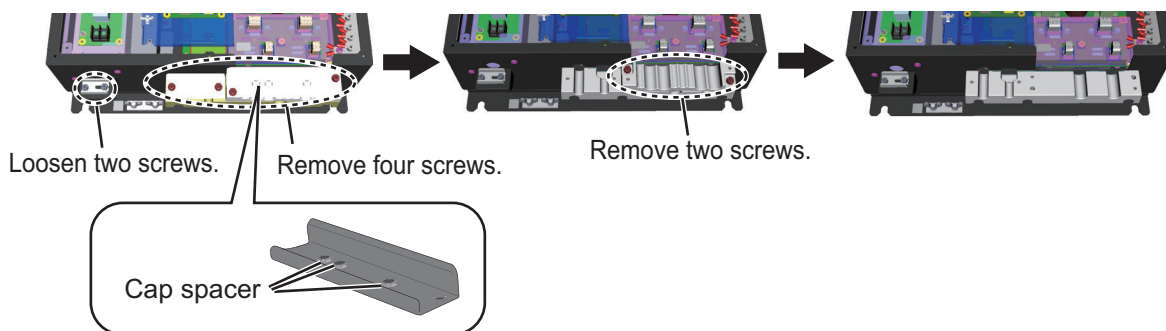
4. There is a plastic sheet on the inside of the cable entrance. Before passing the cables, tear the plastic sheet by hand to pass the cables.

5. Connect cables as shown below.

CN12　CN13　CN14

CN9　　CN10　　CN11

CN4　　CN6　　CN8

CN5　　　CN7

CN1

Transceiver unit

CN2　　CN3

Top view

⑦　⑧　　⑨⑩　⑤

①

Front view

②　③　④　　⑥
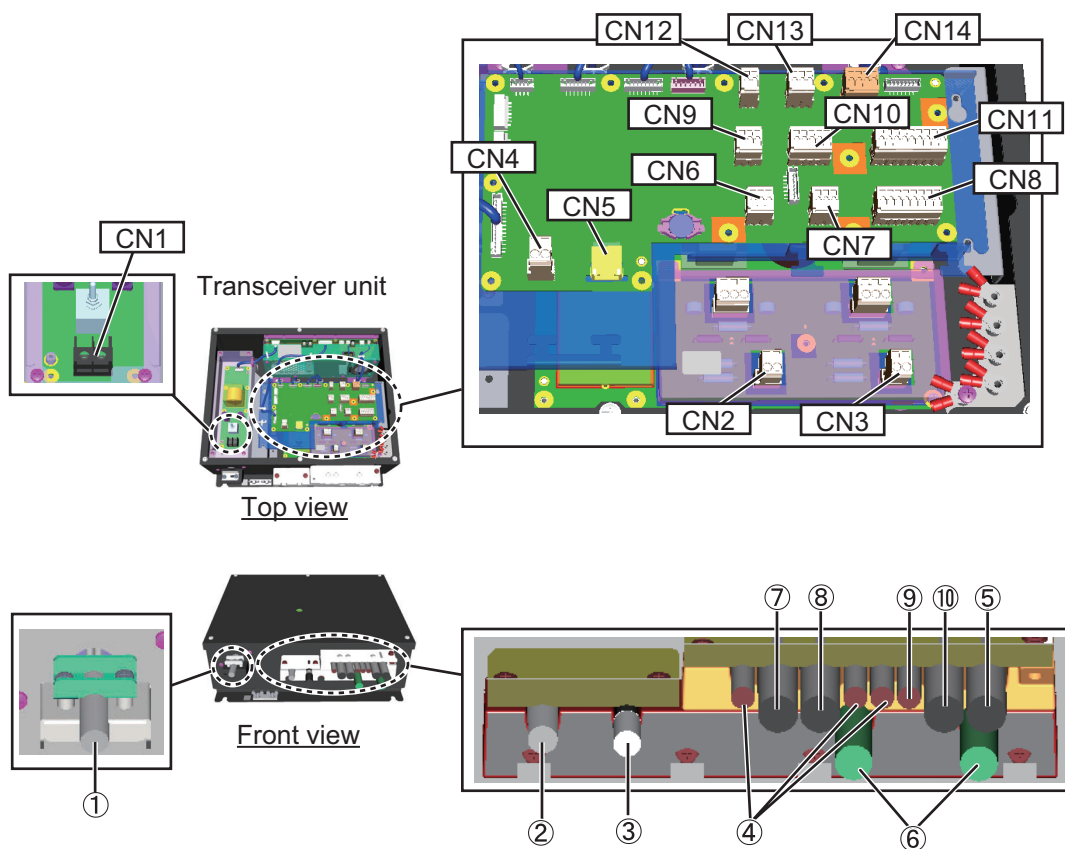
Top and front views of the Transceiver unit

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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	
4: For external equipment	TTYCSLA-1	CN6, CN7, CN9	Needed
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.	

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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.

Ground point

8. Refasten the cable entrance assembly.

9. Turn on the power switch.
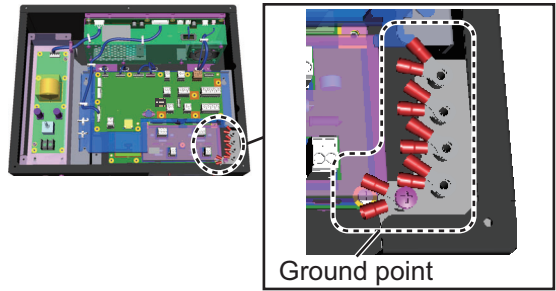
   Power switch
   Set the power switch to On to activate the Transceiver unit. The default setting is Off.
   Note: For maintenance, the power switch should be Off.

Power switch (toggle)

ON

OFF
(Default setting)
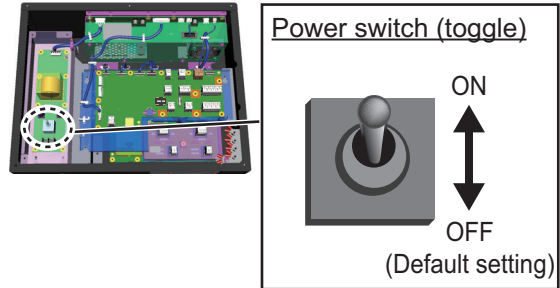
10. Close the covers.

Grounding

Attach the supplied copper strap between the fixing plate on the unit and the ship's ground.

Note: Ground the equipment to prevent mutual interference.

Fixing plate
Copper strap
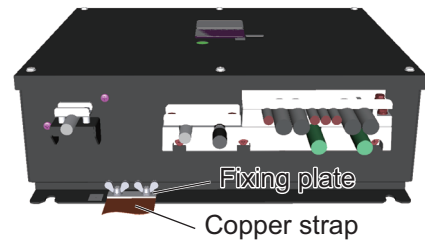
2.5   Matching Box

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.

Transducer side
- Cable gland
- Two flat washers
- Gasket

Transceiver unit side
- Cable gland
- Three flat washers
- Gasket

The cable gland closest to the FURUNO logo is for the Transceiver unit.
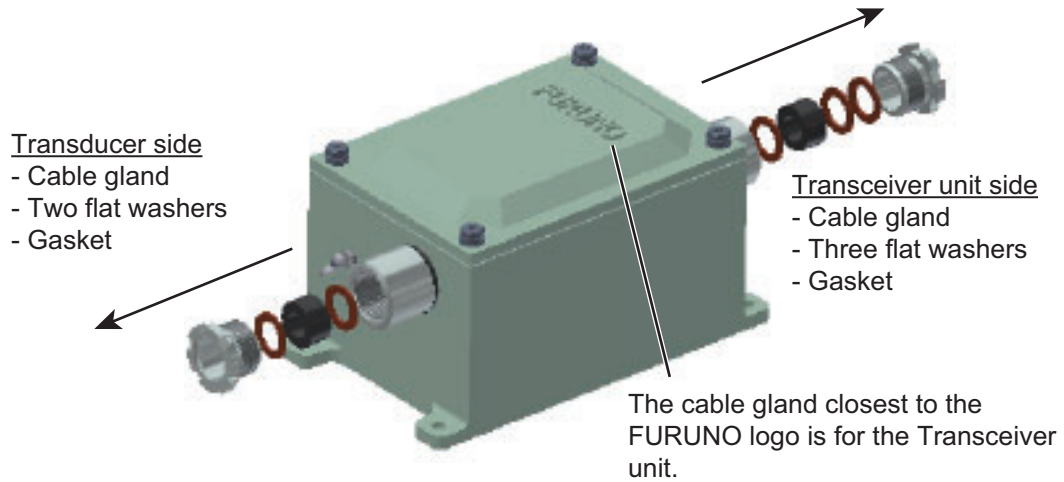
3. Slide the cable gland, the gasket and the flat washers onto the cable as shown below.

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

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

Cable gland

Flat washer

Gasket

Outer sheath

Inner sheath
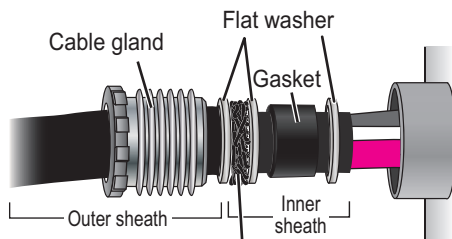
Cut and trim the armor.

Flat washer

Gasket

Cable gland

Sheath
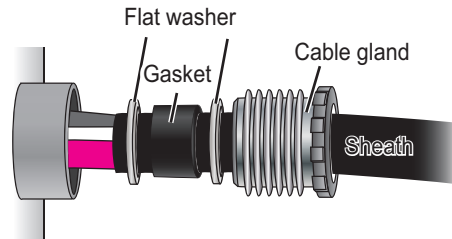
4. For the cable connected to transceiver unit, push the flat washer against the armor. Then trim the armor so that it does not extend past the flat washers, then pass the cable through the cable entrance.

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.

From Transceiver unit   From Transducer

1a 2a 3a   1T 2T 3T

Connect the cable from transceiver unit.   Connect the cable from transducer.
(2a: Ground wire)   (2T: Ground wire)
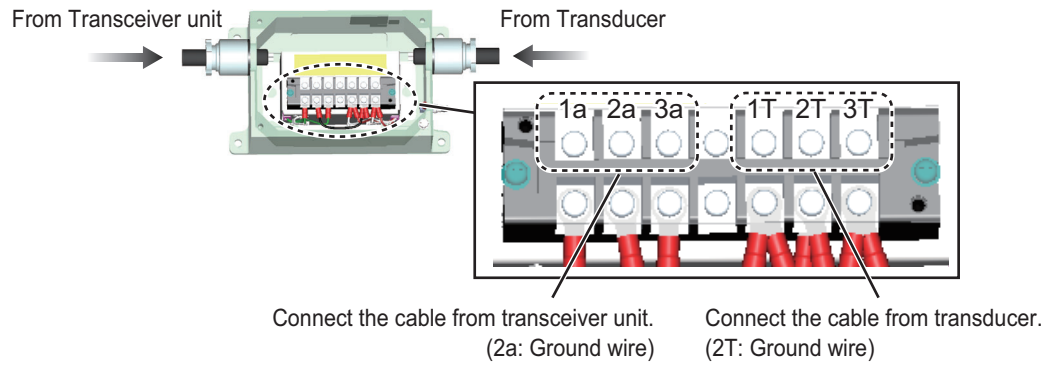
7. Close the top cover.

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.

Ground point
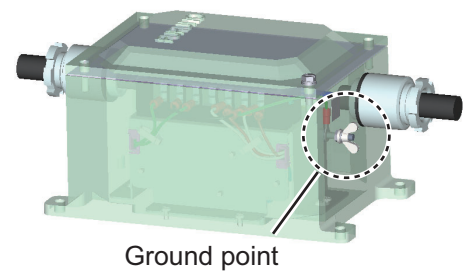
2.6   Bridge Alert Management (BAM) Connection

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

Alert System   TTYCSLA-1   1 NORMAL CLOSE
                              2 NORMAL OPEN   Select either one.
                              3 RELAY COMMON
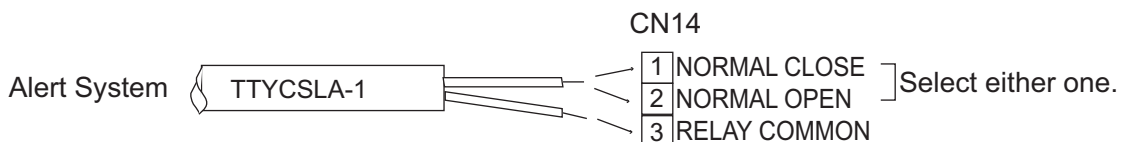
	CN14 terminals 1 & 3	**CN14 terminals 2 & 3**
Power supplied	Close	Open
Power not supplied	Open	Close

2.7   Junction Box (Option)

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

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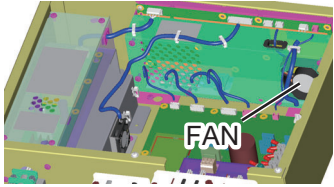
This section provides the procedures for initial set up of the equipment.

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 CON-FIG]	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 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.
[DISP Order]	For dual frequency display, select the transducer to display in the left and right displays.

| Menu	Contents
[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]	[Alert Mode Select]: Select the alert mode among [Legacy], [Alert I/F1] and [Alert I/F 2]. If IF-2550 is connected to FE-800, select [Legacy]. • [Legacy]: Use IIalr and IIals sentences. • [Alert I/F 1]: Use ALR and ACK sentences. • [Alert I/F 2]: Use ALF and ACN sentences. [Bottom Lost Priority]: 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]	[EXT EQUIP]: 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. [Port1], [Port4]: Set the IEC standard to use for input and output signals. See section 3.4. [Port Monitor]: Show the port monitor. [Ethernet]: Set up the Ethernet. See section 3.5.
[Network]	[IP ADD]: 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. [SFI]: 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]	[EXT Device Port]: Set the port for receiving settings from external equipment. Select from PORT1, PORT4 and LAN. The default setting is LAN. [EXT IP Address]: Input the IP address. [EXT Port]: Set the port number for LAN connection.
[Dimmer Setting]	[Dimmer Mode]: 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. [Dimmer Control Port]: 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.
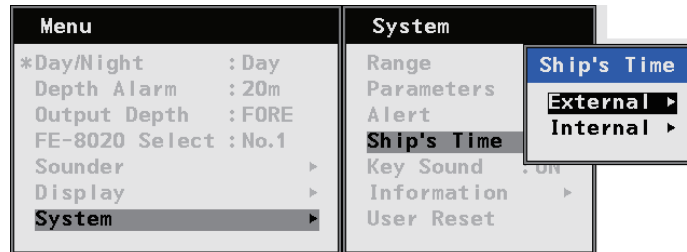
Select [External] to use time data which the external equipment outputs.

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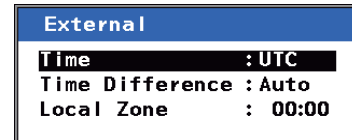
Select [Internal] to use the internal clock. Select [Date] or [Time] to adjust and then set the value with the ▲ or ▼ key.

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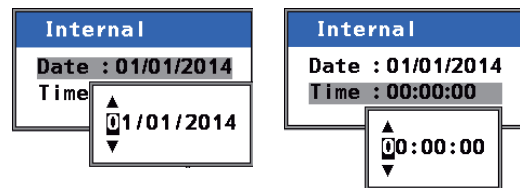
Battery

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.
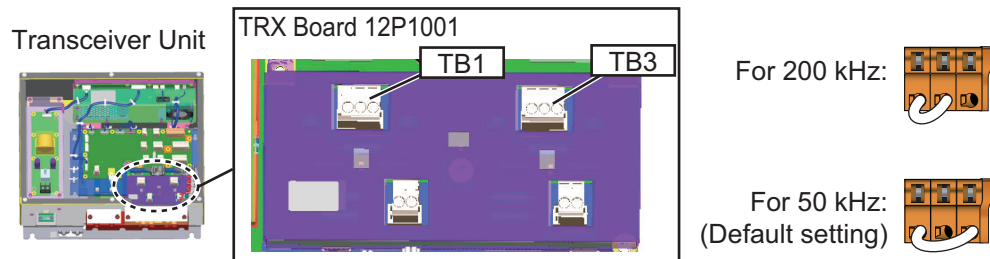
3.4 How to Set the Port

On the [Service Menu], select [I/O] → [Port1] (or [Port4]). [Port1] is for IN1 (CN9) and OUT1/2/3 (CN6/CN7CN13). [Port4] is for CN10.
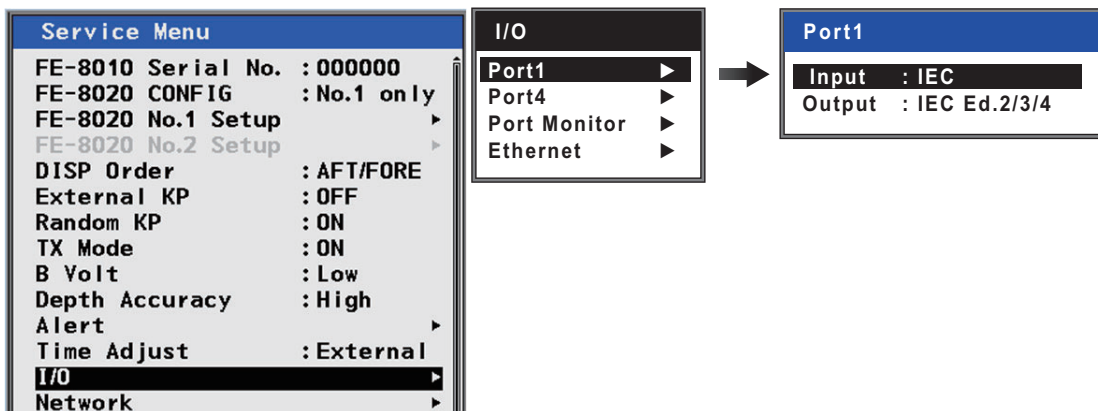
Menu	Contents
[Input]	Select standard for the input signal, [IEC] (default) or [NMEA].
[Output]	Select the standard for the output signal, [NMEA V1.5], [IEC Ed.1] or [IEC Ed.2/3/4] (default). **Note:** [NMEA V1.5] does not comply with SOLAS standards.

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.
[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 (mm^2)* 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)

DPYCY

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

TPYCY
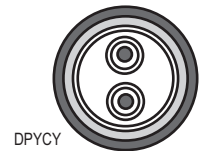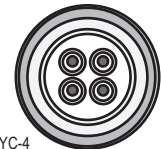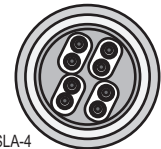
MPYC-4

```
       1 3 4 5   6                      1 2 3 4
EX: TTYCYSLA - 4                      MPYC - 4
    Designation type─┘ └─# of twisted pairs─┘   Designation type─┘ └─# of cores─┘
```

TTYCSLA-4

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

Type	Core Area	Core Diameter	Cable Diameter	Type	Core 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, yyyyy.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,llll.ll,a,yyyyy.yy,a,x.x,x.x,x.x,x.x,x.x,a,a*hh <CR><LF>
         1 2   3   4   5 6 7   8 9 10 1112

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 indicatior (S=Safe, C=Caution)

SRP: System function ID resolution protocol

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

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

AP-7

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,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

AP-8

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

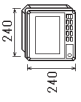| Alert Title	Alert Description Text	Priority/ Category	Alert ID, Instance	Meaning	Measures
SHALLOW DEPTH	TCVR1 FORE depth below keel alarm.	Alarm/A	3031, 1	Depth at fore transducer is shallower than that set for the alarm.	Check the depth visually.
	TCVR1 AFT depth below keel alarm.	Alarm/A	3031, 2	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.	
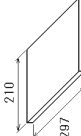
Alert Title	Alert Description Text	Priority/ Category	Alert ID, Instance	Meaning	Measures
BOTTOM LOST *	TCVR1 FORE bottom losts.	Warning/B (Caution/B)	3055, 1(3056, 1)	Seabed at fore transducer cannot be detected	Check that the seabed is within range. If the problem recurs, consult a FURUNO technician.
	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

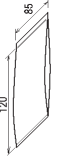| Alert Title	Alert Text	Priority/ Category	Alert ID	Meaning	Measures
SHAL-LOW DEPTH	Depth below keel alarm.	Alarm/A	230	Depth below the Keel is too shallow.	Check the depth visually.
LOST MEAS	TCVR1 TX voltage ERR stopped MEAS.	Warning/B	101	Transceiver 1 PWR board or TRX board may be damaged. Voltage is not within safe guidelines.	Consult a FU-RUNO techni-cian.
	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 tem-perature 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 tem-perature 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 FURU-NO technician.
LOST DISP	DISP COM ERR stops display up-date.	Caution/B	301	Communication error be-tween display unit and trans-ceiver 1.	Consult a FU-RUNO techni-cian.
LOST TCVR	TCVR2 COM ERR stops MEAS.	Caution/B	302	Communication error be-tween display unit and trans-ceiver 2.	
FAN SPEED LOW	CVR1 fan ERR may stop MEAS.	Caution/B	104	Fan No.1 speed lower than minimum speed on transceiv-er 1.	
	TCVR2 fan ERR may stop MEAS.	Caution/B	114	Fan No.2 speed lower than minimum speed on transceiv-er 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.

FURUNO

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	フィルタークリーナー LCD CLEANING CLOTH	120 85	02-155-1082-2 CODE NO. 100-332-652-10	1	
2	ネジ キャップ CAP	φ13 6	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過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

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

FURUNO ELECTRIC CO .,LTD.

C2384-F01-A

PACKING LIST

FE-8010-J,FE-8010-J-HK,FE-8010-E,FE-8010-E-HK

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
指示器 DISPLAY UNIT	240 240	FE-8010-* 000-025-189-00 **	1
付属品 ACCESSORIES			
付属品 ACCESSORIES		FP12-00801 001-273-710-00	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP12-01101 001-273-700-00	1
図書 DOCUMENT			
取扱説明書 OPERATOR'S MANUAL	210 297	OM*-23840-* 000-179-825-1* **	1
装備要領書 INSTALLATION MANUAL	210 297	IM*-23840-* 000-179-828-1* **	1

コード番号末尾の[**]は、選択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-E

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-273-730-00
TYPE	CP12-01201

12AF-X-9402 -0   1/1
A-4

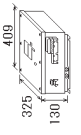| 番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	コンバ゛ッフス CABLE TIE	150	CV-150N CODE NO. 000-162-186-10	6	
2	バネ座金 SPRING WASHER	15	M8 SUS304 CODE NO. 000-167-410-10	4	
3	ミカ゛キ丸平座金 FLAT WASHER	φ17	M8 SUS304 CODE NO. 000-167-464-10	8	
4	六角ナット 1シュ HEX. NUT	7 13	M8 SUS304 CODE NO. 000-167-479-10	4	
5	六角ボルト HEXAGONAL HEAD BOLT	25 φ8	M8X25 SUS304 CODE NO. 000-162-879-10	4	
6	アース板 COPPER STRAP	50 L=1.2m	WEA-1004-0 ROHS CODE NO. 500-310-040-10	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達期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
（略図の寸法は、参考値です。） DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO ., LTD.

C2384-M02-A

PACKING LIST

FE-8020, FE-8020-HK

12AF-X-9853 -0   1/1
A-3

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
送受信機 TRANSCEIVER UNIT	409 325 130	FE-8020* 000-025-197-00 **	1
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP12-00801 001-273-720-00	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP12-01201 001-273-730-00	1

コード番号末尾の[**]は、選択品の代表コードを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

型式/コード番号が2段の場合、下段より上段に代わる通達期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

C2384-Z03-A

FURUNO

工事材料表
INSTALLATION MATERIALS

TTF-2000

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

番号 NO.	名 称 NAME	略 図 OUTLINE	型名/規格 DESCRIPTIONS	CODE NO.	数量 Q'TY	用途/備考 REMARKS
1	グランド用締付 CABLE GLAND NIPPLE	34 / 22	JIS F8801 20ケ	000-171-874-10	1	
2	電線貫通金座金 WASHER	φ24 / 6	TPB-11-07 ROHS	270-100-270-10	1	
3	貫通金物用パッキン RUBBER PACKING	φ24 / 10	TPB-11-08 ROHS	270-100-230-10	1	
4	振動子押えゴム DAMPER	φ100 / 25	TTF-2000-03 ROHS	250-820-030-10	1	
5	六角レンチ SOCKET SCREW WRENCH	85 / 33	対辺5.0MM	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過渡期品であり、どちらかが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME. DIMENSIONS IN DRAWING FOR REFERENCE ONLY.
(略図の寸法は、参考値です。)

FURUNO ELECTRIC CO .,LTD.

C2366-M10-B

FURUNO

工事材料表
INSTALLATION MATERIALS

TTF-5600

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

番号 NO.	名 称 NAME	略 図 OUTLINE	型名/規格 DESCRIPTIONS	CODE NO.	数量 Q'TY	用途/備考 REMARKS
1	グランド用締付 CABLE GLAND NIPPLE	34 / 22	JIS F8801 20ケ	000-171-874-10	1	
2	電線貫通金座金 WASHER	φ24 / 6	TPB-11-07 ROHS	270-100-270-10	1	
3	貫通金物用パッキン RUBBER PACKING	φ24 / 10	TPB-11-08 ROHS	270-100-230-10	1	
4	六角レンチ SOCKET SCREW WRENCH	85 / 33	対辺5.0MM	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過渡期品であり、どちらかが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME. DIMENSIONS IN DRAWING FOR REFERENCE ONLY.
(略図の寸法は、参考値です。)
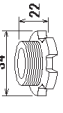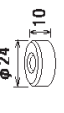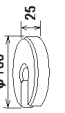
FURUNO ELECTRIC CO .,LTD.

C2366-M11-B

FURUNO

D-2

表1　TABLE1

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

4－取付穴位置
PILOT HOLES

取付穴寸法
CUTOUT DIMENSIONS

223±0.5

232±1

223±0.5

232±1

C22

電源端子
POWER TERMINAL

アース端子
GND TERMINAL

信号コネクタ
SIGNAL CONNECTOR

ケーブル導入口
CABLE ENTRY

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

フラッシュマウント用スポンジ
FLUSH MOUNT SPONGE

#150

78

12

型式銘板
NAMEPLATE

240

223±0.5

取付穴
4－φ6
FIXING HOLES

223±0.5

240

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）　取付用ネジはバインドタッピンネジ呼び径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 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（埋込装備）
APPROVED	10/Jan/2014	H.MAKI					外寸図
SCALE	1/4	MASS	2.1	±10% kg		NAME	DISPLAY UNIT (FLUSH MOUNT)
DWG.No.	C2384-G02-A						OUTLINE DRAWING

FE-800

REF.No. 12-005-101G-2

FURUNO ELECTRIC CO., LTD.

FURUNO

表1 TABLE 1

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

4-取付穴位置
PILOT HOLES

取付穴寸法
CUTOUT DIMENSIONS

239±1

239±1

260±0.5

260±0.5

電源端子
POWER TERMINAL

アース端子
GND TERMINAL

信号コネクタ
SIGNAL CONNECTOR

ケーブル導入口
CABLE ENTRY

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

#150

76

14

取付穴
4-φ6
FIXING HOLES

277

260±0.5

260±0.5

277
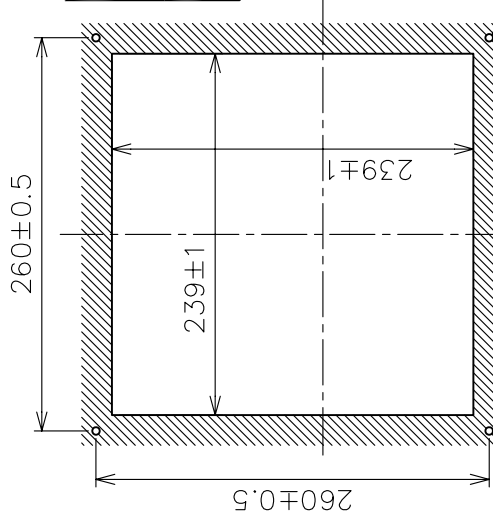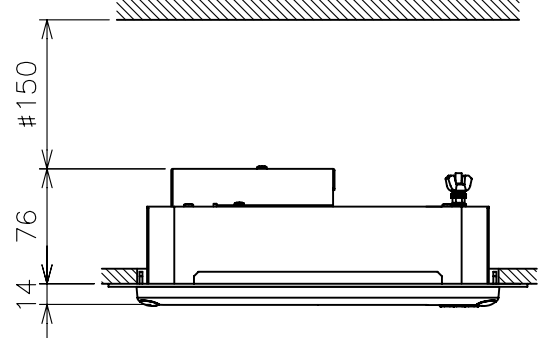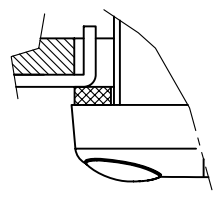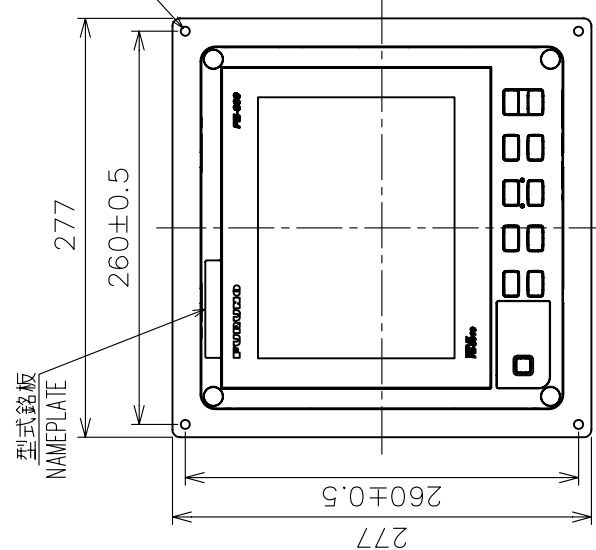
型式銘板
NAMEPLATE

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空間寸法とする。

3) 取付用ネジはバインドタッピンネジ呼び径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 φ5x20 FOR FIXING THE UNIT.

DRAWN	7/Jan/2014	T.YAMASAKI		
CHECKED	7/Jan/2014	H.MAKI		
APPROVED	10/Jan/2014	H.MAKI		
SCALE	1/5	MASS	2.3	+10% kg
DWG.No.	C2384-G03-A	REF.No.	12-005-1.02G-2	

TITLE	FE-8010
名称	指示器（埋込パネル装備）
	外寸図
NAME	FE-800
	DISPLAY UNIT (FLUSH MOUNT PANEL)
	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

FURUNO ELECTRIC CO., LTD.

表1 TABLE 1

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

4－取付穴位置
PILOT HOLES

320±0.5
340±1
280±1
160±0.5
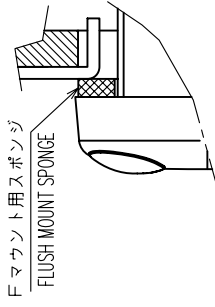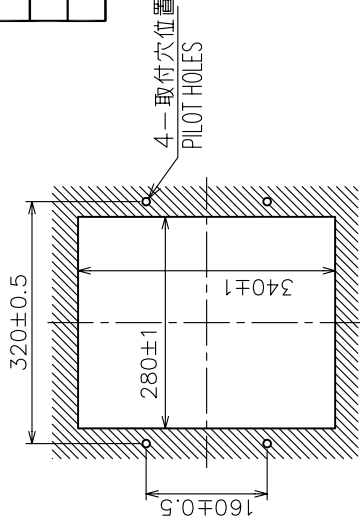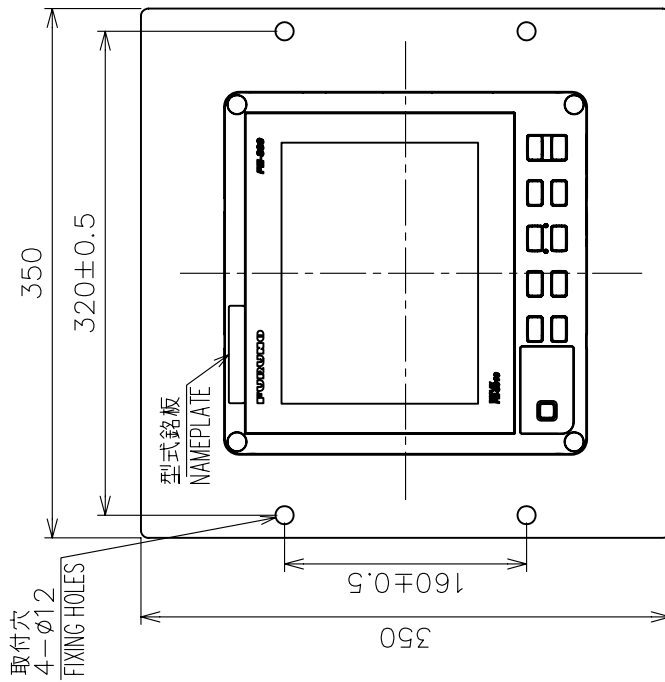
取付穴寸法（尺度：1／10）
CUTOUT DIMENSIONS (SCALE: 1/10)

電源端子
POWER TERMINAL

アース端子
GND TERMINAL

信号コネクタ
SIGNAL CONNECTOR

ケーブル導入口
CABLE ENTRY

Fマウント用スポンジ
FLUSH MOUNT SPONGE

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

#150
76
14

350
320±0.5
160±0.5
350

型式銘板
NAMEPLATE

取付穴
4－φ12
FIXING HOLES
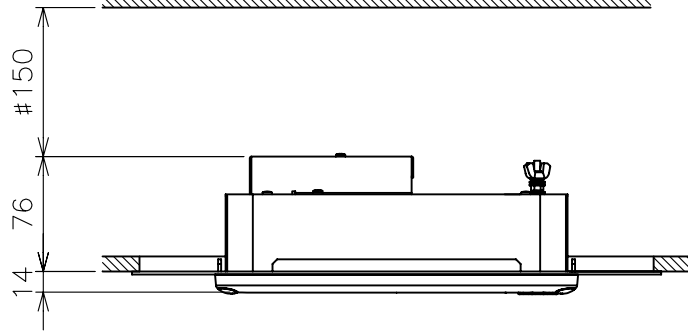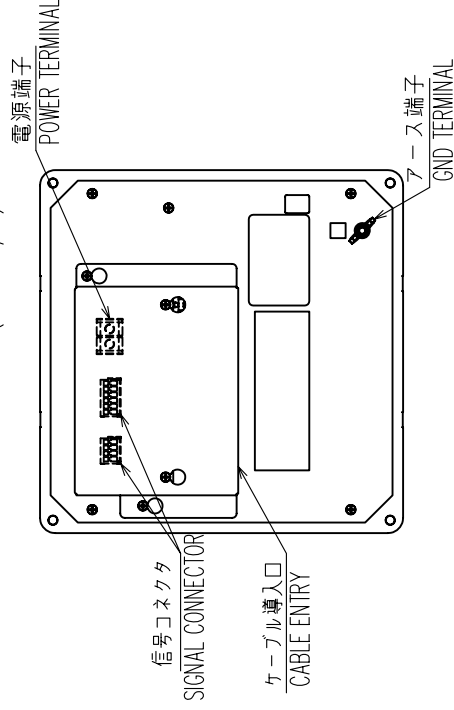
注 記 1） 指定外の寸法公差は表1による。
　　　2） #印寸法は最小サービス空間寸法とする。
　　　3） 取付用ネジはM8×35ボルトを使用のこと。

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	T.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
SCALE	1/5	MASS	2.5	±10% kg		NAME	DISPLAY UNIT (REMOUNT FROM FE-680)
DWG.No.	C2384-G05-A		REF.No.	12-005-1036-2			OUTLINE DRAWING

FE-800

表1　TABLE 1

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

取付穴
2-ø9
FIXING HOLES

350±1

♯200

コネクタ基板
CONNECTOR BOARD

型式銘板
NAMEPLATE

ヒューズ
FUSE

369

346±1

325

底面（壁掛時）
BOTTOM
(BULKHEAD MOUNT)

電源端子
POWER TERMINAL

アース端子
GND TERMINAL

350±1

10

28

130

133

17

2-取付用切欠
FIXING NOTCH

♯300

♯100

ケーブルクランプ
CABLE CLAMP

409

♯100
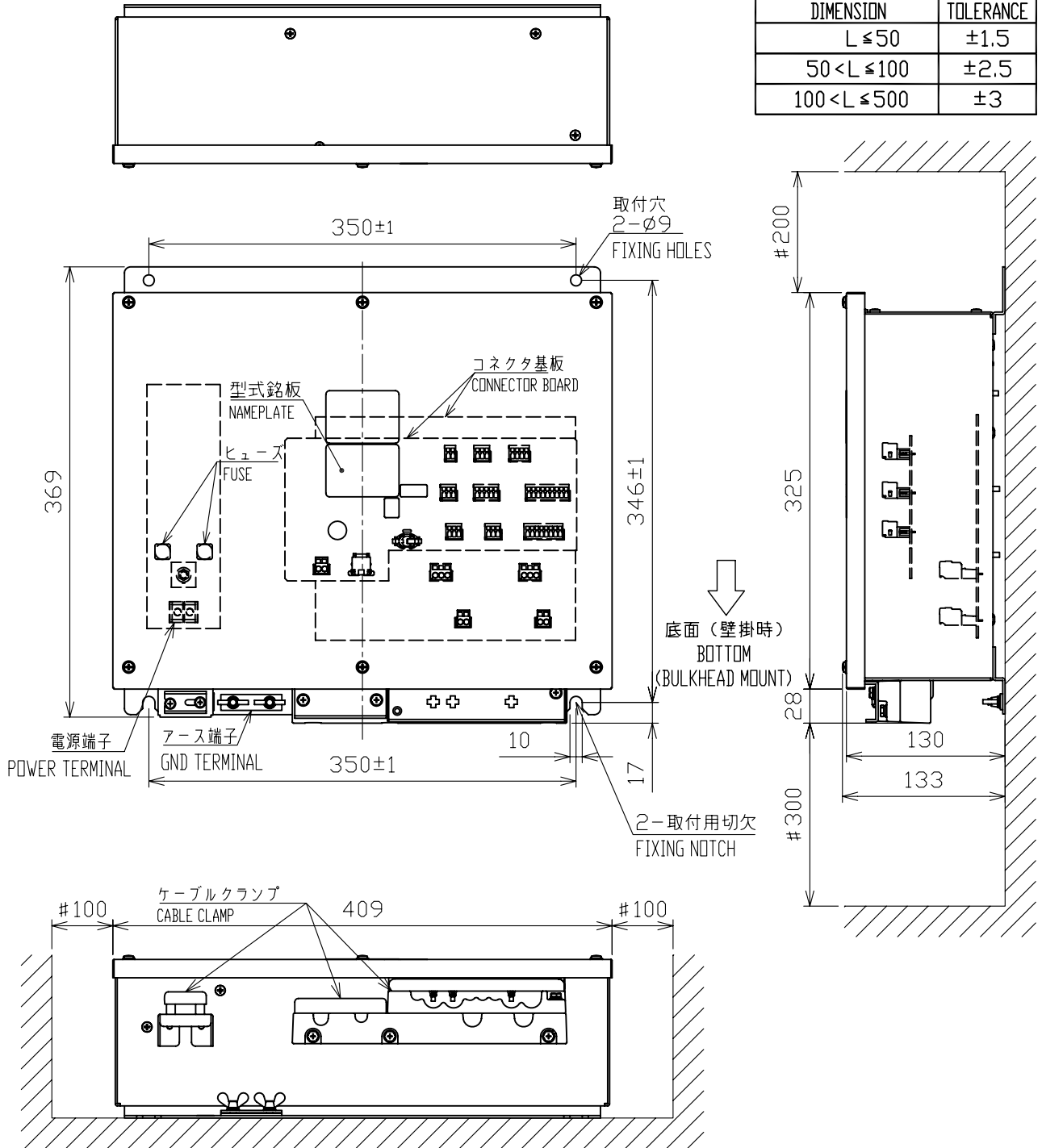
注　記　　1）　指定外の寸法公差は表1による。
　　　　　2）　♯印寸法は最小サービス空間寸法とする。
　　　　　3）　取付用ネジはM8ボルト又はコーチボルト呼び8を使用のこと。

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	FE-800	外寸図
SCALE 1/5 MASS 10 ±10% kg		NAME TRANSCEIVER UNIT (BULKHEAD/TABLETOP MOUNT)
DWG. No. C2384-G04- A	REF. No. 12-005-200G-2	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

取付穴
4-ø7
FIXING HOLES

100±1

190±1

(252)

アース端子
GND TERMINAL

ケーブルグランド
JIS F8801-20b
CABLE GLAND

112

#300

170

#300

型式銘板
NAMEPLATE

端子台
TERMINAL BOARD

#100   120   #100
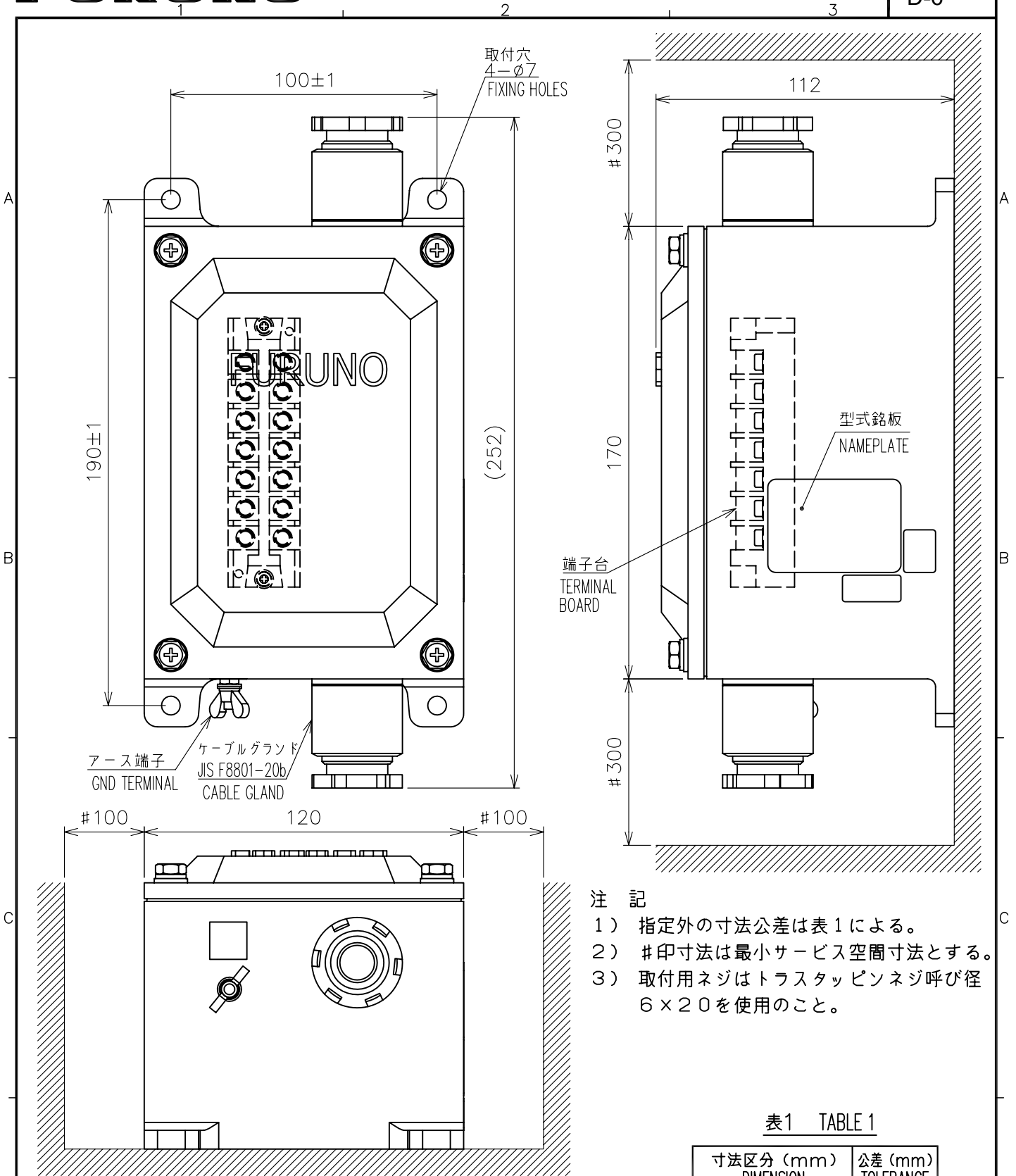
注 記
1) 指定外の寸法公差は表1による。
2) #印寸法は最小サービス空間寸法とする。
3) 取付用ネジはトラスタッピンネジ呼び径
　　6×20を使用のこと。

表1　TABLE 1

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

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #:MIMIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS ø6x20 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	FE-700/800/880		外寸図
SCALE 1/2	MASS 2.6 ±10% kg	NAME	MATCHING BOX
DWG. No. C2006-006-F	REF. No. 12-005-300G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

φ12

φ22

30

61.3±1.4

Ø70.2±0.5

Ø89.8±0.7

5.9±0.9
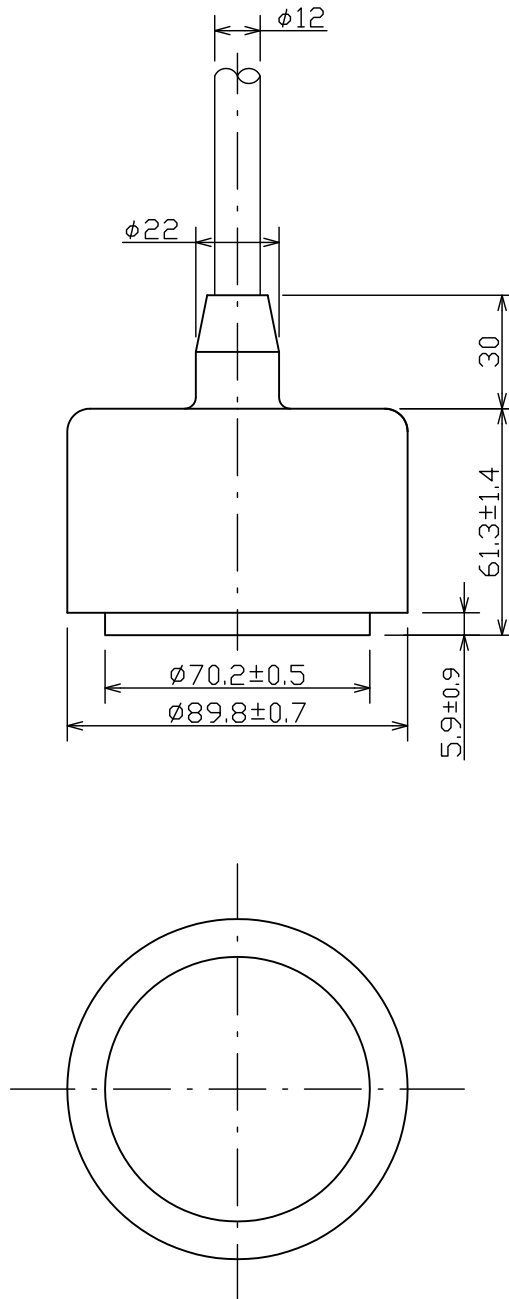
表1　TABLE 1

型式 TYPE	ケーブル長 CABLE LENGTH (m)	質量 MASS (kg±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（1m当り0.19ｋｇ）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

FURUNO ELECTRIC CO., LTD.

FURUNO

φ12
φ22
30
36
3
φ95±0.3
φ110±0.5
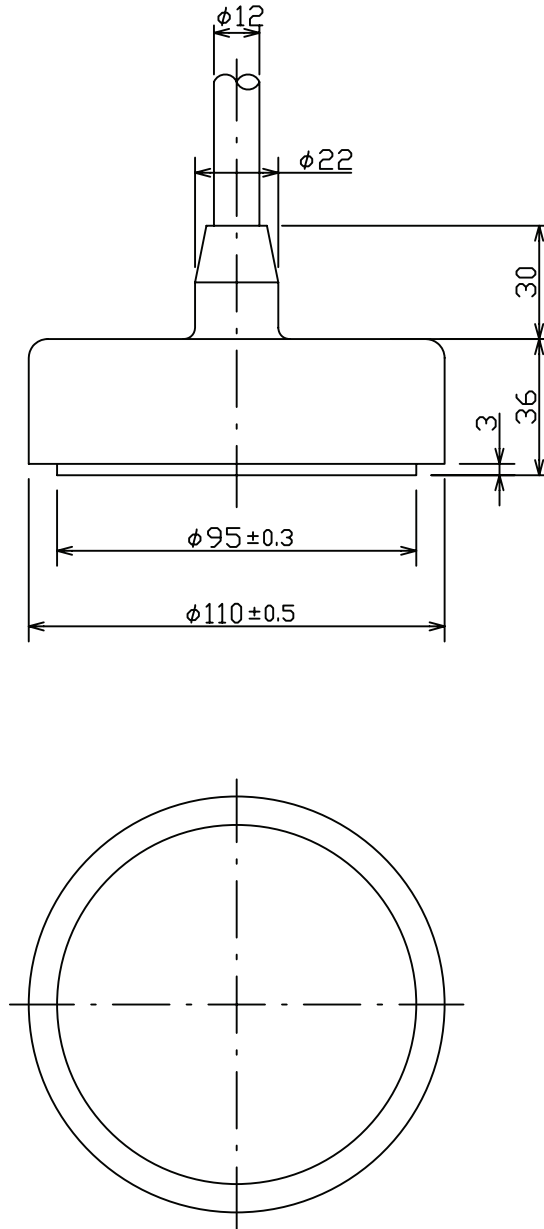
表1　TABLE 1

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 T.YAMASAKI		TITLE	200B-8(B)/(N)
CHECKED	Oct.26 '04 R.ESUMI		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
DWG.No.	C2003-019-E			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO ELECTRIC CO., LTD.

| 周波数 FREQUENCY | 50 kHz |

表1 (Table1)

寸法区分 (mm) Dimension	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一とし、船底板より凹凹まないように装備してください。正み防止のため
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剥がし、"③取付フランジ"を必ず取付けて
   ①送受波器と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. ④締付グランドは、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 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 ③ WITH SILICONE AFTER ATTACHING THE TRANSDUCER ①.
8. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

品番 ITEM	品名 NAME		材質 MATERIAL	数量 Q'TY	備要 REMARKS
8	バネ座金 SPRING WASHER		SUS316L	4	M6
7	六角穴付きボルト HEX.S.H.C.SCREW		SUS316L	4	M6×25
6	ゴムパッキン GASKET		CR	1	TPB-11-08
5	座金 WASHER		C3604(CdL)	1	TPB-11-07
4	締付けグランド GLAND NUT		C3604(CdL)	1	JIS F8801 20 1a
3	取付フランジ FIXING FLANGE		SUS316L	1	TTF-5600-02
2	タンク本体 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.

TITLE	TTF-5600 (5K-32A)
名称	送受波器タンク
NAME	TRANSDUCER TANK
	送受波器装備図
	TRANSDUCER INSTALLATION

DRAWN	2/Jun/2020	I.YAMASAKI
CHECKED	2/Jun/2020	H.MAKI
APPROVED	5/Jun/2020	H.MAKI
SCALE 1/2	MASS 表2参照 Table 2	
DWG.No.	C2001-T46-B	

質量は送受波器を含まず
MASS DOES NOT INCLUDE TRANSDUCER
REF.No. 02-TTF-565G-5

表2 (Table2)

板厚寸法 (mm) Thickness		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を選択してください
SELECT THICKNESS 'T' ACCORDING TO
THICKNESS OF HULL PLATE.

ダブリ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.

フランジ型式
5K-32A (JIS B 2220)
FLANGE TYPE

φ115
φ90
4-φ15
45°

MAX φ34
154
12
60
B
T
φ190.7
φ191(HULL PLATE)
φ70
φ116

船底板
HULL PLATE

周波数 FREQUENCY	200 KHz

表1 (Table1)

寸法区分 (mm) Dimension	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一とし、船底板より凹凸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剥がし、歪み防止のため ①送受波器・④押えゴム・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締付けグランドは、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.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
9	バネ座金 SPRING WASHER	SUS316L	4	M6	
8	六角穴付きボルト HEX.S.H.C.SCREW	SUS316L	4	M6x25	
7	ゴムパッキン GASKET	CR	1	TPB-11-08	
6	座金 WASHER	C3604B	1	TPB-11-07	
5	締付けグランド 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.

DRAWN	1/Jun/2020	I.YAMASAKI
CHECKED	1/Jun/2020	H.MAKI
APPROVED	5/Jun/2020	H.MAKI
APPROVED	5/Jun/2020	H.MAKI

	TTF-2000 (5K-32A)
名称	送受波器タンク
NAME	TRANSDUCER TANK

MASS	表2参照 Table 2
質量は送受波器を含まず MASS DOES NOT INCLUDE TRANSDUCER.	
REF. No.	02-TTF-205G-3

| SCALE | 1/2 |
| DWG.No. | C2001-T48- A |

送受波器装備図
TRANSDUCER INSTALLATION

FURUNO ELECTRIC CO., LTD.

ダブリ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.

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

船底厚に応じて板厚Tを選択ください
SELECT THICKNESS 'T' ACCORDING TO THICKNESS OF HULL PLATE.

フランジ型式
5K-32A (JIS B 2220)
FLANGE TYPE

Ø115
Ø90
4-Ø15
45°

MAX Ø34

154
12
B
59
T

Ø216.3
Ø220 (HULL PLATE)

船底板
HULL PLATE

Ø95
Ø138

T

FURUNO ELECTRIC CO., LTD.

表1（Table1）

寸法区分 (mm) Dimension	公差 (mm) Tolerance
L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3
500 < L ≦ 1000	±4

注 記
1. 指定外の寸法公差は表1の通り。
2. #印寸法は最小サービス空間寸法とする。
3. ゲートバルブ⑫は45°ピッチで任意の方向に取付け可能です。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. # : MINIMUM SERVICE CLEARANCE.
3. GATE VALVE⑫ CAN BE ATTACHED IN THE ANY DIRECTION IN INCREMENT OF 45°.

Parts List

品番 ITEM	品 名 NAME	材 質 MATERIAL	数量 QTY	図 番 DWG. NO.	摘 要 REMARKS
25	HEX.S.H.C.SCREW M10×30	SUS316L	2		
24	SPRING WASHER M10	SUS316L	2		
23	O-RING	NBR	3		JIS B2401 P60
22	O-RING	NBR	1		JIS B2401 P135
21	EYENUT M10	SUS304	2		
20	FLAT WASHER M12	SUS316L	4		
19	SPRING WASHER M12	SUS316L	4		
18	NUT M12	SUS316L	8		
17	BOLT M20×80	SUS316L	8		
16	SPRING WASHER M20	SUS316L	16		
15	NUT M20	SUS316L	16		
14	SPRING WASHER M6	SUS316L	6		
13	BOLT M6×25	SUS316L	6		
12	GATE VALVE 9.8×10⁵Pa	SC480	1	02-129-6311 (JIS F7366-150S)	CLASSIFIATION SOCIETY APPROVED
11	ZINC RICH PRIMER WASHER	C3604(CdL)	1	TPB-11-07	
10	PACKING	CR	1	TPB-11-08	
9	ZINC RICH PRIMER GRAND	C3604(CdL)	1	JIS F8801 20.1a	
8	SEACHEST CAP	SS400	1	02-129-6307	T/#1995 t=1.5mm
7	GASKET	JOINT SHEET	2	02-129-6306	CLASSIFIATION SOCIETY APPROVED MATERIAL
6	ZINC RICH PRIMER SPACER	KA	1	02-129-6305	
5	FLANGE2	SUS316L	1	02-129-6304	
4	SHAFT	SUS316LTP	1	02-129-6303	
3	FLANGE1	SUS316L	1	02-129-6302	
2	TRANSDUCER CASE	SUS316L	1	02-129-6301	
1	TRANSDUCER		1	50B-6B	NOT INCLUDED IN MASS

名称 ゲートバルブ GV-50B-6B
NAME GATE VALVE

送受波器装備図 TRANSDUCER INSTALLATION

FE-700

質量は送受波器を含まず。 MASS DOES NOT INCLUDE TRANSDUCER.
REF.No. 02-129-630g-7

DRAWN	4/Oct/2021 T.YAMASAKI
CHECKED	4/Oct/2021 H.MAKI
APPROVED	5/Nov/2021 H.MAKI
SCALE 1/5	MASS 170 kg ±10%
DWG.No. C2366-T01-J	02-129-630g-7

LIFTING HOOK (SHIPYARD SUPPLY)

#1000
(850)
545
290
1.5
95
#280
6 APPROX.
Ø280
312

φ295
φ300 (HULL PLATE)
(HULL PLATE)
φ250

(132±5)
(175±5)
(182±5)
(241.5±5)
580 APPROX.

SCALE

仕切弁取付部詳細図 ATTACHMENT PART DETAIL VIEW
45°

HULL PLATE

ダブリ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.

FURUNO

FURUNO ELECTRIC CO., LTD.

表1（Table1）

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

注 記
1．指定外の寸法公差は表1の通りです。
2．#印寸法は最小サービス空間寸法とする。
3．ゲートバルブ⑫は45°ピッチで任意の方向に取付け可能です。

NOTE
1．TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2．# : MINIMUM SERVICE CLEARANCE.
3．GATE VALVE⑫ CAN BE ATTACHED IN THE ANY DIRECTION IN INCREMENT OF 45°.
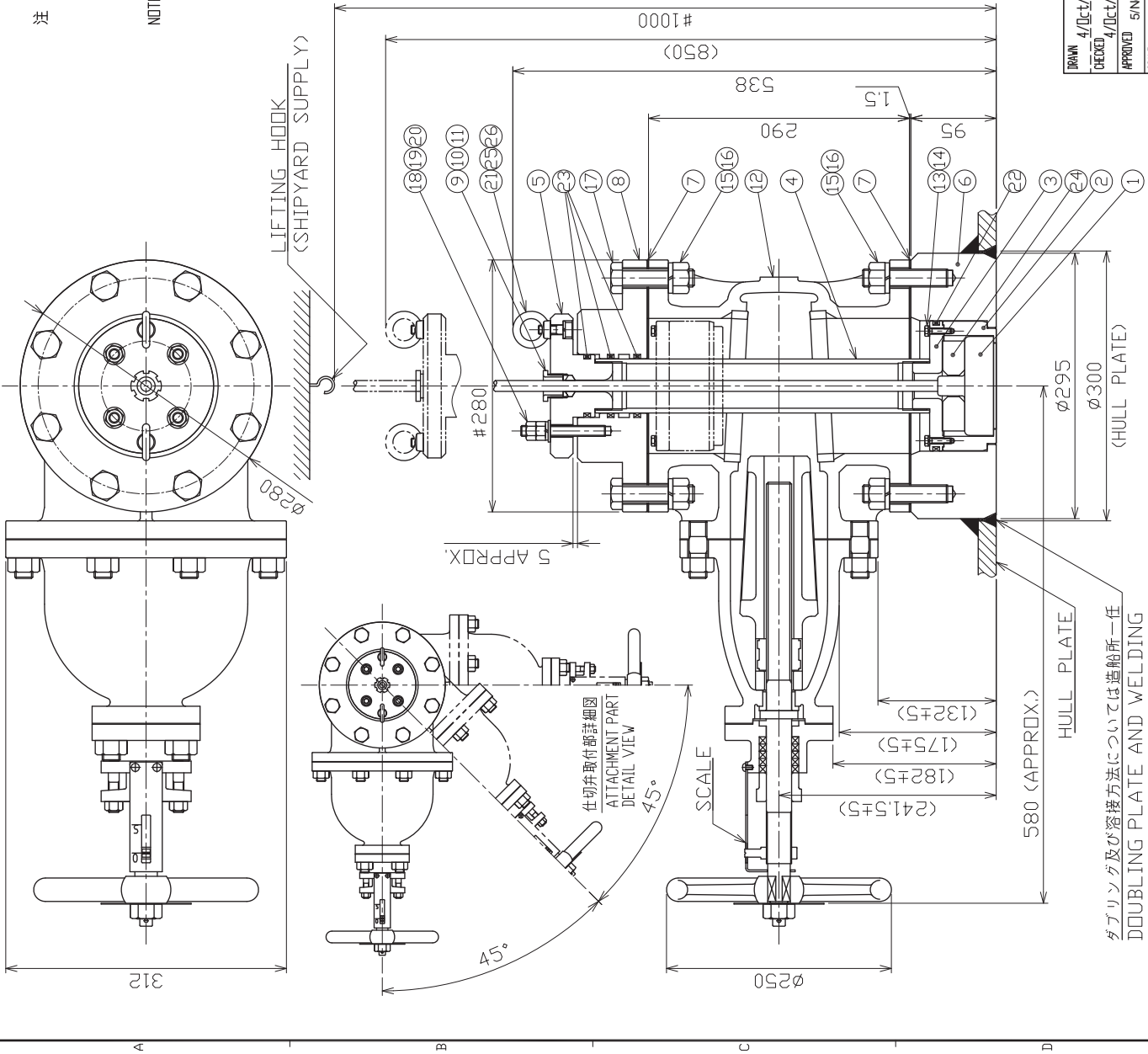
ITEM 品番	NAME 品 名	MATERIAL 材 質	QTY 数量	DWG. NO. 図 番	REMARKS 摘 要
26	HEX.S.H.C.SCREW M10×30	SUS316L	2		
25	SPRING WASHER M10	SUS316L	2		
24	DAMPER	CR	1	TTF-2000-03	
23	O-RING	NBR	3	JIS B2401 P60	
22	O-RING	NBR	1	JIS B2401 P135	
21	EYENUT M10	SUS304	2		
20	FLAT WASHER M12	SUS316L	4		
19	SPRING WASHER M12	SUS316L	4		
18	NUT M12	SUS316L	8		
17	BOLT M20×80	SUS316L	8		
16	SPRING WASHER M20	SUS316L	16		
15	NUT M20	SUS316L	16		
14	SPRING WASHER M6	SUS316L	6		
13	BOLT M6×25	SUS316L	6		
12	GATE VALVE 9.8×10 Pa	SC480	1	02-129-6311 (JIS F 7366-150S)	CLASSIFIATION SOCIETY APPROVED
11	WASHER	C3604B	1	TPB-11-07	
10	PACKING	CR	1	TPB-11-08	
9	GRAND	C3604B	1	JIS F8801 20 1a	
8	SEACHEST CAP ZINC RICH PRIMER	SS400	1	02-129-6307	CLASSIFIATION SOCIETY APPROVED MATERIAL
7	GASKET	JOINT SHEET	2	02-129-6306	T/#1995 ±1.5mm
6	SPACER ZINC RICH PRIMER	KA	1	02-129-6305	CLASSIFIATION SOCIETY APPROVED
5	FLANGE 2	SUS316L	1	02-129-6304	
4	SHAFT	SUS316LTP	1	02-129-6303	
3	FLANGE 1	SUS316L	1	02-129-6302	
2	TRANSDUCER CASE	SUS316L	1	02-129-7301	
1	TRANSDUCER		1	200B-8B	NOT INCLUDED IN MASS

名称 ゲートバルブ　GV-200B-8B

NAME 送受波器装備図　GATE VALVE

TRANSDUCER INSTALLATION

DRAWN	4/Oct/2021 T.YAMASAKI			
CHECKED	4/Oct/2021 H.MAKI			
APPROVED	5/Nov/2021 H.MAKI	FE-700	MASS ±10% 170 kg	質量は送受波器を含みます。 MASS DOES NOT INCLUDE TRANSDUCER.
SCALE 1/5	C2366-T02-H	REF.No.	02-129-730G-6	
DWG.No.				

#1000

(850)

538

1.5

290

95

⑱⑲⑳
⑨⑩⑪
㉑㉕㉖
⑤
㉓
⑰
⑧
⑦
⑮⑯
⑫
④
⑮⑯
⑦
⑬⑭
⑥
㉒
③
㉔
②
①

LIFTING HOOK (SHIPYARD SUPPLY)

#280

5 APPROX.

φ280

312

φ295
φ300 (HULL PLATE)

(132±5)
(175±5)
(182±5)
(241.5±5)

580 (APPROX.)

HULL PLATE

仕切弁取付部詳細図
ATTACHMENT PART DETAIL VIEW

45°

SCALE

φ250

45°

ダブリ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.

FURUNO

周波数 FREQUENCY	50 kHz

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、①送受波器と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。 ②タンク本体溶接部の表面処理を剥がし、歪み防止のため
3. ②タンク本体の材質はNK（日本海事協会）規格のKA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. ④締付グランド④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 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.

表1 (Table1)

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

ITEM 品番	NAME 品名	MATERIAL 材質	Q'TY 数量	REMARKS 備要
8	バネ座金 SPRING WASHER	SUS316L	4	M6
7	六角穴付きボルト HEX.S.H.C.SCREW	SUS316L	4	M6x25
6	ゴムパッキン GASKET	CR	1	TPB-11-08
5	座金 WASHER	C3604(CdL)	1	TPB-11-07
4	締付グランド GLAND NUT	C3604(CdL)	1	JIS F8801 20 1a
3	取付フランジ FIXING FLANGE	SUS316L	1	TTF-5600-02
2	タンク本体T30用 CASING EPOXY ZINC RICH PRIMER	KA	1	02-133-0991
1	送受波器 TRANSDUCER			50B-6B

THICKNESS 板厚寸法 T=25

APPROVED MATERIAL CLASSIFICATION SOCIETY 船級認定材

NOT INCLUDED IN MASS. 下記質量には含まず

DRAWN	2/Jun/2020	T.YAMASAKI
CHECKED	2/Jun/2020	H.MAKI
APPROVED	5/Jun/2020	H.MAKI
SCALE	1/2	MASS 19 kg	±10%
DWG.No.	C2001-T47-B

MASS 質量は送受波器を含みます。

TITLE TTF-5600 (5K-32A)

NAME 送受波器 TRANSDUCER TANK

名称 送受波器タンク

TITLE 送受波器装備図 TRANSDUCER INSTALLATION

REF.No. MASS W/O TRANSDUCER 質量は送受波器を含みます。 02-133-0990-2

図番 DWG.NO. 02-133-0990-2

FURUNO ELECTRIC CO., LTD.

フランジ型式 5K-32A (JIS B 2220) FLANGE TYPE

Ø115
Ø90
MAX Ø34
4-Ø15
45°

154
12
90
30
B

Ø190.7
Ø191 (HULL PLATE)
A

Ø70
Ø116

船底板 HULL PLATE

ダブリ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.

① ② ③ ④ ⑤ ⑥ ⑦ ⑧
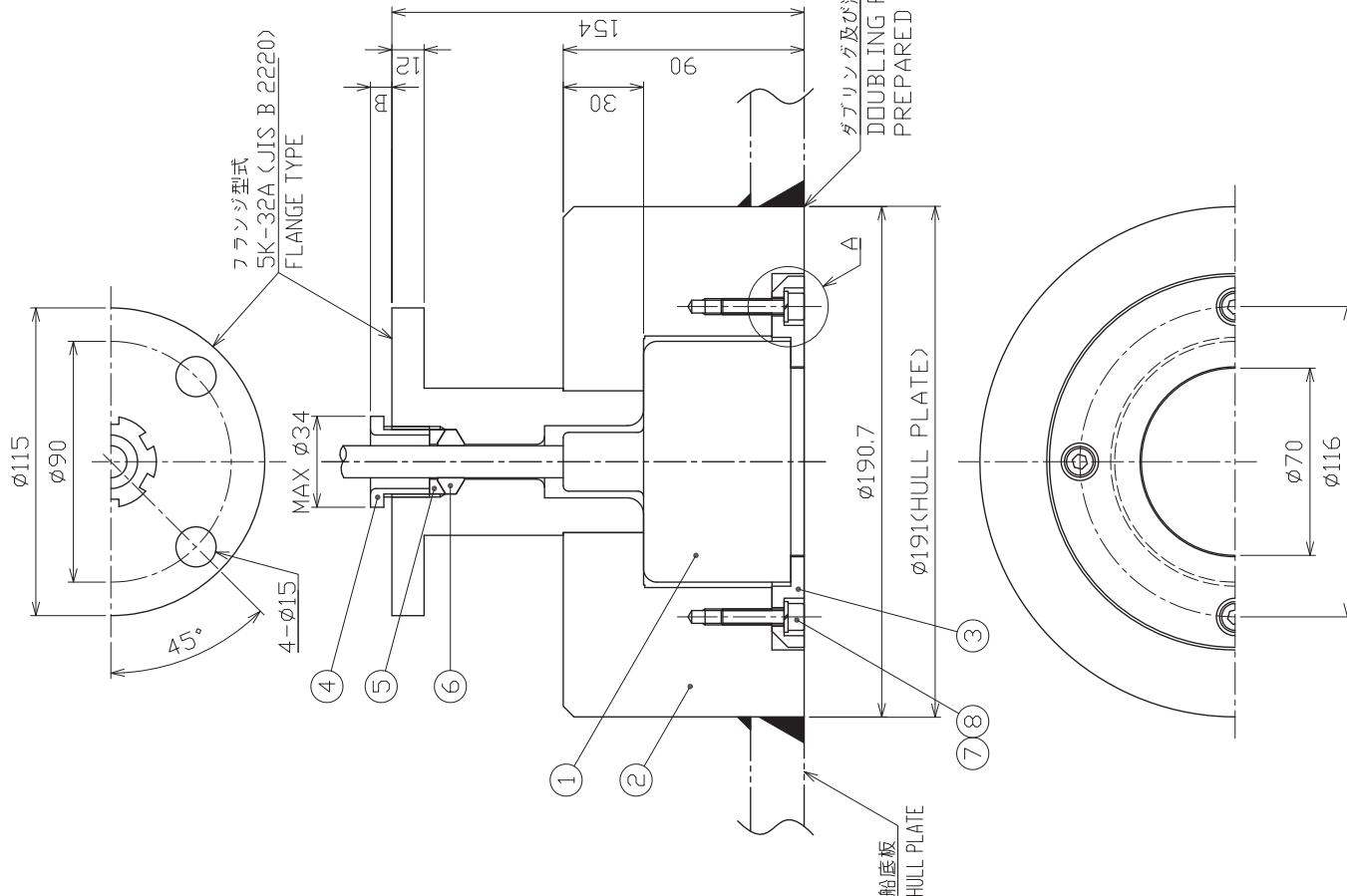
FURUNO ELECTRIC CO., LTD.

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剥がし、歪み止めのため①送受波器④押えゴムパッキン⑦を取り外し、"③取付フランジ"を必ず取り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KA材です。
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締付けグランドは、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 TRANSDUSER 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 CASING② WHILE WELDING.
3. MATERIAL OF CASING②MEETS NK (NIPPON KAIJI KYOUKAI) 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 FLANGE③WITH SILICONE AFTER ATTACHING THE TRANSDUCER①.
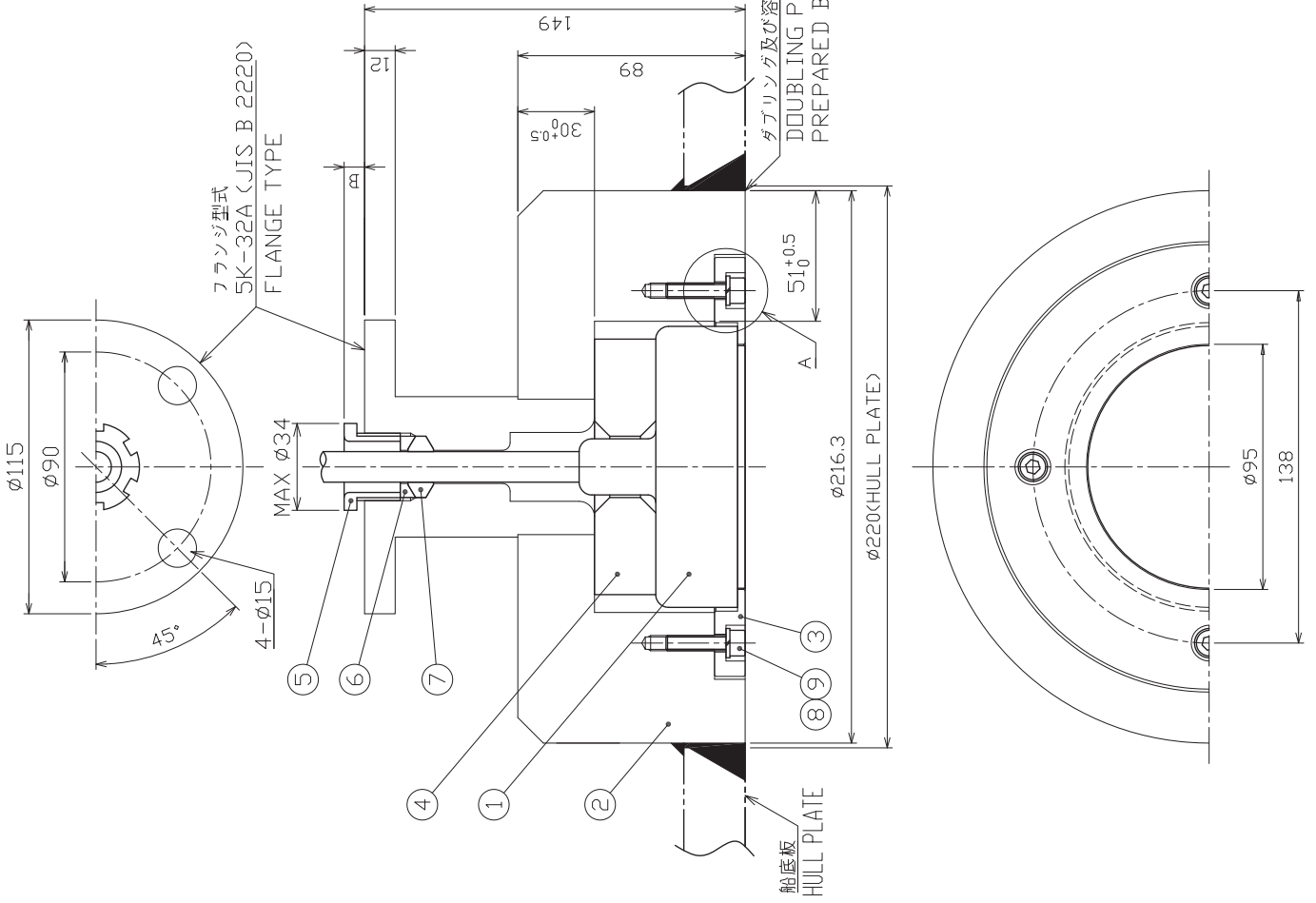8. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

表1（Table1）

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

品番 ITEM	品 名 NAME	材 質 MATERIAL	数量 Q'TY	図 番 Dwg.NO.	摘 要 REMARKS
9	バネ座金 SPRING WASHER	SUS316L	4	M6	
8	六角穴付きボルト HEX.S.H.C.SCREW	SUS316L	4	M6X25	
7	ゴムパッキン GASKET	CR	1	TPB-11-08	
6	座金 WASHER	C3604B	1	TPB-11-07	
5	締付けグランド 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-2000-12	
2	タンク本体 CASING EPOXY ZINC RICH PRIMER	KA	1	02-133-0601	船級認定材 CLASSIFICATION SOCIETY APPROVED MATERIAL
1	送受波器 TRANSDUCER		1	200B-8B	質量に含まず NOT INCLUDED IN MASS.

TITLE: TTF-2000 (5K-32A, T=30) (TK-085)
名称: 送受波器タンク
NAME: TRANSDUCER TANK
図番: 送受波器装備図 TRANSDUCER INSTALLATION
Dwg.NO.: 02-133-0600-3
REF. No.: 02-133-0600-3

質量は送受波器を含みます。MASS DOES NOT INCLUDE TRANSDUCER.

DRAWN	9/Jun/2020	I.YAMASAKI
CHECKED	9/Jun/2020	H.MAKI
APPROVED	9/Jun/2020	H.MAKI
SCALE	1/2	MASS	24	kg	±10%
DWG.No.	C2001-T49-A

板厚寸法 (mm) Thickness 指定品 Optional
T=30

ダブリ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.

フランジ型式 5K-32A (JIS B 2220)
FLANGE TYPE

Ø115
Ø90
4-Ø15
45°
MAX Ø34

149
12
89
30 0 +0.5
51 0 +0.5
B
A

Ø216.3
Ø220(HULL PLATE)

Ø95
138

船底板 HULL PLATE

1　　　　　　2　　　　　　3

表1　TABLE 1

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

A

取付穴 2-φ7
FIXING HOLES

145
114
80
26
23
(15)
3
23
61

41
10
27
88
47
50
85
120

B

C

D
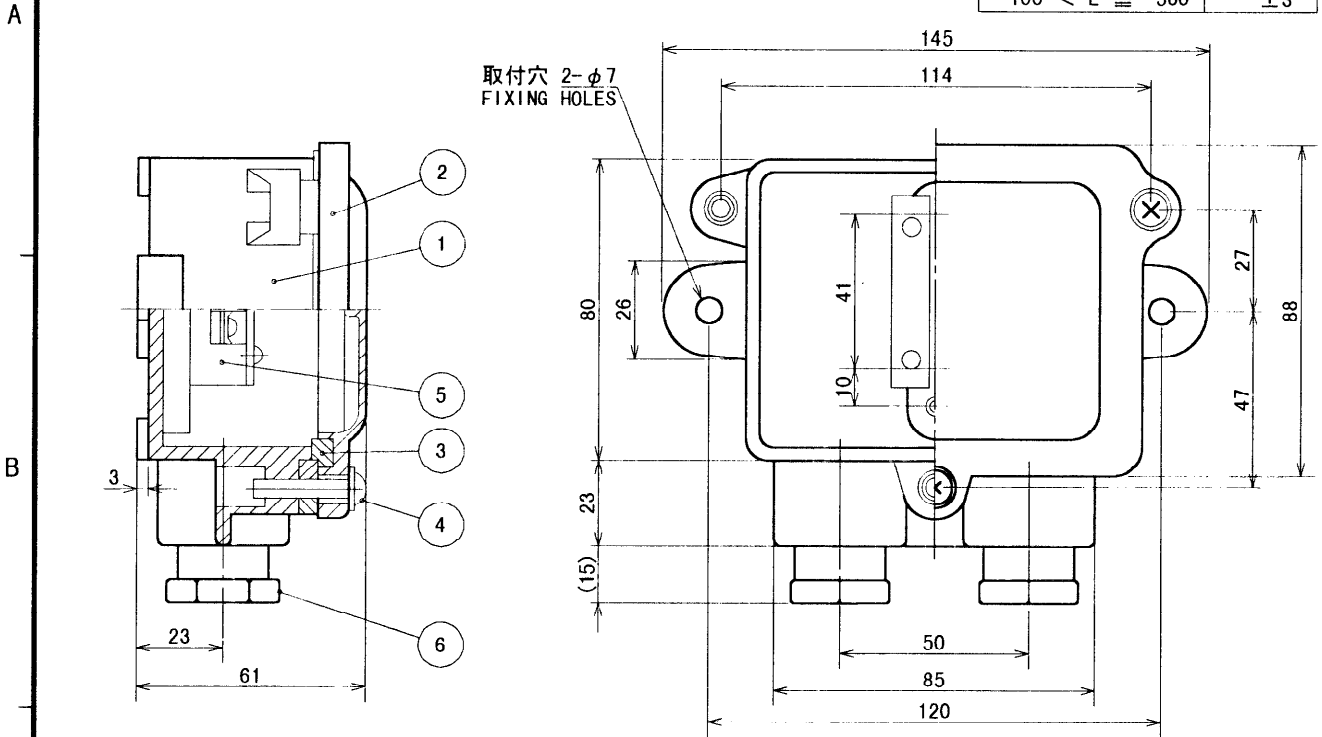
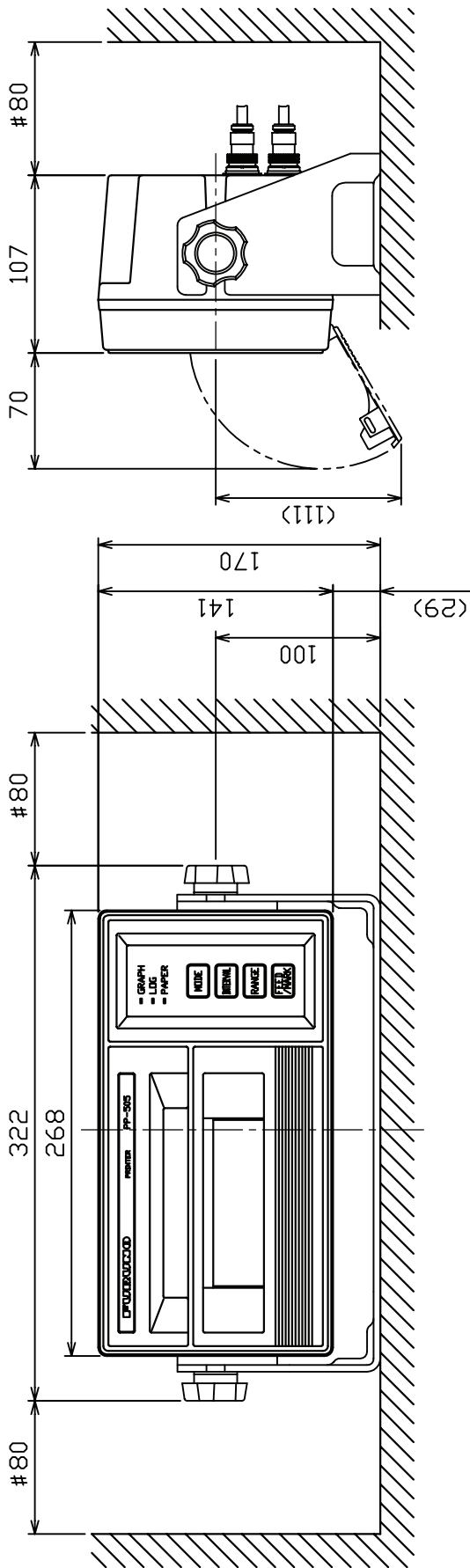| 6	電線貫通金物 CABLE GLAND	P.B.T. 樹脂 RESIN	2		JIS F8801-20
5	端子盤 TERMINAL BOARD		1		JIS F8812-020-3
4	締付ねじ CLAMPING SCREW	真鍮 BRASS	3		
3	ガスケット GASKET	ネオプレン NEOPRENE	1		
2	蓋 COVER	P.B.T. 樹脂 RESIN	1		
1	箱体 BOX	P.B.T. 樹脂 RESIN	1		
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

DRAWN
July 5 '00 T.YAMASAKI
CHECKED
July 6 '00 T.Kim
APPROVED
July 6 '00 T.Kim

SCALE 1/2　MASS ±10%　0.4 kg

DWG. No. C0002-G01-B

TITLE
JIS F8821-1

名称
防水型船用小型接続箱

外寸図

NAME
WATERTIGHT JUNCTION BOX

OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.
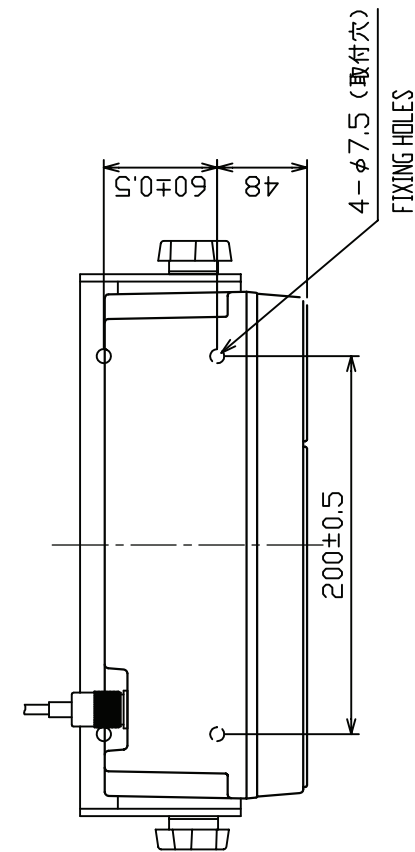
表 1　TABLE 1

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

#80

107

70

(111)

170

141

100

(29)

#80

322

268

#80

60±0.5

48

200±0.5

4－φ7.5（取付穴）
FIXING HOLES

GRAPH
LOG
PAPER

MODE
INTERNAL
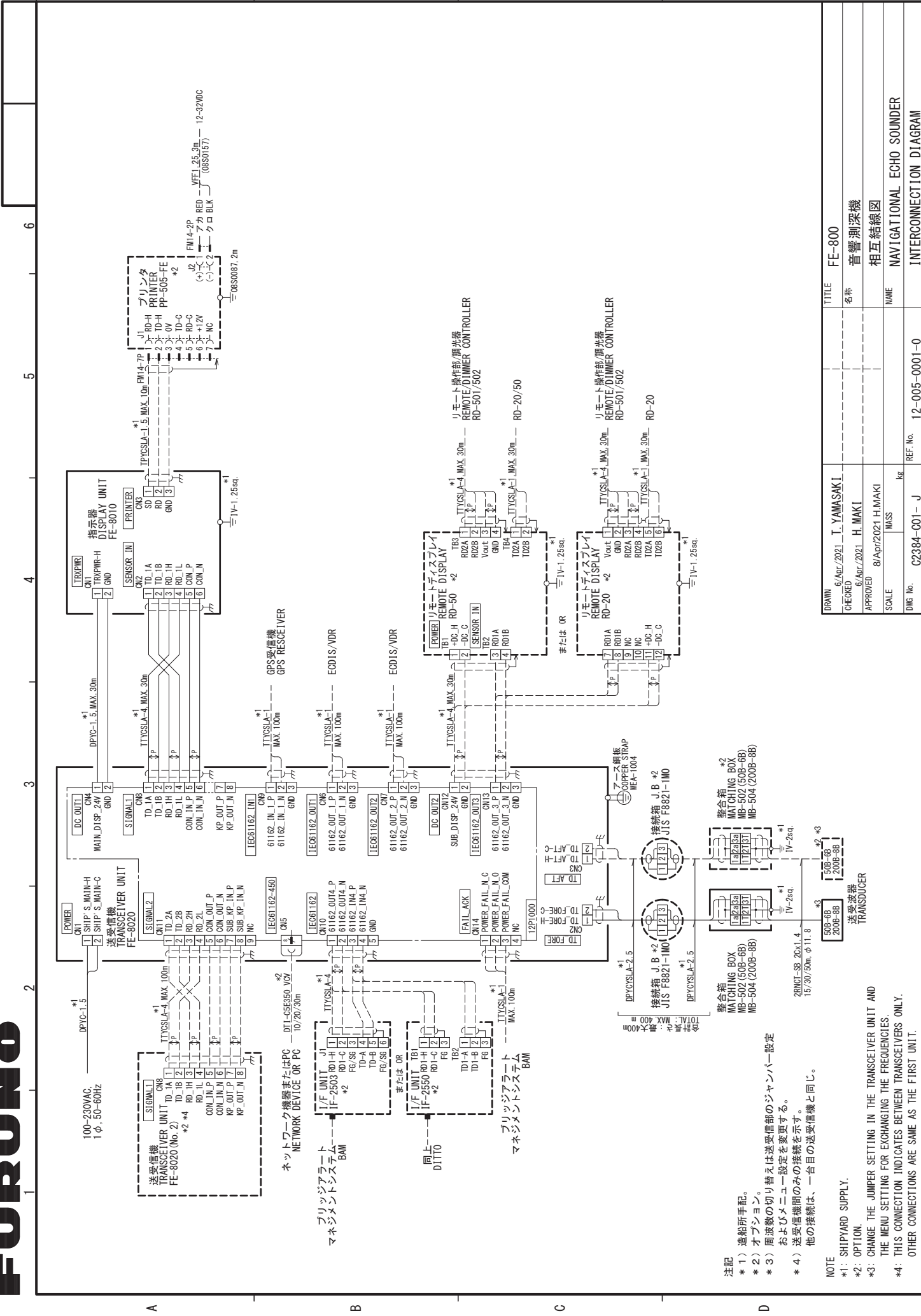RANGE
FEED
MARK

PRINTER　PP-505

DFUO/DXUO/DO

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	
CHECKED	Dec. 5 '03	T. Takeno	
APPROVED	Dec. 08 '03	T. Matsuguchi	
SCALE	1/4	MASS 2.9 ±10% kg	
DWG.No.	C2366-G10-B		16-010-005G-0

TITLE　PP-505-FE
名称　プリンタ
NAME　外寸図（卓上装備）
PRINTER (TABLETOP MOUNT)
OUTLINE DRAWING

FE-700

FURUNO

FURUNO ELECTRIC CO., LTD.

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: CHANGE THE JUMPER SETTING IN THE TRANSCEIVER UNIT AND
    THE MENU SETTING FOR EXCHANGING THE FREQUENCIES.
*4: THIS CONNECTION INDICATES SAME AS THE FIRST UNIT.
    OTHER CONNECTIONS ARE SAME AS THE FIRST UNIT.

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。
    他の接続は、一台目の送受信機と同じ。

FURUNO ELECTRIC CO., LTD.

TITLE	FE-800
名称	音響測深機
	相互結線図
NAME	NAVIGATIONAL ECHO SOUNDER
	INTERCONNECTION DIAGRAM

DRAWN	6/Apr./2021	T.YAMASAKI
CHECKED	6/Apr./2021	H.MAKI
APPROVED	8/Apr/2021	H.MAKI
SCALE	MASS	kg
DWG No.	C2384-C01- J	
	12-005-0001-0	REF. No.

ECF
(Elemental Chlorine Free)
The paper used in this manual
is elemental chlorine free.

FURUNO ELECTRIC CO., LTD.

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