JFE-400
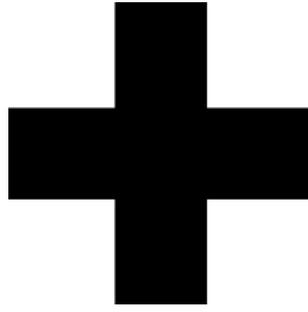**Echo Sounder**

INSTALLATION
MANUAL

● Safety Cautions ●

Cautions for High Voltage

High voltages, ranging from several hundreds to tens of thousands of volts, are used in electronic apparatus, such as radio and radar instruments. These voltages are totally harmless in most operations. However, touching a component inside the unit is very dangerous. (Any person other than authorized service engineers should not maintain, inspect, or adjust the unit.)

High voltages on the order of tens of thousand volts are most likely to cause instant deaths from electrical shocks. At times, even voltages on the order of several hundred volts could lead to electrocution. To defend against electrical shock hazards, don't put your hand into the inside of apparatus.

When you put in a hand unavoidably in case of urgent, it is strongly suggested to turn off the power switch and allow the capacitors, etc. to discharge with a wire having its one end positively grounded to remove residual charges. Before you put your hand into the inside of apparatus, make sure that internal parts are no longer charged. Extra protection is ensured by wearing dry cotton gloves at this time. Another important precaution to observe is to keep one hand in your pocket at a time, instead of using both hands at the same time. It is also important to select a secure footing to work on, as the secondary effects of electrical shock hazards can be more serious. In the event of electrical shocks, disinfect the burnt site completely and obtain medical care immediately.

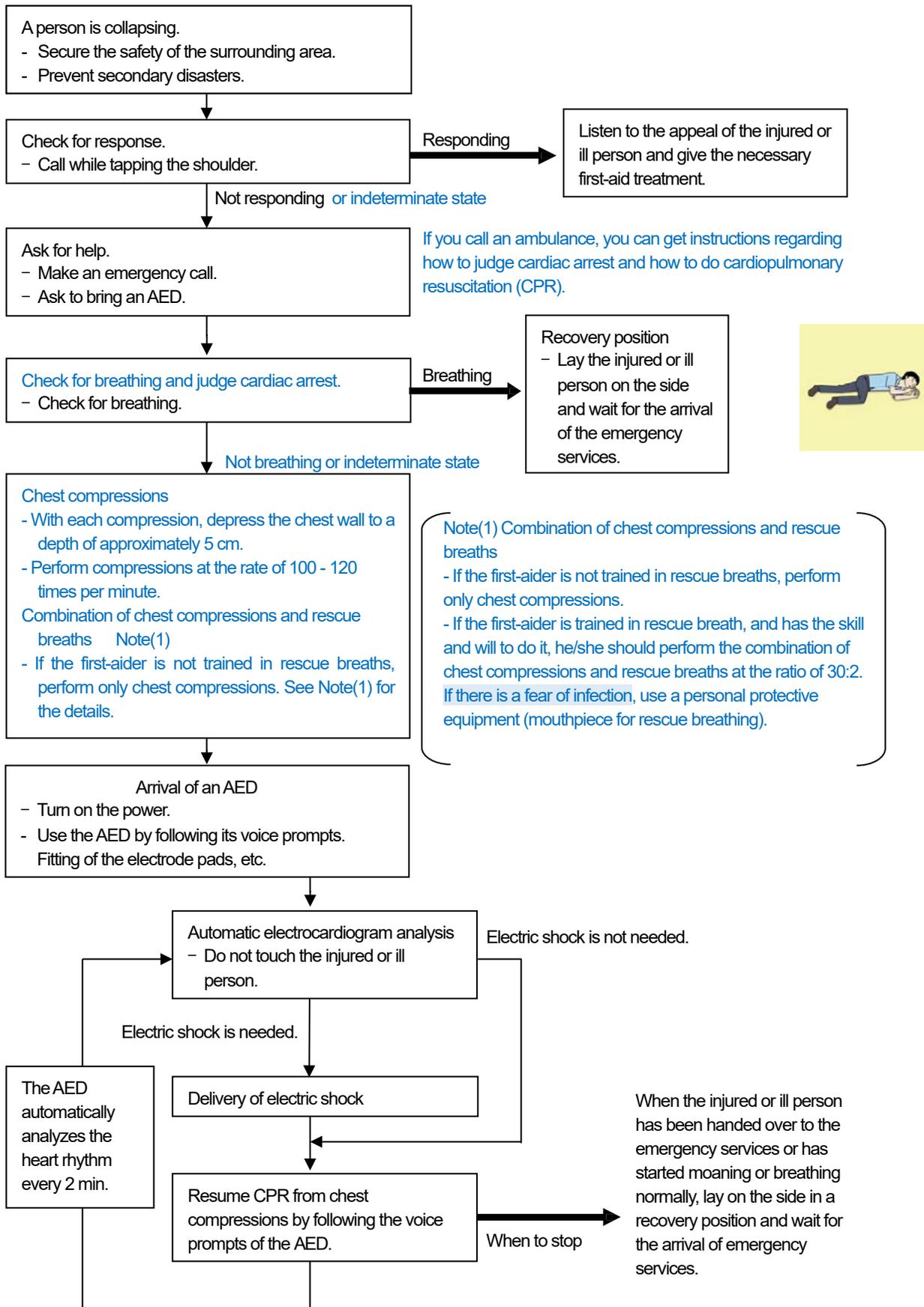## Precautions for Rescue of Victim of Electric Shock

When a victim of electric shock is found, turn off the power source and ground the circuit immediately. If this is impossible, move the victim away from the unit as quick as possible without touching him or her with bare hands. He or she can safely be moved if an insulating material such as dry wood plate or cloth is used.

It is necessary to perform first aid immediately.

Breathing may stop if current flows through the respiration center of brain due to electric shock. If the electric shock is not large, breathing can be restored by artificial respiration. A victim of electric shock looks pale and his or her pulse may become very weak or stop, resulting in unconsciousness and rigidity at worst.

First Aid Method

Flow of Cardiopulmonary Resuscitation (CPR)

A person is collapsing.
- Secure the safety of the surrounding area.
- Prevent secondary disasters.

↓

Check for response.
– Call while tapping the shoulder.

— Responding → Listen to the appeal of the injured or ill person and give the necessary first-aid treatment.

Not responding or indeterminate state

↓

Ask for help.
– Make an emergency call.
– Ask to bring an AED.

If you call an ambulance, you can get instructions regarding how to judge cardiac arrest and how to do cardiopulmonary resuscitation (CPR).

↓

Check for breathing and judge cardiac arrest.
– Check for breathing.

— Breathing → Recovery position
– Lay the injured or ill person on the side and wait for the arrival of the emergency services.

Not breathing or indeterminate state

↓

Chest compressions
- With each compression, depress the chest wall to a depth of approximately 5 cm.
- Perform compressions at the rate of 100 - 120 times per minute.
Combination of chest compressions and rescue breaths   Note(1)
- If the first-aider is not trained in rescue breaths, perform only chest compressions. See Note(1) for the details.

Note(1) Combination of chest compressions and rescue breaths
- If the first-aider is not trained in rescue breaths, perform only chest compressions.
- If the first-aider is trained in rescue breath, and has the skill and will to do it, he/she should perform the combination of chest compressions and rescue breaths at the ratio of 30:2. If there is a fear of infection, use a personal protective equipment (mouthpiece for rescue breathing).

↓

Arrival of an AED
– Turn on the power.
- Use the AED by following its voice prompts. Fitting of the electrode pads, etc.

↓

Automatic electrocardiogram analysis
– Do not touch the injured or ill person.

— Electric shock is not needed.

Electric shock is needed.

↓

Delivery of electric shock

The AED automatically analyzes the heart rhythm every 2 min.

↓

Resume CPR from chest compressions by following the voice prompts of the AED.

When to stop → When the injured or ill person has been handed over to the emergency services or has started moaning or breathing normally, lay on the side in a recovery position and wait for the arrival of emergency services.

Specific Procedures for Cardiopulmonary Resuscitation (CPR)

1. **Check the scene for safety to prevent secondary disasters**
   a) Do not touch the injured or ill person in panic when an accident has occurred. (Doing so may cause electric shock to the first-aiders.)
   b) Do not panic and be sure to turn off the power. Then, gently move the injured or ill person to a safe place away from the electrical circuit.

2. **Check for responsiveness**
   a) Tap the shoulder of the injured or ill and shout in the ear saying, "Are you OK?"
   b) If the person opens eyes or there is some response or gesture, determine it as "responding." But, if there is no response or gesture, determine it as "not responding."

3. **If responding**
   a) Give first-aid treatment.

4. **If not responding**
   a) Ask for help loudly. Ask somebody to make an emergency call and bring an AED.
   - Somebody has collapsed. Please help.
   - Please call an ambulance.
   - Please bring an **AED**.
   - If there is nobody to help, call an ambulance yourself.
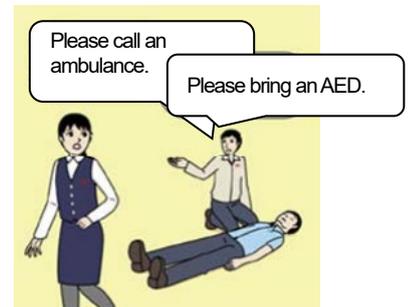
5. **Check for breathing**
   a) Look to see if the chest and abdomen of the injured or ill person are rising and falling.
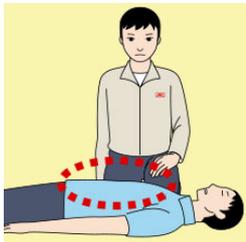
   b) If the injured or ill person is breathing, place the recovery position and wait for the arrival of the emergency services.
   - Position the injured or ill person on the side.
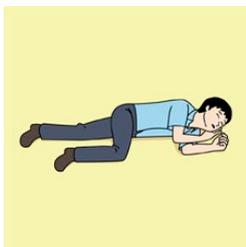
6. Cardiopulmonary resuscitation (CPR) (combination of chest compressions and rescue breaths)

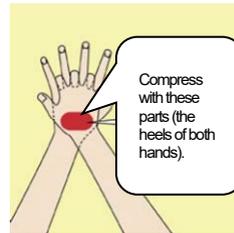a) Chest compressions

1) Position of chest compressions

- Position the heel of one hand in the center of the chest, approximately between the nipples, and place your other hand on top of the one that is in position.
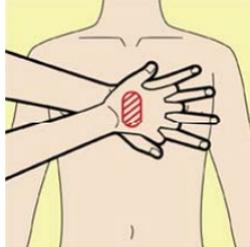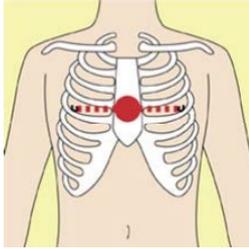
2) Perform chest compressions

Perform uninterrupted chest compressions of 30 at the rate of about 100 - 120 times per minute, while locking your elbows positioning yourself vertically above your hands.

- With each compression, depress the chest wall to a depth of approximately 5 cm.

Compress with these parts (the heels of both hands).

b) Combination of 30 chest compressions and 2 rescue breaths

1) If the first-aider is not trained in rescue breaths, he/she should perform only chest compressions.

2) If the first-aider is trained in rescue breath, and has the skill and will to do it, he/she should perform 30 chest compressions, then give 2 rescue breaths.

3) If there is a fear of infection, use a personal protective equipment (mouthpiece for rescue breathing).

4) Continuously perform the combination of 30 chest compressions and 2 rescue breaths without interruption.

5) If there are two or more first-aiders, alternate with each other approximately every two minutes (five cycles) without interruption.


CPR mask

Mouthpiece for rescue

7. When to stop cardiopulmonary resuscitation (CPR)

    a) When the injured or ill person has been handed over to the emergency services

    b) When the injured or ill person has started moaning or breathing normally, lay on the side in a recovery position and wait for the arrival of emergency services.

8. Arrival and preparation of an AED

    a) Place the AED at an easy-to-use position. If there are multiple first-aiders, continue CPR until the AED becomes ready.

    b) Turn on the power to the AED unit. Depending on the model of the AED, you may have to push the power on button, or the AED automatically turns on when you open the cover.

    c) Follow the voice prompts of the AED.

Turn on the power.
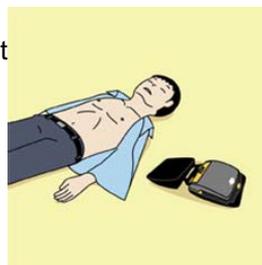
9. Attach the electrode pads to the injured or ill person's bare chest

    a) Remove all clothing from the chest, abdomen, and arms.

    b) Open the package of electrode pads, peel the pads off and securely place them on the chest of the injured or ill person, with the adhesive side facing the chest. If the pads are not securely attached to the chest, the AED may not function. Paste the pads exactly at the positions indicated on the pads, If the chest is wet with water, wipe dry with a dry towel and the like, and then paste the pads. If there is a pacemaker or implantable cardioverter defibrillator (ICD), paste the pads at least 3 cm away from them.
If a medical patch or plaster is present, peel it off and then paste the pads.
If the injured or ill person's chest hair is thick, paste the pads on the chest hair once, peel them off to remove the chest hair, and then paste new pads.

    c) Some AED models require to connect a connector by following voice prompts.

    d) The electrode pads for small children should not be used for children over the age of 8 and for adults.
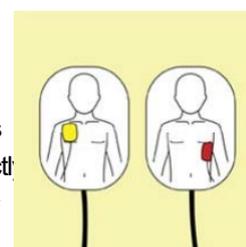
10. Electrocardiogram analysis

    a) The AED automatically analyzes electrocardiograms. Follow the voice prompts of the AED and ensure that nobody is touching the injured or ill person while you are operating the AED.

    b) On some AED models, you may need to push a button to analyze the heart rhythm.

11. Electric shock (defibrillation)

a) If the AED determines that electric shock is needed, the voice prompt saying, "Shock is needed" is issued and charging starts automatically.

b) When charging is completed, the voice prompt saying, "Press the shock button" is issued and the shock button flashes.

c) The first-aider must get away from the injured or ill person, make sure that no one is touching, and then press the shock button.

d) When electric shock is delivered, the body of the injured or ill person may jerk.

Press the shock button.
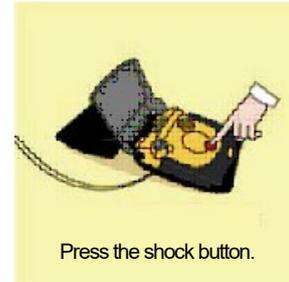
12. Resurgence of cardiopulmonary resuscitation (CPR)

a) Resume chest compressions by following the voice prompts of the AED.

- With each compression, depress the chest wall to a depth of approximately 5 cm.
- Perform compressions at the rate of 100 - 120 times per minute.

13. Automatic electrocardiogram analysis

a) When 2 minutes have elapsed since you resumed cardiopulmonary resuscitation (CPR), the AED automatically analyzes the electrocardiogram.

b) If you suspended CPR by following voice prompts and AED voice prompt informs you that shock is needed, give electric shock again by following the voice prompts.
If AED voice prompt informs you that no shock is needed, immediately resume CPR.

14. When to stop CPR (Keep the electrode pads on.)

a) When the injured or ill person has been handed over to the emergency services

b) When the injured or ill person has started moaning or breathing normally, lay on the side in a recovery position and wait for the arrival of emergency services.

Before You Begin

Symbols Used in This Manual

To ensure that the equipment is used safely and correctly, and that the operator and third parties are not exposed to danger or damage, various pictograms are used in this manual and on the equipment itself. These pictograms are described below.

Please familiarize yourself with these pictograms and the meanings they convey before reading the rest of the manual.

⚠ **DANGER**

Failure to observe a danger indication, leading to incorrect handling, may result in an imminent risk of death or serious injury.

⚠ **WARNING**

Failure to observe a warning indication, leading to incorrect handling, may result in death or serious injury to the operator.

⚠ **CAUTION**

Failure to observe a caution indication, leading to incorrect handling, may result in injury to the operator, or physical damage to the equipment.

Example Pictograms

This mark is intended to alert the user to the presence of precautions including danger and warning items. The picture in each mark alerts you to operations that should be carefully performed.

This mark is intended to alert the user to the presence of prohibited activity. The picture/word in/beside each mark alerts you to operations that are prohibited.

This mark is intended to alert the user to the presence of necessary instructions. The picture in each mark alerts you to operations that must be performed.

Warning Labels

⚠ 警告 **WARNING**
このカバーをはずすな
感電の恐れあり
HIGH VOLTAGE
DO NOT REMOVE
THE COVER

There is a warning label on the top cover of NQA-4327 processing unit.
Do not try to remove, break or modify the label.
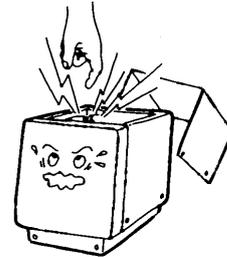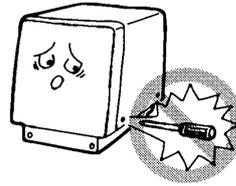
Usage Hints

⚠ DANGER

Do not remove the cover of this set.   Otherwise, you may touch a high-voltage part and suffer from an electrical shock.

Do not dismantle or modify this equipment.   Failure to observe this warning may result in fire, electric shock, or damage.

Do not insert or remove the power cord or operate switches with a wet hand.
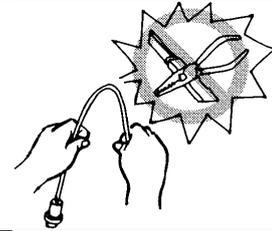Otherwise, you may suffer from an electrical shock.
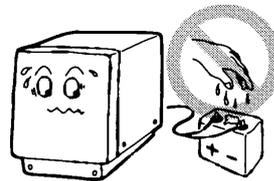
⚠ WARNING

Do not damage, break or modify the power cord.
When a heavy object is placed on the cord or the cord is heated, pulled, or forcibly bent, the cord will be broken resulting in a fire or an electrical shock.

Do not place any vessels containing water or other liquids, or metal objects, on top of this equipment. If water is spilled on or metal objects fall into the equipment there is a risk of fire, electric shock, or damage.

Do not use this set at a voltage other than the supply voltage stated on the set.
Otherwise, a fire, an electrical shock, or a failure may occur.
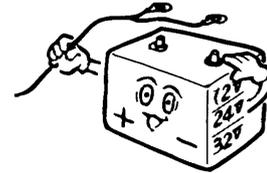
In the event of water of metal objects falling inside the equipment, immediately turn off the power switch, then contact JRC or its agent.
There is a risk of file or electric shock if you continue to use the equipment.
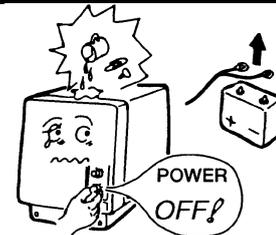
If you notice smoke, unusual smells, or abnormal heat coming from the equipment, immediately turn off the power switch, then contact JRC or its agent.
There is a risk of fire, electric shock, or damage if you continue to use the equipment.
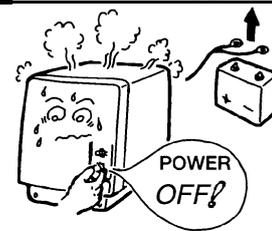
There are no customer-serviceable parts inside.   Unauthorized inspections and repairs could cause fires and electrical shock hazards.

Please call our field representative or your nearest JRC office for inspection and repair services.

Use only the specified fuses.
The use of other fuse may cause fire and/or damage.
The Main switch on the CQD-2348 I/F unit must be turned off during replacing a fuse.
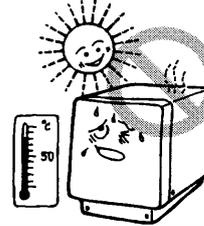
⚠ CAUTION

Please contact JRC or its agent for the electrical installation of this equipment.   Electrical installations carried out by other than the qualified staff may result in faulty operation.

Do not store or operate the equipment where subject to temperatures more than 55℃ or less than -15℃.   High temperature may cause failures.

Do not install the equipment on unstable or unleveled surfaces. Failure to observe this condition may result in the equipment falling or toppling over, resulting in injury.
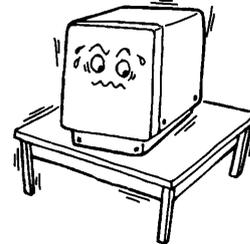
If it is cold, do not move the equipment suddenly into a warm environment and switch it on.   High-voltage leaks due to condensation may result in damage to the equipment.
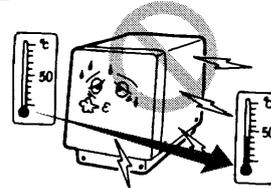
When condensation forms, leave the equipment in the warm environment for about 30 minutes before switching it on.

When installing the equipment, securely connect the earth lead to the earth terminal.   Failure to connect the earth may result in electric shock in the event of a fault or power leak developing.
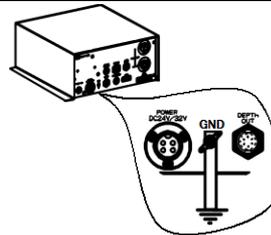
Use the echo sounder only as a navigation aid. Making the final navigation decision based only on the echo sounder display information may cause accidents such as collisions or running aground.

Use a chart to secure a safe depth when the equipment cannot measuring depth by malfunction, and contact JRC or our distributor for repair.
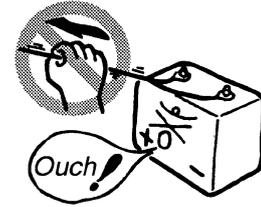
⚠ CAUTION

Do not turn on the equipment's power when the ship is in dry docks.
Failure to observe this caution may result in damage to the transducer, etc. by heat.

When removing the power cord, be sure to remove the power cord terminal correctly.
If the power cord is pulled, the cord may be damaged resulting in a fire or an electrical shock.

Do not install the units on the place being poor ventilation.
Otherwise, the set that is heated may cause a fire or failure.
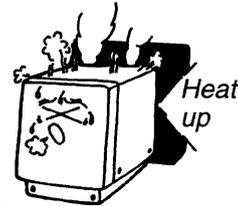
For safety when the equipment is to be left unused for an extended period, turn off the power switch.
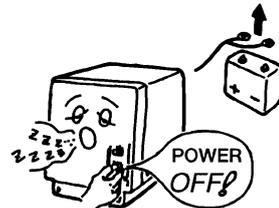
Take care when laying the transducer cable, power cable, and earth lead as positioning has an affect on electromagnetic interference.   There is a risk of interfering with other equipment or the echo-sounder being interfered with by the other equipment.

After installing the echo-sounder, turn on the power to all other equipment to check for interference with or from all the equipment.   Interference may cause malfunctions.

Handle the paper cutter carefully not to cut your hand. When optional printer is Installed.

Contents

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Chapter 1 Outline

1.1   Equipment Function

The JFE-400 Echo-Sounder consists of a transducer mounted on the bottom of the ship's hull and a main unit that displays information on the depth and formation of the seabed.

This information is gained by using ultrasonic waves sent from the transducer that are then reflected off the seabed and picked up again by the transducer.

This equipment is Echo-Sounder that satisfies the IMO (International Maritime Organization) performance standards.

1.2   Contents of this manual

This manual provides the summary of the notes for the procedures up to installation of each device that forms this equipment on the ship as a reference material.

For the operations after installation, refer to this manual or the instruction manual and service manual.

1.3   Components

This section lists the components

1.3.1   Standard Equipment

Name	Type No.	Qty.	Remarks
Display Unit	NWZ-1650	1	
Display Cable	CFQ-7540	1	LAN 15m for DISPLAY
Processing Unit	NQA-4327	1	
Matching box(Primary)	NQD-2597	1	200kHz
	NQD-2598		50kHz
Transducer(Primary)	NKF-349	1	200kHz (with cable 20, 30, 40,50m)
	NKF-350		50kHz (with cable 20, 30, 40m)
Spare parts	7ZXNA2012	1	Fuse ×2
Instruction manual	7ZPNA2051	1	

1.3.2　Option

Name	Type No.	Remarks
Matching box(Secondary)	NQD-2597	200kHz
	NQD-2598	50kHz
	AW-154F	200kHz
	AW-154F-50	50kHz
Transducer(Secondary)	NKF-349	200kHz (with cable 20,30,40,50m)
	NKF-350	50kHz (with cable 20,30,40m)
	NKF-341	200kHz (with cable 20,30,40,50m)
	NKF-345	50kHz (with cable 20,30,40m)
Gate valve transducer	NKF-394	200kHz (with cable 20,30,40,50m)
	NKF-396	50kHz (with cable 20,30,40m)
	G-002759	Alphatron Gate valve for 200kHz LR
	G-002758	Alphatron Gate valve for 50kHz LR
	G-002760	Alphatron Gate valve for 200kHz ABS
	G-002761	Alphatron Gate valve for 50kHz ABS
	G-002762	Alphatron Gate valve for 200kHz BV
	G-002763	Alphatron Gate valve for 50kHz BV
	G-008792	Alphatron Gate valve for 200kHz DNV
	G-008791	Alphatron Gate valve for 50kHz DNV
Spare parts	7ZXNA2009	Fuse×2, Printer paper×1
	7ZXNA2010	Fuse×2, Printer paper×4
	7ZXNA2011	Fuse×2, Printer paper×10
Junction box	JB-340	for junction
Output buffer	NQA-4351	12ch buffer unit
Remote display	NWZ-4610	Remote display for Depth data
Dimmer unit	NCM-227	for remote display
AC power rectifier	NBA-5143	for remote display
Base Kit	MPBX50347	For NWZ-1650 Desktop type
Printer	NKG-901	External printer
Printer wall mount bracket	MPBP32159A	Wall mounting for NKG-901 Printer
Printer cable	7ZCJD0254A	Length1.5m
Printer cable	7ZCJD0270B	Length10m
Power supply cable	CFQ-7539	for NWZ-1650 external power input

UT200NDxx* is the Type No. of the transducer installed to 200kHz transducer.

● "xx" means the nominal cable length. (20/30/40/50)

● " * " means the revision indicator. (D and after is a version with improved water pressure resistance performance)

1.3.3　Equipment identification method

Model numbers are classified according to frequency and number of transducers as shown in the figure below.
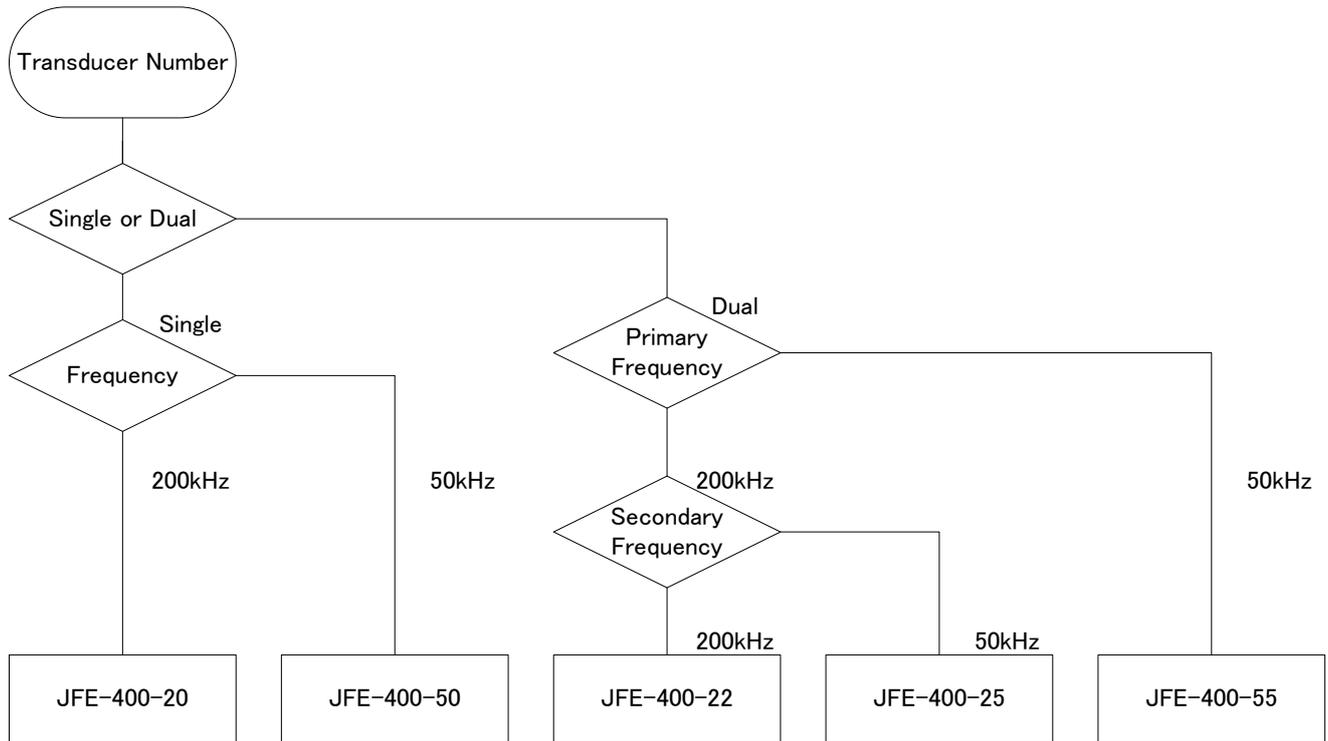
You can check which frequency and number of transducers are supported by the identification sticker on the processing unit.
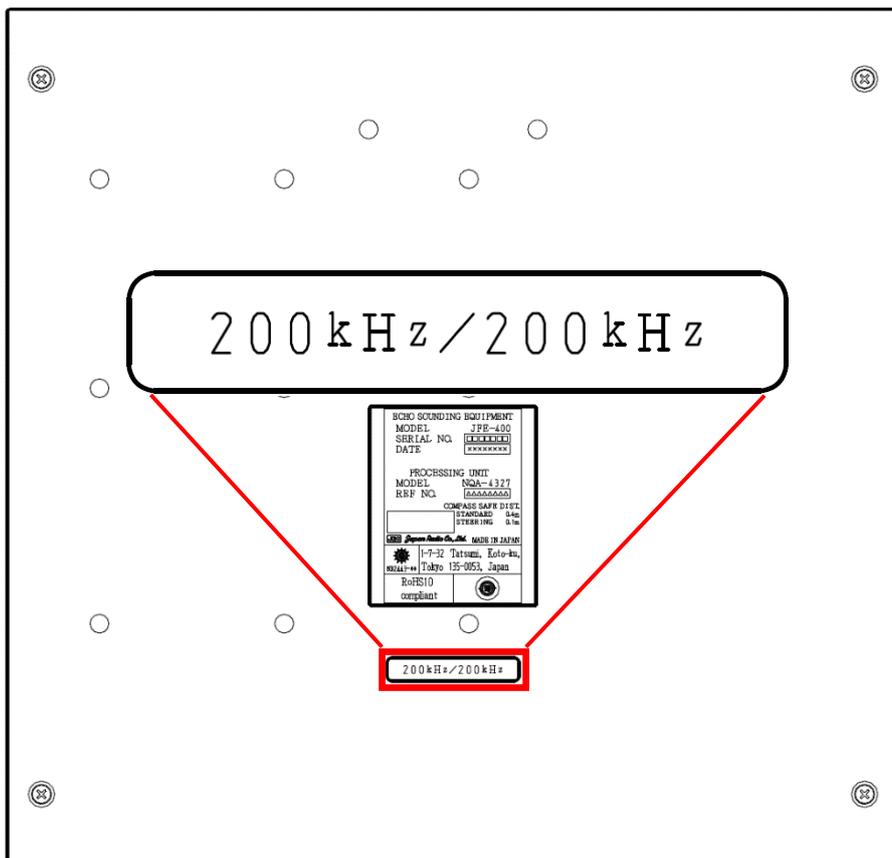
Furthermore, the CMN-869 TX/RX unit inside the equipment is built in based on the model number.
CMN-869 is also classified in the same way as the JFE model name.

S	P
200	50
50	200

P: Primary
S: Secondary
200: 200kHz
50: 50kHz
Unsupported numbers are filled.

Left figure is example;
Primary: 200kHz
Secondary: 50kHz

CMN-869

Sticker type	Model Name	TX/RX Unit	Description
200kHz	JFE-400-20	CMN-869-20	Single transducer 200kHz
50kHz	JFE-400-50	CMN-869-50	Single transducer 50kHz
200kHz/200kHz	JFE-400-22	CMN-869-22	Dual transducers primary 200kHz and secondary 200kHz
200kHz/50kHz	JFE-400-25	CMN-869-25	Dual transducers primary 200kHz and secondary 50kHz
50kHz/50kHz	JFE-400-55	CMN-869-55	Dual transducers primary 50kHz and secondary 50kHz

Note:
When changing the frequency or the number of transducers of this equipment, it is necessary to change sticker and CMN-869 TX/RX unit to a compatible board.
After changing board, be sure to inform JRC of this matter for traceability.

1.4   Construction

External Dimension of NWZ-1650 Display Unit

Flush Mount Type

160

9   125

180

Unit : mm
Mass : Approximately 1kg

Desktop Type(Optional Base Kit use)

160

69.5
54.9
9

LAN Connector

FG

189.2

180

Serial Connector

3.2

9.2

172

201

65
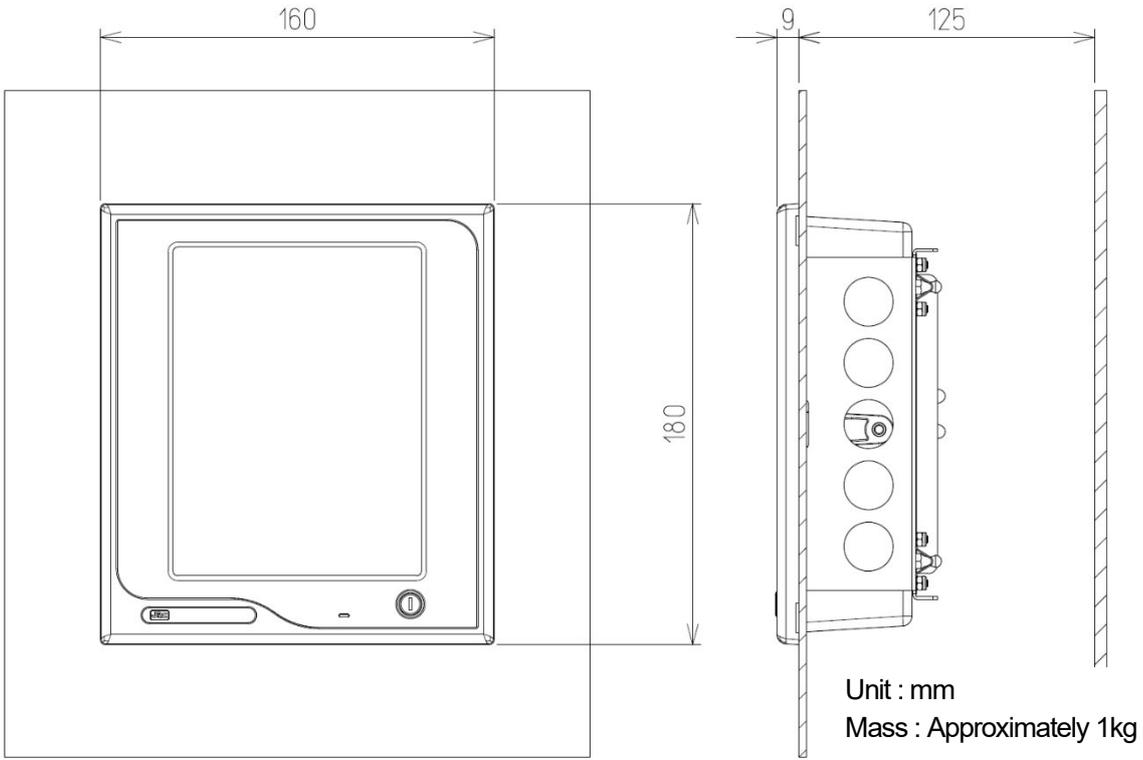
Unit : mm
Mass : Approximately 1.5kg
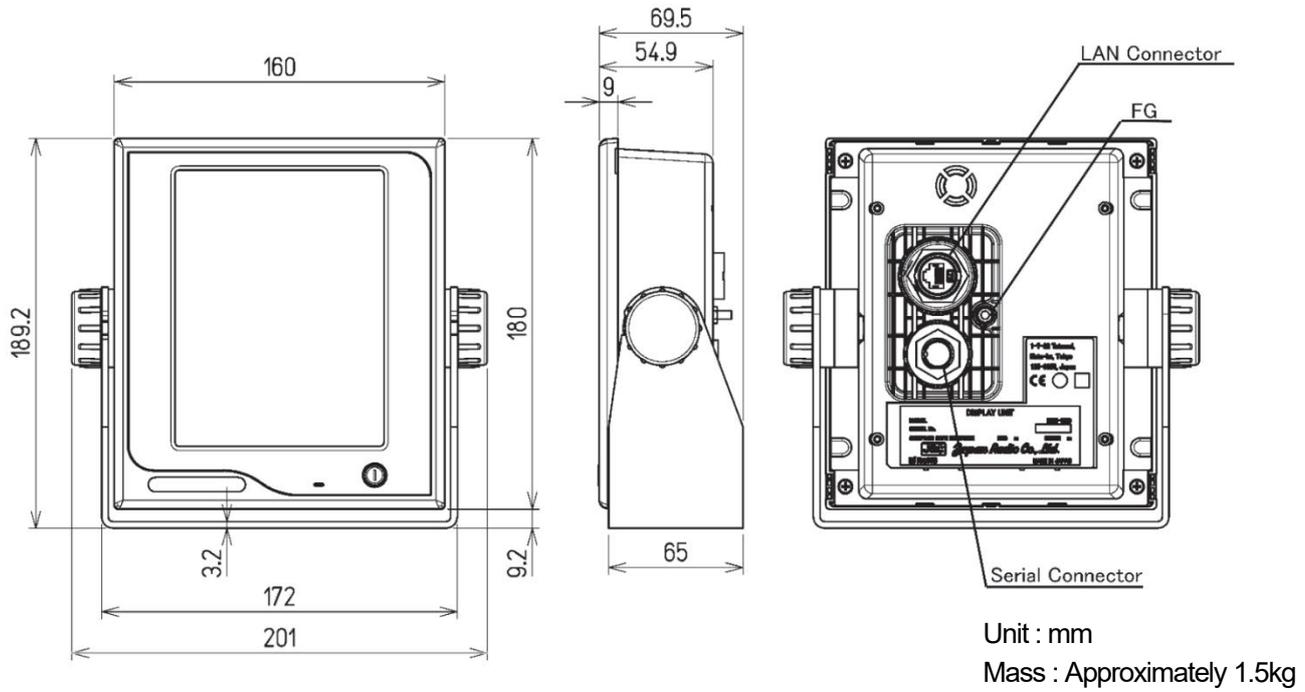
External Dimension of NQA-4327 Processing Unit
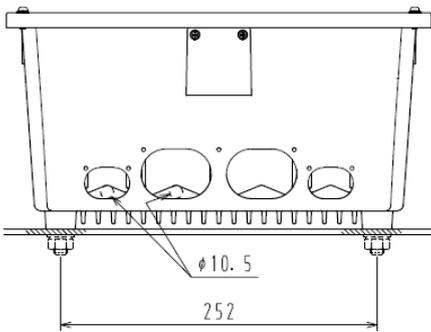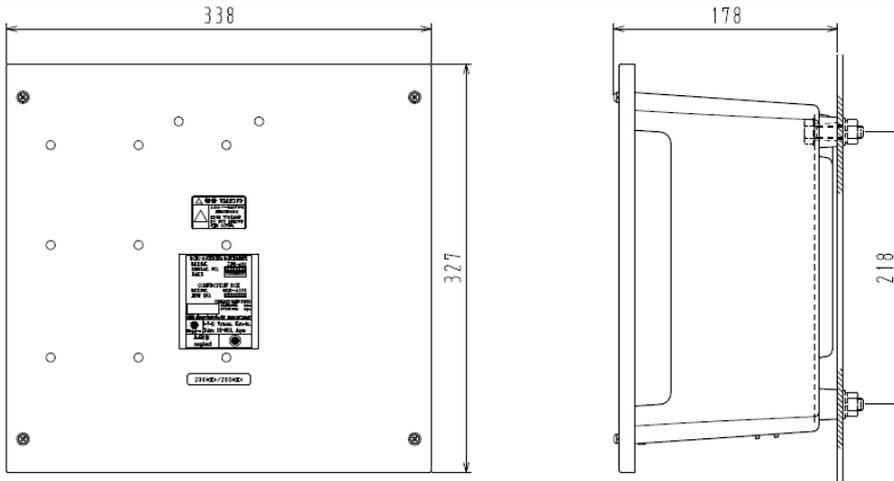
Unit : mm
Mass : Approximately 5.9kg

External Dimension of NQD-2597 Matching Box for 200kHz

NQD-2597 is a standard matching box for 200kHz.

6
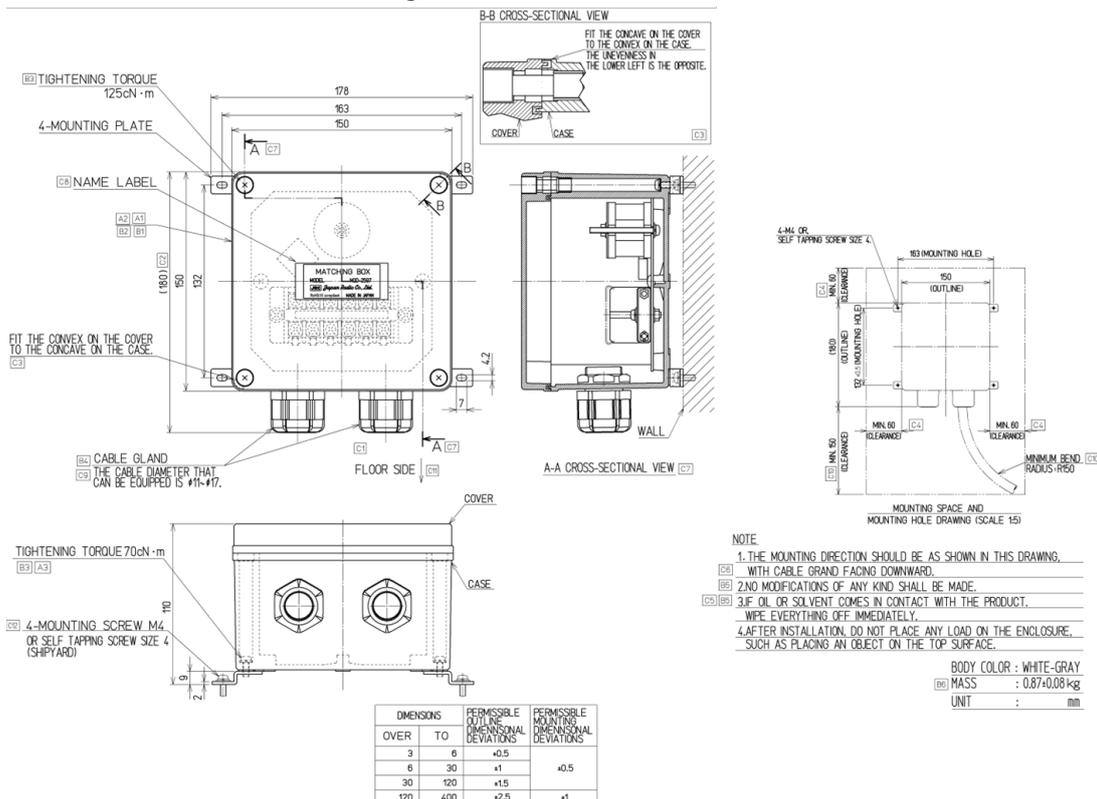
External Dimension of NQD-2598 Matching Box for 50kHz

NQD-2598 is a standard matching box for 50kHz.
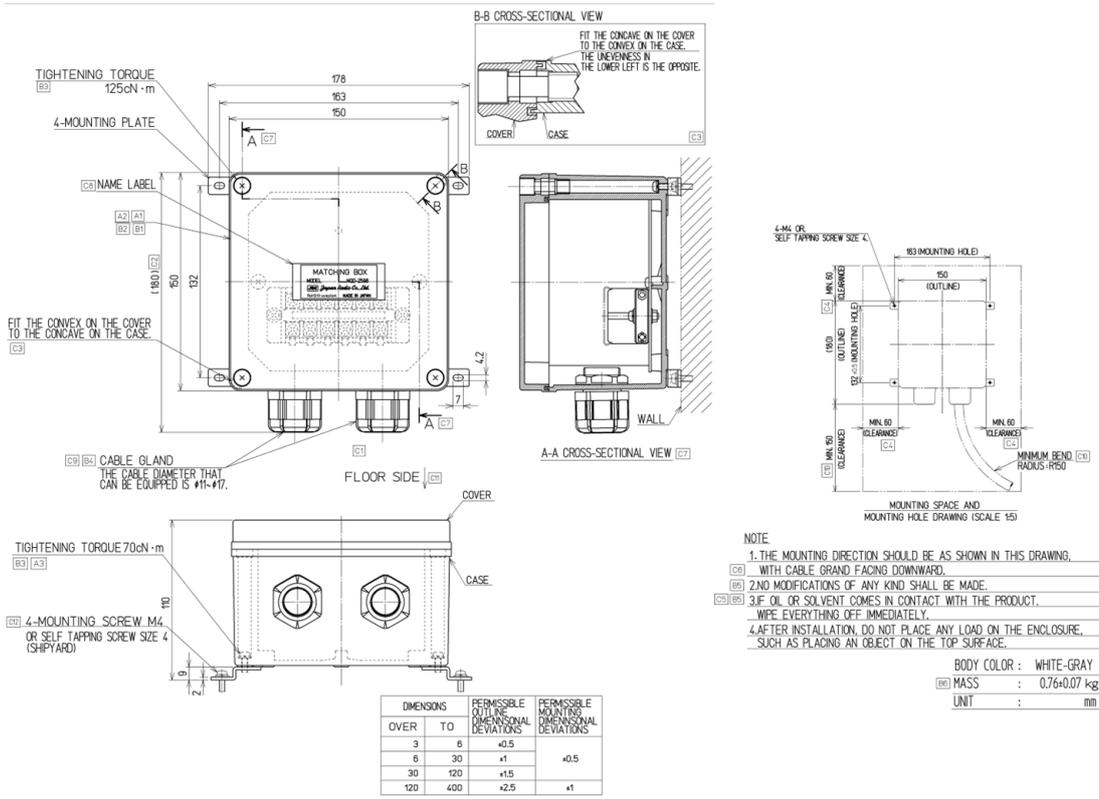
External Dimension of Matching box AW-154F/AW-154F-50 (Previous Model)

AW-154F/AW154F-50 is an optional matching box. AW-154F is a transducer for 200kHz, and AW-154F-50 is a transducer for 50kHz.

Unit : mm

Mass : Approximately 4kg
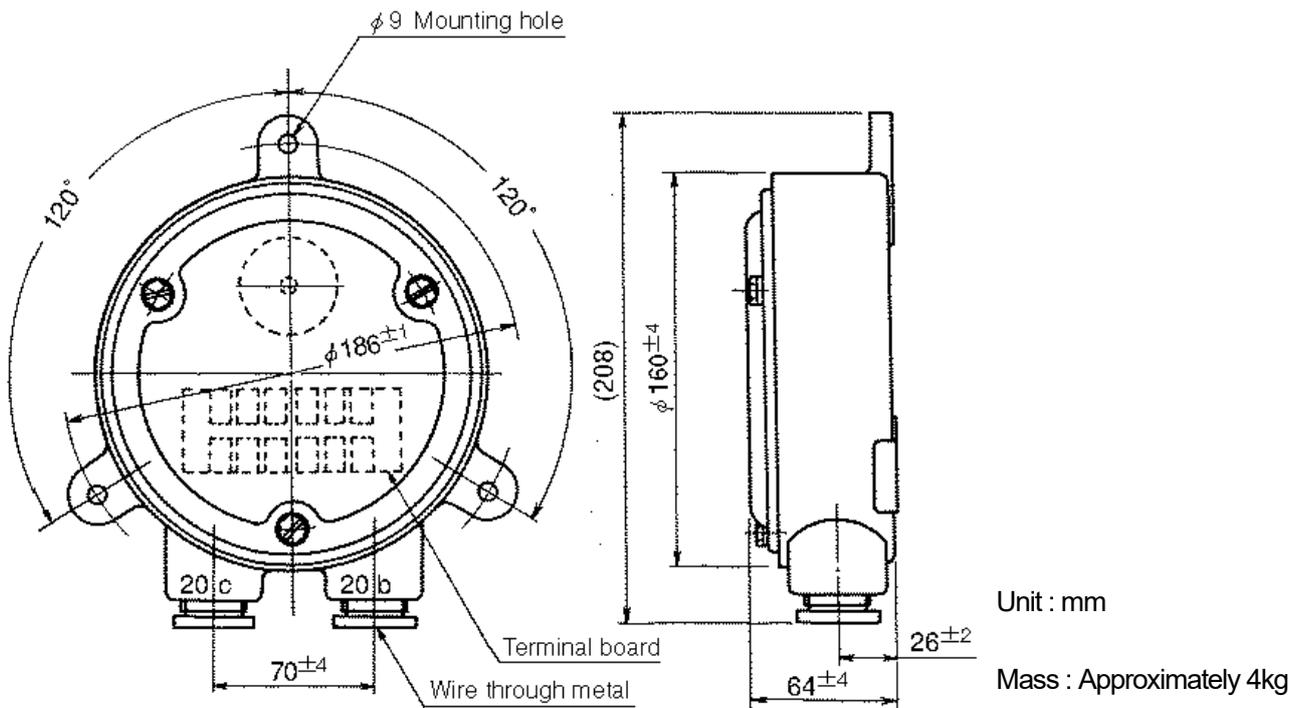
External Dimension of NKF-349 Transducer

NKF-349 is a standard transducer for 200kHz. It is not possible to replace the transducer in the sea.

External Dimension of NKF-350 Transducer

NKF-350 is a standard transducer for 50kHz. It is not possible to replace the transducer in the sea.

External Dimension of NKF-341 Previous Transducer (Previous Model)

NKF-341 is the transducer for 200kHz of the previous model. It is not possible to replace the transducer in the sea.

OUTLINE DIMENSIONS		PERMISSIBLE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6
2000	4000	±8

NOTE
1. BOW DIRECTION OF THE TRANSDUCER IS FREE.
2. WELDING THE TANK ② TO THE BOTTOM PLATE. THE TRANSDUCER ① THE PACKING ⑧ AND THE SPACER ⑦ SHOULD BE REMOVED FROM THE TANK. AFTER WELDING , SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
3. THE MOUNTING PLATE ⑩ SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
4. THE TANK AND THE MOUNTING PLATE ARE FINISHED BY SHOP PRIMER.
5. THE WELDING GROOVE OF THE BOTTOM PLATE AND THE COMPRESSION FLANGE ARE DESIGNED IN THE SHIPYARD ACCORDING TO THE CLASSIFICATION.

MASS. 22kg

PARTS LIST (SUPPLIED BY JRC)

NO	NAME	TYPE	MATERIAL	Q'TY
1	TRANSDUCER	UT-200ND		1
2	TANK with FLANGE		KSTPT42 (C≤0.23%)	1
3	M6X16 BOLT		SUS304B	6
4	M16X70 BOLT		SS400	4
5	M16 NUT		SUS304B	4
6	PACKING	MTT004170A	JOINT SHEET	1
7	SPACER	MTT015293	RUBBER	1
8	PACKING	MPPK00784	RUBBER	1
9	GLAND	MTL024005	SUS304B	1
10	MOUNTING PLATE	MTL024129	SS400	1
11	WASHER	MTD003720	SPCC	1

External Dimension of NKF-345 Transducer (Previous Model)

NKF-345 is the transducer for 50kHz of the previous model. It is not possible to replace the transducer in the sea.

OUTLINE DIMENSIONS		PERMISSIBLE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6
2000	4000	±8

NOTE
1. BOW DIRECTION OF THE TRANSDUCER IS FREE.
2. WELDING THE TANK ② TO THE BOTTOM PLATE. THE TRANSDUCER ① THE PACKING ⑧ AND THE SPACER ⑦ SHOULD BE REMOVED FROM THE TANK. AFTER WELDING , SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
3. THE MOUNTING PLATE ⑩ SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
4. THE TANK AND THE MOUNTING PLATE ARE FINISHED BY SHOP PRIMER.
5. THE WELDING GROOVE OF THE BOTTOM PLATE AND THE COMPRESSION FLANGE ARE DESIGNED IN THE SHIPYARD ACCORDING TO THE CLASSIFICATION.

MASS. 20kg

PARTS LIST (SUPPLIED BY JRC)

NO	NAME	TYPE	MATERIAL	Q'TY
1	TRANSDUCER	UT-50MD		1
2	TANK with FLANGE		KSTPT42 (C≤0.23%)	1
3	M6X16 BOLT		SUS304B	6
4	M16X70 BOLT		SS400	4
5	M16 NUT		SUS304B	4
6	PACKING	MTT004170A	JOINT SHEET	1
7	SPACER	MTT015293	RUBBER	1
8	PACKING	MPPK00784	RUBBER	1
9	GLAND	MTL024005	SUS304B	1
10	MOUNTING PLATE	MTL024128A	SS400	1
11	WASHER	MTD003720	SPCC	1

9

External Dimension of NKF-394 Gate valve Transducer

NKF-394 is a gate valve transducer for 200kHz transducer. It is possible to replace the transducer in the sea.

MASS. 150 kg

RESERVE SPACE FOR MAINTENANCE

OUTLINE DIMENSIONS		PERMISSIBLE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±15
120	400	±2.5
400	1000	±4
1000	2000	±6
2000	4000	±8

FORM NAME	CABLE
NKF-394	40m
NKF-394-01	30m
NKF-394-02	50m

NO PROJECTION IN THIS BOW AREA
MANUFACTURED BY SHIP YARD

TRANSDUCER

A—A

BOW
R2000

INSTALLATION
1. MADE A MOUNTING HOLE(ϕ184) ON THE BOTTOM PLATE.
2. ϕTANK SHOULD BE WELDED TO BOTTOM PLATE SO AS ITS FLANGE BECOME HORIZONTAL.
3. PAINT THE OIL SEAL ON ⑥GASKET. AND ASSEMBLE ④VALVE.
   AT THIS TIME. THE DIRECTION OF ④VALVE CAN BE SELECTED EVERY 45 DEGREES.
4. PAINT THE OIL SEAL ON ⑥GASKET. AND ASSEMBLE ⑥SEA CHEST(INCLUDE③⑤⑥⑦⑧).
   AT THIS TIME. LOOSEN ⑨ AND CHECK RISE-AND-FALL OPERATION OF ①TRANSDUCER AND THE RADIATION SURFACE OF
   ①TRANSDUCER HAS COME OUT OF THE BOTTOM PLATE.

COMPARTMENT
1. EQUIP THE WATERTIGHT COMPARTMENT.
2. ②TANK IS FINISHED BY PRIMER. ('EPIKON ZINCRICH PRIMER' Made in CHUGOKU MARINE PAINTS.LTD.)
   ②TANK SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
3. DO NOT PAINT THE RADIATION SURFACE OF ①TRANSDUCER.
   THE BOTTOM OF ③ FIXED PIECE SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
4. THE WELDING GROOVE OF ②TANK AND THE COMPRESSION FLANGE ARE DESIGNED IN THE SHIPYARD
   ACCORDING TO THE CLASSIFICATION.

PARTS LIST(SUPPLIED BY JRC)

NO	NAME	MATERIAL	ASTM Q'TY	NOTE
1	TRANSDUCER	UT-200ND	1	
2	TANK	SM490A	1	SEPARATE PACK
3	FIXED PIECE	SUS316	1	
4	VALVE(150)	SC480	1	SEPARATE PACK 85 kg
5	GASKET	JOINT SEAT	2	GASKET IN THE POLY BAG HAS BEEN ATTACHED TO THE VALVE.
6	SEA CHEST	SS400	1	SEPARATE PACK
7	CLAMP	SS400	1	
8	PIPE(ϕ50)	SUS316	1	JIS B 2403
9	V PACKING	V99F NBR	1	
10	PACKING	NEOPRENE	1	
11	GLAND	SUS304	1	
12	BOLT M20X80	SUS304	16	BOLTS IN THE POLY BAG HAVE BEEN ATTACHED TO THE VALVE.
13	U-NUT M20	SUS304	16	NUTS IN THE POLY BAG HAVE BEEN ATTACHED TO THE VALVE.
14	BOLT&WASHER M16X70	SUS304	2	
15	NUT&WASHER M20	SUS304	2	
16	BOLT&WASHER M16X60	SUS304	2	
17	WASHER	SPCC	1	

TRANSDUCER INSERTION MARK

FLANGE JIS B 2220
10K-32

ϕ34

EYEBOLT(M10)

SEAWATER AREA

FLANGE

304 (STROKE)

740

290

80

22

UT-200ND

ϕ184 (MOUNTING HOLE)

ϕ100

ϕ140

ϕ180

ϕ280

10K-150

ϕ250

250

560

4-ϕ19

ϕ250

ϕ100

22.5° 22.5°
45°

296

ϕ50

LIFTING HOOK
(SHIP YARD)

CABLE ϕ12.9
KEEP AWAY FROM POWER CABLE

BOTTOM PLATE

(SHIP YARD)

SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
(SHIP YARD)

DO NOT PAINT THE RADIATION SURFACE

SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
(SHIP YARD)

10

External Dimension of NKF-396 Gate valve Transducer

NKF-396 is a gate valve transducer for 50kHz transducer. It is possible to replace the transducer in the sea.

INSTALLATION

1. MADE A MOUNTING HOLE (φ184) ON THE BOTTOM PLATE.
2. ② TANK SHOULD BE WELDED TO BOTTOM PLATE SO AS ITS FLANGE BECOME HORIZONTAL.
3. PAINT THE OIL SEAL ON ⑤ GASKET, AND ASSEMBLE ④ VALVE.
   AT THIS TIME, THE DIRECTION OF ④ VALVE CAN BE SELECTED EVERY 45 DEGREES.
4. PAINT THE OIL SEAL ON ⑤ GASKET, AND ASSEMBLE ⑥ SEA CHEST (INCLUDE ①③⑦⑧⑨⑩⑪).
   AT THIS TIME, LOOSEN ④ ⑮ ⑯ AND CHECK RISE-AND-FALL OPERATION OF TRANSDUCER. AND THE RADIATION SURFACE OF ① TRANSDUCER HAS COME OUT OF THE BOTTOM PLATE.

COMPARTMENT

1. EQUIP THE WATERTIGHT COMPARTMENT.
2. ② TANK IS FINISHED BY PRIMER. ('EPIKON ZINCRICH PRIMER' Made in CHUGOKU MARINE PAINTS.LTD.)
   ② TANK SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
3. DO NOT PAINT THE RADIATION SURFACE OF ① TRANSDUCER.
   THE BOTTOM OF ③ FIXED PIECE SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
4. THE WELDING GROOVE OF ② TANK AND THE COMPRESSION FLANGE ARE DESIGNED IN THE SHIPYARD ACCORDING TO THE CLASSIFICATION.

MASS. 150kg

OUTLINE DIMENSIONS		PERMISSIBLE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6
2000	4000	±8

PARTS LIST (SUPPLIED BY JRC)

NO	NAME	MATERIAL ASTM	Q'TY	NOTE
1	TRANSDUCER	UT-50MD	1	
2	TANK	SM490A	1	SEPARATE PACK
3	FIXED PIECE	STKM13A	1	
4	VALVE (150)	SC4B0	1	SEPARATE PACK 85kg
5	GASKET	JOINT SEAT	2	GASKET IN THE POLY BAG HAS BEEN ATTACHED TO THE VALVE.
6	SEA CHEST	SS400	1	SEPARATE PACK
7	CLAMP	SS400	1	
8	PIPE (φ50)	SUS304	1	
9	V PACKING	V99F NBR	1	JIS B 2403
10	PACKING	NEOPRENE	1	
11	GLAND	SUS304	1	
12	BOLT M20X80	SUS304	16	BOLTS IN THE POLY BAG HAVE BEEN ATTACHED TO THE VALVE.
13	U-NUT M20	SUS304	16	NUTS IN THE POLY BAG HAVE BEEN ATTACHED TO THE VALVE.
14	BOLT&WASHER M16X70	SUS304	2	
15	NUT&WASHER M20	SUS304	2	
16	BOLT&WASHER M16X60	SUS304	2	
17	WASHER	SPCC	1	

TRANSDUCER INSERTION MARK

FLANGE JIS B 2220 10K-32

NO PROJECTION IN THIS BOW AREA MANUFACTURED BY SHIP YARD

A–A

TRANSDUCER

BOW

R-2000

CABLE φ12.9 20m
KEEP AWAY FROM POWER CABLE

LIFTING HOOK (SHIP YARD)

EYEBOLT (M10)

SEAWATER AREA

FLANGE

SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
(SHIPYARD)

DO NOT PAINT THE RADIATION SURFACE

SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
(SHIPYARD)

BOTTOM PLATE

External Dimension of G-002758/G-002761/G-002763/G-008791 Gate valve transducer

The gate valve transducer for 50kHz transducer is made by Alphatron. It is possible to replace the transducer in the sea.

Gate valve assembly for UT50MD
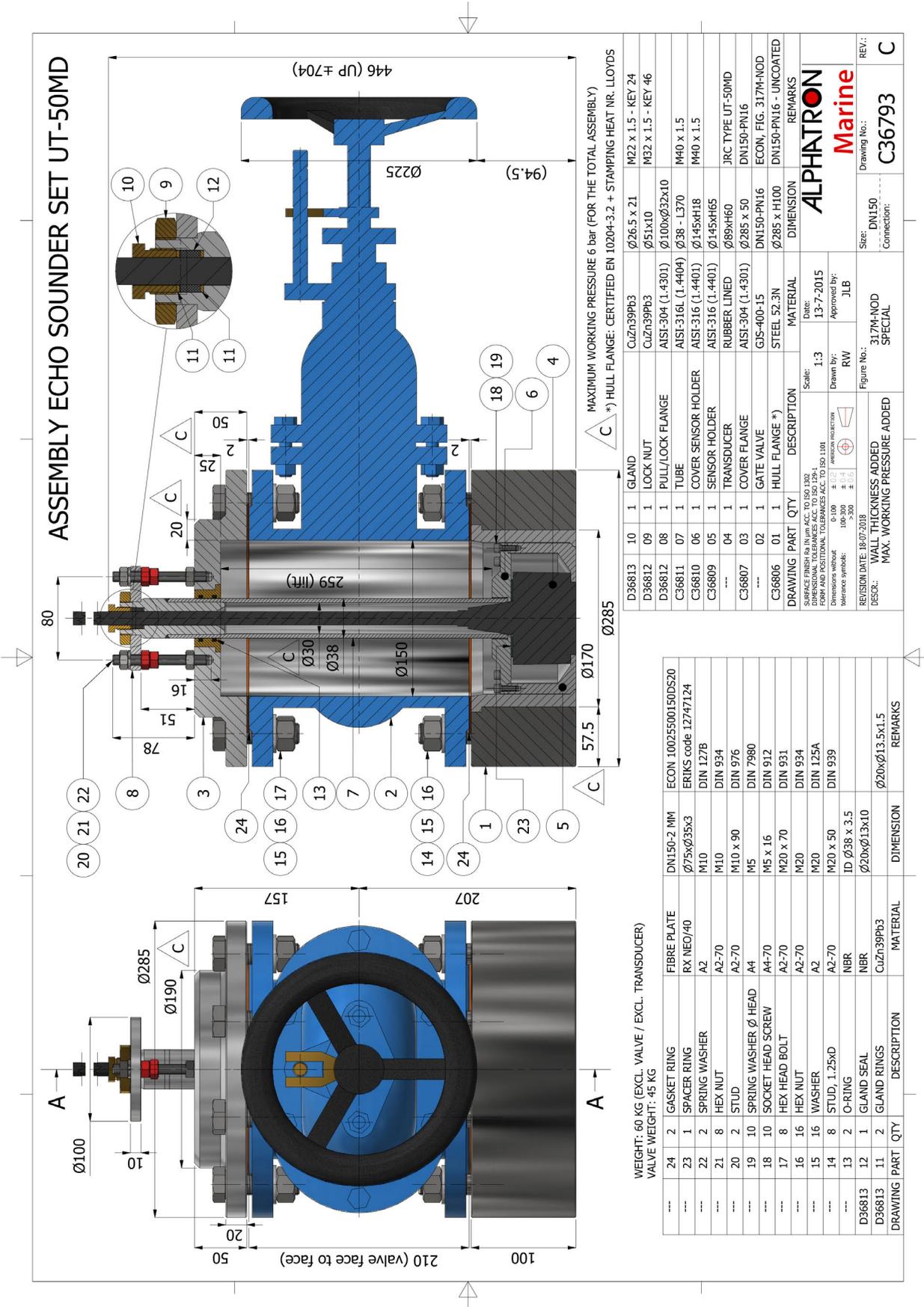
ASSEMBLY ECHO SOUNDER SET UT-50MD

WEIGHT: 60 KG (EXCL. VALVE / EXCL. TRANSDUCER)
VALVE WEIGHT: 45 KG

MAXIMUM WORKING PRESSURE 6 bar (FOR THE TOTAL ASSEMBLY)
*) HULL FLANGE: CERTIFIED EN 10204-3.2 + STAMPING HEAT NR. LLOYDS

DRAWING	PART	QTY	DESCRIPTION	MATERIAL	DIMENSION	REMARKS
D36813	10	1	GLAND	CuZn39Pb3	Ø26.5 x 21	M22 x 1.5 - KEY 24
D36812	09	1	LOCK NUT	CuZn39Pb3	Ø51x10	M32 x 1.5 - KEY 46
D36812	08	1	PULL/LOCK FLANGE	AISI-304 (1.4301)	Ø100xØ32x10	M40 x 1.5
C36811	07	1	TUBE	AISI-316L (1.4404)	Ø38 - L370	M40 x 1.5
C36810	06	1	COVER SENSOR HOLDER	AISI-316 (1.4401)	Ø145xH18	
C36809	05	1	SENSOR HOLDER	AISI-316 (1.4401)	Ø145xH65	
----	04	1	TRANSDUCER	RUBBER LINED	Ø89xH60	JRC TYPE UT-50MD
C36807	03	1	COVER FLANGE	AISI-304 (1.4301)	Ø285 x 50	DN150-PN16
----	02	1	GATE VALVE	GJS-400-15	DN150-PN16	ECON, FIG. 317M-NOD
C36806	01	1	HULL FLANGE *)	STEEL 52.3N	Ø285 x H100	DN150-PN16 - UNCOATED

DRAWING	PART	QTY	DESCRIPTION	MATERIAL	DIMENSION	REMARKS
----	24	2	GASKET RING	FIBRE PLATE	DN150-2 MM	ECON 10025500150DS20
----	23	1	SPACER RING	RX NEO/40	Ø75xØ35x3	ERIKS code 12747124
----	22	2	SPRING WASHER	A2	M10	DIN 127B
----	21	8	HEX NUT	A2-70	M10	DIN 934
----	20	2	STUD	A2-70	M10 x 90	DIN 976
----	19	10	SPRING WASHER Ø HEAD	A4	M5	DIN 7980
----	18	10	SOCKET HEAD SCREW	A4-70	M5 x 16	DIN 912
----	17	8	HEX HEAD BOLT	A2-70	M20 x 70	DIN 931
----	16	16	HEX NUT	A2-70	M20	DIN 934
----	15	16	WASHER	A2	M20	DIN 125A
----	14	8	STUD, 1.25xD	A2-70	M20 x 50	DIN 939
----	13	2	O-RING	NBR	ID Ø38 x 3.5	
D36813	12	1	GLAND SEAL	NBR	Ø20xØ13x10	
D36813	11	2	GLAND RINGS	CuZn39Pb3	Ø20xØ13.5x1.5	

SURFACE FINISH Ra IN µm ACC. TO ISO 1302
DIMENSIONAL TOLERANCES ACC. TO ISO 1291-1
FORM AND POSITIONAL TOLERANCES ACC. TO ISO 1101

Dimensions without tolerance symbols:
0-100 ±0.2
100-300 ±0.4
>300 ±0.6

Scale: 1:3   Drawn by: RW   Date: 13-7-2015   Approved by: JLB
Figure No.: ----

317M-NOD SPECIAL

REVISION DATE: 18-07-2018
DESCR.: WALL THICKNESS ADDED
MAX. WORKING PRESSURE ADDED

ALPHATRON Marine
Drawing No.: C36793
REV.: C
Size: DN150
Connection: ----

Dimensions on drawing:
446 (UP ±704), Ø225, (94.5), Ø285, Ø170, Ø150, Ø38, Ø30, 259 (lift), 80, 51, 16, 78, 50, 25, 20, 2, 57.5
210 (valve face to face), 207, 157, 100, 50, 20, 10, Ø285, Ø190, Ø100

The gate valve transducer for 200kHz transducer is made by Alphatron. It is possible to replace the transducer in the sea.

ASSEMBLY ECHO SOUNDER SET UT-200ND

MAXIMUM WORKING PRESSURE 6 bar (FOR THE TOTAL ASSEMBLY)
*) HULL FLANGE: CERTIFIED EN 10204-3.2 + STAMPING HEAT NR. LLOYDS

DRAWING	PART	QTY	DESCRIPTION	MATERIAL	DIMENSION	REMARKS
D36813	10	1	GLAND	CuZn39Pb3	Ø26.5 x 21	M22 x 1.5 - KEY 24
D36812	09	1	LOCK NUT	CuZn39Pb3	Ø51x10	M32 x 1.5 - KEY 46
D36812	08	1	PULL/LOCK FLANGE	AISI-304 (1.4301)	Ø100xØ32x10	
C36811	07	1	TUBE	AISI-316L (1.4404)	Ø38 - L370	M40 x 1.5
C36810	06	1	COVER SENSOR HOLDER	AISI-316 (1.4401)	Ø145xH18	M40 x 1.5
C36808	05	1	SENSOR HOLDER	AISI-316 (1.4401)	Ø145xH65	
---	04	1	TRANSDUCER	RUBBER LINED	Ø125xH60	JRC TYPE UT-200ND
C36807	03	1	COVER FLANGE	AISI-304 (1.4301)	Ø285 x 50	DN150-PN16
---	02	1	GATE VALVE	GJS-400-15	DN150-PN16	ECON, FIG. 317M-NOD
C36806	01	1	HULL FLANGE *)	STEEL 52.3N	Ø285 x H100	DN150-PN16 - UNCOATED

DRAWING	PART	QTY	DESCRIPTION	MATERIAL	DIMENSION	REMARKS
---	24	2	GASKET RING	FIBRE PLATE	DN150-2 MM	ECON 1002550150DS20
---	23	1	SPACER RING	RX NEO/40	Ø75xØ35x3	ERIKS code 12747124
---	22	2	SPRING WASHER	A2	M10	DIN 127B
---	21	8	HEX NUT	A2-70	M10	DIN 934
---	20	2	STUD	A2-70	M10 x 90	DIN 976
---	19	10	SPRING WASHER Ø HEAD	A4	M5	DIN 7980
---	18	10	SOCKET HEAD SCREW	A4-70	M5 x 16	DIN 912
---	17	8	HEX HEAD BOLT	A2-70	M20 x 70	DIN 931
---	16	16	HEX NUT	A2-70	M20	DIN 934
---	15	16	WASHER	A2	M20	DIN 125A
---	14	8	STUD, 1.25xD	A2-70	M20 x 50	DIN 939
D36813	13	2	O-RING	NBR	ID Ø38 x 3.5	
D36813	12	1	GLAND SEAL	NBR	Ø20xØ13x10	
D36813	11	2	GLAND RINGS	CuZn39Pb3	Ø20xØ13.5x1.5	

WEIGHT: 60 KG (EXCL. VALVE / EXCL. TRANSDUCER)
VALVE WEIGHT: 45 KG

SURFACE FINISH Ra 3N μm ACC. TO ISO 1302
DIMENSIONAL TOLERANCES ACC. TO ISO 129-1.
FORM AND POSITIONAL TOLERANCES ACC. TO ISO 1101

Dimensions without tolerance symbols:
0-100 ± 0.2
100-300 ± 0.4
>300 ± 0.6

Scale: 1:3	Date: 10-7-2015
Drawn by: RW	Approved by: JLB
Figure No.:	317M-NOD SPECIAL

REVISION DATE: 18-07-2018
DESCR.: WALL THICKNESS ADDED
MAX. WORKING PRESSURE ADDED

ALPHATRON Marine

Drawing No.: **C36792**

Size: DN150
Connection:

REV.: C

DIMENSION

446 (UP ±704)
Ø225
(94.5)
Ø285
Ø170
57.5
259 (lift)
Ø30
Ø38
Ø150
80
20
25
50
16
51
78
Ø285
Ø190
Ø100
cable Ø13
10
20
50
100
157
207
210 (valve face to face)

External Dimension of JB-340 Junction box

Unit : mm
Mass : Approximately 2kg

External Dimension of NQA-4351 Output buffer

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	±0.5
30	120	±1.5	±0.5
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	±3
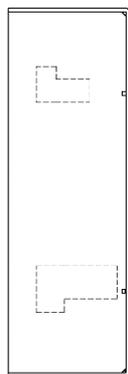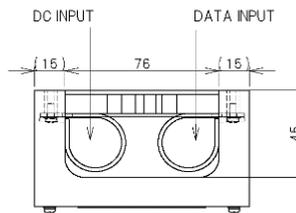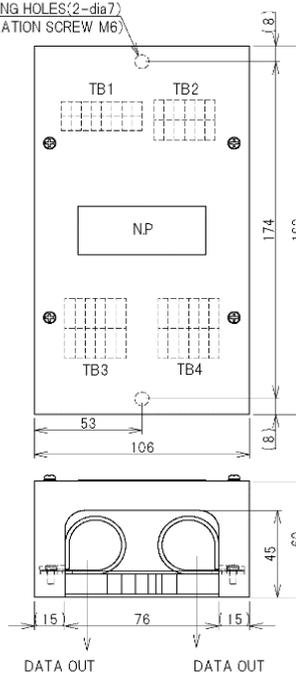
Note:

JUMPER OF DC INPUT VOLTAGE

DC input voltage	Jumper of Terminal
DC 12V input	TB1-IN 1 2 JUMPER ON 9-16V Jumper cable (Cabe of 0.25 - 2.5 sqr)
DC 24V input	TB1-IN 1 2 JUMPER ON 9-16V Not connect

Unit : mm
Mass : Approximately 0.8kg

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External Dimension of NWZ-4610 Remote display

取付穴寸法図
SETTING HOLES DRAWING

| UNIT : mm |
| MASS : APPROX. 600 g |
| BODY COLOR |
| : MUNSELL N4 Semi-gloss Texture |

UNLESS OTHERWISE SPECIFIED

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2

Unit : mm
Mass : Approximately 0.6kg
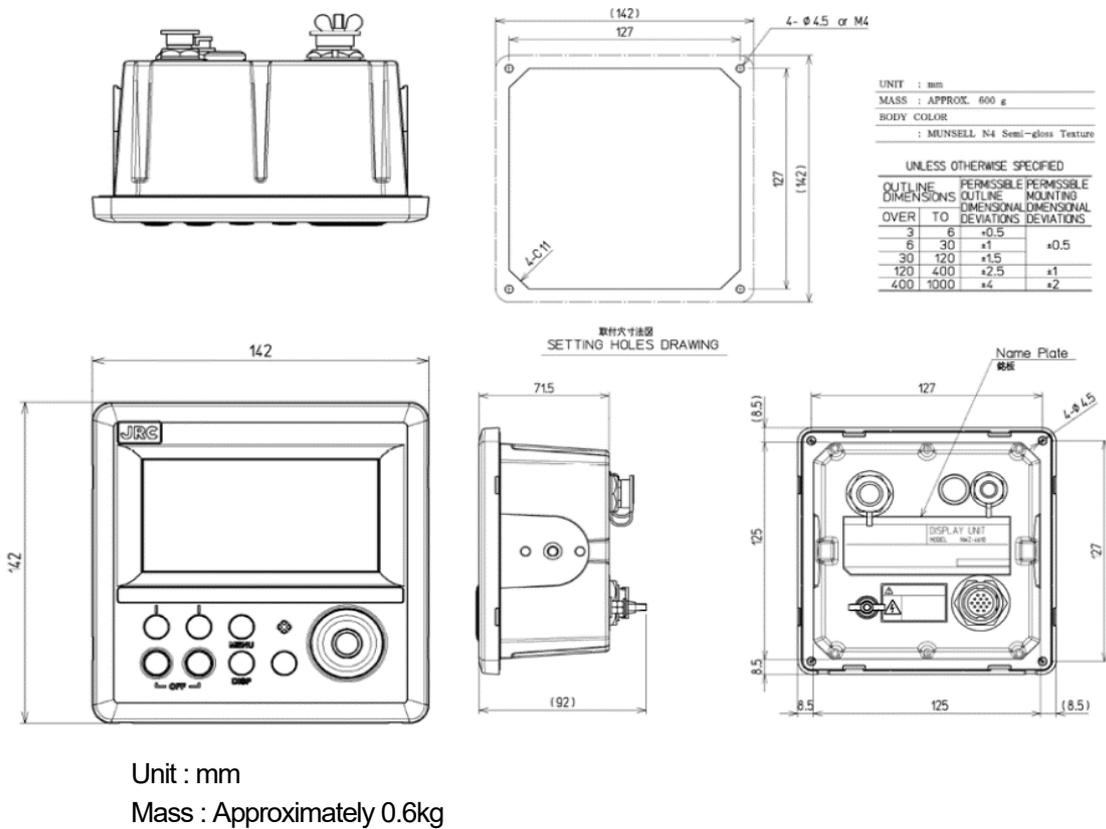
External Dimension of NCM-227 Dimmer unit

SETTING DRAWING

Unit : mm
Mass : Approximately 0.5kg
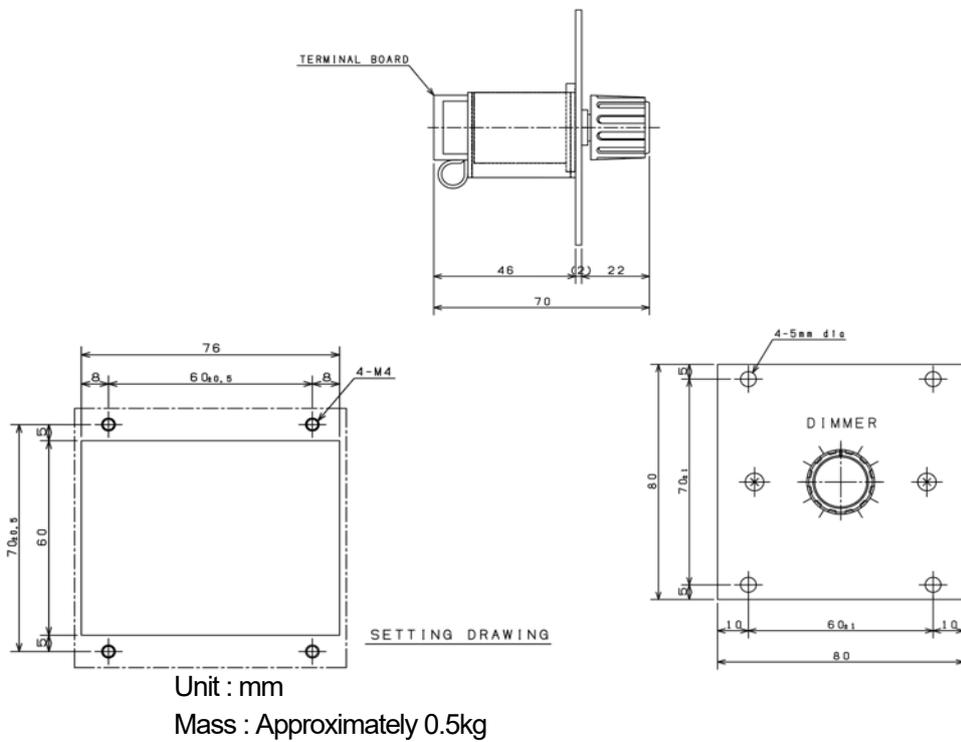
External Dimension of NBA-5143 AC power rectifier
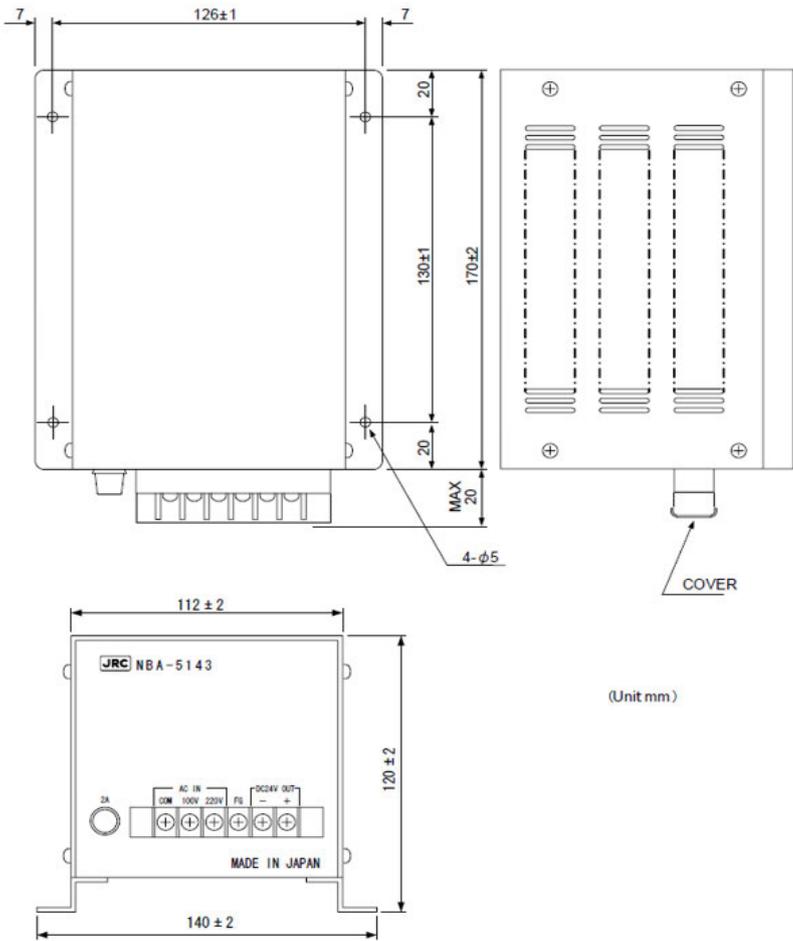
(Unit mm)

Unit : mm
Mass : Approximately 3.5kg

17
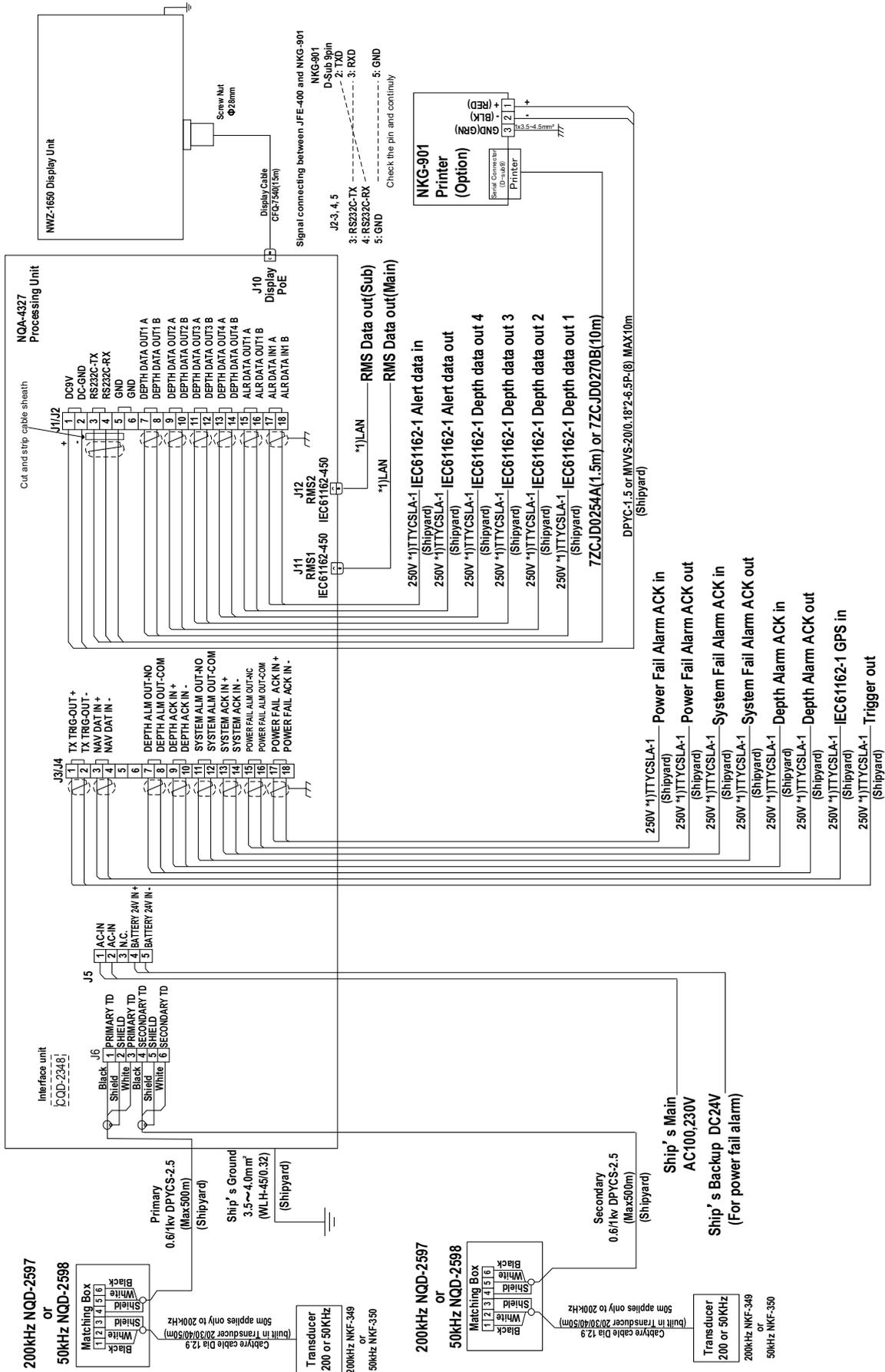
1.6   Interconnection Diagram
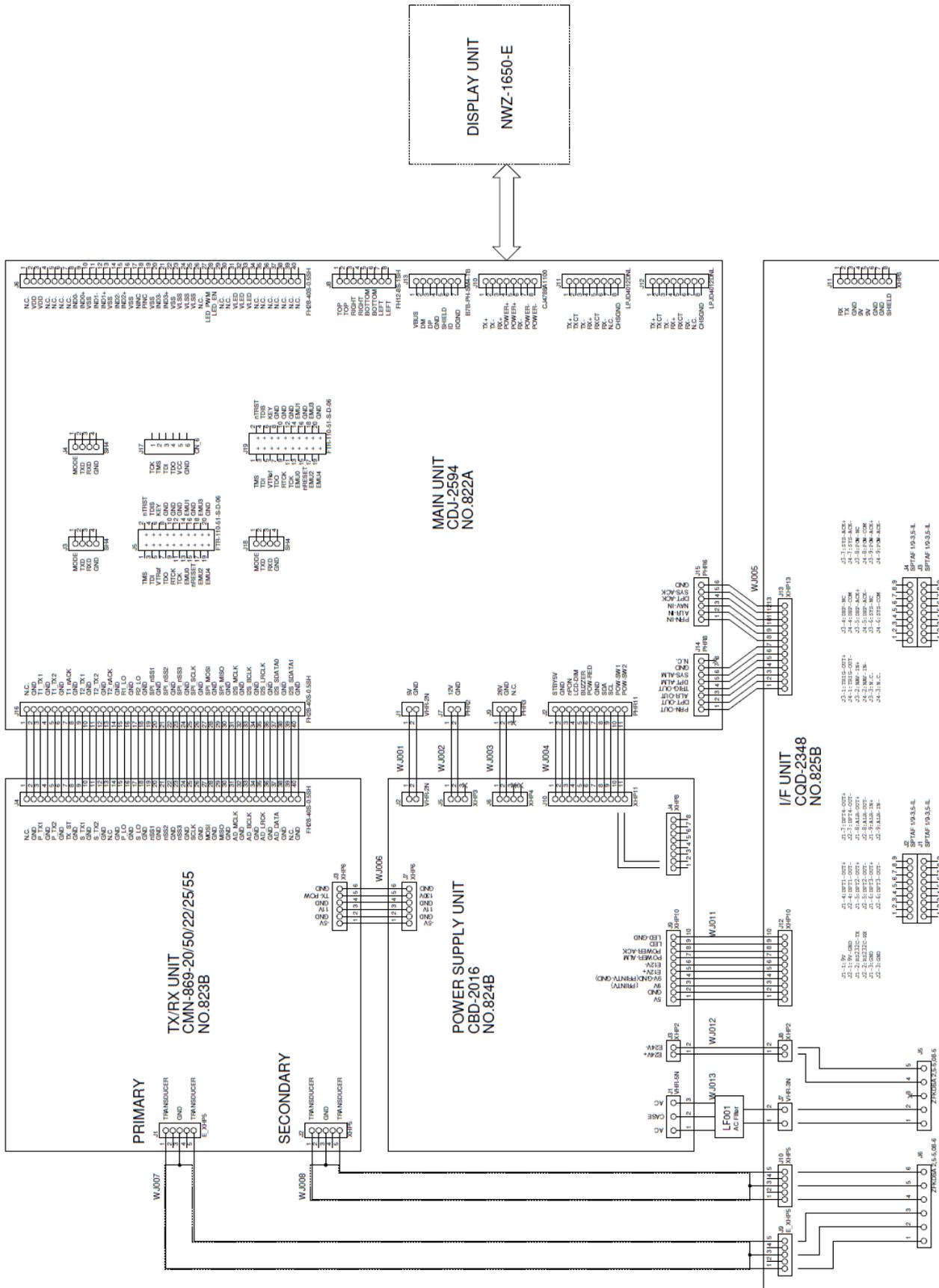
JFE-400(NQA-4327) inter connection

1.7　Interfaces

Power line of JFE-400 is as shown the table below.

Power type	Range	Mounted Circuit	Location	Remark
AC for main power	AC85-AC264V	CQD-2348	J5-1/2	Connect to ship's main
DC for power fail	DC21.6-DC31.2V	CQD-2348	J5-4/5	Connect to ship's backup
DC for external printer	DC9V	CQD-2348	J2-1/2	Output

The JFE-400 has an interface for connecting to external devices.　The types and uses are as shown in the table below.

Interface	Direction	Mounted Circuit	Location	Default Use	Remark
IEC61162-1	TX	CQD-2348	J2-7/8	Output depth data	
	TX		J2-9/10	Output depth data	
	TX		J2-11/12	Output depth data	
	TX		J2-13/14	Output depth data	
	TX		J2-15/16	Output alert data	
	RX		J2-17/18	Input alert data	
	RX		J4-3/4	Input navigational data	
IEC61162-450	TX/RX	CDJ-2594	J11	Output depth data Output maintenance data Output alert data Input alert data Input navigational data	Main network
	TX/RX		J12	Output depth data Output maintenance data Output alert data Input alert data Input navigational data	Sub network
Non-voltage contact	Out	CQD-2348	J4-7/8	Depth alert	
	Out		J4-11/12	System alert	
	Out		J4-15/16	Power fail alert	Need to connect DC24V
	In		J4-9/10	Depth alert ACK	
	In		J4-13/14	System alert ACK	
	In		J4-17/18	Power fail alert ACK	
Other	+/-		J4-1/2	Output Trigger	
	TX/RX		J2-3/4	Printer connection	For external printer

1.8 Installation Workflow

```
                    ┌─────────────┐
                    │    start    │
                    └──────┬──────┘
                           │
┌──────────────────────────────────────────────────┐
│              Installing of Transducer              │
│  ・Installing                                       │
│    NKF-349/350 ・・・Chapter 2                        │
│    NKF-341/345 ・・・Chapter 3                        │
│    Gate Valve Transducer ・・・Chapter 4             │
└──────────────────────────────────────────────────┘
┌──────────────────────────────────────────────────┐
│             Installing of Matching Box             │
│  ・Installing                                       │
│    NQD-2598/2597 ・・・Chapter 5                      │
│    AW-154F/154F-50 ・・・Chapter 5                    │
└──────────────────────────────────────────────────┘
                           │
┌──────────────────────────────────────────────────┐
│  Installing of Display Unit NWZ-1650 ・・・Chapter 6 │
└──────────────────────────────────────────────────┘
                           │
┌──────────────────────────────────────────────────┐
│  Installing of processing Unit NQA-4327・・・Chapter 7│
└──────────────────────────────────────────────────┘
                           │
┌──────────────────────────────────────────────────┐
│ Installing of Printer NKG-901 (Optional)・・・Chapter 8│
└──────────────────────────────────────────────────┘
                           │
┌──────────────────────────────────────────────────┐
│      Connecting the equipment・・・Chapter 9         │
└──────────────────────────────────────────────────┘
                           │
┌──────────────────────────────────────────────────┐
│   Setting of Echo Sunder JFE-400・・・Chapter 10     │
└──────────────────────────────────────────────────┘
                           │
┌──────────────────────────────────────────────────┐
│          Final check・・・Chapter 11                 │
└──────────────────────────────────────────────────┘
                           │
                    ┌─────────────┐
                    │     END     │
                    └─────────────┘
```

Chapter 2 Transducer Installing of NKF-349/350

<div style="border:2px solid black; padding:10px;">

⚠ CAUTION

This equipment measures water depth by using the ultrasonic wave.

The ultrasonic wave causes attenuation and diffusion when the influence of the bubble is received, and cannot measure an accurate water depth. Install the transducer in the place where the bubble is not generated when sailing.

</div>

2.1 Preparation Tool

Preparation tool	Qty.	Purpose
Grinder	1	Repairing the welding bead with the grinder processing
polyester putty / Silicone Bond / asphalt	-	Filling for bolt holes
Masking tape	-	Painting
Box wrench (for M6)	1	Bolt tightening
Wrench (for M16)	1	Bolt tightening
Hook spanner	1	Gland tightening

(1) NKF-349

Standard equipment drawing
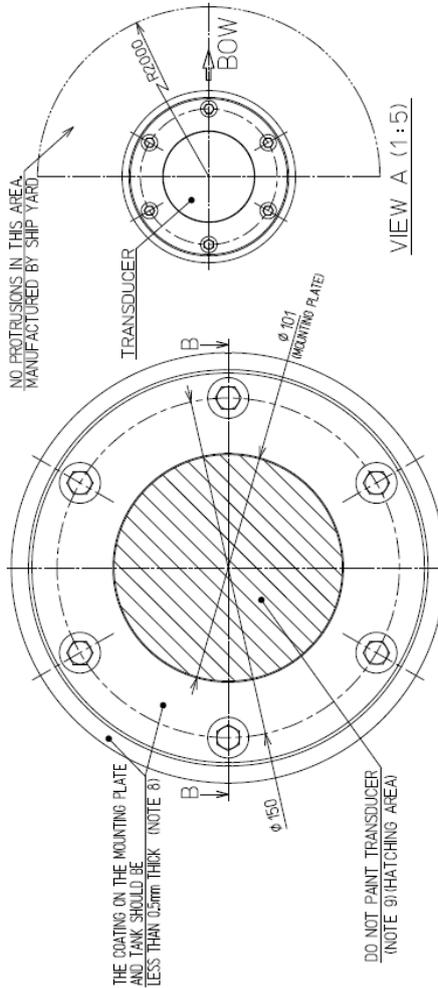

NOTE:
1) THIS SHEET IS FOR STANDARD EQUIPMENT.
2) CABLE END AT TRANSDUCER SIDE SHOULD NOT BE BENT SEVERELY WHEN MAKING INSTALLATION.
3) CABLE END AT TRANSDUCER SIDE SHOULD BE SECURELY FASTENED TO AVOID VIBRATION.
4) DO NOT PULL THE TWISTED CABLE.
5) BOW DIRECTION OF THE TRANSDUCER IS FREE.
6) WHEN WELDING THE TANK ② TO THE BOTTOM PLATE, THE TRANSDUCER ① AND PACKING ⑤ SHOULD BE REMOVED FROM THE TANK. WELD TANK ② SO THAT IT IS FLUSH WITH THE BOTTOM PLATE.
7) PAINTING SHOULD BE DONE AFTER WELDING.
8) ALSO, USE THE SAME PAINT AS USED FOR THE BOTTOM PLATE. THE COATING ON THE TANK ② AND MOUNTING PLATE ③ SHOULD BE LESS THAN 0.5mm THICK.
9) TRANSDUCER ① SHOULD NOT BE PAINTED.
10) DESIGN THE BOTTOM PLATE AT GROOVE AND FILLET WELDS IN THE SHIPYARD.

TYPE NAME LIST

TYPE NAME	TRANSDUCER TYPE (CABLE LENGTH)	MASS OF NKF-349-** (TRANSDUCER+TANK ASSY)
NKF-349-20	UT200ND20D (20m)	30±3.0 kg
NKF-349-30	UT200ND30D (30m)	32±3.2 kg
NKF-349-40	UT200ND40D (40m)	34±3.4 kg
NKF-349-50	UT200ND50D (50m)	36±3.6 kg

OUTLINE DIMENSIONS		PERMISSIBLE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6

MASS	
DEPENDENT ON CABLE LENGTH	
MASS OF TANK ASSY (TOTAL OF ② TO ⑧)	25±2.5 kg

PARTS LIST (SUPPLIED BY JRC)

No.	NAME	TYPE	MATERIAL	Q'TY
1	TRANSDUCER	UT200ND***	-	1
2	TANK	MTL325983C	SM490A	1
3	MOUNTING PLATE	MTL335634	SUS316L	1
4	GLAND	MTL338564	SUS316L	1
5	PACKING	MPPK32277	NBR	1
6	WASHER	MTB423069	SUS316L	1
7	M6X16BOLT	BRT002547	SUS316	6
8	SPRING WASHER (M6)	BRT002682	SUS316	6

NKF-349   STANDARD EQUIPMENT

SECTION VIEW B-B
VIEW A (1:5)

Piping connection equipment drawing

NKF-349 PIPING CONNECTION EQUIPMENT
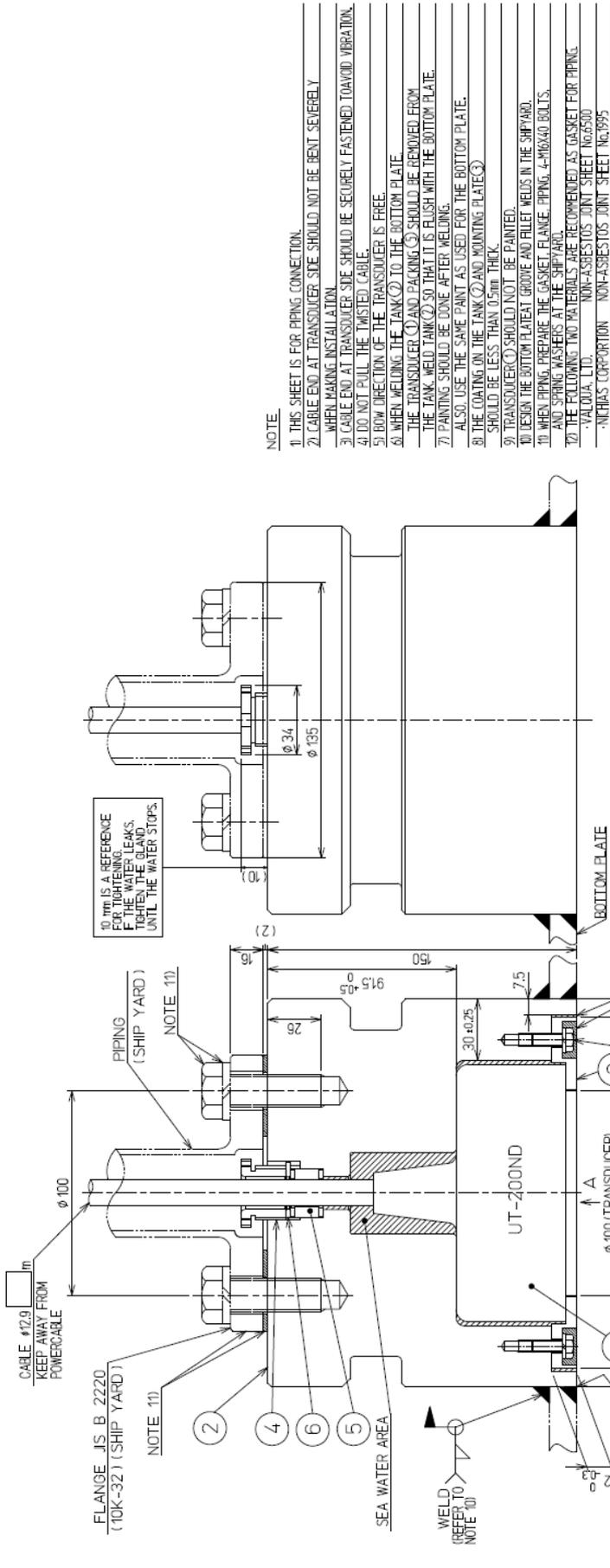
NOTE

1) THIS SHEET IS FOR PIPING CONNECTION.
2) CABLE END AT TRANSDUCER SIDE SHOULD NOT BE BENT SEVERELY WHEN MAKING INSTALLATION.
3) CABLE END AT TRANSDUCER SIDE SHOULD BE SECURELY FASTENED TO AVOID VIBRATION.
4) DO NOT PULL THE TWISTED CABLE.
5) BOW DIRECTION OF THE TRANSDUCER IS FREE.
6) WHEN WELDING THE TANK② TO THE BOTTOM PLATE. THE TRANSDUCER① AND PACKING⑤ SHOULD BE REMOVED FROM THE TANK. WELD TANK② SO THAT IT IS FLUSH WITH THE BOTTOM PLATE.
7) PAINTING SHOULD BE DONE AFTER WELDING. ALSO, USE THE SAME PAINT AS USED FOR THE BOTTOM PLATE.
8) THE COATING ON THE TANK② AND MOUNTING PLATE③ SHOULD BE LESS THAN 0.5mm THICK.
9) TRANSDUCER① SHOULD NOT BE PAINTED.
10) DESIGN THE BOTTOM PLATE AT GROOVE AND FILLET WELDS IN THE SHIPYARD.
11) WHEN PIPING, PREPARE THE GASKET, FLANGE PIPING, 4-M16X40 BOLTS, AND SPRING WASHERS AT THE SHIPYARD.
12) THE FOLLOWING TWO MATERIALS ARE RECOMMENDED AS GASKET FOR PIPING. ·VALQUA, LTD.   NON-ASBESTOS JOINT SHEET No.6500 ·NICHIAS CORPORATION   NON-ASBESTOS JOINT SHEET No.1995

TYPE NAME LIST

TYPE NAME	TRANSDUCER TYPE (CABLE LENGTH)	MASS OF NKF-349-** (TRANSDUCER+TANK ASSY)
NKF-349-20	UT200ND20D (20m)	30±3.0 kg
NKF-349-30	UT200ND30D (30m)	32±3.2 kg
NKF-349-40	UT200ND40D (40m)	34±3.4 kg
NKF-349-50	UT200ND50D (50m)	36±3.6 kg

PARTS LIST (SUPPLIED BY JRC)

No.	NAME	TYPE	MATERIAL	Q'TY	MASS
1	TRANSDUCER	UT200ND-***	-	1	DEPENDENT ON CABLE LENGTH
2	TANK	MTL325983C	SM490A	1	MASS OF TANK ASSY (TOTAL OF ② TO ⑧) 25±2.5 kg
3	MOUNTING PLATE	MTL335634	SUS316L	1	
4	GLAND	MTL338564	SUS316L	1	
5	PACKING	MPPK32277	NBR	1	
6	WASHER	MTB423069	SUS316L	1	
7	M6×16BOLT	BRTG02547	SUS316	6	
8	SPRING WASHER (M6)	BRTG02682	SUS316	6	

PERMISSIBLE DIMENSIONAL DEVIATIONS

OUTLINE DIMENSIONS OVER	TO	PERMISSIBLE DIMENSIONAL DEVIATIONS
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6

GASKET (1:5)
φ100 ±0.8
φ56
φ135
4X φ18 ±0.5

VIEW A (1:5)
BOW
R2000
TRANSDUCER
φ101 (MOUNTING PLATE)
φ150
NO PROTRUSIONS IN THIS AREA MANUFACTURED BY SHIP YARD
THE COATING ON THE MOUNTING PLATE AND TANK SHOULD BE LESS THAN 0.5mm THICK. (NOTE 8)
DO NOT PAINT TRANSDUCER (NOTE 9)(HATCHING AREA)

SECTION VIEW B-B
UT-200ND
φ172
φ190
φ100 (TRANSDUCER)
(MOUNTING HOLE φ194)
150
91.5 0 -0.5
26
16
30 ±0.25
7.5

BOTTOM PLATE
AFTER TIGHTENING BOLTS, FILL WITH PUTTY.(SHIP YARD) SELECT A MATERIAL THAT CAN BE REMOVED WHEN THE TRANSDUCER IS REPLACED. EXAMPLE: SILICON SEALANT

10 mm IS A REFERENCE FOR TIGHTENING. IF THE WATER LEAKS, TIGHTEN THE GLAND UNTIL THE WATER STOPS.

CABLE φ12.9
KEEP AWAY FROM POWER CABLE

FLANGE JIS B 2220 (10K-32) (SHIP YARD)
PIPING (SHIP YARD)
NOTE 11)
φ100
φ34
φ135

SEA WATER AREA
WELD (REFER TO NOTE 10)
12 +3 -3
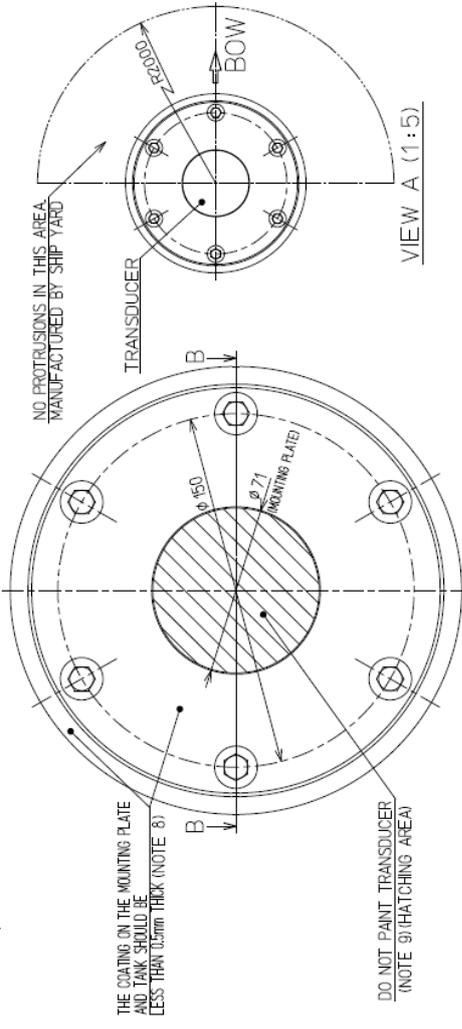NOTE 11)

Standard equipment drwaing

NOTE
1) THIS SHEET IS FOR STANDARD EQUIPMENT.
2) CABLE END AT TRANSDUCER SIDE SHOULD NOT BE BENT SEVERELY WHEN MAKING INSTALLATION.
3) CABLE END AT TRANSDUCER SIDE SHOULD BE SECURELY FASTENED TO AVOID VIBRATION.
4) DO NOT PULL THE TWISTED CABLE.
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8) THE COATING ON THE TANK②AND MOUNTING PLATE③ SHOULD BE LESS THAN 0.5mm THICK.
9) TRANSDUCER①SHOULD NOT BE PAINTED.
10) DESIGN THE BOTTOM PLATE AT GROOVE AND FILLET WELDS IN THE SHIPYARD.

TYPE NAME LIST

TYPE NAME	TRANSDUCER TYPE (CABLE LENGTH)	MASS OF NKF-350-** (TRANSDUCER+TANK ASSY)
NKF-350-20	UT50MD020B (20m)	304.0 kg
NKF-350-30	UT50MD030B (30m)	323.2 kg
NKF-350-40	UT50MD040B (40m)	343.4 kg

OUTLINE DIMENSIONS / PERMISSIBLE DIMENSIONAL DEVIATIONS

OVER	TO	PERMISSIBLE DIMENSIONAL DEVIATIONS
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6

PARTS LIST (SUPPLIED BY JRC)

No.	NAME	TYPE	MATERIAL	Q'TY	MASS
1	TRANSDUCER	UT50MD***	-	1	DEPENDENT ON CABLE LENGTH
2	TANK	MTL325983C	SM490A	1	
3	MOUNTING PLATE	MTL335635	SUS316L	1	MASS OF TANK ASSY (TOTAL OF ② TO ⑧)
4	GLAND	MTL338564	SUS316L	1	
5	PACKING	MPPK32277	NBR	1	25±2.5 kg
6	WASHER	MT8423069	SUS316L	1	
7	M6×16BOLT	BRTG02547	SUS316	6	
8	SPRING WASHER (M6)	BRTG02682	SUS316	6	

NKF-350 STANDARD EQUIPMENT

NKF-350-**

φ34
(10)

10 mm IS A REFERENCE FOR TIGHTENING. IF THE WATER LEAKS, TIGHTEN THE GLAND UNTIL THE WATER STOPS.

NOT USE IN STANDARD EQUIPMENT. (NOTE 1)

BOTTOM PLATE

CABLE φ12.9
KEEP AWAY FROM POWER CABLE

SEA WATER AREA

AFTER TIGHTENING BOLTS,FILL WITH PUTTY.(SHIP YARD) SELECT A MATERIAL THAT CAN BE REMOVED WHEN THE TRANSDUCER IS REPLACED. EXAMPLE SILICON SEALANT

150
φ15.0−0.5
26
30 ±0.25
7.5
φ100
UT-50MD
φ70 (TRANSDUCER)
φ172
φ190
(MOUNTING HOLE φ194)
SECTION VIEW B-B

WELD (REFER TO NOTE 10)
12 0−0.3

THE COATING ON THE MOUNTING PLATE AND TANK SHOULD BE LESS THAN 0.5mm THICK (NOTE 8)

NO PROTRUSIONS IN THIS AREA MANUFACTURED BY SHIP YARD

TRANSDUCER

BOW
R2000

VIEW A (1:5)

φ150
φ71 (MOUNTING PLATE)

DO NOT PAINT TRANSDUCER (NOTE 9)(HATCHING AREA)

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Piping connection equipment drawing

2.3　Installation Procedure

```
                    ╭─────────────╮
                    │    start     │
                    ╰─────────────╯
                            │
            ┌───────────────────────────────┐
            │  Welding the tank to ship's bottom plate │
            │      (Refer to 2.4 Welding Guide)        │
            └───────────────────────────────┘
                            │
            ┌───────────────────────────────┐
            │        Painting inside of tank          │
            │     (Refer to 2.5 Painting Guide-1)     │
            └───────────────────────────────┘
                            │
            ┌───────────────────────────────┐
            │        Preparing transducer             │
            │  (Refer to 2.6 Handling of the Transducer) │
            └───────────────────────────────┘
                            │
            ┌───────────────────────────────┐
            │          Install transducer             │
            │  (Refer to 2.7 Mounting of the Transducer) │
            └───────────────────────────────┘
                            │
            ┌───────────────────────────────┐
            │        Painting mounting plate          │
            │     (Refer to 2.8 Painting Guide-2)     │
            └───────────────────────────────┘
                            │
            ┌───────────────────────────────┐
            │        Cable Laying and piping          │
            │  (Refer to 2.9 Cable Laying and Piping) │
            └───────────────────────────────┘
                            │
            ┌───────────────────────────────┐
            │          Operation check                │
            │      (Refer to 2.10 Check Items)        │
            └───────────────────────────────┘
                            │
                    ╭─────────────╮
                    │     END      │
                    ╰─────────────╯
```

・Weld the bottom of tank and the ship's bottom plate to a flat surface.

1.

Tank

⬇ Insert

Ship's Bottom plate

Mounting hole
φ194

2.

Ship's Bottom plate　　Good install　Flat

Defective install　protrude

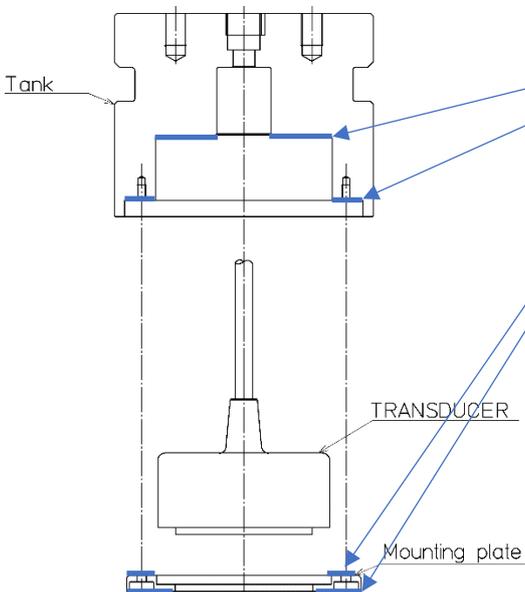Defective install　Dent

3.

Ship's Bottom plate

Weld

Flat

●Reinforcement by doubling

handle doubling at the shipyard according to the hull design.

Weld

Weld

Doubling
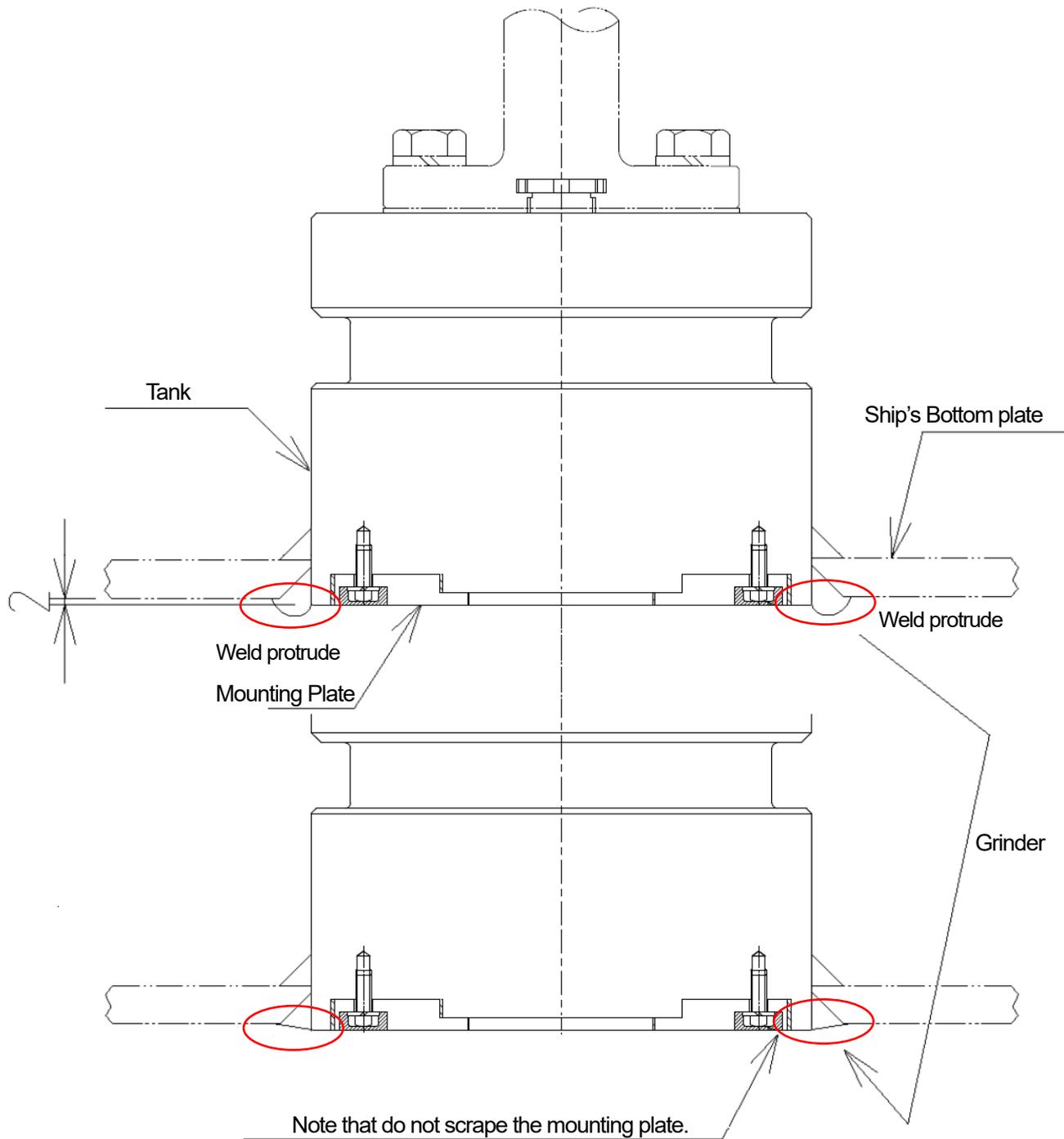
Note:

In the post-process, the inside of the tank and the both side of mounting plate are painted and mounted.

Therefore, when welding the tank to ship's bottom plate, consider the paint thickness of the transducer and mounting plate.

The protrusion of the tank from the bottom of the ship should be within 2 mm including the thickness of the paint.

Tank

TRANSDUCER

Mounting plate

Consider the coating thickness on the contact surface when assembling each unit.

The painting thickness is less than 1 mm

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・When the bottom of the tank protrudes by 2 mm or more and is welded, repair the welding beat to a gentle slope with grinder processing.

Tank

Ship's Bottom plate

Weld protrude

Weld protrude

Mounting Plate

Grinder

Note that do not scrape the mounting plate.

· Install by welding so that the bottom surface of transducer is horizontal with seabed while sailing.

· When ship's bottom plate is inclination, reinforce the protrusions so that the tank is not exposed.

· Do not install the tank dented from the bottom plate of the ship as bubbles will accumulate and it will not be possible to measure the depth accurately.

Ship's Bottom plate

Reinforcement against expose

Reinforcement against expose

Example picture (Painted and finished form)

・When there are protrusions on the semicircle within a radius of 2 m centered on the mounting hole to the bow direction, it is necessary to scrape them (welding character, joint connecting, discharge outlets, and cover of another equipment etc.).

No protrusions within this range

Grinder finishing by shipyard

Transducer

R 2000

mm

Bow

Wrong example protrusion: Welding character

Wrong example protrusion: Joint connection

Discharge outlet
Do not install within
a radius of 2m

Cover
Do not install within a radius of 2m

・When welding the tank, remove the transducer and packing..
・Design the groove and doubling of the bottom plate at the shipyard according to the ship class.
・The tank material is SM490A that ensures weldability.

2.5　Painting Guide-1

・After welding, paint the tank as same as ship's bottom plate.

・Paint the inside of tank.

Note:

The painting thickness should be less than 1mm to avoid protrusions of 2 mm or more.

Example of Tank
internal painting

2.6　Handling of the Transducer

・Do not lift the transducer by gripping the cable.

Figure 1 Good Example

Figure 2 Bad Example

Note:
　There might be the disconnection when the cable is pulled with being twisted.
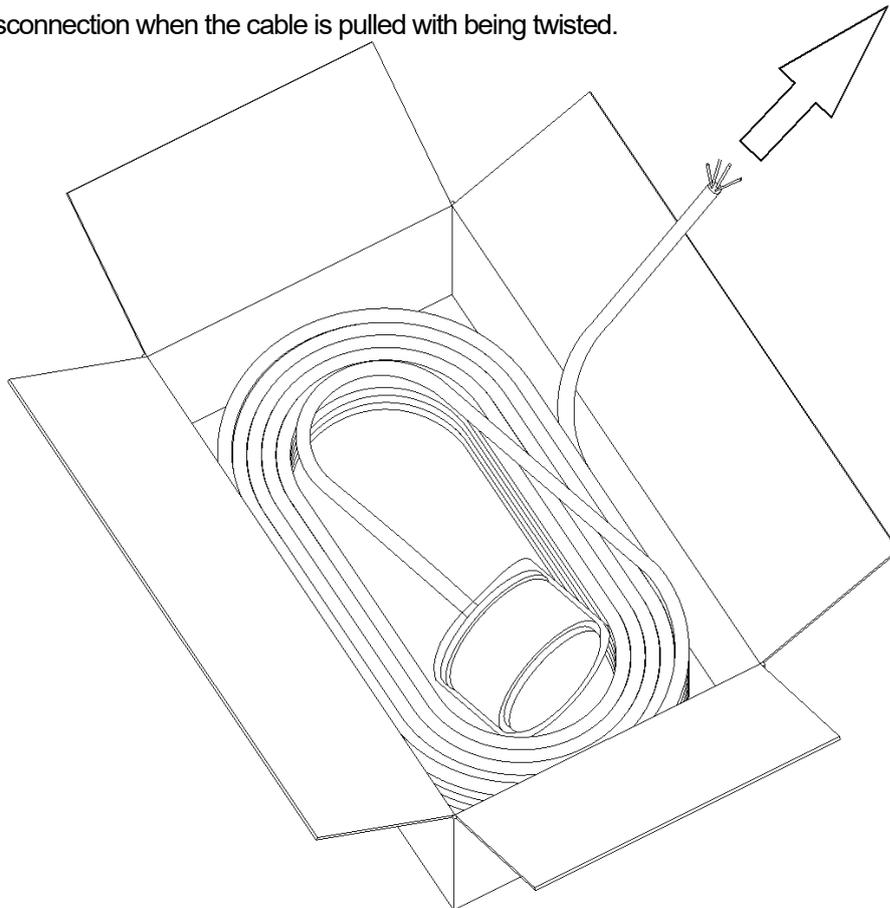
2.7　Mounting of the Transducer

・Install the transducer as shown below.
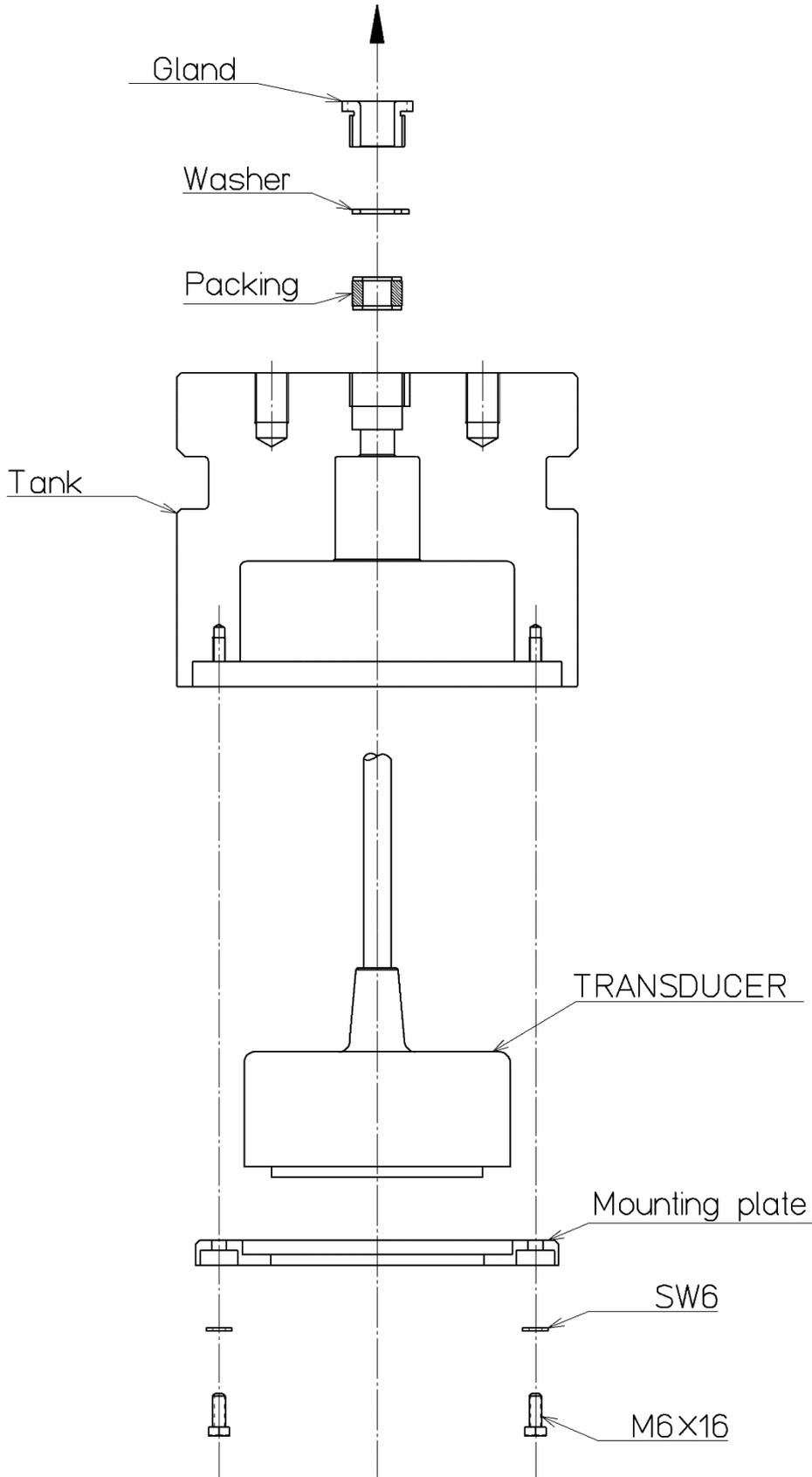
Gland

Washer

Packing

Tank

TRANSDUCER

Mounting plate

SW6

M6×16

・Do not fill the resin within the range of the seawater invasion in the tank interior.
・Fill the resin such as Silicone Bond, etc. to counter bored hole for the installation bolt of the mounting plate.

Cannot be filled with resin

SEA WATER AREA

WELD
(SHIP
YARD)

UT-200ND

After tightening the bolts, fill with resin (polyester putty or silicon bond or asphalt).

Cannot be filled with resin

SEA WATER AREA

WELD
(SHIP
YARD)

UT-50MD
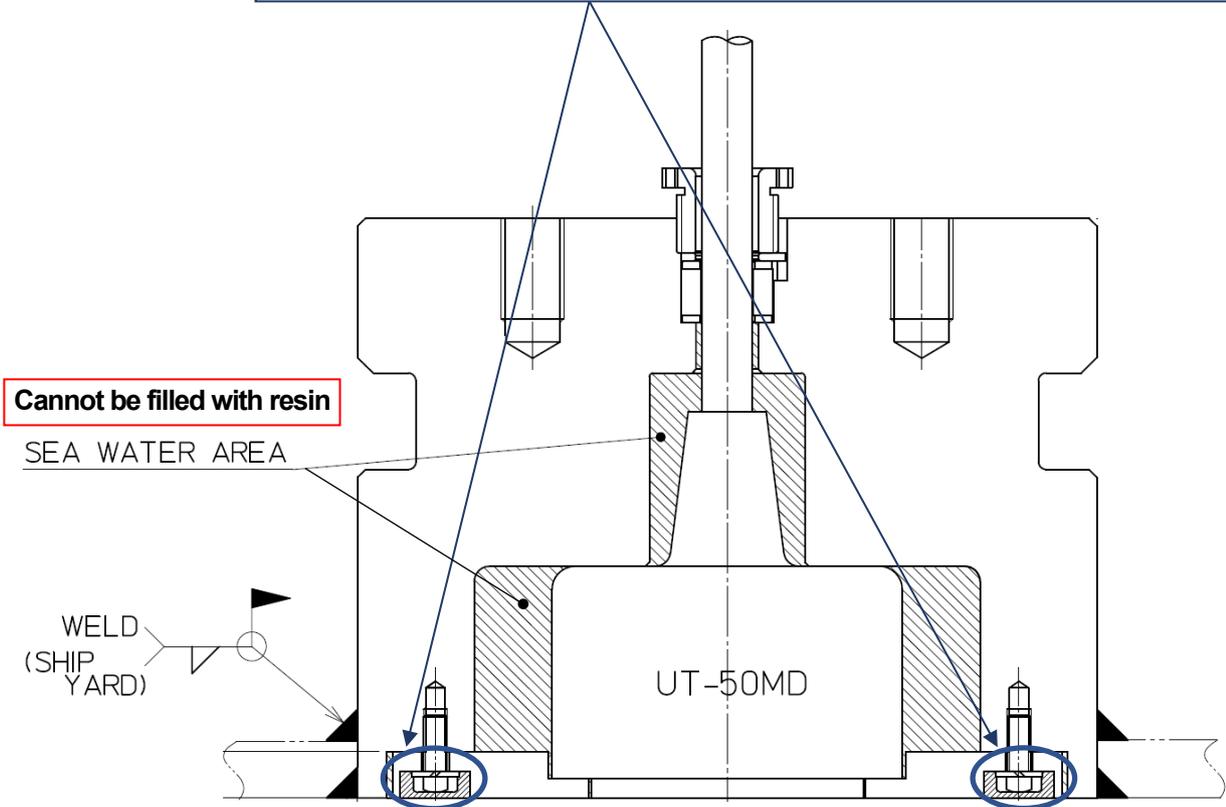
Be sure to fill the 6 bolt holes with resin.

Be sure to fill the outer circumference with resin.

Wrong installation example:
The blue part is the filled silicon bond attached to the transducer.

Do not fill the resin in the inside of tank.

・After resin drying, paint area around mouthing plate except transducer radiation side.
・Tighten until tightening GLAND becomes from 9.5mm to 10mm from the upper surface of the tank by using hook spanner.
Note: This value is only a approximate value. When a water leaks, tighten the GLAND until the water stops.

(10mm)

2.8 Painting Guide-2

・After installing transducer, paint the mounting plate as same as ship's bottom plate.

・The base processing of the tank is shop primer.

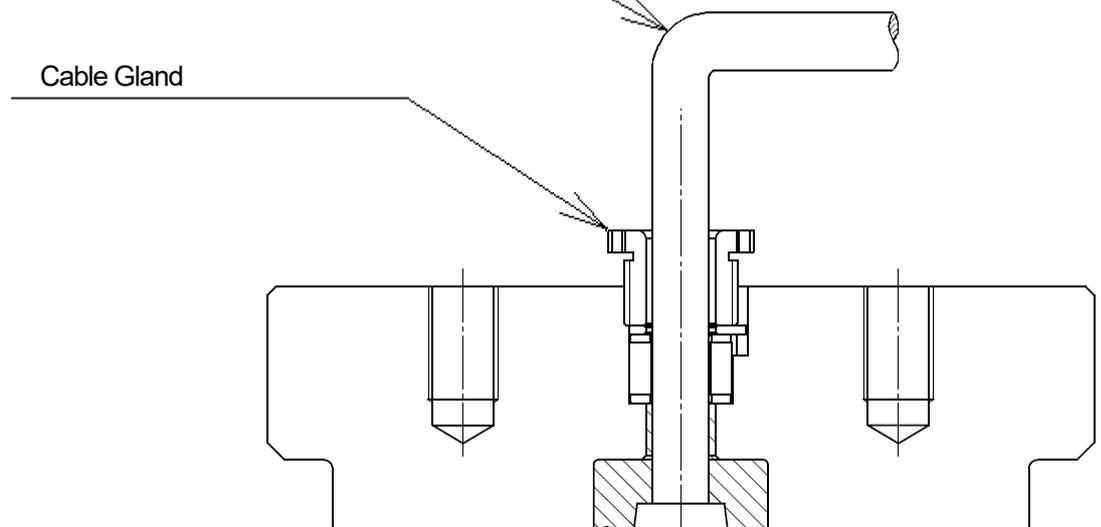・Do not paint the transducer radiation side. Mask it to prevent paint from adhering.

Note;

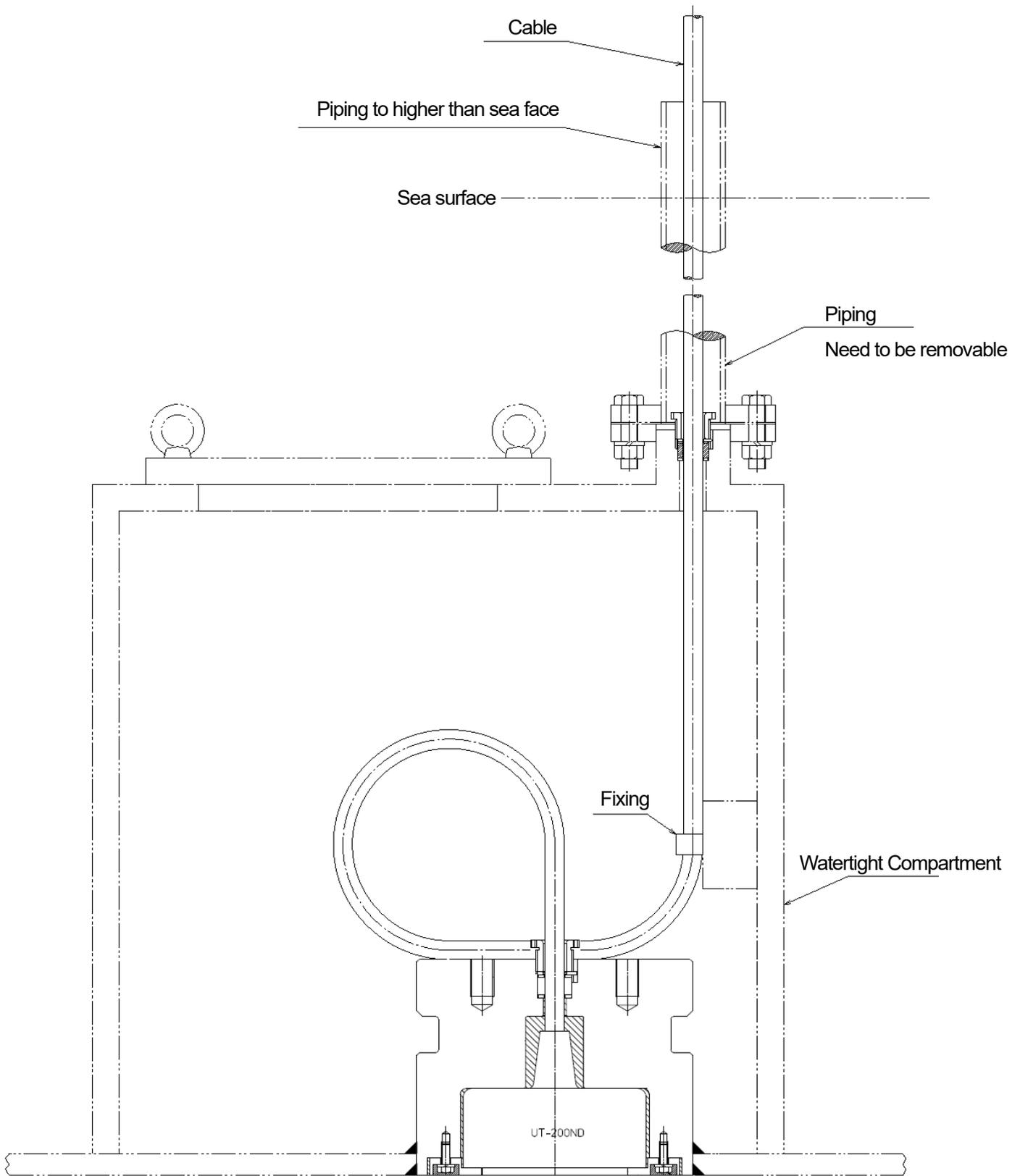The painting thickness should be less than 1mm to avoid protrusions of 2 mm or more.

Mounting Plate

Ship's Bottom plate

Example of transducer radiation side masking

After painting, peel making off before launching.

2.9   Cable Laying and Piping

・Do not bend the rising part of the cable at an acute angle.

・Do not shake the rising part of the cable by vibration.

・Do not pull the cable strongly in the state of kink (in tangles, twisted state).

・Cables should be waterproofed by piping from installation position of tank to higher than sea surface to protect the cables, prevent interference from other cables, and in case water leaks from the tightening gland.

・The pipes can be filled with dry sand to prevent cable vibration and maintain its own weight as needed.

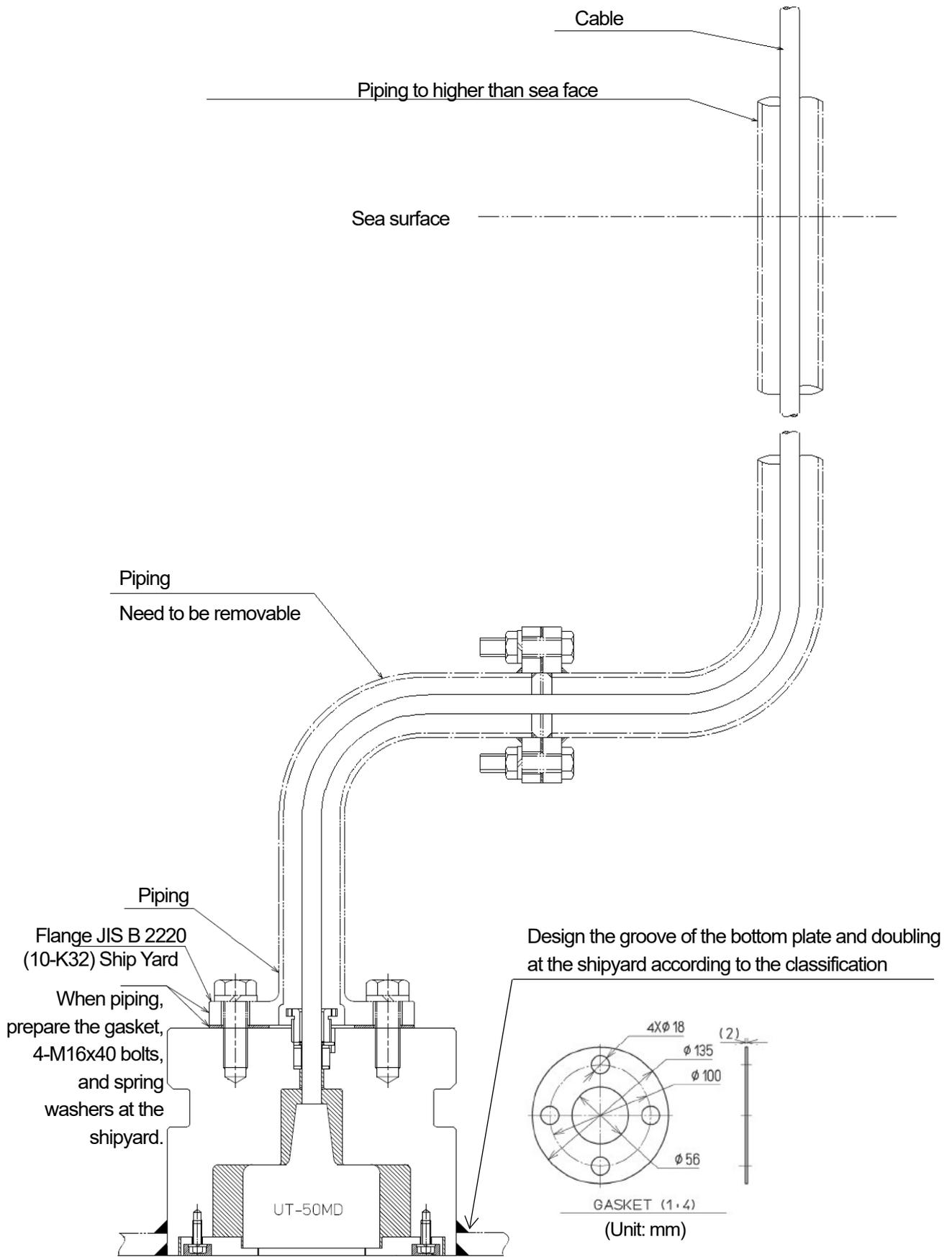・When cable is installed in watertight compartment, fix the cable to prevent it from vibration.

Do not bend the rising part of the cable at an acute angle.

Cable Gland

Cable

Piping to higher than sea face

Sea surface

Piping
Need to be removable

Fixing

Watertight Compartment

UT-200ND

Piping Example in Watertight Compartment

When use a flange, cannot to pipe directly to the tank.

Cable

Piping to higher than sea face

Sea surface

Piping

Need to be removable

Piping

Flange JIS B 2220
(10-K32) Ship Yard

When piping,
prepare the gasket,
4-M16x40 bolts,
and spring
washers at the
shipyard.

Design the groove of the bottom plate and doubling
at the shipyard according to the classification

4X⌀18
⌀135
⌀100
⌀56

(2)

GASKET (1·4)
(Unit: mm)

UT-50MD

Direct Tank Piping Example

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2.10　Check Items

After the installation, check the following items to make sure that the tank is properly equipped.

  1. Inside of the ship

    a) All bolts are not loose.

    b) The waterproof gland is not loose.

    c) When the cable is exposed, rising part of cable is not bent at an acute angle.

    d) When the cable is exposed, there is no damage to cable.

    e) The pipe fixing bolt is not loose.

  2. Outside of the ship

    a) The surface of transducer radiation is not painted.

    b) No masking tape remains on the surface of transducer radiation.

    c) The transducer and ship's bottom plate is flat.

    d) Bolt holes is filled with putty, etc.

    e) There is no protrusion of 2 mm or more within a radius of 2 m centered on the transducer to the bow direction.

2.11　Others

- ・NKF-349/350 transducer cannot be exchanged in principle in the sea. The transducer exchange work by the diver is very dangerous. In the case of malfunctions, contact to JRC or your agency.
- ・Note that the gasket attached to the flange of the tank keeps water tightness (water pressure), but not airtightness (air pressure).
- ・To prevent interference, install the cable of transducer of this equipment at a distance of 0.5m or more from the cable of transducer of other equipment (e.g. Doppler sonar).
- ・To prevent interference, install the tank at a distance of 2m or more from the transducer of other equipment.
- ・The tightening torques of the screws such as bolts and nuts not specially specified are based on Table 1 below.

Table1

Unit: N・cm (kgf・cm)

Screw diameter Screw material	M2	M2.6	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
Brass	13.7 (1.4)	32.4 (3.3)	50 (5.1)	118 (12)	235 (24)	402 (41)	961 (98)	1960 (200)	-	-	-	-
Soft iron	15.7 (1.6)	36.3 (3.7)	56.9 (5.8)	127 (13)	265 (27)	451 (46)	1080 (110)	2160 (220)	3820 (390)	9410 (960)	18600 (1900)	32400 (3300)

Chapter 3 Transducer Installing of NKF-341/345

<div style="border:2px solid black">

⚠ CAUTION

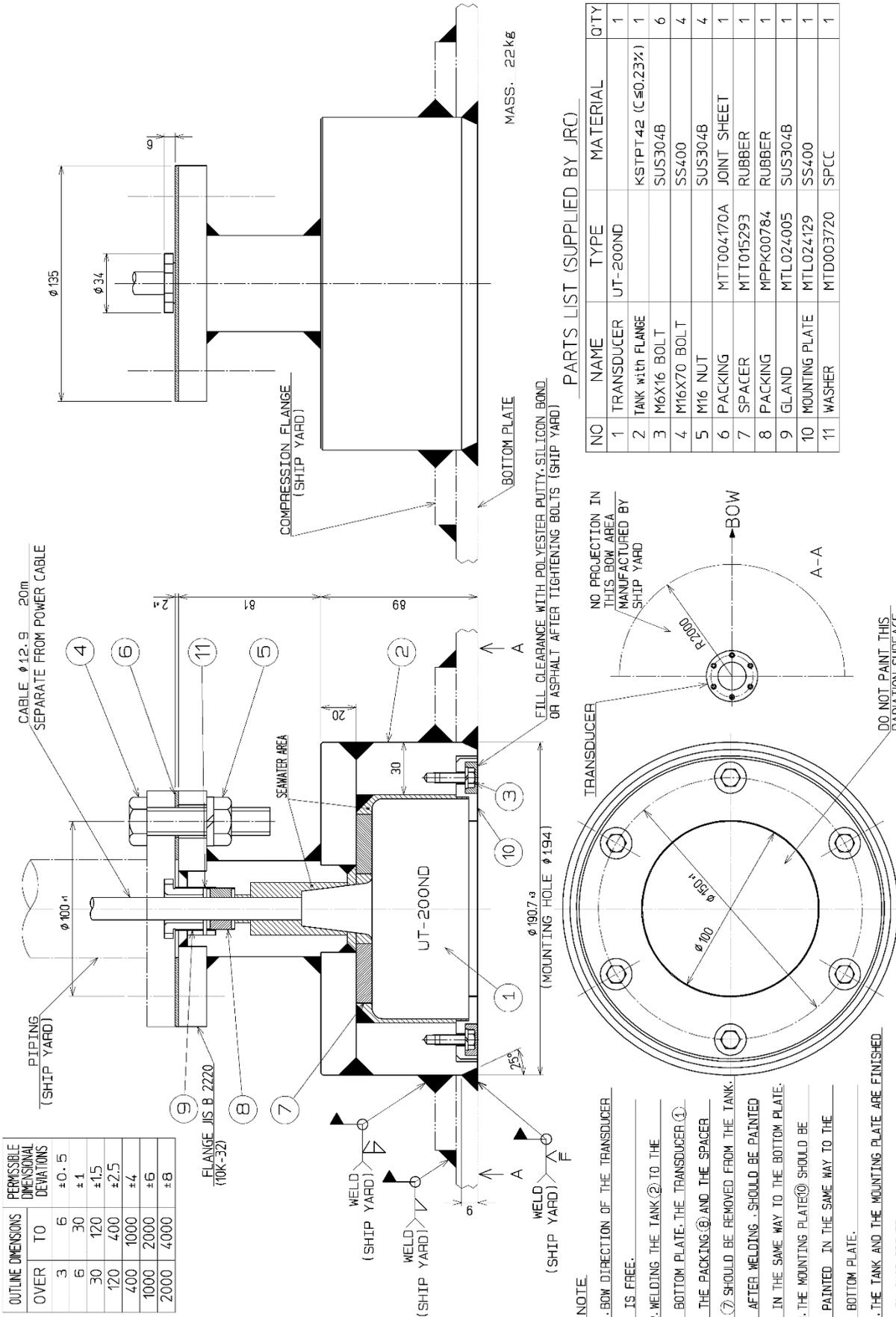This equipment measures water depth by using the ultrasonic wave.

The ultrasonic wave causes attenuation and diffusion when the influence of the bubble is received, and cannot measure an accurate water depth. Install the transducer in the place where the bubble is not generated when sailing.

</div>

3.1　Preparation Tool

Preparation Tool	Qty.	Purpose
Grinder	1	Repairing the welding bead with the grinder processing
polyester putty / Silicone Bond / asphalt	-	Filling for bolt holes
Masking tape	-	Painting
Box wrench (for M6)	1	Bolt tightening
Wrench (for M16)	1	Bolt tightening
Hook spanner	1	Gland tightening

3.2 Installation Drawing

(1) NKF-341

MASS. 22kg

COMPRESSION FLANGE (SHIP YARD)

BOTTOM PLATE

FILL CLEARANCE WITH POLYESTER PUTTY, SILICON BOND OR ASPHALT AFTER TIGHTENING BOLTS (SHIP YARD)

NO PROJECTION IN THIS BOW AREA MANUFACTURED BY SHIP YARD

BOW

A-A

TRANSDUCER

DO NOT PAINT THIS RADIATION SURFACE

CABLE ø12.9 20m SEPARATE FROM POWER CABLE

SEAWATER AREA

PIPING (SHIP YARD)

FLANGE JIS B 2220 (10K-32)

UT-200ND

(MOUNTING HOLE ø194)

WELD (SHIP YARD)

PARTS LIST (SUPPLIED BY JRC)

NO	NAME	TYPE	MATERIAL	Q'TY
1	TRANSDUCER	UT-200ND		1
2	TANK with FLANGE		KSTPT42 (C≤0.23%)	1
3	M6X16 BOLT		SUS304B	6
4	M16X70 BOLT		SS400	4
5	M16 NUT		SUS304B	4
6	PACKING	MTT004170A	JOINT SHEET	1
7	SPACER	MTT015293	RUBBER	1
8	PACKING	MPPK00784	RUBBER	1
9	GLAND	MTL024005	SUS304B	1
10	MOUNTING PLATE	MTL024129	SS400	1
11	WASHER	MTD003720	SPCC	1

OUTLINE DIMENSIONS		PERMISSIBLE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6
2000	4000	±8

NOTE

1. BOW DIRECTION OF THE TRANSDUCER IS FREE.

2. WELDING THE TANK② TO THE BOTTOM PLATE. THE TRANSDUCER① THE PACKING⑧ AND THE SPACER ⑦ SHOULD BE REMOVED FROM THE TANK. AFTER WELDING, SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.

3. THE MOUNTING PLATE⑩ SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.

4. THE TANK AND THE MOUNTING PLATE ARE FINISHED BY SHOP PRIMER.

5. THE WELDING GROOVE OF THE BOTTOM PLATE AND THE COMPRESSION FLANGE ARE DESIGNED IN THE SHIPYARD ACCORDING TO THE CLASSIFICATION.

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MASS. 20kg

COMPRESSION FLANGE
(SHIP YARD)

BOTTOM PLATE

FILL CLEARANCE WITH POLYESTER PUTTY,SILICON BOND
OR ASPHALT AFTER TIGHTENING BOLTS (SHIP YARD)

OUTLINE DIMENSIONS		PERMISSIBLE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6
2000	4000	±8

PARTS LIST (SUPPLIED BY JRC)

NO	NAME	TYPE	MATERIAL	QTY
1	TRANSDUCER	UT-50MD		1
2	TANK with FLANGE		KSTPT42 (C≤0.23%)	1
3	M6X16 BOLT		SUS304B	6
4	M16X70 BOLT		SS400	4
5	M16 NUT		SUS304B	4
6	PACKING	MTT004170A	JOINT SHEET	1
7	SPACER	MTT015293	RUBBER	1
8	PACKING	MPPK00784	RUBBER	1
9	GLAND	MTL024005	SUS304B	1
10	MOUNTING PLATE	MTL024128A	SS400	1
11	WASHER	MTD003720	SPCC	1

PIPING
(SHIP YARD)

CABLE φ12.9 20m
SEPARATE FROM POWER CABLE

FLANGE JIS B 2220
(10K-32)

WELD
(SHIP YARD)

WELD
(SHIP YARD)

WELD
(SHIP YARD)

SEAWATER AREA

UT-50MD

φ190.7₋₃

(MOUNTING HOLE φ194)

25°

φ100 ±1

NO PROJECTION IN
THIS BOW AREA
MANUFACTURED BY
SHIP YARD

BOW

R2000

TRANSDUCER

A-A

DO NOT PAINT THIS
RADIATION SURFACE

φ150 ʜ

φ70

NOTE

1. BOW DIRECTION OF THE TRANSDUCER
   IS FREE.

2. WELDING THE TANK ② TO THE
   BOTTOM PLATE,THE TRANSDUCER ①
   THE PACKING ⑧ AND THE SPACER
   ⑦ SHOULD BE REMOVED FROM THE TANK.
   AFTER WELDING,SHOULD BE PAINTED
   IN THE SAME WAY TO THE BOTTOM PLATE.

3. THE MOUNTING PLATE ⑩ SHOULD BE
   PAINTED IN THE SAME WAY TO THE
   BOTTOM PLATE.

4. THE TANK AND THE MOUNTING PLATE ARE FINISHED
   BY SHOP PRIMER.

5. THE WELDING GROOVE OF THE BOTTOM PLATE AND THE COMPRESSION FLANGE ARE
   DESIGNED IN THE SHIPYARD ACCORDING TO THE CLASSIFICATION.

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3.3　Installation procedure

<u>Work flow of NKF-341 and NKF-345</u>

```
                    ╭─────────────╮
                    │    start    │
                    ╰─────────────╯
                           │
 ┌─────────────────────────────────────────────────┐
 │  Welding the tank and tank to ship's bottom plate │
 │   (Refer to Installation drawing and 3.4 Welding Guide) │
 └─────────────────────────────────────────────────┘
                           │
 ┌─────────────────────────────────────────────────┐
 │              Painting inside of tank              │
 │          (Refer to 3.5 Painting Guide-1)          │
 └─────────────────────────────────────────────────┘
                           │
 ┌─────────────────────────────────────────────────┐
 │               Preparing transducer                │
 │     (Refer to 3.6 Handling of the Transducer)     │
 └─────────────────────────────────────────────────┘
                           │
 ┌─────────────────────────────────────────────────┐
 │                Install transducer                 │
 │     (Refer to 3.7 Mounting of the Transducer)     │
 └─────────────────────────────────────────────────┘
                           │
 ┌─────────────────────────────────────────────────┐
 │              Painting mounting plate              │
 │          (Refer to 3.8 Painting Guide-2)          │
 └─────────────────────────────────────────────────┘
                           │
 ┌─────────────────────────────────────────────────┐
 │              Cable Laying and piping              │
 │      (Refer to 3.9 Cable Laying and Piping)       │
 └─────────────────────────────────────────────────┘
                           │
 ┌─────────────────────────────────────────────────┐
 │                 Operation check                   │
 │          (Refer to 3.10 Check Items)              │
 └─────────────────────────────────────────────────┘
                           │
                    ╭─────────────╮
                    │     END     │
                    ╰─────────────╯
```

3.4   Welding Guide

・Weld the tank with reference to installation drawing.
・Weld the bottom of tank and the ship's bottom plate to a flat surface.

1.

Tank

Insert

Ship's Bottom plate

Mounting hole
φ194

2.

Ship's Bottom plate   Flat
Good install

protrude
Defective install

Dent
Defective install

3.

Weld

Ship's Bottom plate

Flat

Note:

In the post-process, the inside of the tank and the both side of mounting plate are painted and mounted.

Therefore, when welding the tank to ship's bottom plate, consider the paint thickness of the transducer and mounting plate.

The protrusion of the tank from the bottom of the ship should be within 2 mm including the thickness of the paint.

Consider the coating thickness on the contact surface when assembling each unit.

The painting thickness is less than 1 mm

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・When the bottom of the tank protrudes by 2 mm or more and is welded, repair the welding beat to a gentle slope with grinder processing.

Tank

Ship's Bottom plate

Weld protrude

Weld protrude

Mounting Plate

Grinder

Note that do not scrape the mounting plate.

・Install by welding so that the bottom surface of transducer is horizontal with seabed while sailing.

・When ship's bottom plate is inclination, reinforce the protrusions so that the tank is not exposed.

・Do not install the tank dented from the bottom plate of the ship as bubbles will accumulate and it will not be possible to measure the depth accurately.

Ship's Bottom plate

Reinforcement against expose

Reinforcement against expose

Example picture (Painted and finished form)

・When there are protrusions on the semicircle within a radius of 2 m centered on the mounting hole to the bow direction, it is necessary to scrape them (welding character, joint connecting, discharge outlets, and cover of another equipment etc.).

No protrusions within this range

Grinder finishing by shipyard

Transducer

R 2000

mm

►Bow

Wrong example protrusion: Welding character

Wrong example protrusion:
Joint connection

Cover
Do not install within a radius of 2m

Discharge outlet
Do not install within
a radius of 2m

・When welding the tank, remove the transducer and packing..
・Design the groove and doubling of the bottom plate at the shipyard according to the ship class.
・The tank material is SM490A that ensures weldability.

3.5 Painting Guide-1

・After welding, paint the tank as same as ship's bottom plate.

・The inside of the tank is painted.

Note:

The painting thickness should be less than 1mm to avoid protrusions of 2 mm or more.

Example of Tank
internal painting

3.6　Handling of the Transducer

・Do not lift the transducer by gripping the cable of it.

Figure 1 Good Example

Figure 2 Bad Example

・Note that there might be the disconnection when the cable is pulled with being twisted.
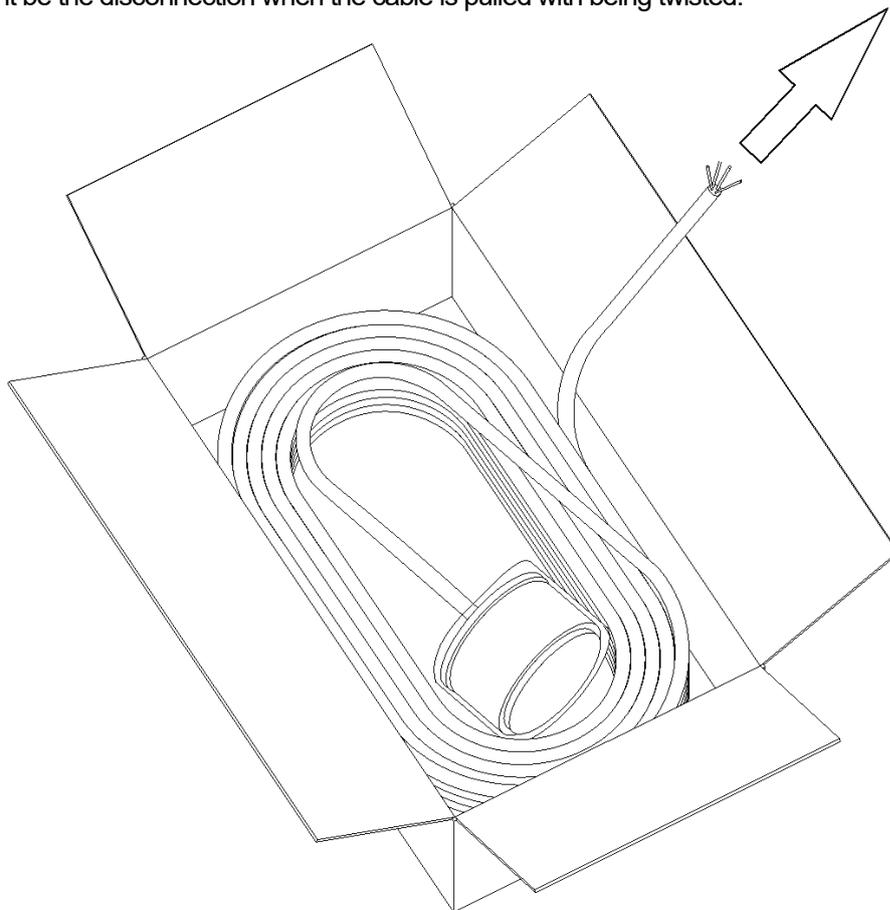
3.7   Mounting of the Transducer

(1) NKF-341
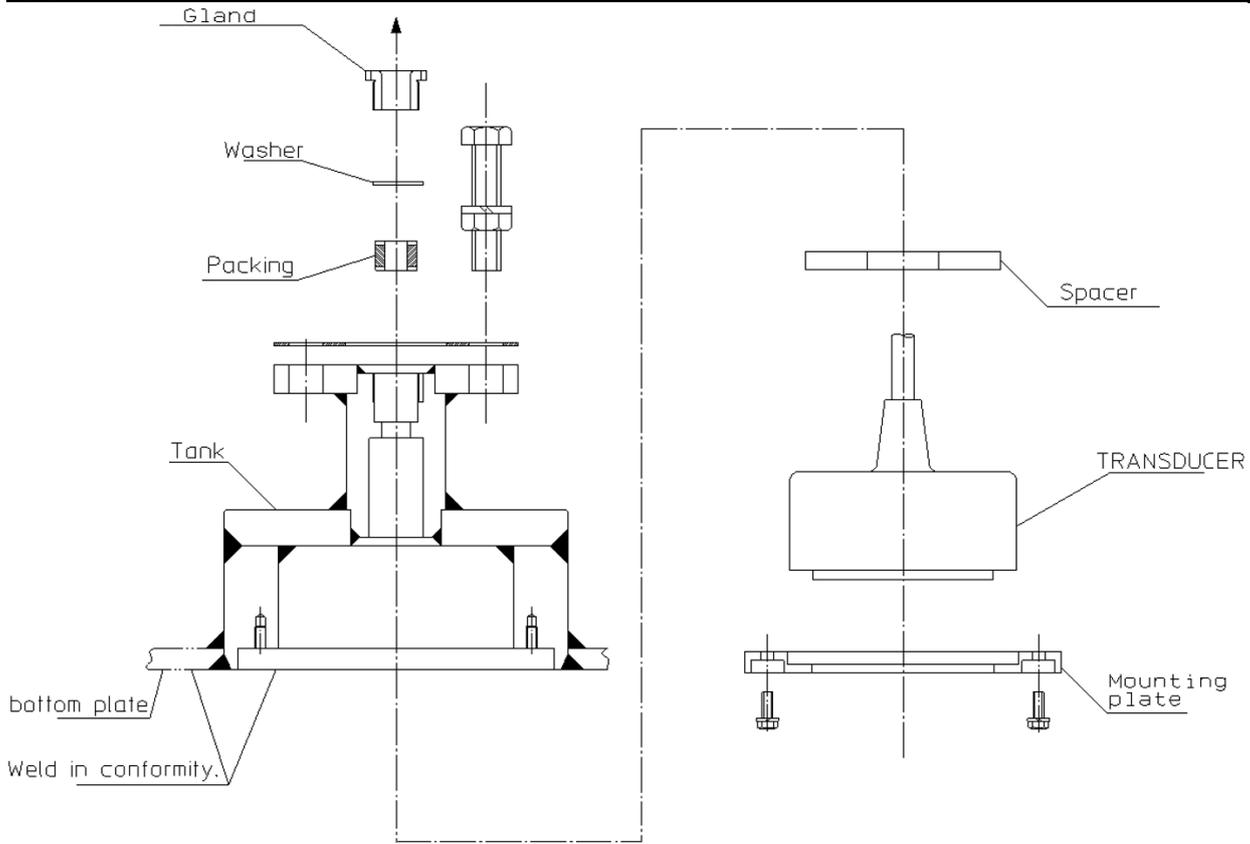
(2) NKF-345
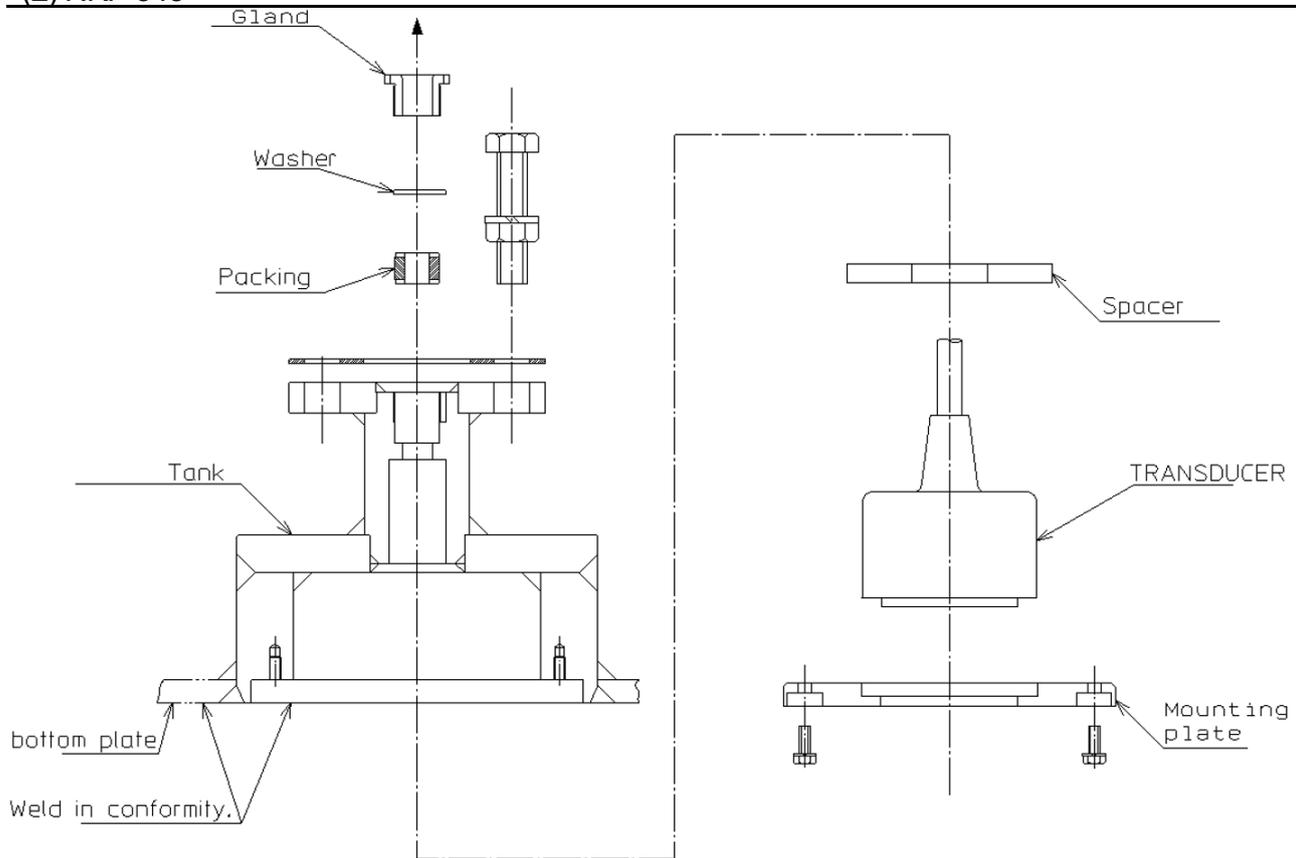
・Do not fill the resin within the range of the seawater invasion in the tank interior.

・Fill the resin such as Silicone Bond, etc. to counter bored hole for the installation bolt of the mounting plate.

SPACER

WELD
(SHIP YARD)

WELD
(SHIP YARD)

SEAWATER AREA

Cannot be filled with resin

UT-200ND

WELD
(SHIP YARD)

After tightening the bolts, fill with resin (polyester putty or silicon bond or asphalt).

SPACER

WELD
(SHIP YARD)

WELD
(SHIP YARD)

SEAWATER AREA

Cannot be filled with resin

UT-50MD

WELD
(SHIP YARD)
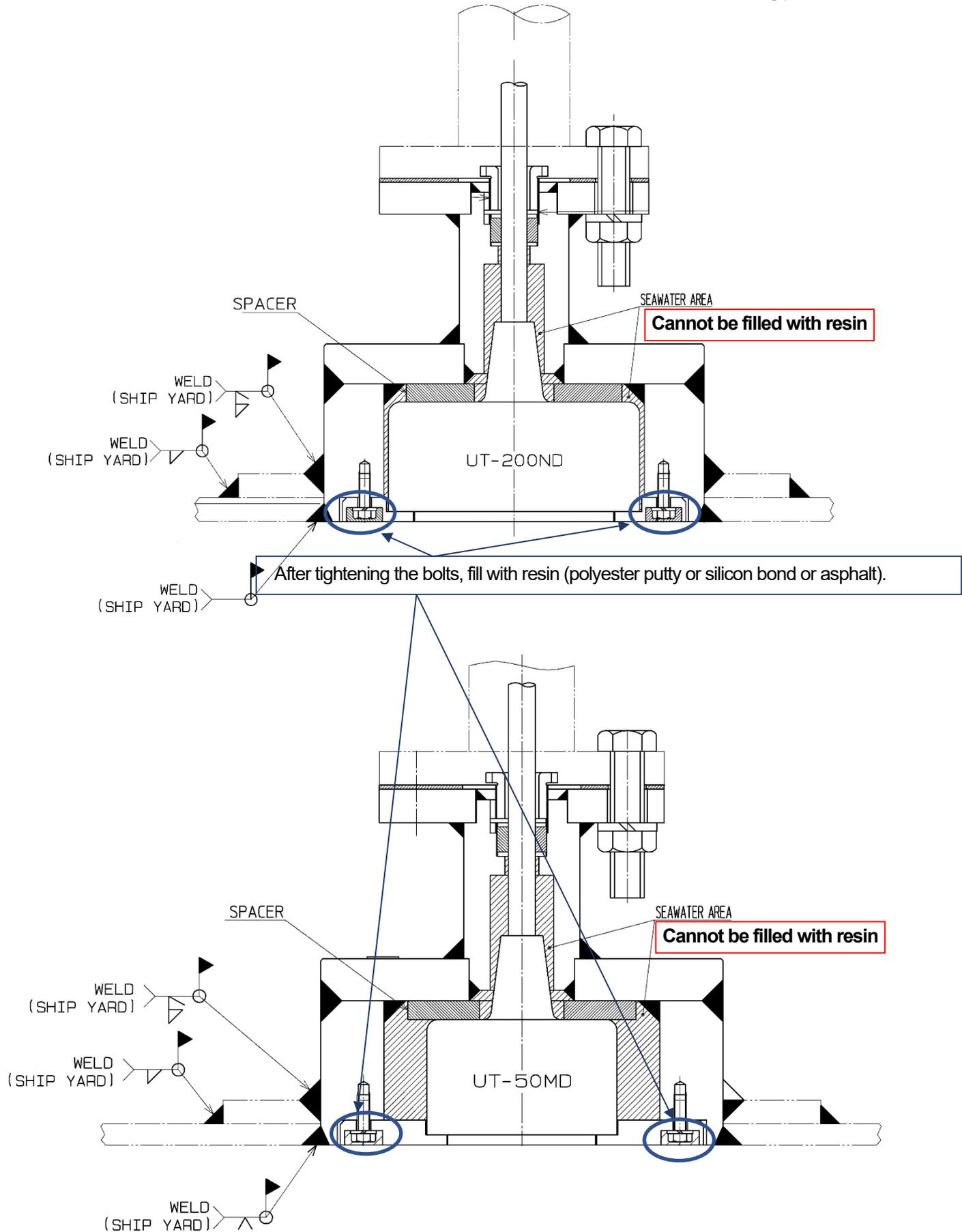
Be sure to fill the 6 bolt holes with resin.

Be sure to fill the outer circumference with resin.

Wrong installation example:
The blue part is the filled silicon bond attached to the transducer.

Do not fill the resin in the inside of tank.

・After resin drying, paint area around mouthing plate except transducer radiation side.
・Tighten until tightening GLAND becomes 5.5 mm from the upper surface of the tank by using hook spanner.

3.8   Painting Guide-2

・After installing transducer, paint the mounting plate as same as ship's bottom plate.

・The base processing of the tank is shop primer.

・Do not paint the transducer radiation side. Mask it to prevent paint from adhering.

Note;

The painting thickness should be less than 1mm to avoid protrusions of 2 mm or more.

Mounting Plate

Ship's Bottom plate

Example of transducer
radiation side masking

After painting, peel making off before launching.

3.9　Cable Laying and Piping

・Do not bend the rising part of the cable at an acute angle.

・Do not shake the rising part of the cable by vibration.

・Do not pull the cable strongly in the state of kink (in tangles, twisted state).

・Cables should be waterproofed by piping from installation position of tank to higher than sea surface to protect the cables, prevent interference from other cables, and in case water leaks from the tightening gland.

・The pipes can be filled with dry sand to prevent cable vibration and maintain its own weight as needed.

・When cable is installed in watertight compartment, fix the cable to prevent it from vibration.

Do not bend the rising part of the cable at an acute angle.

Cable Gland

58

Cable

Piping to higher than sea face

Sea surface

Piping
Need to be removable

Fixing

Watertight Compartment

Piping Example in Watertight Compartment

Cable

Piping to higher than sea face

Sea surface

Piping
Need to be removable

Direct Tank Piping Example

60

3.10 Check Items

After the installation, check the following items to make sure that the tank is properly equipped.

1. Inside of the ship
    a) All bolts are not loose.
    b) The waterproof gland is not loose.
    c) When the cable is exposed, rising part of cable is not bent at an acute angle.
    d) When the cable is exposed, there is no damage to cable.
    e) The pipe fixing bolt is not loose.
2. Outside of the ship
    a) The surface of transducer radiation is not painted.
    b) No masking tape remains on the surface of transducer radiation.
    c) The transducer and ship's bottom plate is flat.
    d) Bolt holes is filled with putty, etc.
    e) There is no protrusion of 2 mm or more within a radius of 2 m centered on the transducer to the bow direction.

3.11 Others

・NKF-341/345 transducer cannot be exchanged in principle in the sea. The transducer exchange work by the diver is very dangerous. In the case of malfunctions, contact to JRC or your agency.
・Note that the gasket attached to the flange of the tank keeps water tightness (water pressure), but not airtightness (air pressure).
・To prevent interference, install the cable of transducer of this equipment at a distance of 0.5m or more from the cable of transducer of other equipment (e.g. Doppler sonar).
・To prevent interference, install the tank at a distance of 2m or more from the transducer of other equipment.
・The tightening torques of the screws such as bolts and nuts not specially specified are based on Table 1 below.

Table1

Unit: N・cm (kgf・cm)

Screw diameter / Screw material	M2	M2.6	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
Brass	13.7 (1.4)	32.4 (3.3)	50 (5.1)	118 (12)	235 (24)	402 (41)	961 (98)	1960 (200)	-	-	-	-
Soft iron	15.7 (1.6)	36.3 (3.7)	56.9 (5.8)	127 (13)	265 (27)	451 (46)	1080 (110)	2160 (220)	3820 (390)	9410 (960)	18600 (1900)	32400 (3300)

Chapter 4 Gate Valve Transducer installing

```
┌─────────────────────────────────────────────────────────────────────┐
│  ⚠ CAUTION                                                            │
├─────────────────────────────────────────────────────────────────────┤
│  This equipment measures water depth by using the ultrasonic wave.    │
│  The ultrasonic wave causes attenuation and diffusion when the        │
│  influence of the bubble is received, and cannot measure              │
│  an accurate water depth. Install the transducer in the place where   │
│  the bubble is not generated when sailing.                            │
└─────────────────────────────────────────────────────────────────────┘
```

Note:

When installing NKF-394/396 gate valve, use this installation manual.

When installing G-002758/G-002761/G-002763/ G-008791/G-002759/G-002760/G-002762/G-008792 series gate valve provided by Alphatron, refer to the installation manual provided by Alhatoron.

4.1   Preparation Tool

Preparation tool	Qty.	Purpose
Grinder	1	Repairing the welding bead with the grinder processing
polyester putty / Silicone Bond / asphalt	-	Filling for bolt holes
Masking tape	-	Painting
Spanner (for M16)	1	Bolt tightening
Spanner (for M20)	1	Bolt tightening
Chain block	1-2	For mounting transducer
Jig for steering wheel	1	for steering wheel

(1)NKF－394

PARTS LIST(SUPPLIED BY JRC)

NO	NAME	MATERIAL ASTM	Q'TY	NOTE
1	TRANSDUCER	UT-200ND	1	
2	TANK	SM490A	1	SEPARATE PACK
3	FIXED PIECE	SC480	1	SEPARATE PACK　85 kg
4	VALVE(150)		1	SEPARATE PACK
5	GASKET	JOINT SEAT	2	GASKET IN THE POLY BAG HAS BEEN ATTACHED TO THE VALVE.
6	SEA CHEST	SS400	1	SEPARATE PACK
7	CLAMP	SS400	1	
8	PIPE(φ50)	SUS316	1	
9	V PACKING	V99F NBR	1	JIS B 2403
10	PACKING	NEOPRENE	1	
11	GLAND	SUS304	1	
12	BOLT M20X80	SUS304	16	BOLTS IN THE POLY BAG HAVE BEEN ATTACHED TO THE VALVE.
13	U-NUT M20	SUS304	16	NUTS IN THE POLY BAG HAVE BEEN ATTACHED TO THE VALVE.
14	BOLT&WASHER M16X70	SUS304	2	
15	NUT&WASHER M20	SUS304	2	
16	BOLT&WASHER M16X60	SUS304	2	
17	WASHER	SPCC	1	

MASS.　150 kg

OUTLINE DIMENSIONS		PERMISSIBLE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6
2000	4000	±8

FORM NAME	CABLE
NKF-394	40m
NKF-394-01	30m
NKF-394-02	50m

INSTALLATION

1. MADE A MOUNTING HOLE(φ184) ON THE BOTTOM PLATE.
2. ②TANK SHOULD BE WELDED TO BOTTOM PLATE SO AS ITS FLANGE BECOME HORIZONTAL.
3. PAINT THE OIL SEAL ON ⑤GASKET, AND ASSEMBLE ④VALVE.
   AT THIS TIME, THE DIRECTION OF ④VALVE CAN BE SELECTED EVERY 45 DEGREES.
4. PAINT THE OIL SEAL ON ⑤GASKET, AND ASSEMBLE ⑥SEA CHEST(INCLUDE ⑦⑧⑨⑩⑪).
   AT THIS TIME, LOOSEN ⑨V PACKING AND CHECK RISE-AND-FALL OPERATION OF ①TRANSDUCER, AND THE RADIATION SURFACE OF
   ①TRANSDUCER HAS COME OUT OF THE BOTTOM PLATE.

COMPARTMENT

1. EQUIP THE WATERTIGHT COMPARTMENT.
2. ②TANK IS FINISHED BY PRIMER.　('EPIKON ZINCRICH PRIMER' Made in CHUGOKU MARINE PAINTS.LTD.)
   ②TANK SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
3. DO NOT PAINT THE RADIATION SURFACE OF ①TRANSDUCER.
   THE BOTTOM OF ③ FIXED PIECE SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
4. THE WELDING GROOVE OF ②TANK AND THE COMPRESSION FLANGE ARE DESIGNED IN THE SHIPYARD
   ACCORDING TO THE CLASSIFICATION.

RESERVE SPACE FOR MAINTENANCE

NO PROJECTION IN THIS BOW AREA
MANUFACTURED BY SHIP YARD

TRANSDUCER INSERTION MARK

FLANGE JIS B 2220
10K-32

TRANSDUCER

A-A

BOW

EYEBOLT(M10)

LIFTING HOOK
(SHIP YARD)

CABLE φ12.9
SEPARATE FROM POWER CABLE

SEAWATER AREA

FLANGE

SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
(SHIP YARD)

(MOUNTING HOLE φ184)

BOTTOM PLATE

(SHIP YARD)

DO NOT PAINT THE RADIATION SURFACE.

SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.

OUTLINE DIMENSIONS		PERMISSIBLE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6
2000	4000	±8

MASS. 150kg

NO PROJECTION IN THIS BOW AREA
MANUFACTURED BY SHIP YARD

TRANSDUCER

A–A

TRANSDUCER INSERTION MARK

FLANGE JIS B 2220
10K-32

INSTALLATION
1. MADE A MOUNTING HOLE(φ184) ON THE BOTTOM PLATE.
2. ② TANK SHOULD BE WELDED TO BOTTOM PLATE SO AS ITS FLANGE BECOME HORIZONTAL.
   ② TANK SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
3. PAINT THE OIL SEAL ON ⑤ GASKET, AND ASSEMBLE ④ VALVE.
   AT THIS TIME, THE DIRECTION OF ④ VALVE CAN BE SELECTED EVERY 45 DEGREES.
4. PAINT THE OIL SEAL ON ⑤ GASKET, AND ASSEMBLE ⑥ SEA CHEST(INCLUDE⑬⑭⑦⑧⑨⑩⑪).
   AT THIS TIME, LOOSEN ⑭⑮⑯ AND CHECK RISE-AND-FALL OPERATION OF TRANSDUCER, AND THE RADIATION SURFACE OF
   ① TRANSDUCER HAS COME OUT OF THE BOTTOM PLATE.

COMPARTMENT
1. EQUIP THE WATERTIGHT COMPARTMENT.
   (*'EPIKON ZINCRICH PRIMER* Made in CHUGOKU MARINE PAINTS,LTD.)
   ② TANK IS FINISHED BY PRIMER.
   ② TANK SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
3. DO NOT PAINT THE RADIATION SURFACE OF ① TRANSDUCER.
   THE BOTTOM OF ③ FIXED PIECE SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
4. THE WELDING GROOVE OF ② TANK AND THE COMPRESSION FLANGE ARE DESIGNED IN THE SHIPYARD ACCORDING TO THE CLASSIFICATION.

PARTS LIST(SUPPLIED BY JRC)

NO	NAME	MATERIAL ASTM	Q'TY	NOTE
1	TRANSDUCER	UT-50MD	1	SEPARATE PACK
2	TANK	SM490A	1	
3	FIXED PIECE	STKM13A	1	SEPARATE PACK 85kg
4	VALVE (150)	SC480	1	SEPARATE PACK
5	GASKET	JOINT SEAT	2	GASKET IN THE POLY BAG HAS BEEN ATTACHED TO THE VALVE.
6	SEA CHEST	SS400	1	SEPARATE PACK
7	CLAMP	SS400	1	
8	PIPE (φ50)	SUS304	1	
9	V PACKING	V99F NBR	1	JIS B 2403
10	PACKING	NEOPRENE	1	
11	GLAND	SUS304	1	
12	BOLT M20X80	SUS304	1	
13	U-NUT M20	SUS304	1	
14	BOLT&WASHER M16X70	SUS304	16	BOLTS IN THE POLY BAG HAVE BEEN ATTACHED TO THE VALVE.
15	NUT&WASHER M20	SUS304	16	NUTS IN THE POLY BAG HAVE BEEN ATTACHED TO THE VALVE.
16	BOLT&WASHER M16X60	SUS304	2	
17	WASHER	SPCC	1	

EYEBOLT(M10)
LIFTING HOOK
(SHIP YARD)

SEAWATER AREA
FLANGE

(STROKE)
400

φ625
290
197

3.4

UT-50MD

φ70
φ132
φ180+2
φ280

(MOUNTING HOLE φ184)

25°

φ240
φ40
4-φ19
22.5°

CABLE φ12.9 20m
SEPARATE FROM POWER CABLE

CAUTION

560

312

SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
(SHIPYARD)

DO NOT PAINT THE RADIATION SURFACE

SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
(SHIPYARD)

(SHIP YARD)
(SHIP YARD)

BOTTOM PLATE

φ250
345

64

(1) NKF－394

NKF-394
INSTALLATION MANUAL

transducer insertion mark.

sea chest

M20×80 bolts

transducer

gasket

M20 U nuts

valve

gasket

M20×80 bolts

tank

ship's bottom plate

F

GO DOWN

Check the transducer insertion mark.
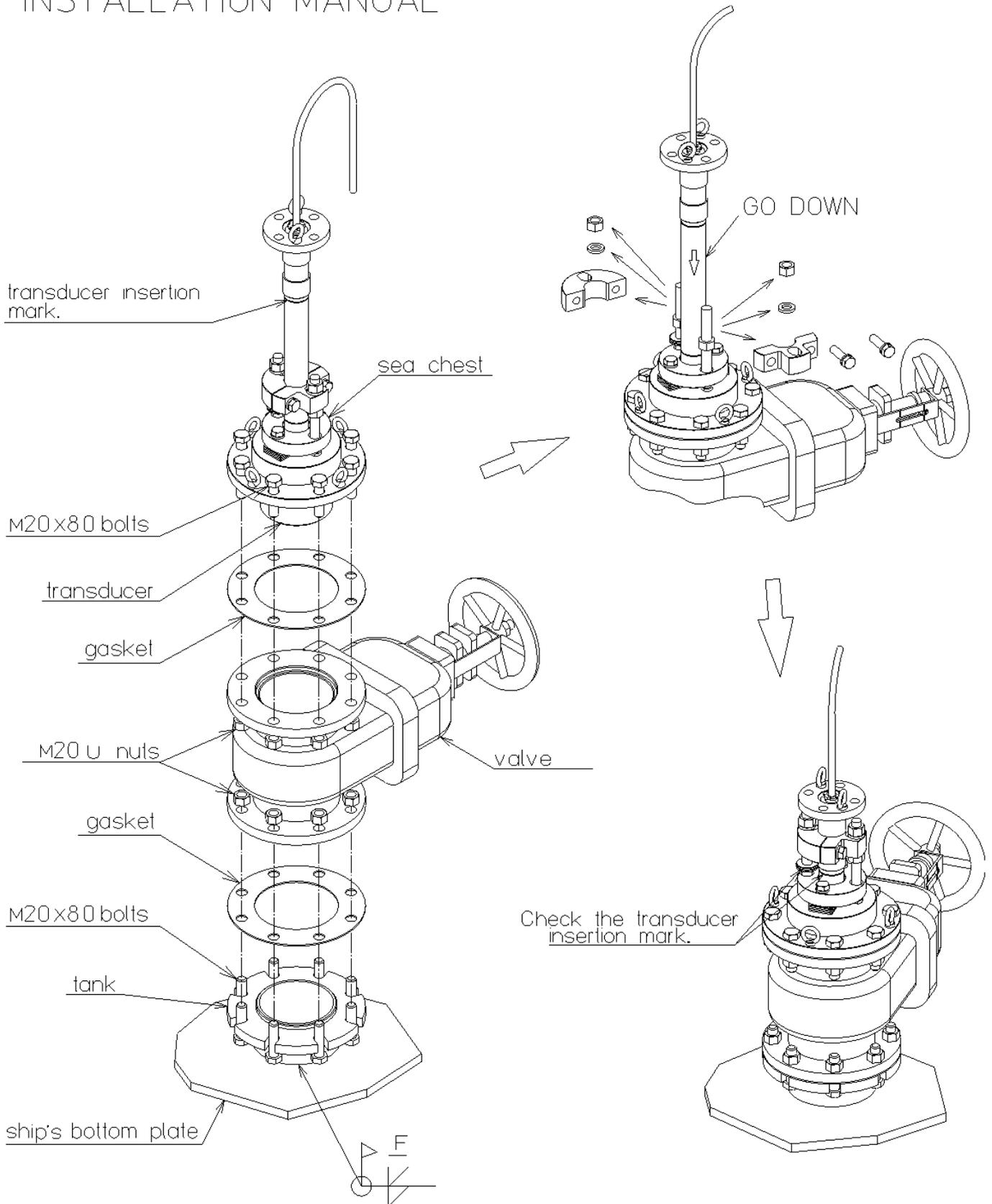
NKF-396
INSTALLATION MANUAL

transducer
insertion mark

sea chest

bolts

transducer

gasket

nuts

gasket

bolts

tank

ship's bottom plate

GO DOWN

Check the scale
"opening"

valve

Check
the transducer
insertion mark

F
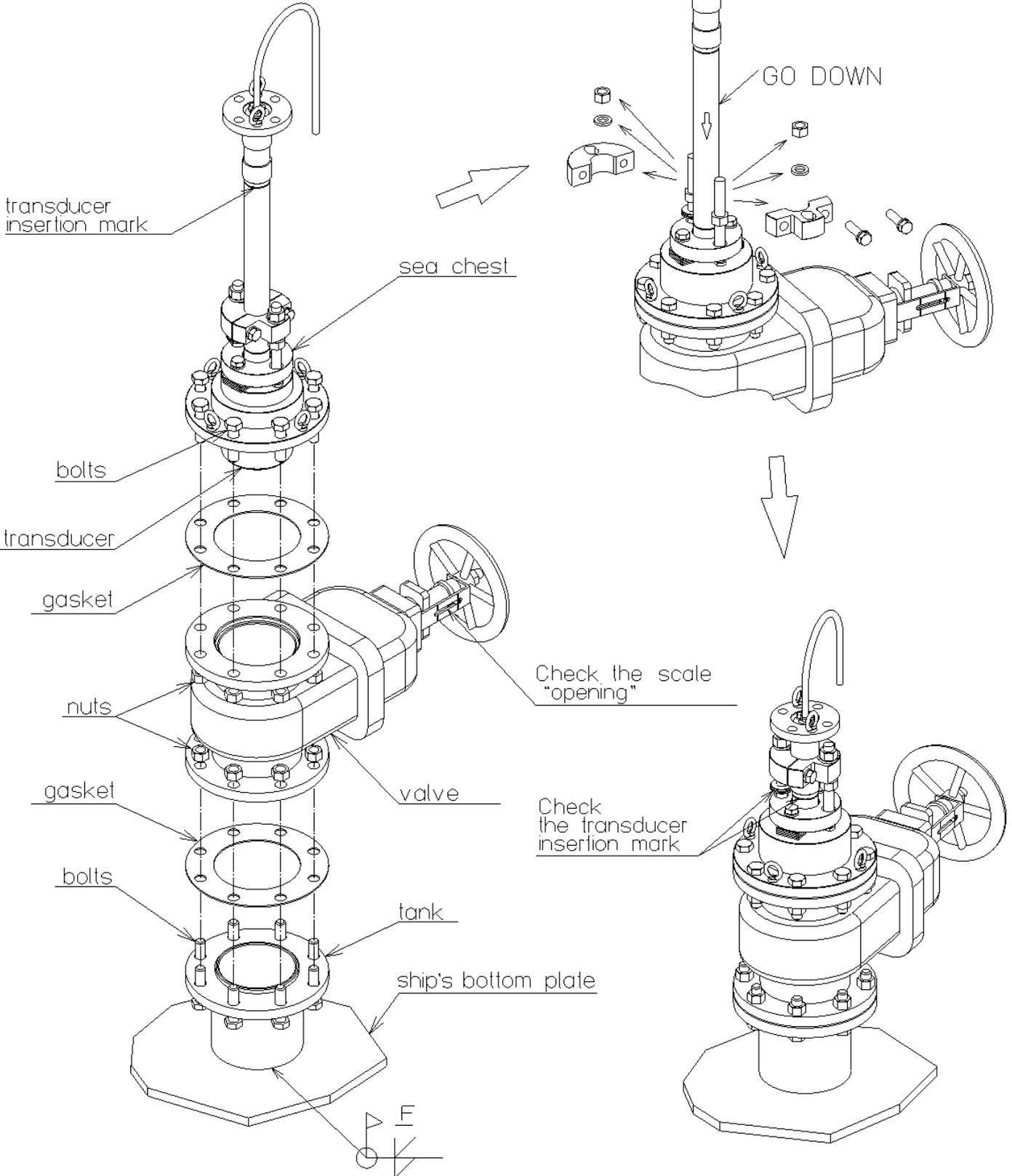
4.4   Welding Guide

・Remove the tank from the crate packing.

・Store other parts until the transducer is installed.

Tank

Packing

16 Bolts and Nuts

Assembly procedure
(Paste with tape)

Valve

Transducer
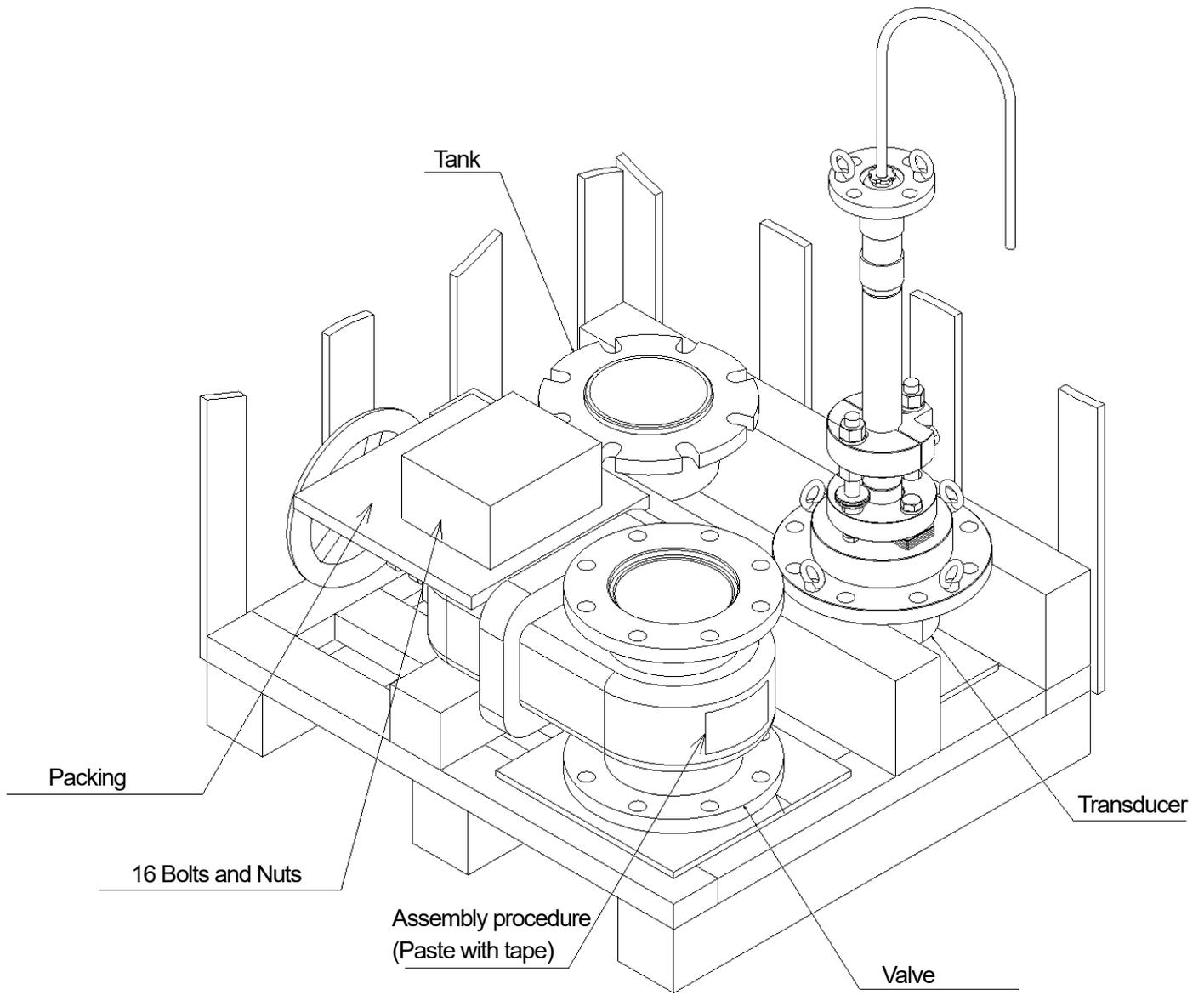
・Weld the bottom of tank and the ship's bottom plate to a flat surface.
・Weld carefully about bow direction because direction of the gate valve handle is determined by the welding direction of the tank.
・Install by welding so that the bottom surface of transducer is horizontal with seabed while sailing.
・Design groove and doubling on the ship's bottom plate side in the shipyard according to the classification.
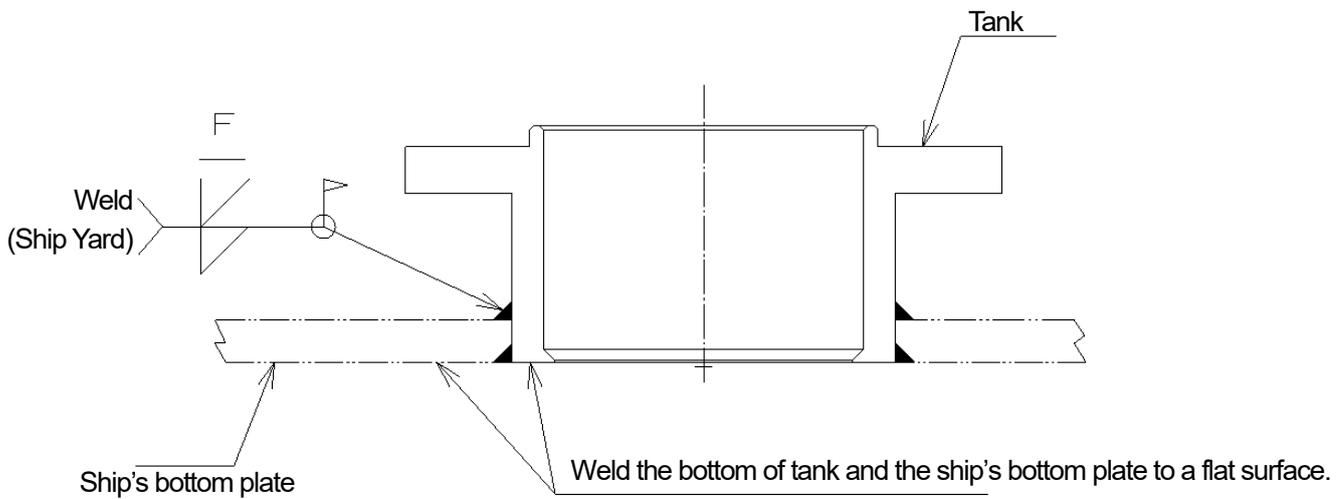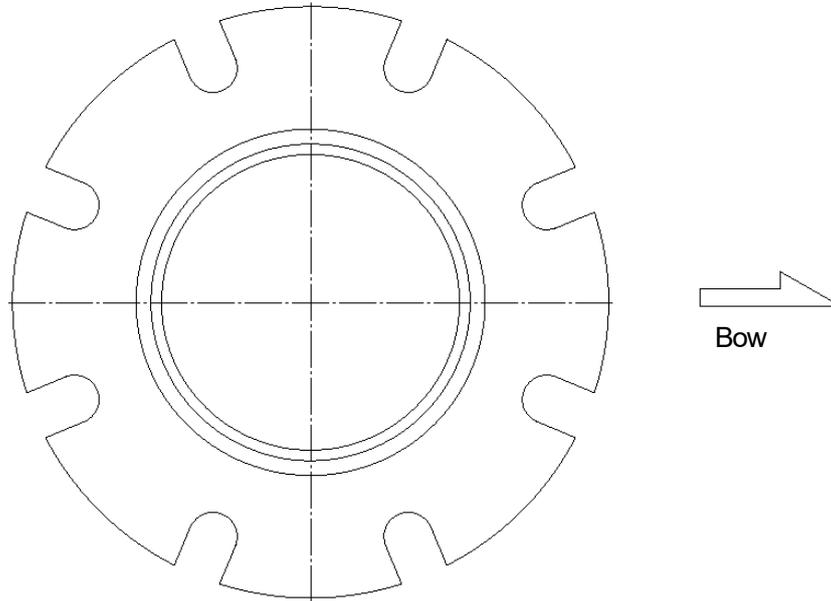
Bow

Tank

Weld
(Ship Yard)

Ship's bottom plate

Weld the bottom of tank and the ship's bottom plate to a flat surface.

・When there are protrusions on the semicircle within a radius of 2 m centered on the mounting hole to the bow direction, it is necessary to scrape them (welding character, joint connecting, discharge outlets, and cover of another equipment etc.).

No protrusions within this range

Grinder finishing by shipyard

Transducer

R 2000 mm

►Bow
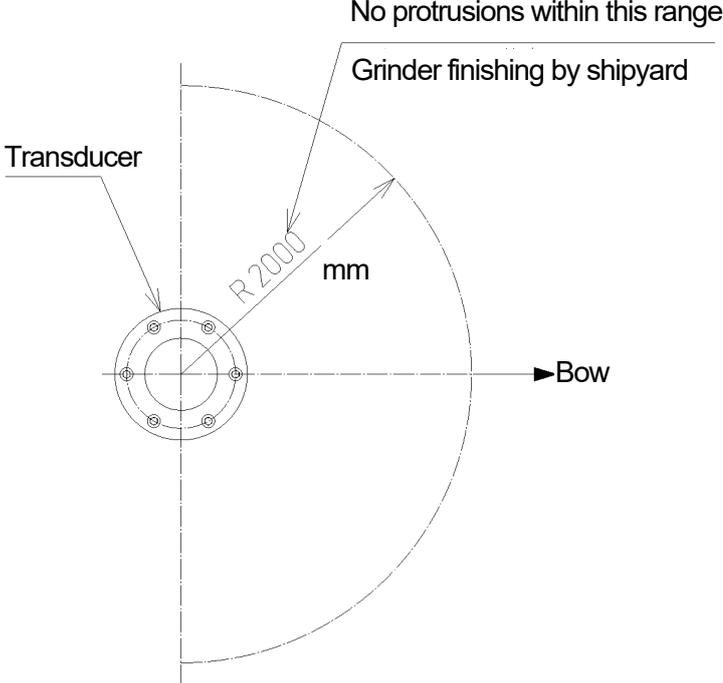
4.5   Mounting of the Gate Valve Transducer

・Place the gasket, gate valve, gasket, and sea chest (transducer) on the tank in this order, and fix them with M20 x 80 bolts and nuts.

・Provide a hook on the ceiling and use a chain block to transport the equipment without damaging it.
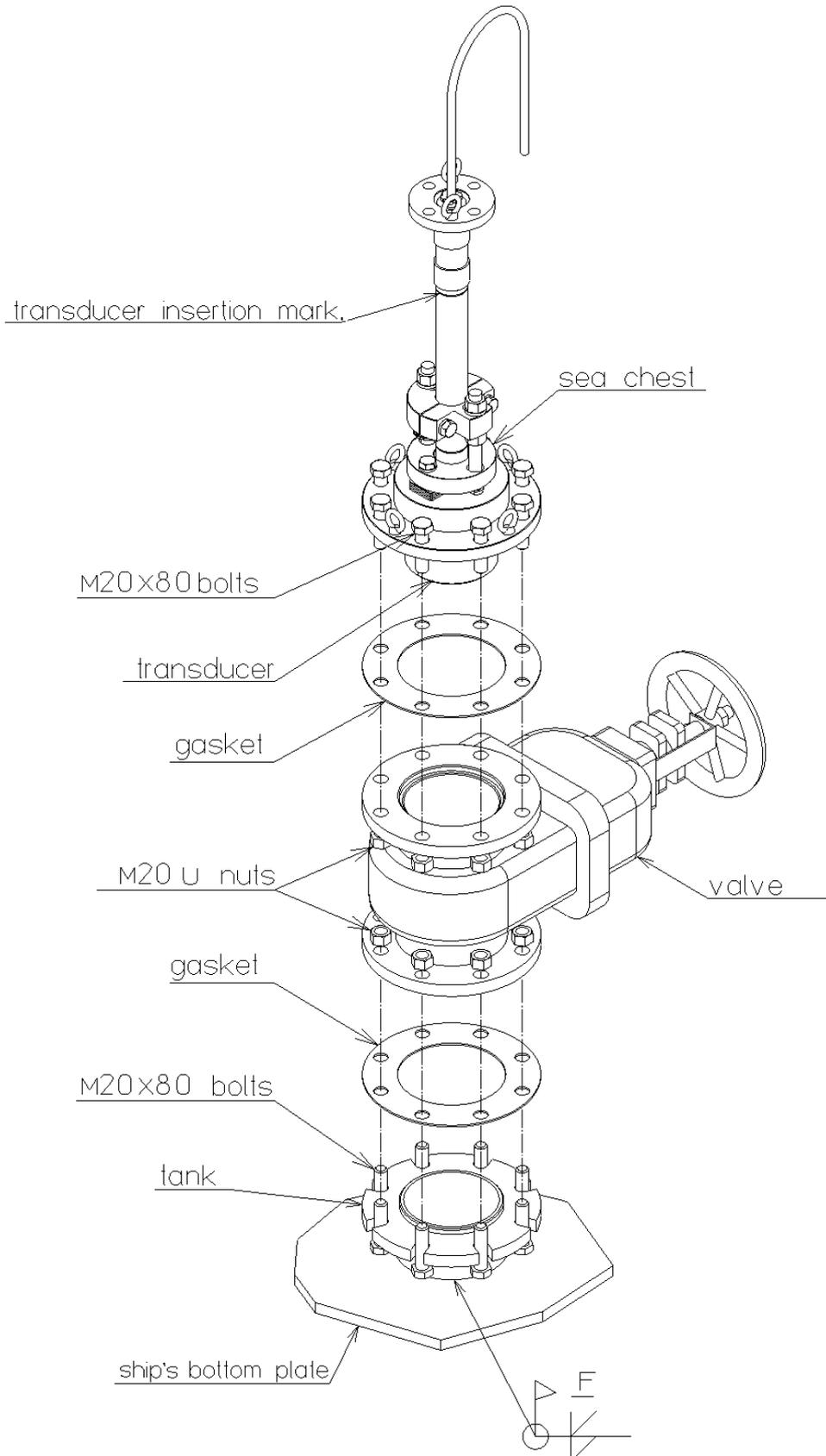
・Remove the M20 nut and M16 x 60 bolt, and remove the clamp.
・After confirming that the valve is open with the opened mark of valve, go down the transducer holder.

GO DOWN

Transducer holder

M20 nuts

M16 X 60 bolts

clamp

opened mark of valve
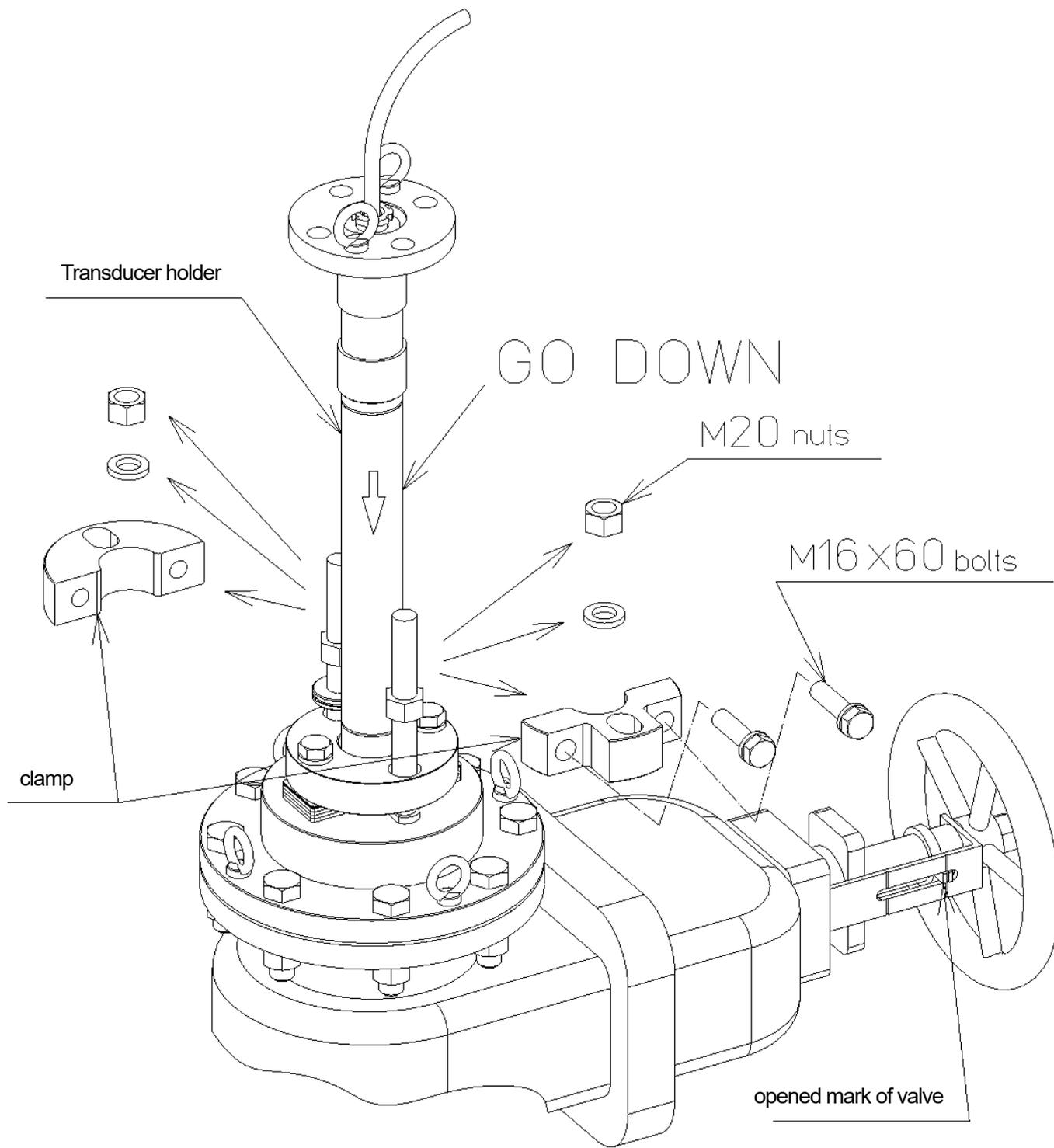
・After confirming that the transducer holder has gone down until the transducer insertion mark matches, attach the clamp with the M20 nut to fix the transducer holder.

・When installing the transducer, do not loosen the adjustment nut and M16 x 70 bolt.

adjustment nut

Check the transducer insertion mark.

M20 nuts

M16X70 bolts
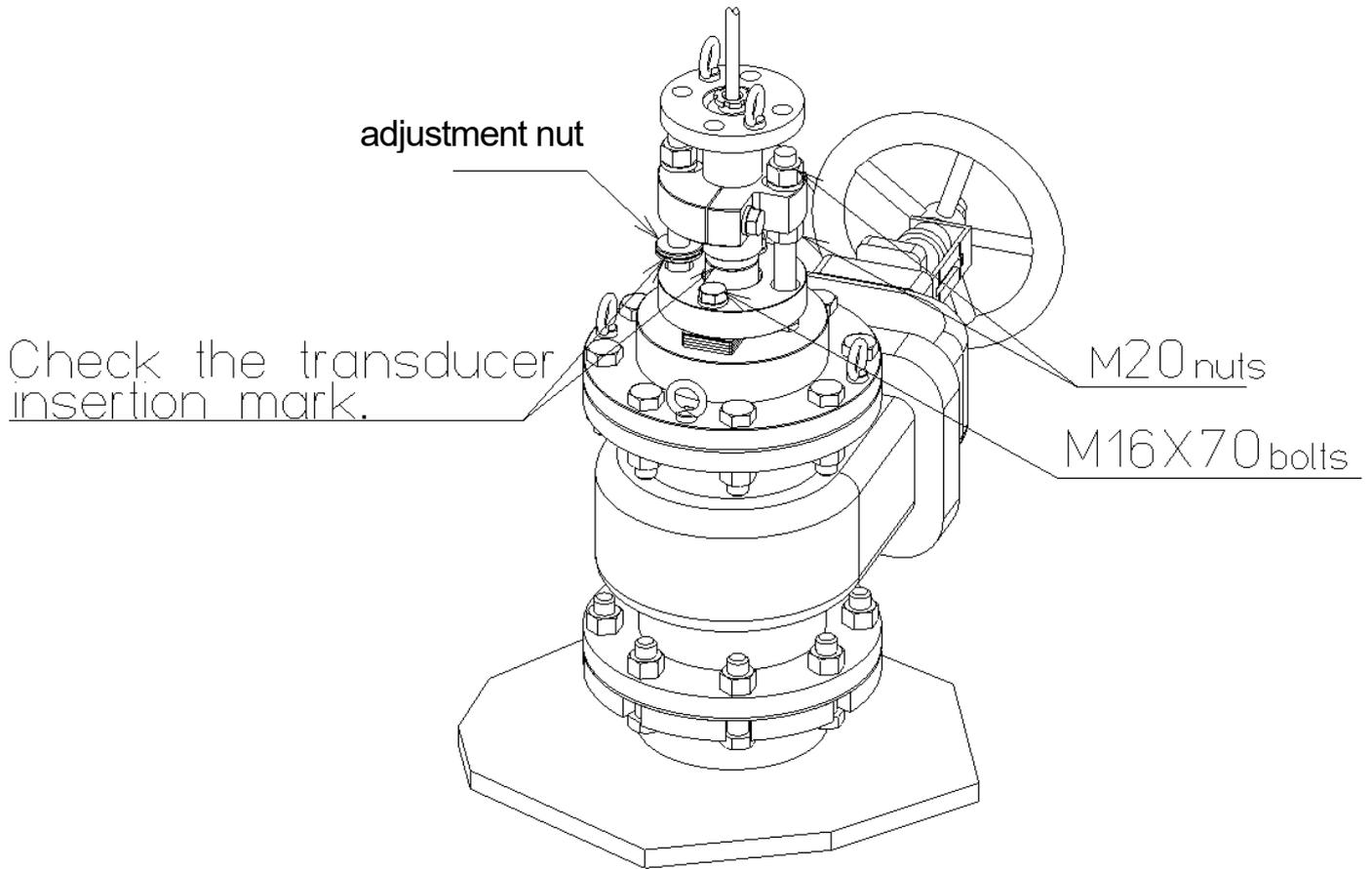
4.6　Painting Guide

・Paint the bottom of transducer holder as same as the ship's bottom plate.

・Do not paint the radiation surface of the transducer.

F

Weld by shipyard

Ship's plate bottom

Paint same as ship's bottom plate.
〔Paint by shipyard〕

Do not paint the radiation surface of the transducer.

Paint same as ship's bottom plate.
〔Paint by shipyard〕
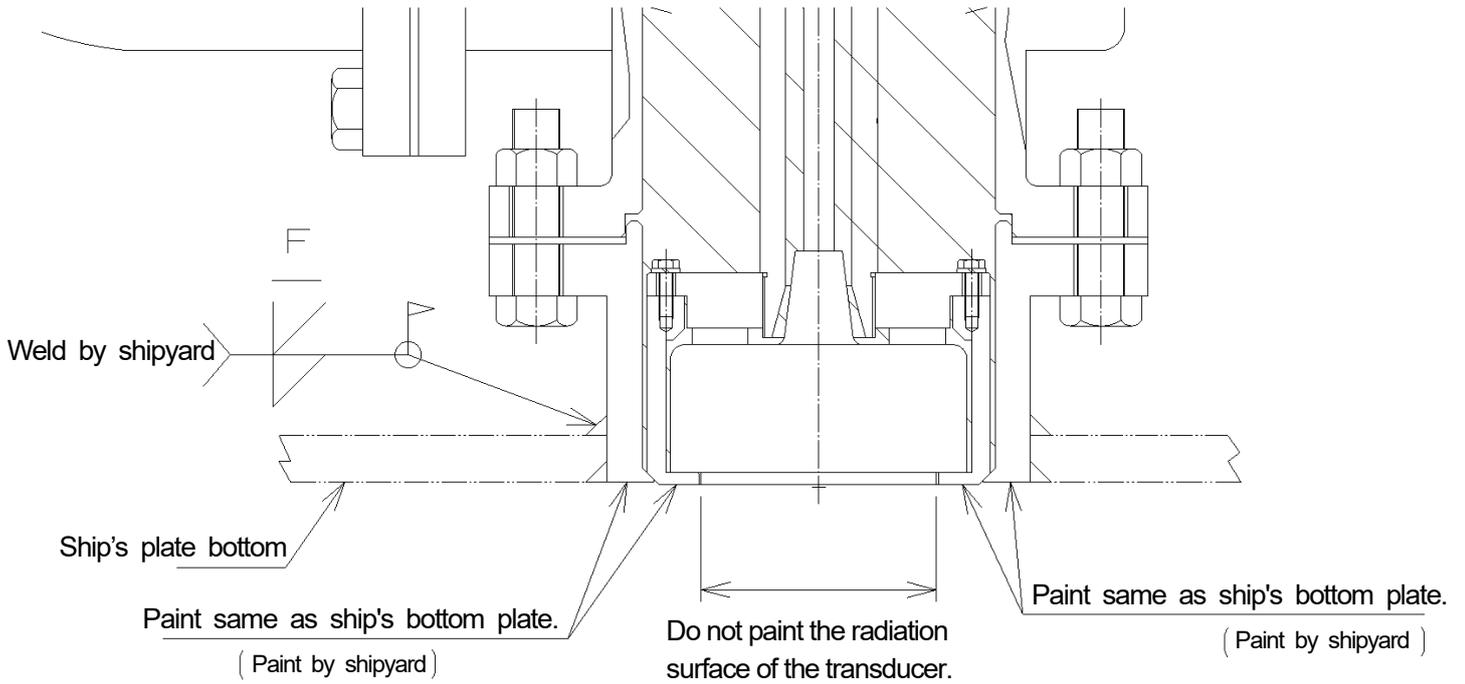
・Do not topcoat painting anything other than the green undercoat painting on the tank and gate valve.

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4.7   Maintenance Space and Piping

・Install in a watertight compartment large enough for maintenance.

・Cables should be waterproofed by piping from installation position of tank to higher than sea surface to protect the cables, prevent interference from other cables, and in case water leaks from the tightening gland.

・The pipes can be filled with dry sand to prevent cable vibration and maintain its own weight as needed.

・Do not pull the cable strongly in the state of kink (in tangles, twisted state).
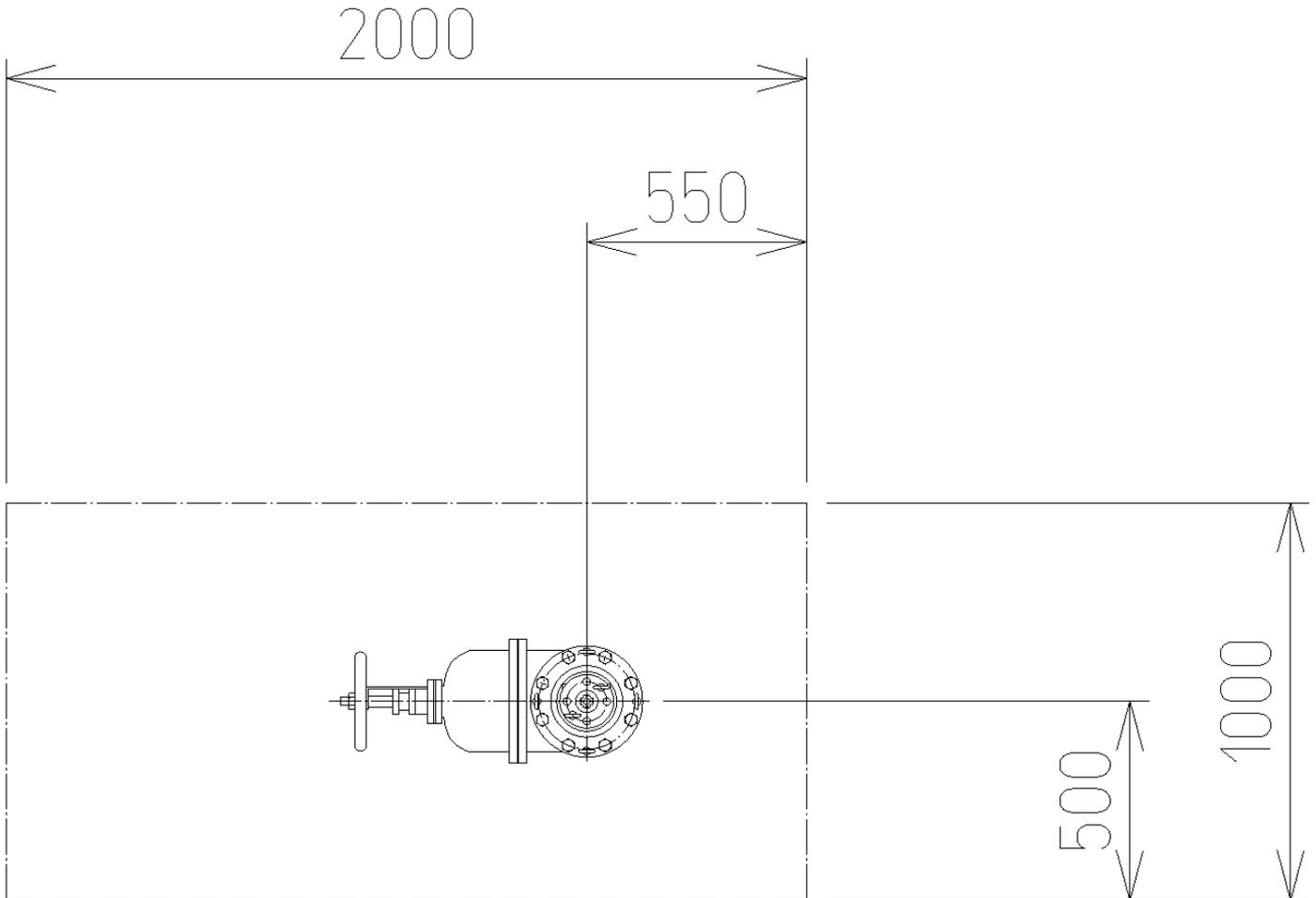
Maintenance Space

4.8 Check Items

After the installation, check the following items to make sure that the tank is properly equipped.

1. Inside of the ship
   a) All bolts are not loose.
   b) The pipe fixing bolt is not loose.
2. Outside of the ship
   a) The surface of transducer radiation is not painted.
   b) No masking tape remains on the surface of transducer radiation.
   c) The transducer and ship's bottom plate is flat.
   d) Bolt holes is filled with putty, etc.
   e) There is no protrusion of 2 mm or more within a radius of 2 m centered on the transducer to the bow direction.

4.9 Others

・Note that the gasket attached to the flange of the tank keeps water tightness (water pressure), but not airtightness (air pressure).
・To prevent interference, install the cable of transducer of this equipment at a distance of 0.5m or more from the cable of transducer of other equipment (e.g. Doppler sonar).
・To prevent interference, install the tank at a distance of 2m or more from the transducer of other equipment.
・The tightening torques of the screws such as bolts and nuts not specially specified are based on Table 1 below.

Table1

Unit: N・cm (kgf・cm)

Screw diameter / Screw material	M2	M2.6	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
Brass	13.7 (1.4)	32.4 (3.3)	50 (5.1)	118 (12)	235 (24)	402 (41)	961 (98)	1960 (200)	-	-	-	-
Soft iron	15.7 (1.6)	36.3 (3.7)	56.9 (5.8)	127 (13)	265 (27)	451 (46)	1080 (110)	2160 (220)	3820 (390)	9410 (960)	18600 (1900)	32400 (3300)

Chapter 5 installing of Matching Box

⚠ CAUTION

The matching box cannot be installed outdoors or in flooded areas.

5.1   Preparation Tool

Matching box	Preparation tool	Qty.
NQD-2598/2597	Phillips screwdriver or Wrench (For M4)	1
AW-154F-50/AW-154F	Wrench (For M8)	1

5.2   Installation Drawing

(1) NQD－2597

(2) NQD－2598
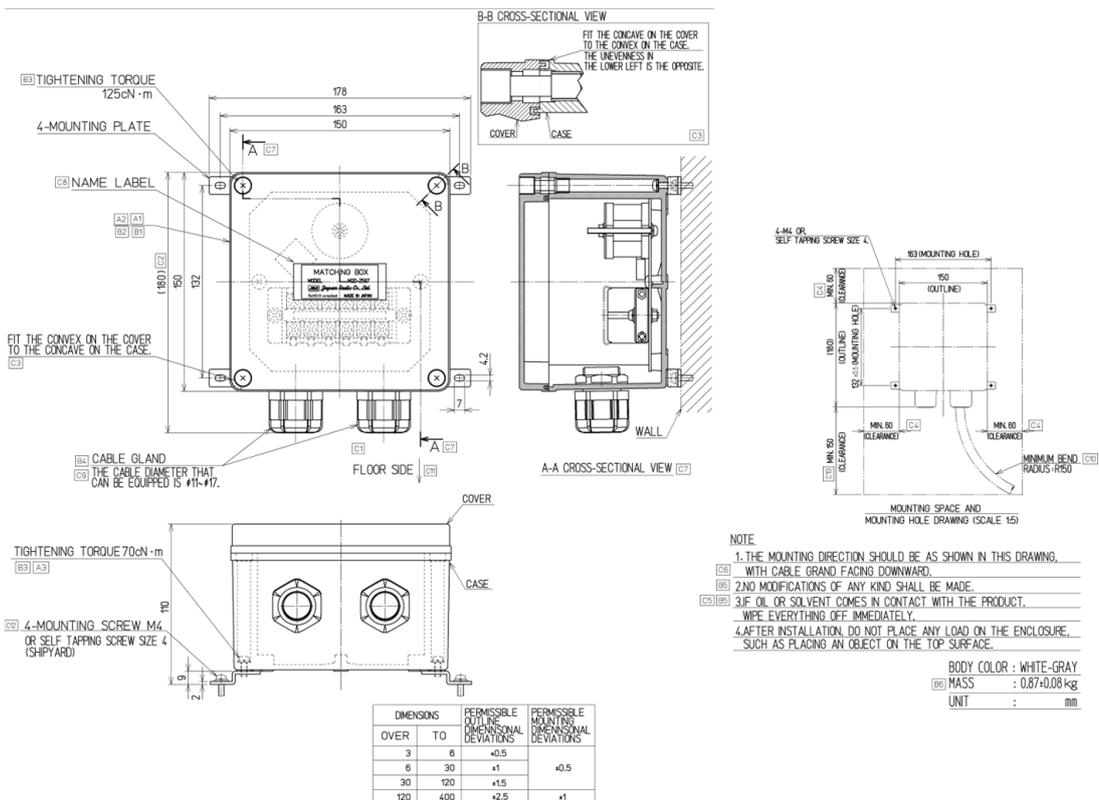
(3) AW-154F/AW-154F-50

5.3   Installation Procedure

(1) NQD-2597/2598

Fix with M4 screw ND4 Tapping screw on the mounting plate at the four corners.
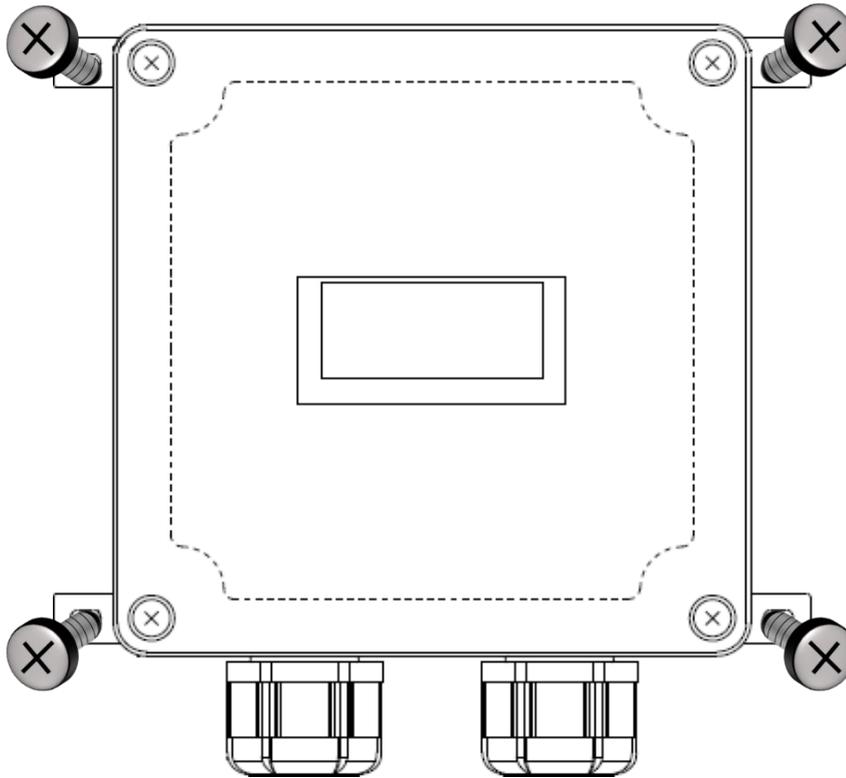
(2) AW-154F/AW-154F-50

Fix with M8 bolt at the three mounting plate.
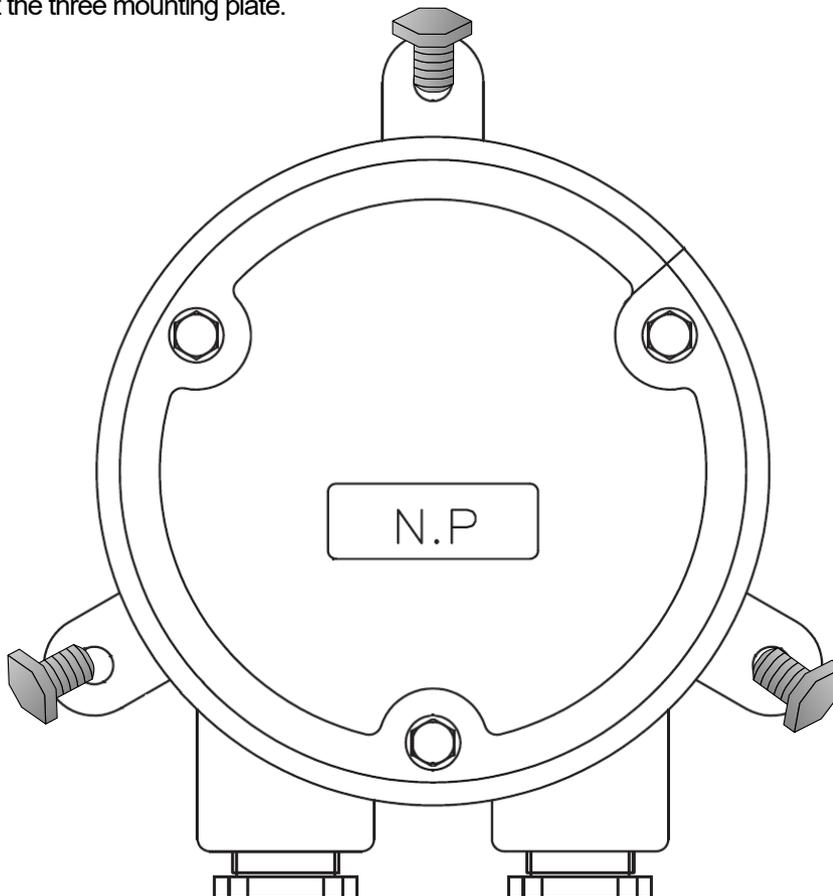
5.4　Others

Install the NQD-2597 / 2598 so that the gland side faces the bottom side and is perpendicular to the bottom of the ship.
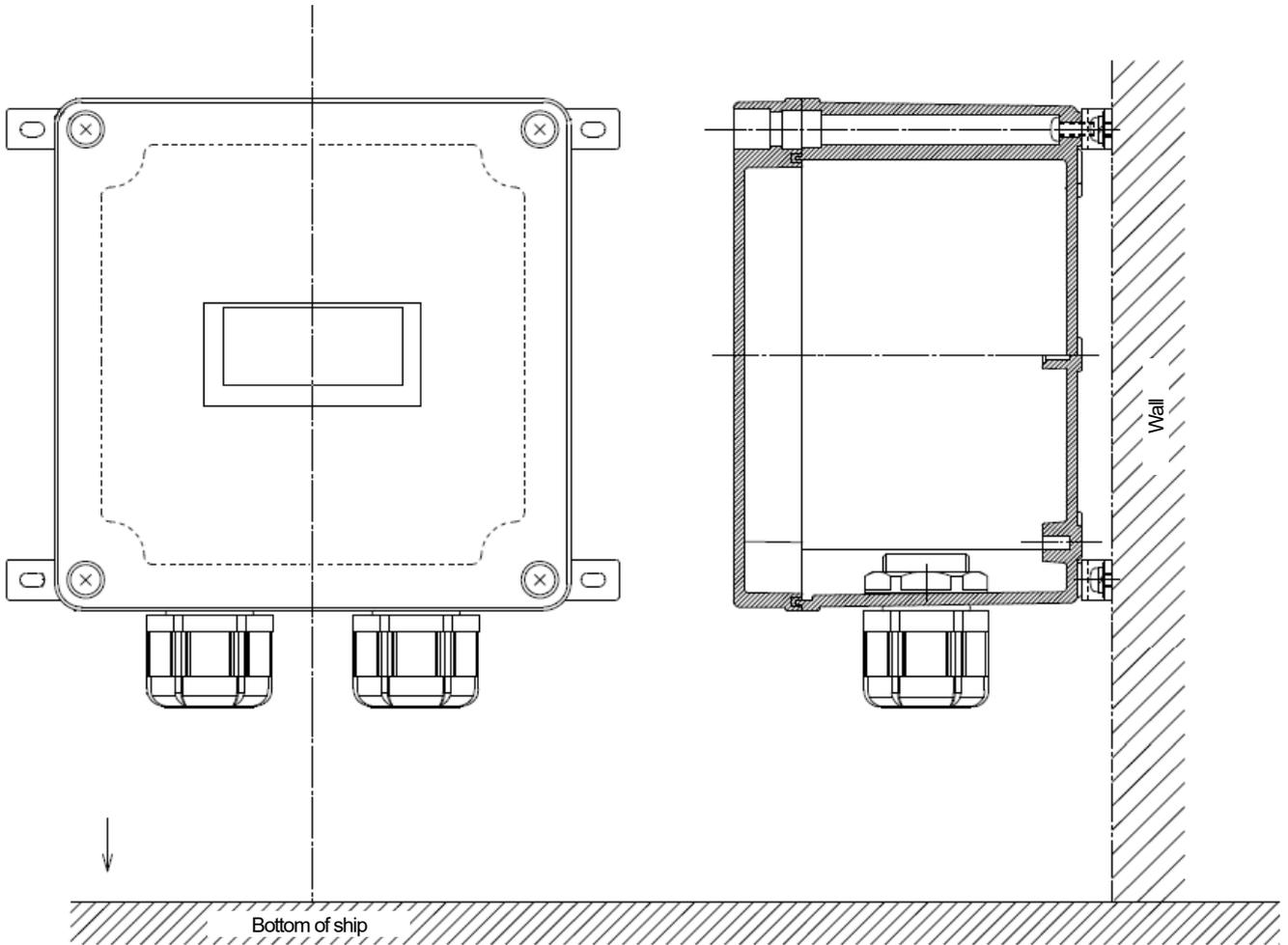
Good installation (Gland faces the bottom side of ship and perpendicular)
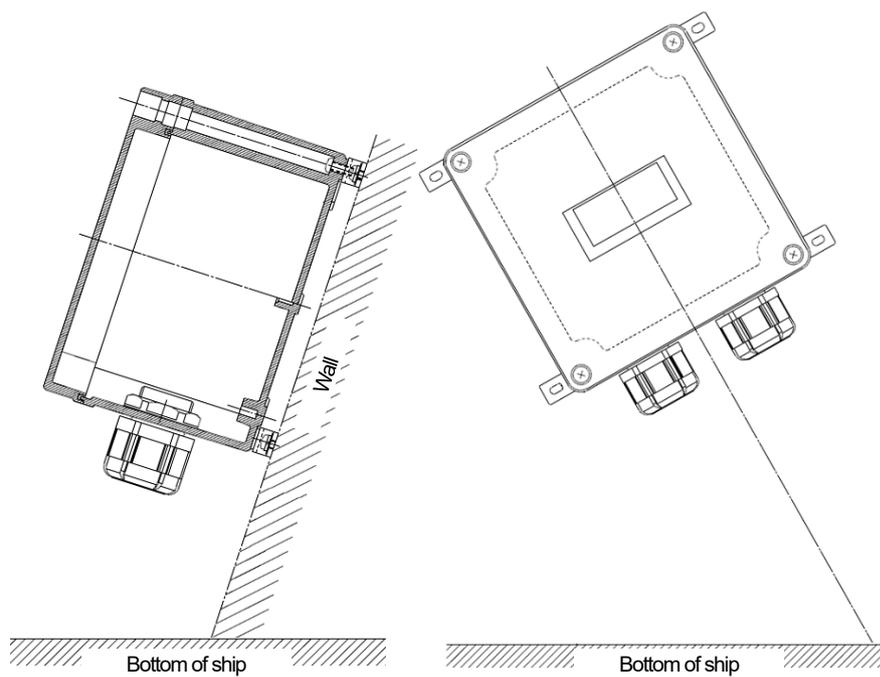
Bad installation

・The tightening torques of the screws such as bolts and nuts not specially specified are based on Table 1 below.

Table1

Unit: N・cm (kgf・cm)

Screw diameter / Screw material	M2	M2.6	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
Brass	13.7 (1.4)	32.4 (3.3)	50 (5.1)	118 (12)	235 (24)	402 (41)	961 (98)	1960 (200)	-	-	-	-
Soft iron	15.7 (1.6)	36.3 (3.7)	56.9 (5.8)	127 (13)	265 (27)	451 (46)	1080 (110)	2160 (220)	3820 (390)	9410 (960)	18600 (1900)	32400 (3300)

Chapter 6 Installing of Display Unit NWZ-1650

6.1   Preparation Tool

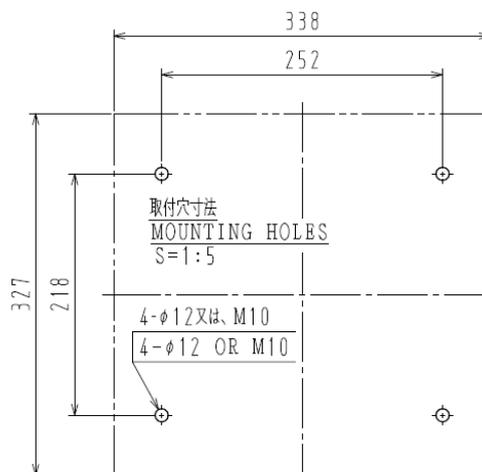| Equipment	Preparation tool	Qty.
NWZ-1650	Phillips screwdriver (For M4)	1
	Phillips screwdriver (For M3)	1

6.2   Installation Drawing

Flush Mount Type

Unit : mm

Mass : 1kg

Desktop Type(Optional Base Kit use)

LAN Connector

FG

Serial Connector

Unit : mm

Mass : 1.5kg
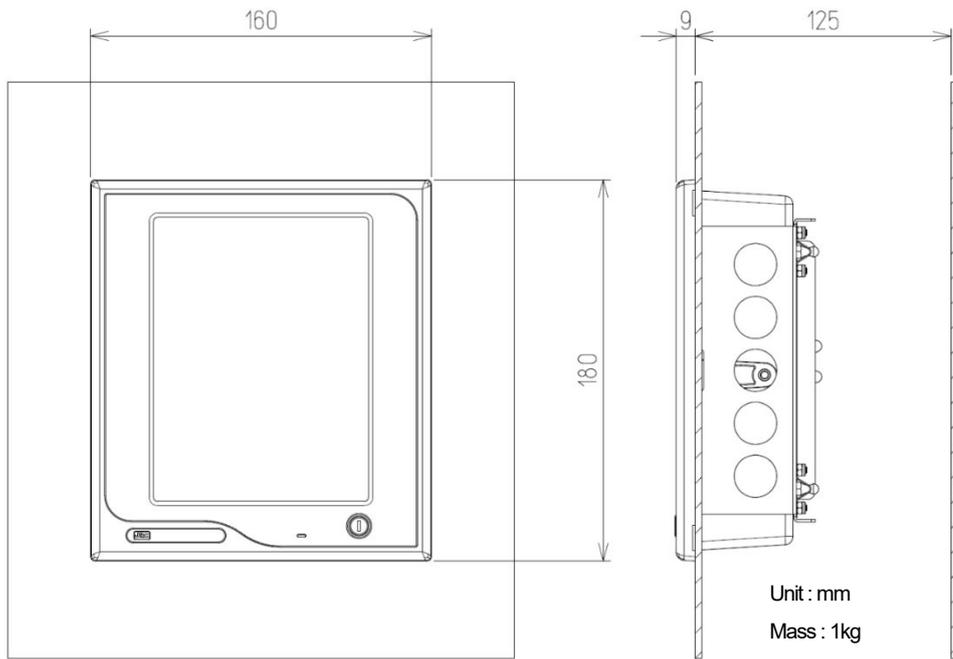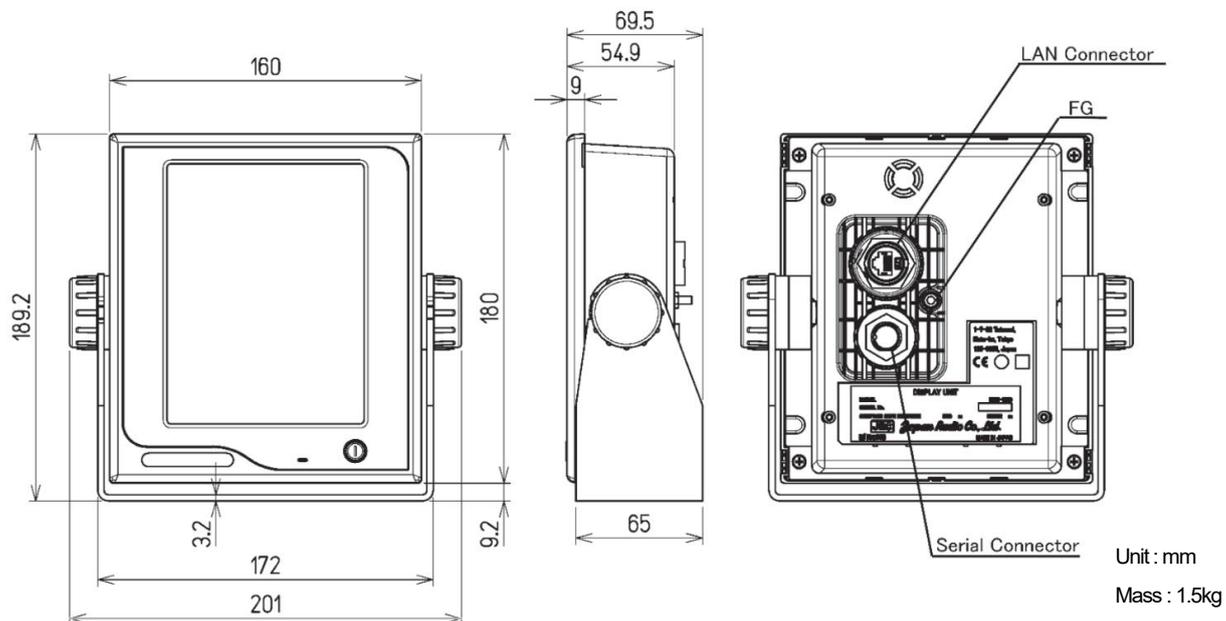
6.3 Installing Guide

6.3.1 Selecting an Installation Location

This equipment can be installed on a table or a wall (flush-mount). Install the equipment on a flat floor or wall.

| ⚠ **WARNING** |
|---|
| ❗ | Install this unit at least 1 m away from any magnetic compasses. Installation near a magnetic compass may result in interference with the magnetic compass, and may result in an accident. |

6.3.2 Flush-mount installation

1) Provide the following spaces.
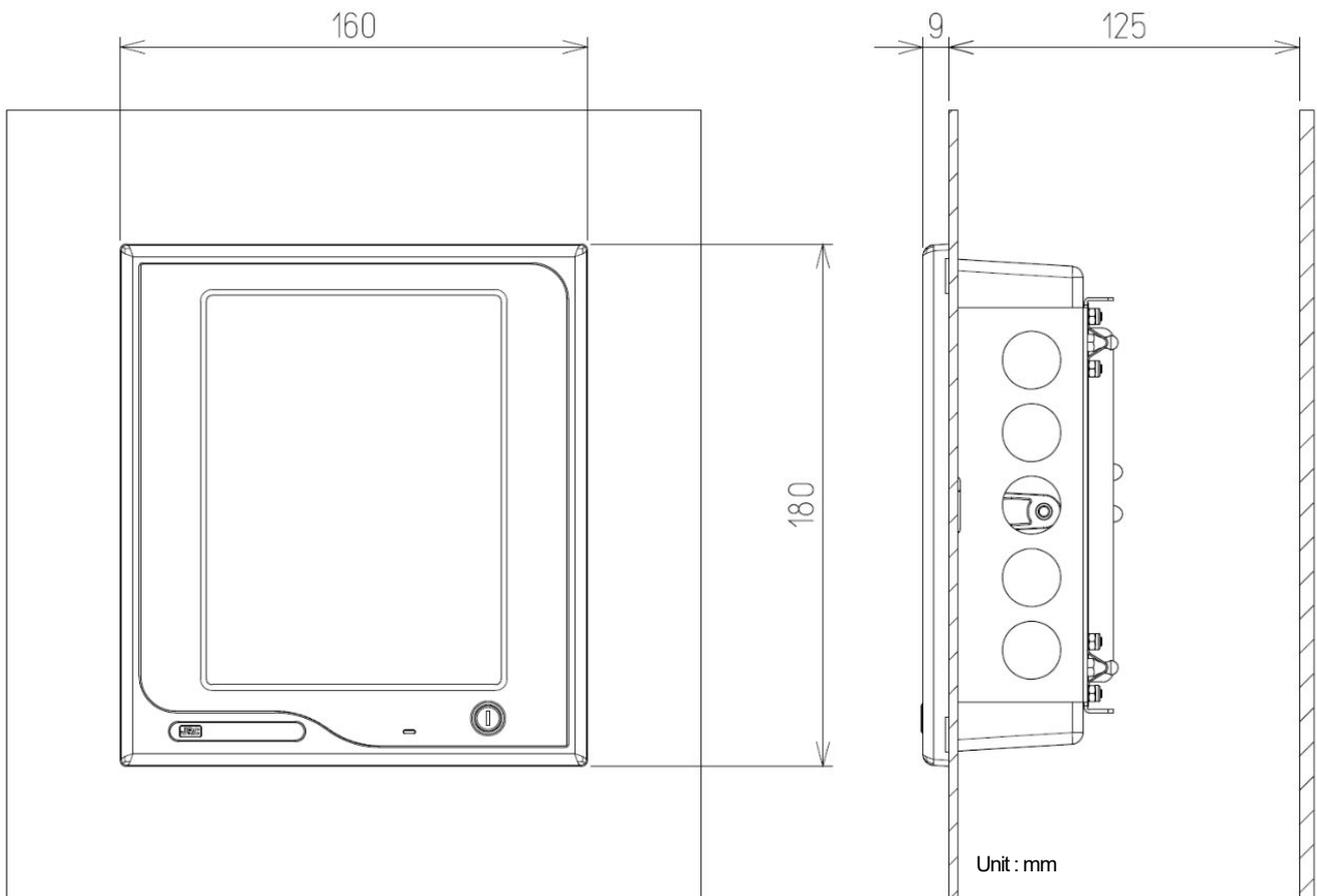
Unit : mm

2) The panel cut size is shown below.
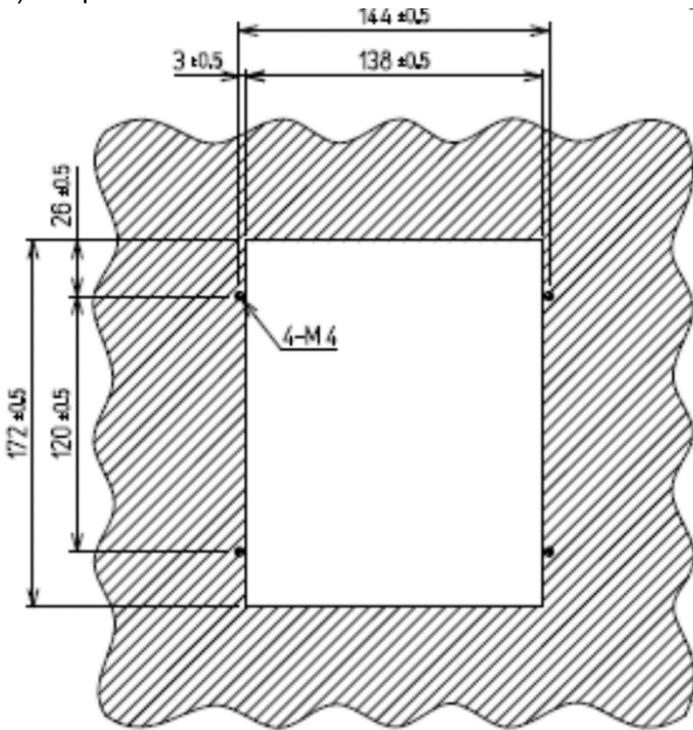
Unit : mm

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4

3) Remove the fixing bracket for panel mounting at the rear of the display and fix it on the panel. Insert the display in the fixing bracket for panel mounting that is fixed on the panel.

Fixing bracket for panel mounting

Spring washer +M4 small pan head screw with small round washer 4 pieces

Display main unit + snap-on bracket
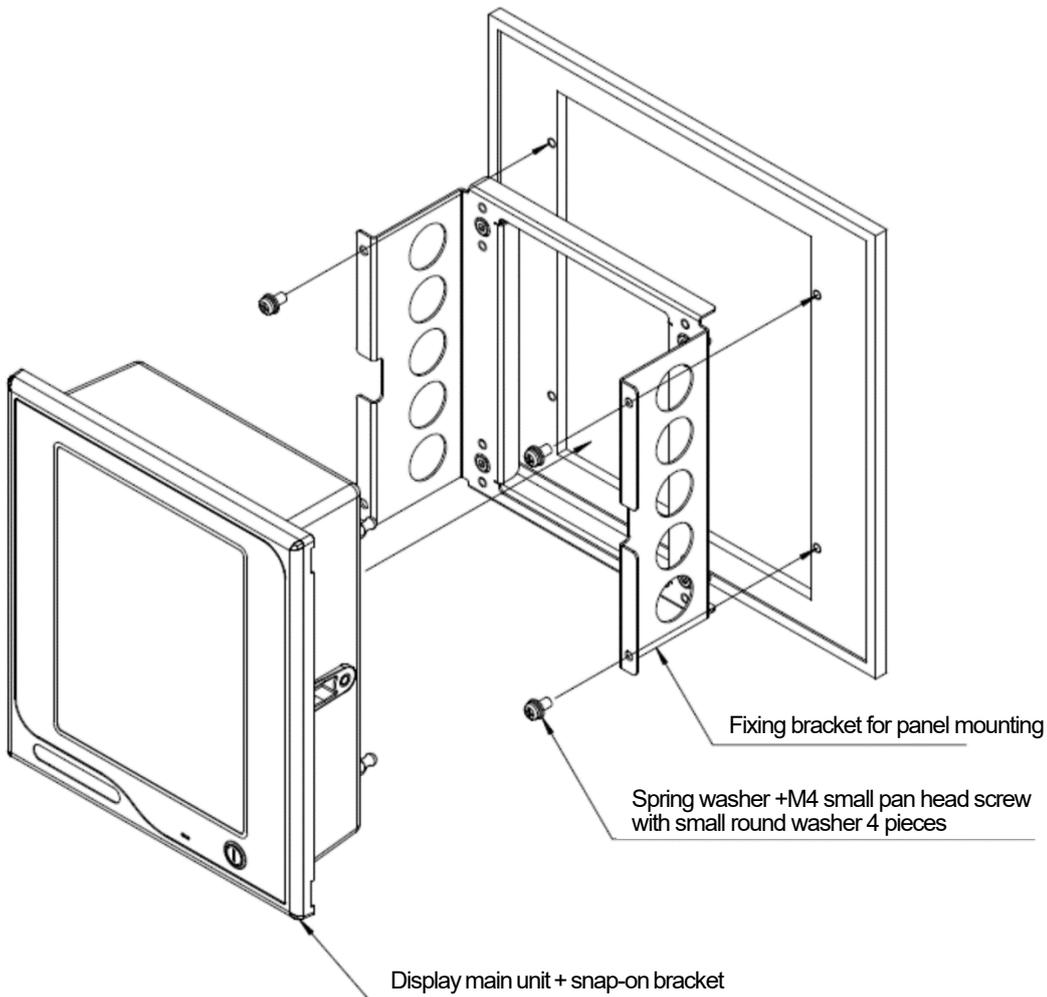
6.3.3   Tabletop installation

1) For tabletop installation, prepare an optional Base kits. Desktop installation on a Base kits is recommended. When installing on a ceiling, install after checking that the ceiling is sufficiently strong. Provide the following spaces.

350 or more

134 or more

220 or more

Unit : mm
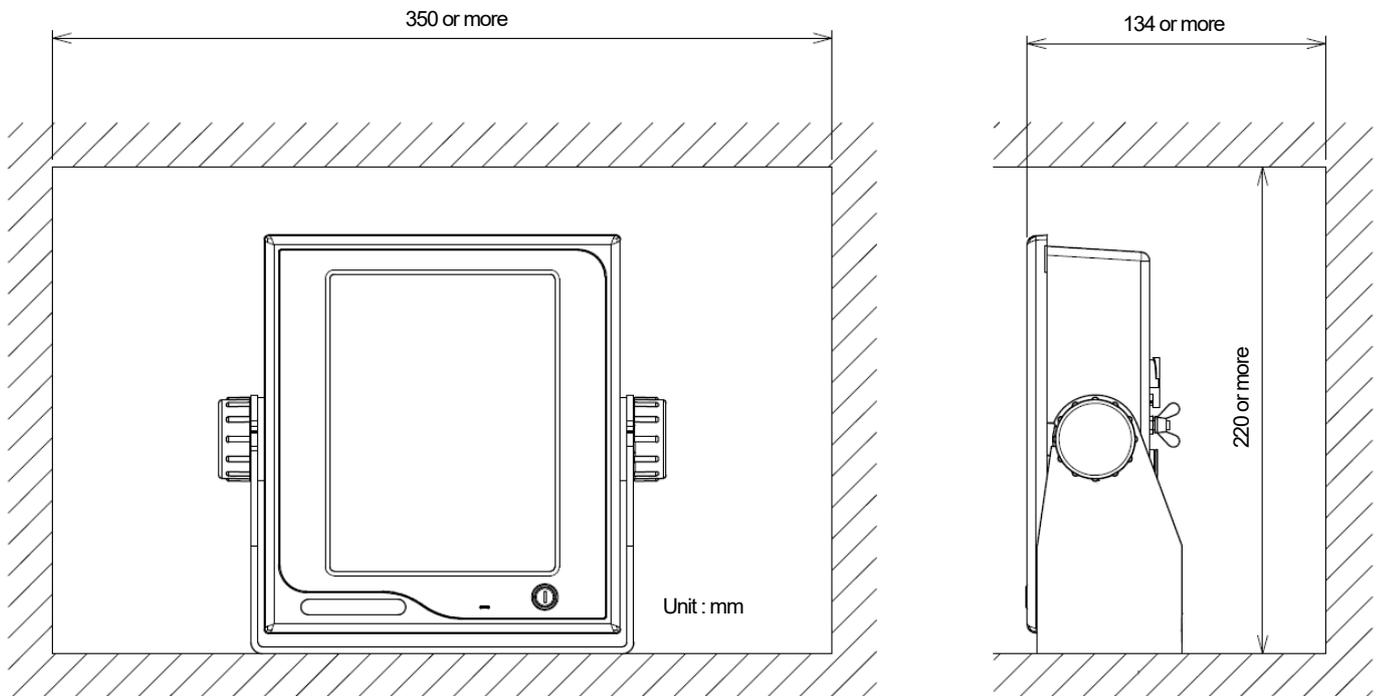
2) Base kits mounting hole size

5-ø 6.5

Unit : mm

7.5

50

(7.5)

29   57   57   (29)
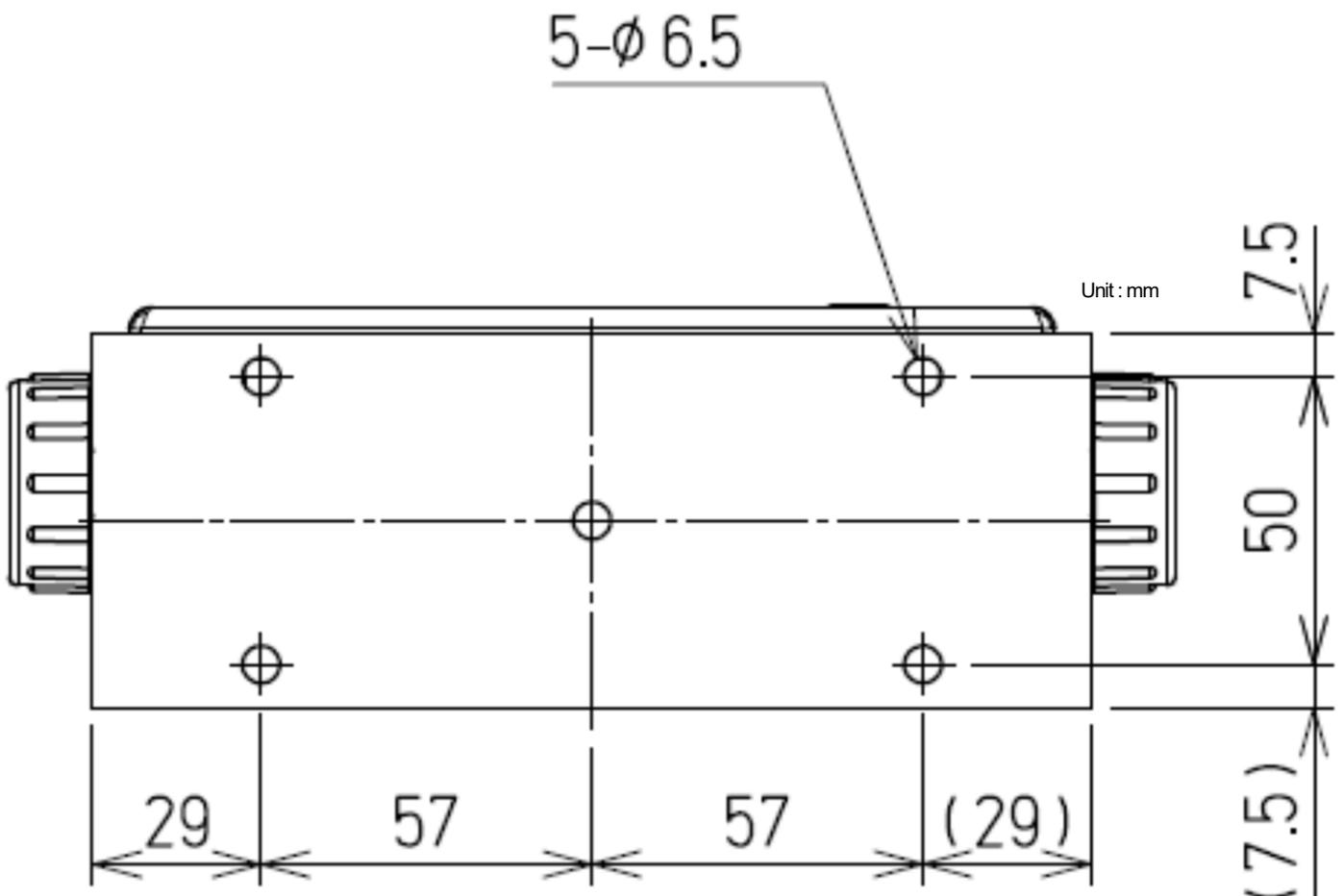
3) Mount plate nuts and rubber spacers on the display. Fix the Base kits on the tabletop. Mount the display on the Base kits.

Spring washer +M3 small pan head screw with small round washer 2 pieces

Plate nut

Knob bolt

Rubber spacer

Plate nut

Spring washer +M3 small pan head screw with small round washer 2 pieces

U shaped stand

Rubber spacer

Knob bolt
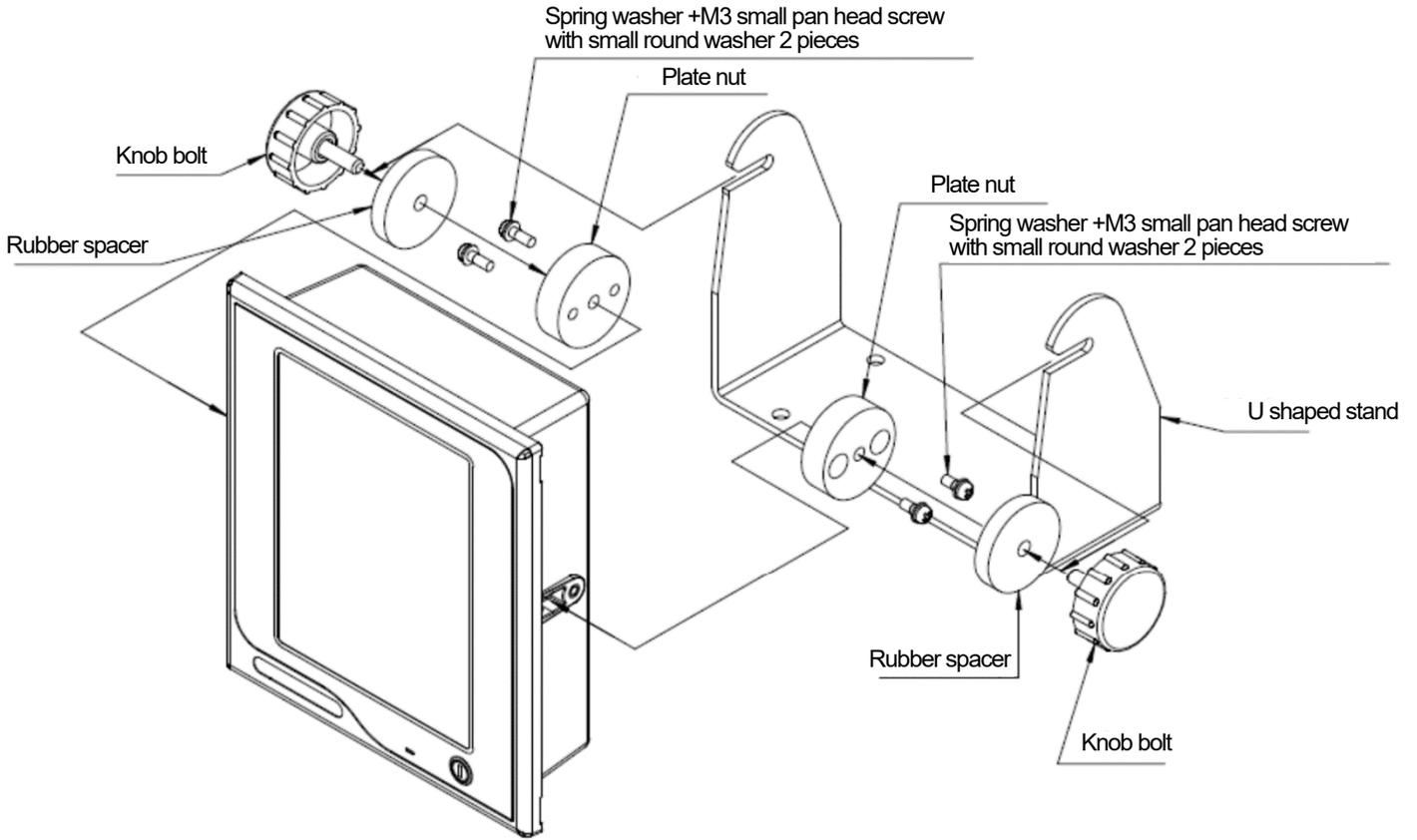
6.4 Installing of NWZ-4610 Remote Display(Option)

● Mounting the display unit using a rack

Use the following procedure.

1) Fix the desktop rack at the required installation position by using the mounting screws (ϕ4～6 screw or wood screw, L>=15mm, provided by the shipyard).

2) Insert the front panel into the main unit.

3) Attach the rotational washer on the side of the main unit.

4) Attach the rotational washer on the side of the desktop rack.

5) Assemble the main unit on the desktop rack, insert the knob metal washer between the desktop rack and the knob bolt, and fix the main unit by tightening the knob bolts.

Mounting screw
(provided by the shipyard)

Knob bolt

Knob metal washer

Rotational washer

Desk rack

Main unit

ϕ6 mounting hole (4 holes)

Front panel

285 or more

190 or more

190 or more
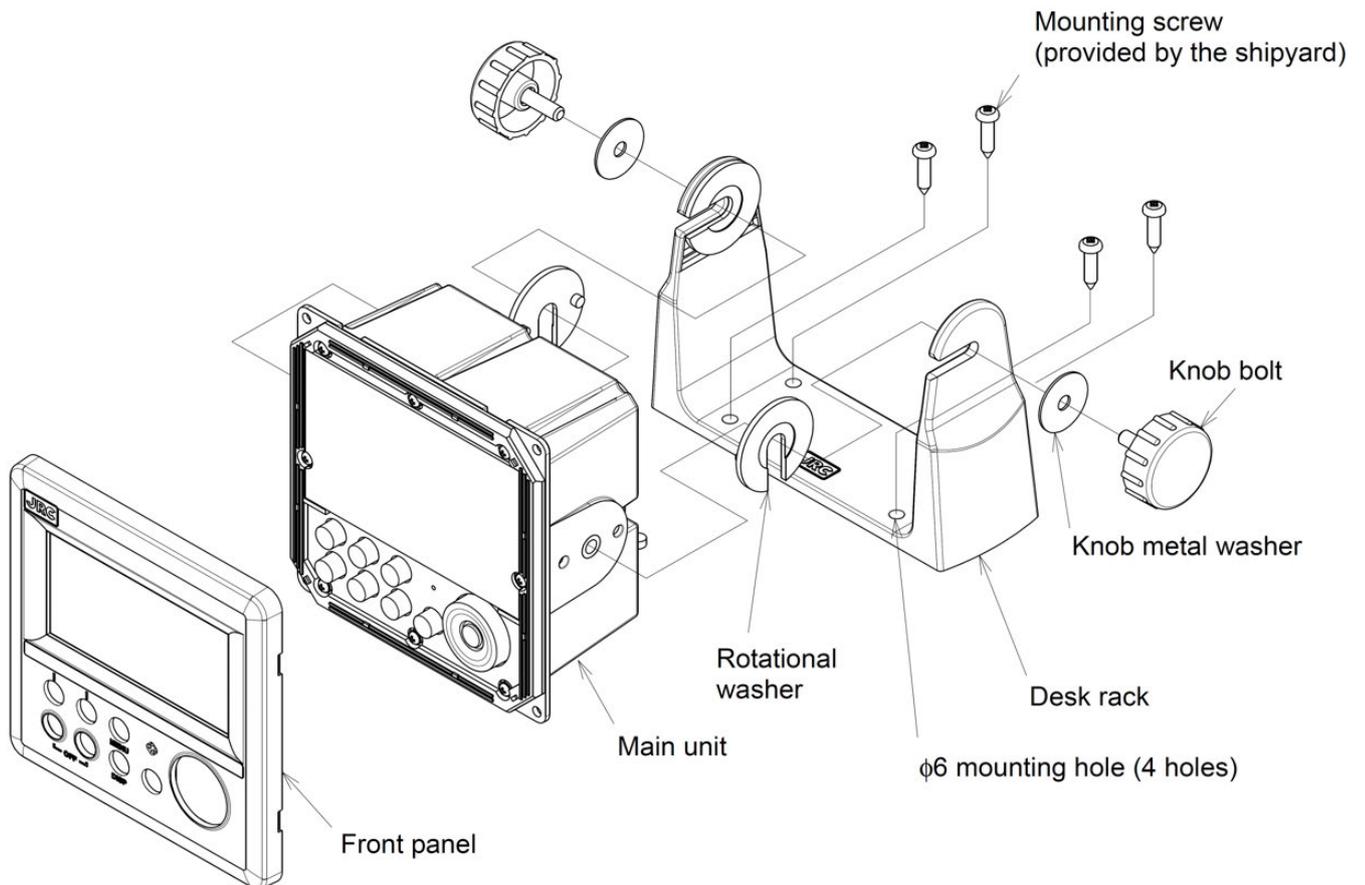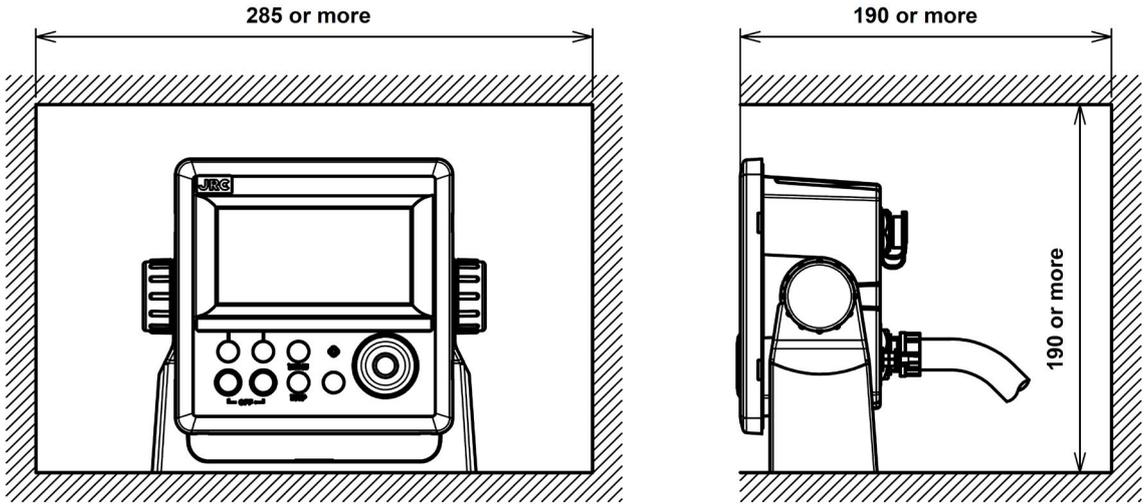
Required installation space

4-ø6

10

35

(10)

37

92

(37)
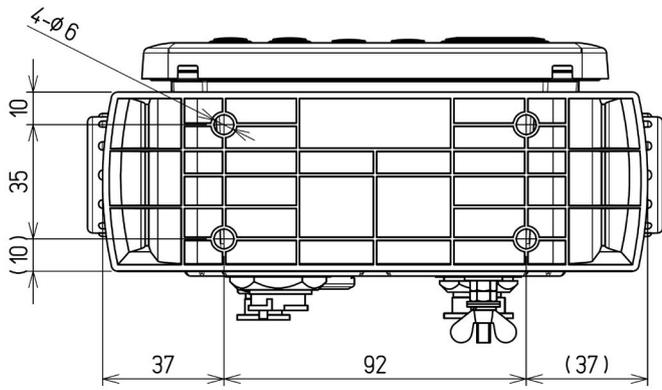
Mount (bottom)

(Unit: mm)

88

●Mounting using a flush mount

Use the following procedure.

See the diagram below for the mounting space and mounting holes.

Do not tighten a screw too much. Doing so may result in damage of installation holes.

   1) Insert the main unit in the installation location.

   2) Fix the main unit using the mounting screws (φ4 screw or wood screw, L>=10mm, provided by the shipyard).

The sizes of the heads of the screws that are used are restricted as follows including the   washers.

   ・Diameter: Up to □8 mm

   ・Height: Up to 4.5 mm

3) Insert the front panel into the main unit

Front panel

Mounting screw (provided by the shipyard)

2.5

φ4.5 mounting hole (4)

Main unit   Mounting wall

After mounting

Provide maintenance space

11.5 60

142

142

180 or more

127 ±1 (Square hole)

4-Ø4.5 or M4

127 ±1 (Square hole)

Mounting hole

4-C11

127 ±1 (Screw pitch)

127 ±1 (Screw pitch)

12.5

4-Ø25

12.5

※About the corner C11,
may want to cut Ø25
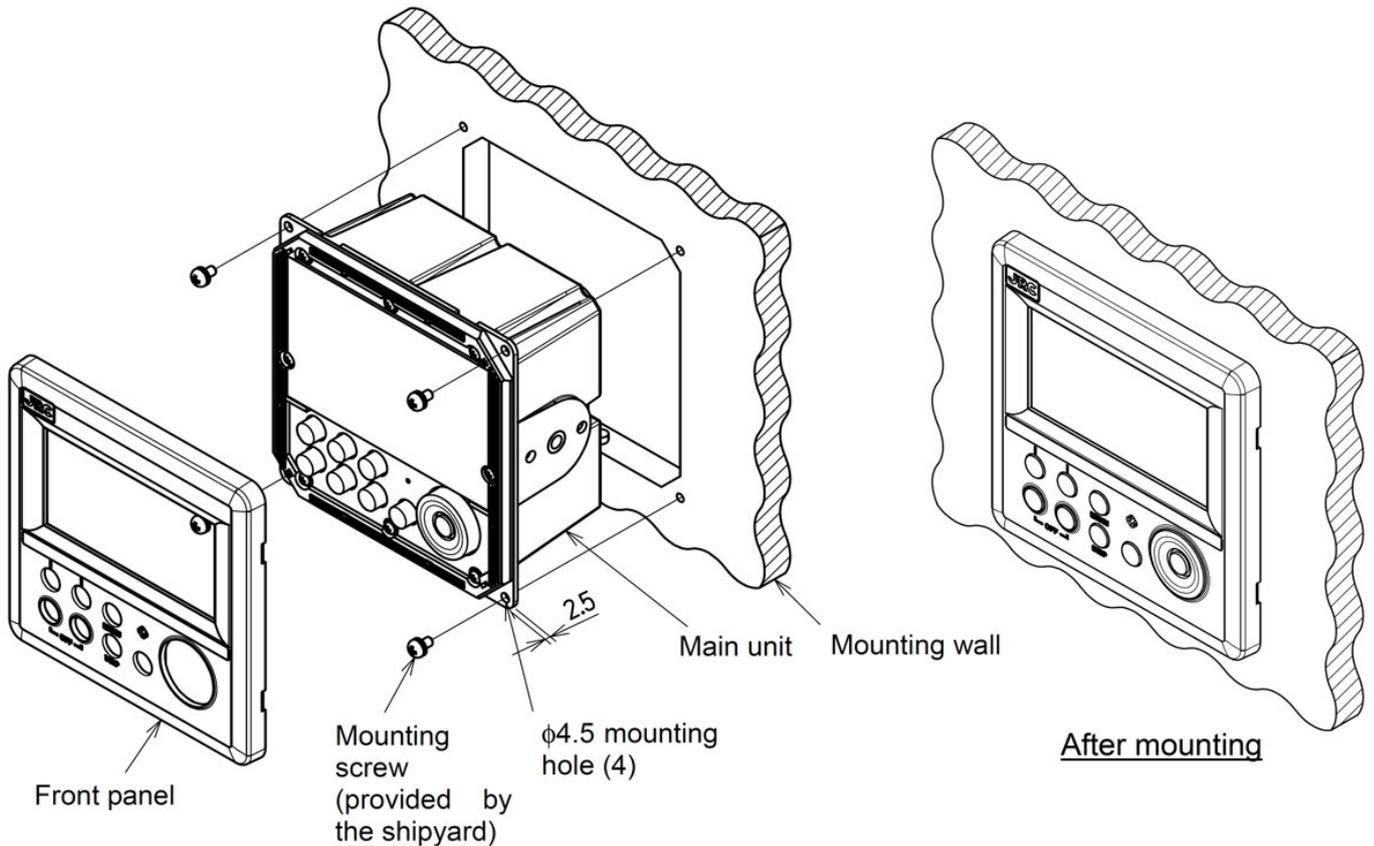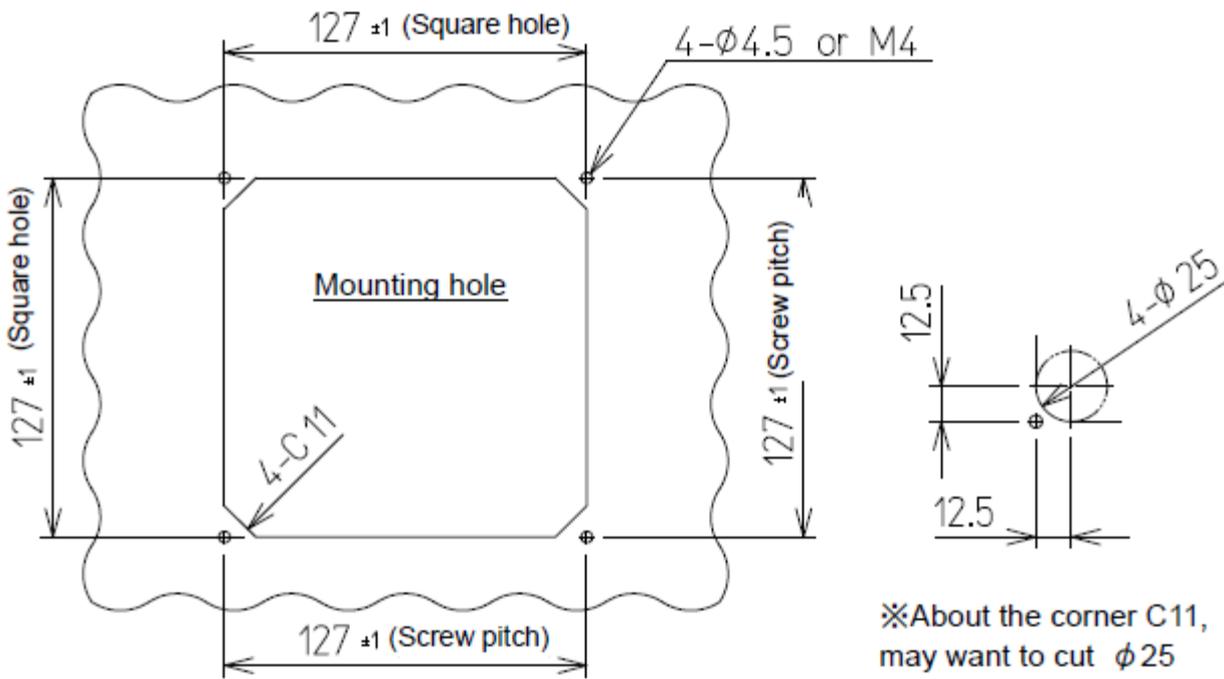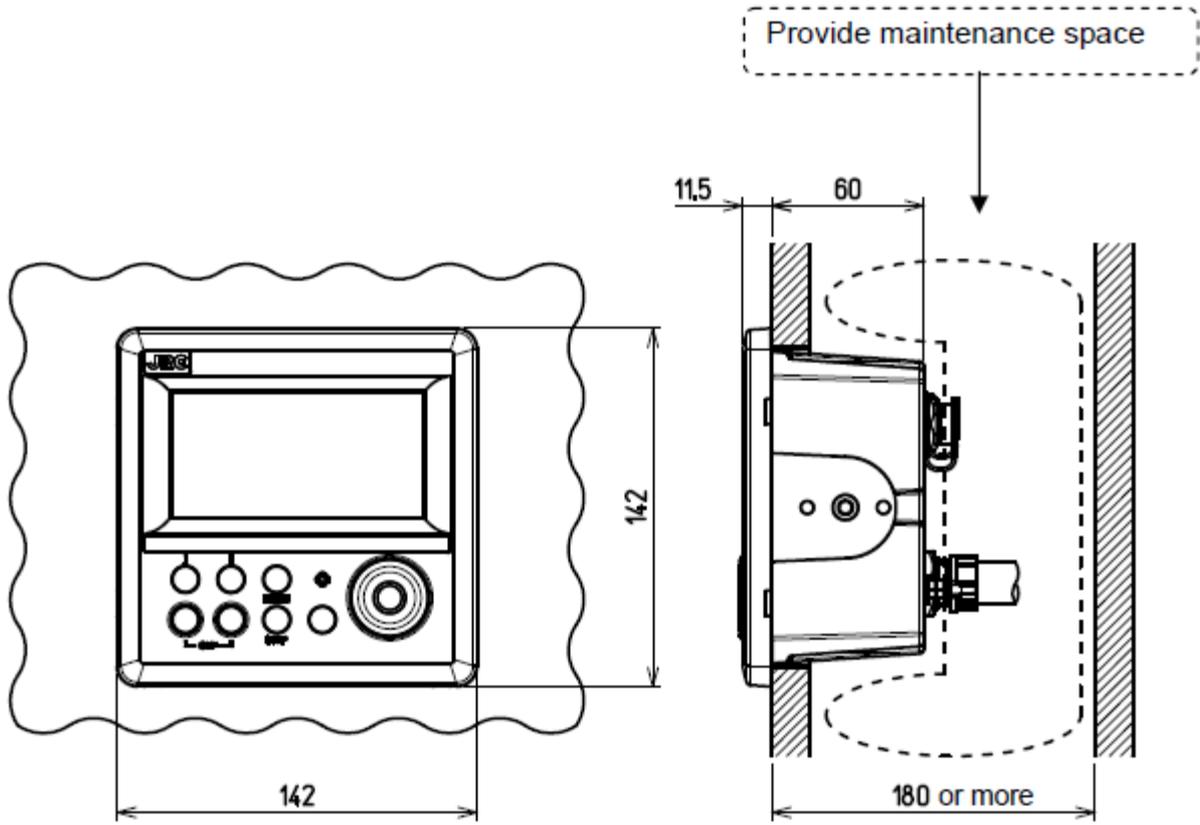
Chapter 7 Installing of Processing Unit NQA-4327

7.1   Preparation Tool

Equipment	Preparation tool	Qty.
NQA-4327	Wrench (For M10) Phillips screwdriver (For M4)	1

7.2   Installation Drawing

⚠ **WARNING**

Install this unit at least 1 m away from any magnetic compasses. Installation near a magnetic compass may result in interference with the magnetic compass, and may result in an accident.

取付穴寸法
MOUNTING HOLES
S=1:5

4-φ12又は、M10
4-φ12 OR M10

Unit: mm
Mass: Approximately 5.9kg

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±5	±3
2000	4000	±8	

7.3   Installing Guide

1) Remove the 4 screws (M4) at the four corners of the front of the NQA-4327 and remove the front cover.
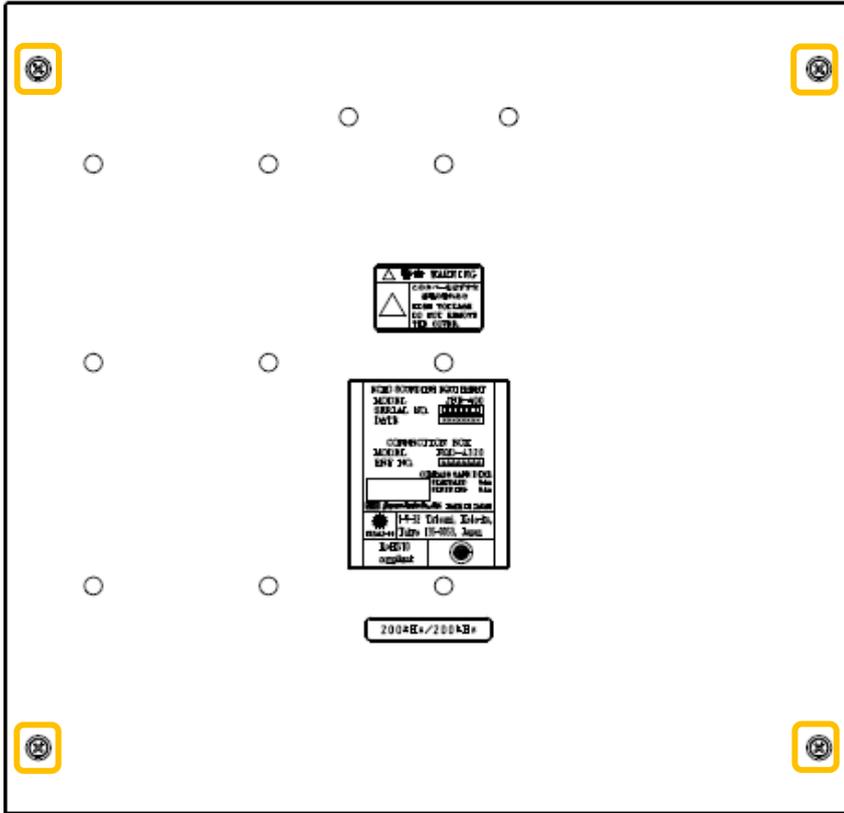
2) Remove the 9 cables of front cover that are connected to the rear case.
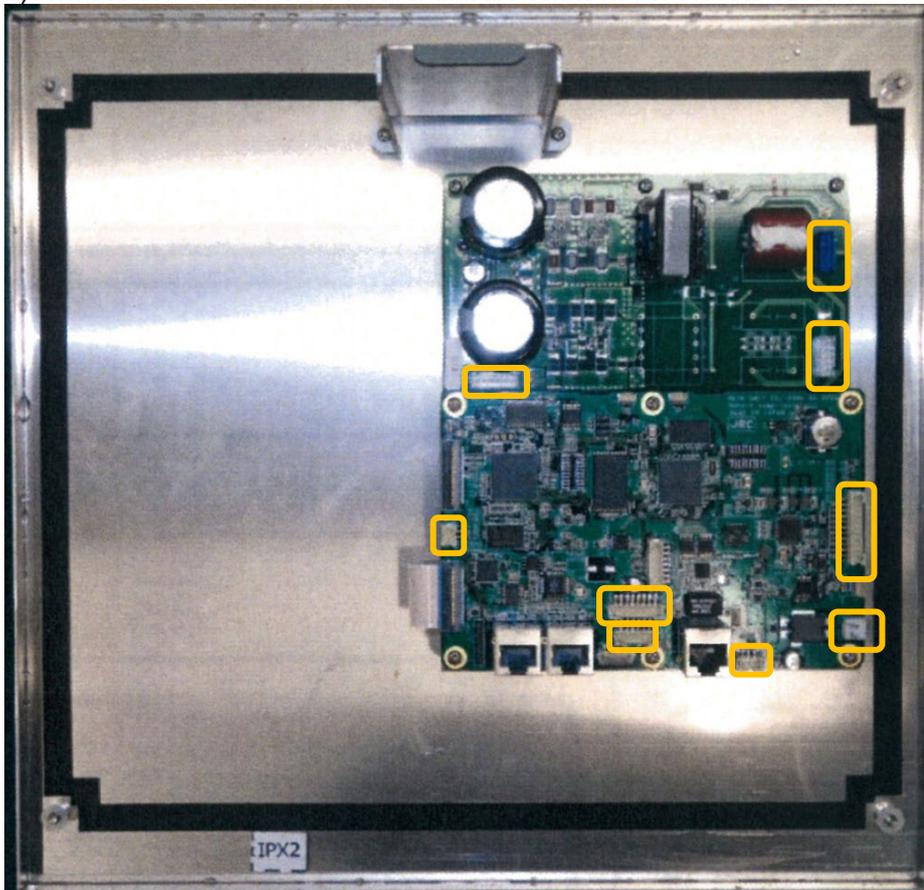
4) Fix the mounting holes at the four corners of the rear case and the wall with 4 bolts and nuts (M10).

5) Hook the mounting bracket on the front cover to the rear case. (Wiring work will be easier by hooking.)

mounting bracket
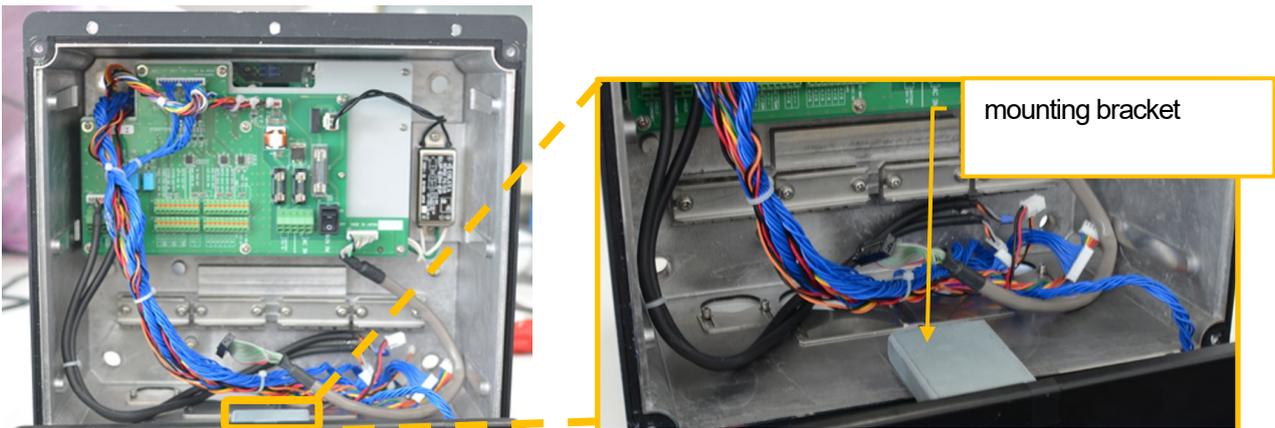
6) Assemble the processing unit in the reverse order of procedure 1) to 3).
When fitting the front cover to the rear case, be careful not to pinch the cable.

Note: When wiring to processing unit has not been performed, assemble the front cover after wiring. Refer "9.6 Processing Unit NQA-4327 wiring" for wiring.

7.4   Others

・The tightening torques of the screws such as bolts and nuts not specially specified are based on Table 1 below.

Table1

Unit: N・cm (kgf・cm)

Screw diameter / Screw material	M2	M2.6	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
Brass	13.7 (1.4)	32.4 (3.3)	50 (5.1)	118 (12)	235 (24)	402 (41)	961 (98)	1960 (200)	-	-	-	-
Soft iron	15.7 (1.6)	36.3 (3.7)	56.9 (5.8)	127 (13)	265 (27)	451 (46)	1080 (110)	2160 (220)	3820 (390)	9410 (960)	18600 (1900)	32400 (3300)

Chapter 8 Installing of Printer NKG-901 (Option)

8.1   Preparation Tool

Equipment	Preparation tool	Qty.
NKG-901	Phillips screwdriver (For M4)	1

8.2   Installation Drawing

Unit : mm

8.3 Installation Guide

8.3.1 Wall mounting with MPB32159A

6x∅5
MOUNTING HOLES

VIEW A

CABLE INLET

Unit : mm
Mass : 1.5kg

CABLE INLET

MPB32159A

M4 SCREWS
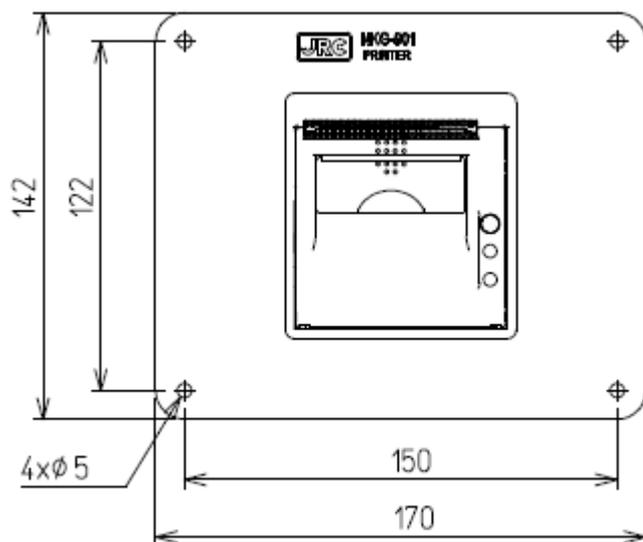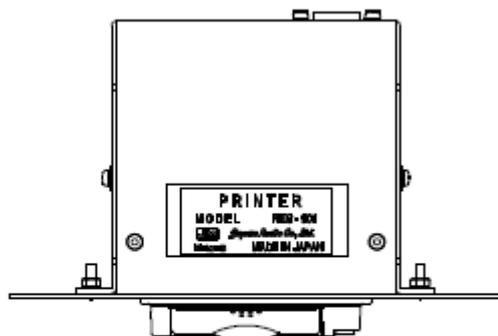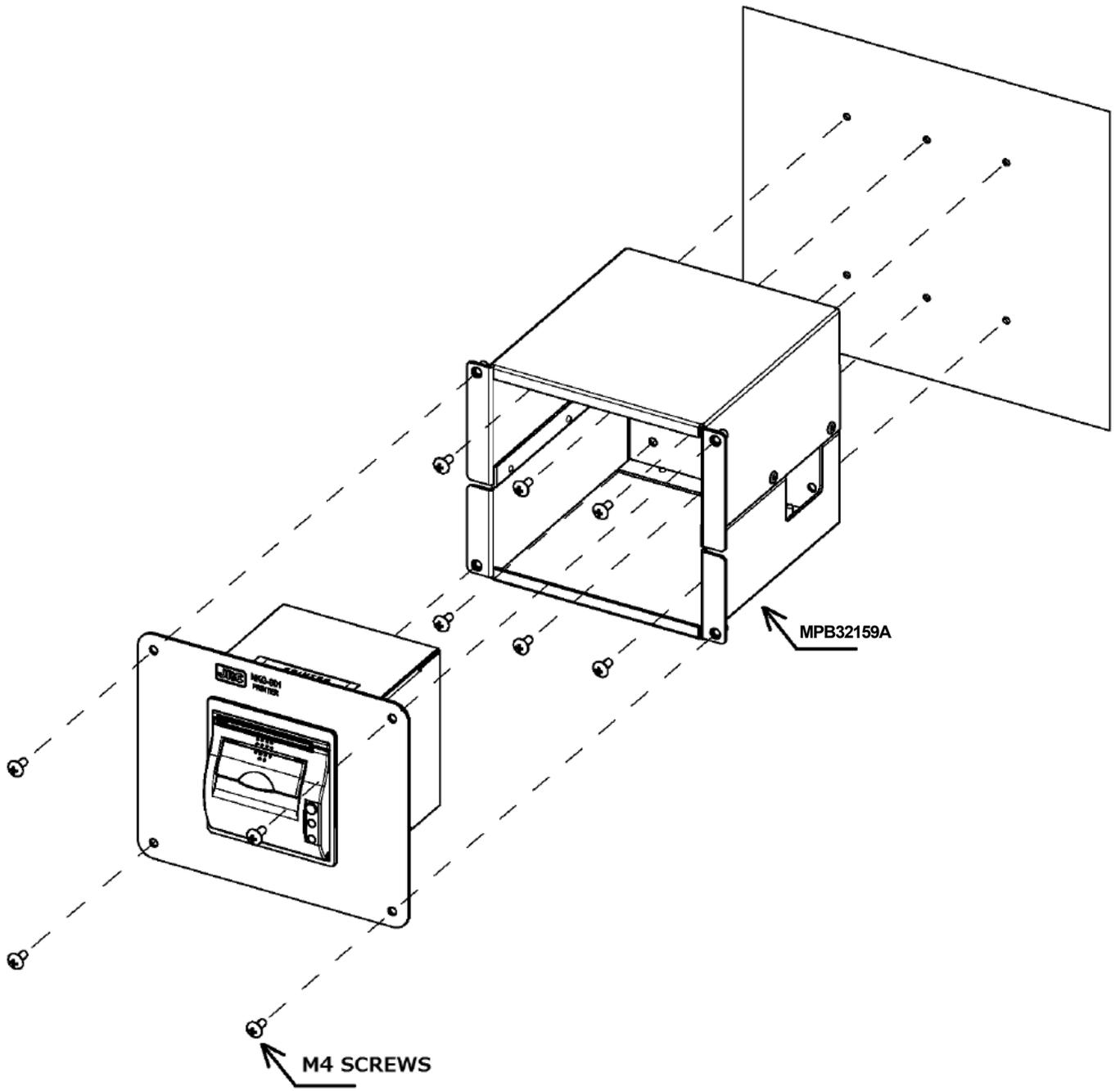
See "9.7 Printer NKG-901 Wiring" for how to connect the cable.

8.3.2 Flush mounting

Unit : mm

Mass : 0.8kg

4×∅5

142
122
150
170
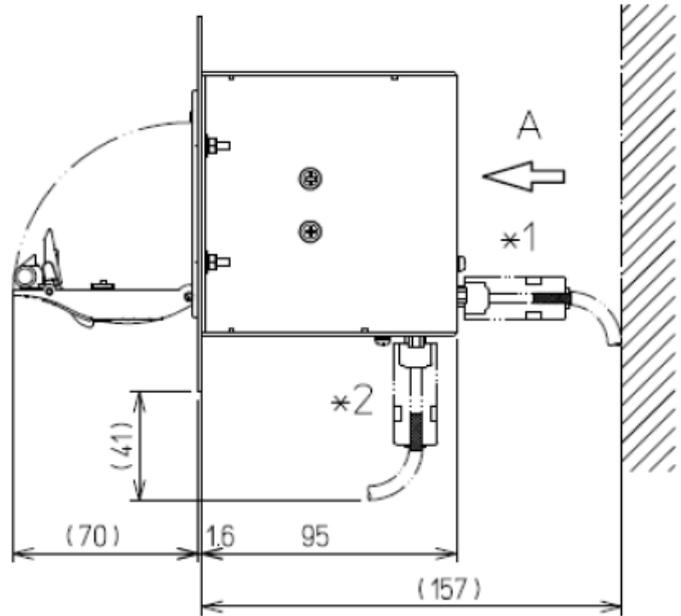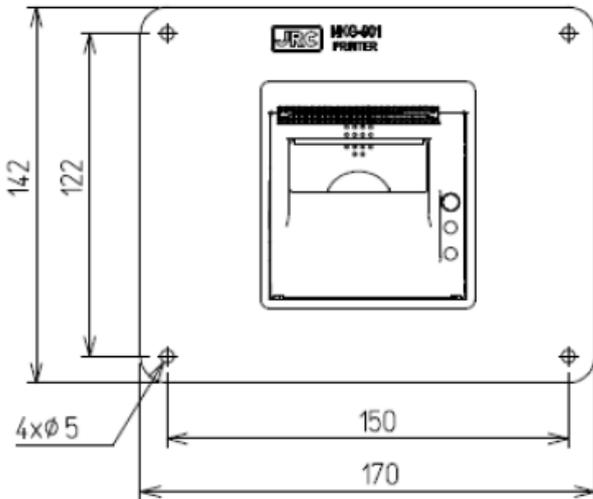
VIEW A

Connection direction of D-sub is selectable either back(∗1) or bottom(∗2)

A

∗1

∗2

(41)

(70)   1.6   95

(157)

4×M 4

140

(5)

122

120

(3)

(5)   150   (5)
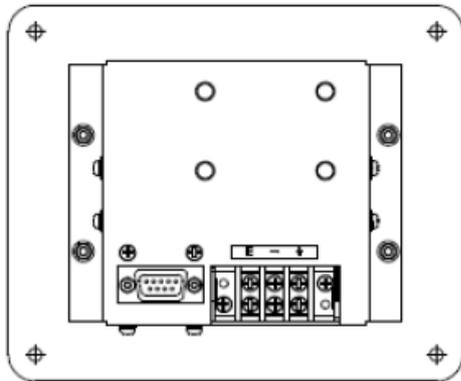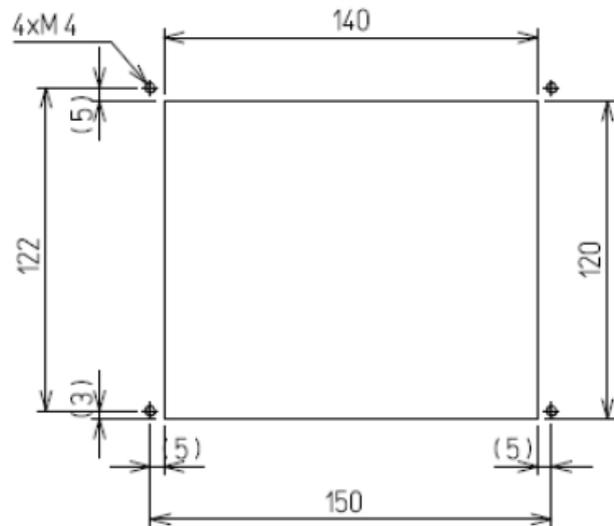
The dimensions of a hole in the wall

98

M4 SCREWS
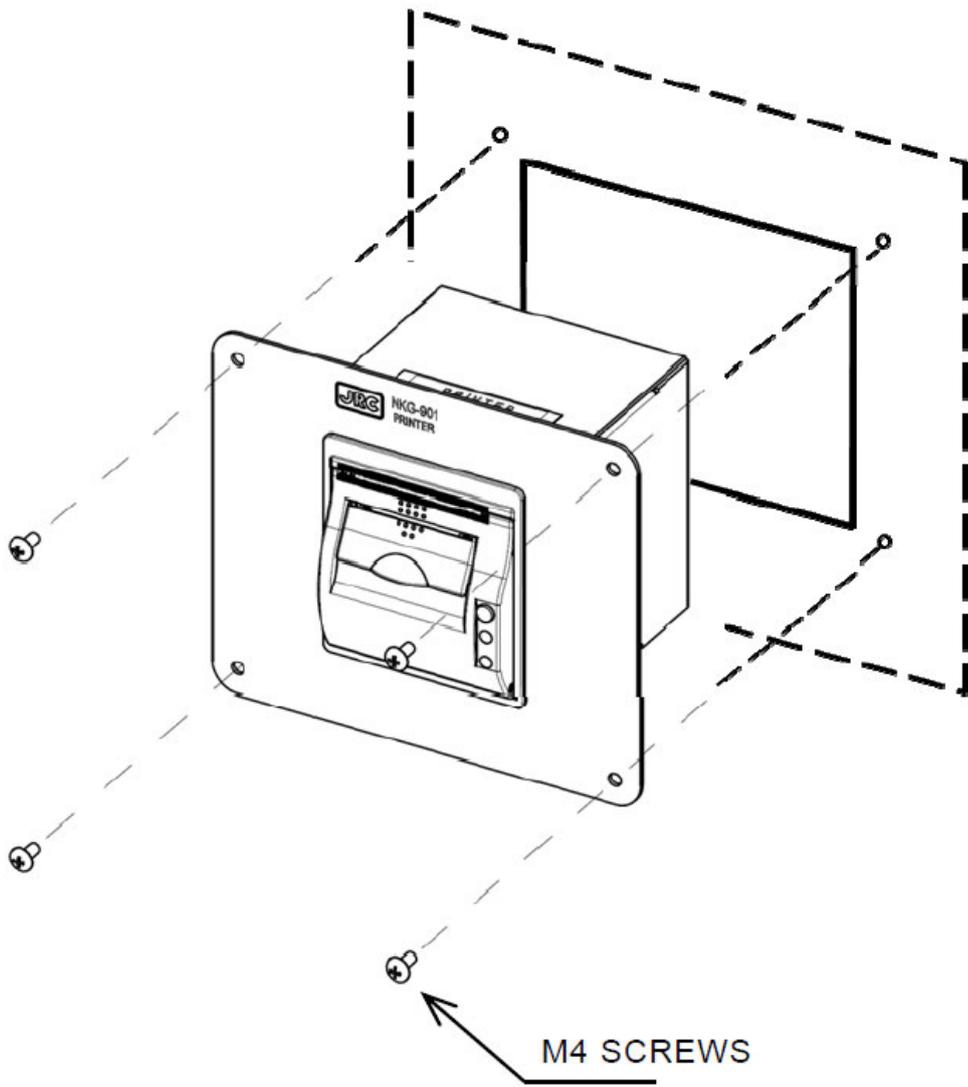
See "9.7 Printer NKG-901 Wiring" for how to connect the cable.

Chapter 9 Connecting the Equipment

9.1   Preparation Tool

Equipment	Preparation tool	Qty.
NWZ-1650	Phillips screwdriver (For M4)	1
	Phillips screwdriver (For M3)	1
NQD-2597/NQD-2598	Phillips screwdriver (For M4)	1
	Crimping tool	1
AW-154/AW-154-50	Phillips screwdriver (For M4)	1
	Flathead screwdriver (No.5)	1
	Crimping tool	1
NQA-4327	Phillips screwdriver (For M4)	1
	Flathead screwdriver (Width 3.5 × Thick 0.5mm recommended)	1
	Hexagonal wrench (3/32 inch)	1

9.2   Before installing

The processing unit has frequency combinations with the built-in TX/RX unit, and the frequency of the transducer and the frequency of the TX/RX unit are matched and shipped according to the specifications of the ship.
Check frequency type sticker on front cover of the processing unit.

200kHz: One transducer is installed and using frequency is 200kHz.
50kHz: One transducer is installed and using frequency is 50kHz.
200kHz/200kHz: Two transducers are installed and using frequencies are both of 200kHz.
200kHz/50kHz: Two transducers are installed and using frequencies are 200kHz and 50kHz.
50kHz/50kHz: Two transducers are installed and using frequencies are 50kHz and 50kHz.

The model name, number and position of the installed transducer are follows.

Transducer/Gate valve	Installing number	Installing position	Frequency
NKF-349	0／1／2	FWD/MID/AFT	200kHz
NKF-350	0／1／2	FWD/MID/AFT	50kHz
NKF-341	0／1／2	FWD/MID/AFT	200kHz
NKF-345	0／1／2	FWD/MID/AFT	50kHz
NKF-394	0／1／2	FWD/MID/AFT	200kHz
NKF-396	0／1／2	FWD/MID/AFT	50kHz

Note: The nominal viewing distance of JFE-400 is 1.2m or less.

The installation of transducer and signal input / output connections to processing unit differ for each ship. When "Drawing for installation" has been issued by JRC for the ship, perform wiring between devices according to it. When "Drawing for installation" has not been issued, perform wiring according to the standard diagram below.
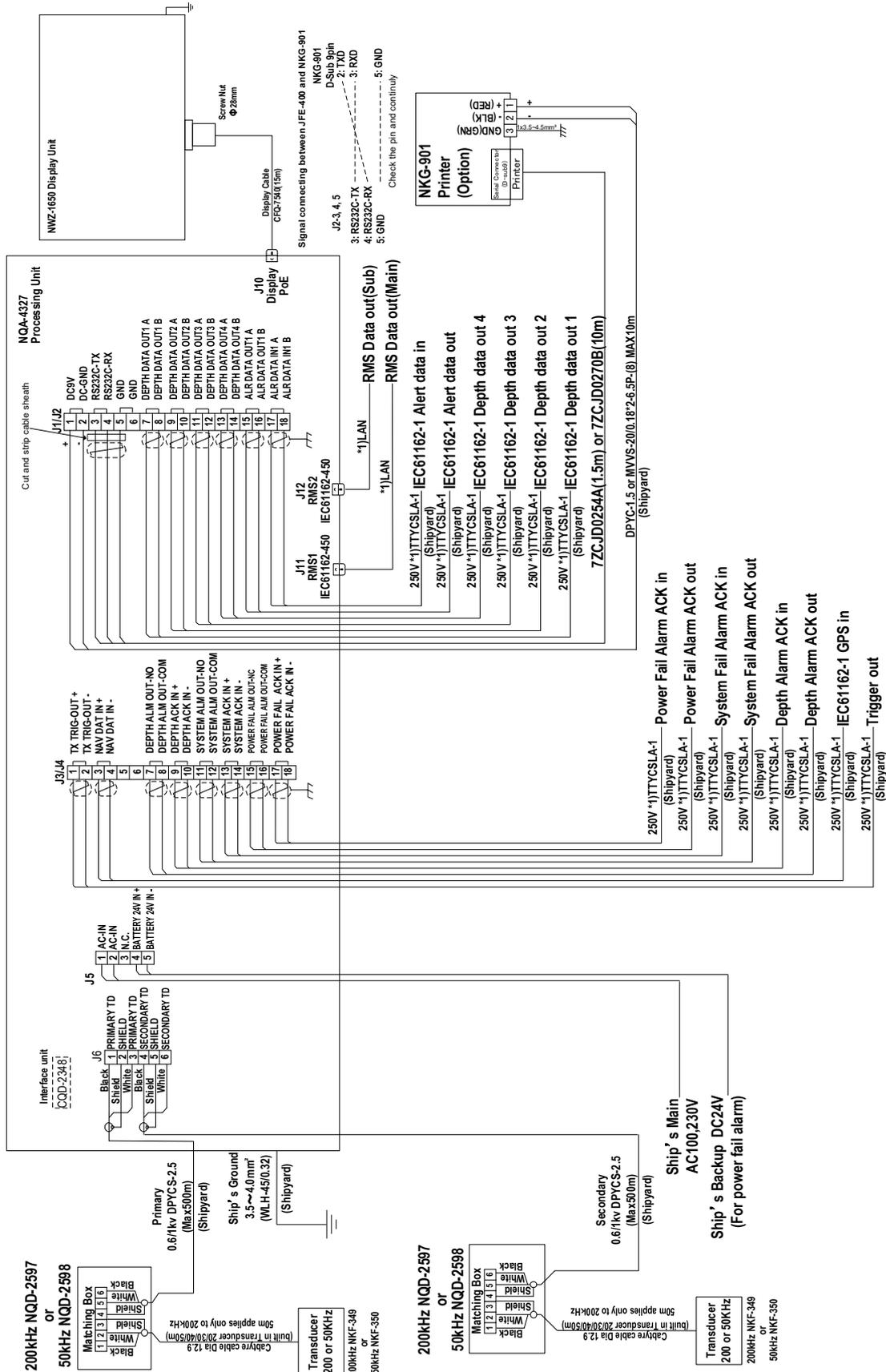
9.4　Matching Box Wiring

(1) NQD-2597/NQD-2598
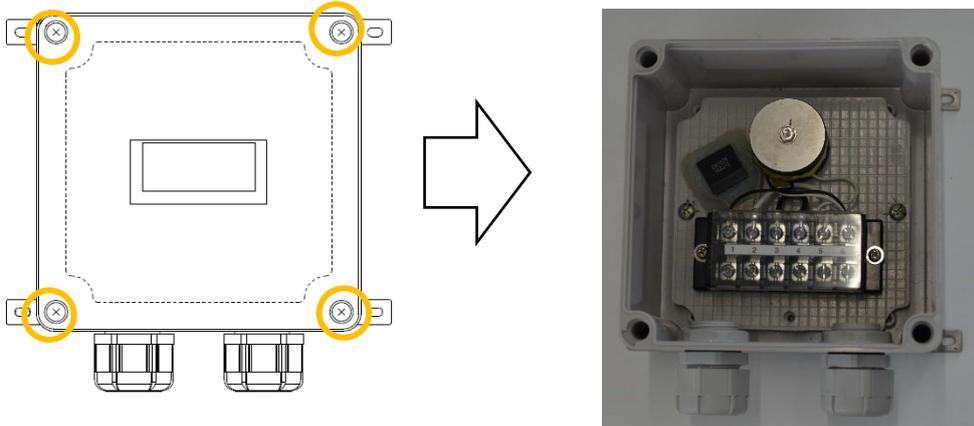
1) Process the 2 cables that connect to the matching box.

　　Peel off the outside sheath by 5 cm, and attach a nylon-isolated crimp terminal (R2-4) to the tip of the conductor.

　　Wrap the shield wire with isolating tape and process it so that it does not short-circuit.

　　* For the cables to be used, refer to "9.3 Installation for Each Cable".

5cm

isolating tape
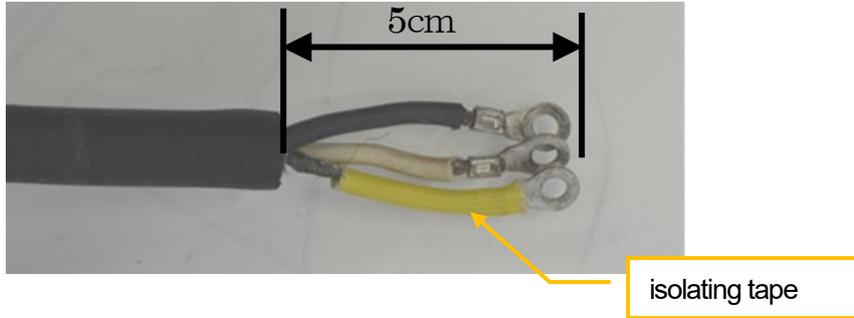
2) Loosen the 4 screws (M4) at the four corners of the matching box and remove the cover.

3) Remove the plastic cover that covers the terminal box, and remove the 6 screws(M4) on the underside of the terminal box.

① Remove the plastic cover

② remove the 6 screws

4) Turn the connec to loosen it.

Tightened state → Loosened state

Gland
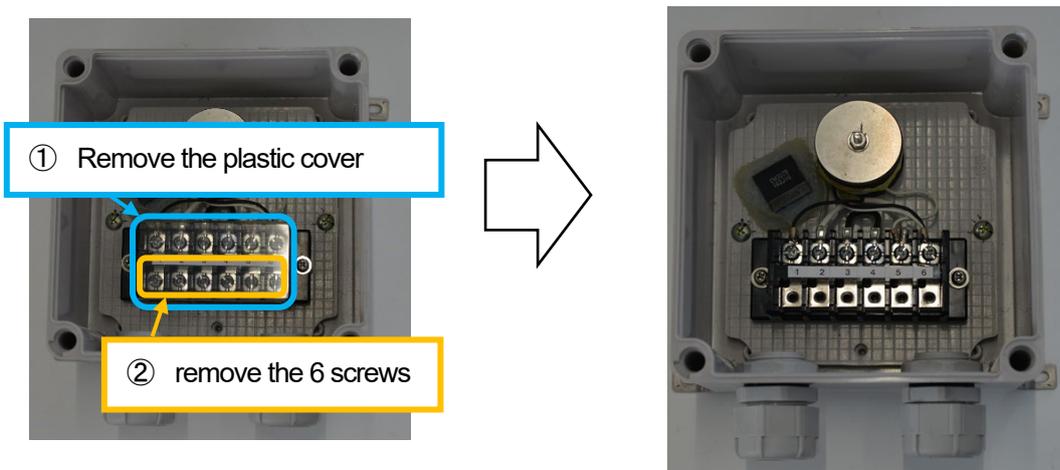
5) Wire the cable. The connection method is described on the back of the cover of the matching box.
Connect the cable to the transducer and NQA-4327 based on this connection method.

Cable from transducer

Cable to connect to NQA-4327

NQD‐2597 for 200kHz

NQD-2597/2598　back of the cover
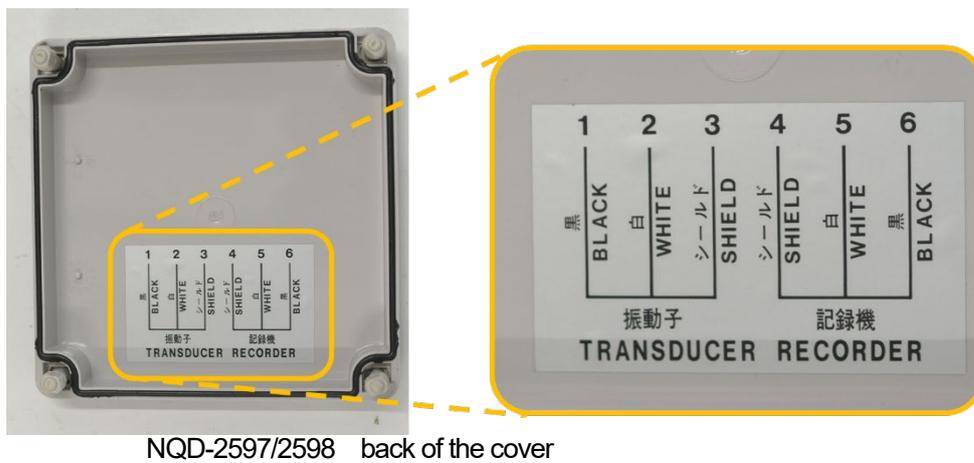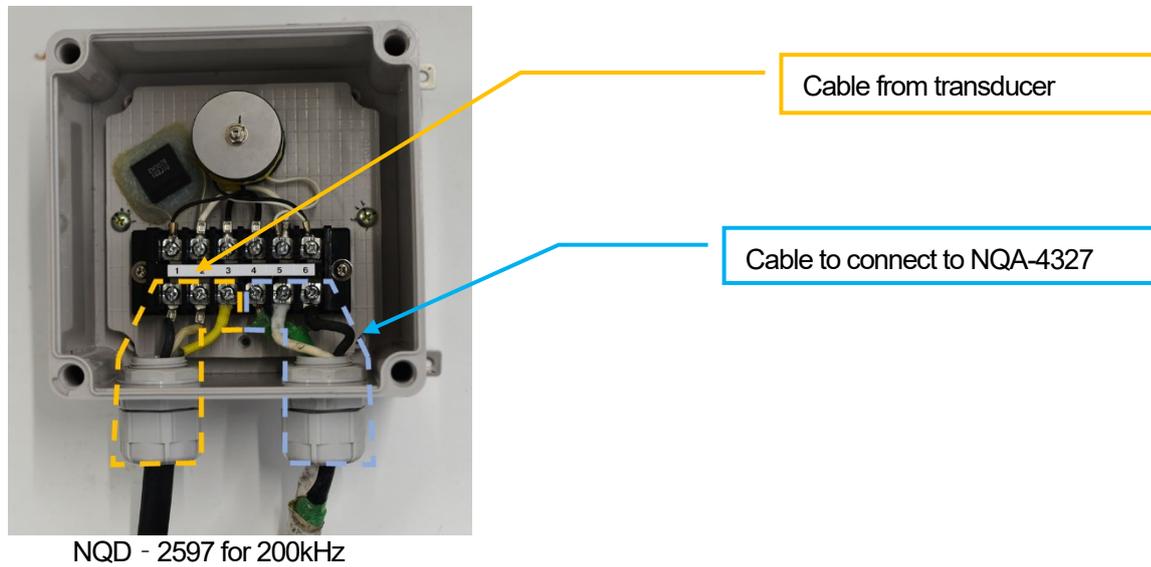
6) Assemble the matching housing in the reverse order of procedure 2) to 4).

1) Process the 2 cables that connect to the matching box.

　　Peel off the outside sheath by 5 cm, and attach a nylon-isolated crimp terminal (R2-4) to the tip of the conductor.

　　Wrap the shield wire with isolating tape and process it so that it does not short-circuit.

　　* For the cables to be used, refer to "9.3 Installation for Each Cable".

5cm

isolating tape
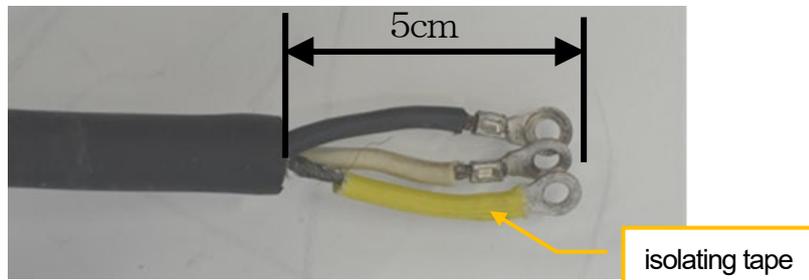
2) Loosen the 3 screws of the matching box by No.5 flathead screwdriver and remove the cover.
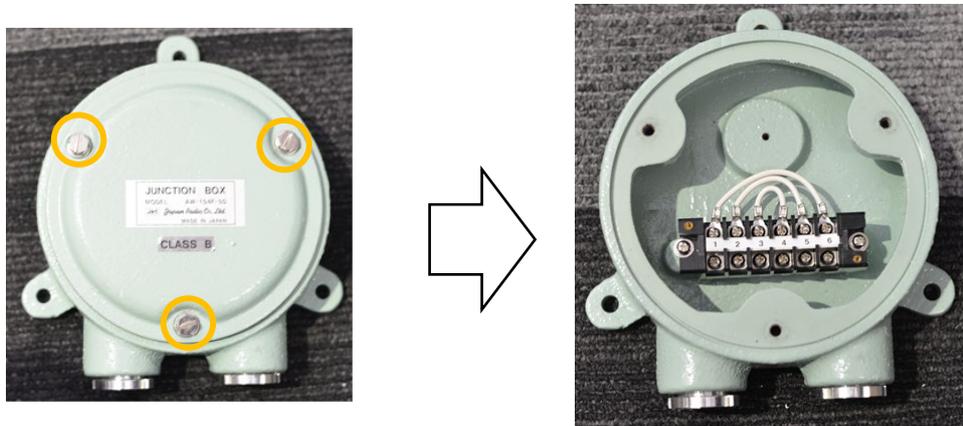
3) Remove the 6 screws(M4) on the underside of the terminal box.
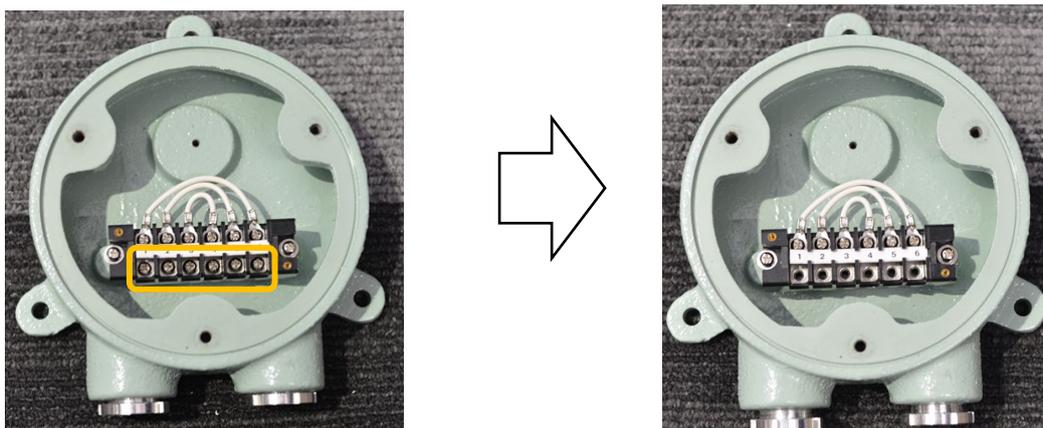
4) Turn the gland to loosen it.

Gland
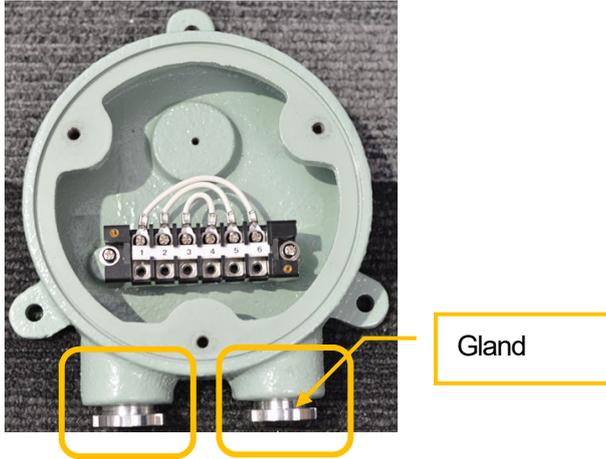
5) Insert the cable and wire. The connection method is described on the back of the cover of the matching box. Connect the cable to the transducer and NQA-4327 based on this connection method.

Cable from transducer

Cable to connect to NQA-4327
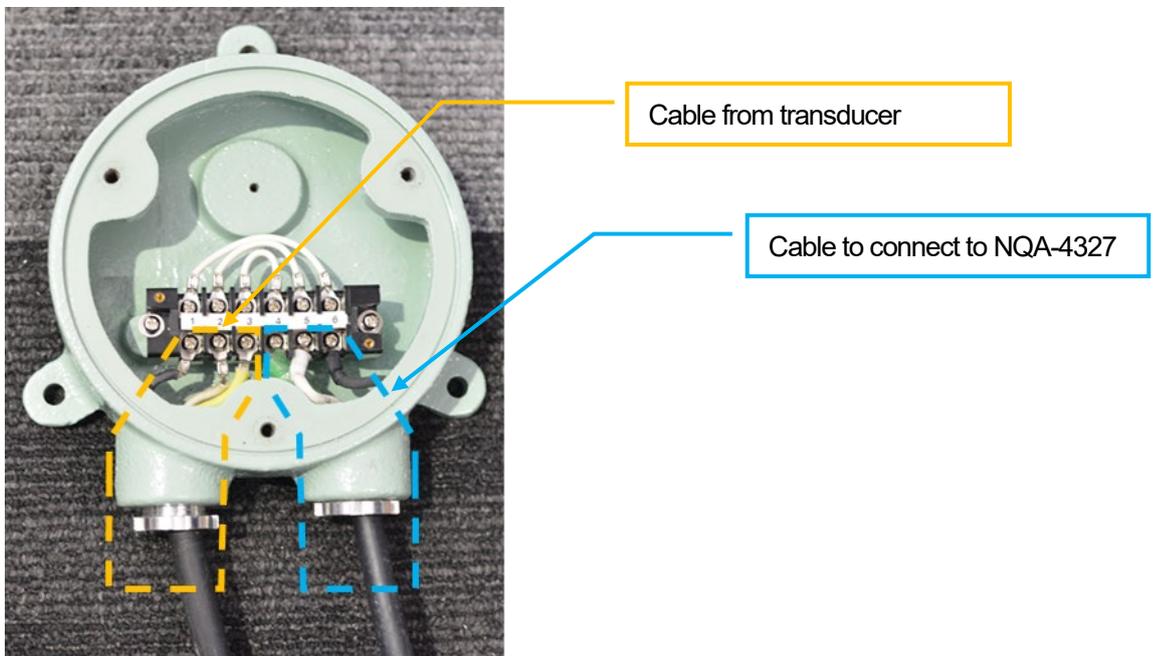
AW-154F/F-50   back of the cover
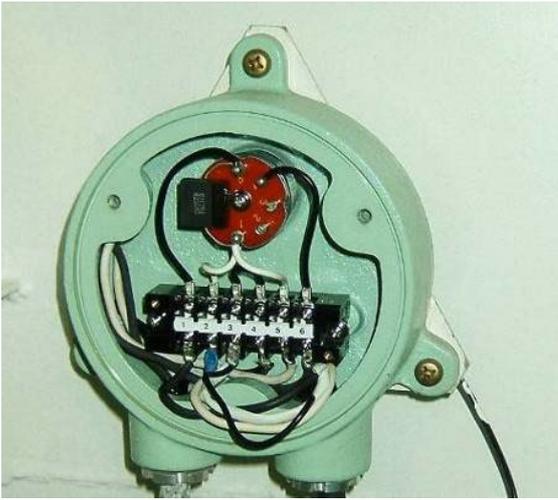
AW-154F for 200kHz   AW-154F-50 for 50kHz

An example of lifting from the bottom of the ship to the bow with pipe piping and equipping with a matching box.

Bad example
Do not bundle the transmission cable and reception cable.

Good example
The cabtyre cable of transducer is fixed with a margin of several turns.

Good example
Lift the cabtyre cable of transducer from the bottom of the ship with a pipe and connect it to the matching BOX above the sea surface.

6) Assemble the matching box in the reverse order of procedure 2) to 4).

9.5　Display Unit NWZ-1650 Wiring

9.5.1　Connecting cables

1) A LAN cable and a ground cable can be connected to the display.
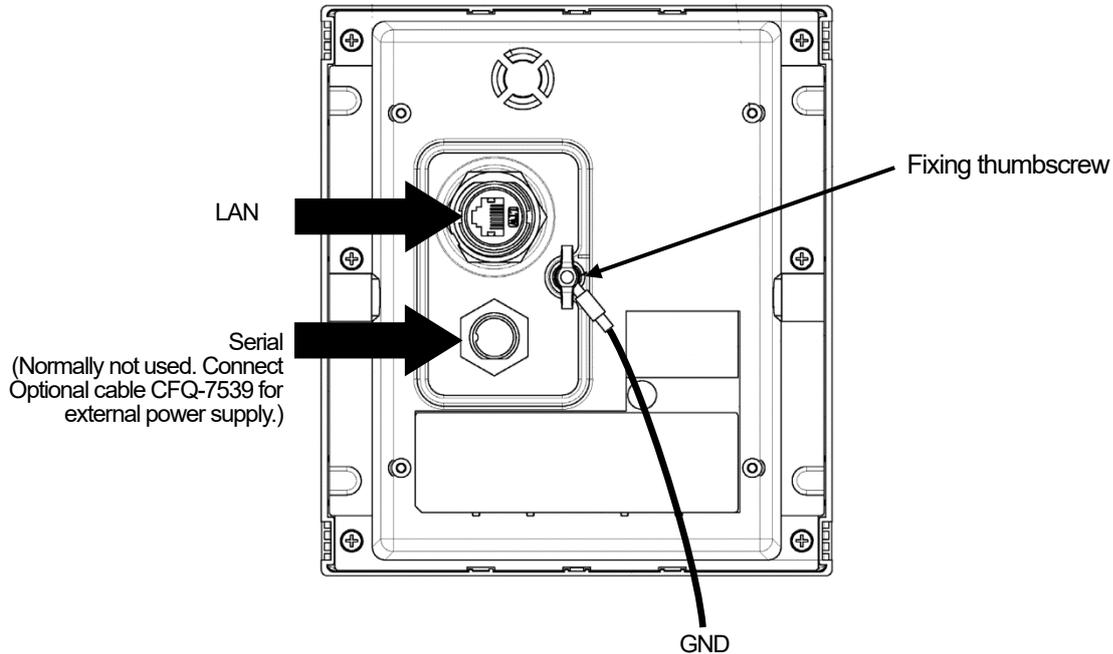
1.　LAN cable(PoE: Power over Ethernet)

Since the connectors on the display apply a waterproof structure, use a LAN cable that is attached as standard (CFQ-7540). Although a general-purpose LAN cable can also be used, a waterproof material cannot be applied in that case. When using a genera-purpose LAN cable, use a straight cable. Connect on the other side of CFQ-7540 cable to J10 in the NQA-4327 processing unit.

### 2.　Serial cable

Not Used

3. Ground cable

Connect a display to the body of the ship ground. Connect from the fixing thumbscrew (M4) to the body of the ship ground. Use the following body of the ship ground cable or an equivalent product.

| Item name	Model	Manufacture
Ground wire	UL1015TEW 1X10AWG(104/0.26) LF5 Green PBF or equivalent product	Hitachi Cable or equivalent

9.5.2　Fitting the Clamp Filter

Attach the included Clamp Filter to LAN cable as shown below.
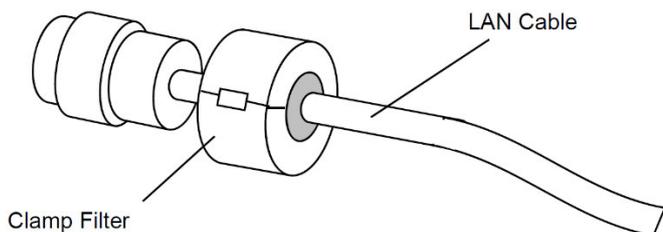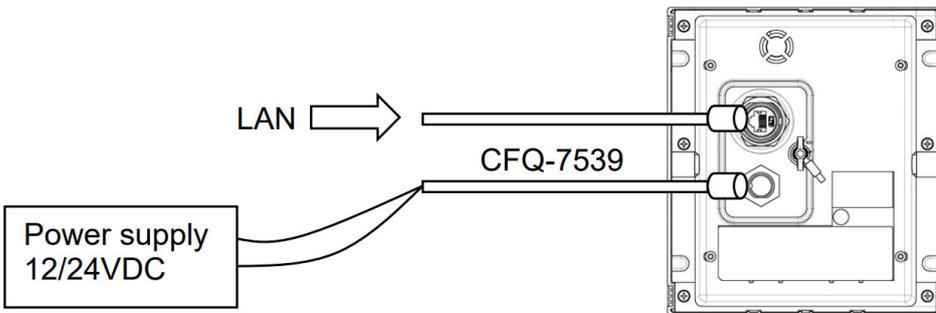
9.5.3　Connecting Power Supply

Power can be supplied from a LAN cable. The voltage range that can be supplied is from 12VDC to 24VDC.
Power is supplied from the processing unit via the LAN cable (No other cable is connected for power supply).

NQA-4327   NWZ-1650
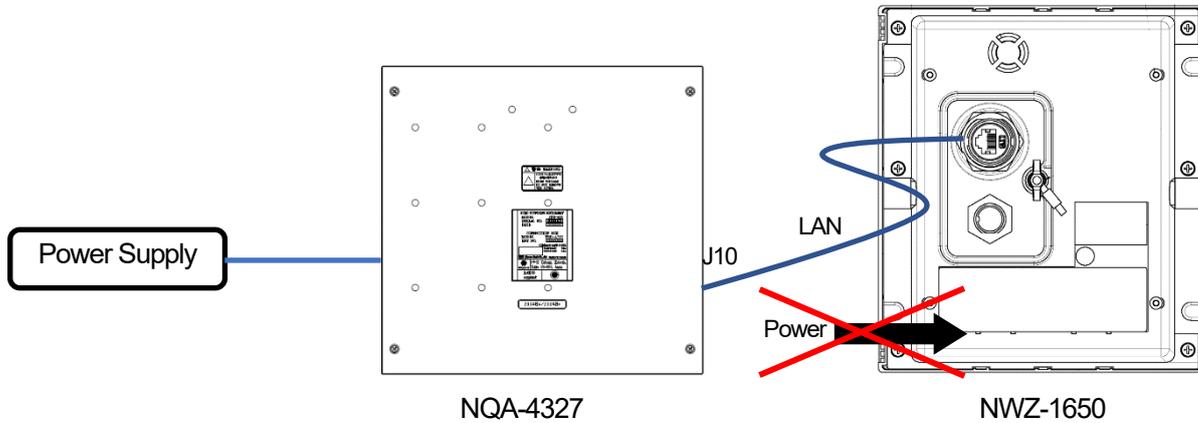
Use the optional cable CFQ-7539 when supplying power from an external source.

CFQ-7539

| No.	Color	Name	Description
1	BLACK	Power supply GND	With fuse holder
2	GRAY	Power supply output	**Not used** **Do not connect this cable as power supply voltage is output.**
3	ORANGE	RX1A	**Not used**
4	YELLOW	RX1B	**Not used**
5	GREEN	TX1A	**Not used**
6	BLUE	GND	**Not used**
7	PURPLE	TX1B	**Not used**
8	RED	Power supply DC12/24V	With a fuse holder

9.6.1 Wiring preparation

1) Remove the 4 screws (M4) at the four corners of the front of the NQA-4327 and remove the front cover.
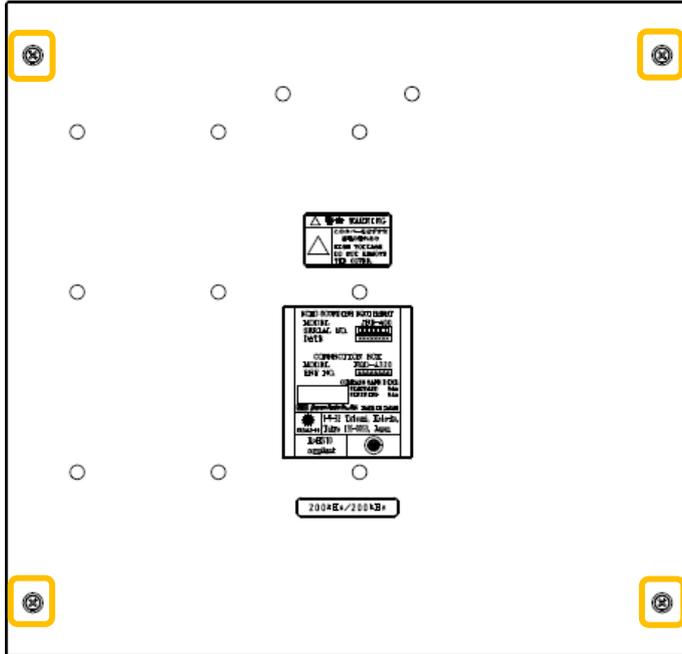
2) Hook the mounting bracket on the front cover to the rear case. (Wiring work will be easier by hooking.)
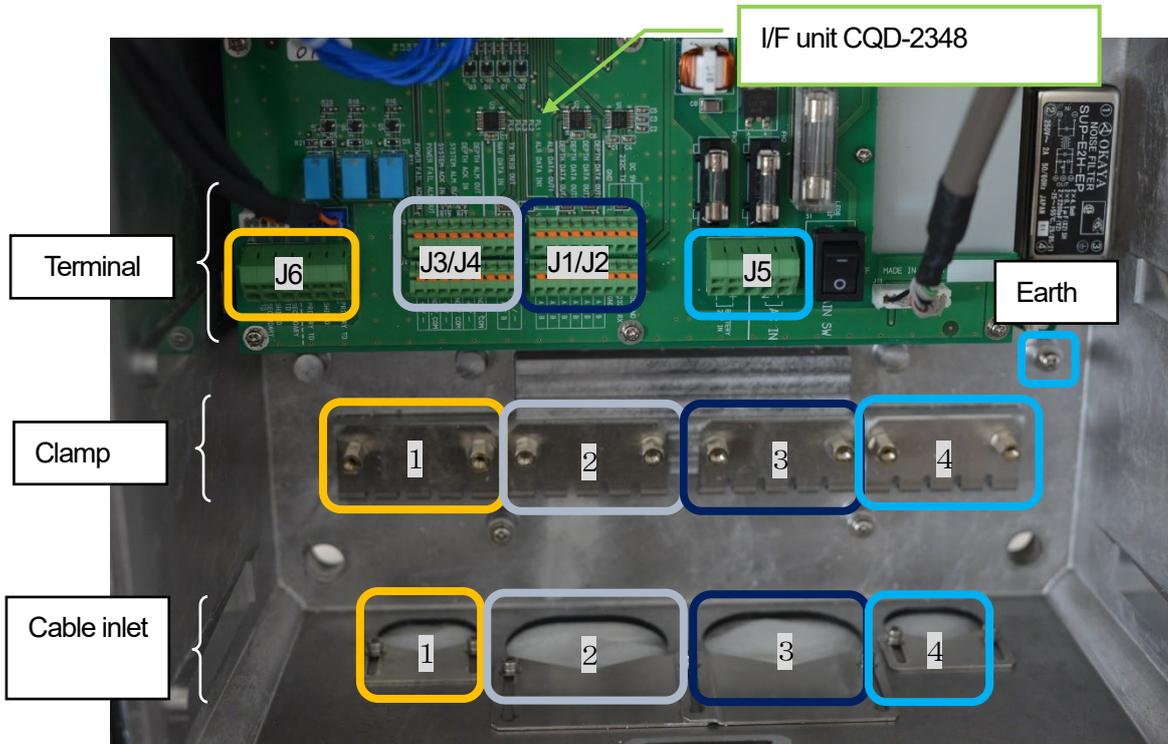

mounting bracket
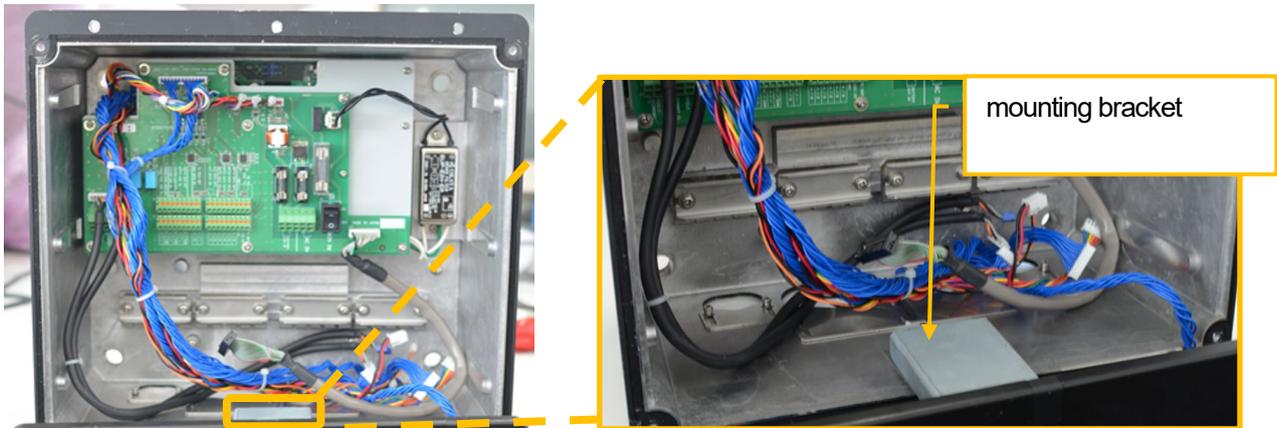
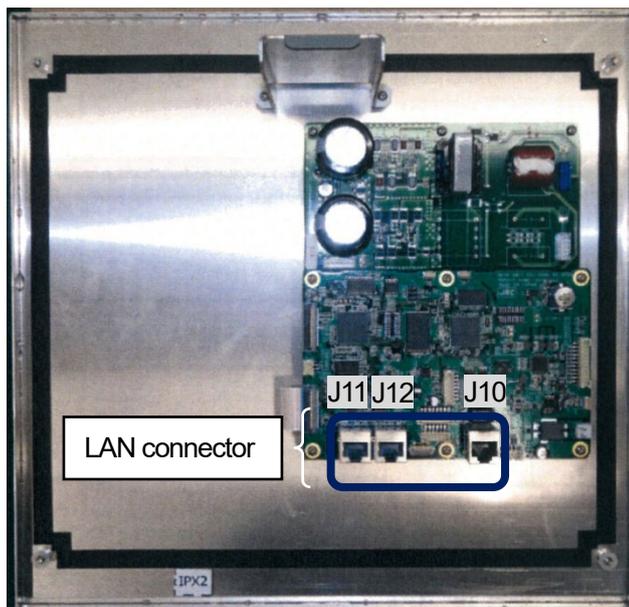3) Confirm the SW mounted on IF circuit (CQD-2348) is off.

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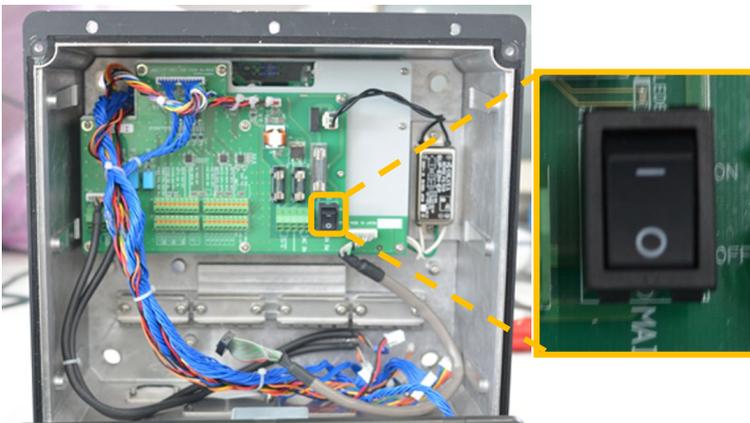
4) Thread each cable through the cable inlet on the rear case.
    Note: Refer to the table below for the cable inlet and clamp to be used.

| Connection terminal	Clamp	Cable inlet
J6	1	1
J3/J4, J10	2	2
J1/J2, J11, J12	3	3
J5, Earth	4	4

Rear case

Front Cover

Note:
When clamping the cable, wrap the shield around the cable and ground it so that it contacts the comb-shaped clamp.
Refer to the photo and use INSULOK (TY-RAP) to fix it firmly.

9.6.2 Connection of power supply

1) Process the power cable to be connected to the processing unit.
    Peel off the outside sheath by 20cm, and attach a nylon-isolated crimp terminal (13AWG compatible product) to the tip
    of the conductor.
    * For the cables to be used, refer to "9.3 Installation for Each Cable".

2) Refer to the figure below and connect the cable to the I / F unit CQD-2348.
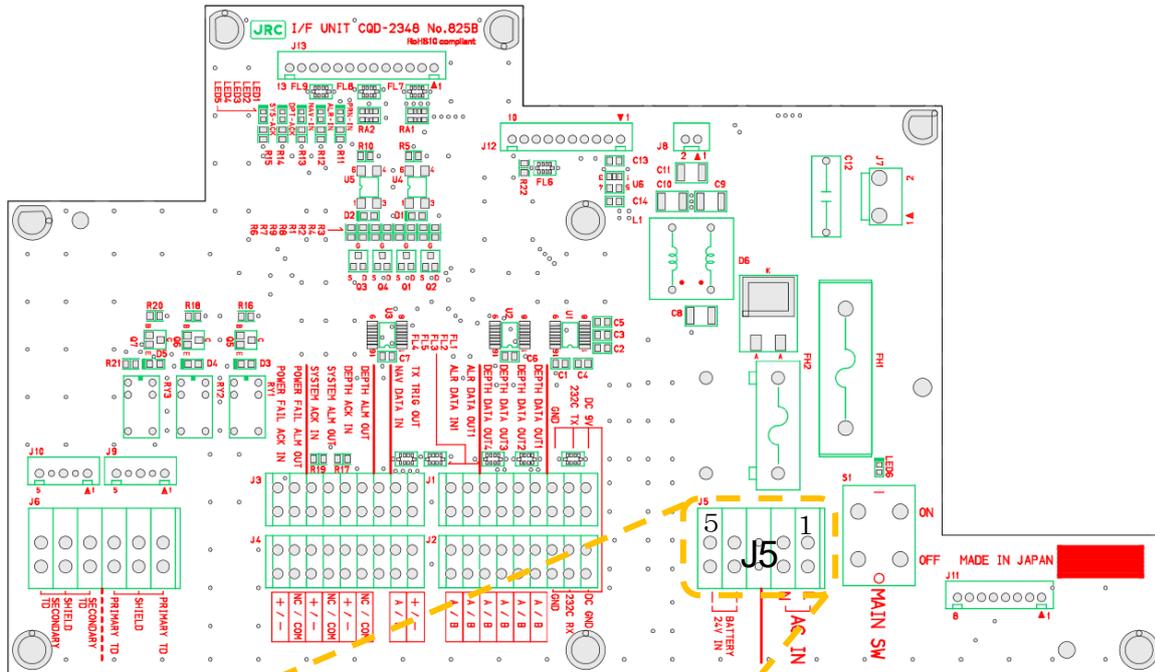
I/F unit CQD-2348

J5	1	AC	IN	Ship's Main AC100,230V
	2		IN	
	3	N.C.		
	4	DC	+	Ship's Backup DC24V
	5		-	(For Power fail alarm)

● Connection method:
Push a flathead screwdriver into the hole at the top of the connector and push up the flathead screwdriver to insert the cable
into the bottom of the connector.
* For a flathead screwdriver, a width 3.5 x thickness 0.5 mm is recommended.

9.6.3 Connection of ship's ground

Refer to the figure below and connect the ground cable.

* Attach a crimp terminal with nylon isolation that is conformed with the cable and connect to ship's ground.

* For the cables to be used, refer to "9.3 Installation for Each Cable".

9.6.4　Connection of transducer cable

1) Process the transducer cable to be connected to the processing unit.
　　Peel off the outside sheath by 15cm, and attach a nylon-isolated crimp terminal (13AWG compatible product) to the tip
　　of the conductor.
　　* For the cables to be used, refer to "9.3 Installation for Each Cable".

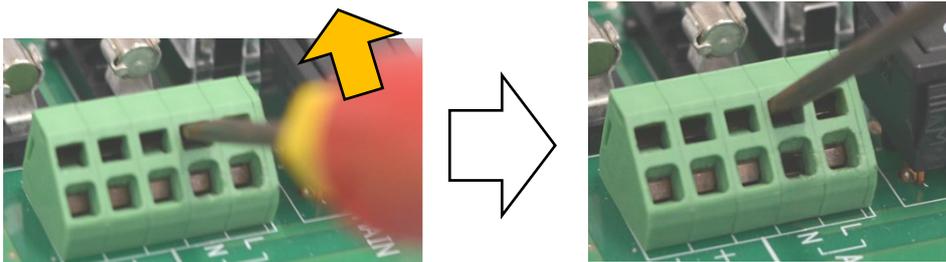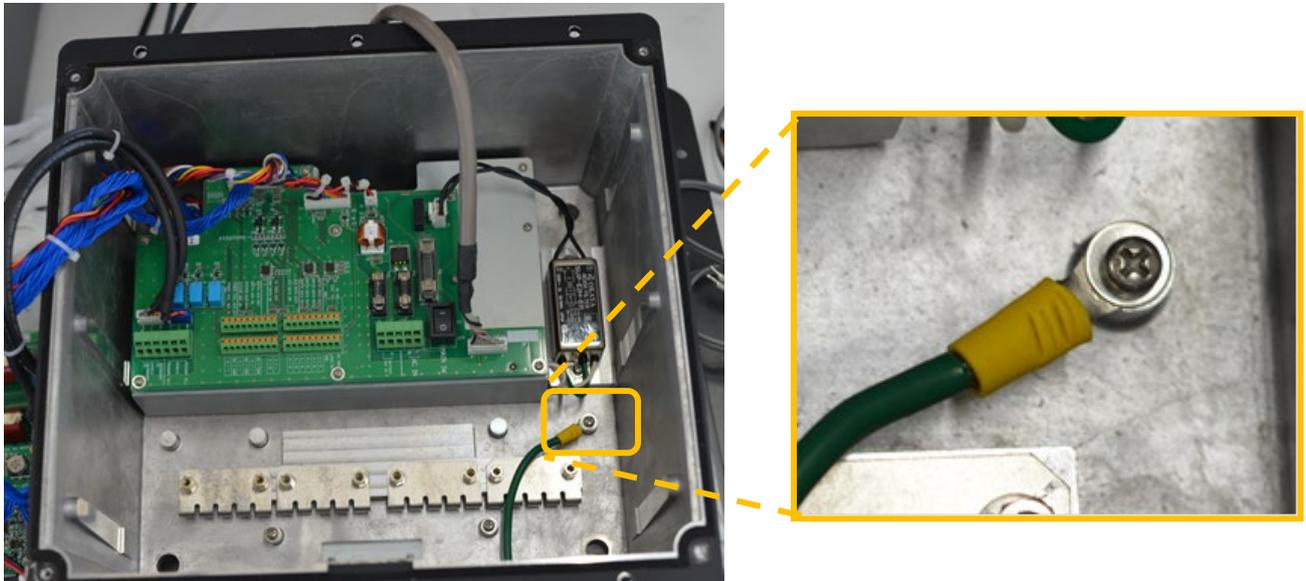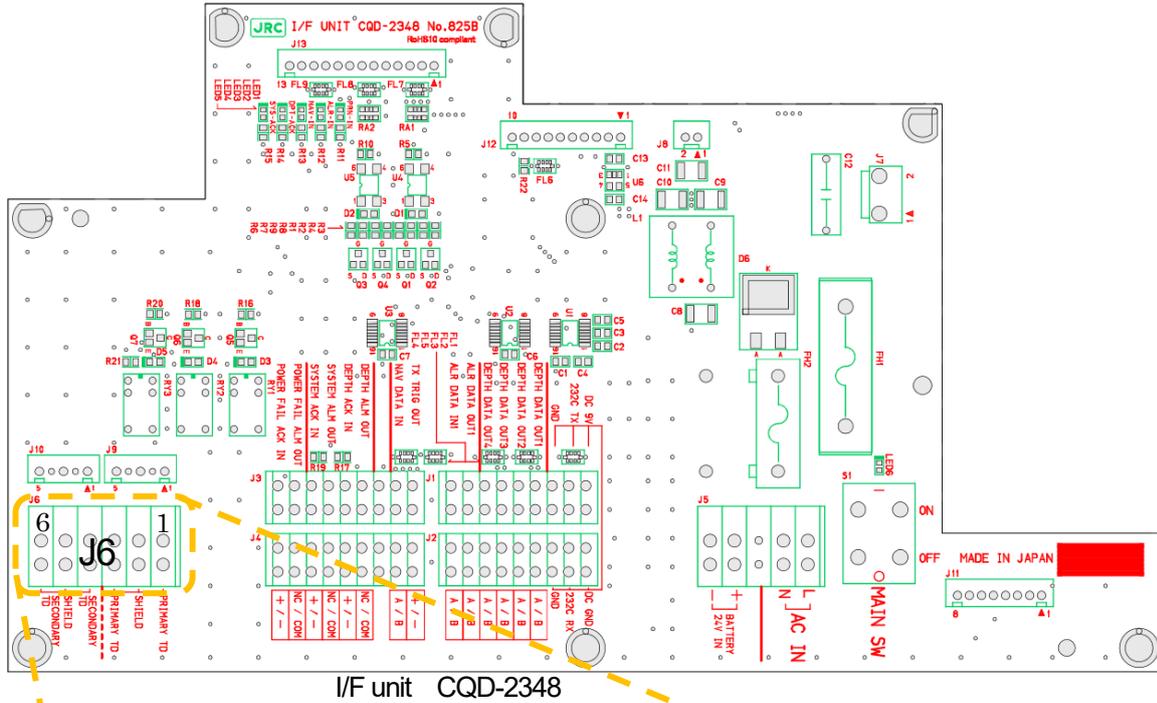2) Refer to the figure below and connect the cable to the I/F unit CQD-2348.

I/F unit　CQD-2348

J6	1	Primary	TD(BLACK)	Transducer(Primary)
	2		SHIELD	
	3		TD(WHITE)	
	4	Secondary	TD(BLACK)	Transducer(Secondary)
	5		SHIELD	
	6		TD(WHITE)	

● Connection method:
Push a flathead screwdriver into the hole at the top of the connector and push up the flathead screwdriver to insert the cable
into the bottom of the connector.
* For a flathead screwdriver, a width 3.5 x thickness 0.5 mm is recommended.

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9.6.5 Connection of other cables

1) Process the transducer cable to be connected to J1/J2 and J3/J4.

   Peel off the outside sheath of the cable connected to J1/J2 by 20cm.

   Peel off the outside sheath of the cable connected to J3/J4 by 15cm.

   The use of bar-type crimp terminals is optional. When using, attach a nylon-isolated rod-type crimp terminal (18AWG compatible product).

   When not using the rod-type crimp terminal, peel off the cable sheath by 8 mm and connect it to the terminal

   * For the cables to be used, refer to "9.3 Installation for Each Cable".

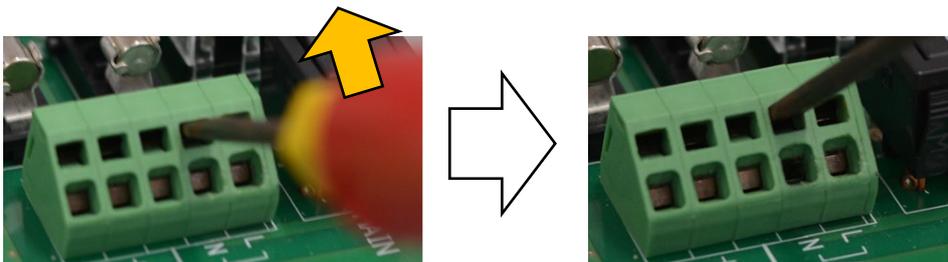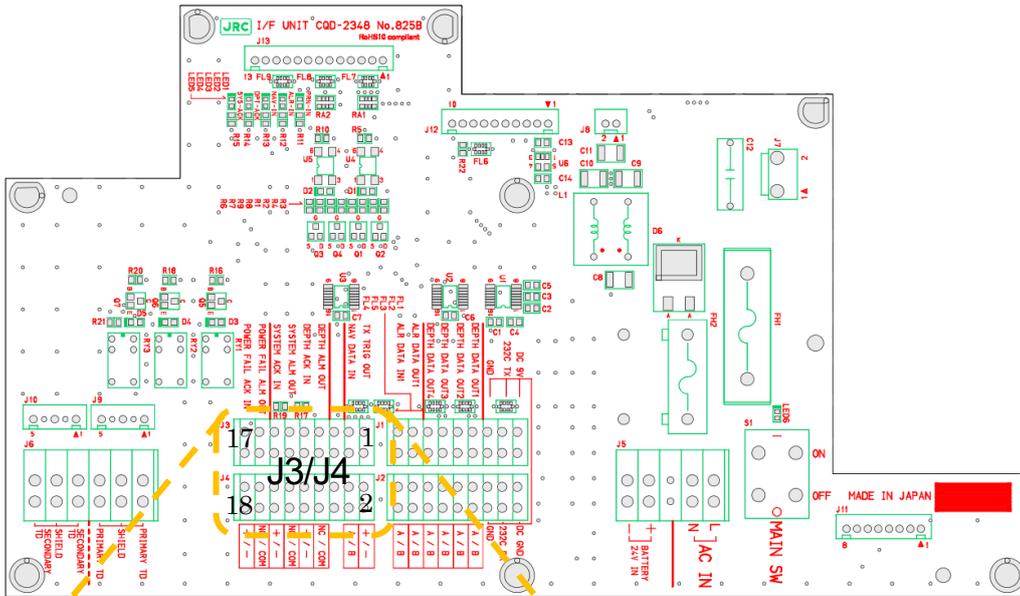2) Refer to the figure below and connect the cable to the I/F unit CQD-2348.

I/F unit CQD-2348

	1	TX TRIG OUT	+	Trigger output
	2		-	
	3	NAV DAT IN	A	IEC61162-1 GPS connection
	4		B	
	5			
	6			
J3 J4	7	DEPTH ALM OUT	NO	Depth alert contact out
	8		COM	
	9	DEPTH ACK IN	+	Depth alert conact in
	10		-	
	11	SYSTEM ALM OUT	NO	System alert contact out
	12		COM	
	13	SYSTEM ACK IN	+	System alert contact in
	14		-	
	15	POWER FAIL ALM OUT	NC	Power fail alert contact out
	16		COM	
	17	POWER FAIL ACK IN	+	Power fail alert contact in
	18		-	

I/F unit CQD-2348

J1 J2	1	DC	9 V	For External Printer
	2		GND	
	3	232C	T X	
	4		RX	
	5	GND	GND	
	6		GND	
	7	DEPTH DATA OUT1	A	Output depth data 1
	8		B	
	9	DEPTH DATA OUT2	A	Output depth data 2
	10		B	
	11	DEPTH DATA OUT3	A	Output depth data 3
	12		B	
	13	DEPTH DATA OUT4	A	Output depth data 4
	14		B	
	15	ALR DATA OUT1	A	Output ALR sentence
	16		B	
	17	ALR DATA IN1	A	Iutput ALR sentence
	18		B	

Same depth data output

● Connection method:

By pushing the button on the top of the connector with a flathead screwdriver, you can insert the cable into the bottom of the connector.

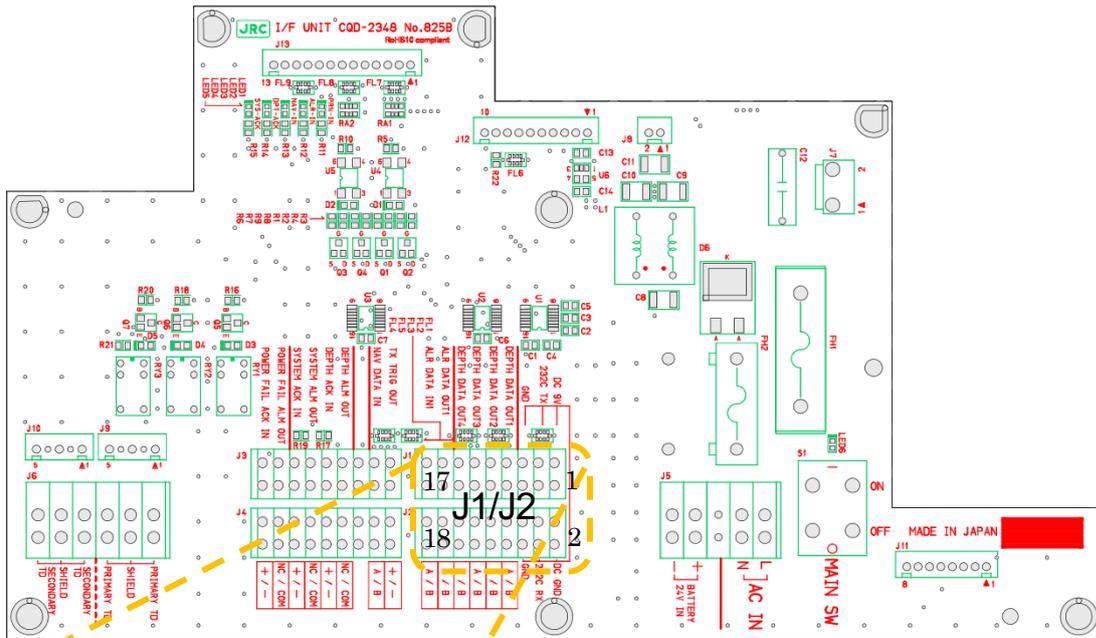* For a flathead screwdriver, a width 3.5 x thickness 0.5 mm is recommended.

9.6.6 Assembling an Ethernet cable and connection

(1) Assembling an Ethernet cable (RJ-45 type connecter)

● Assemble outside Sheath of an Ethernet cable
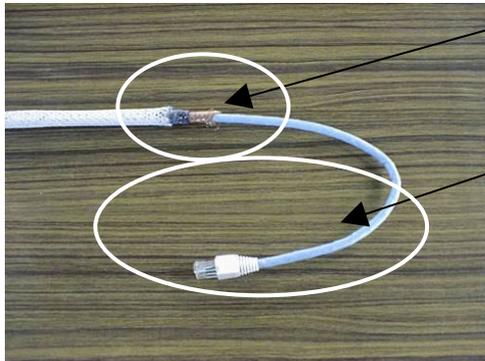
Cut off outside sheath except for inner LAN Cable at the cable let-in hole.
Only shielding wire needs to leave length to a chassis.

Wire an inner LAN cable with sheath into Radar.

● How to Assemble an Ethernet Connector

①	Let the Ethernet cable pass through the cable boot.
②	Measure the length of the cable sheath that is to be peeled. *** The rough standard is the length of your thumb (about 5 to 6 cm).**
③	Make a cut in the sheath by a wire stripper. If Cut the sheath by a cutter, be careful not to damage the foil inside. *** Do not rotate the stripper over 360 degrees.**

④

Check by bending the cable that the foil inside is not damaged. If the foil inside is damaged, cut the cable there and go back to the step 2 again.
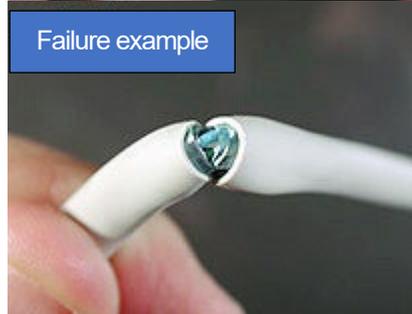
Failure example

[Failure example]
The foil is torn and the core wires inside can be seen.

⑤

Cut the sheath by a cutter vertically from the cut line made by the stripper in the procedure 3.
* Do not damage the foil inside.

⑥

Twist the cable to split off the sheath. Peel the sheath along the cut lines made by the stripper and the cutter.

⑦

Check that the foil is not damaged after the sheath is peeled.
* The foil is OK if it is not torn by the pull of the arrow direction shown in the left figure.

⑧ Fold back the foil and roll it up around the cable.
* The blue surface of the foil must be touched to the sheath.

⑨ As the same way, fold back the drain wire to attach to the sheath.
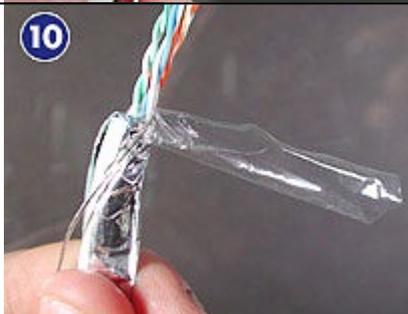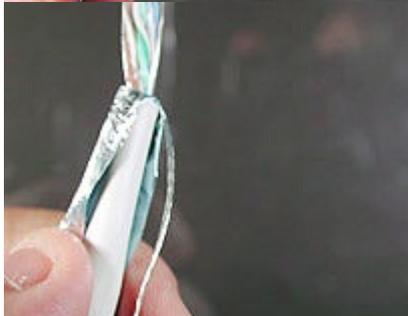
⑩ Cut off the vinyl covering the core wires by scissors.
* Cut the vinyl off at the bottom-most of the bare core wires for not blocking the connector to put in.
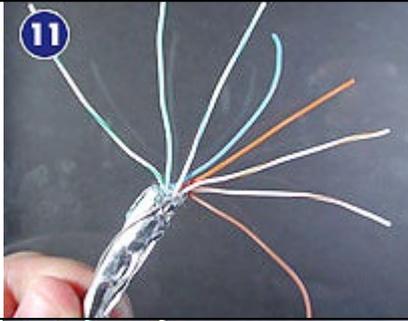
⑪ Untwist the core wires and straighten each wire.
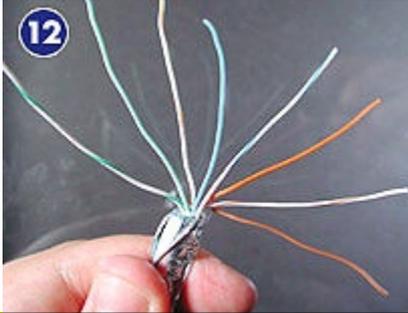
⑫ After straightening, arrange the core wires so that the wires are aligned in the wiring order.
* Above picture shows the order of "Wiring A."

Green Blue Orange Brown

White/green White/orange White/blue White/brown
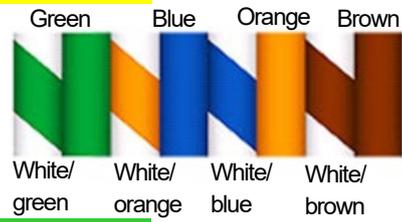
A pin number is 1 to 8 in an order from the left.

1	2	3	4	5	6	7	8
W/G	G	W/O	Bl	W/Bl	O	W/Br	Br
Tx+	Tx-	Rx+			Rx-		

Wiring B

Orang Blue Green Brown

White/orange White/green White/blue White/brown
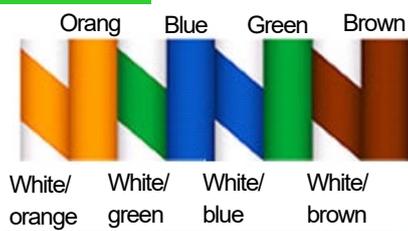
B pin number is 1 to 8 in an order from the left.

1	2	3	4	5	6	7	8
W/O	O	W/G	Bl	W/Bl	G	W/Br	Br
Tx+	Tx-	Rx+			Rx-		

⑬ Gather all the core wires with maintaining the order.

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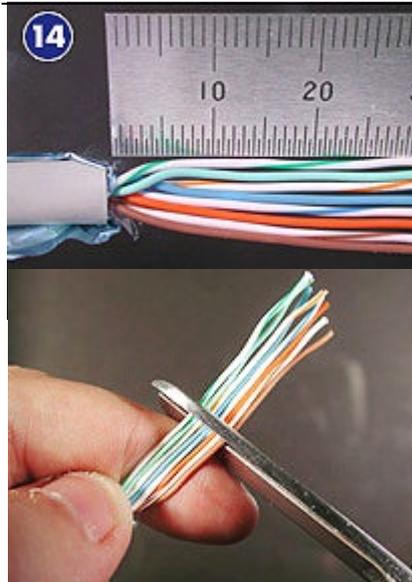
Cut off the core wires at about 16 mm from the sheath.
* First, cut them 1 to 3 mm longer. Then, adjust by inserting the connector.

15
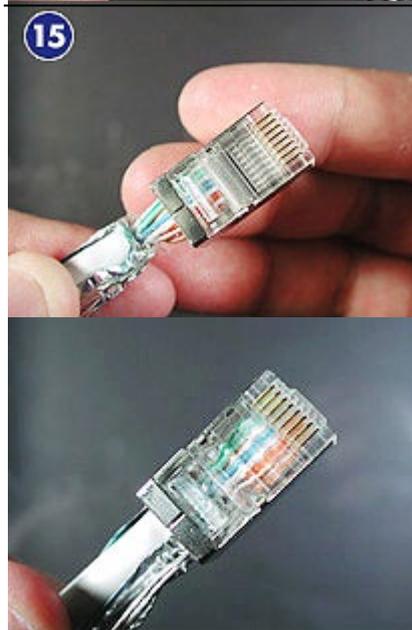
Insert the core wires into the STP connector. Check that the leading edges of the wires reach to the connector edge.
* Also check that the foil and the drain wire are touched to the metal part inside the connector.

A pin number is 1 to 8 in an order from the left.

1   8

16

Calk by a calking tool.
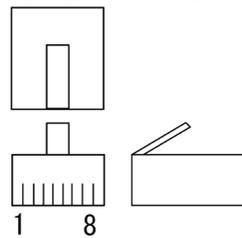
⑰	Cut off the unnecessary foil and drain wire by scissors.
⑱	Attach the cable boot. The cable assembling procedure is completed.

(2) Connection of Ethernet cable

Refer to the figure below and connect the LAN cable to the main unit CDJ-2594.
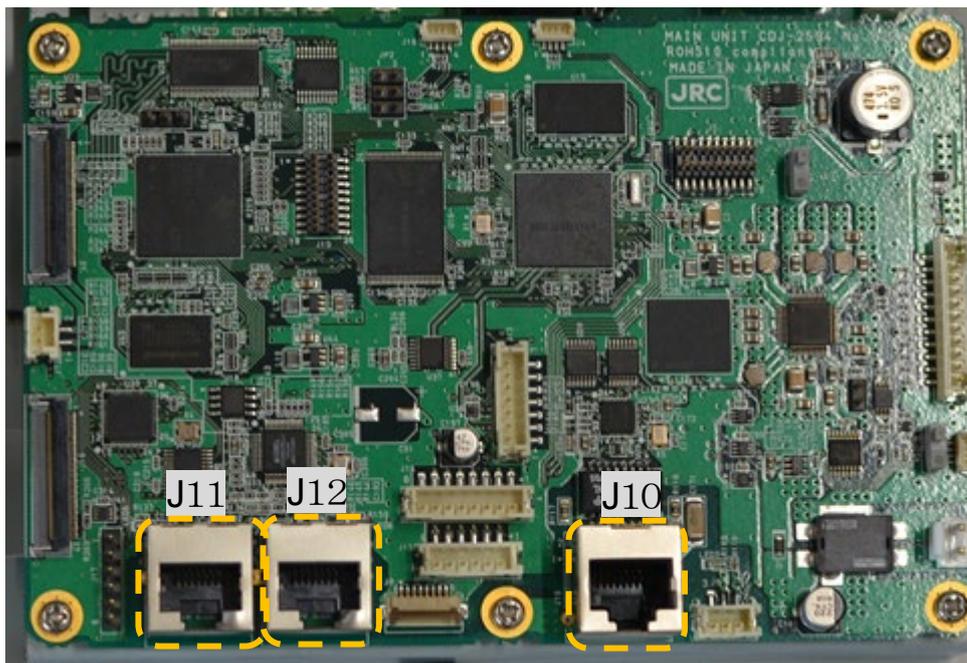
Main unit CDJ-2594

J10	NWZ-1650	NWZ-1650 Connection by CFQ-7540
J11	RMS1	RMS/Depth/Alert data output (Main network)
J12	RMS2	RMS/Depth/Alert data output (Sub network)

9.6.7 Assembly of NQA-4327

1) Fix each cable with cable clamps.
Refer to Chapter "9.6.1 Wiring Preparation" for the location of the clamp to be used when fixing.

2) Loosen the screw on the cover of the cable inlet with a hexagonal wrench (3/32 inch) and slide the cover.
After that, tighten the screws
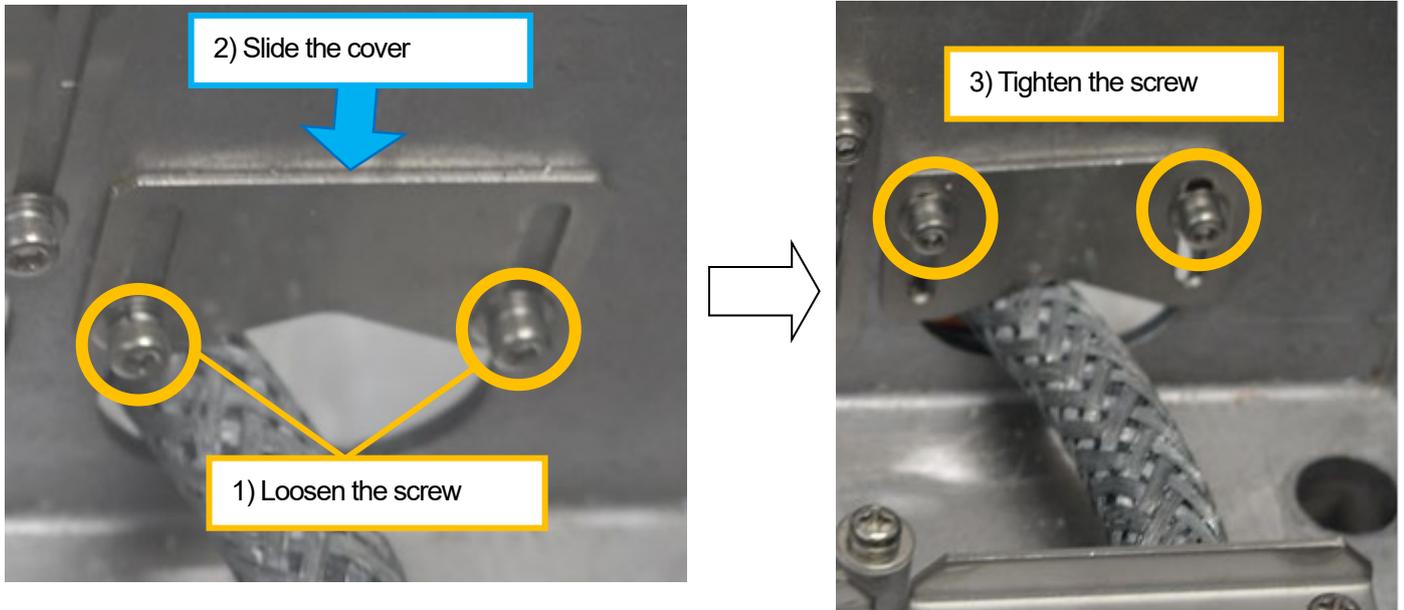
3) Turn on the main SW of the I/F unit (CQD-2348) attached to the rear case.
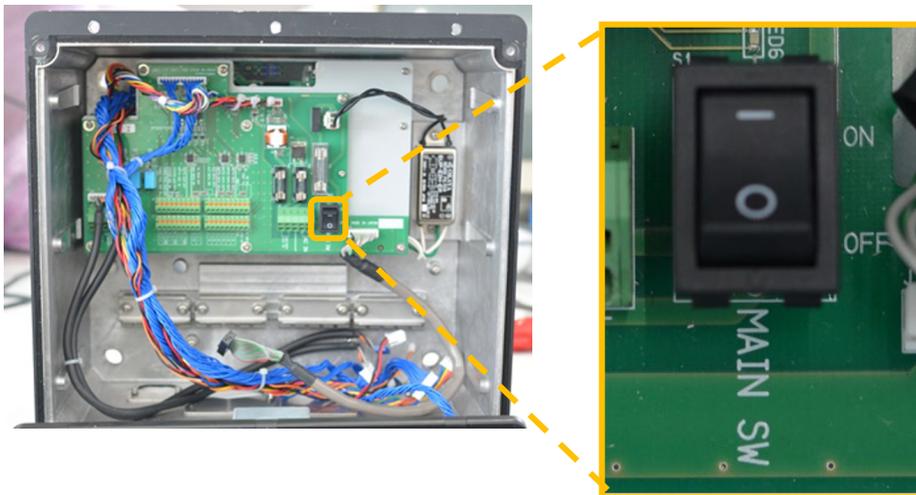
4) Assemble the processing unit in the reverse order of procedure 1) to 2) in "9.6.1 Wiring Preparation".
* Note: When fitting the front cover to the rear case, be careful not to pinch the cable.

Power supply terminal board

No.	Signal	I/O	Description
1	DC +	Input	+9.0V DC
2	DC -	Input	DC Ground
3	E	—	Ground

NKG-901 back view

Serial connector

Green Black Red

3 2 1

Power supply board (9.0V)

Printer cable:
7ZCJD0254A (1.5m)
or
7ZCJD0270B (10m)

Printer power supply cable:
DPYC-1.5
or
MVVS-20/0.18*2-6.5P-(8)
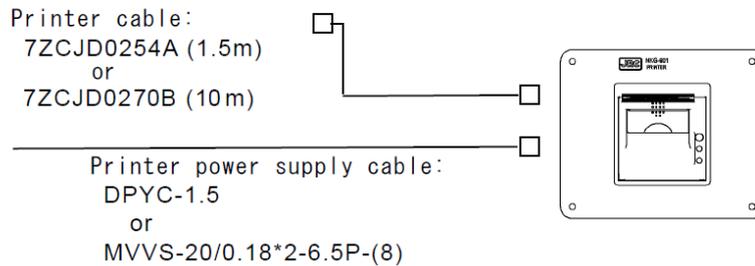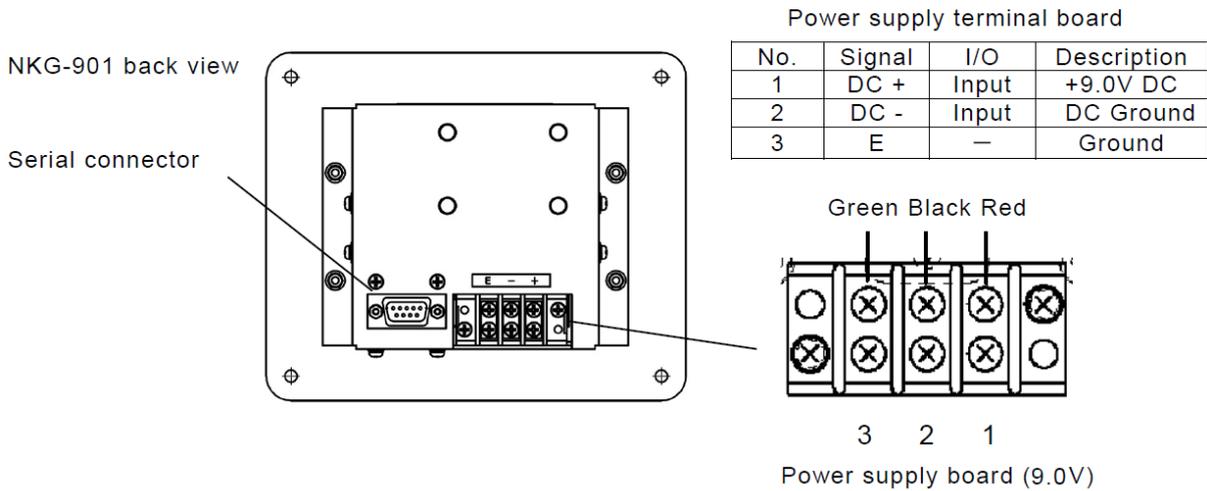
Signal connecting between JFE-400 and NKG-901

NKG-901 Printer

NKG-901 D-Sub 9pin

J2-3, 4, 5

2: TXD

3: RS232C-TX ---------- 3: RXD

4: RS232C-RX ---------

5: GND -------------- 5: GND

Check the pin and continuly

GND(GRN)
- (BLK)
+ (RED)

Serial Connector (D-sub9)
Printer

3 2 1

1x3.5~4.5mm²

7ZCJD0254A or 7ZCJD0270B

DPYC-1.5 or MVVS-20/0.18*2-6.5P-(8)

Cut and strip cable sheath

NQA-4327 Processing Unit

J2

+	1	9V
-	2	9V-GND
	3	RS232C-TX
	4	RS232C-RX
	5	GND
	6	GND
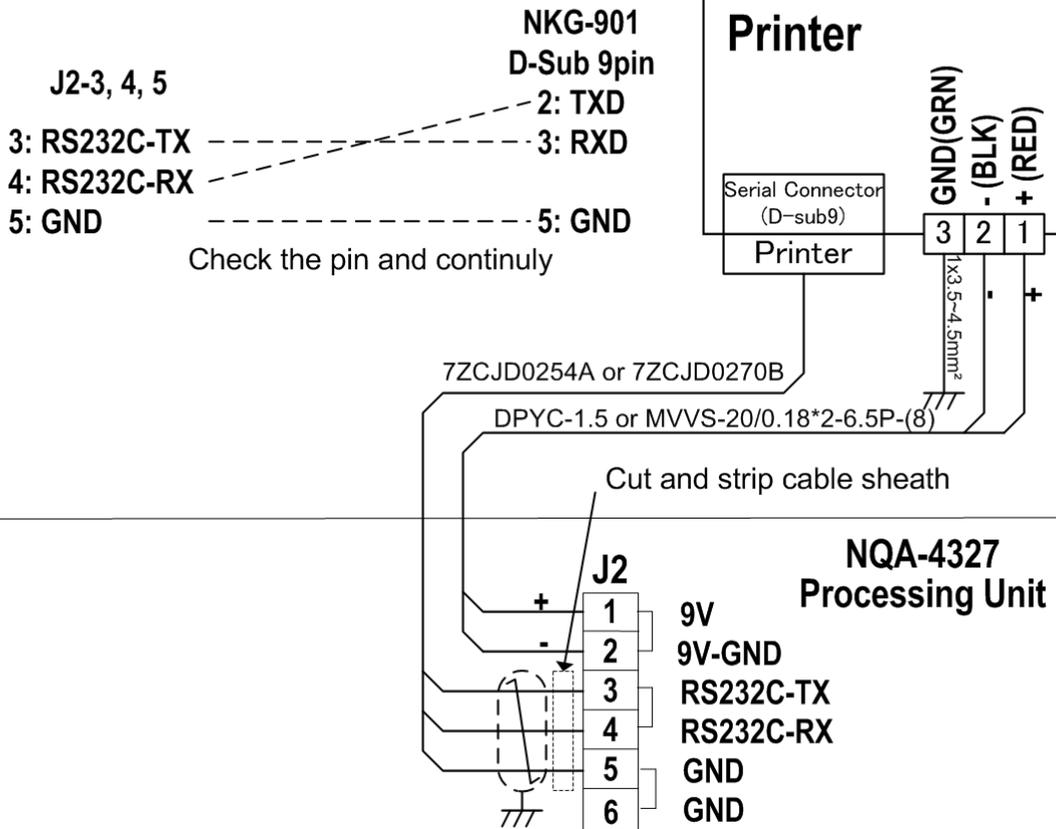
Software setting of printer refer to 10.3.3 Printer Model setting. It is necessary to set to NKG-901.

9.8 Remote Display NWZ-4610 Wiring

There are following two patterns of wiring.

●Pattern1：Using NBA-5143
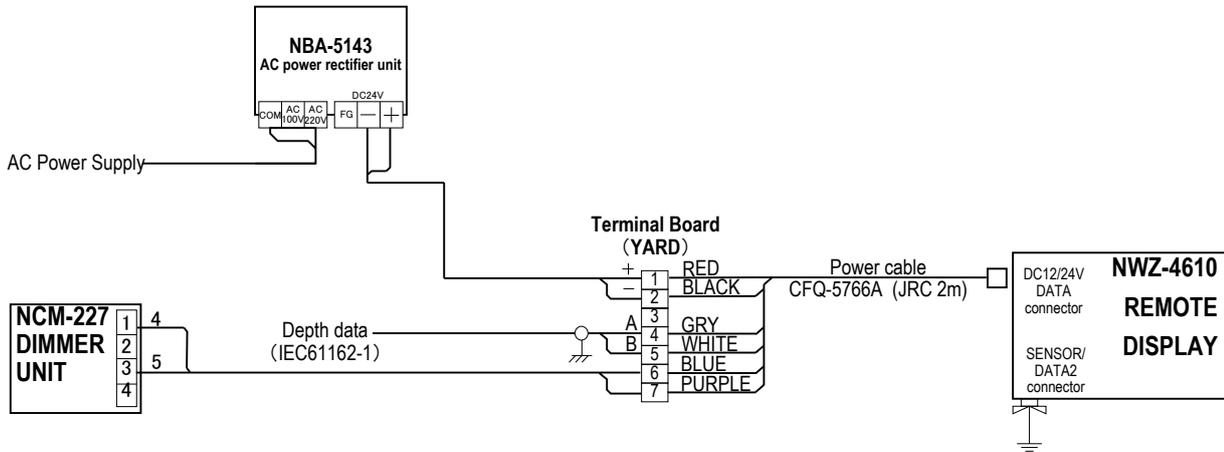
Note：

-The power cable CFQ-5766A can be used together with the depth data input cable.

-It is not necessary to use CFQ-5767 (CFQ-5767 also can be used to enter depth data).

●Pattern2：Not using NBA-5143
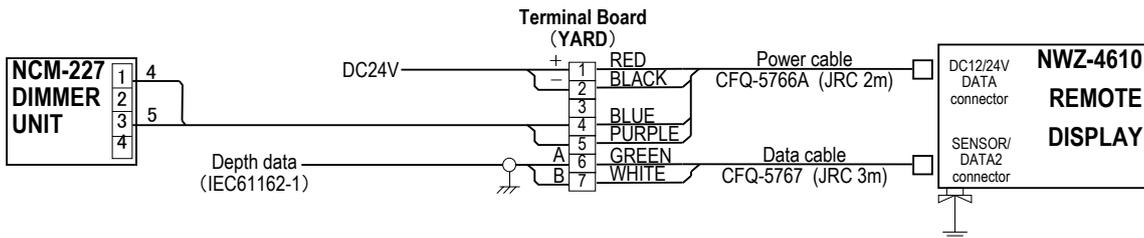
Note：

-The power cable **CFQ-5766A cannot be used** together with the depth data input cable.

-**Be sure to use CFQ-5767** for depth data input.

-In case of battery series connection, don't connect to midpoint between each battery. The case has possibility that the fuse may blow out.

-In case that the ship's common battery is grounded to the plus pole, don't contact a cable(GND) to FG terminal of the NWZ-4610 remote display.

*When it is difficult to make a countermeasure of the battery, use pattern 1 for wiring.

●NWZ-4610 Connector-cable rear view

CFQ-5767	Cable color	Signal name	
Terminal No.1-2	Red.Black	Not use	
Terminal No.3	White	Pattern2 Depth data	IEC61162-1 B
Terminal No.4	Green		IEC61162-1 A
Terminal No.5-6	Yellow,Brown	Not use	

Display Unit Rear
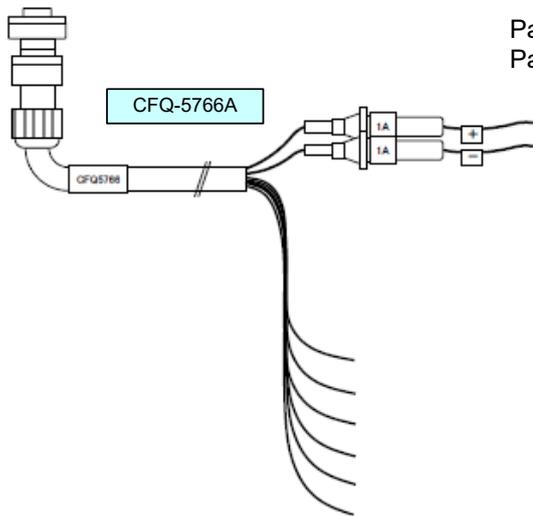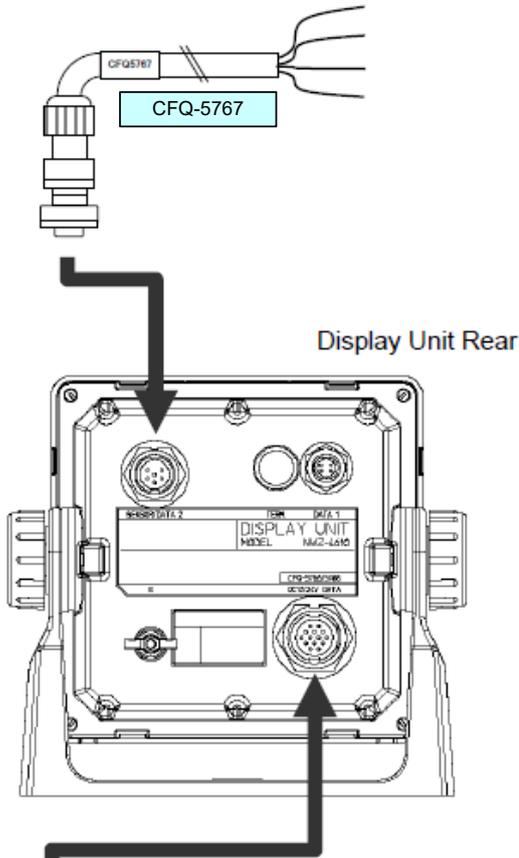
Pattern 1: Supplying 24V DC from NBA-5143 AC power rectifier unit
Pattern 2: Direct connection from 24V DC(etc battery)

CFQ-5766A	Cable color	Signal name	
Terminal No.1	Red	DC_IN	+
Terminal No.2	Black		-

CFQ-5766A	Cable color	Signal name	
Terminal No.3-5	Orange, Yellow,Green	Not use	
Terminal No.6	Blue	Dimmer unit	Dimmer unit Terminal 1
Terminal No.7	Purple		Dimmer unit Terminal 3
Terminal No.8	Gray	Pattern1 Depth data	IEC61162-1 A
Terminal No.9	White		IEC61162-1 B
Terminal No.10-14	Pink, Sky blue,Bright green,Black(Shield)	Not use	

Chapter 10 Setting of Echo Sounder JFE-400

10.1 Basic Operation

This chapter describes the basic operations of the MAIN screen. For the settings of the MENU screen, refer to "10.2 Basic Settings" and "10.3 Advanced Settings".

10.1.1 Turning power ON/OFF

・Turn on the power: Press the power switch ⏻ at the bottom of the display unit. When the power is turned on, the MAIN screen is displayed.
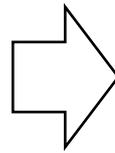
power switch at the bottom of the display unit

MAIN screen

・Turn off the power: Press and hold the power switch ⏻ at the bottom of the display unit. A confirmation screen will be displayed whether to turn off the power. Touch the ✓ button.

Note: When the power is turned on by a breaker while all the power supply to the equipment is cut off, the equipment will automatically start up without pressing the power button. In this time, it may take about two minutes from the startup screen to the main screen.

10.1.2 Switching operation to MAIN/MENU screen

MAIN screen
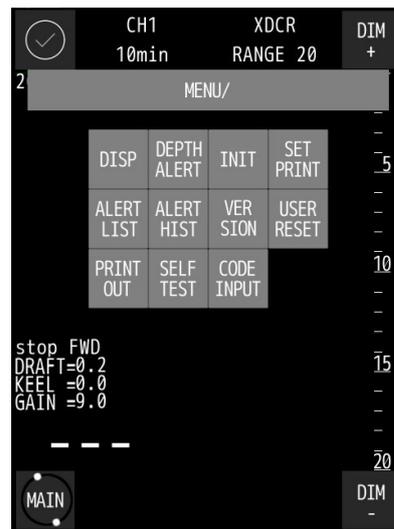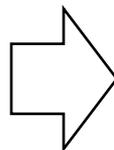
MENU screen

・Touch [MENU] on the MAIN screen to move to the MENU screen.

・Touch [MAIN] on the MENU screen to move to the MAIN screen.

・The each menu setting mainly used by operator is available.

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10.1.3 Selecting display mode

MAIN screen

· Each time with ⬚MODE⬚ touch, the display mode changes.

Single frequency: Each time with ⬚MODE⬚ touch, the display mode changes as follows.
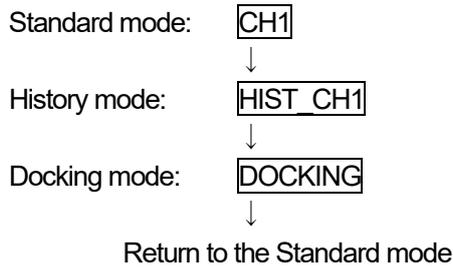
Standard mode:　　CH1
　　　　　　　　　　↓
History mode:　　　HIST_CH1
　　　　　　　　　　↓
Docking mode:　　　DOCKING
　　　　　　　　　　↓
　　　　　Return to the Standard mode

Dual frequency: Each time with ⬚MODE⬚ touch, the display mode changes as follows.

Standard mode:　　CH1　→　CH2　→　CH1/CH2
　　　　　　　　　　↓
History mode　　　　HIST_CH1　→　HIST_CH2　→　HIST_CH1/CH2
　　　　　　　　　　↓
Docking mode　　　DOCKING
　　　　　　　　　　↓
　　　　　Return to the Standard mode
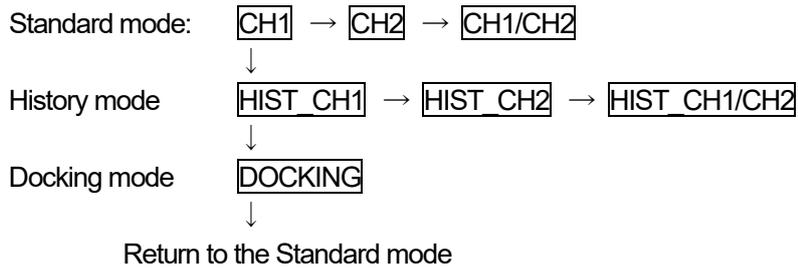
10.1.4 Gain control

MAIN screen → Gain control screen

- Gain can be set to 41 stages of 0～40.

- Touch [GAIN] on main screen. The button color change to green and gain menu is displayed.

- Auto gain mode or manual gain value is displayed with highlight on screen.

- Auto or manual gain mode can be set with each [AUTO => MANUAL] [MANUAL => AUTO] touch.

- Whenever [+] is touched, the sensitivity is raised.

- Whenever [—] is touched, the sensitivity is lowered.

- When touch [AUTO => MANUAL] or [+], [—], auto gain is released automatically and switch to the manual gain.
- When auto gain mode is canceled, the gain setting is continued and doesn't return before the auto gain mode.
- After setting the gain. touch green GAIN button and gain menu is closed.
- When 2 transducers are installed, touch the green GAIN button again to switch to the CH2 setting.

◆ About the sensitivity setting
- Note that improper gain settings may result in incorrect depth measurement.
- The reflection from seabed is different according to the condition of seabed. The reflection weakens like sand and mud, etc. though a strong reflection returns like the bedrock.
- It becomes impossible to recognize seabed when the reflection is weak and the depth value might not be displayed. For this case, bottom of the sea is displayed in red by raising sensitivity. However, dirt and the plankton, etc. in the sea are mistaken when sensitivity is raised too much for seabed, it recognizes, and a wrong depth value might be displayed.
- As for the setting of sensitivity, extent to which seabed is displayed by a red or an orange color is proper.
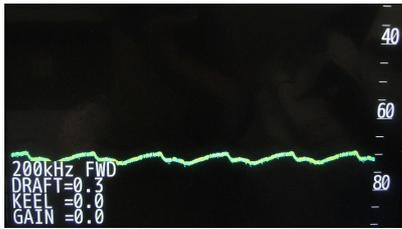
Sensitivity is too low.
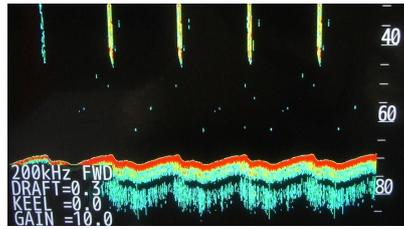
When seabed is a red or an orange color, the display sensitivity is proper.
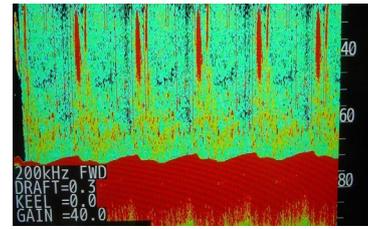
sensitivity is too high.

Note ： When setting to an auto gain, the STC curve becomes "LONG" regardless of the setting of STC.

10.1.5   Setting Draft

MAIN screen
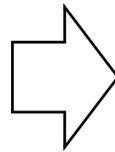
Draft setting screen

- ・ Draft can be set to 0～50m in 0.1 step.
- ・ Touch [DRAFT] on main screen. The button color change to green and draft menu is displayed.
- ・ Draft value is displayed with highlight on screen.
- ・ Whenever [+] is touched, the draft value is raised.
- ・ Whenever [−] is touched, the draft value is lowered.
- ・ After setting the draft. touch green DRAFT button and gain menu is closed.
- ・ When 2 transducers are installed, touch the green DRAFT button again to switch to the CH2 setting.

10.1.6 Range control

MAIN screen → Range control screen
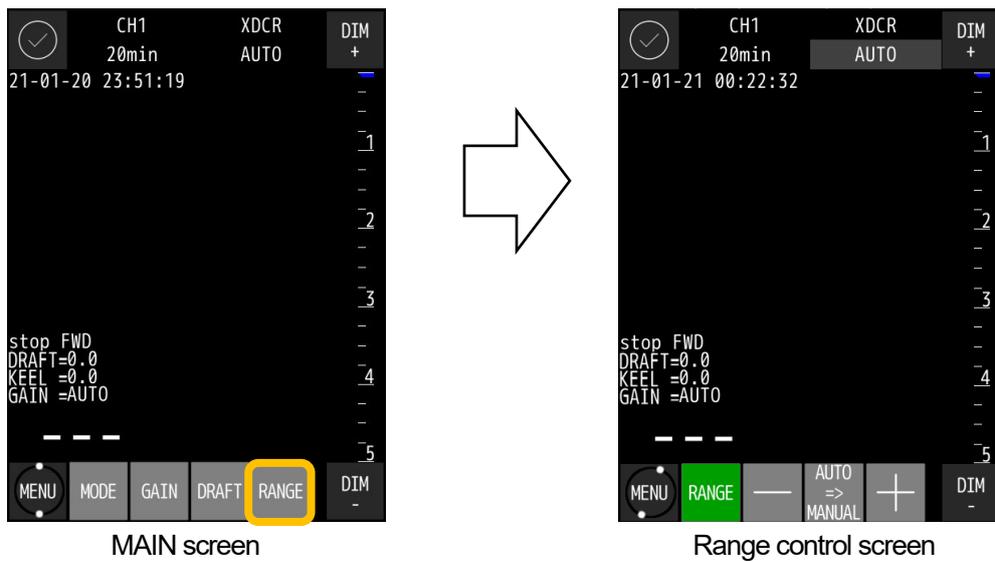
- The range change of this equipment is eight stages of 5,10, 20, 50,100,200,500,800m.

- Touch RANGE on main screen. The button color change to green and range menu is displayed.

- Range mode is displayed on the right side of main screen.

- Auto or manual range mode can be set with each AUTO => MANUAL / MANUAL => AUTO touch.

- Whenever + is touched, the range is switched to the deep end.

- Whenever − is touched, the range is switched to shallow one.

- When touch AUTO => MANUAL or +, −, auto range mode is released automatically and switch to the manual range.

- When auto range mode is canceled, the range setting is continued and doesn't return before the auto range mode.

- After setting the range. touch green RANGE button and range menu is closed.

Note

- Sea bottom might not be displayed according to the setting of draft.

- When sea bottom is not displayed, depth is not displayed.

- Auto range automatically switches the range so that the bottom 3/5 of the range scale shows the sea bottom.

10.1.7　Adjusting control panel illumination

MAIN screen

・ On echo sounder working adjust the brightness with [DIM +], [DIM -] on the screen while.

・ The brightness of the screen can be adjusted to 16 levels in each mode (DAY/DUSK/NIGHT).

・ Whenever [DIM +] is touched, brightness goes up and Whenever [DIM -] is touched, brightness goes down.

10.2　Basic Setting

This chapter describes the basic settings on the MENU screen. For how to switch to the MENU screen, refer to "10.1.2 Switching operation to MAIN / MENU screen".
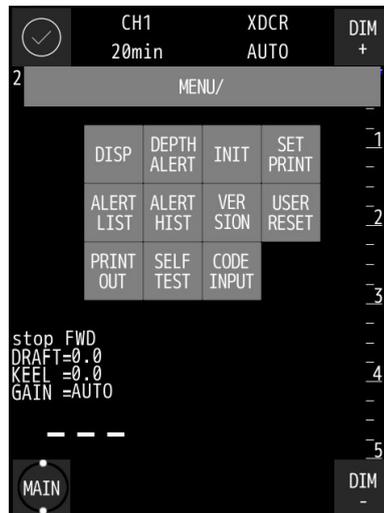
MENU screen

10.2.1 Menu list

```
MENU
  ┌─────────────
  │ DISP
  │   ├─ SCROLL SPEED        SLOW  STD  FAST
  │   ├─ NOISE REJECT        0 1 2 3 4 5 6 7 8 9 10
  │   ├─ IR                  OFF  IR1  IR2  IR3  AUTO
  │   ├─ CURSOR              OFF  ON  AUTO
  │   ├─ BOTTOM LINE         OFF  ON
  │   ├─ DEPTH DISP MODE     SURF  XDCR  KEEL
  │   │  DAY NIGHT           DAY  DUSK  NIGHT
  │   └─ LAT/LON             OFF  ON
```

SCROLL SPEED	SLOW **STD** FAST
NOISE REJECT	0 1 2 3 **4** 5 6 7 8 9 10
IR	OFF **IR1** IR2 IR3 AUTO
CURSOR	OFF ON **AUTO**
BOTTOM LINE	**OFF** ON
DEPTH DISP MODE	SURF **XDCR** KEEL
DAY NIGHT	**DAY** DUSK NIGHT
LAT/LON	**OFF** ON

DEPTH ALERT — Numerical value input (**0.0** ~ 99.9)

INIT

COLOR	
— DAY	**7color + BLACK** 7color + WHITE 7color + BLUE MONO AMBER MONO YELLOW MONO WHITE
— DUSK	**7color + BLACK** 7color + WHITE 7color + BLUE MONO AMBER MONO YELLOW MONO WHITE
— NIGHT	**7color + BLACK** 7color + WHITE 7color + BLUE MONO AMBER MONO YELLOW MONO WHITE
DATE TIME	
— DATE	YYYY/MM/DD
— TIME	HH:MM:SS
— DIFF	Up to ±14:00
— FORMAT	**YY-MM-DD** DD MM,'YY MM DD,' YY
— 12/24h	12hr **24hr**
— GPS SYNC	OFF **ON**
TOUCH PANEL CAL	
DIM OFFSET	-512 ~ **0** ~ 512

SET PRINT

PRINT MODE	**COPY** HISTORY LOG
PRINT CYCLE (LOG)	**OFF** 0.5min 1min 2min 5min 10min
PRINT LENGTH (LOG)	**10min** 20min 30min 1hr 2hr

ALERT LIST

ALERT HIST

VERSION

USER RESET

PRINT OUT

SELF TEST
- DEMO MODE
- CONT UNIT
- LCD UNIT
- TOUCH PANEL UNIT
- PRINT TEST
- ALERT TEST
  - ALL
  - DEPTH ALERT
  - LOST DEPTH
  - WEAK ECHO TX F
  - WEAK ECHO TXA
  - WEAK ECHO RX F
  - WEAK ECHO RX A
  - NO PAPER
  - LOST PRINT
  - LOG MEMORY FAIL
  - LOST PROC.(Only JFE-400)
- BUZZER TEST
- TRANSDUCER
  - CH1
  - CH2

CODE INPUT — *For service engineer menu

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10.2.2　Display setting

Set the display. The explanation of each setting item is as follows.

MENU screen　　　　　　　　　　　　DISPLAY menu screen

MENU 1	MENU 2	Contents
DISPLAY	SCROLL SPEED	The real time echo image scroll speed is selectable. 　　　Set content: SLOW / **STD** / FAST
	NOISE REJECT	The generation of this noise is decreased when a weak noise to the entire screen occurs and the screen is hard to see. 　　　Set content: 0 / 1 / 2 / 3 / **4** / 5 / 6 / 7 / 8 / 9 / 10 The ability to decrease the noise as the numerical value increases strengthens though "0" doesn't have the ability to decrease.
	IR (INTERFERENCE)	The interference noise by another ship displayed on the screen is reduced. 　　　Set content: OFF / **IR1** / IR2 / IR3 / Auto The ability to do the interference prevention processing strengthens while switching to "IR1 → IR2 → IR3→ Auto" though the interference prevention processing is not done in "OFF".
	CURSOR	The cursor display method in a standard mode and a history mode is selected. 　　　Set content: OFF / ON / **AUTO** OFF: The Depth cursor is not always displayed. ON: The Depth cursor is always displayed. **AUTO**: The Depth cursor disappears from the screen when the non-operation time reaches 30 seconds. When the depth cursor disappears, tap the screen to redisplay it.
	BOTTOM LINE	Select whether to simplify the sea bottom echo notation. Set content: **OFF** / ON **OFF**: Normal echo display. ON: Shows a red line on the edge of the sea bottom echo.

MENU 1	MENU 2	Contents
DISPLAY	DEPTH DISPLAY MODE	The standard when the depth value is displayed is selected. 　　Set Content: SURF / **XDCR** / KEEL SURF: The record and the depth value in which the draft adjusted value is considered are displayed. For the draft adjustment, refer to "10.1.5 Setting Draft". **XDCR**: The record and the depth value right under transducer are displayed. KEEL: The record and the depth value in which the keel correction value is considered are displayed. For the keel adjustment, refer to "10.3.4 Transducer Setting"
	DAY/NIGHT	Select a display color (Day, Dusk, Night). The display color of each color (Day, Dusk, night) can be set individually. For the setting display color, refer to "10.2.4 Initial Setting". 　　Set Content: **DAY** / DUSK / NIGHT Note: When the display color is switched, brightness will automatically return to the default brightness value of each display color.
	LAT/LON	Select whether to display the own ship position. 　　Set Content: **OFF** / ON OFF: Does not display the own ship position on the screen. ON: Display the own ship position on the screen. 　　To use this function, it is necessary to connect GPS to PIN3 and PIN4 of J4 terminal.
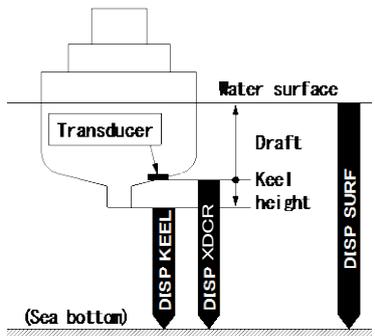
10.2.3　Setting Depth Alert

Set the water depth alert. The explanation of each setting item is as follows.

MENU screen

MENU 1	MENU 2	Contents
DEPTH ALERT		Depth where the depth alert starts is set. Set Content: Depth can be set up to 99.9m by a 0.1m unit. When depth is set and the depth alert is made "ON", the depth alert mark is displayed at the set depth position on the right of the range scale. This mark is not displayed to make the depth alert "OFF". An alert will be generated when the set value is reached. When the alert depth is set to 10.0m, alert starts by 10.0m When sea bottom becomes deeper than a set value after the depth alert starts, the alert will be canceled.

10.2.4　Initial Setting

Make settings when equipped. The explanation of each setting item is as follows.
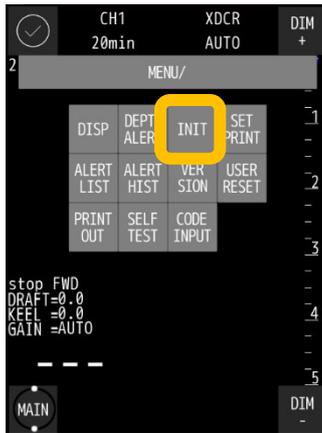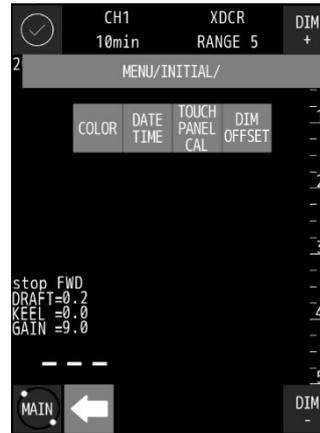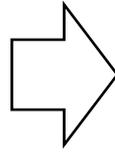
MENU screen　　　　　　　　　　　　　　INITIAL menu screen

MENU 1	MENU 2	MENU 3	Contents
INIT	COLOR	DAY	Set the screen color of DAY/DASK/NIGHT.
		DUSK	**7color + BLACK** :　Echo color is 7colors and screen is black.
		NIGHT	7color + BLUE :　Echo color is 7colors and screen is blue.
			7color + WHITE : Echo color is 7colors and screen is white.
			MONO AMBER : Echo color is amber gradation and screen is black.
			MONO YELLOW : Echo color is yellow gradation and screen is black.
			MONO WHITE : Echo color is white gradation and screen is black.
	DATE TIME	DATE	Set the date. 　　set Content: YYYY : MM : DD
		TIME	Set the time 　　Set Content: HH : MM : SS
		DIFF	set the time difference. When the time difference is "±0", it is recognized as UTC. 　　Set Content: ±HH : MM
		FORMAT	Set the format of date. 　　Set Content: **YY-MM-DD** / DD MM,'YY　/ MM DD,'YY
		12/24h	Set the format of time 　　Set Content: 12hr / **24hr**
		GPS SYNC	Set the GPS synchronization. 　　Set Content: OFF / **ON** OFF: An internal clock is used. **ON**: An internal clock is corrected by using ZDA sentence from PIN3 and PIN4 of terminal J4. When an internal clock and the ZDA data have shifted for 30 seconds or more by using the ZDA sentence, an internal clock is corrected.
	TOUCH PANLEL	-	Calibrate touch position The + on the screen turns red in the order of top left　→　top right　→　bottom left　→　bottom right　→　center.
	DIMM OFFSET	-	Make fine adjustments to the LCD default dimming. Dimm offset can be set up from -512 to 512 by 1 unit.

10.2.5 Printer Setting (Option)

Set the printer settings. The explanation of each setting item is as follows. For the base settings of the printer, refer to "10.3.3 Printer Model setting". For the printout method, refer to "10.2.10 Printout".

MENU screen   PRINT menu screen

MENU 1	MENU 2	Contents
PRINTER CONTROL	PRINT MODE	Select the item to print or output data. Set Content: **COPY** / HISTORY / LOG **COPY**: A present screen display is printed. HISTORY: All the memorized depth data is graphically printed. LOG: This printout is available only the history display mode. On history display mode, move time cursor by ◀ or ▶ key to select the center of LOG printout. LOG graphical printout length is set by "PRINT LENGTH(LOG)" menu.
	PRINT CYCLIC (LOG)	Select the automatic LOG book print mode. When select this interval setting menu to 0.5min, 1min, 2min, 5min, 10min, depth data will automatically print with every selected interval. The water depth memory interval is 0.5min. Set Content: **OFF** / 0.5min / 1min / 2min / 5min / 10min
	LOG PRINT LENGTH	Select the LOG output length. Set Content: **10min** / 20min / 30min / 1hr / 2hr

10.2.6 Alert List

Lists and displays the occurring alerts and their details.
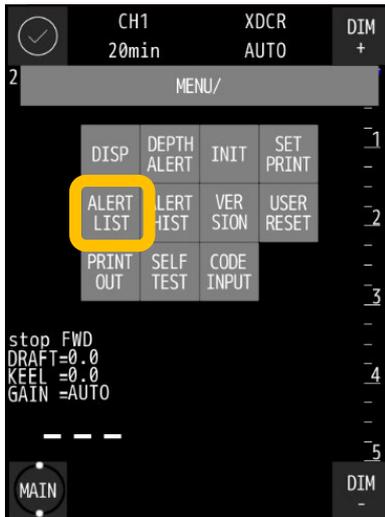
MENU screen
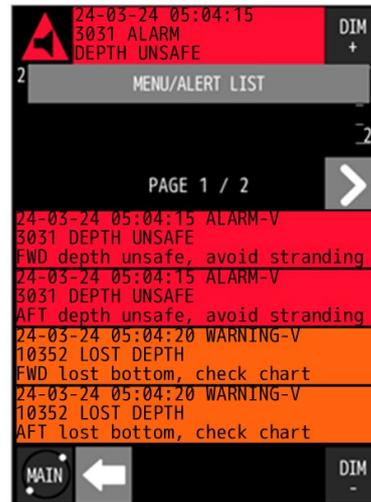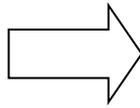
ALERT LIST screen

Touch ◁ ▷ to move to previous / next page.

When ⬅ is touched, return to previous menu.

10.2.7 Alert History

Lists and displays the alerts that have occurred in the past.

MENU screen
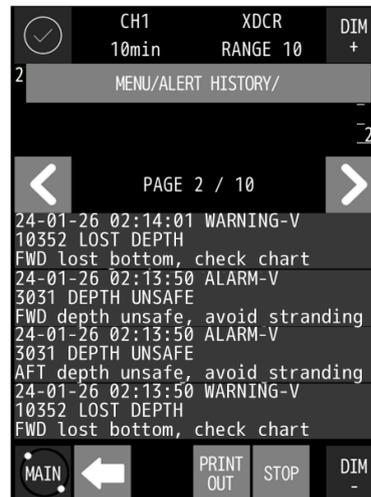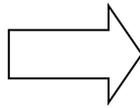
ALERT HISTORY screen

Touch ◁ ▷ to move to previous / next page.

When ⬅ is touched, return to previous menu.

When PRINT OUT is touched, print Alert History(Option printer is needed).

When STOP is touched, stop printout.

* The Alert History can display up to 40 past alerts.
* The displayed content is the same as the content of the Alert Detail area

10.2.8   Confirming the Version

The software version of the processing unit and DSP can be confirmed.

MENU screen

Version screen
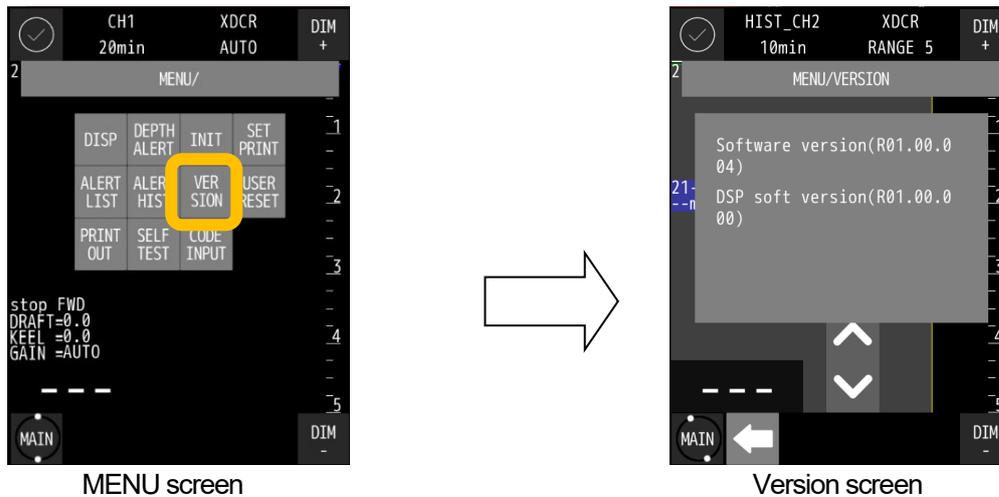
10.2.9   User Reset

The user settings are initialized. See Appendix B for the items to be initialized.

MENU screen

USER RESET screen
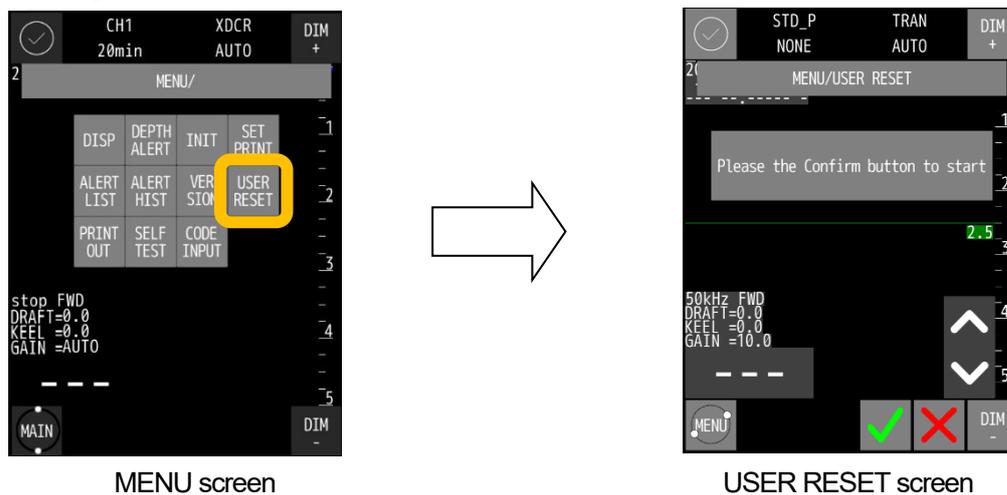
10.2.10   Printout (Option)

Printed out according to print mode. Each mode of the printed data, refer to "10.2.5 Printer Setting". For the printer model settings of the printer, refer to "10.3.3 Printer Model Setting".

MENU screen

PRINT OUT screen
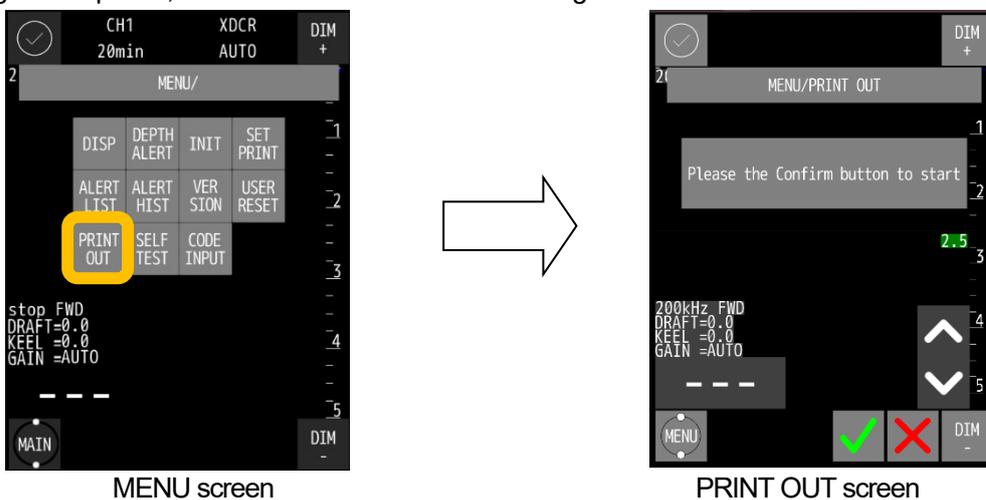
10.2.11 Self-Test

Self-test can be performed. The explanation of each item is as follows.
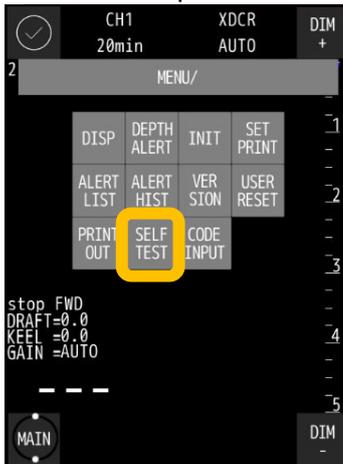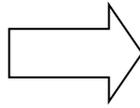
MENU screen　　　　　　　　　　　　SELF TEST screen

MENU1	MENU2	MENU3	Contents
SELF TEST	DEMO MODE		The demo mode setting Set Content: **OFF**: Switch to normal mode. ON: Switch to demo mode. During demo mode, the "In demo mode" window is displayed. Tap the window to hide it. In addition, character of DEMO is always displayed on the screen.
	CONTROL UNIT		Perform the self-test of control unit by PROM / SRAM / VRAM read/write. When ROM and RAM are normal in the result, "OK" is displayed, and when ROM and RAM are an abnormality, "NG" is displayed.
	LCD UNIT		Perform the self-test of LCD unit by displaying color pattern. The screen color changes in the order of black red, green, blue, and white. Check all colors are displayed correctly.
	TOUCH PANEL UNIT		Perform the self-test of touch panel. When screen is touched, a green dot will be displayed where touched. When there is a discrepancy between the touched part and the green dot, refer to "10.2.4 Initial Setting", and perform calibration.
	PRINT TEST		Perform the self-test of printer by printing test pattern. When printing does not start, check the model settings of the printer by referring to "10.3.3 Printer Model Setting".
	ALERT TEST	ALL	All alerts for which the alert generation setting in EQUIP is ON will be generated in a pseudo manner (refer to 10.3.2). **OFF**: Turns off all alert test function. ON: All alerts will be turned on.
		DEPTH ALERT	Test the depth alerts. **OFF**: Turns off the depth alert test function. ON: Depth alert is turned on. To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to 10.3.2).
		LOST DEPTH	Test the seabed lost alert. **OFF**: Turns off the seabed lost alert test function. ON: Seabed lost alert is turned on. To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to 10.3.2).
		WEAK ECHO TX CH1	Test the transmit Echo alert (CH1). **OFF**: Turns off the transmit Echo alert (CH1) test function. ON: Transmit Echo alert (CH1) is turned on. To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to 10.3.2).

MENU1	MENU2	MENU3	Contents
SELF TEST	ALERT TEST	WEAK ECHO TX CH2	Test the transmit Echo alert (CH2). **OFF**: Turns off the transmit Echo alert (CH2) test function. ON: Transmit Echo alert (CH2) is turned on. To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to 10.3.2).
		WEAK ECHO RX CH1	Test the received Echo alert (CH1). **OFF**: Turns off the received Echo alert (CH1) test function. ON: Received Echo alert (CH1) is turned on. To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to 10.3.2).
		WEAK ECHO RX CH2	Test the received Echo alert (CH2). **OFF**: Turns off the received Echo alert (CH2) test function. ON: Received Echo alert (CH2) is turned on. To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to 10.3.2).
		NO PAPER	Test the no paper alert. **OFF**: Turns off the no paper alert test. ON: No paper alert is turned on. To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to 10.3.2).
		LOST PRINT	Test the printer alert. **OFF**: Turns off the printer alert test. ON: Printer alert is turned on. To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to 10.3.2).
		LOG MEMORY FAIL	Test the log data alert. **OFF**: Turns off the log data alert test. ON: Log data alert is turned on. To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to 10.3.2).
		LOST PROC	Test the connection between processing unit and display unit **OFF**: Turns off the LOST PROC alert test. ON: LOST PROC alert is turned on. To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to 10.3.2).
	BUZZER TEST		Check the buzzer. Check (✓) that the buzzer sound.

MENU1	MENU2	MENU3	Contents
SELF TEST	TRANS DUCER	CH1	Check the transducer (CH1/CH2) during the vessel is berthing. When select the CH to diagnose, a warning window is displayed. After checking the contents, touch √ to start self-test of transducer. This function cannot completely identify the failure of the transducer. Use this as a guide to see when the transducer is operating normally. When there is a chevron in the vicinity of the frequency used after checking the waveform, the operation of transducer is good. When there is no chevron in the vicinity of the frequency used after checking the waveform or is flat, the transducer may be defective. Take a picture of the bad waveform and contact us or your distributor. (Contact information is on the back cover) ●Good product ●Defective Product
		CH2	

⚠ CAUTION

The sounding function cannot be used and depth data output to other equipment (E.G. ECDIS) is stopped while TRANSDUCER function of self-test is performed. Do not use this function during voyage.

10.2.12　Code Input

"EQUIP" menu will be displayed on the MENU screen by entering the password "1234" in CODE INPUT.
"EQUIP" menu is for service engineer menu.

10.3 Advanced Setting

Detail settings can be set in the "EQUIP". Normally, EQUIP is not displayed on the MENU screen. For displaying the "EQUIP", input password "1234".

MENU screen

Code input screen

EQUIP menu is displayed
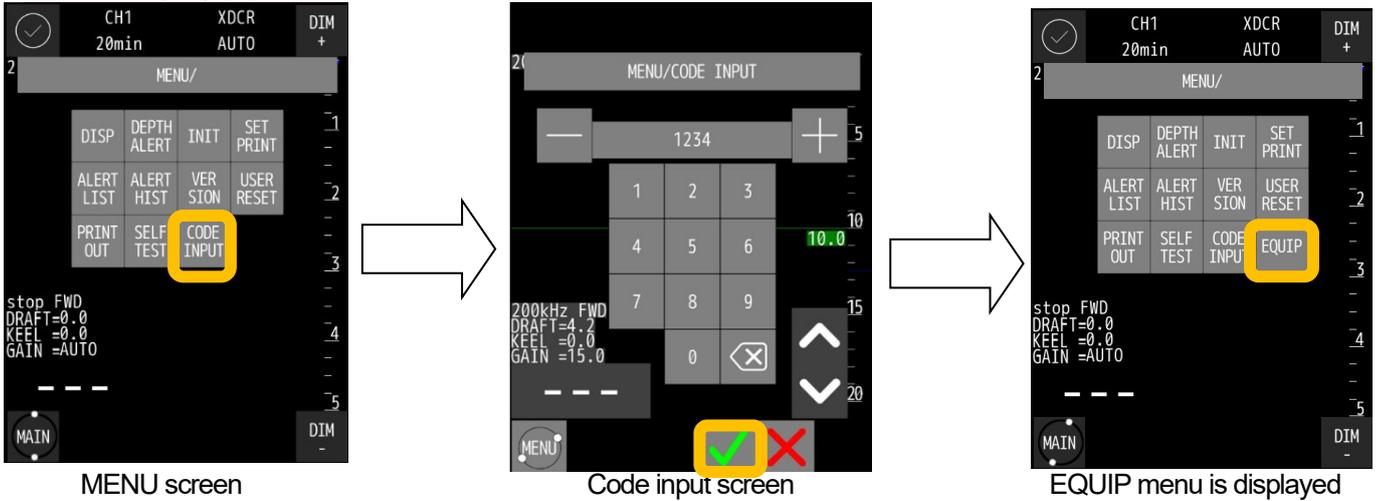
10.3.1 EQUIP Menu list

```
SERVICEMAN MENU
MENU
  ┌ EQUIP
     ├ SYSTEM ALERT
     │    ├ DEPTH ALERT              OFF  ON
     │    ├ LOST DEPTH               OFF  ON
     │    ├ WEAK ECHO TX             OFF  ON
     │    ├ WEAK ECHO RX             OFF  ON
     │    ├ NO PAPER                 OFF  ON
     │    ├ LOST PRINT               OFF  ON
     │    ├ LOG MEMORY FAIL          OFF  ON
     │    └ LOST PROC. (JFE-400 only)  OFF  ON
     │
     ├ PRINTER                  NKG-901 NKG-91 DPU-414  No printer
     │
     ├ TD SET
     │    ├ CH1
     │    │    ├ FREQ               200 or 50  stop
     │    │    ├ POS                FWD  MID  AFT
     │    │    ├ STC                SHORT  MIDDLE  LONG
     │    │    ├ AUTO GAIN MAX       15 ~ 30 ~ 35
     │    │    ├ AUTO GAIN TH UP     1419 ~ 1499 ~ 1539
     │    │    ├ AUTO GAIN TH DB     27 ~ 57 ~ 87
     │    │    ├ INNER HULL OFFSET   OFF  1 2 3 4 5
     │    │    └ KEEL               Numerical value input (0.0 ~ 9.9)
     │    ├ CH2
     │    │    ├ FREQ               200 or 50  stop
     │    │    ├ POS                FWD  MID  AFT
     │    │    ├ STC                SHORT  MIDDLE  LONG
     │    │    ├ AUTO GAIN MAX       15 ~ 30 ~ 35
     │    │    ├ AUTO GAIN TH UP     1419 ~ 1499 ~ 1539
     │    │    ├ AUTO GAIN TH DB     27 ~ 57 ~ 87
     │    │    ├ INNER HULL OFFSET   OFF  1 2 3 4 5
     │    │    └ KEEL               Numerical value input (0.0 ~ 9.9)
     │    ├ BAND WIDTH             50kHz 200kHz / SHORT MIDDLE LONG /
     │    │                        5m 10m 100m 200m 500m 800m / 0 1 2 3 4 5 6 7
     │    └ POWER REDUCTION        OFF  ON
```

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```
~~
 ─ COM
     ├─ NMEA VER.              VER1.5  VER2.3  **ALL**
     ├─ ALERT MODE             **IEC**  DNV
     ├─ KEY ACK                OFF  **ON**
     ├─ DNV SET
     │   ├─ ALERT BUZZER       OFF  **ON**
     │   ├─ ALF OUTPUT         ALL  **DEPTH**  SYSTEM
     │   └─ PJRC OUTPUT        OFF  **ON**
     ├─ LAN COMMON
     │   ├─ IGMP               Ver1  Ver2  **Ver3**
     │   ├─ TTL                Numerical value input
     │   ├─ SFI                **SD0001** ~ SD9999
     │   └─ RMS                OFF  **ON**
     ├─ LAN1
     │   ├─ IP ADRESS
     │   │   ├─ RESET IP
     │   │   └─ MANUAL SET     Numerical value input (**No.1:172.16.60.125**)
     │   ├─ SUBNET MASK        Numerical value input (**255.255.0.0**)
     │   ├─ GATE WAY           Numerical value input (**172.16.60.1**)
     │   ├─ ALERT TX           **BAM1**  BAM2 NAVD MISC
     │   ├─ ALERT RX           **CAM1**  CAM2 NAVD MISC
     │   └─ DATA TX            **NAVD**  MISC
     ├─ LAN2
     │   ├─ IP ADRESS
     │   │   ├─ RESET IP
     │   │   └─ MANUAL SET     Numerical value input (**No.1:172.17.60.125**)
     │   ├─ SUBNET MASK        Numerical value input (**255.255.0.0**)
     │   ├─ GATE WAY           Numerical value input (**172.17.60.1**)
     │   ├─ ALERT TX           **BAM1**  BAM2 NAVD MISC
     │   ├─ ALERT RX           **CAM1**  CAM2 NAVD MISC
     │   └─ DATA TX            **NAVD**  MISC
     ├─ ALERT OUT
     │   ├─ OUTPUT CYCLE       **1S**  2S  5S  10S
     │   ├─ TYPE               ALR  **ALF**
     │   └─ PORT               LAN  ALR OUT  **BOTH**
     ├─ DEPTH OUT
     │   ├─ OUTPUT CYCLE       **1S**  2S  5S  10S
     │   └─ PORT               LAN  DEPTH OUT  **BOTH**
     ├─ LINE MON
     │   ├─ LAN1
     │   ├─ LAN2
     │   ├─ ALRT OUT
     │   ├─ DEPTH OUT
     │   └─ NAV IN
     └─ DRY CT ACK IN          **OFF**  ACK IN  BZ OFF IN
 ─ RX MON                      **OFF**  ON
 ─ MASTER RESET
```

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10.3.2 System Alert Setting

The system alerts can be set. The explanation of each setting item is as follows.

EQUIP screen

MENU 1	MENU 2	MENU 3	Contents
EQUIP	SYSTEM ALERT	DEPTH ALERT	The operation of the depth alert is selected. OFF: The depth alert is not generated. **ON**: When seabed becomes shallower than the depth set by " MENU/DEPTH ALERT/", the depth alert starts. When seabed becomes deeper than a set value after the depth alert is generated. When the depth alert is generated, the color of depth value is changed to red. Note: The color of depth value is changed to red only when the software version is R01.00.060 or later.
		LOST DEPTH	The seabed lost alert setting. **OFF**: The seabed lost alert is not generated. ON: When seabed was not able to be detected 15 times or more, the seabed lost alert is generated. When seabed was not able to be detected 40 times or more with range of 10/20/50m, the seabed lost alert is generated. When seabed is detected after the "LOST DEPTH" alert generates, the alert is rectified. In this case, when this alarm is not acknowledged, the alarm is displayed as rectified and unacknowledged alarm. When the seabed lost alert is generated, the color of depth value is changed to orange. Note: The color of depth value is changed to orange only when the software version is R01.00.060 or later.
		WEAK ECHO TX	The transmit Echo alert setting. **OFF**: The transmit Echo alert is not generated. ON: When the voltage of the transmit echo signal is below the threshold, the transmit Echo alert is generated.
		WEAK ECHO RX	The received Echo alert setting. **OFF**: The received Echo alert is not generated. ON: When the signal strength of the received echo is less than half of the normal value, the received Echo alert is generated.
		NO PAPER	The no paper alert setting. **OFF**: The no paper alert is not generated. ON: When there is no printing paper, the no paper alert is generated.
		LOST PRINTER	The printer alert setting. **OFF**: The printer alert is not generated. ON: When connection of the printer disconnected, the printer alert is generated.

MENU 1	MENU 2	MENU 3	Contents
EQUIP	SYSTEM ALERT	LOG MEMORY FAIL	The Log data alert setting. OFF: The Log data alert is not generated. **ON**: When the depth log data is corrupted, the log data alert is generated.
		LOST PROC	The processing unit connection alert setting OFF: The LOST PROC alert is not generated. **ON**: When detecting disconnection between processing unit and display unit, alert is generated.

10.3.3 Printer Model Setting (Option)

The system printer setting can be set. The explanation of printer setting item is as follows.
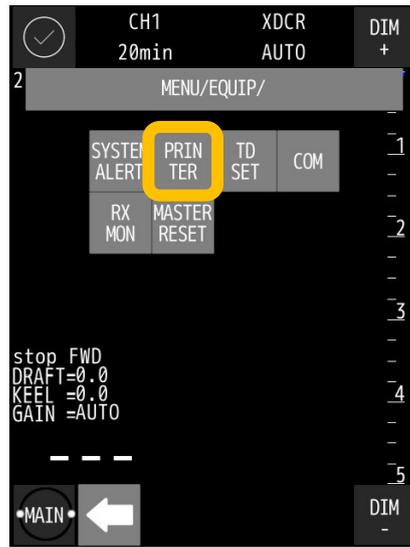
EQUIP screen

MENU 1	MENU 2	MENU 3	MENU 4	Contents
EQUIP	PRINTER			Set the printer model. NKG-901 NKG-91 DPU-414 **No printer**

10.3.4　Transducer Setting

Set the transducer. The explanation of each item is as follows.
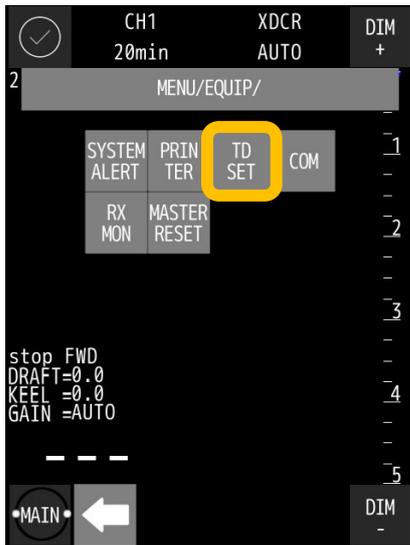
EQUIP screen
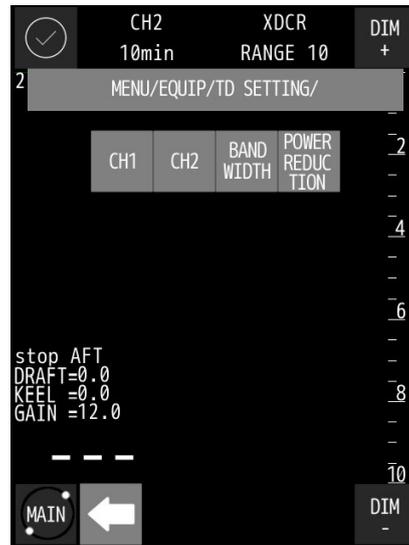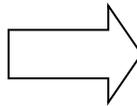
TD Setting screen

MENU 1	MENU 2	MENU 3	MENU 4	Contents
EQUIP	TD SETTING	CH1/ CH2	FREQ	Sets the frequency of the CH1 (CH2) transducer. The frequency of the transducer is automatically read and set. stop: Set when the function of the transducer of CH1 (CH2) is turned off or when the transducer is not installed. 50kHz: It is set automatically when the transducer of CH1 (CH2) is 50kHz. 200kHz: It is set automatically when the transducer of CH1 (CH2) is 200kHz.
			POS	Set the mounting position of the CH1 (CH2) transducer. FWD: Set when the CH1 (CH2) transducer is installed at the front of the ship. MID: Set when the CH1 (CH2) transducer mounting position is in the center of the ship. AFT: Set when the CH1 (CH2) transducer is installed at the rear of the ship. (Default setting:　CH1: **FWD,** CH2:**AFT**)
			STC	Sets the STC curve for CH1 (CH2). * When set to auto gain, the STC curve will be "LONG" regardless of the setting here. SHORT: Set the STC curve for CH1 (CH2) to 40log. MIDDLE: Set the STC curve for CH1 (CH2) to 30log. **LONG**: Set the STC curve for CH1 (CH2) to 20log.
			AUTO GAIN MAX	Sets the maximum auto gain value for CH1 (CH2). The maximum value of auto gain can be set in the range of 15 to 35 dB in 1 unit.(Initial value: **30dB**)
			AUTO GAIN TH UP	Sets the threshold up of auto gain value for CH1 (CH2). Threshold can be set in the range of 1419 to 1539(Initial value:**1499**)
			AUTO GAIN TH DB	Sets the threshold dead of auto gain value for CH1 (CH2). Threshold can be set in the range of 27 to 87(Initial value:**57**)

MENU 1	MENU 2	MENU 3	MENU 4	Contents
EQUIP	TD SETTING	CH1/ CH2	INNER HULL OFFSET	Set the inner hull offset of CH1 (CH2). **OFF**: Inner hull offset is not applied to CH1 (CH2). 1: Set an offset of +4dB to the gain of CH1 (CH2). 2: Set an offset of +8dB to the gain of CH1 (CH2). 3: Set an offset of +12dB to the gain of CH1 (CH2). 4: Set an offset of +16dB to the gain of CH1 (CH2). 5: Set an offset of +20dB to the gain of CH1 (CH2).
			KEEL	Set the keel correction value. The keel correction can be set in the range of 0.0 to 9.9m in 0.1m. (initial value: **0.0m**)
		BAND WIDTH	-	Set the bandwidth of each frequency 50kHz / 200kHz SHORT / MIDDLE / LONG 5m / 10m / 20m / 50m / 100m / 200m 1 / 2 / 3 / 4 / 5 / 6 / 7
		POWER REDUCTION	-	Reduces the output of the transducer. **OFF**: Use the transducer with normal power ON: Use the transducer with reduces power
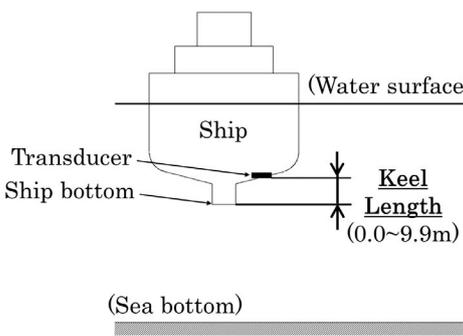
10.3.5 Communication setting

Communication settings can be set. The explanation of each setting item is as follows.

EQUIP screen

COMMUNICATION screen

MENU 1	MENU 2	MENU 3	MENU 4	Contents
EQUIP	COMMU NICATION	NMEA VER.	-	Set the output format of water depth information. VER 1.5: DBK, DBS, DBT sentence can be output VER2.3: DPT sentence can be output. **ALL**: DBK, DBS, DBT, DPT sentence can be output. Details of the sentence can be found in the Appendix D "Data Format" at the end of the book.
		ALERT MODE	-	Set the communication standard for alert signals. Use the IEC settings unless instructed by us. **IEC** / DNV
		KEY ACK	-	Set the buzzer sound when operating the display unit. OFF: A buzzer does not sound during operation. **ON**: The buzzer sounds during operation.
		DNV SET	ALERT BUZZER	Set the alert sound of the bridge. Use the ON settings unless instructed by JRC. OFF / **ON**
			ALF OUTPUT	Set the alert output to the bridge. Use the DEPTH settings unless instructed by JRC. ALL / **DEPTH** / SYSTEM
			PJRC OUTPUT	Set the communication of PJRC sentence. Use the ON settings unless instructed by JRC. OFF / **ON**

MENU 1	MENU 2	MENU 3	MENU 4	Contents
EQUIP	COMMU NICATION	LAN COMMON	IGMP	Set the IGMP (Internet Group Management Protocol) snooping Ver1 / Ver2 / **Ver3**
			TTL	Set the TTL (Time to live) Numeric value input TTL can be set in the range of 1 to 99 (Initial value: **1**)
			SFI	Set the SFI (System function ID) Talker has been decided as SD. **SD0001** – SD9999
			RMS	RMS: Select when connecting to a remote maintenance system. OFF: Not output JRC remote maintenance Data **ON**: Output JRC remote maintenance Data
		LAN1	IP ADDRESS	Set the IP address of LAN1. Default IP address: 172.16.60.125 RESET IP Button: Set IP 192.168.60.125 for JRC old IP group Manual SET Button: Set IP manually by numeric value input.
			SUBNET MASK	Set the subnet-mask for LAN1 Default Subnet mask: 255.255.0.0
			DEFAULT GATEWAY	Sets the default gateway for LAN1. Default "Default gateway": 172.16.60.1
			ALERT TX	Set the transmission group of alert output **BAM1: 239.192.0.17** BAM2: 239.192.0.18 NAVD: 239.192.0.4 MISC: 239.192.0.1
			ALERT RX	Set the transmission group of alert input **CAM1 239.192.0.19** CAM2 239.192.0.20 NAVD 239.192.0.4 MISC 239.192.0.1
			DATA TX	Set the transmission group of depth data output **NAVD 239.192.0.4** MISC 239.192.0.1
		LAN2	IP ADDRESS	Set the IP address of LAN2. Default IP address: 172.17.60.125 RESET IP Button: Set IP 192.168.61.125 for JRC old IP group Manual SET Button: Set IP manually by numeric value input.
			SUBNET MASK	Set the subnet-mask for LAN2 Default Subnet mask: 255.255.0.0
			DEFAULT GATEWAY	Sets the default gateway for LAN2. Default "Default gateway": 172.17.60.1
			ALERT TX	Set the transmission group of alert output **BAM1: 239.192.0.17** BAM2: 239.192.0.18 NAVD: 239.192.0.4 MISC: 239.192.0.1
			ALERT RX	Set the transmission group of alert input **CAM1 239.192.0.19** CAM2 239.192.0.20 NAVD 239.192.0.4 MISC 239.192.0.1
			DATA TX	Set the transmission group of depth data output **NAVD 239.192.0.4** MISC 239.192.0.1

MENU 1	MENU 2	MENU 3	MENU 4	Contents
EQUIP	COMMU NICATION	ALERT OUT	OUTPUT CYCLE	Sets the output cycle of alert output. Output cycle: **1** / 2 / 5 / 10s
			TYPE	Sets to use alert sequence ALR: Sets to use alert sequence of ALR **ALF**: Sets to use alert sequence of ALF
			PORT	Sets to output port of alert data LAN: Outputs alert data to the LAN port. ALR OUT: Outputs alert data to the serial port of ALR OUT. **BOTH**: Outputs alert data to both of LAN and serial port
		DEPTH OUT	OUTPUT CYCLE	Sets the output cycle of depth data output. Output cycle: **1** / 2 / 5 / 10s
			PORT	Sets to output port of depth data LAN: Outputs alert data to the LAN port. DPT OUT: Outputs alert data to the serial port of DPT OUT. **BOTH**: Outputs alert data to both of LAN and serial port
		LINE MON	LAN1	The transmission / reception signal of LAN1 can be checked.
			LAN2	The transmission / reception signal of LAN2 can be checked.
			ALERT OUT	The transmission / reception of alert data can be checked.
			DEPTH OUT	The transmission of depth out and reception of GPS data can be checked.
		CONTACT ACK IN	-	Sets to contact input mode **OFF**: Not used ACK IN: Use for alert acknowledged BUZZER OFF: Use for alert silence

10.3.6   Transducer Signal Monitoring

The signal of the transducer can be monitored. The item description is as follows.

EQUIP screen

MENU 1	MENU 2	Contents
EQUIP	RX MONITOR	The signal of the transducer can be monitored. **OFF**: Turns off the monitoring function. ON: CH1 and 2 LEVEL (reception level), S_RANGE (start range), and E_RANGE (end range) are displayed. The start range and end range are determined from the current seabed distance. Assuming that the next seabed exists within this range and focus on searching within that range.

10.3.7　Master Reset

The set value is returned to the factory default. The item description is as follows. For the items to be initialized, refer to Appendix B.
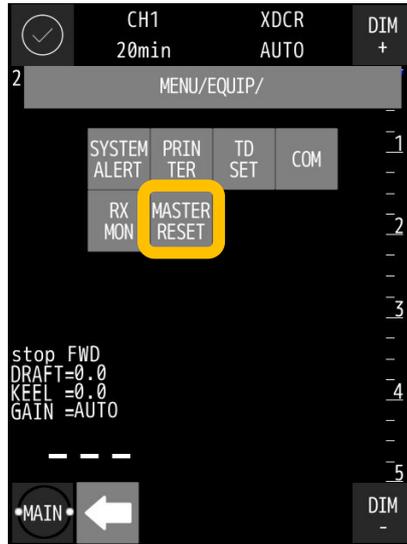
EQUIP screen

MENU 1	MENU 2	Contents
EQUIP	MASTER RESET	The set value is returned to the factory default. **ALL**: Returns all settings at the factory. MAINTENANCE DATA: Returns maintenance data to factory default. USER DATA: Returns user data to factory default.

10.4 Software Update

Note:

Performing this procedure will update both processing unit and display Unit software.

10.4.1 Preparation Tools

Following tools are needed for updating software.

Preparation Tools	Q'ty	Remarks
Laptop PC	1	OS: Windows XP, Vista, 7, 8,10 (Japanese/English)
LAN Cable	1	

Installing following software are needed.

Software	Ver.	Remarks
.Net Framework	4.5 or later	Software available from Microsoft's HP. Install in advance.
jrcupdatetool.exe	1.00.000 or later	

10.4.2 Confirmation of current software version

See 10.2.8 Confirming the Version.

10.4.3 Software update procedure for processing unit and display unit

1) Turn off the power: Press the power switch at the bottom of the display unit.
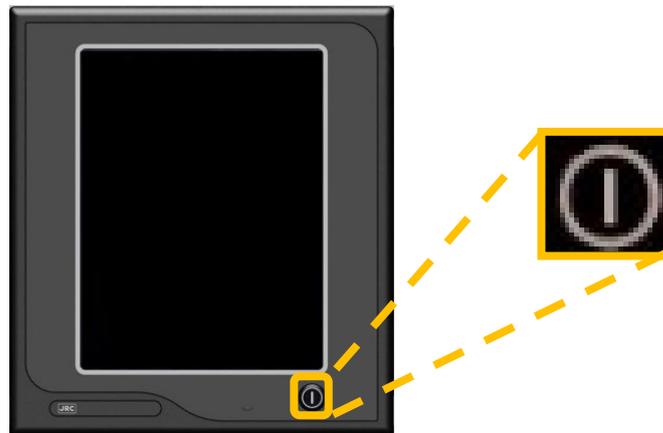
2) Remove the 4 screws (M4) at the four corners of the front of the NQA-4327 and remove the front cover.
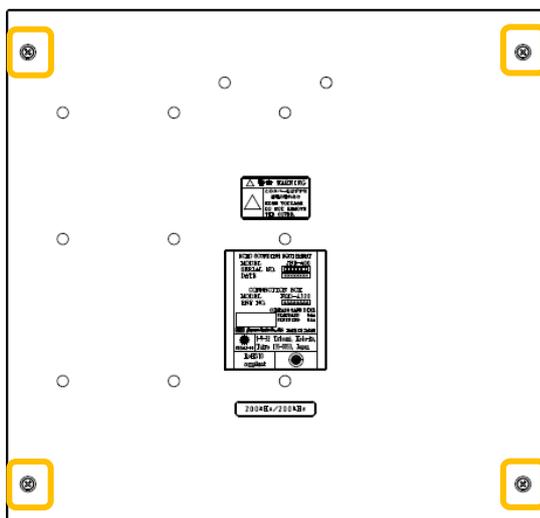
3) Hook the mounting bracket on the front cover to the rear case. (Wiring work will be easier by hooking.)

mounting bracket
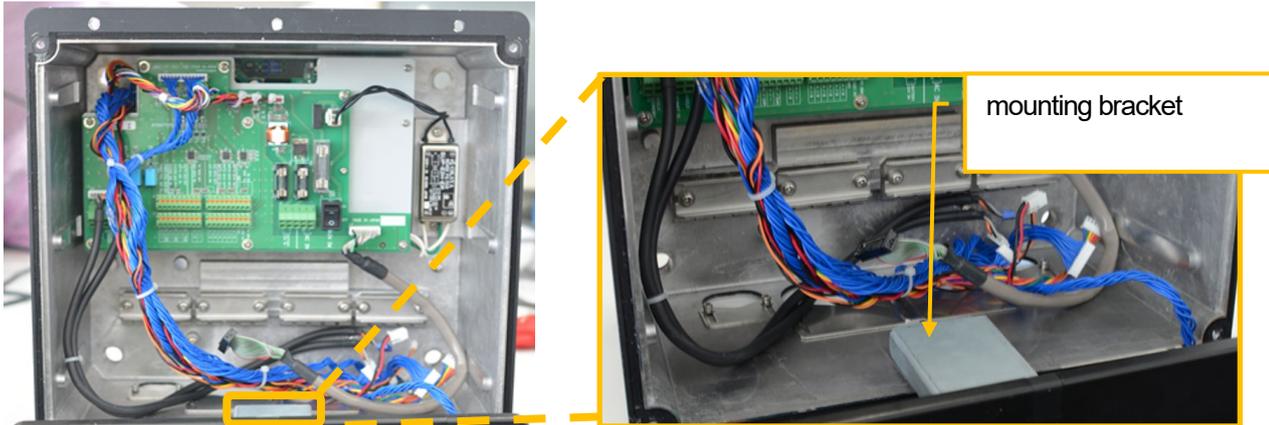
4) Confirm the SW mounted on IF circuit (CQD-2348) is off.
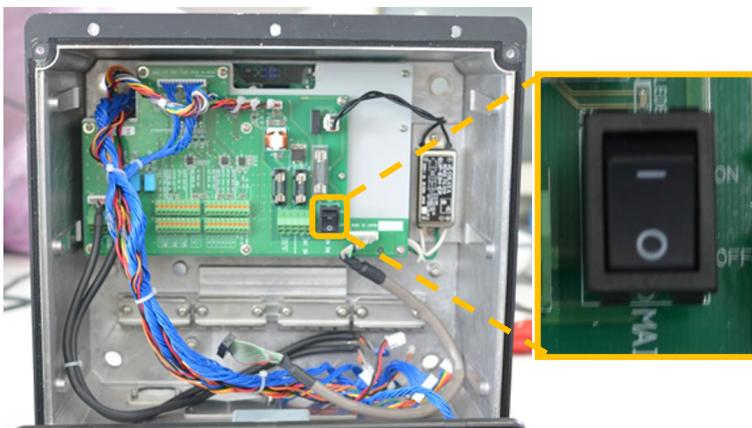
5) Connect to J11 or J12 of Main PCB (CDJ-2594) on front cover with LAN cable. Both J11 and J12 are acceptable.
   Keep the J10 connected to NWZ-1650.
Note: When the LAN cable is already wired at J11 and J12, temporarily disconnect and change it to the LAN cable that connects to the PC.

Connect to J11 or J12 of Main PCB (CDJ-2594) on front cover with LAN cable. Both J11 and J12 are acceptable.

Keep the J10 connected to NWZ-1650.

J11 J12   J10
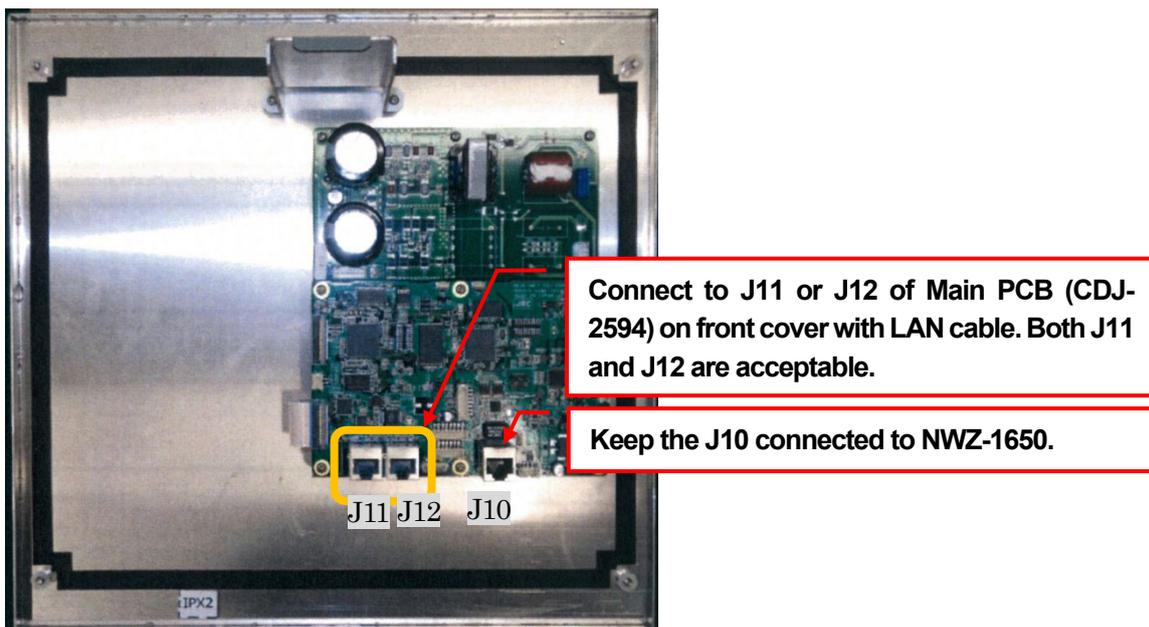
6) Turn on the main SW of the I/F unit (CQD-2348) attached to the rear case.
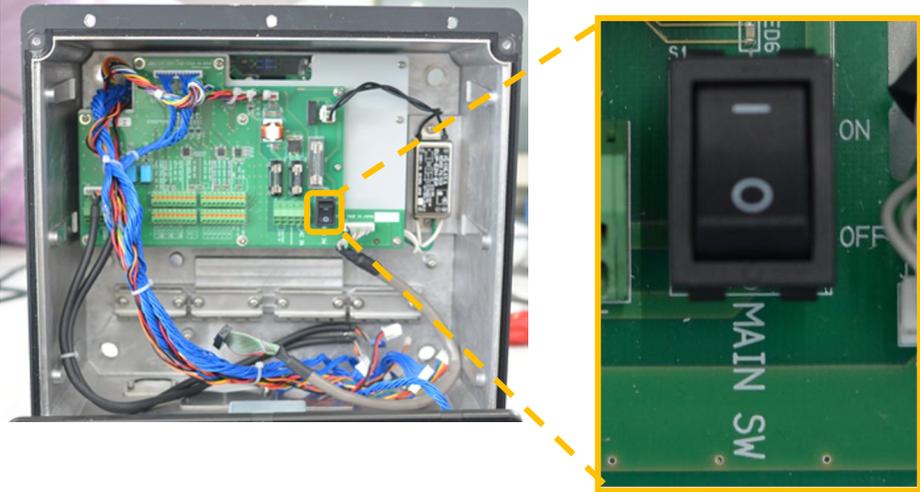
7) Press the power switch at the bottom of the display processing unit to start up.
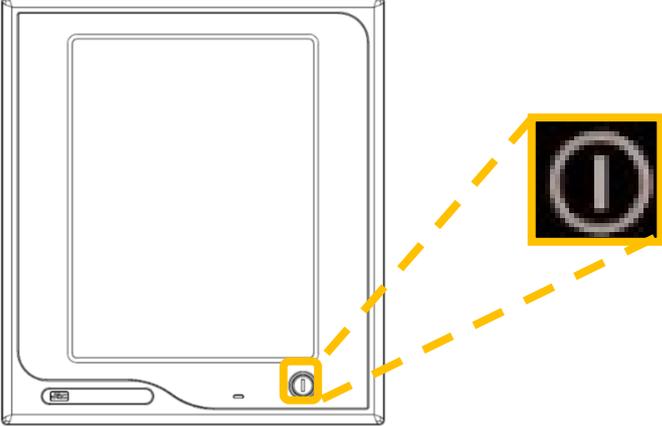
10.4.4 Procedure of execute update tool

Note:

Performing this procedure will update both processing unit and display Unit software.

1) Start the update tool "jrcupdatetool.exe" from laptop computer with administrator.

Procedure for starting with administrator
   (I) Log in to Windows as an administrator.
   (II)Right-click "jrcupdatetoo.exe".
   (III)Left-click "Run as administrator".
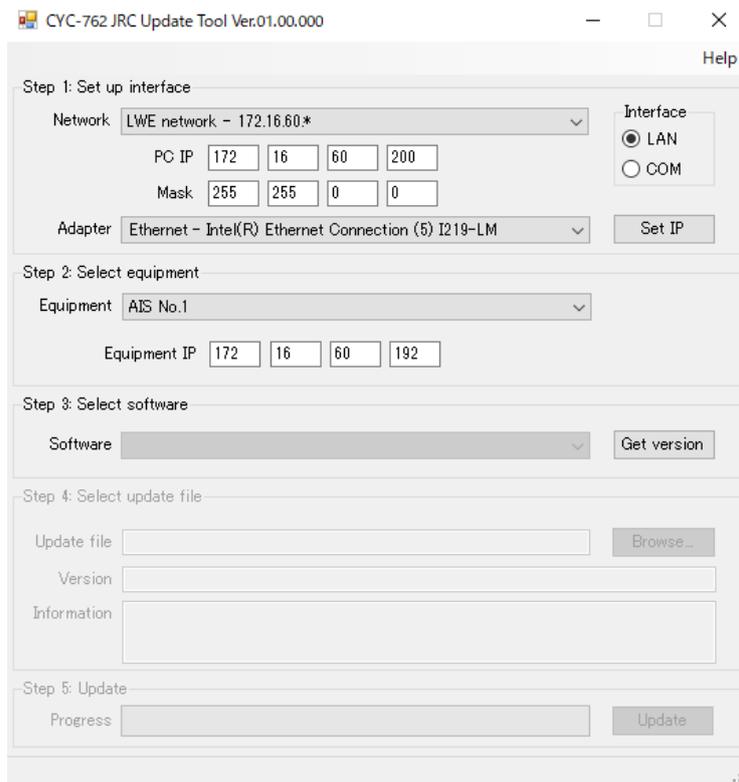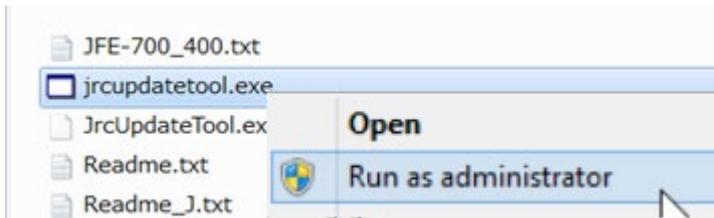
JRC Update Tool

2) Set Network to "LWE network – 172.16.60. *"in "Step1: Set up interface".

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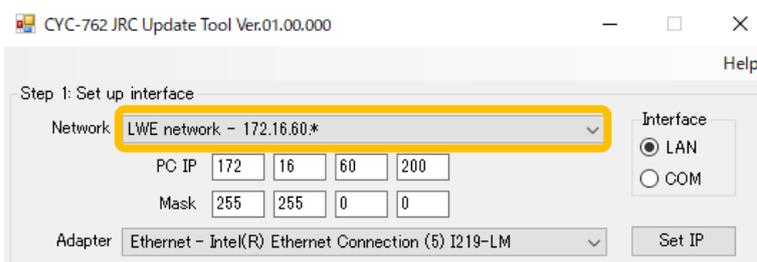
3) Set Interface to "LAN" in "Step1: Set up interface".
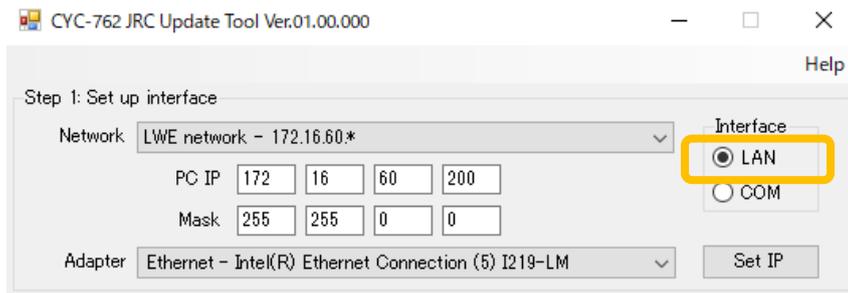
4) Set Adapter to adapter connected to echo sounder in "Step1: Set up interface".
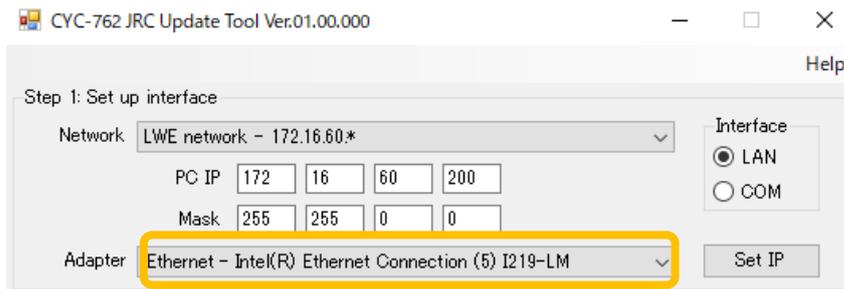
This adapter is example

5) Press "Set IP" button in Step1: Set up interface
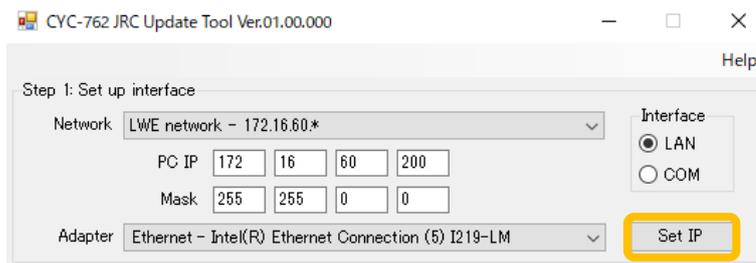
Note: When press "Set IP", the IP address will be set automatically to connect echo sounder.
When press "Recovery IP", it will return to your previous IP address setting.

6) Press OK button when 「IP setting is OK」 is displayed.
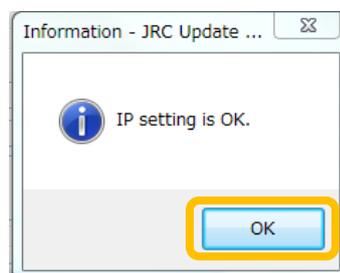
7) Select "JFE 400/700 No.1" in "Step2：Select equipment" of Equipment.
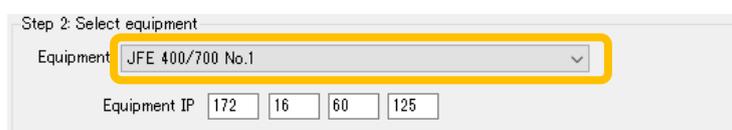
8) Confirm Equipment IP is 172.16.60.125 in "Step2：Select equipment".

Step 2: Select equipment

Equipment JFE 400/700 No.1

Equipment IP 172 16 60 125
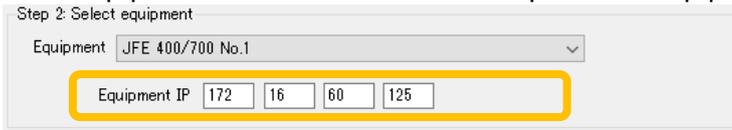
9）Press "Get version" in "Step3：Select software".

Step 3: Select software

Software [   ] Get version
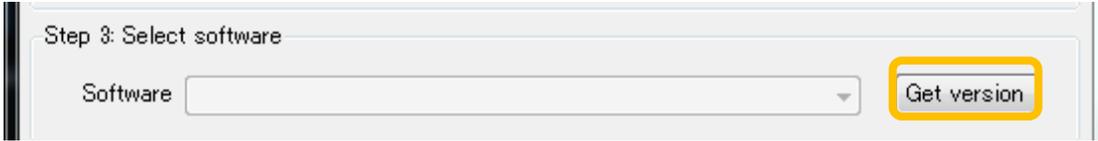
Note: When "Get version" function fails, refer to 10.4.5 Software update with Manual IP Settings.

10) When OK dialog is displayed, press "OK" button.

Information - JRC Update ...

i OK.

OK
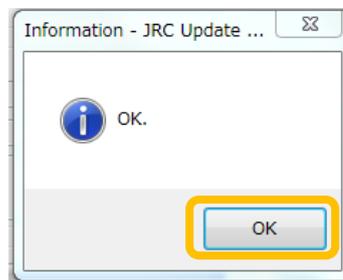
11）Confirm that the software version confirmed in Chapter 10.4.2 is displayed in "Software" of Step3: Select software.

Step 3: Select software

Software JFE700 (Ver. R01.00.041) Get version
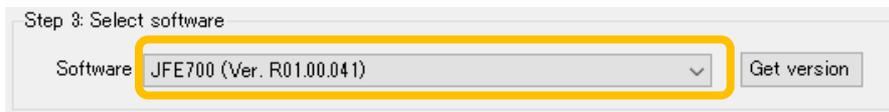
12) Click "Browse ..." of Step4: Select update file and select the update file (JFE400-700_R ***. Jrc: *** is software version)

Step 4: Select update file

Update file [   ] Browse...
Version   [   ]
Information [   ]
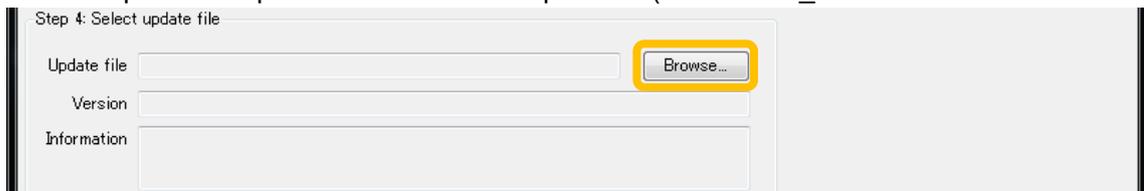
13) Confirm the file selected in (Step12) is displayed in "Update file" and "Version" of Step4: Select update file (The version shown below is example).

Step 4: Select update file

Update file JFE400-700_R01.00.041.jrc Browse...
Version R01.00.041
Information
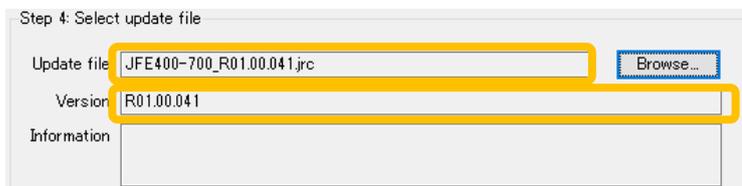
This screen is example

14) Press "Update" button in Step5: Update to start the software update.
* It takes about 5 minutes from pressing "Update" to completion.
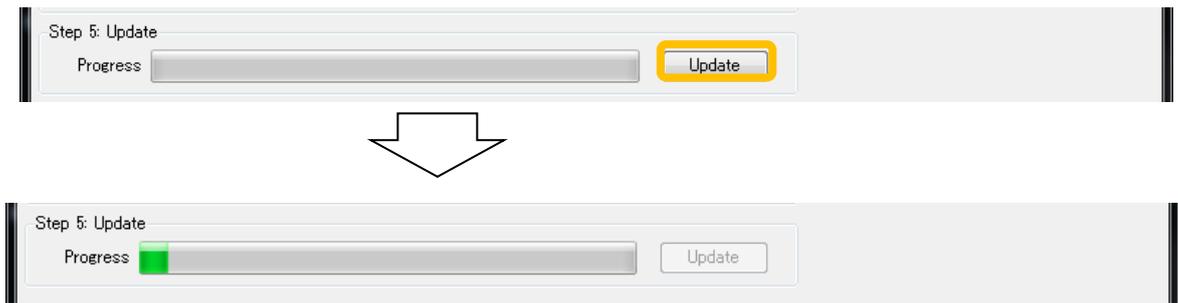
15) After the update is complete, power of the main unit will automatically turn off.
   "Waiting for reboot. (120sec.)" is displayed in the update tool, wait 120 seconds.
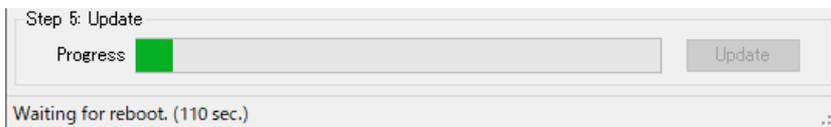
16) After the 120-second countdown is completed, refer to Chapter 10.2.8, and check that the software version has been
      updated correctly.
* When "TCP connection error" is displayed in the update tool at the end of the countdown, you can ignore it.

17) Assemble the NQA-4327 in the reverse order of disassembly.
*Note: Disconnect LAN cable that connects to the PC and reconnect existing LAN cable.
*Note: When fitting the front cover to the rear case, be careful not to pinch the cable.

10.4.5　Software update with manual IP settings

Perform this section when the update software cannot communicate correctly with the display processing unit even if pressing "Get Version" in 9) Step3: Select software.

1.Check cable connection
　Connect the PC and the J11 LAN connector of the main unit CDJ-2594 directly with a LAN cable.

* Note that connecting a LAN cable to J10 and J12 will not work properly.

2. Reset the PC side
1) Close the running update tool "jrcupdatetool.exe".
2) Manually change the IP address of the PC. The method differs slightly depending on the type of Windows, but in general, it can be changed with the Internet Protocol version 4 (TCP / IP4) property of the adapter to be connected from "Control Panel-> Network and Internet-> Network Connection".
3) Follow the steps below to change the IP address. Record the original IP address, subnet mask, and default gateway before making any changes. It will be used later to restore the original settings.
4) Set the IP address of PC to something other than 172.16.60.125 and 172.16.60.126 (172.16.60.125 and 172.16.60.126 are the IP addresses of the Echo Sounder itself).
5) Set the subnet mask to 255.255.0.0.
6) Set the default gateway to 172.60.125.1.

3. Execute the update tool
Same procedure and carry out 10.4.4 Procedure of execute update tool.

After the update is complete, return the IP address of your PC to the original address.

Chapter 11 Final Check

11.1　Checking before underlay

When installing, make sure to measure insulation resistance of the transducer and the extension cable and check the resonance frequency of the transducer before the underlay.

!	Make sure to turn off power of the display unit when replacing the transducer. (Refer to the step1 to step 3 in the clause 9.6.1)

11.1.1　Measurement of insulation resistance

The tools used are as follows.

Tool	Q'ty	Remark
Phillips screwdriver (For M4)	1	
Flathead screwdriver(No.5)	1	
Flathead screwdriver (Width 3.5 × Thick 0.5mm recommended)	1	
Tester	1	
Transducer checker (e.g.TT-2, TT-2D)	1	Either transducer checker or antenna analyzer shall be prepared.
Antenna analyzer AA-30		

1) Measurement insulation resistance of the transducer

1) Disconnect transducer cable from terminal of the matching box. Wiring diagram is shown the back of the matching box cover. Refer the "9.4 Matching box Wring" to disconnect cable
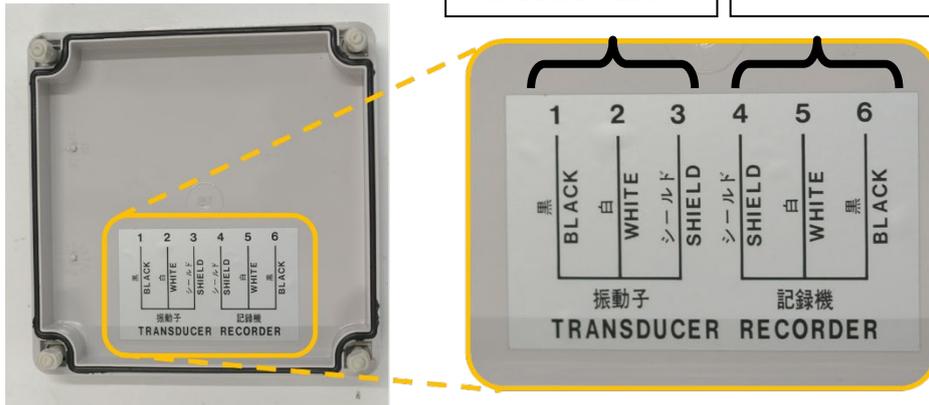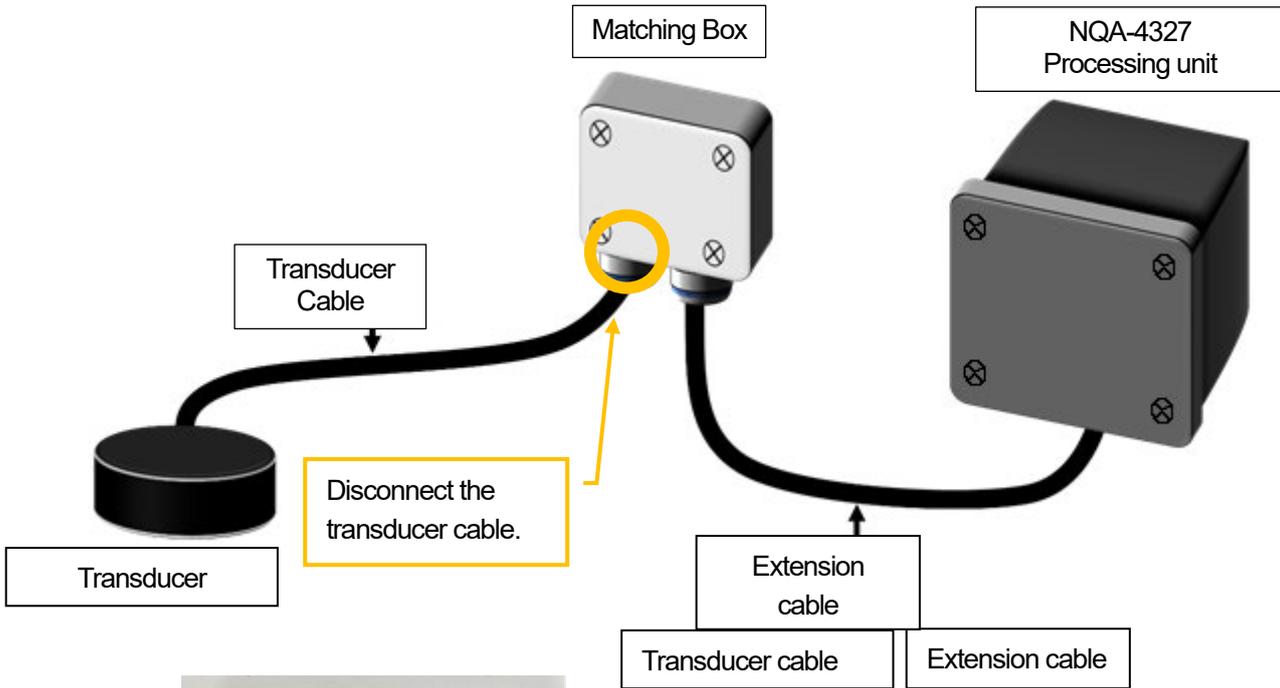
Back of the NQD-2597/2598 cover
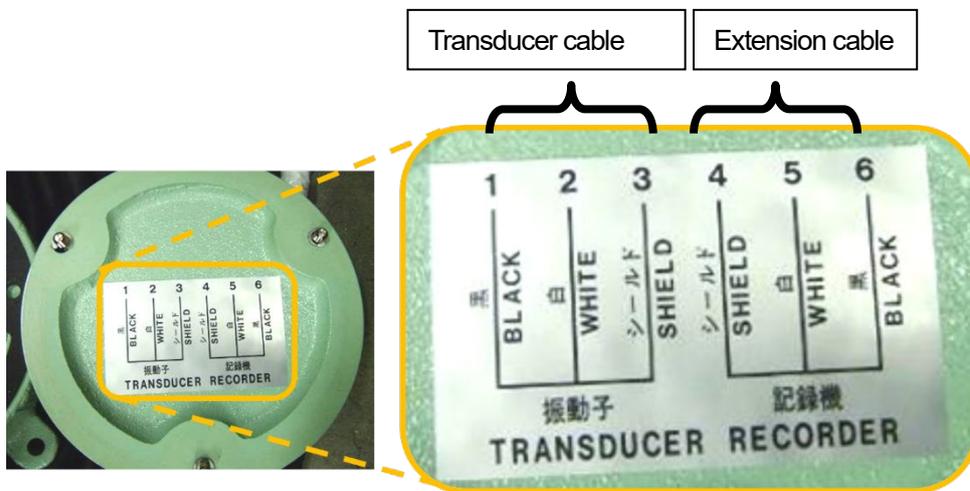
Back of the AW-154/154-F cover

2) Measure the transducer cable with insulation resistance tester (DC500V M ohm). Measurement point: White-Black, White-Shield, Black-Shield, White-Earth, Black-Earth and Shield-Earth

Measurement point	Specified value	Measurement result	
		value	Judgment
White-Black,	10MΩ or more	Ω	Good・No
White-Shield	10MΩ or more	Ω	Good・No
Black-Shield	10MΩ or more	Ω	Good・No
White-Earth	10MΩ or more	Ω	Good・No
Black-Earth	10MΩ or more	Ω	Good・No
Shield-Earth	10MΩ or more	Ω	Good・No

3) When the insulation resistance is 10MΩ or more, the transducer insulation is normal. When the insulation resistance is less than 10MΩ, the transducer insulation is deteriorating. Replace the cable during drydock.

4) Go ahead the next the extension cable resistance measurement under keeping to disconnect the transducer cable.
*Note: Discharge by shorting between white and black terminal due to remaining charge in transducer after measuring with the insulation tester.

(2) Measurement of insulation resistance for the extension cable

1) Disconnect the extension cable from terminal of the echo sounder and the junction box. Refer to the "9.4 Matching box Wring" and "9.6 Processing Unit NQA-4327 wiring" to disconnect cable.
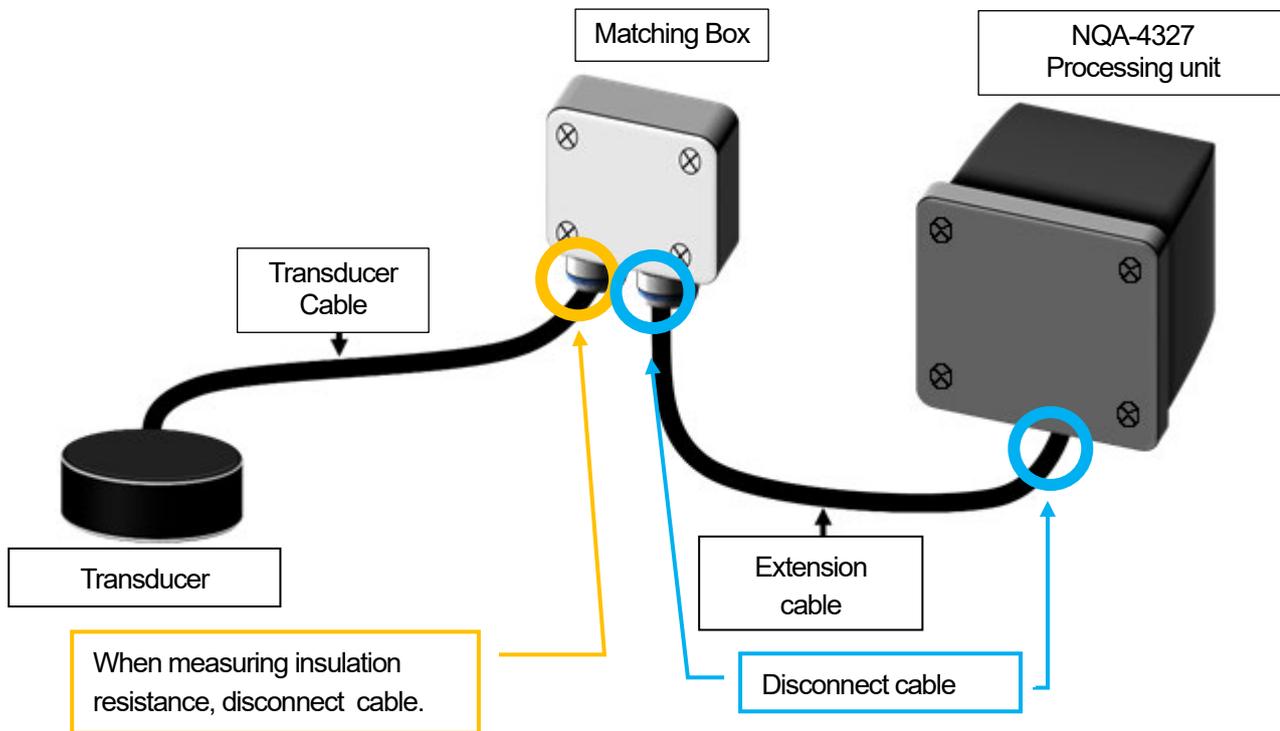
2) Measure the extension cable with insulation resistance tester (DC500V M ohm). Measurement point: White-Black, White-Shield, Black-Shield, White-Earth, Black-Earth and Shield-Earth

Measurement point	Specified value	Measurement result	
		value	Judgment
White-Black,	10MΩ or more	Ω	Good・No
White-Shield	10MΩ or more	Ω	Good・No
Black-Shield	10MΩ or more	Ω	Good・No
White-Earth	10MΩ or more	Ω	Good・No
Black-Earth	10MΩ or more	Ω	Good・No
Shield-Earth	10MΩ or more	Ω	Good・No

3) When the insulation resistance is 10MΩ or more, the transducer insulation is normal. When the insulation resistance is less than 10MΩ, the transducer insulation is deteriorating. Replace the cable during drydock.

(Step 4) To check that the extension cable is broken, connect the white-black on one side of the extension cable and check with a tester that it conducts on the other side. When it does not, the extension cable is broken. Repair the broken part or re-lay a good cable. Also, When the resistance is high, it may be broken, or an improperly thin cable may be used. Replace it with an appropriate extension cable. Our specified cable is 0.6 / 1kV DPYCS-2.5 and the conductor resistance is about 7.5 Ω/km (Normal cross-sectional are 2.5mm[2] For example, when the extension cable is 100m, the conductor resistance of 200m reciprocating is measured, so it is about 1.5Ω.

In the case of a cable with a nominal cross-sectional area of 1.5 mm, the conductor resistance is about 12 Ω/km, which is about 1,6 times larger. However, when measuring a small resistance value, the error will be large, so check the conductor thickness of the cable and the model name stamp of the cable to make a judgment.

Extension cable length	Specified value	Measurement result	
		Value	Judgment
100m	About1.5Ω	Ω	Good・No
200m	About 3Ω	Ω	Good・No
300m	About 4.5Ω	Ω	Good・No
400m	About 6Ω	Ω	Good・No

11.1.2 Checking of a resonance frequency of the transducer

There are two methods, one is to measure the resonance point using a transducer checker such as TT-2 or TT-2D, and the other is to use an antenna analyzer AA-30.
Make sure to check the resonance frequency of the transducer one of the measurement methods.

(1) Checking a resonance frequency with transducer cheker (TT-2/TT-2D)

1) Remove the transducer cable from the terminal of the matching box. To remove the cable, refer to the "9.4 Matching box Wring".
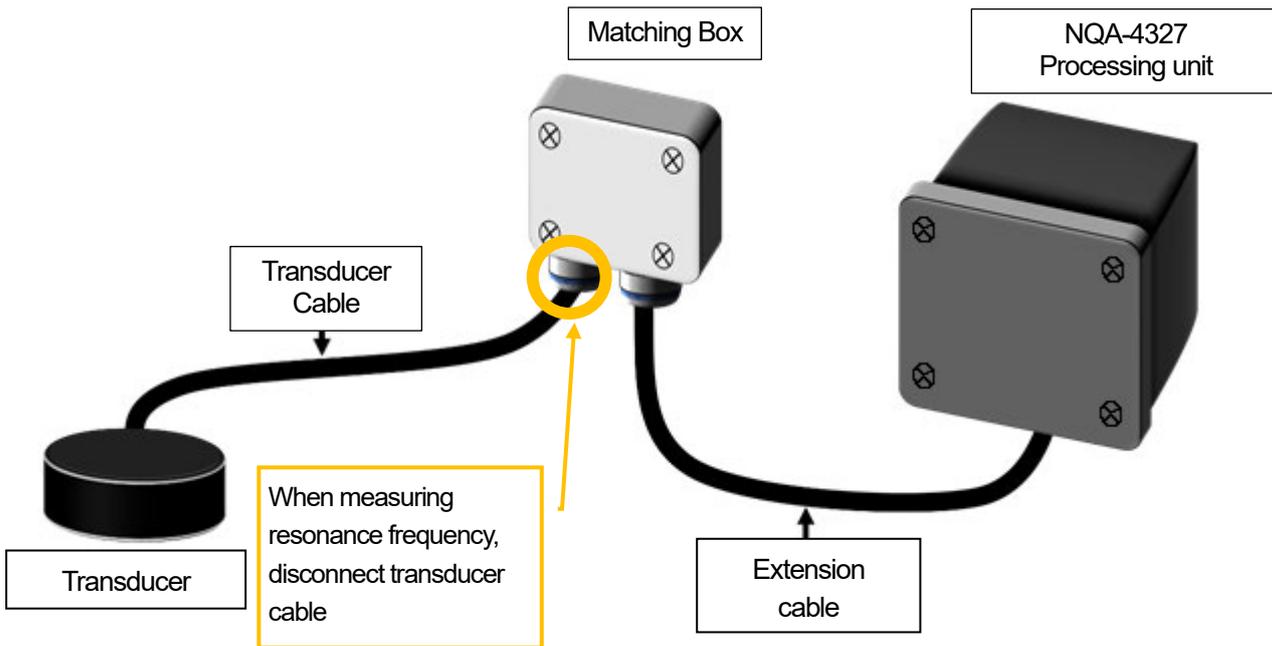
2) Refer to the instruction manual of the transducer checker, check the operation method.
3) According to the instructions of the instruction manual, confirm that the battery voltage is more than the specified voltage.
4) Measure a resonance frequency. Though mention in the instruction manual, to measure 50 kHz and 200 kHz of the echo sounder frequency, measure the range from 20kHz to 250kHz since there are normally several resonance points.
5) Measure impedance at the main resonance point by adjusting knob of the Z OUT.

   Measure example1: 50kHz transducer on dry dock (Air), UT50MD-40

| **52 kHz/ 300 ohm** | 70 kHz/ 100 ohm | 190 kHz/ 30 ohm | 210 kHz/ 80 ohm |

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4 resonance points were Measured. Which is difficult to judge the main resonance point, when there is a resonance point in the 50kHz ±5kHz range, it is judged to be normal as a 50kHz transducer.

Measurement example 2: 200kHz transducer on dry dock (Air), UT200ND-20

| 37 kHz/ 600 ohm | **200 kHz/ 50 ohm** |

2 resonance points were Measured. The main resonance point is 200 kHz and it is judged to be normal.

(2) Checking of a resonance frequency with antenna analyzer (AA-30)

1) Remove the transducer cable from the terminal of the matching box. To remove the cable, refer to the "9.4 Matching box Wring".
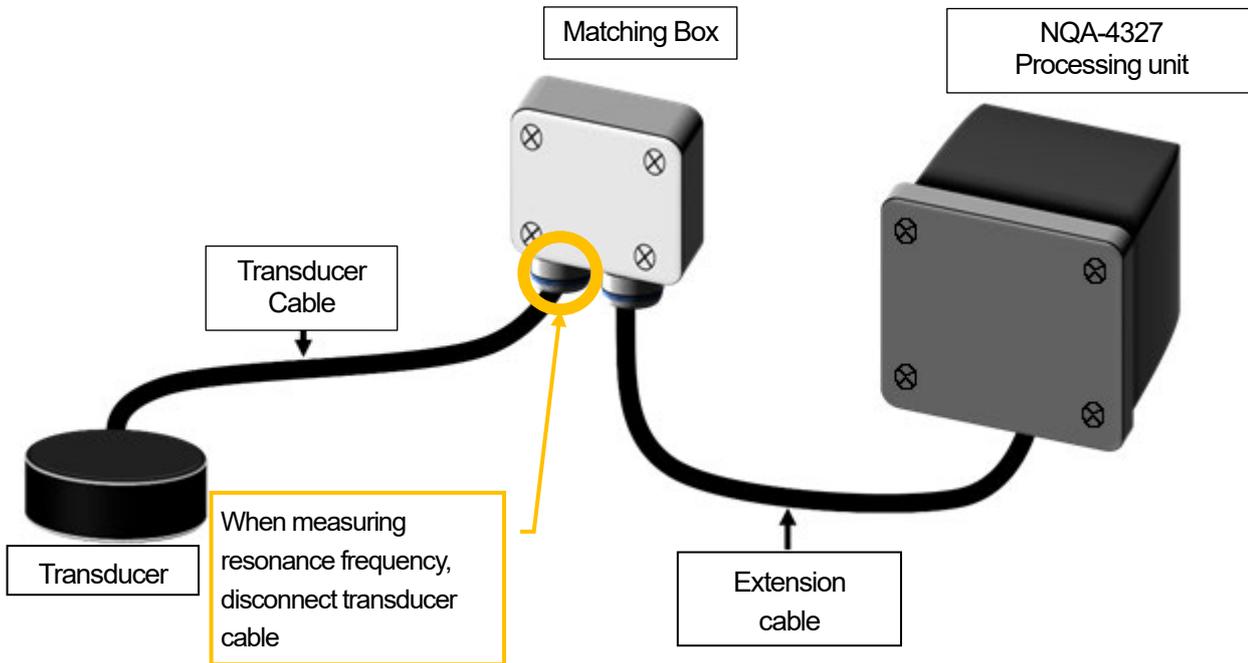
2) Refer to the instruction manual of the antenna analyzer, check the operation method.

  *Note: The AA-30 cannot withstand high voltage input. Transducer for discharge before connecting the transducer cable.
        Short the cable between white and black.

3) Connect measurement terminal of the antenna analyzer to the white (+) and black (-) of the transducer cable.

4) Measure by setting the antenna analyzer to "4:Scan SWR".
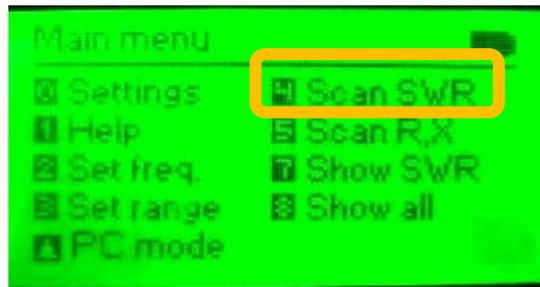
● Settings
　　・In case of 200kHz transducer (NKF-349、NKF-341、NKF-394、G-002759、G-002760、G-002762、G-008792)
　　　　2: SetFreq : 200kHz
　　　　3:SetRange ： 100kHz
　　・In case of 50kHz transducer (NKF-350、NKF-345、NKF-396、G-002758、G-002761、G-002763、G-008791)
　　　　2: SetFreq : 200kHz
　　　　3: Set Range: 200kHz (Since the minimum frequency of AA-30 is up to 100kHz, measure with a resonance wave
　　　　　　　　meter that is 4 times 50kHz. Therefore, the sub-resonance point may be displayed in the
　　　　　　　　measurement of 50kHz, but it is not included in the measurement.)

5) Measure toward higher frequencies. The dip point (Frequency with minimum SWR level) is resonance point.
　When there are multiple resonance points, up to two resonance points are OK as long as they are **within the specified frequency**. For example, in the case of 200kHz, it is OK even if there are two resonance points within 200kHz ± 10kHz.

Kind of transducer	Specified value		Measurement result		
	Specified value	SWR	Frequency	SWR	Judgment
200kHz transducer	200kHz±10kHz	1.2 – 3.5	kHz		Good・No
50kHz transducer	200kHz±40kHz (4times 50kHz±10kHz)	1.2 – 3.5 (Not include sub-resonance)	kHz		Good・No

Antenna analyzer（AA-30）
Specified value of the resonance frequency
　Freq=200kHz : 200kHz±10kHz
　Freq=50kHz ： 50kHz±10kHz
　　　　　　　(4 times 50kHz±10kHz)
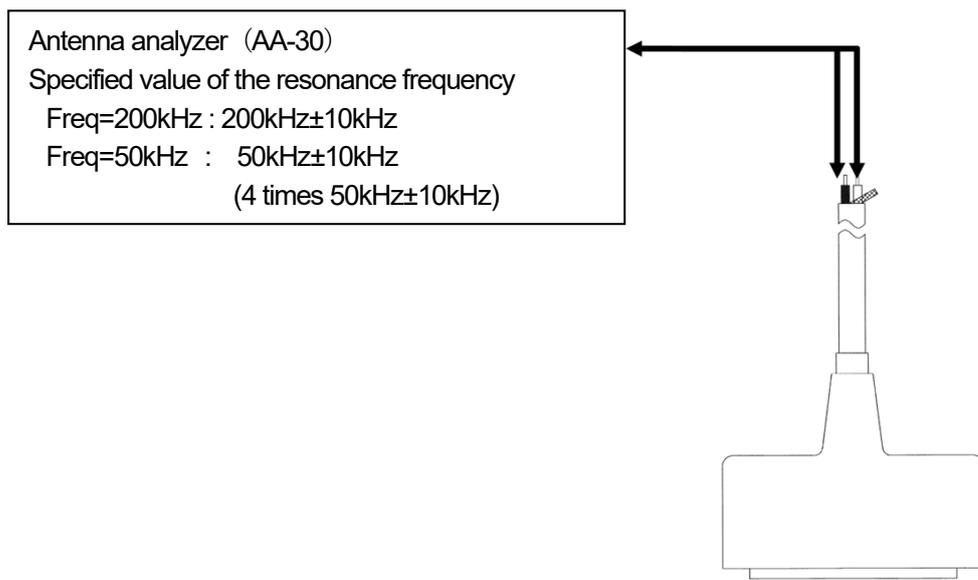
6) When the transducer is normal, resonance is as follows.

   Measurement example 1: On dry dock (Air), 50kHz transducer UT50MD-40 (4x resonance can be measured)

Example 1: On dry dock (Air), 50 kHz transducer UT50MD-40
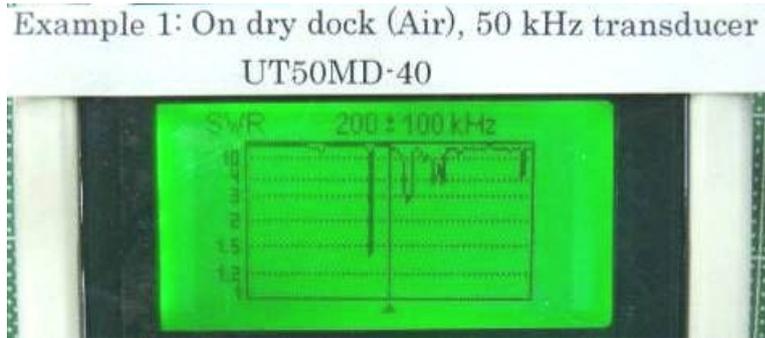
Measurement example 2: On dry dock (Air), 200kHz transducer UT200ND-20

Example 3: On dry dock (Air), 200 kHz transducer UT200ND-20
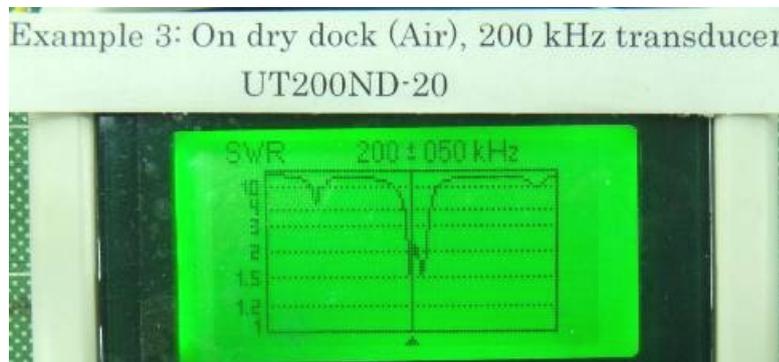
//Criteria//

NG

-Resonance frequency deviates from the specified value

-There is no resonance point.

-There are multiple resonance points outside the specified frequency range regardless of the influence of the lowest
 measurable frequency of the measuring instrument.

Defective example (No resonance point)
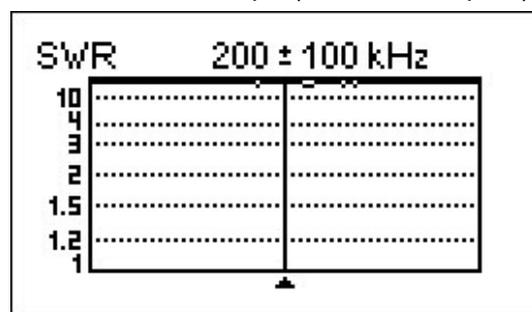
11.2　Checking after leaving the dock

After the ship leaves the dock, check the following items.

●Operation check of the transducer
　　　1) Refer to TRANSDUCER function in item of 10.2.11 self-test.

Appendix A Setting Value List

MENU	MENU 1	MENU 2	Setting Value	User setting Current	User setting Change	Description
DISPLAY	SCROLL SPEED		SLOW **STD** FAST			Setting of scroll speed
	NOISE REJECT		0 1 2 3 **4** 5 6 7 8 9 10			Setting of display noise mitigation
	INTERFERENCE		OFF **IR1** IR2 IR3 AUTO			Setting for interference noise mitigation with other ships
	CURSOR		OFF ON **AUTO**			Setting of cursor display method
	BOTTOM LINE		**OFF** ON			Setting whether to simplify the seafloor echo notation.
	DEPTH DISPLAY MODE		SURF **XDCR** KEEL			The depth value display is selected
	DAY/NIGHT		**DAY** DUSK NIGHT			Day, Dusk, Night display color is selected
	LAT/LON		**OFF** ON			Own ship position display is selected
DEPTH ALERT			**0.0** (0.0 to 99.9)			Depth value for depth alert
INITIAL	COLOR	DAY	**7color + BLACK** 7color + WHITE 7color + BLUE MONO AMBER MONO YELLOW MONO WHITE			Day screen color
		DUSK	**7color + BLACK** 7color + WHITE 7color + BLUE MONO AMBER MONO YELLOW MONO WHITE			Dusk screen color
		NIGHT	**7color + BLACK** 7color + WHITE 7color + BLUE MONO AMBER MONO YELLOW MONO WHITE			Night screen color
	DATE TIME	DATE	01/09/2011			Setting of Date
		TIME	0:00:00			Setting of Time
		DIFF	±00:00			Setting of Time deference
		FORMAT	**YY-MM-DD** / DD MM,'YY / MM DD,'YY			Setting of Date format
		12/24h	12hr **24hr**			Setting of Time format
		GPS SYNC	OFF **ON**			Setting of clock with GPS
	DIMM OFFSET		**0** (-512 to 512)			Setting of display dimmer offset
SET PRINT	PRINT MODE		**COPY** HISTORY LOG			Setting of Output items
	PRINT CYCLE (LOG)		**OFF** 0.5min 1min 2min 5min 10min			Setting of print cycle
	PRINT LENGTH (LOG)		**10min** 20min 30min 1hr 2hr			Setting of Log print time length
EQUIP	SYSTEM ALERT	DEPTH ALERT	OFF **ON**			Setting of depth alert
		LOST DEPTH	**OFF** ON			Setting of seabed lost alert
		WEAK ECHOTX	**OFF** ON			Setting of transmit Echo alert
		WEAK ECHORX	**OFF** ON			Setting of received Echo alert
		NO PAPER	**OFF** ON			Setting of no paper alert
		LOST PRINTER	**OFF** ON			Setting of printer lost alert
		LOG MEMORY FAIL	OFF **ON**			Setting of Log memory error alert
		LOST PROC	OFF **ON**			Setting of Lost processing unit error alert

MENU	MENU 1	MENU 2	MENU 3	Setting Value	User Setting		Description
					Current	Change	
EQUIP		PRIN TER			NKG-901 NKG-91 DPU-414 **No printer**			Setting of printer model
	TD SET	CH1	FREQ	OFF 50kHz 200kHz			Setting of Transducer frequency
			POS	**FWD** MID AFT			Setting of Transducer mounting position
			STC	SHORT MIDDLE **LONG**			Setting of STC curve
			AUTO GAIN MAX	**30**(15 to 35)			Setting of maximum auto gain value
			AUTO GAIN TH UP	**1499**(1419 to 1539)			Setting of upper side gain threshold
			AUTO GAIN TH DB	**57** (27 to 87)			Setting of lower side gain threshold
			INNER HULL OFFSET	**OFF** 1 2 3 4 5			Setting of inner hull offset
			KEEL	**0.0**(0.0 to 9.9)			Setting of Keel correction
		CH2	FREQ	**OFF** 50kHz 200kHz			Setting of Transducer frequency
			POS	FWD MID **AFT**			Setting of Transducer mounting position
			STC	SHORT MIDDLE **LONG**			Setting of STC curve
			AUTO GAIN MAX	**30**(15 to 35)			Setting of maximum auto gain value
			AUTO GAIN TH UP	**1499**(1419 to 1539)			Setting of upper side gain threshold
			AUTO GAIN TH DB	**57** (27 to 87)			Setting of lower side gain threshold
			INNER HULL OFFSET	**OFF** 1 2 3 4 5			Setting of inner hull offset
			KEEL	**0.0**(0.0 to 9.9)			Setting of Keel correction
		BAND WIDTH		**50kHz** 200kHz **SHORT** MIDDLE LONG **5m** 10m 100m 200m 500m 800m 0 **1** 2 3 4 5 6 7			Setting of each frequency of band width
		POWER REDUC TION		**OFF** ON			Setting of transducer power reduction
	COMM UNICATI ON	NMEA VER.		VER1.5 VER2.3 **ALL**			Setting of depth output format
		ALERT MODE		**IEC** DNV			Setting of alert communication standard
		KEY ACK		OFF **ON**			Setting of operation buzzer sound
		DNV SET	ALERT BUZZER	OFF **ON**			Setting of alert sound
			ALF OUTPUT	ALL **DEPTH** SYSTEM			Setting of alert sentence
			PJRC OUTPUT	OFF **ON**			Setting of alert sentence

MENU	MENU 1	MENU 2	MENU 3	Setting Value	User Setting Current	User Setting Change	Description
EQUIP	COMMUNICATION	LAN COMMON	IGMP	Ver.1 Ver.2 **Ver.3**			Setting of IGMP snooping version
			TTL	**1**(1 to 99)			Setting of time to live
			SFI	**SD0001** – SD9999			Setting of SFI
			RMS	OFF **ON**			Setting output RMS data
		LAN1	IP ADDRESS	**172.16.60.125**			Setting of IP address
			SUBNET MASK	**255.255.0.0**			Setting of Subnet mask
			DEFAULT GATEWAY	**172.16.60.1**			Setting of default gateway
			ALERT TX	**BAM1** BAM2 NAVD MISC			Setting of alert output MMSI
			ALERT RX	**CAM1** CAM2 NAVD MISC			Setting of alert input MMSI
			DATA TX	**NAVD** MISC			Setting of depth output MMSI
		LAN2	IP ADDRESS	**172.17.60.125**			Setting of IP address
			SUBNET MASK	**255.255.0.0**			Setting of Subnet mask
			DEFAULT GATEWAY	**172.17.60.1**			Setting of default gateway
			ALERT TX	**BAM1** BAM2 NAVD MISC			Setting of alert output MMSI
			ALERT RX	**CAM1** CAM2 NAVD MISC			Setting of alert input MMSI
			DATA TX	**NAVD** MISC			Setting of depth output MMSI
		ALERT OUT	OUTPUT CYCLE	**1S** 2S 5S 10S			Setting of alert sentence of output cycle
			TYPE	ALR **ALF**			Setting of alert sequence
			PORT	LAN ALR OUT **BOTH**			Setting of output port
		DEPTH OUT	OUTPUT CYCLE	**1S** 2S 5S 10S			Setting of depth sentence of output cycle
			PORT	LAN DEPTH OUT **BOTH**			Setting of output port
		CONTACT ACK IN		**OFF** ACK IN BZ OFF IN			Setting of contact input specification
	RX MON			**OFF** ON			Setting of displaying RX monitor

Appendix B Reset List

MENU	MENU 1	MENU 2	Setting Value	User Reset	Master Reset ALL	Master Reset MAINTENANCE DATA	Master Reset USER DATA
DISPLAY	SCROLL SPEED		SLOW **STD** FAST	✓	✓		✓
	NOISE REJECT		0 1 2 3 **4** 5 6 7 8 9 10	✓	✓		✓
	INTERFERENCE		OFF **IR1** IR2 IR3 AUTO	✓	✓		✓
	CURSOR		OFF ON **AUTO**	✓	✓		✓
	BOTTOM LINE		**OFF** ON	✓	✓		✓
	DEPTH DISPLAY MODE		SURF **XDCR** KEEL	✓	✓		✓
	DAY/NIGHT		**DAY** DUSK NIGHT	✓	✓		✓
	LAT/LON		**OFF** ON	✓	✓		✓
DEPTH ALERT			**0.0** (0.0 to 99.9)	✓	✓		✓
INITIAL	COLOR	DAY	**7color + BLACK** 7color + WHITE 7color + BLUE MONO AMBER MONO YELLOW MONO WHITE	✓	✓		✓
		DUSK	**7color + BLACK** 7color + WHITE 7color + BLUE MONO AMBER MONO YELLOW MONO WHITE	✓	✓		✓
		NIGHT	**7color + BLACK** 7color + WHITE 7color + BLUE MONO AMBER MONO YELLOW MONO WHITE	✓	✓		✓
	DATE TIME	DATE	01/09/2011				
		TIME	0:00:00				
		DIFF	±00:00				
		FORMAT	**YY-MM-DD** / DD MM,'YY / MM DD,'YY	✓	✓		✓
		12/24h	12hr **24hr**	✓	✓		✓
		GPS SYNC	OFF **ON**	✓	✓		✓
	DIMM OFFSET		**0** (-512 to 512)	✓	✓		✓
SET PRINT	PRINT MODE		**COPY** HISTORY LOG	✓	✓		✓
	PRINT CYCLE (LOG)		**OFF** 0.5min 1min 2min 5min 10min	✓	✓		✓
	PRINT LENGTH (LOG)		**10min** 20min 30min 1hr 2hr	✓	✓		✓
EQUIP	SYSTEM ALERT	DEPTH ALERT	OFF **ON**		✓	✓	
		LOST DEPTH	**OFF** ON		✓	✓	
		WEAK ECHO TX	**OFF** ON		✓	✓	
		WEAK ECHO RX	**OFF** ON		✓	✓	
		NO PAPER	**OFF** ON		✓	✓	
		LOST PRINTER	**OFF** ON		✓	✓	
		LOG MEMORY FAIL	OFF **ON**		✓	✓	
		LOST PROC	OFF **ON**		✓	✓	

MENU	MENU 1	MENU 2	MENU 3	Setting Value	User Reset	Master Reset		
						ALL	MAINTE NANCE DATA	USER DATA
EQUIP	PRIN TER			NKG-901 NKG-91 DPU-414 **No printer**				
	TD SET	CH1	FREQ	OFF 50kHz 200kHz		✓	✓	
			POS	**FWD** MID AFT		✓	✓	
			STC	SHORT MIDDLE **LONG**		✓	✓	
			AUTO GAIN MAX	**30**(15 to 35)		✓	✓	
			AUTO GAIN TH UP	**1499**(1419 to 1539)		✓	✓	
			AUTO GAIN TH DB	**57** (27 to 87)		✓	✓	
			INNER HULL OFFSET	**OFF** 1 2 3 4 5		✓	✓	
			KEEL	**0.0**(0.0 to 9.9)		✓	✓	
		CH2	FREQ	**OFF** 50kHz 200kHz		✓	✓	
			POS	FWD MID **AFT**		✓	✓	
			STC	SHORT MIDDLE **LONG**		✓	✓	
			AUTO GAIN MAX	**30**(15 to 35)		✓	✓	
			AUTO GAIN TH UP	**1499**(1419 to 1539)		✓	✓	
			AUTO GAIN TH DB	**57** (27 to 87)		✓	✓	
			INNER HULL OFFSET	**OFF** 1 2 3 4 5		✓	✓	
			KEEL	**0.0**(0.0 to 9.9)		✓	✓	
		BAND WIDTH		**50kHz** 200kHz **SHORT** MIDDLE LONG **5m** 10m 100m 200m 500m 800m 0 **1** 2 3 4 5 6 7		✓	✓	
		POWER REDUC TION		**OFF** ON		✓	✓	
	COMM UNICATI ON	NMEA VER.		VER1.5 VER2.3 **ALL**		✓	✓	
		ALERT MODE		**IEC** DNV		✓	✓	
		KEY ACK		OFF **ON**		✓	✓	
		DNV SET	ALERT BUZZER	OFF **ON**		✓	✓	
			ALF OUTPUT	ALL **DEPTH** SYSTEM		✓	✓	
			PJRC OUTPUT	OFF **ON**		✓	✓	

MENU	MENU 1	MENU 2	MENU 3	Setting Value	User Reset	ALL	MAINTENANCE DATA	USER DATA
EQUIP	COMMUNICATION	LAN COMMON	IGMP	Ver.1 Ver.2 **Ver.3**		✓	✓	
			TTL	**1** (1 to 99)		✓	✓	
			SFI	**SD0001** – SD9999		✓	✓	
			RMS	OFF **ON**		✓	✓	
		LAN1	IP ADDRESS	**172.16.60.125**	No Reset			
			SUBNET MASK	**255.255.0.0**				
			DEFAULT GATEWAY	**172.16.60.1**				
			ALERT TX	**BAM1** BAM2 NAVD MISC		✓	✓	
			ALERT RX	**CAM1** CAM2 NAVD MISC		✓	✓	
			DATA TX	**NAVD** MISC		✓	✓	
		LAN2	IP ADDRESS	**172.17.60.125**	No Reset			
			SUBNET MASK	**255.255.0.0**				
			DEFAULT GATEWAY	**172.17.60.1**				
			ALERT TX	**BAM1** BAM2 NAVD MISC		✓	✓	
			ALERT RX	**CAM1** CAM2 NAVD MISC		✓	✓	
			DATA TX	**NAVD** MISC		✓	✓	
		ALERT OUT	OUTPUT CYCLE	**1S** 2S 5S 10S		✓	✓	
			TYPE	ALR **ALF**		✓	✓	
			PORT	LAN ALR OUT **BOTH**		✓	✓	
		DEPTH OUT	OUTPUT CYCLE	**1S** 2S 5S 10S		✓	✓	
			PORT	LAN DEPTH OUT **BOTH**		✓	✓	
		CONTACT ACK IN		**OFF** ACK IN BZ OFF IN		✓	✓	
	RX MON			**OFF** ON		✓	✓	

Appendix C Each Alert and Alert Display

◎The following alerts are generated on JFE-400/700 Echo Sounder

No.	Name	Detail information on screen	Alert ID	Alert instance	Priority	Category	Rectified unacknowledged	Responsibility Transfer	Escalation	Backup Navigator Call
1	DEPTH UNSAFE	"Install position" depth unsafe, avoid stranding	3031	1	Alarm	A	Yes	No	N/A	Yes
2	DEPTH UNSAFE	"Install position" depth unsafe, avoid stranding	3031	2	Alarm	A	Yes	No	N/A	Yes
3	LOST DEPTH	"Install position" lost bottom, check chart	10352	1	Warning	B	Yes	Yes	warning to warning	No
4	LOST DEPTH	"Install position" lost bottom,check chart	10352	2	Warning	B	Yes	Yes	warning to warning	No
5	NO PAPER	No paper of printer	10356	-	Caution	B	N/A	N/A	N/A	No
6	LOST PRINTER	Discommunication with printer	10359	-	Caution	B	N/A	N/A	N/A	No
7	WEAK ECHO TX	"Install position" transmission level down	10363	1	Caution	B	N/A	N/A	N/A	No
8	WEAK ECHO TX	"Install position" transmission level down	10363	2	Caution	B	N/A	N/A	N/A	No
9	WEAK ECHO RX	"Install position" receive sensitivity down	10365	1	Caution	B	N/A	N/A	N/A	No
10	WEAK ECHO RX	"Install position" receive sensitivity down	10365	2	Caution	B	N/A	N/A	N/A	No
11	LOST PROCESSOR	Processor com fail, check LAN cable	10353	-	Warning	B	No	Yes	warning to warning	No
12	LOG MEMORY FAIL	Cannot log Depth	10362	-	Caution	B	N/A	N/A	N/A	No

11 Lost processor alert only occurs on JFE-400

◎The icon of the alert changes depending on the situation and status. JFE-400/700 Echo Sounder uses the icons in the table below.

No.	Name of alert icon	Functional outline	Alert icon
1	Active - unacknowledged alarm	A flashing red triangle. A symbol of loudspeaker in the middle of the triangle.	
2	Active - silenced alarm	A flashing red triangle. A symbol as in icon number 1 with a prominent diagonal line above it.	
3	Active - acknowledged alarm	A red triangle. An exclamation mark in the middle of the triangle.	
4	Rectified – unacknowledged alarm	A flashing red triangle. A tick mark in the middle of the triangle.	
5	Active - unacknowledged warning	A flashing red triangle. A tick mark in the middle of the triangle.	
6	Active - silenced warning	A flashing yellowish orange circle. A symbol as in icon number 5 with a prominent diagonal line above it.	
7	Active - acknowledged warning	A yellowish orange circle. An exclamation mark in the middle of the circle.	
8	Active - responsibility transferred warning	A yellowish orange circle. An arrow pointing towards the right in the middle of the circle.	
9	Rectified - unacknowledged warning	A flashing yellowish orange circle. A tick mark in the middle of the circle.	
10	Caution	A yellow square. An exclamation mark in the middle of the square.	

◎Each alert sequence is as shown below.

■ Alarm

Start

Terminated

Normal — N

Rectified Unacknowledged
Flashing + No Audio — U

Acknowledge

Raise

Reoccur

Rectify

Active Unacknowledged
Flashing + Audio — V

Silence

Acknowledge

Time Out
Set Timer

Rectify

Active Acknowledged
No Flashing + No Audio — A

Acknowledge

Active Silenced
Flashing + No Audio — S

Rectify   Rectify

■ Warning

Start

Terminated

Normal — N

Transfer Responsibility
Acknowledge

Rectified Unacknowledged
Flashing + No Audio — U

Raise

Escalation
Set Timer

Reoccur

Rectify

Active Unacknowledged
Flashing + Audio — V

Rectify

Acknowledge

Silence

Time Out
Set Timer

Rectify

Active Acknowledged
No Flashing + No Audio — A

Acknowledge

Rectify   Acknowledge

Resp. Lost

Active Resp. Transferred
No Flashing + No Audio — O

Transfer Responsibility

Transfer Responsibility

Active Silenced
Flashing + No Audio — S

Rectify   Rectify

■ Caution

Normal — N

Raise

Terminated   Rectify

Active
No Flashing + No Audio — A

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◎Alert Detail (ex; DEPTH UNSAFE)

```
24-03-24 05:04:15 ALARM-V←————————————  Date and Time, Alert Priority and Status
3031 DEPTH UNSAFE←————————————  Alert ID, Alert Name
FWD depth unsafe, avoid stranding←————————————  Detail Information
```

◎Alert Status

　On the Alert Detail screen, an acronym is added after alert priority to indicate alert status. The meaning of the acronym is as follows.

　　-A: Active Acknowledged

　　-V: Active Unacknowledged

　　-O: Responsibility Transferred

　　-S: Silence

　　-N: Normal

　　-U: Rectified Unacknowledged

◎Connecting CAM system

　Each alert can be displayed on not only own screen but also the CAM (Central Alert Management) system by connecting CAM system. In addition, the following functions can be used by connecting to the BAM system.

● Alert silence from CAM

　　The alert sound ringing on JFE-400/700 Echo Sounder can be silenced by operating on the CAM system.

● Alert ACK from CAM

　Applies to category –B alert in JFE-400/700 Echo Sounder.

　　Category- B alert generated on JFE-400/700 Echo Sounder can be acknowledged by operating on the CAM system.

● Responsibility Transfer to the CAM system

　Applies to category –B alert in JFE-400/700 Echo Sounder.

　JFE-400/700 Echo Sounder can transfer responsibility for Category B alerts at request of CAM.

Appendix D Data Format

1.List of Handling Sentence Data

No.	Sentence	Description	Message Type	Direction	Interface
1	DPT	Depth	SBM	Output	LAN & Serial
2	DBT	Depth below transducer	SBM	Output	LAN & Serial
3	DBK	Depth below keel	SBM	Output	LAN & Serial
4	DBS	Depth below surface	SBM	Output	LAN & Serial
5	PJRCU	Depth relative to transducer (2frequencies)	-	Output	LAN & Serial
6	ALR	Set alarm state	-	Output	Serial
7	ALC	Cyclic alert list	MSM	Output	LAN & Serial
8	ALF	Alert sentence	MSM	Output	LAN & Serial
9	ARC	Alert command refused	SBM	Output	LAN & Serial
10	HBT	Heartbeat supervision sentence	SBM	Output/ Input	LAN & Serial
11	SRP	System function ID resolution protocol	SBM	Output	LAN
12	RMC	Recommended minimum specific GNSS data	SBM	Input	LAN & Serial
13	GGA	Global positioning system (GPS) fix data	SBM	Input	LAN & Serial
14	GLL	Geographic position – Latitude/longitude	SBM	Input	LAN & Serial
15	ZDA	Time and date	SBM	Input	LAN & Serial
16	ACN	Alert command	SBM	Input	LAN & Serial
17	ACK	Acknowledge alarm	-	Input	Serial

No.	Sentence	Enabled setting	Port setting	Port location
1	DPT	NMEA VER. :ALL or Ver.2.3	Serial and LAN use: BOTH Only Serial use: DEPTH OUT Only LAN use: LAN	Direction: Output Serial: J2-7/8, J2-9/10, J2-11/12, J2-13/14 LAN:J11(Main), J12(Sub)
2	DBT	NMEA VER. :ALL or Ver.1.5 Depth Disp mode: XDCR (User menu)		
3	DBK	NMEA VER. :ALL or Ver.1.5 Depth Disp mode: KEEL (User menu)		
4	DBS	NMEA VER. :ALL or Ver.1.5 Depth Disp mode: SURF (User menu)		
5	PJRCU	-		
6	ALR	ALRT OUT TYPE: ALR	Serial use: ALR OUT (Unable to use LAN)	Direction: Output Serial: J2-15/16
7	ALC	ALRT OUT TYPE: ALF	Serial and LAN use: BOTH Only Serial use: ALR OUT Only LAN use: LAN	Direction: Output Serial: J2-15/16 LAN:J11(Main), J12(Sub)
8	ALF			
9	ARC			
10	HBT	-	-	-
11	SRP	-	-	-
12	RMC	LAT/LON: ON (User menu)	-	Direction: Input J4-3/4
13	GGA	LAT/LON: ON (User menu)	-	
14	GLL	LAT/LON: ON (User menu)	-	
15	ZDA	GPS SYNC:ON (User menu)		
16	ACN	ALRT OUT TYPE: ALF	Serial and LAN use: BOTH Only Serial use: ALR OUT Only LAN use: LAN	Direction: Input Serial: J2-17/18 LAN:J11(Main), J12(Sub)
17	ACK	ALRT OUT TYPE: ALR	Serial use: ALR OUT (Unable to use LAN)	Direction: Input Serial: J2-17/18

2. Output Data Format

1) DPT – Depth

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

 1: Water depth relative to the transducer, in meters

 2: Offset from transducer, in meters 1) 2)

 3: Maximum range scale in use

Note;

 1) "positive" = distance from transducer to water line; "-" = distance from transducer to keel.

 2) For IEC applications, the offset should always be applied so as to provide depth relative to the keel.

2) DBT – Depth below transducer

$--DBT, x.x, f, x.x, M, x.x, F*hh<CR><LF>
     1 2   3

 1: Water depth, feet

 2: Water depth, meters

 3: Water depth, fathoms

3) DBK – Depth below keel

$--DBK, x.x, f, x.x, M, x.x, F*hh<CR><LF>
     1 2   3

 1: Water depth, feet

 2: Water depth, meters

 3: Water depth, fathoms

4) DBS – Depth below surface

$--DBS, x.x, f, x.x, M, x.x, F*hh<CR><LF>
     1 2   3

 1: Water depth, feet

 2: Water depth, meters

 3: Water depth, fathoms

5) PJRCU – Depth relative to transducer (2frequencies)

$PJRCU,SD,x.x,x.x,x.x,x.x,xx,c-c*hh<CR><LF>
     1 2 3 4 5 6 7

 1: Water depth relative to transducer, meters.

 2: Offset from transducer, meters

 3: Maximum range scale in use, meters

 4: Reserved

 5: Echo sounder channel number 1: reserved 2:50 kHz 3: 200 kHz

 6: Transducer location FWD/MID/AFT

 7: Checksum (result after each ASCII code of every character between "S" just after "$" and "X" just before " * " is
  EXORed.)

6) ALR – Set alarm state(Legacy Alert sentece)

$--ALR,hhmmss.ss,xxx,A,A,c--c*hh<CR><LF>

     1   2 3 4 5

 1: Time of alarm condition change, UTC

 2: Alarm condition (A = threshold exceeded, V = not exceeded)

 3: Unique alarm number (identifier) at alarm source

 4: Alarm's acknowledge state, A = acknowledged V = unacknowledged

 5: Alarm's description text

7) ALC – Cyclic alert list

$--ALC,xx,xx,xx,x.x,aaa,x.x,x.x,x.x,……...,aaa,x.x,x.x,x.x*hh <CR><LF>

    1 2 3 4 5 6 7 8 9 10

 1: Total number of sentences for this message, 01 to 99 1

 2: Sentence number, 01 to 99 1)

 3: Sequential message identifier, 00 to 99 2)

 4: Number of alert entries 3)

 5: Manufacturer mnemonic code

 6: Alert identifier

 7: Alert instance

 8: Revision counter

 9: Additional Alert entries

 10: Alert entry n 4)

Note;

 1) The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1. These cannot be null fields.

 2) The sequential message identifier relates all sentences that belong to a group of multiple sentences (i.e.message). Multiple sentences with the same sequential message identifier, make up onemessage.

 3) Contains the number of alert entries transported within this sentence.

 4) Alert entry 0 – n: Each alert entry consists of four fields:

  · Manufacturer Identifier (see ALF Manufacturer Identifier)

  · Alert Identifier (see ALF Alert Identifier)

  · Alert instance (see ALF Alert instance)

  · Revision Counter (see ALF Revision Counter)

Each entry identifies a certain alert with a certain state. It is not allowed that an alert entry is split between two ALC sentences.

8) 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 for this message, 1 to 2 1)

 2: Sentence number, 1 to 2 1)

 3: Sequential message identifier, 0 to 9 2)

 4: Time of last change 3)

 5: Alert category, A, B or C 4)

 6: Alert priority, E, A, W or C 5)

 7: Alert state, A, S, N, O, U or V 6)

 8: Manufacturer mnemonic code 7)

 9: Alert identifier 8)

 10: Alert instance, 1 to 999999 9)

 11: Revision counter, 1 to 99 10)

12: Escalation counter, 0 to 9 11)

13: Alert text 12)

Note;

1) The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1. These cannot be null fields. When the sentence number is 2, the following Alert category, Alert priority and Alert state can be null fields.

2) The sequential message identifier relates all sentences that belong to a group of multiple sentences (i.e. message). Multiple sentences with the same sequential message identifier, make up one message.

3) Time should represent the last time the data within the alert message has changed. For example changing the alert text by in-/decrementing a contained counter or count down should cause a revision of alert message and a new time. Time is an optional field. The time-field is additional information about when this happened and not used for decision making. There is no mandatory requirement for time synchronization between the equipment. It should by either a null field (if not used) or UTC (if used). Sender is allowed to use all alternatives defined in Table 5 Field type summary. Receiver is allowed to ignore content of this field. If the receiver does not ignore this field it should support all alternatives defined in Table 5 Field type summary.

4) The alert category is in compliance with the category definition as described in INS Performance Standard (IMO MSC.252(83)) and Bridge Alert Management Performance Standard (IMO MSC.302(87)):

A, Category A: Alerts where information at operator unit directly assigned to the function generating the alert is necessary, as decision support for the evaluation of the alert-related condition, e.g. graphical information of danger of collision or graphical information of danger of grounding.

B, Category B: Alerts where no additional information for decision support is necessary besides the information which can be presented using alert source and alert description text.

C, Category C: Alerts that cannot be acknowledged on the bridge but for which information is required about the status and treatment of the alerts, e.g., certain alerts from the engine.

5) Alert priority: Emergency Alarm: E, for use with Bridge alert management

Alarm: A

Warning: W

Caution: C

6) The alert state transition is defined in IEC 61924-2:2012, Annex J

active – unacknowledged: V

active – silenced: S

active – acknowledged or active: A

active – responsibility transferred: O

rectified – unacknowledged: U

normal: N

7) Used for proprietary alerts defined by the manufacturer. For standardized alerts this should be a null field.

8) The alert identifier is unique within a single alert source. The alert identifier is a variable length integer field of maximum a 7-digit integer. It identifies the type of the alert, e.g. a "lost target" alert. Standardized alerts use unique alert identifiers described in equipment standards. Number range 10000-9999999 is reserved for proprietary alerts. Alert Identifier examples: "001", "2456789", "245"

9) The alert instance identifies the current instance of an alert to distinguish alerts of the same type (Alert identifier) and from the same source (e.g. dangerous target). Alert instance is maximum a 6-digit integer from 1 to 999999, the number '0' indicates that this sentence is intended for all alert instances. Except for number '0', the number of alert instance can be freely defined by the manufacturer as long as it is unique for one type of alert (alert identifier). It is not permitted to modify the alert instance within a life cycle of a distributed alert (from 'active and unacknowledged' state until 'normal' state is reached). It can be also a null field, when there is only one alert of that type.

10) The revision counter is the main method to follow up-to-date status. Revision counter is also unique for each instance of alert. Revision counter starts with 1 and the step for increment is 1. The count resets to 1 after 99 is used. Revision counter increments on each change of content of any field of the alert.

11) The escalation counter is presenting the number of alert escalations after time expiration during the state active-unacknowledged. The escalation counter starts with 0 and the step for increment is 1. The count resets to 1 after 9 is used. The alert escalation can be the escalation from warning into warning (activation of audible signal only), the escalation from warning to alarm or the escalation from alarm to alarm with activation of backup navigator alarm.

12) This field is used for Alert title which is mandatory and for additional alert description which is optional.

• The first ALF sentence transmits the Alert title. Alert title is maximum 16 characters short form of the alert text.

• The optional second ALF sentence transmits the additional alert description. Additional alert description is the long description of the alert. The additional alert description contains more information for decision making (i.e. alert description text).

• The second ALF sentence uses null fields for Time of last change, Alert category, Alert priority, and Alert state to allow longer text. The actual number of valid characters should be such that the total number of characters in a sentence does not exceed the "82"-character limit.

• Some equipment standards specify alert text longer than 16 characters (for example the AIS standard has defined some alerts to be coded with ALR sentence and with text longer than 16 characters). In such cases the first ALF sentence is used for the first 16 characters of the alert text as alert title and the second ALF sentence to carry the full alert text.

9) ARC – Alert command refused

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

1: Time 1)

2: Manufacturer mnemonic code 2)

3: Alert identifier 3)

4: Alert instance, 1 to 999999 4)

5: Refused alert command, A, Q, O or S 5)

Note;

1) Release time of the Alert Command Refused. (e.g. for VDR purposes), optional, can be a null field. Sender is allowed to use all alternatives defined in Table 5 Field type summary. Receiver is allowed to ignore content of this field. If receiver does not ignore this field it should support all alternatives defined in Table 5 Field type summary.

2) Used for proprietary alerts defined by the manufacturer. For standardized alerts this should be a null field.

3) The alert identifier is unique within a single alert source. The alert identifier is a variable length Integer field of maximum a 7-digit integer. It identifies the type of the alert, e.g. a "lost target" alert. Standardized alerts use unique alert identifiers described in equipment standards. Number range 10000-9999999 is reserved for proprietary alerts. Alert Identifier examples: "001", "2456789", "245"

4) The alert instance identifies the current instance of an alert to distinguish alerts of the same type (Alert identifier) and from the same source (e.g. dangerous target). Alert instance is maximum a 6-digit integer from 1 to 999999. The number of alert instance can be freely defined by the manufacturer as long as it is unique for one type of alert (alert identifier). It is not permitted to modify the alert instance within a life cycle of a distributed alert (from 'active and unacknowledged' state until 'normal' state is reached). It can be also a null field, when there is only one alert of that type.

5) Refused Alert Command: Indicates refused "Alert command" of corresponding ACN sentence. This should not be a null field.

acknowledge: A

request / repeat information: Q

responsibility transfer: O

silence: S

10) HBT – Heartbeat supervision sentence

$--HBT,x.x,A,x*hh<CR><LF>

        1 2 3

  1: Configured repeat interval 1)

  2: Equipment status 2)

  3: Sequential sentence identifier 3)

Note;

  1) Configured autonomous repeat interval in seconds. This field should be set to NULL in response to a query if the query response feature is supported.

  2) Equipment in normal operation A = yes, V = no

    This field can be used to indicate the current equipment status. This could be the result of an built-in integrity testing function.

  3) The sequential sentence identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new sentence. The count resets to 0 after 9 is used.

11) SRP-System function ID resolution protocol

¥s:ccxxxx*hh¥$--SRP,x,hhhhhhhhhhhh,c--c*hh<CR><LF>

    1   2 3   4

  1: SFI of the transmitter 1)

  2: Instance number of redundant alternative 2)

  3: MAC address 3)

  4: IP address 4)

Note;

  1) Reported SFI of the transmitter

  2) Instance number for interface redundancy (i.e. number of physical port for identical SFI), null if interface redundancy not in use. The instance numbers shall be ordinal with no skipping (1, 2, 3,…).

  3) Reported MAC address used by SFI, 48bit hexadecimal number, for example 32613C4EB605

  4) Reported IP address used by SFI as text string, for example 239.192.0.1

3) Input data

1) HBT – Heartbeat supervision sentence

$--HBT,x.x,A,x*hh<CR><LF>

        1 2 3

  1: Configured repeat interval 1)

  2: Equipment status 2)

  3: Sequential sentence identifier 3)

Note;

  1) Configured autonomous repeat interval in seconds. This field should be set to NULL in response to a query if the query response feature is supported.

  2) Equipment in normal operation A = yes, V = no

    This field can be used to indicate the current equipment status. This could be the result of an built-in integrity testing function.

  3) The sequential sentence identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new sentence. The count resets to 0 after 9 is used.

2) 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
```

  1: UTC of position fix

  2: Status 3) A = data valid V = navigation receiver warning

  3: Latitude, N/S

  4: Longitude, E/W

  5: Speed over ground, knots

  6: Course over ground, degrees true

  7: Date: dd/mm/yy

  8: Magnetic variation,degrees, E/W 1)

  9: Mode indicator 2) 3)

  10: Navigational status 4)

 Note;

  1) E = Easterly variation subtracts from True course

     W = Westerly variation adds to True course

  2) Positioning system mode Indicator:

     A = Autonomous. Satellite system used in non-differential mode in position fix;

     D = Differential. Satellite system used in differential mode in position fix;

     E = Estimated (dead reckoning) mode;

     F = Float RTK. Satellite system used in real time kinematic mode with floating integers;

     M = Manual input mode;

     N = No fix. Satellite system not used in position fix, or fix not valid;

     P = Precise. Satellite system used in precision mode. Precision mode is defined as: no deliberate degradation (such
        as selective availability) and higher resolution code (P-code) is used to compute position fix. P is also used for
        satellite system used in multi-frequency, SBAS or Precise Point Positioning (PPP) mode;

     R = Real time kinematic. Satellite system used in RTK mode with fixed integers;

     S = Simulator mode.

  3) The positioning system mode indicator field supplements the positioning system status field. The status field should be
     set to V = Invalid for all values of the mode indicator except for A= Autonomous, D = Differential, F = Float RTK, P =
     Precise and R = Real time kinematic. The positioning system mode indicator and status fields should not be null fields.

  4) The navigational status indicator is according to IEC 61108 requirements on 'Navigational (or Failure) warnings and
     status indications'. This field should not be a NULL field and the character should take one of the following values:

     S = Safe when the estimated positioning accuracy (95 % confidence) is within the selected accuracy level
        corresponding to the actual navigation mode, and/or integrity is available and within the requirements for the
        actual navigation mode, and/or a new valid position has been calculated within 1 s for a conventional craft and
        0,5 s for a high speed craft.

     C = Caution when integrity is not available.

     U = Unsafe when the estimated positioning accuracy (95 % confidence) is less than the selected accuracy level
        corresponding to the actual navigation mode, and/or integrity is available but exceeds the requirements for the
        actual navigation mode, and/or a new valid position has not been calculated within 1 s for a conventional craft
        and 0,5 s for a high speed craft.V = Navigational status not valid, equipment is not providing navigational status
        indication.

3) 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
```

  1: UTC of position

  2: Latitude N/S

3: Longitude E/W

4: GPS quality indicator 1)

5: Number of satellites in use, 00-12, maybe different from the number in view

6: Horizontal dilution of precision

7: Antenna altitude above/below mean sea level (geoid)

8: Units of antenna altitude, m

9: Geoidal separation 3)

10: Units of geoidal separation,m

11: Age of differential GPS data 2)

12: Differential reference station ID, 0000-1023

Note;

1) All GPS quality indicators in headings 1 through 8 are considered "valid". The heading "0" is the only "invalid" indicator. The GPS quality indicator field should not be a null field.

0 = fix not available or invalid

1 = GPS SPS mode

2 = differential GPS, SPS mode

8 = Simulator mode

2) Time in seconds since last SC104 type 1 or 9 update, null field when DGPS is not used.

3) Geoidal separation: the difference between the WGS-84 earth ellipsoid surface and mean sea level (geoid) surface, " – " = mean sea level surface below the WGS-84 ellipsoid surface.

4) GLL – Geographic position – Latitude/longitude

$--GLL, llll.ll, a, yyyyy.yy, a, hhmmss.ss, A, a *hh<CR><LF>

              1 2 3   4   5   6 7

1: Latitude, N/S

2: Latitude, N/S

3: Longitude, E/W

4: Longitude, E/W

5: UTC of position

6: Status 2) A=data valid V=data invalid

7: Mode indicator 1) 2)

Note;

1) Positioning system mode indicator:

D = Differential

S = Simulator

N = Data not valid

2) The mode indicator field supplements the status field (field 6). The status field should be set to V = invalid for all values of operating mode except for A = Autonomous and D = Differential. The positioning system mode indicator and status fields should not be null fields.

5) 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, 01 to 31 (UTC)

3: Month, 01 to 12 (UTC)

4: Year (UTC)

5: Local zone hours 1), 00 h to ±13 h

6: Local zone minutes 1), 00 to +59

Note;

  1)Local time zone is the magnitude of hours plus the magnitude of minutes added, with the sign of local zone hours, to local time to obtain UTC. Local zone is generally negative for East longitudes with local exceptions near the international date line.

Example: At Chatham Is. (New Zealand) at 1230 (noon) local time on June 10, 1995:

        $GPZDA,234500,09,06,1995,-12,45*6C<CR><LF>

        In the Cook Islands at 1500 local time on June 10, 1995:

        $GPZDA,013000,11,06,1995,10,30*4A<CR><LF>

6) ACN – Alert command

$--ACN,hhmmss.ss,aaa,x.x,x.x,c,a*hh <CR><LF>

       1   2   3   4   5 6

  1: Time 1)

  2: Manufacturer mnemonic code 2)

  3: Alert Identifier 3)

  4: Alert Instance, 1 to 999999 4)

  5: Alert command, A, Q, O or S 5)

  6: Sentence status flag 6)

Note;

  1) Release time of the alert command. (e.g. for VDR purposes), optional can be a null field. Sender is allowed to use all alternatives defined in Table 5 Field type summary. Receiver is allowed to ignore content of this field. If receiver does not ignore this field it should support all alternatives defined in Table 5 Field type summary.

  2) Used for proprietary alerts defined by the manufacturer. For standardized alerts this should be a null field.

  3) The alert identifier is unique within a single alert source. The alert identifier is a variable length integer field of maximum 7-digit integer. It identifies the type of the alert, e.g. a "lost target" alert. Standardized alerts use unique alert identifiers described in equipment standards. Number range 10000-9999999 is reserved for proprietary alerts and number '0' is reserved for a command request to all alerts (e.g. alert command Q requests transmission of all alert states). Alert Identifier examples: "001", "2456789", "245"

  4) The alert instance identifies the current instance of an alert to distinguish alerts of the same type (Alert identifier) and from the same source (e.g. dangerous target). Alert instance is maximum a 6-digit integer from 1 to 999999, the number '0' indicates that the command is intended for all alert instances. Except for number '0', the number of alert instance can be freely defined by the manufacturer as long as it is unique for one type of alert (alert identifier). It is not permitted to modify the alert instance within a life cycle of a distributed alert (from 'active and unacknowledged' state until 'normal' state is reached). It can be also a null field, when there is only one alert of that type.

  5) This should not be a null field

    acknowledge: A

    request / repeat information: Q

    responsibility transfer: O

    silence: S

  6) This field should be "C" and should not be a null field. This field indicates a command. A sentence without "C" is not a command.

7) ACK – Acknowledge alarm(Legacy Alert sentence)

$--ACK,xxx*hh<CR><LF>

      1

  1: Unique alarm number (identifier) at alarm source.

Appendix E Compass Safety Distance

Compass safety distance is as follows.

No.	Name	Type No.	Compass safety distance(m)	
			Standard	Steering
1	Display unit	NWZ-1650	0.6	0.3
2	Processing unit	NQA-4327	0.6	0.4
3	Printer	NKG-901	0.9	0.7
4	Remote display	NWZ-4610	1.0	0.5
5	Dimmer unit	NCM-227	0.1	0.1
6	Output buffer	NQA-4351	0.1	0.1

Note:

NBA-5143 AC power rectifier should be installed at a distance of 5 m or more from a standard or a steering magnetic compass.

Appendix F Vacuum Test Procedure

1) Overview

The purpose of conducting the vacuum test is to confirm that there are no air leaks between the welded joint between the bottom of the hull and the NKF-394/396. NKF-394/396 is designed to handle water pressure but is not designed to handle negative pressure. This procedure describes how to deal with air leaks that occur during the vacuum test of the NKF-394/396. Targets areas other than welded areas. It does not guarantee that the vacuum test will pass. By testing as recommended bellow, NKF-394/396 should withstand a vacuum pressure of -0.26 bar (-26kPa).

2) Reference Standards

Tests are conducted in accordance with JIS Z 2332:2012 "Pressure change leak test method."

3) Air pockets in the gate valve of NKF-394/396

When the vacuum test begins, the air trapped inside the gate valve is expelled. (Figure 1)
For this reason, it may be mistaken for air leak detection fluid being used near the transducer. Use the detection fluid only on the welded parts, not near the transducer. (Figure 1)
If you perform a vacuum test with the transducer lowered position, the transducer may prevent the air from escaping properly, making it difficult to eliminate air pockets. In that case, remove the nuts and spring washers from the sea chest and perform the vacuum test with the pipe (vibrator) raised with a chain block (Fig. 2).
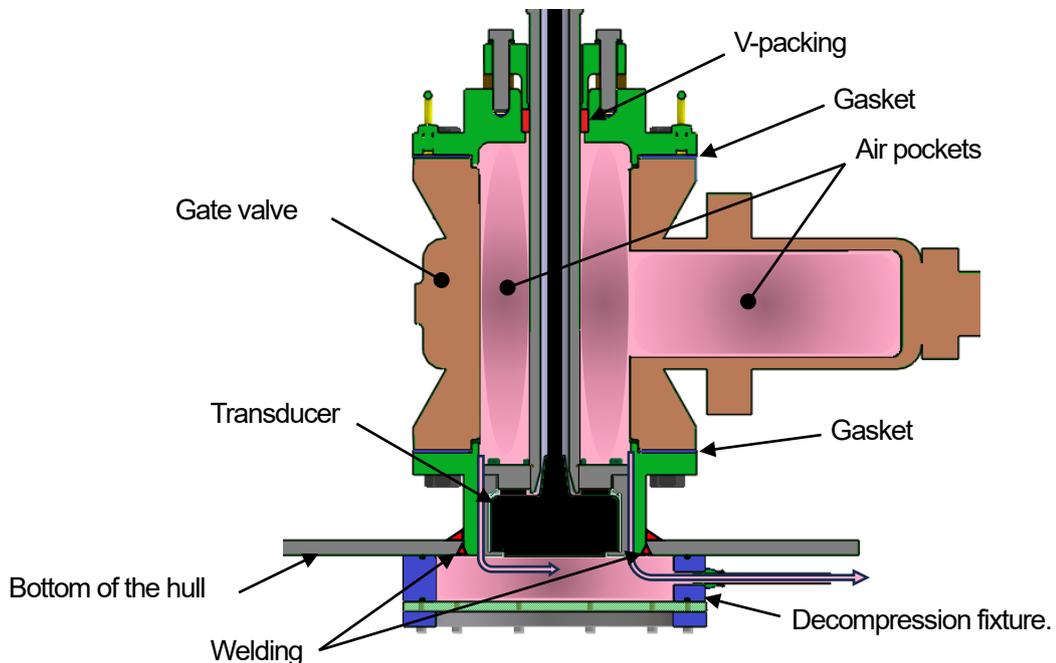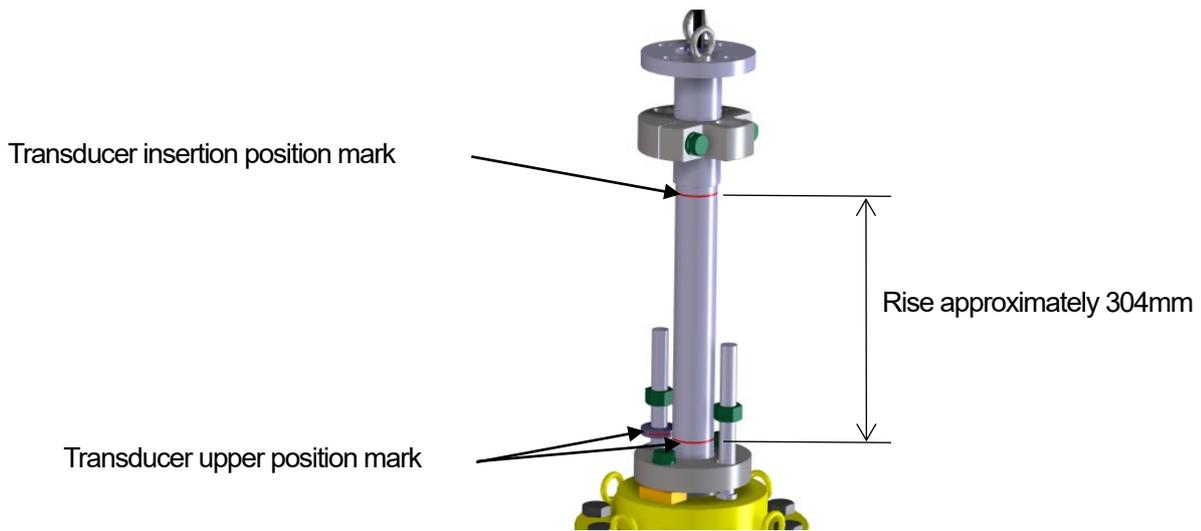

Figure 1 Air pocket

Transducer insertion position mark

Rise approximately 304mm

Transducer upper position mark

Figure 2 When air pockets cannot be removed.

4) Presence or absence of air leaks Check for air leaks

When performing a vacuum test, air may leak from (A) the gasket on the gate valve flange and (B) the V-packing around the sea chest and pipe. If air leaks occur, take the measures listed below.
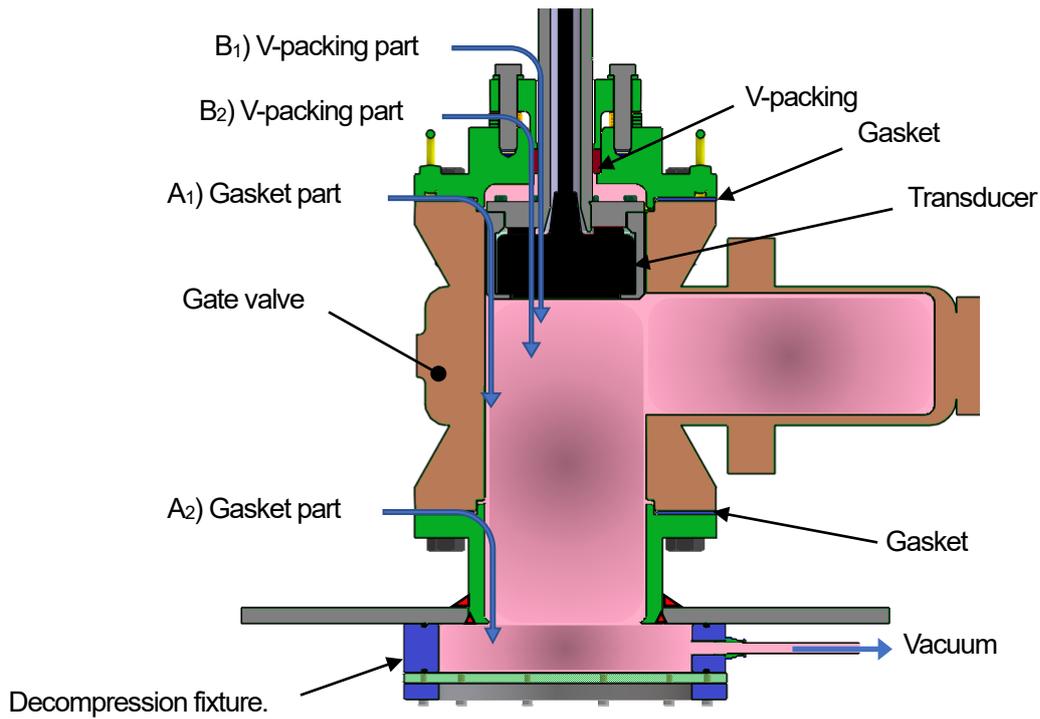

B$_1$) V-packing part

B$_2$) V-packing part

A$_1$) Gasket part

Gate valve

A$_2$) Gasket part

Decompression fixture.

V-packing

Gasket

Transducer

Gasket

Vacuum

Figure 3 Air inflow path

A) Gasket part

Check that the bolts of the connections that use gaskets are tightened to the specified torque of 201 N m. (Figure 4) If any are loose, tighten them to the specified torque. Tighten the bolts diagonally in the order shown in Figure 5. If air leaks occur even after tightening with the specified torque, apply liquid gasket to both sides of the gasket and tighten again with the specified torque.
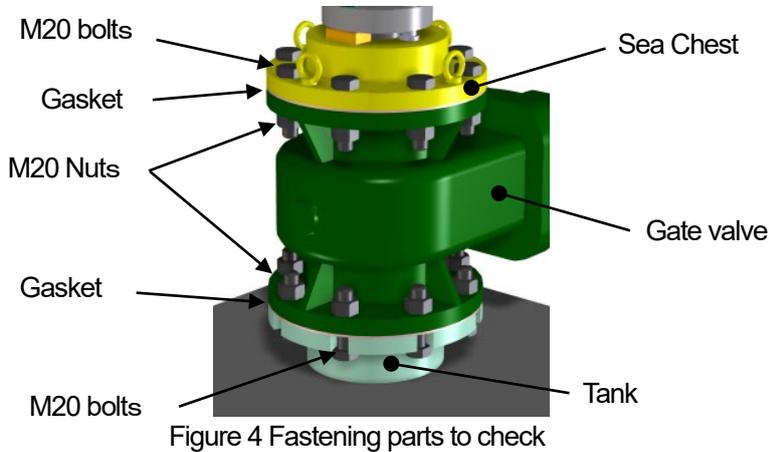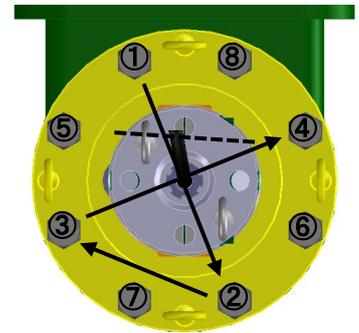

Figure 4 Fastening parts to check

Figure 5 Bolt tightening order

B) V-packing part

Fill all gaps leading to the V-packing section with a non-hardening sealant or similar material.

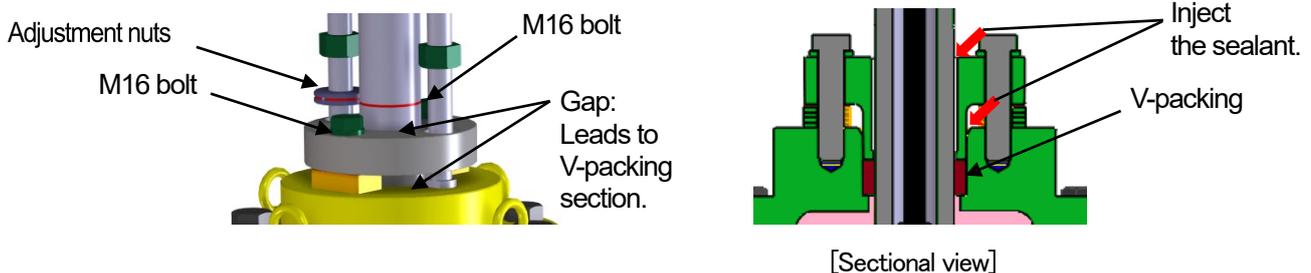Note: Do not loosen the adjustment nut and M16 x 70 bolts.

[Sectional view]

Figure 6 Sealing material injection area

5)　Test system verification

Before connecting the Test target equipment, depressurize the Test system and check the pressure gauge for changes and to ensure that there are no leaks in the fittings and hoses.

5.1) Conducting the test

5.1.1)　Decompression

A)　Press the decompression fixture against the tank (Test target equipment).

B)　Turn on the exhaust system (vacuum pump) and reduce the pressure inside the Test target equipment to the test pressure over approximately 2 minutes.。

C)　If the pressure is not reduced to the test pressure, discontinue the test.
　Check that there are no major leaks in the Test target equipment.
　Check that there are no leaks or abnormalities in the Test system.

D)　After the pressure gauge indicates the test pressure, leave it for at least 60 minutes until the pressure inside the Test target equipment stabilizes.

5.1.2)　Detection

A)　Close the shutoff valve between the exhaust system and the pressure gauge and wait until the pressure fluctuations stop.

B)　Record the internal pressure of the Test target equipment, the outside temperature, and the time as the initial values for the start of detection.

C)　Leave the Test target equipment in the decompressed state for the specified detection time (5 minutes).

D)　After the specified detection time, record the internal pressure of the Test target equipment, the outside temperature, and the time.

E)　If the pressure changes before and after the specified exposure time is less than 1 kPa, it will be considered as passing.
　Note: During detection, no temperature changes or volume changes due to external forces that may affect the test results should be allowed.

5.1.3)　Open

Release the vacuum and return the pressure inside the Test target equipment to atmospheric pressure.

5.1.4)　Post-processing

The non-hardening sealant that was used to block the air inflow path is removed, and the transducer is returned to its original state.