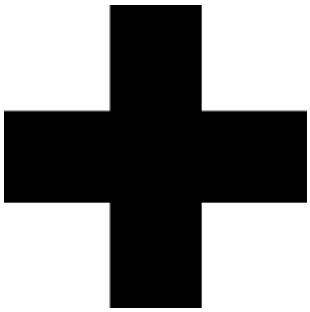
# JFE-400

## Echo Sounder

# SERVICE MANUAL

JRC Japan Radio Co., Ltd.

# ● 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.

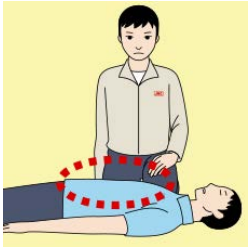
## 4. If not responding

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.

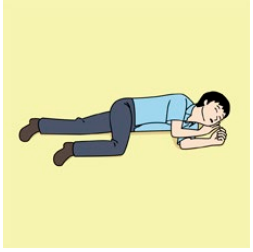

## 5. Check for breathing

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.

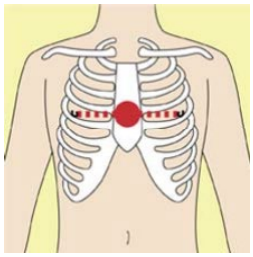


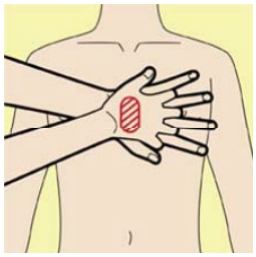
## 6. Cardiopulmonary resuscitation (CPR) (combination of chest compressions and rescue breaths)

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.

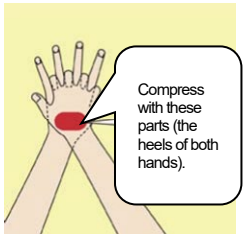




2) Perform chest compressions

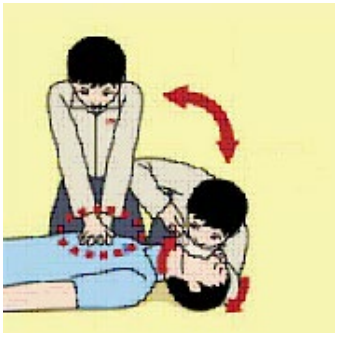
Perform uninterrupted chest compressions of 30 at the rate of about 100 - 120 times per minute, while locking your elbows positioning yourself vertically above your hands.

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




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.

## 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

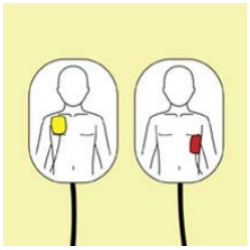
a) Place the AED at an easy-to-use position. If there are multiple first-aiders, continue CPR until the AED becomes ready.

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.

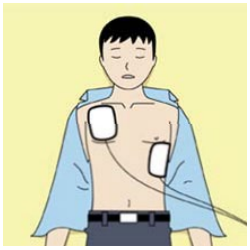
Turn on the power.

## 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)


Press the shock button.

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.

## 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.

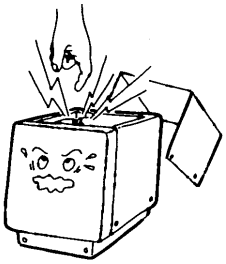
## Warning Labels


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

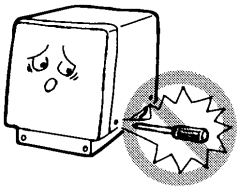
# Usage Hints

## ⚠ DANGER

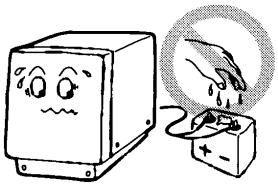
Do not remove the cover of this set. Otherwise, you may touch a high-voltage part and suffer from an electrical shock.



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

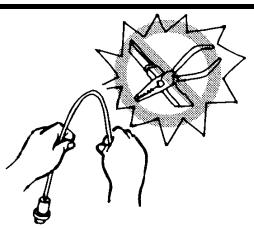


Do not insert or remove the power cord or operate switches with a wet hand.
Otherwise, you may suffer from an electrical shock.

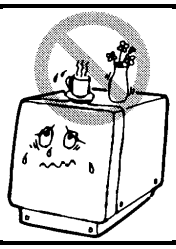


# ⚠ WARNING

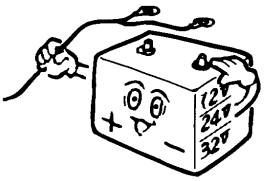
Do not damage, break or modify the power cord.
When a heavy object is placed on the cord or the cord is heated, pulled, or forcibly bent, the cord will be broken resulting in a fire or an electrical shock.



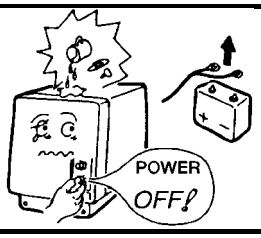
Do not place any vessels containing water or other liquids, or metal objects, on top of this equipment. If water is spilled on or metal objects fall into the equipment there is a risk of fire, electric shock, or damage.



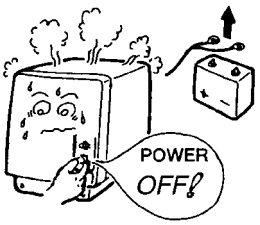
Do not use this set at a voltage other than the supply voltage stated on the set.
Otherwise, a fire, an electrical shock, or a failure may occur.




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.

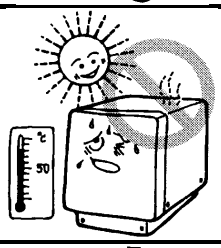
Please call our field representative or your nearest JRC office for inspection and repair services.

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.

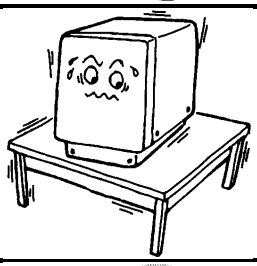
# ⚠ CAUTION

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.

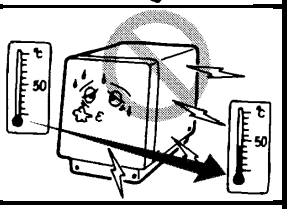
Do not store or operate the equipment where subject to temperatures more than 55℃ or less than -15℃. High temperature may cause failures.



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.

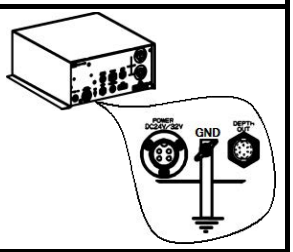


If it is cold, do not move the equipment suddenly into a warm environment and switch it on. High-voltage leaks due to condensation may result in damage to the equipment.



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.

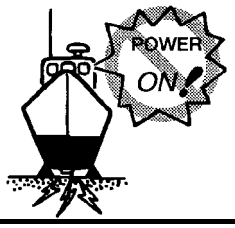



Use the echo sounder only as a navigation aid. Making the final navigation decision based only on the echo sounder display information may cause accidents such as collisions or running aground.

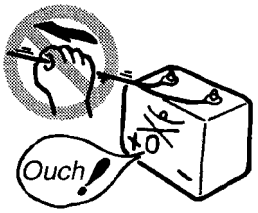
Use a chart to secure a safe depth when the equipment cannot measuring depth by malfunction, and contact JRC or our distributor for repair.

# ⚠ CAUTION

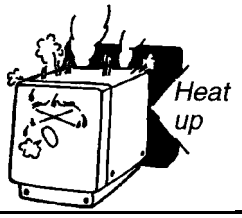
Do not turn on the equipment's power when the ship is in dry docks.
Failure to observe this caution may result in damage to the transducer, etc. by heat.



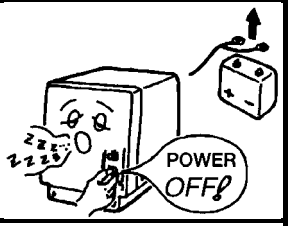

When removing the power cord, be sure to remove the power cord terminal correctly.
If the power cord is pulled, the cord may be damaged resulting in a fire or an electrical shock.




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

# Chapter 1 Components & Configuration

## 1.1 Components

A list of standard components and optional components are shown in the table

### 1.1.1 Standard Equipment

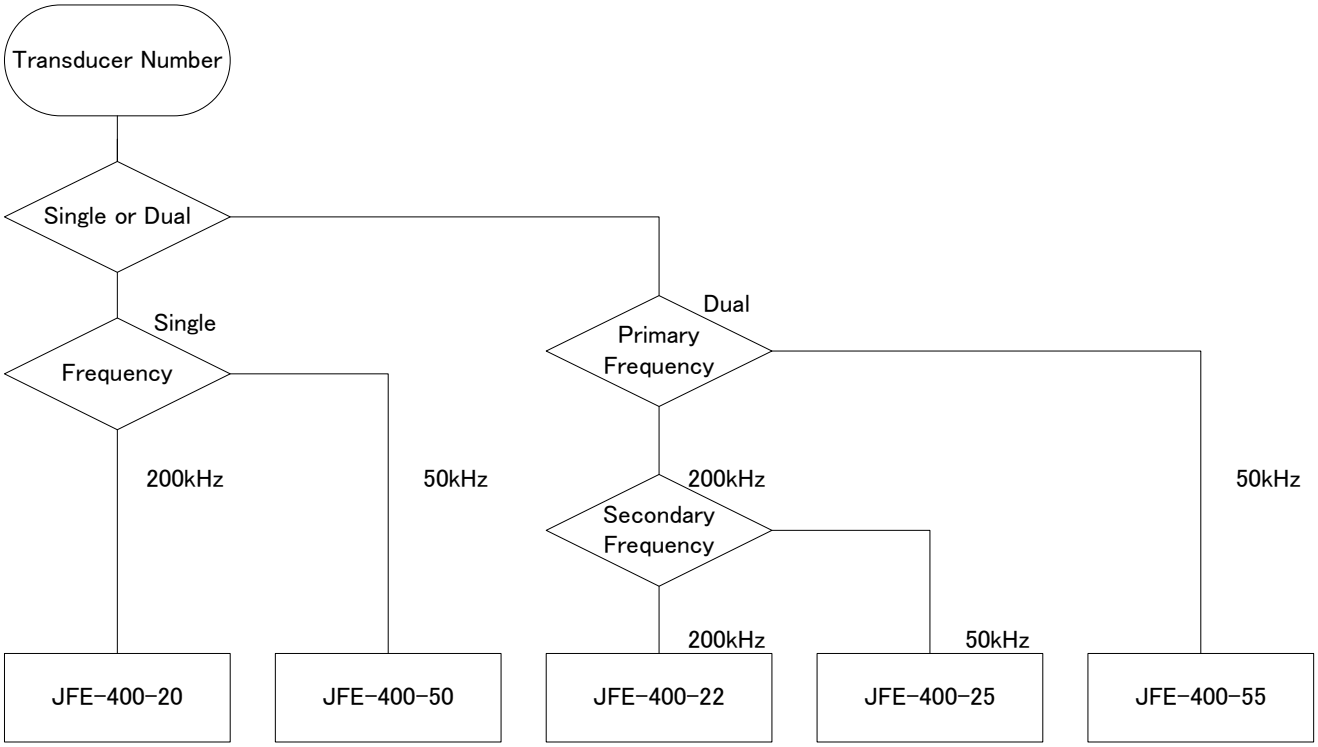
| Name | Type No. | Qty. | Remarks |
|---|---|---|---|
| Display unit | NWZ-1650 | 1 | |
| Display cable | CFQ-7540 | 1 | |
| Processing unit | NQA-4327 | 1 | |
| Matching box(Primary) | NQD-2597 | 1 | 200kHz |
| | NQD-2598 | | 50kHz |
| Transducer(Primary) | NKF-349 | 1 | 200kHz (with cable 20, 30,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

## 1.1.2 Option

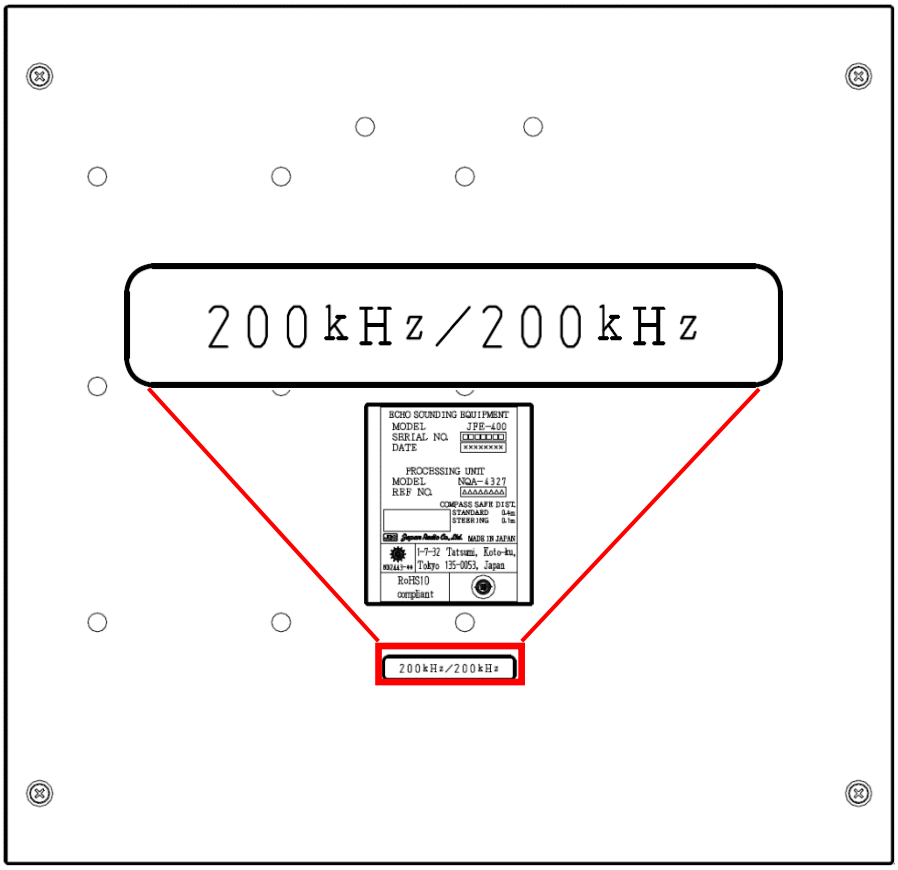
| Name | Type No. | Remarks |
|---|---|---|
| Matching box(Secondary) | NQD-2597 | 200kHz |
| | NQD-2598 | 50kHz |
| | AW-154F | 200kHz |
| | AW-154F-50 | 50kHz |
| Transducer(Secondary) | NKF-349 | 200kHz (with cable 20,30,40,50m) |
| | NKF-350 | 50kHz (with cable 20,30,40m) |
| | NKF-341 | 200kHz (with 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 |

## 1.1.3 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.

CMN-869

| 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

| 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.**

## 1.1.4 Internal configuration

Configuration of NQA-4327

| Circuit Name | Type No. | Code No. | Qty. | Remarks |
|---|---|---|---|---|
| Main Unit | CDJ-2594 | CDJ2594 | 1 | |
| TX/RX Unit<br>(Select one from the right) | CMN-869-20 | CMN869-20 | 1 | 200kHz |
| | CMN-869-50 | CMN869-50 | | 50kHz |
| | CMN-869-25 | CMN869-25 | | 200kHz / 50kHz |
| | CMN-869-22 | CMN869-22 | | 200kHz / 200kHz |
| | CMN-869-55 | CMN869-55 | | 50kHz / 50kHz |
| Power Supply Unit | CBD-2016 | CBD2016 | 1 | |
| Interface Unit | CQD-2348 | CQD2348 | 1 | |

Configuration of NWZ-1650

| Circuit Name | Type No. | Code No. | Qty. | Remarks |
|---|---|---|---|---|
| Processing unit | CMJ-612-E | CMJ612-E | 1 | For Echo sounder model |
| Buzzer unit | CGC-600 | CGC600 | 1 | Replace as CCN-1650-U LCD panel unit |
| LCD interface unit | CMH-2501 | CMH2501 | 1 | |
| LCD unit | CCN-1650 | CCN1650 | 1 | |

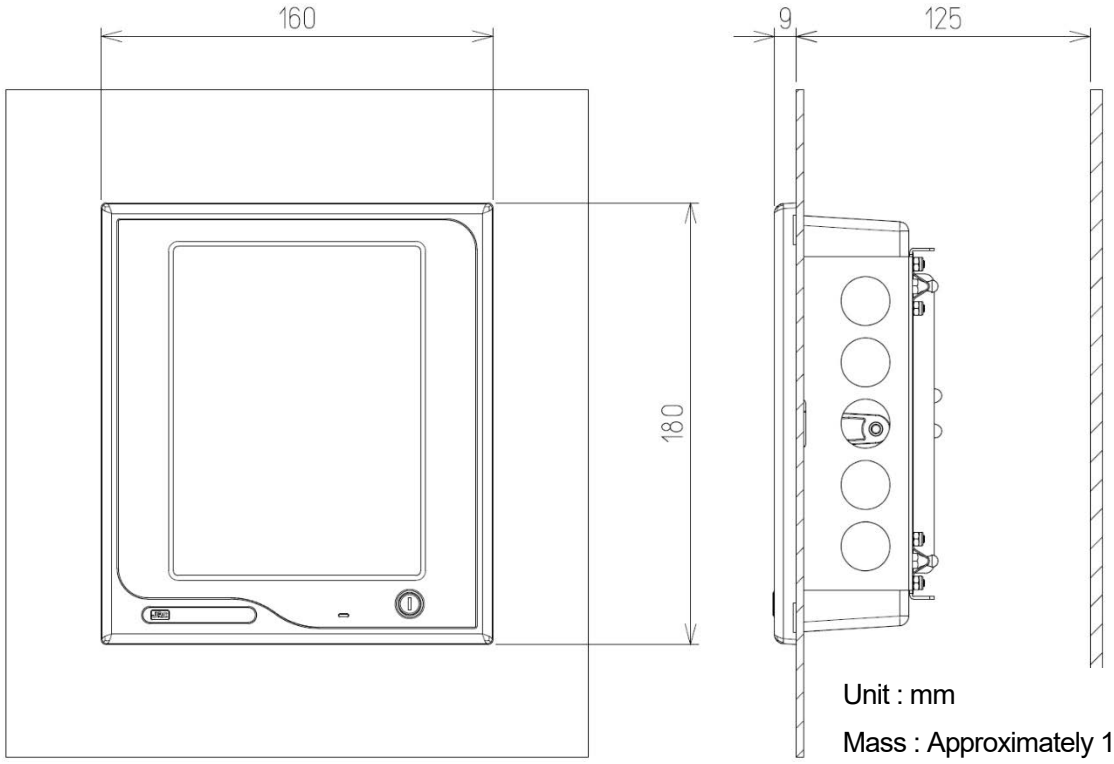
## 1.1.5 Regular replacement parts

| Parts name | Type | Code | Replacement time | Remarks |
|---|---|---|---|---|
| LCD panel kit | CCN-1650 | CCN1650 | About 40,000hours | About 5 years in continuous use as the guideline |

## 1.2 Construction

### External Dimension of NWZ-1650 Display Unit

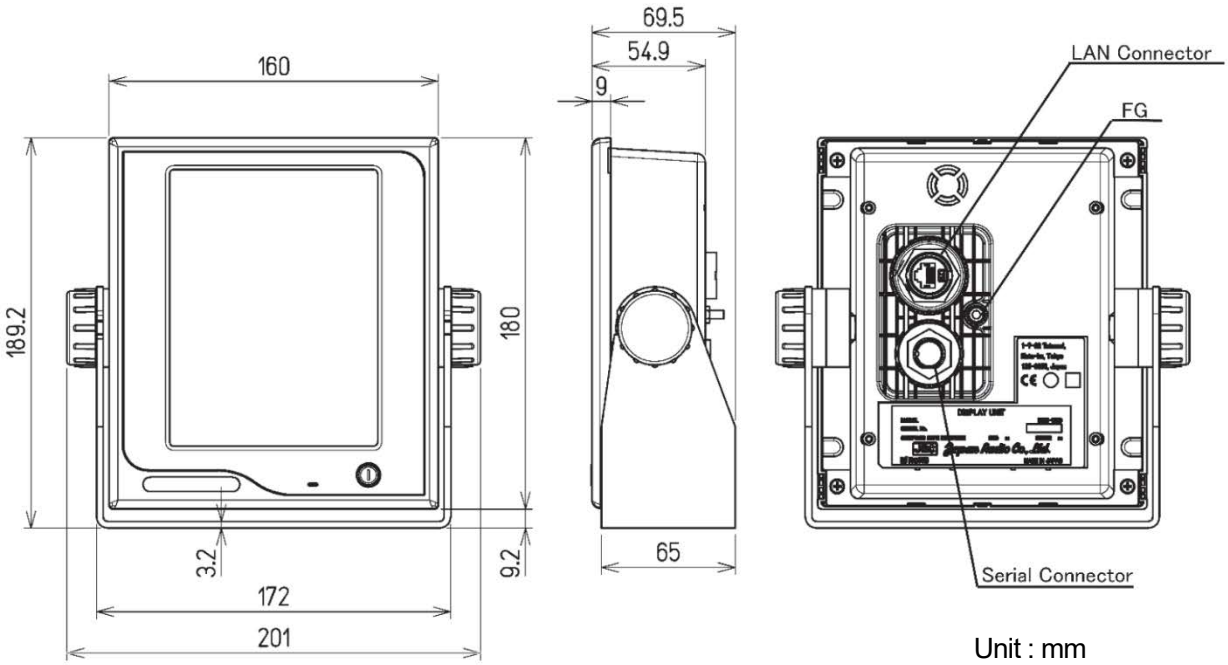
Flush Mount Type




Unit : mm

Mass : Approximately 1kg

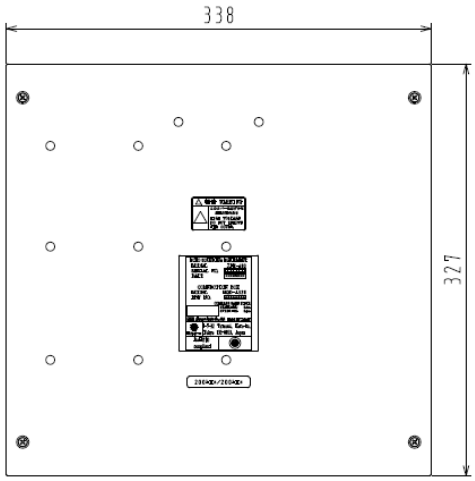
Desktop Type(Optional Base Kit use)

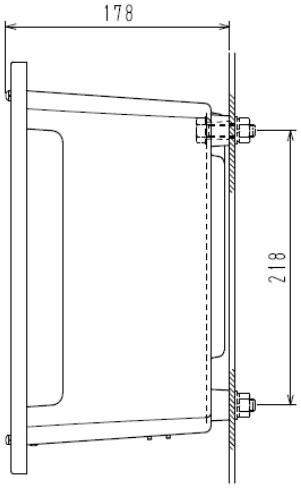


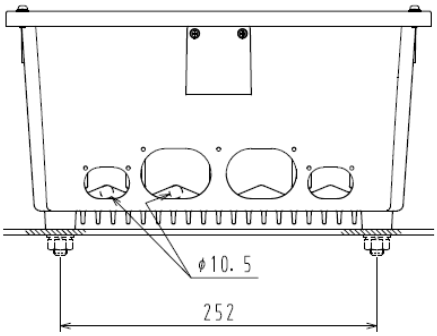

Unit : mm

Mass : Approximately 1.5kg

## External Dimension of NQA-4327 Processing Unit



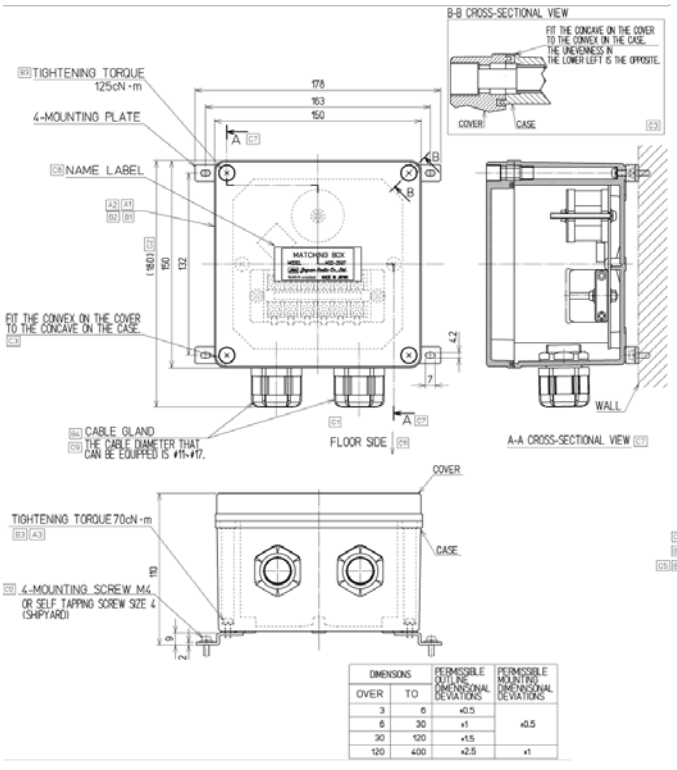



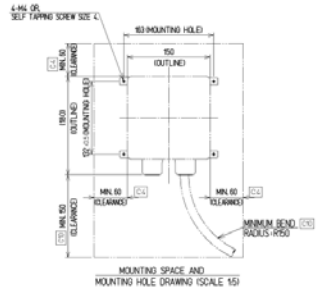

Unit : mm

Mass : Approximately 5.9kg

## External Dimension of NQD-2597 Matching Box for 200kHz

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



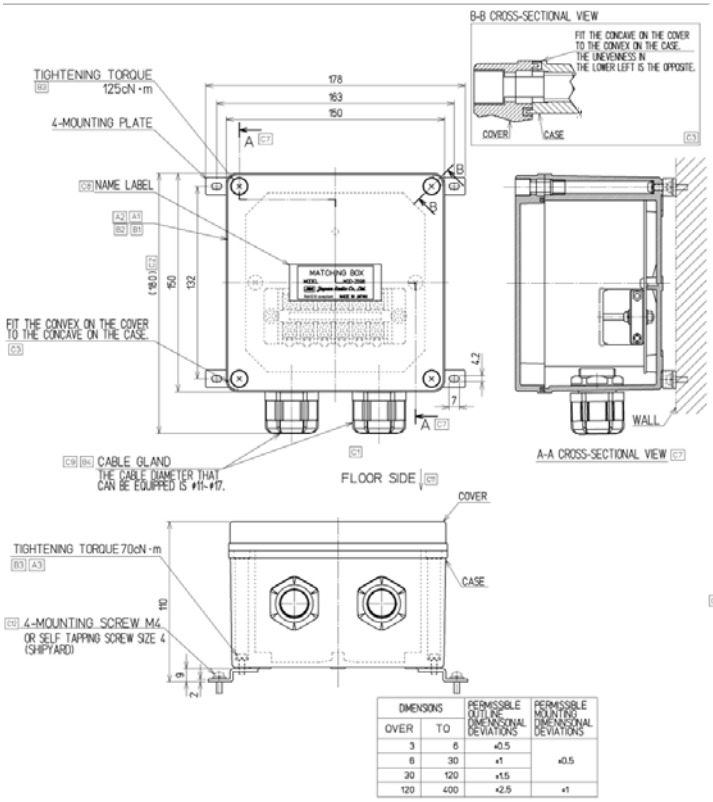

NOTE

1. THE MOUNTING DIRECTION SHOULD BE AS SHOWN IN THIS DRAWING. WITH CABLE GRAND FACING DOWNWARD.
2. NO MODIFICATIONS OF ANY KIND SHALL BE MADE.
3. IF OIL OR SOLVENT COMES IN CONTACT WITH THE PRODUCT, WIPE EVERYTHING OFF IMMEDIATELY.
4. AFTER INSTALLATION, DO NOT PLACE ANY LOAD ON THE ENCLOSURE, SUCH AS PLACING AN OBJECT ON THE TOP SURFACE.

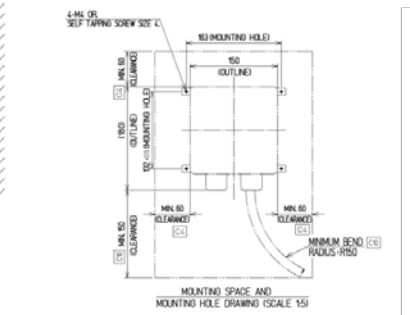
BODY COLOR : WHITE-GRAY
MASS : 0.87±0.08 kg
UNIT : mm

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

NQD-2598 is a standard matching box for 50kHz.




| 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 |

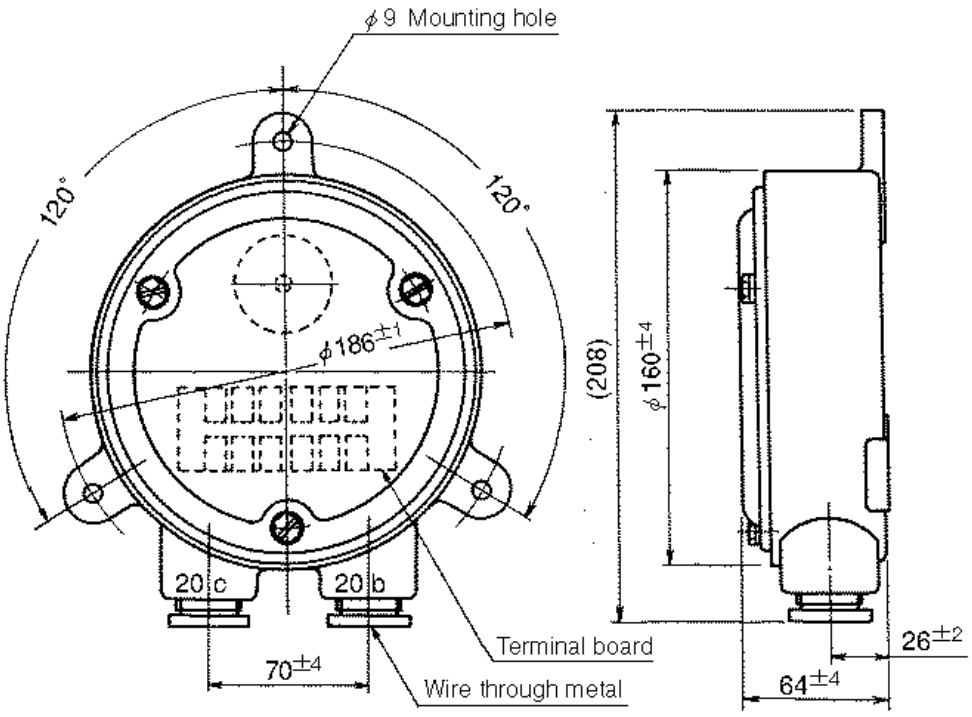



NOTE
1. THE MOUNTING DIRECTION SHOULD BE AS SHOWN IN THIS DRAWING, WITH CABLE GRAND FACING DOWNWARD.
2. NO MODIFICATIONS OF ANY KIND SHALL BE MADE.
3. IF OIL OR SOLVENT COMES IN CONTACT WITH THE PRODUCT, WIPE EVERYTHING OFF IMMEDIATELY.
4. AFTER INSTALLATION, DO NOT PLACE ANY LOAD ON THE ENCLOSURE, SUCH AS PLACING AN OBJECT ON THE TOP SURFACE.

BODY COLOR : WHITE-GRAY
MASS : 0.76±0.07 kg
UNIT : mm

## 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.

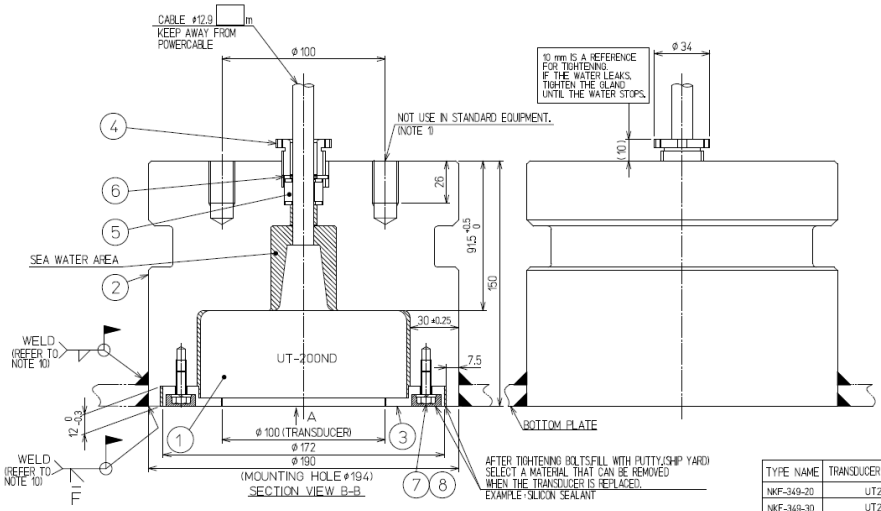


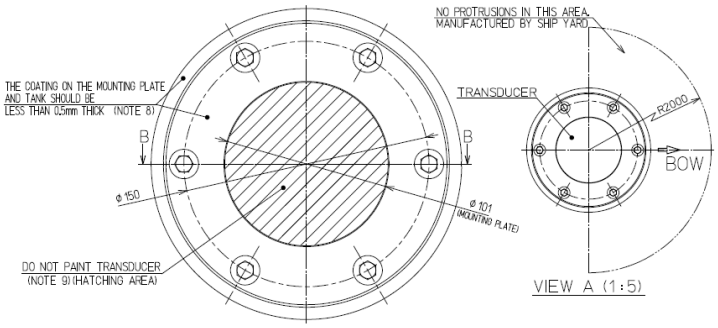

Unit : mm

Mass : 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.




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 TOAVOID 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 TRANSDUCER ① AND PACKING ⑤ 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 PLATE ④ SHOULD BE LESS THAN 0.5mm THICK.
9) TRANSDUCER① SHOULD NOT BE PAINTED.
10) DESIGN THE BOTTOM PLATEAT 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 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 |

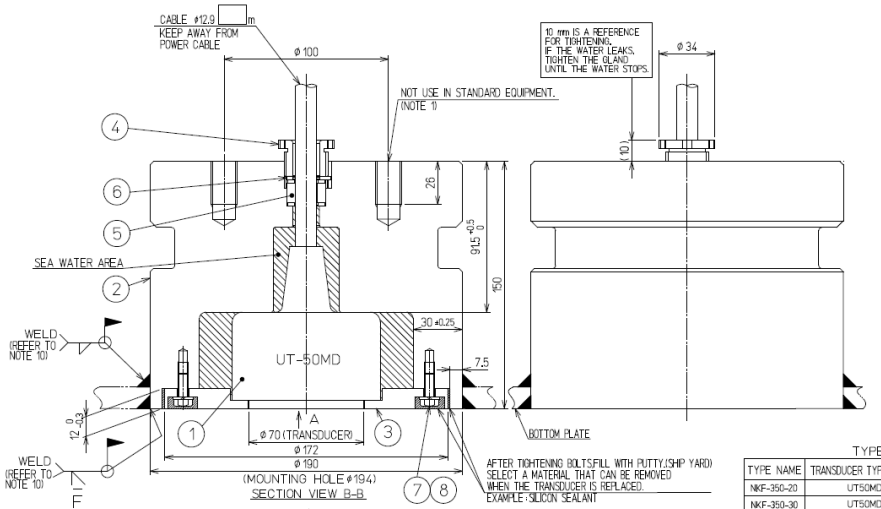
PARTS LIST (SUPPLIED BY JRC)

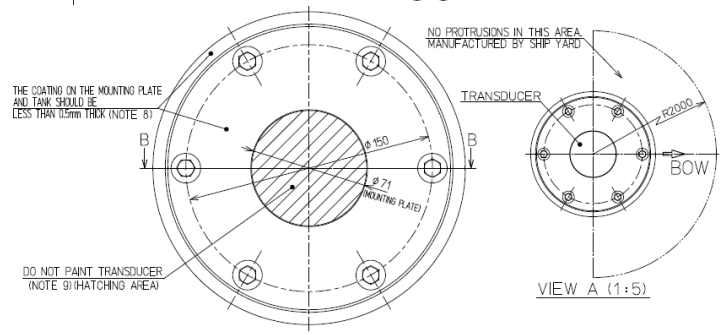
| NKF-349-** No. | NAME | TYPE | MATERIAL | Q'TY | MASS |
|---|---|---|---|---|---|
| 1 | TRANSDUCER | UT200ND*** | - | 1 | DEPENDENT ON CABLE LENGTH |
| 2 | TANK | MTL325983C | SM490A | 1 | |
| 3 | MOUNTING PLATE | MTL335634 | SUS316L | 1 | |
| 4 | GLAND | MTL338564 | SUS316L | 1 | MASS OF TANK ASSY (TOTAL OF ②TO⑧) 25±2.5 kg |
| 5 | PACKING | MPPK32277 | NBR | 1 | |
| 6 | WASHER | MTB423069 | SUS316L | 1 | |
| 7 | M6X16BOLT | BRTG02547 | SUS316 | 6 | |
| 8 | SPRING WASHER (M6) | BRTG02682 | SUS316 | 6 | |

NKF-349 STANDARD EQUIPMENT

## 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.




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 TOAVOID 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 TRANSDUCER ① AND PACKING ⑤ 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 PLATE ④ SHOULD BE LESS THAN 0.5mm THICK.
9) TRANSDUCER① SHOULD NOT BE PAINTED.
10) DESIGN THE BOTTOM PLATEAT 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 | UT50MD20B (20m) | 30±3.0 kg |
| NKF-350-30 | UT50MD30B (30m) | 32±3.2 kg |
| NKF-350-40 | UT50MD40B (40m) | 34±3.4 kg |

| 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 |

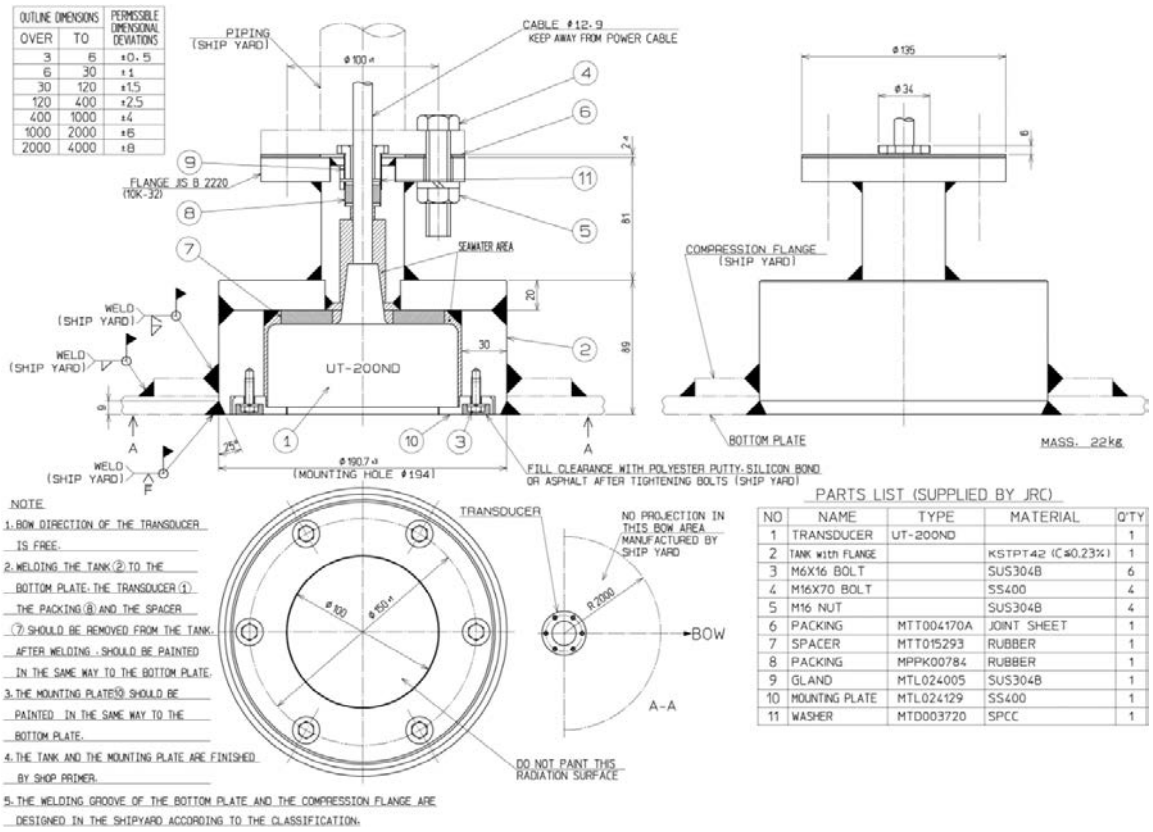
PARTS LIST (SUPPLIED BY JRC)

| NKF-350-** 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 | |
| 4 | GLAND | MTL338564 | SUS316L | 1 | MASS OF TANK ASSY (TOTAL OF ②TO⑧) 25±2.5 kg |
| 5 | PACKING | MPPK32277 | NBR | 1 | |
| 6 | WASHER | MTB423069 | SUS316L | 1 | |
| 7 | M6X16BOLT | BRTG02547 | SUS316 | 6 | |
| 8 | SPRING WASHER (M6) | BRTG02682 | SUS316 | 6 | |

NKF-350 STANDARD EQUIPMENT

## 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 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 |
| 2000 | 4000 | ±8 |

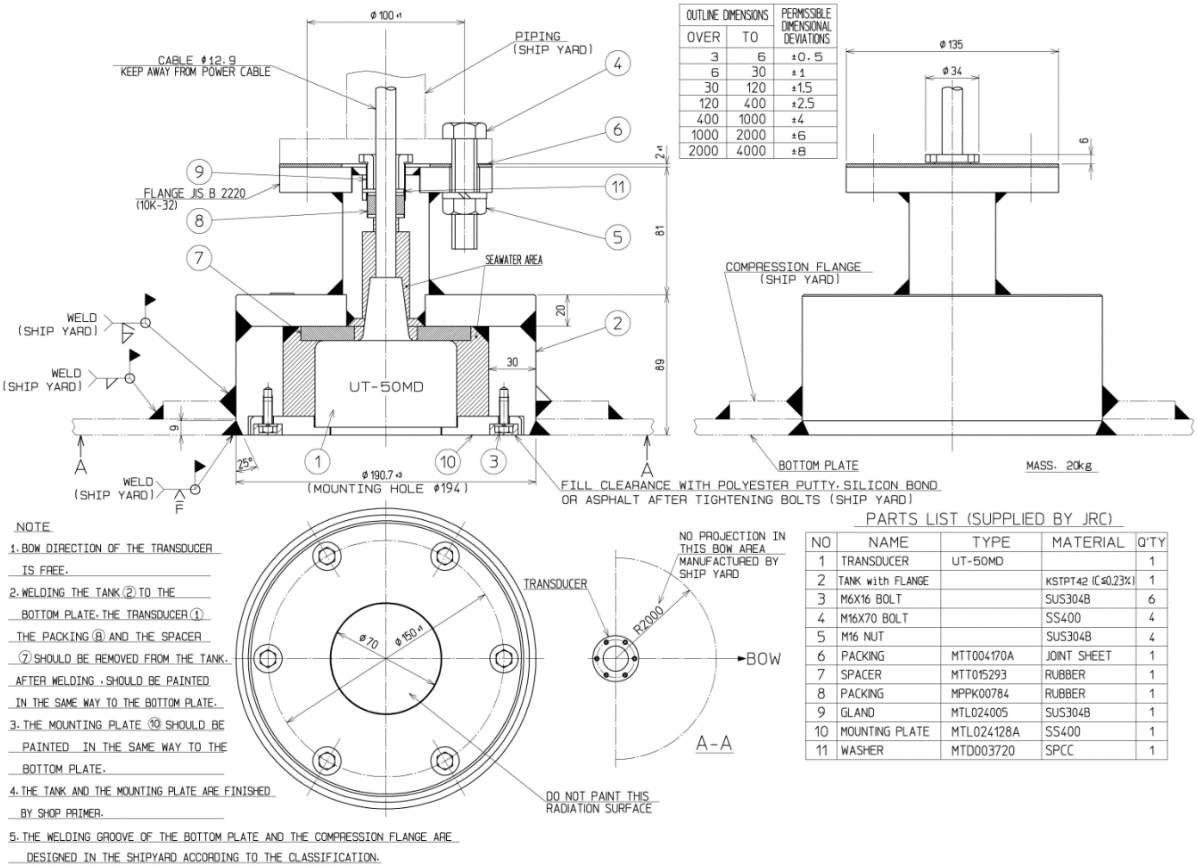
NOTE
1. BOW DIRECTION OF THE TRANSDUCER IS FREE.
2. WELDING THE TANK ② TO THE BOTTOM PLATE. THE TRANSDUCER ① THE PACKING ⑧ AND THE SPACER ⑦ SHOULD BE REMOVED FROM THE TANK. AFTER WELDING, SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
3. THE MOUNTING PLATE ⑩ SHOULD BE PAINTED IN THE SAME WAY 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.

PARTS LIST (SUPPLIED BY JRC)

| NO | NAME | TYPE | MATERIAL | Q'TY |
|---|---|---|---|---|
| 1 | TRANSDUCER | UT-200MD | | 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 Previous 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 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 |
| 2000 | 4000 | ±8 |

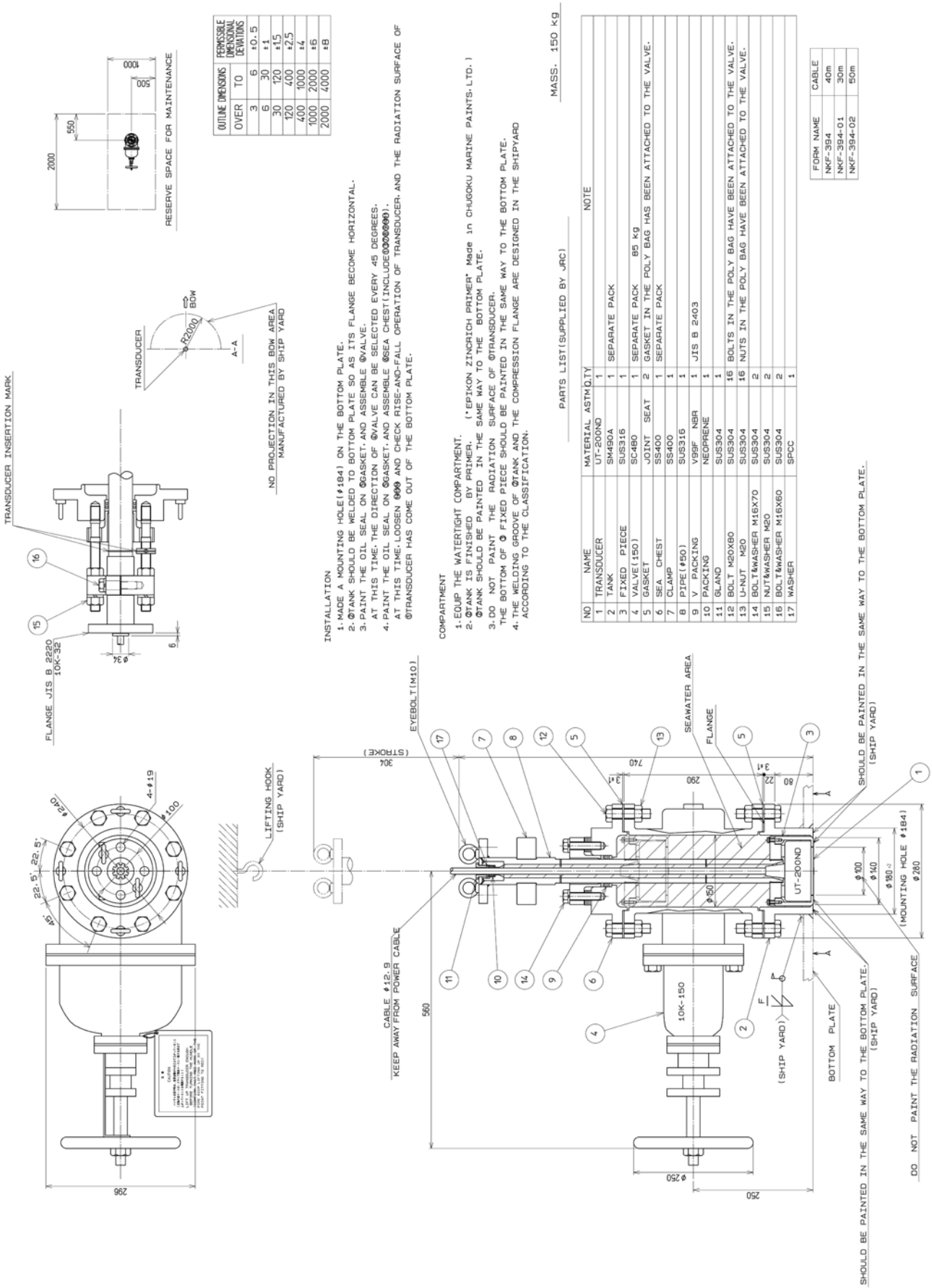
NOTE
1. BOW DIRECTION OF THE TRANSDUCER IS FREE.
2. WELDING THE TANK ② TO THE BOTTOM PLATE. THE TRANSDUCER ① THE PACKING ⑧ AND THE SPACER ⑦ SHOULD BE REMOVED FROM THE TANK. AFTER WELDING, SHOULD BE PAINTED IN THE SAME WAY TO THE BOTTOM PLATE.
3. THE MOUNTING PLATE ⑩ SHOULD BE PAINTED IN THE SAME WAY 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.

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 |

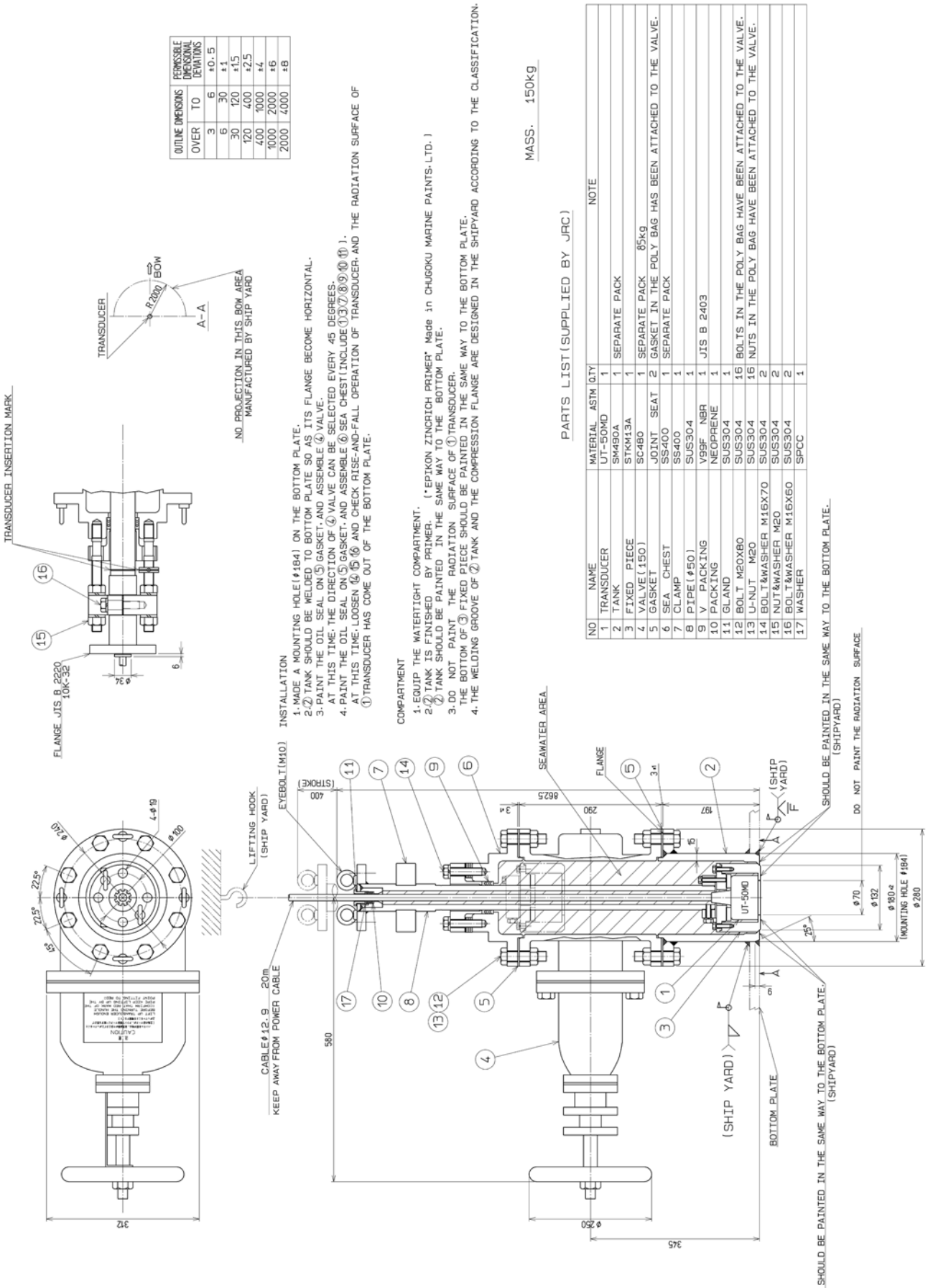
## External Dimension of NKF-394 Gate valve Transducer

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



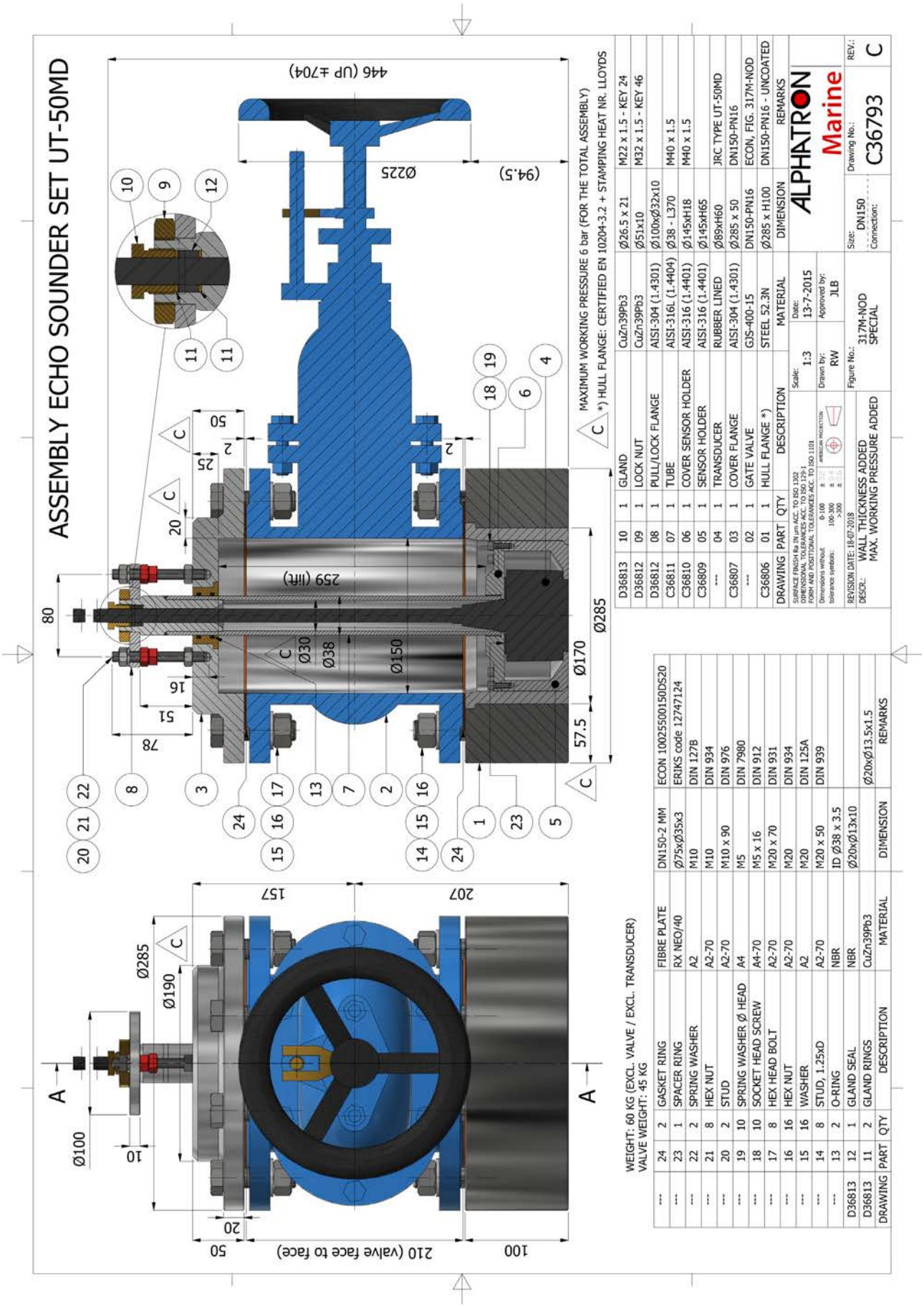
External Dimension of NKF-396 Gate valve Transducer

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



## 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.

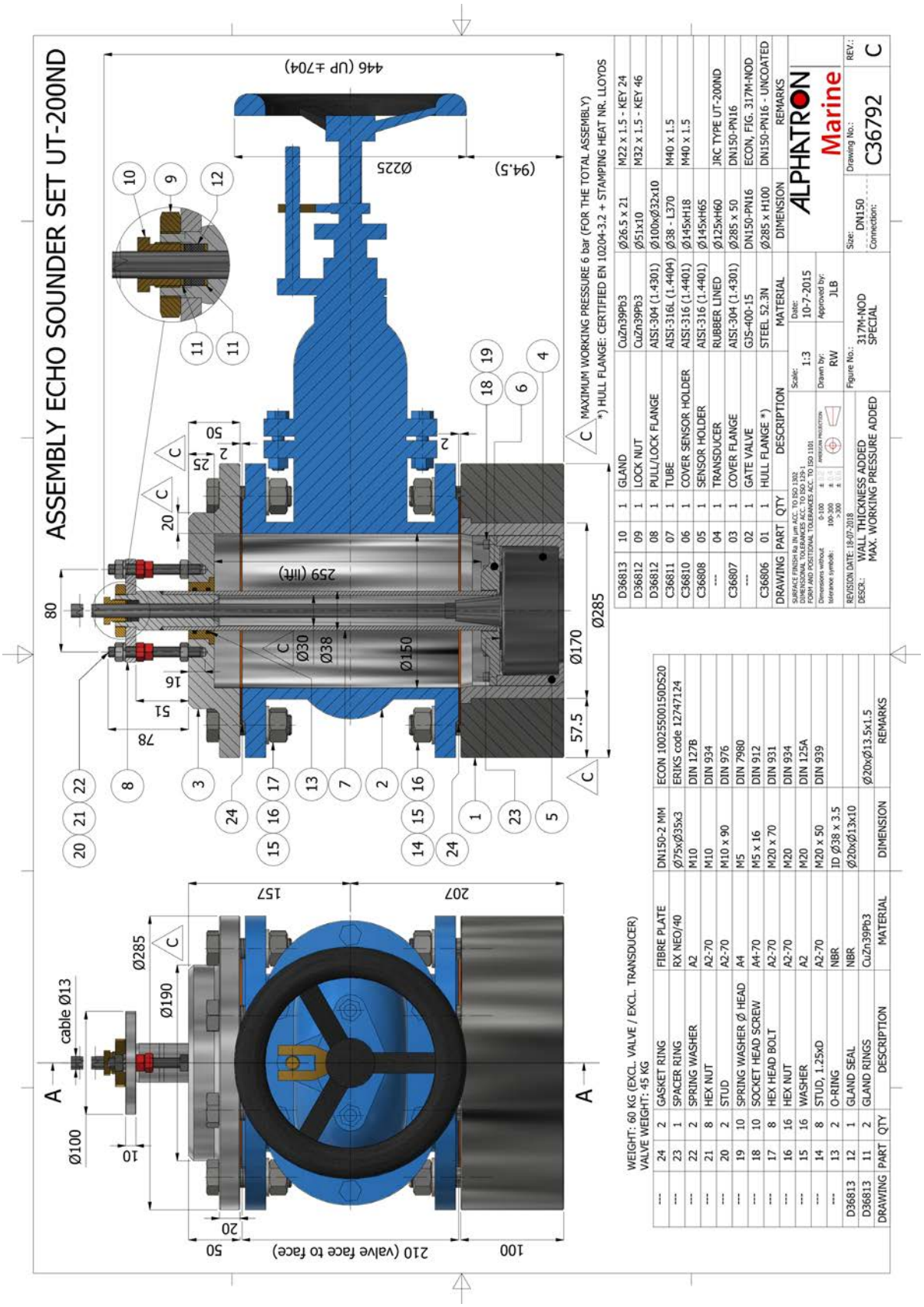



| DRAWING | PART | QTY | DESCRIPTION | MATERIAL | DIMENSION | REMARKS |
|---|---|---|---|---|---|---|
| D36813 | 10 | 1 | GLAND | CuZn39Pb3 | Ø26.5 x 21 | M22 x 1.5 - KEY 24 |
| D36812 | 09 | 1 | LOCK NUT | CuZn39Pb3 | Ø51x10 | M32 x 1.5 - KEY 46 |
| D36812 | 08 | 1 | PULL/LOCK FLANGE | AISI-304 (1.4301) | 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 |
| 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 |

| 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 | |

## External Dimension of G-002759/G-002760/G-002762/G-008792 Gate valve transducer

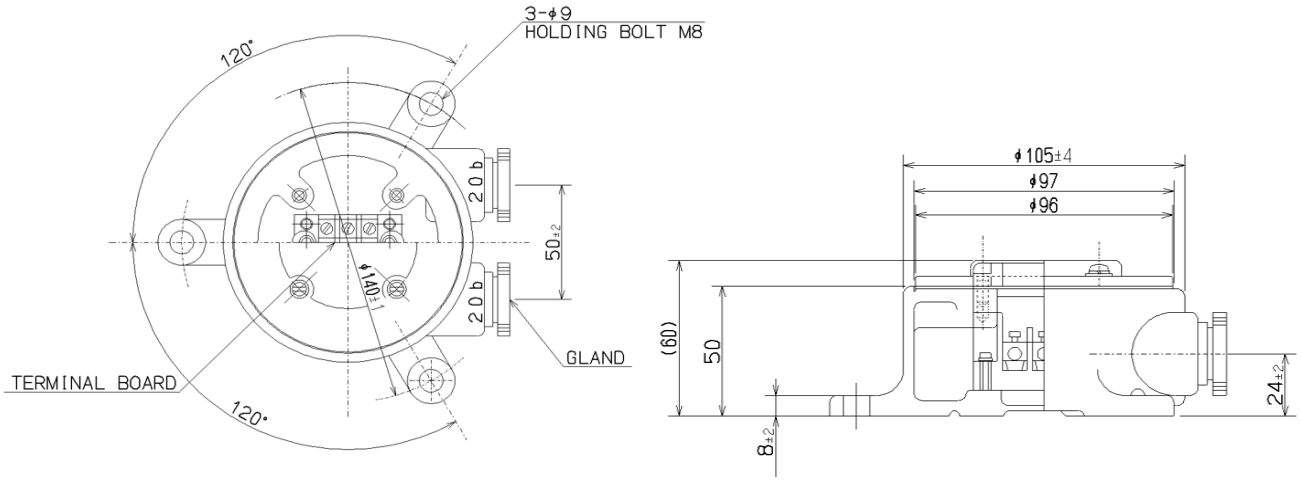
The gate valve transducer for 200kHz transducer is made by Alphatron. It is possible to replace the transducer in the sea.




| DRAWING | PART | QTY | DESCRIPTION | MATERIAL | DIMENSION | REMARKS |
|---|---|---|---|---|---|---|
| D36813 | 12 | 1 | GLAND SEAL | NBR | Ø20xØ13x10 | |
| D36813 | 11 | 2 | GLAND RINGS | CuZn39Pb3 | Ø20xØ13.5x1.5 | |
| --- | 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 | |
| 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 |

## External Dimension of JB-340 Junction box

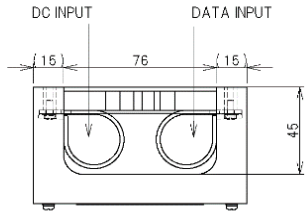


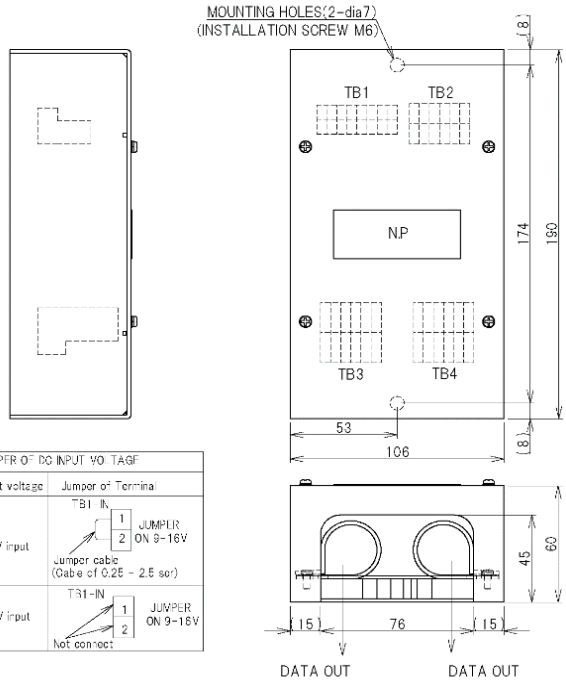

Unit: mm

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 |



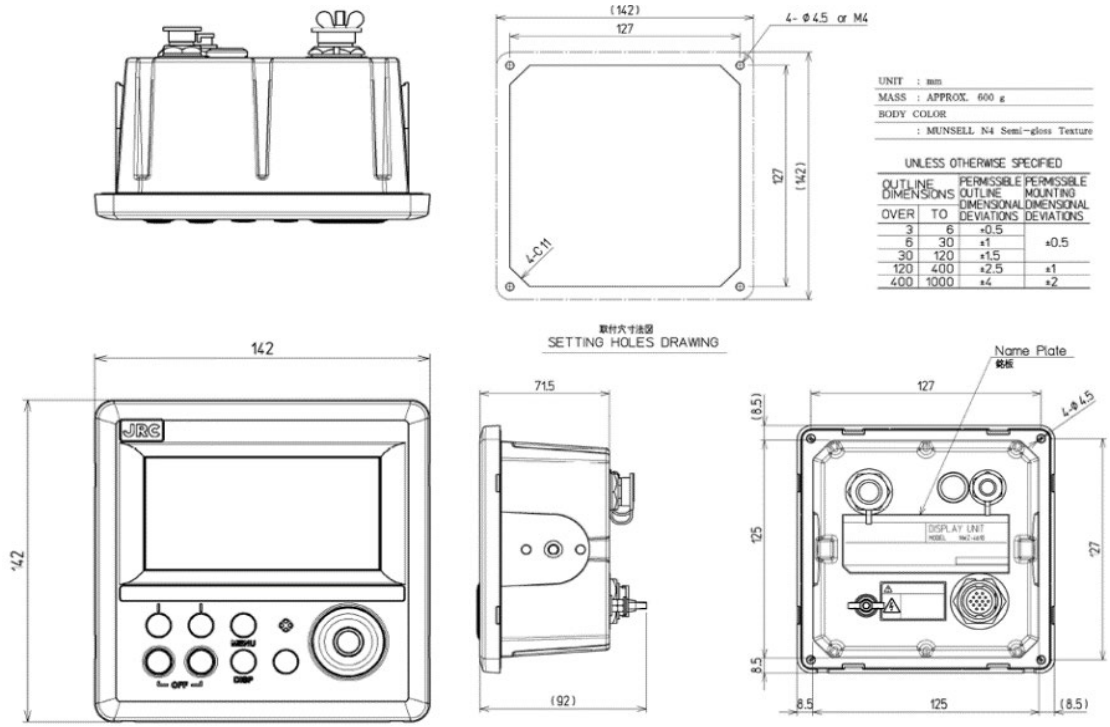

Note:

| JUMPER OF DC INPUT VOTAGE | |
|---|---|
| DC Input voltage | Jumper of Terminal |
| DC 12V input | TB1-IN 1 2 JUMPER ON 9-16V; Jumper cable (Gabe of 0.25 - 2.5 sqr) |
| DC 24V input | TB1-IN 1 2 JUMPER ON 9-16V; Not connect |

Unit : mm

Mass : 0.8kg

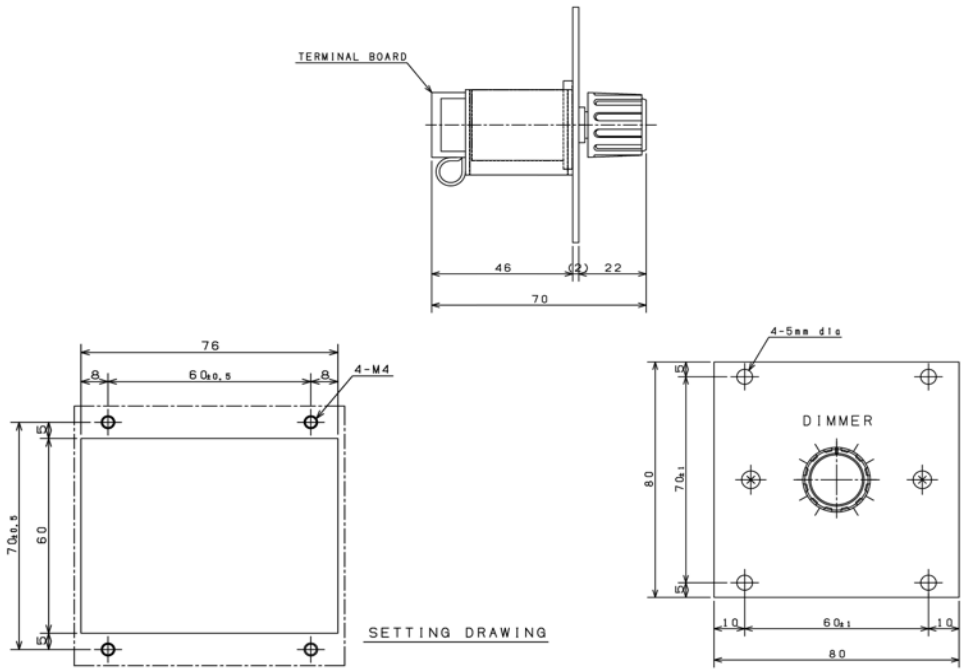
## External Dimension of NWZ-4610 Remote display




Unit: mm

Mass: 0.6kg

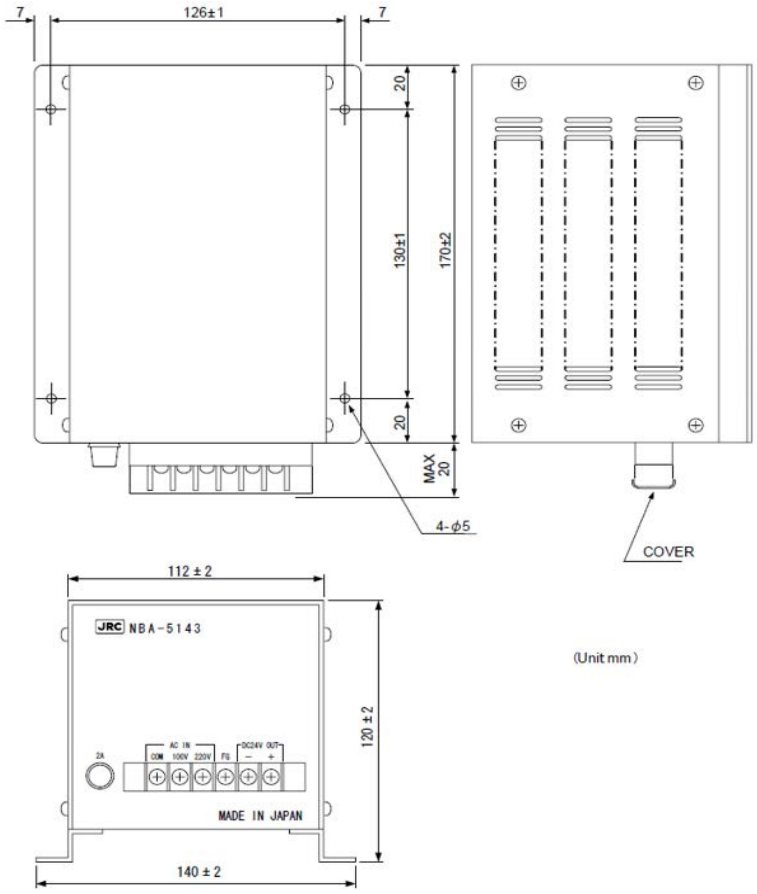
## External Dimension of NCM-227 Dimmer unit




Unit: mm

Mass: 0.5kg

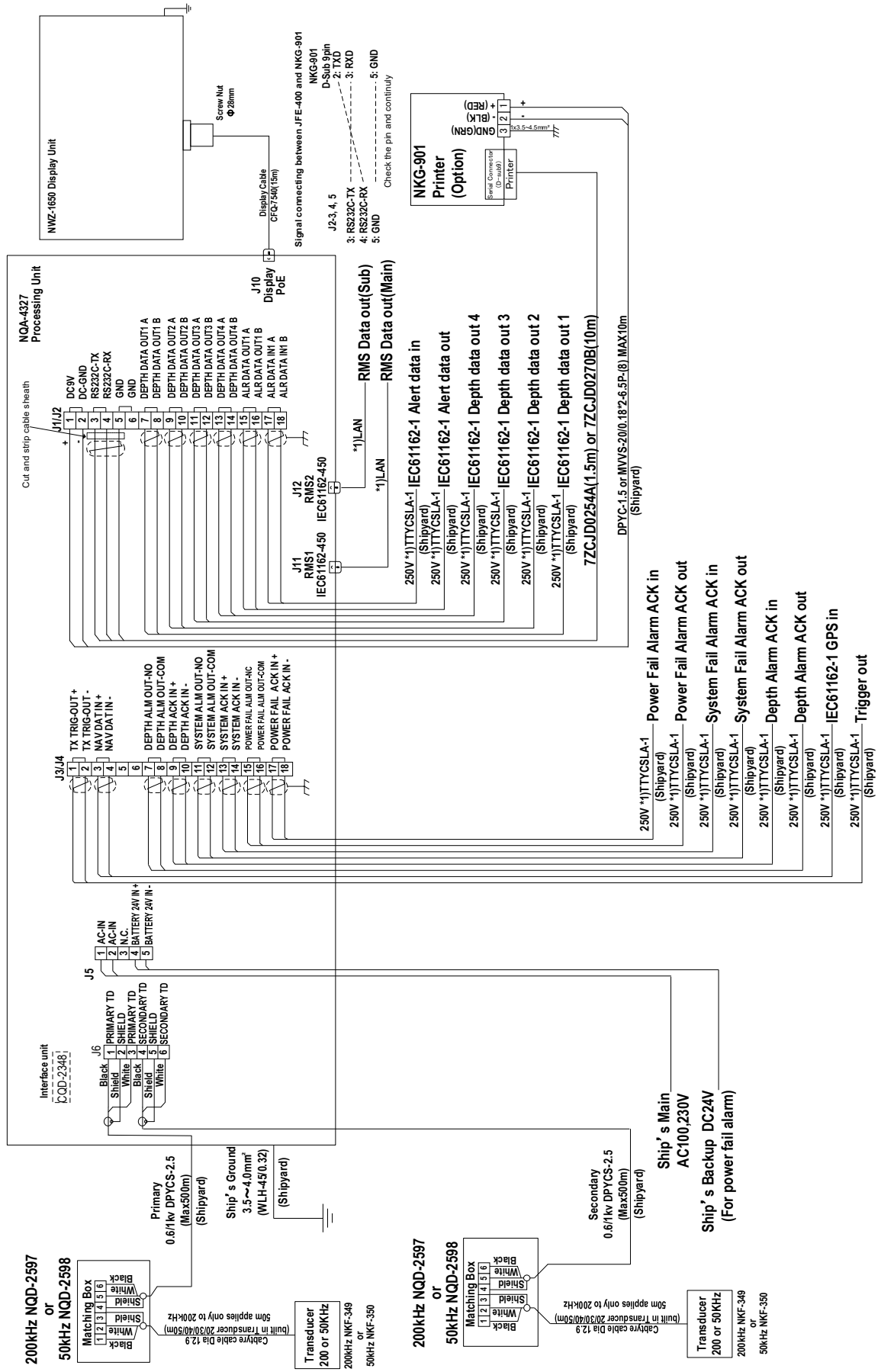
## External Dimension of NBA-5143 AC power rectifier



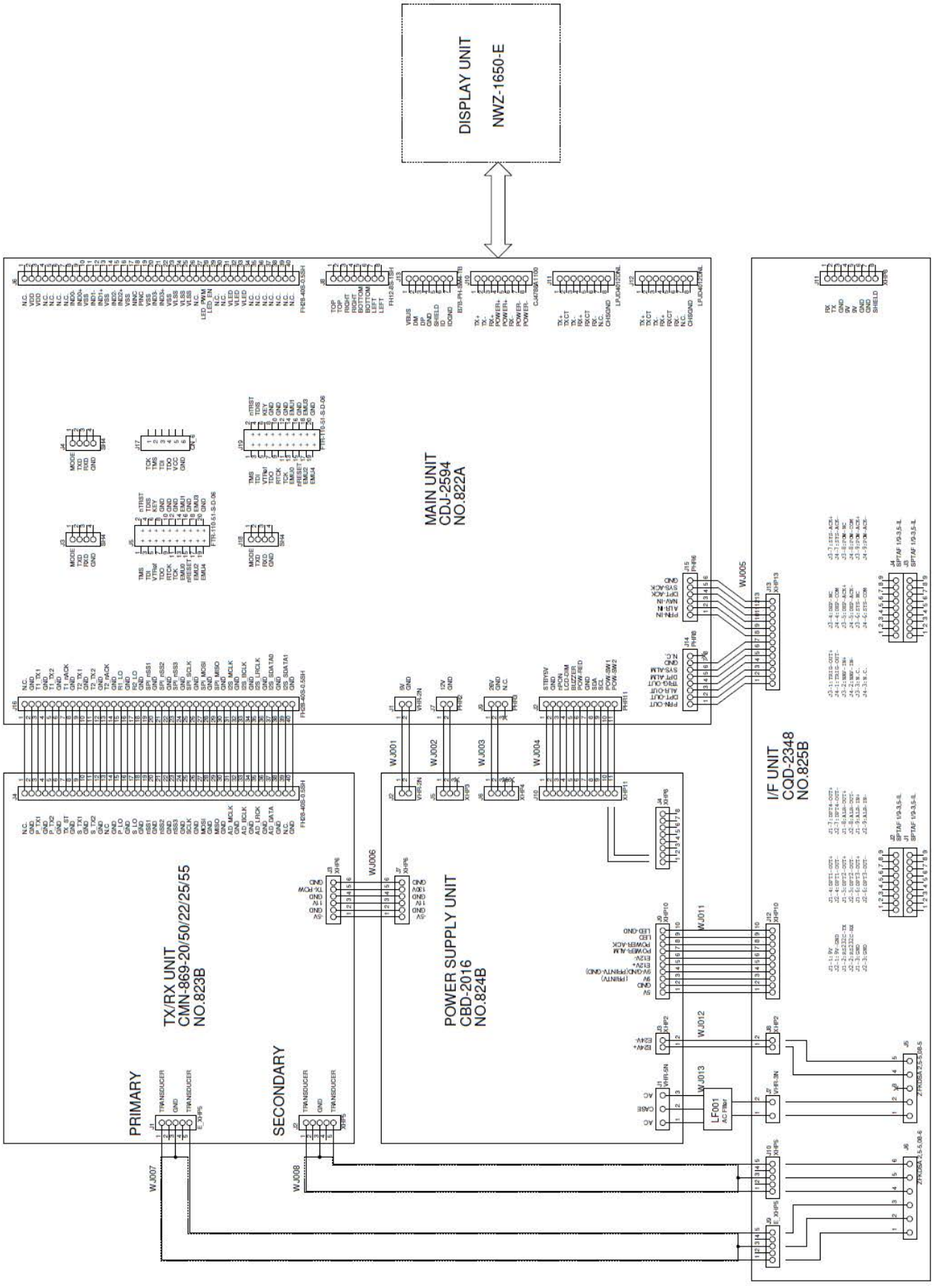

Unit: mm

Mass: 3.5kg

# 1.3 System Configuration



## 1.4 Interconnection Diagram




JFE-400(NQA-4327) inter connection

# Chapter 2 Maintenance and inspection

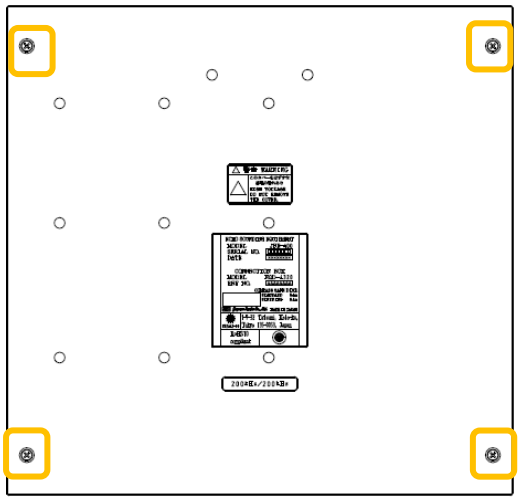
**Before maintenance**

For basic operations, refer to the instruction manual and equipment manual.

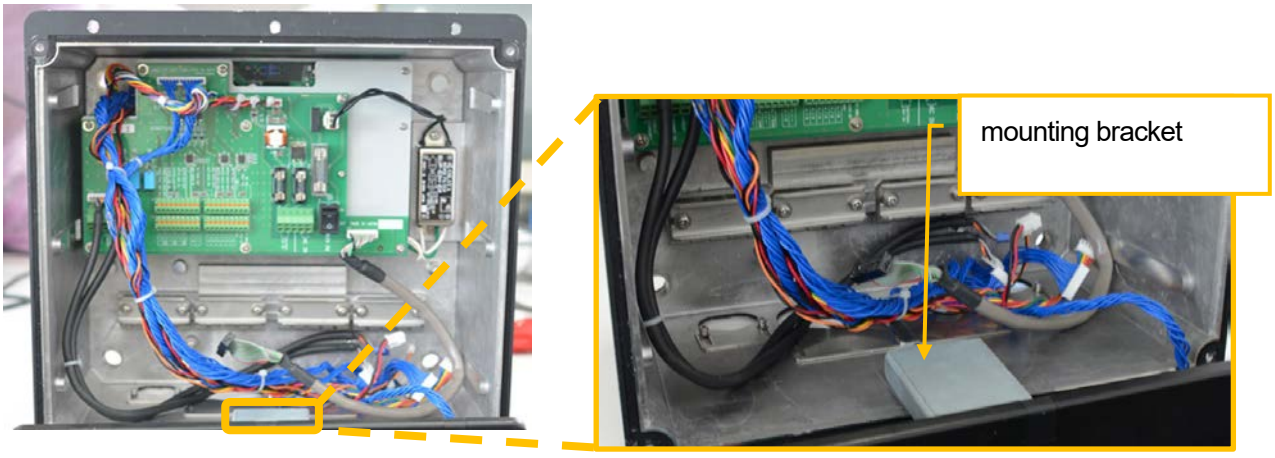
The following work is performed by various maintenance.

●How to open the front cover and main switch to off

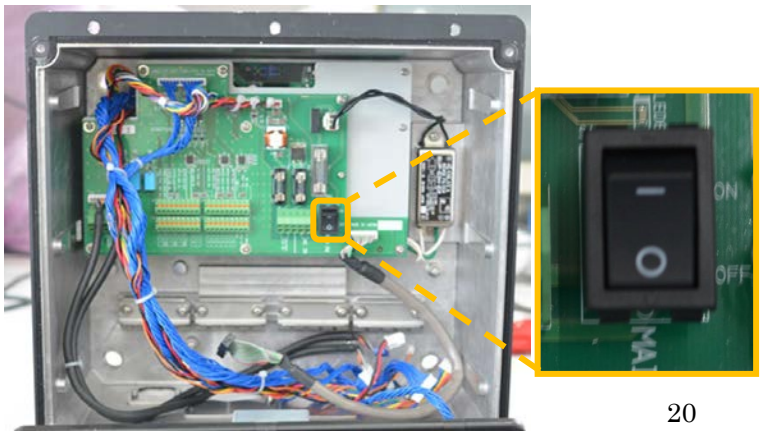
1) Remove the 4 screws (M4) at the four corners of the front of the NQA-4327 and remove the front cover.



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




3) Confirm the SW mounted on Interface unit (CQD-2348) is off.



## 2.1 Basic maintenance

### 2.1.1 Basic maintenance

The following table is the basic maintenance work. Carry out when you visit the ship.

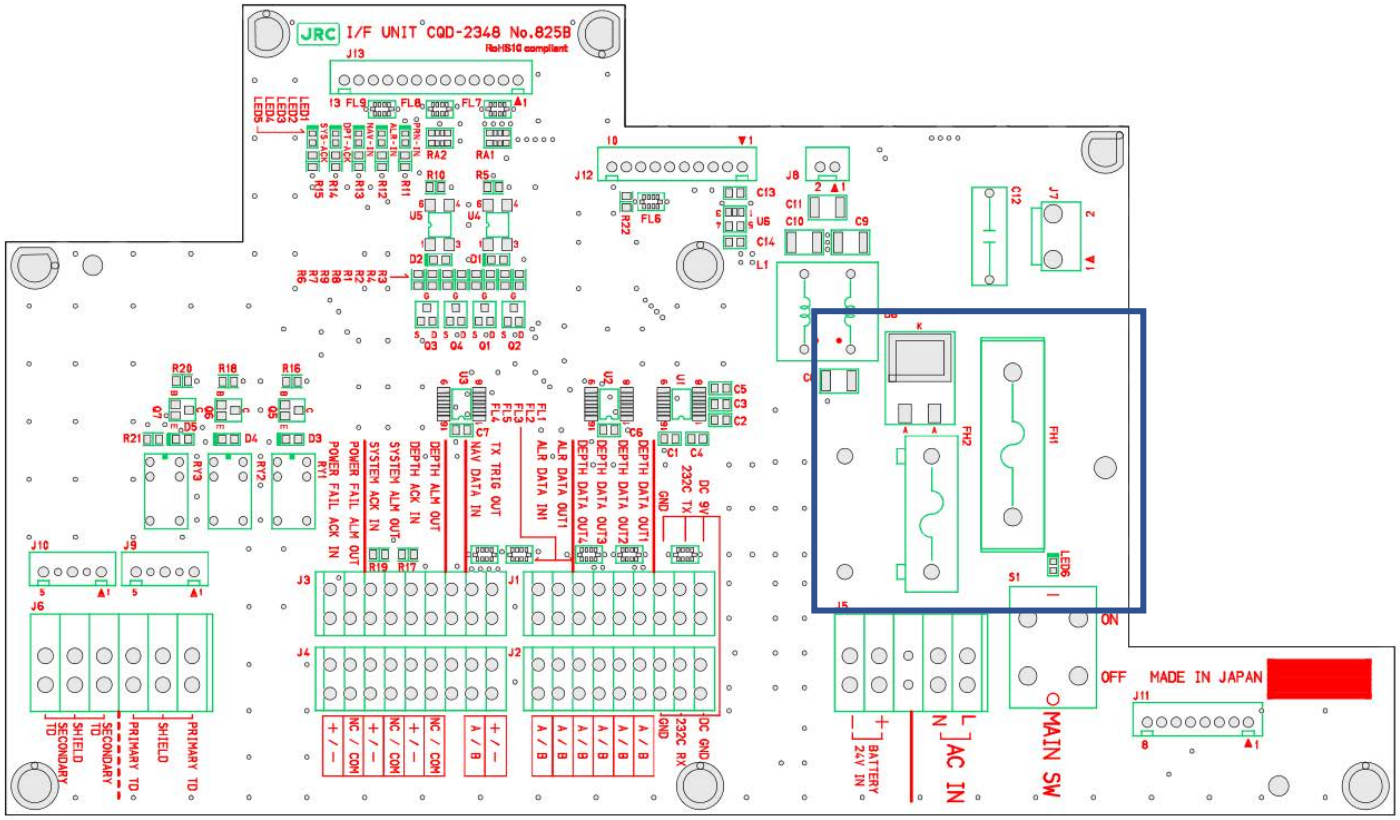
◎Turn off the power supply of equipment when carry out maintenance work.

| No. | Item | Procedure |
|---|---|---|
| 1 | Cleaning | Wipe the display unit and processing unit lightly with a soft, dry cloth to remove dirt.<br>Don't use plastic solvents such as thinner and benzene. |
| 2 | Loose screw, nuts. | Check for loose screws and nuts, and tighten them correctly. |
| 3 | Cable connection | Check the cable connections and connectors between equipment to make sure they are connected securely. |
| 4 | Fuse | When power fuse blows, inspect the cause carefully before replacing.<br>Use a glass tubular fuse (included in spare parts). |
| 5 | Printer Paper (Optional) | When Printer is out of paper, replace printer roll paper. |

### 2.1.2 Replacing Fuses

Exchange the fuse for the one of specification. Exchange it after confirming the cause to which the fuse is blown. Moreover, turn off the main switch of the power supply CQD-2348 when you exchange fuses (Press ○ sign side).

| No. | Model type | Rating | Remarks |
|---|---|---|---|
| FH1 | FGBO-A 250V 2A | 250V 2A | For power supply in this equipment |
| FH2 | MF51NR 250V 0.5 or equivalent | 250V 0.5A | For power supply alert circuit in this equipment |



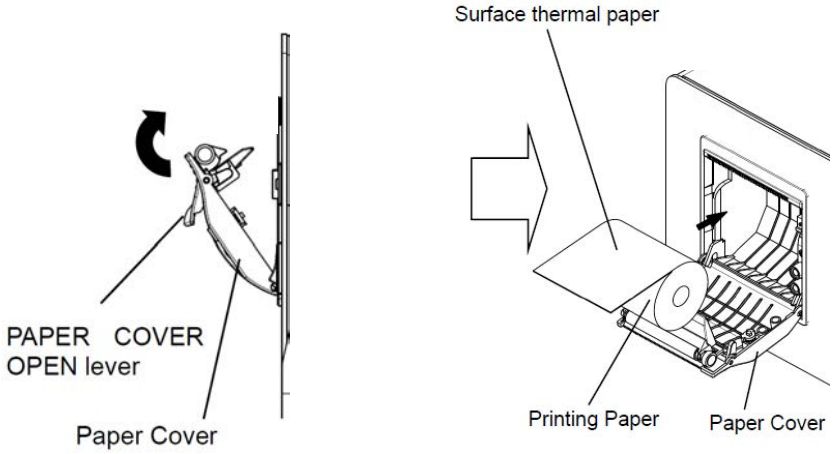
## 2.1.3 Replacing Printer Paper(Option)

**⚠CAUTION**

Be careful not to cut your hand in the blade tip of the paper cutter.

| Name | Model type | Remarks |
|---|---|---|
| Printer paper | H-7ZPJD0384 | TF50KS-E2D for build-in printer |

After turning off the power supply of this equipment, exchange papers. When the printer cover is opened while turning on, the alert of “NO PAPER" sounds.




1) Open the paper cover by pressing the paper cover opening button.

2) Set the paper like the direction of figure.

3) Shut the cover after making the paper tip put out outside of the printer and pushing both ends of the upper paper cover.

Note: A red mark of a paper slip previous notice puts out from 1m remain when the remainder of the paper decreases.

## 2.1.4 Touch Panel Calibration

Touch 



, the calibration screen will be displayed. The  on the screen turns red in the order of top left → top right → bottom left → bottom right → center, so touch them in order.

## 2.1.5 Tightening torques

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

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) |

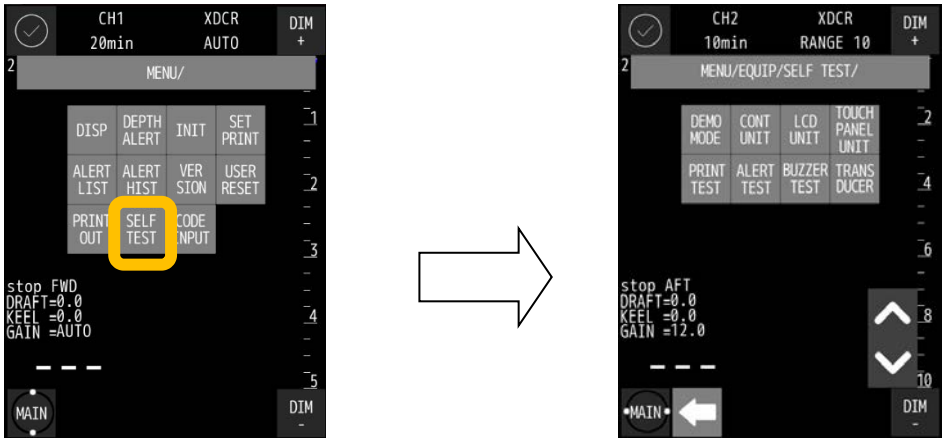
Table1

## 2.2 Diagnosis

### 2.2.1 Self Diagnosis

A self-diagnosis test can be used to check for abnormalities in the display unit and processing unit.

Touch MENU and SELF TEST, self-test menu is displayed.




MENU screen SELF TEST screen

| MENU1 | MENU2 | MENU3 | Contents |
|---|---|---|---|
| SELF TEST | DEMO MODE | | The demo mode setting<br>**OFF**: Switch to normal mode.<br>ON: Switch to demo mode.<br>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.<br>The screen color changes in the order of black red, green, blue, and white.<br>Check all colors are displayed correctly. |
| | TOUCH PANEL UNIT | | Perform the self-test of touch panel.<br>When screen is touched, a green dot will be displayed where touched. |
| | PRINT TEST | | Perform the self-test of printer by printing test pattern.<br>When printing does not start, check the model settings of the printer. |
| | ALERT TEST | ALL | All alerts for which the alert generation setting in EQUIP is ON will be generated in a pseudo manner (refer to JFE-400 Installation manual 10.3.2).<br>**OFF**: Turns off all alert test function.<br>ON: All alerts will be turned on. |
| | | DEPTH ALERT | Test the depth alerts.<br>**OFF**: Turns off the depth alert test function.<br>ON: Depth alert is turned on.<br>To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to JFE-400 Installation manual 10.3.2). |
| | | LOST DEPTH | Test the seabed lost alert.<br>**OFF**: Turns off the seabed lost alert test function.<br>ON: Seabed lost alert is turned on.<br>To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to JFE-400 Installation manual 10.3.2). |
| | | WEAK ECHO TX CH1 | Test the transmit Echo alert (CH1).<br>**OFF**: Turns off the transmit Echo alert (CH1) test function.<br>ON: Transmit Echo alert (CH1) is turned on.<br>To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to JFE-400 Installation manual 10.3.2). |

| MENU1 | MENU2 | MENU3 | Contents |
|---|---|---|---|
| SELF TEST | ALERT TEST | WEAK ECHO TX CH2 | Test the transmit Echo alert (CH2).<br>**OFF**: Turns off the transmit Echo alert (CH2) test function.<br>ON: Transmit Echo alert (CH2) is turned on.<br>To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to JFE-400 Installation manual 10.3.2). |
| | | WEAK ECHO RX CH1 | Test the received Echo alert (CH1).<br>**OFF**: Turns off the received Echo alert (CH1) test function.<br>ON: Received Echo alert (CH1) is turned on.<br>To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to JFE-400 Installation manual 10.3.2). |
| | | WEAK ECHO RX CH2 | Test the received Echo alert (CH2).<br>**OFF**: Turns off the received Echo alert (CH2) test function.<br>ON: Received Echo alert (CH2) is turned on.<br>To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to JFE-400 Installation manual 10.3.2). |
| | | NO PAPER | Test the no paper alert.<br>**OFF**: Turns off the no paper alert test.<br>ON: No paper alert is turned on.<br>To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to JFE-400 Installation manual 10.3.2). |
| | | LOST PRINT | Test the printer alert.<br>**OFF**: Turns off the printer alert test.<br>ON: Printer alert is turned on.<br>To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to JFE-400 Installation manual 10.3.2). |
| | | LOG MEMORY FAIL | Test the log data alert.<br>**OFF**: Turns off the log data alert test.<br>ON: Log data alert is turned on.<br>To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to JFE-400 Installation manual 10.3.2). |
| | | LOST PROC | Test the connection between processing unit and display unit<br>**OFF**: Turns off the LOST PROC alert test.<br>ON: LOST PROC alert is turned on.<br>To use it, it is necessary to turn on alert generation setting in EQUIP menu (refer to JFE-400 Installation manual 10.3.2). |
| | BUZZER TEST | | Check the buzzer.<br>Check (✓) that the buzzer sound. |
| SELF TEST | TRANS DUCER | CH1 | Refer to 2.2.4.1 Measurement of resonance point of frequency using self-test of transducer. |
| | | CH2 | |

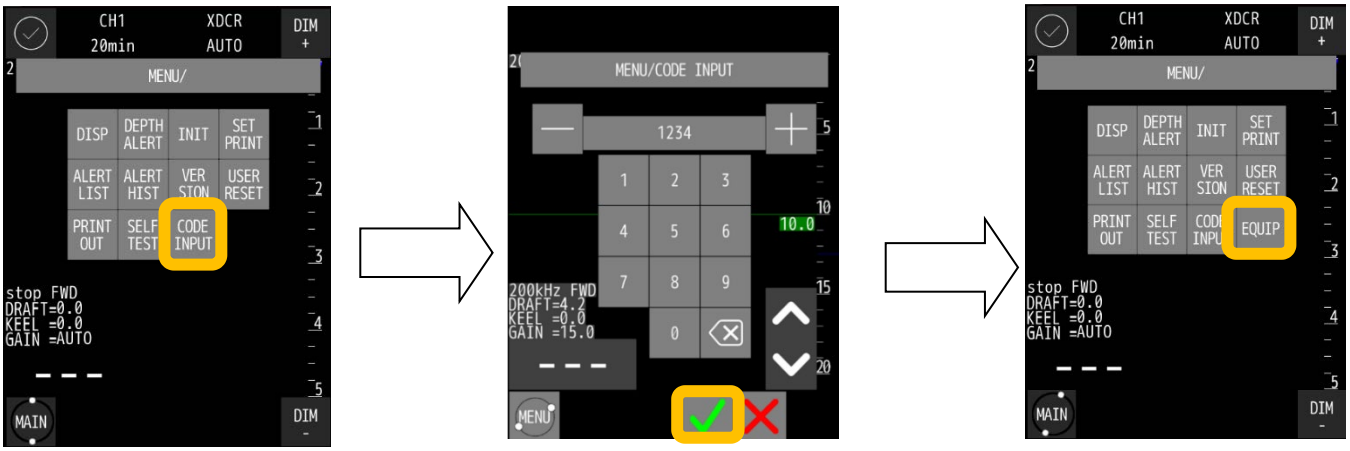
## ⚠ CAUTION

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.

## 2.2.2 Engineer Menu

Engineer setting can be set in the "EQUIP" menu. Normally, EQUIP is not displayed on the MENU screen.

For displaying the "EQUIP", input password “1234” on “CODE INPUT”.

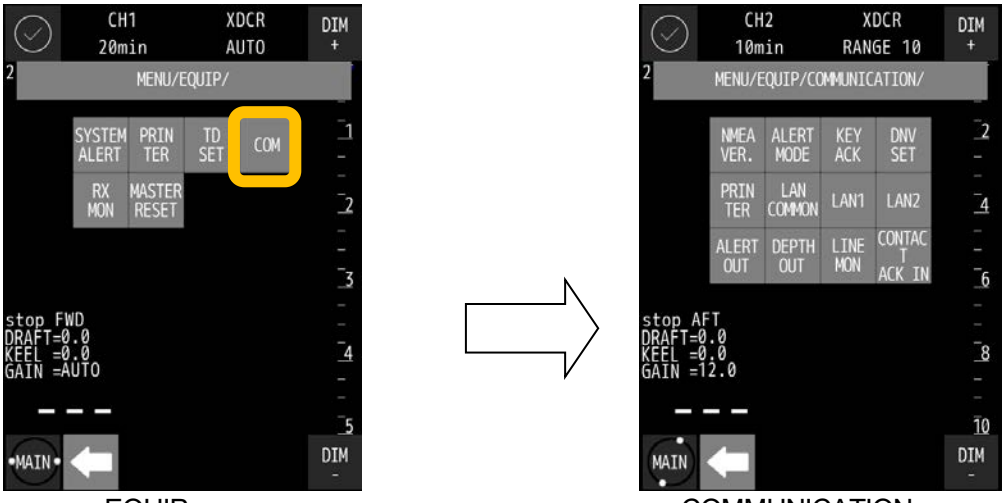



MENU screen　　Code input screen　　EQUIP menu is displayed

In this manual, only items related to after-sales service are described. Detail of other engineer menu is described in installation manual.

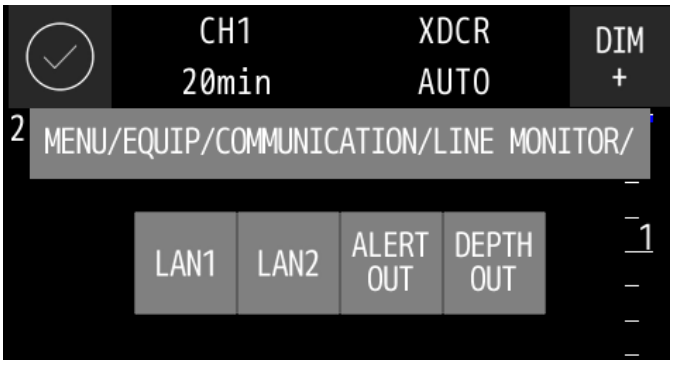
## 2.2.3 Line Monitor

1) Touch COM on EQUIP MENU and communication screen will be displayed.



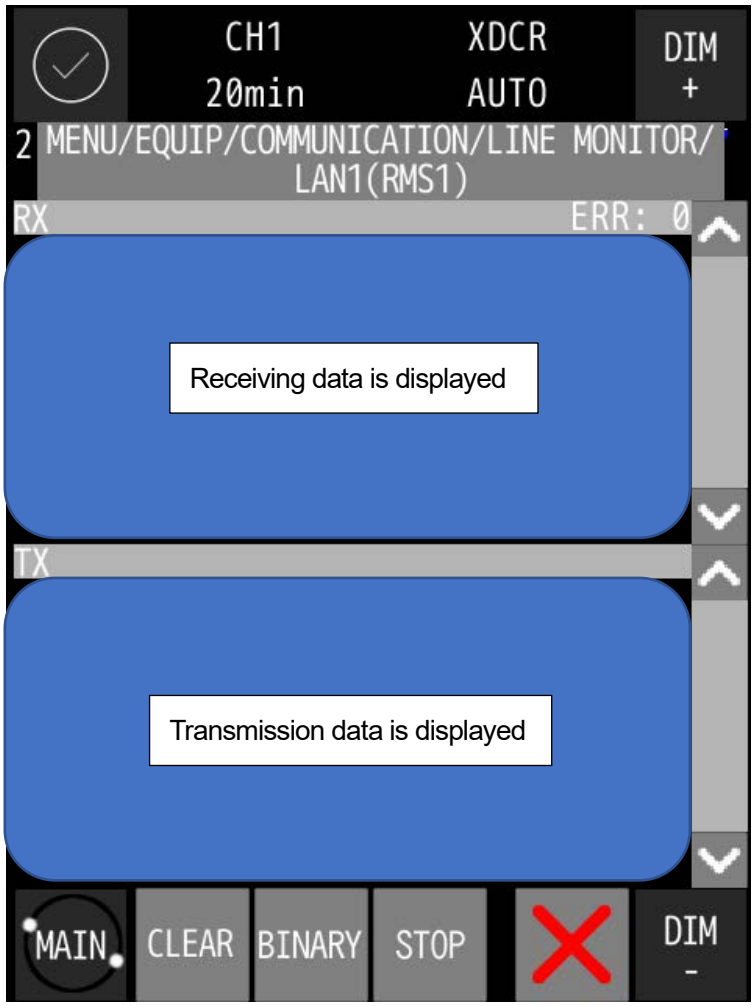

EQUIP screen　　COMMUNICATION screen

2) Touch LINE MON button, and select the port to want to check.



| Signal name | Terminal | Description |
|---|---|---|
| LAN1 | J11 | The transmission / reception signal of LAN1 can be checked. |
| LAN2 | J12 | The transmission / reception signal of LAN2 can be checked. |
| ALERT OUT | J2-15/16(TX)<br>J2-17/18(RX) | The transmission / reception of alert data can be checked. |
| DEPTH OUT | J2-7/8,9/10,11/12,13/14(TX)<br>J4-3/4(RX) | The transmission of depth out and reception of GPS data can be checked. |

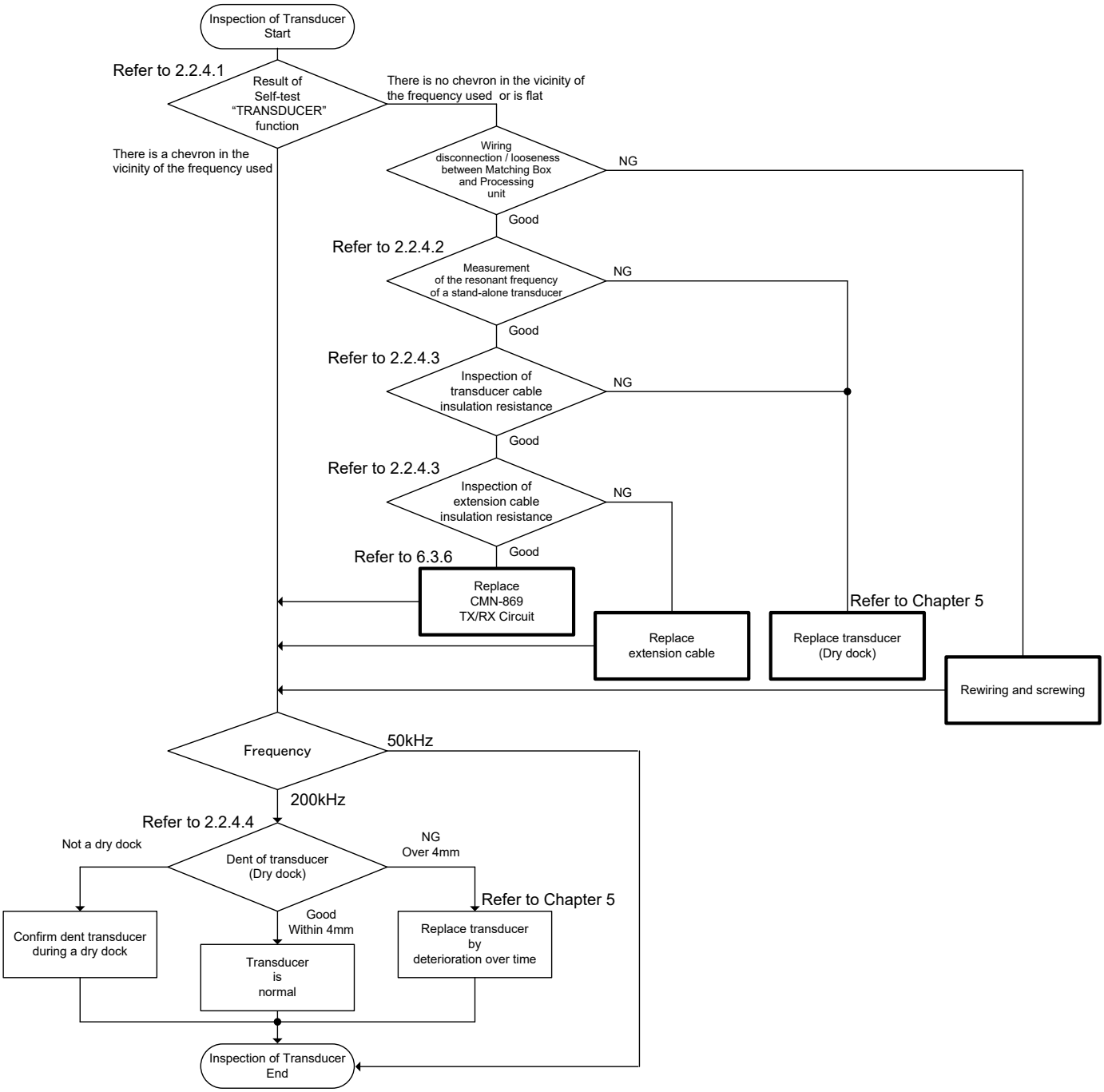
3) Check transmission and receiving data.




CLEAR : Clear the line monitor data
BINARY : display using binary data
ASCII : When setting is binary data, this icon is displayed.
Display using ASCII data
STOP : pause the line monitor
× : Stops the line monitor function and returns to the previous screen.

## 2.2.4 Inspection of Transducer

Follow the workflow below to inspect and determine faults for transducer.




The inspection method of the transducer is as follows.

a) Measurement of resonance point of frequency using Self-test of TRANSDUCER function

b) Measurement of resonance frequency using a measuring instrument

c) Measurement of insulation resistance using a measuring instrument

d) Measurement of dent value using a vernier caliper (Check deterioration over time about the 200kHz of transducer)

The failure of the transducer is comprehensively determined from above four methods.

About dent of transducer

Transducer of 200kHz would be dented by deterioration over time. When the deterioration tends to dent more, the transducer might be come into transducer tank, or sounding failure might be occurred by the air bubble staying.

To avoid the denting trouble, measure the transducer dent value on dry dock.

Preparation Tools

| Preparation Tools | Method | Q'ty | Remarks |
|---|---|---|---|
| Phillips screwdriver (For M4) | b) c) | 1 | |
| Flathead screwdriver(No.5) | b) c) | 1 | When AW-154F/-50 is installed |
| Transducer checker (e.g.TT-2, TT-2D) | b) | 1 | Either transducer checker or antenna analyzer shall be prepared |
| Antenna analyzer AA-30 | b) | 1 | |
| Flathead screwdriver (Width 3.5 × Thick 0.5mm recommended) | c) | 1 | Used to disconnect the wiring transducer extension cable to the processing unit |
| Tester | c) | 1 | |
| more than 15cm length straight ruler | d) | 1 | For reference of denting |
| Vernier caliper | d) | 1 | For dent measure |
| Camera (Smart phone available) | d) | 1 | For picture recording |

2.2.4.1 Measurement of resonance point of frequency using self-test of transducer

**⚠ CAUTION**

The sounding function cannot be used while Self-test of TRANSDUCER function is performed.

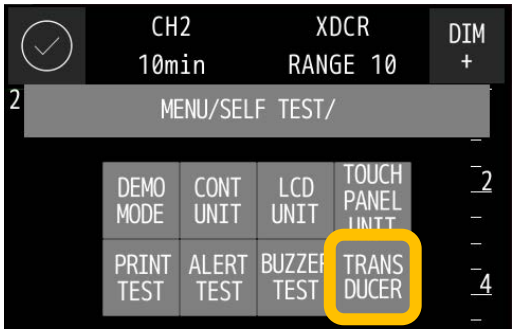
Do not use this function during voyage.

1) Touch 

and 

, Self-test menut will be displayed. Select and touch 

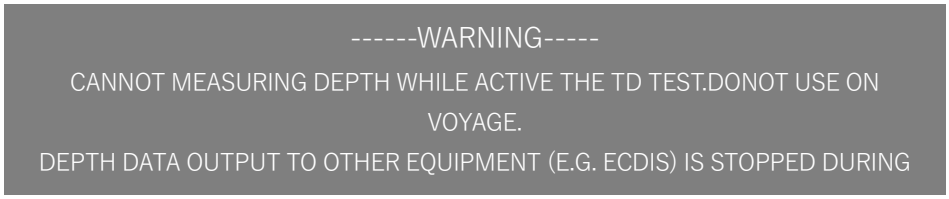
button.




Self-test screen

2) Select CH on Self-test of TRANSDUCER screen.

3) Warning window will be displayed. Don't use during voyage. Touch  button to perform transducer checking.

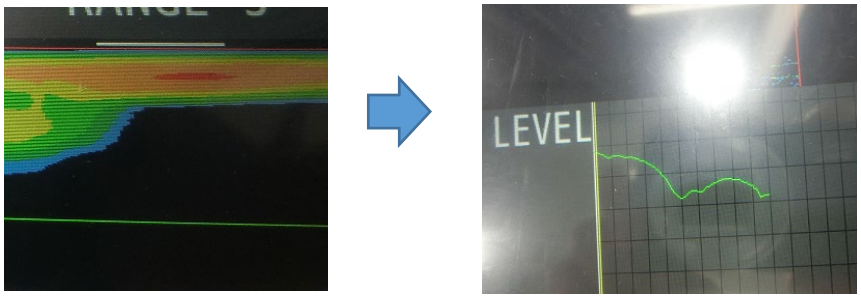



4) The measurement will start. The measurement will take a few minutes.

5) When there is a chevron in the vicinity of the frequency used after checking the waveform, the operation of transducer is normal. When there is no chevron in the vicinity of the frequency used after checking the waveform or is flat, the transducer may be defective.

●Good Product


●Defective Product




5) After checking, when transducer is normal, go to 2.2.4.4 Measurement of dent value using a vernier caliper. However, When the ship does not stay in dry dock, the dent cannot be measured, so finish the work and measure dent in the next dry dock.

When t there is no chevron in the vicinity of the frequency used after checking the waveform or is flat, investigate the cause of the failure according to the workflow.

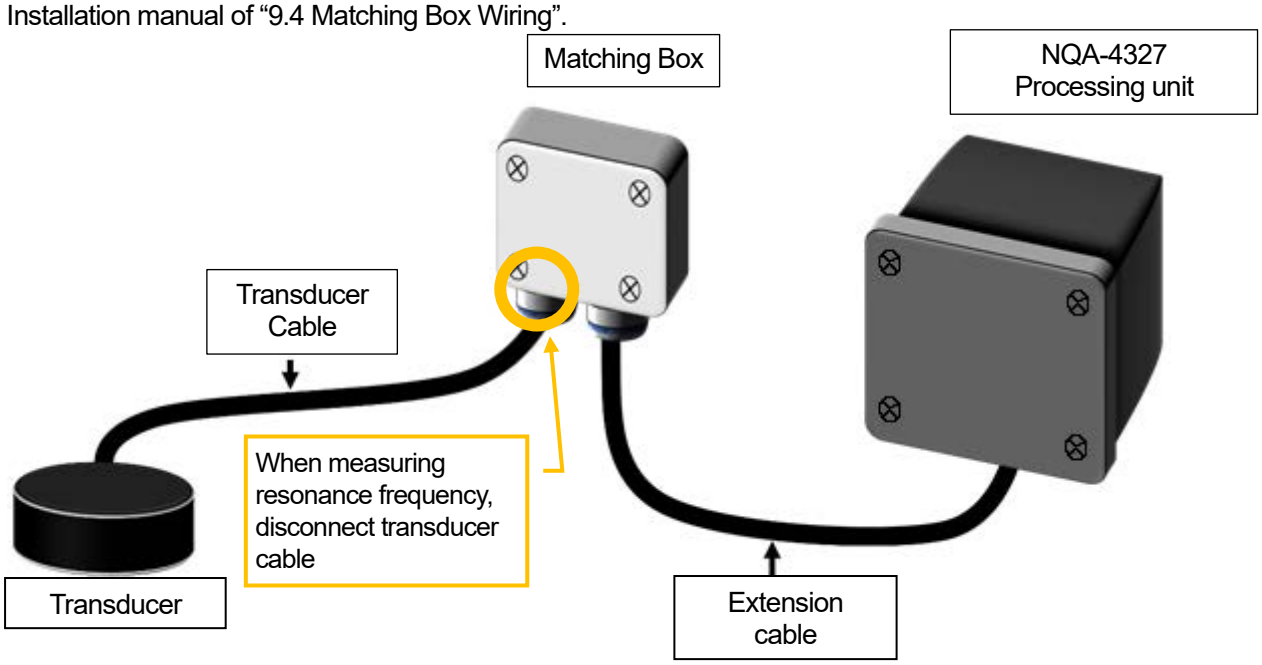
Before implementing Section 2.2.4.2, be sure to check the transducer wiring of the matching box and processing unit according to the installation manual.

2.2.4.2 Measurement of resonance frequency using a measuring instrument

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 checker (TT-2/TT-2D)

1) Remove the transducer cable from the terminal of the matching box. To remove the cable, refer to JFE-400 Installation manual of "9.4 Matching Box Wiring".




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.

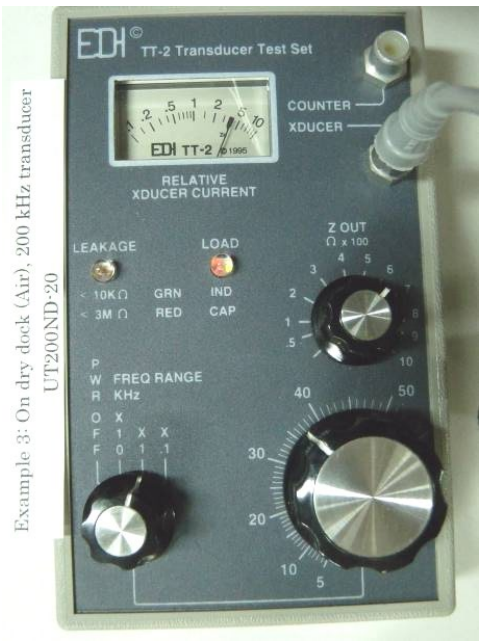
Measure example1: 50kHz transducer on dry dock (Air), UT50MD-40


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

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

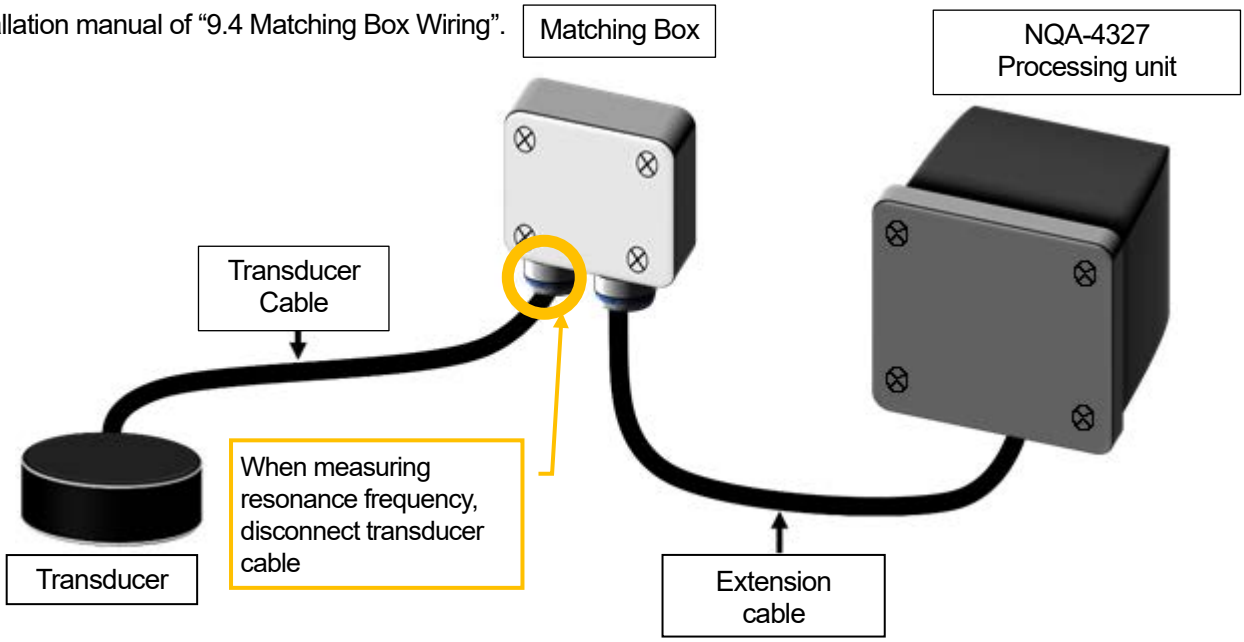

**200 kHz/ 50 ohm**

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

After checking, when resonance frequency is normal, go to 2.2.4.3 Measurement of insulation resistance using a measuring instrument. When the result of resonance point is NG, replacing the transducer is needed. Refer to chapter5.

(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 JFE-400 Installation manual of “9.4 Matching Box Wiring”.

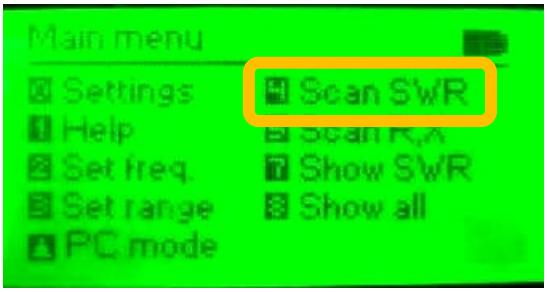



2) Refer to the instruction manual of the antenna analyzer, check the operation method.

*Note: The AA-30 cannot withstand high voltage input. Before connecting the transducer cable, short the between white-black of the transducer cable for discharge.

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.

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

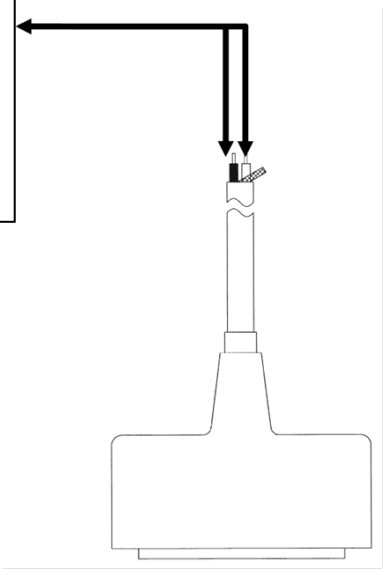
Antenna analyzer (AA-30)

Specified value of the resonance frequency

Freq=200kHz : 200kHz±10kHz

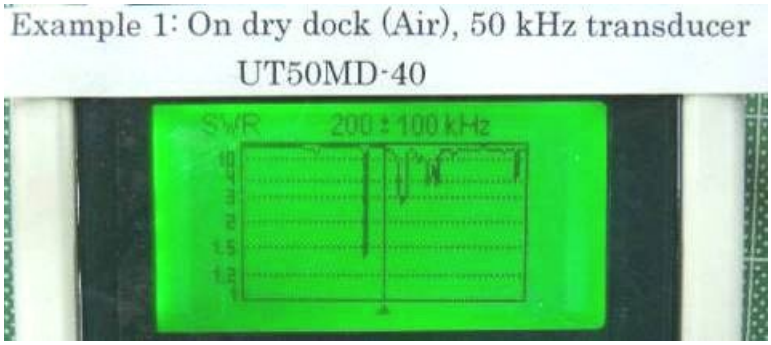
Freq=50kHz ： 50kHz±10kHz

(4 times 50kHz±10kHz)

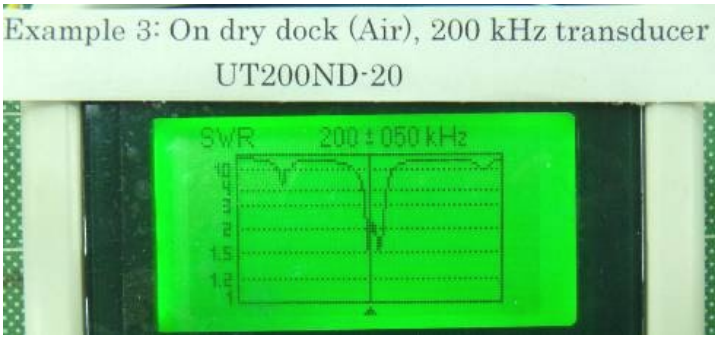


6) When the transducer is normal, resonance is as follows.

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




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




//Criteria//

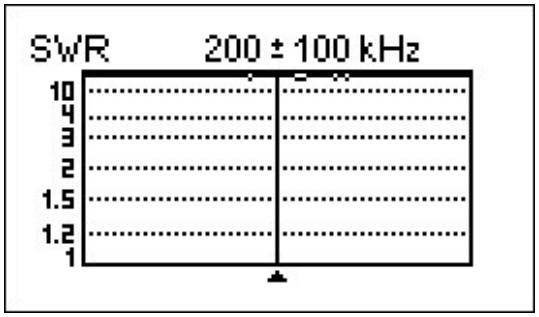
NG

-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)

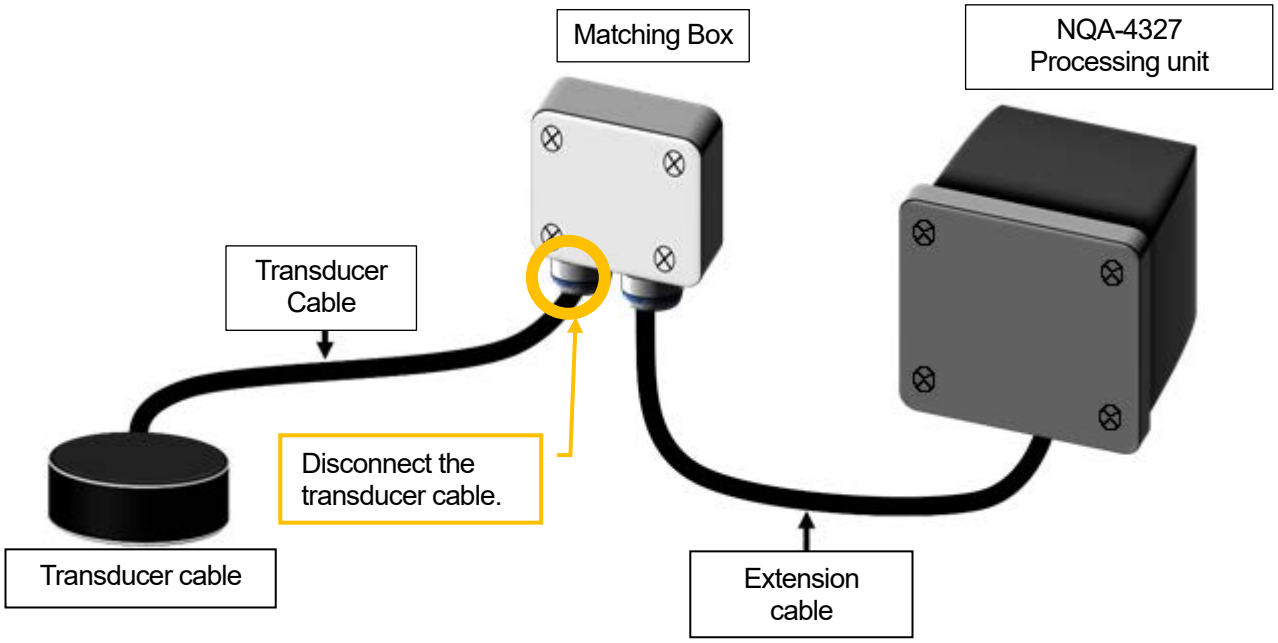


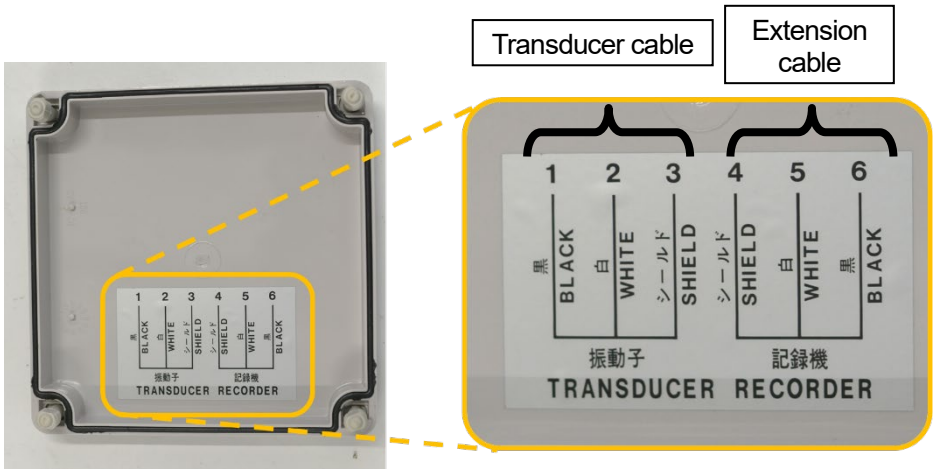

After checking, when resonance frequency is normal, go to 2.2.4.3 Measurement of insulation resistance using a measuring instrument. When the result of resonance point is NG, replacing transducer is needed. Refer to chapter5.

2.2.4.3 Measurement of insulation resistance using a measuring instrument

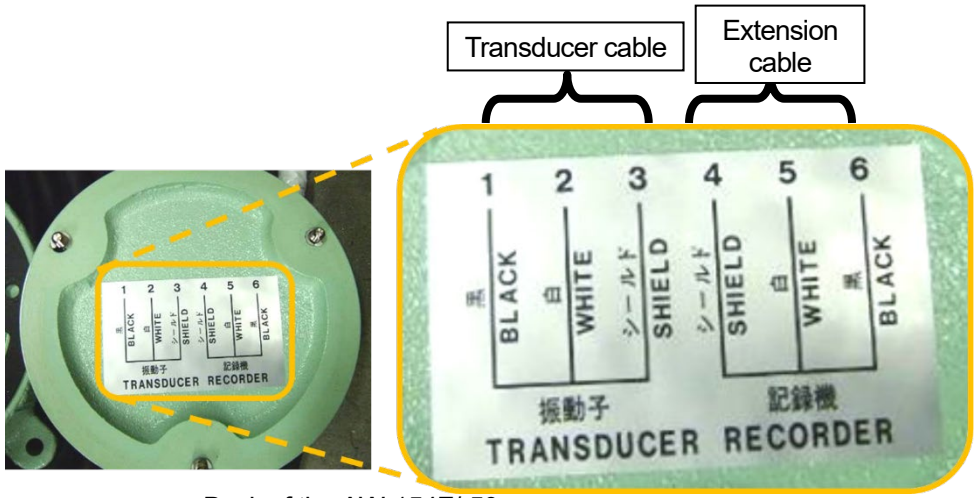
(1) Measurement insulation resistance of the transducer

1) Disconnect transducer cable from terminal of the matching box. Wiring diagram is shown the back of the matching box cover. refer to JFE-400 Installation manual of “9.4 Matching Box Wiring”.



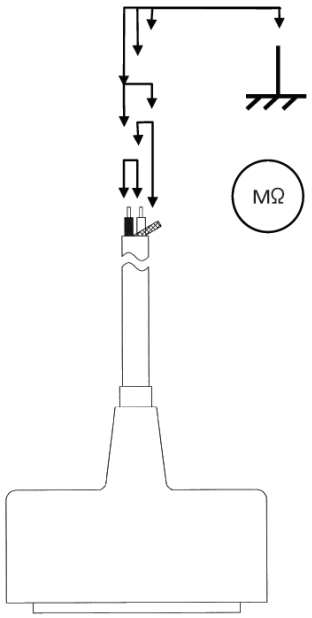

Back of the NQD-2597/2598 cover




Back of the AW-154F/-50 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 result | |
|---|---|---|---|
| Measurement point | Specified value | 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 |



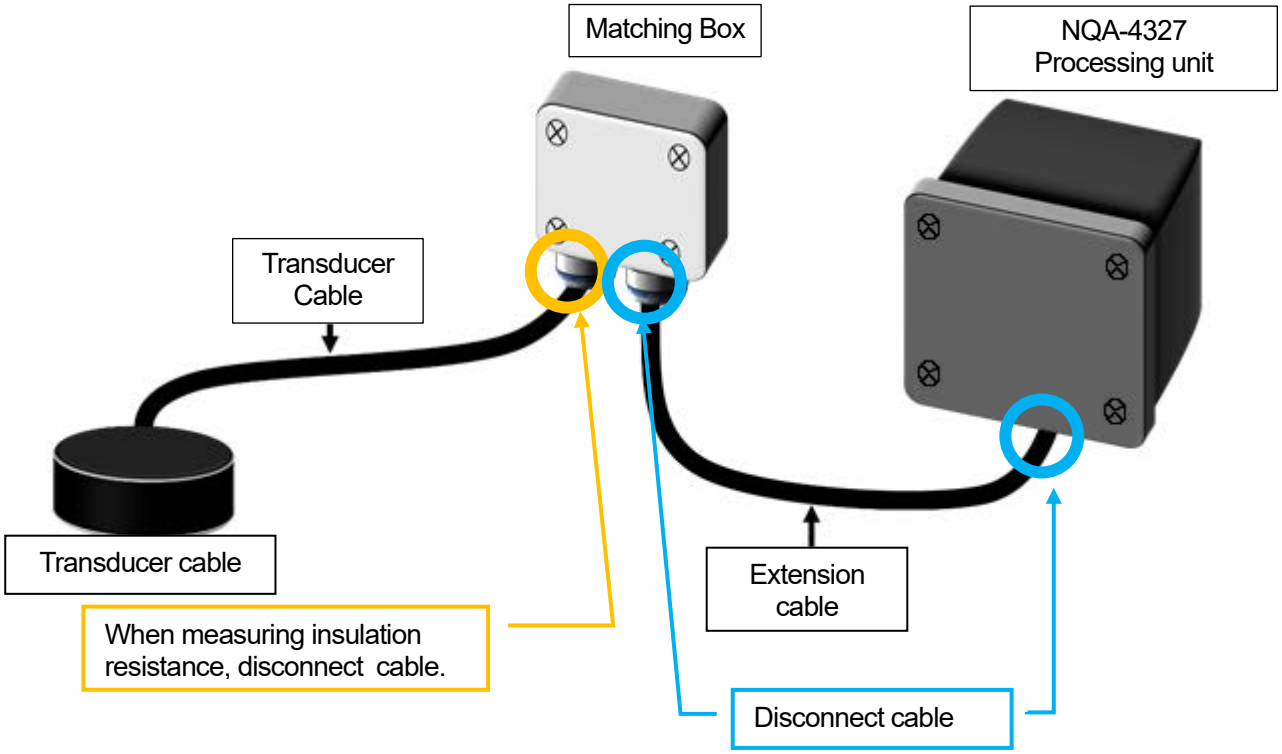

3) When the insulation resistance is 10MΩ or more, the transducer insulation is normal. When the insulation resistance is less than 10MΩ, the transducer insulation is deteriorating. Replace the cable during drydock.

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 JFE-400 Installation manual of “9.4 Matching Box Wiring” 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 result | |
|---|---|---|---|
| Measurement point | Specified value | 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) 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, if 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 2.5mm2). 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.

| | | Measurement result | |
|---|---|---|---|
| Extension cable length | Specified value | 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 |

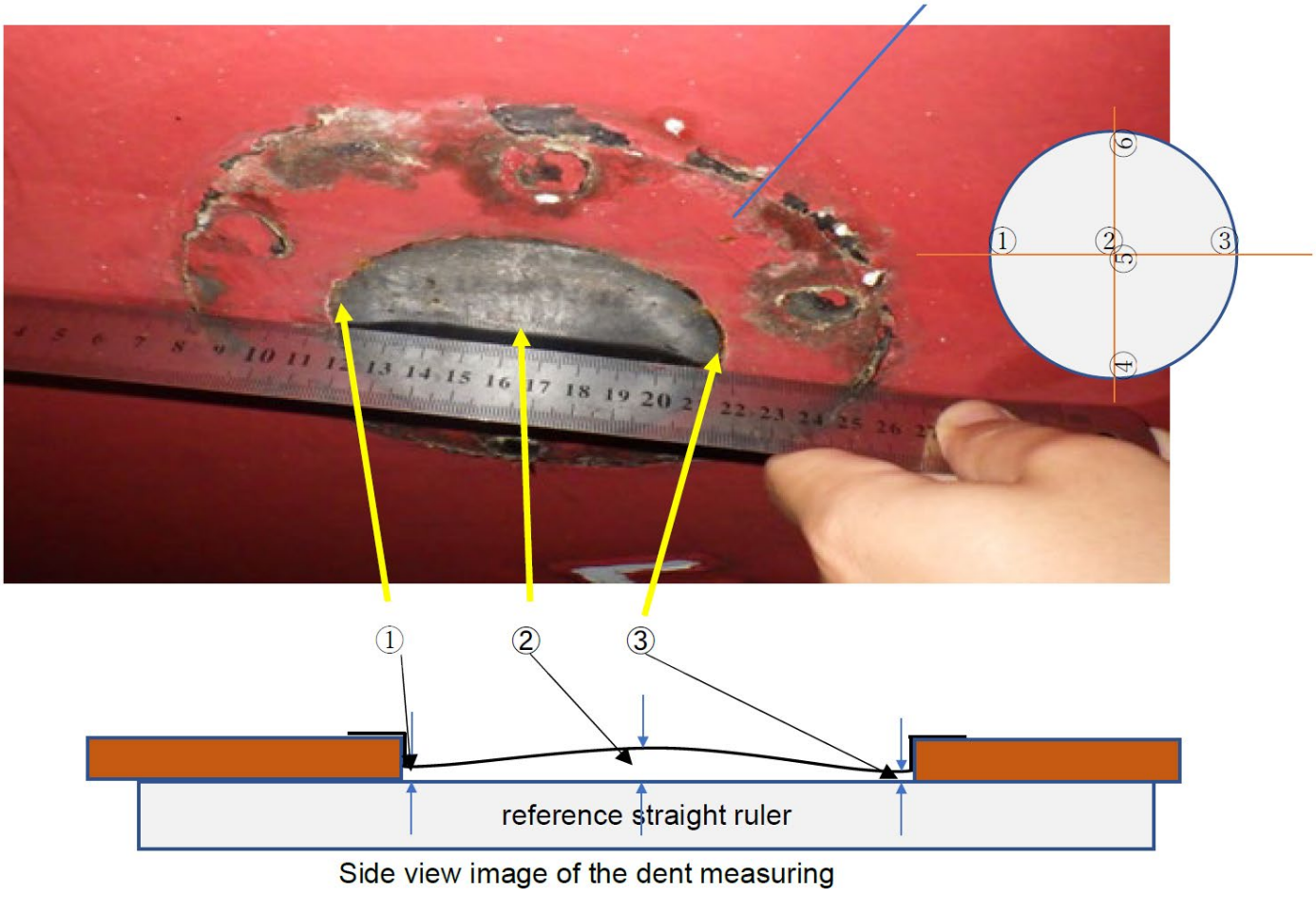
After checking, when insulation resistance is normal, The CMN-869 TX/RX board may be defective. Replace the CMN-869 TX/RX. Be sure to return the replaced board to JRC marine service department. When the insulation resistance is NG, replace transducer or extension cable. In either replacing case, follow the workflow and inspect the transducer for deterioration over time.

2.2.4.4 Measurement of dent value using a vernier caliper

Measure the 200kHz echo sounder transducer dent value from outside of the vessel's hull on dry dock inspection. When dent value exceeds 4mm, replacing transducer is needed.

1) Go down to outside of the vessel hull over 12 hours after dry dock.
2) To go down the vessel hull, ask the permission of the shipyard.
3) Go to the installed position of 200kHz transducer
4) Set the reference straight ruler to the center of transducer mounting plate.

Avoid rough painted areas when using a ruler.




Side view image of the dent measuring

6) Measure dent value by vernier caliper for six point.
   ① Edge of the transducer
   ② Center of the transducer
   ③ Another side edge of transducer
7) 90 degree rotate the reference straight ruler.
   ④ Edge of the transducer
   ⑤ Center of the transducer
   ⑥ Another side edge of transducer

8) Take photos of measuring and wright dent values to check sheet.

**Echo Sounder transducer of 200kHz checking result**

Please copy and use this page.

1 Result and judgment

Vessel name: _____

Information: IMO No. _____ GT: _____

Length: _____ m Width: _____ m Draft: _____ m

Dry docked: Day/Month/Year / / / Hour Min.

Checked: Day/Month/Year / / / Hour Min.

Checked by: _____

| | Result | |
|---|---|---|
| | Dent Value (mm) | Judgement |
| ① edge | | OK/NG |
| ② center | | OK/NG |
| ③ edge | | OK/NG |
| ④ edge | | OK/NG |
| ⑤ center | | OK/NG |
| ⑥ edge | | OK/NG |

Criterion: Dent value exceeds 4.0mm. 0 to 4.0mm: OK, 4.1mm or more: NG

When one or more points exceeds the criterion, transducer must change.

2 Photo attach

Wright dent values and judgment to the check sheet. When result is NG, contact JRC marine service department and send this report.

## 2.3 Trouble shooting

The table below shows the principal symptom, the cause, and measurements. As a result, request the repair to our company or our agency when it is not possible to recover to normal operational condition

| Symptom | Cause | Measurements |
|---|---|---|
| The screen doesn't appear even if power switch is pressed. | The breaker of AC100-230V of the ship is "OFF". | Make the breaker of AC100-230V of the ship "ON". |
| | The main switch in processing unit is off | Check this switch and turn on. |
| | The display unit is faulty. | Contact us or your distributor. |
| | The processing unit is faulty. | Contact us or your distributor. |
| | Low brightness | brighten a screen |
| | The disconnection of the power supply AC inboard cable or the screw in the connecting terminal has loosened. | Repair the cable.<br>Tighten the screw in the connecting terminal surely. |
| | The network cable between Display unit and processing unit is not connected. | Connect CFQ-7540 cable |
| | The fuse of NQA-4327 is blown out | Replace fuses. |
| The brightness is not changed | The display unit is faulty. | Contact us or your distributor. |
| | Software is not working properly | |
| No buzzer sound and key-tone is emitted. | The display unit is faulty. | Contact us or your distributor. |
| | Software is not working properly | |
| | Alert and key buzzer settings are off. | Contact us or your distributor because setting menu is for service engineer. |
| The depth value is not displayed.<br>Only the oscillation line is displayed in the image of a standard mode. | Actual sea bottom is deeper than the setting of range. (out of range) | Make the range setting AUTO. or, change the range setting manually and adjust it. |
| | The transducer cable has been disconnected. | Repair the cable. |
| The depth value is not displayed.<br>The sea bottom echo is slightly recorded by the image of a standard mode. | The sensitivity setting is too weak. | Make the sensitivity setting AUTO. or, raise sensitivity. |
| | Sea bottom is mud (weak stratum). | Make the sensitivity setting AUTO. or, raise sensitivity. |
| | The oyster and the barnacle adhere to the transducer. | Remove the adhesion thing of the transducer at dry-dock. |
| | The cable disconnection of the transducer or the screw in the connecting terminal has loosened. | Check whether for be disconnected of the one side of the transducer.<br>Tighten the screw in the connecting terminal surely. |
| The depth value is not correct. | A set value of the draft adjustment is not correct. | Set a correct value. |
| The depth value is not correct. In the image of a standard mode, the record mistaken in a middle layer as sea bottom appears. | The sensitivity setting is too strong. | It is recorded to garbage in water, dirt, and plankton's layers that sensitivity is too high, and recognizes sea bottom this.<br>Make the sensitivity setting AUTO.<br>Or, lower sensitivity. |
| There are a lot of records of the noise. | Noise generated from dynamo. | Check the dynamo. |
| | The main unit earth is imperfect. | Check the main unit earth. |
| | External interference noise. | The influence of the underwater sonic prospecting equipment of another ship has been received.<br>This symptom is not a trouble of this equipment and originates in an external factor. |
| The echo displayed on the screen becomes all cyan. | Transmission is stopped. | Turn off the power of the display processing unit and restart it.<br>When the problem persists, contact us or distributor. |

# Chapter 3 Software Update

## 3.1 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/Englsh) |
| LAN Cable | 1 | |

Installing following software are needed.

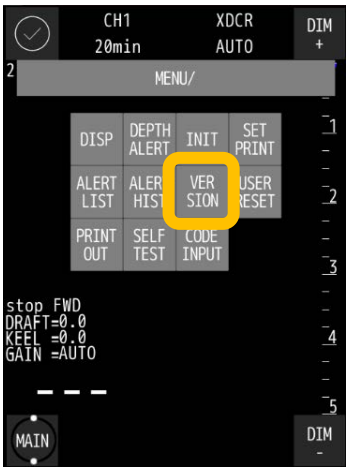
| Software | Ver. | Remarks |
|---|---|---|
| .Net Framework | 4.5 or later | Software available from Microsoft's HP.<br>Install in advance.。 |
| jrcupdatetool.exe | 1.00.000 or later | |

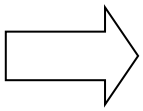
## 3.2 Confirmation of current software version

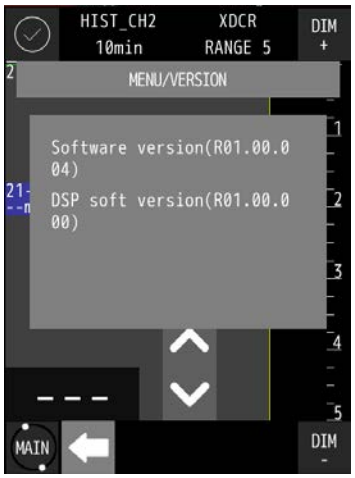
Touch 

and 

, internal software version and DSP version are displayed. After confirming, touch  .



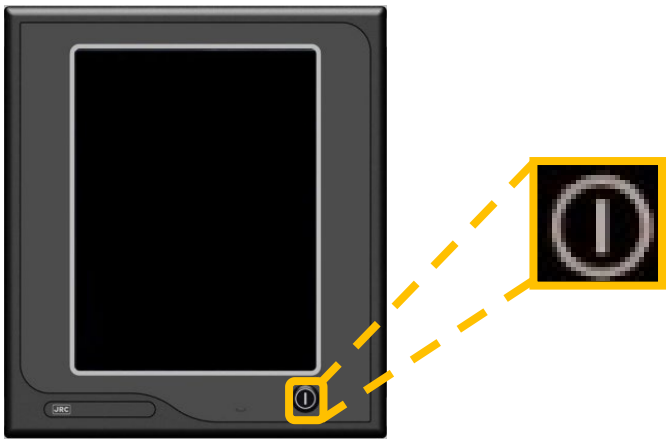






MENU screen　　Version screen

## 3.3 Procedure of software update

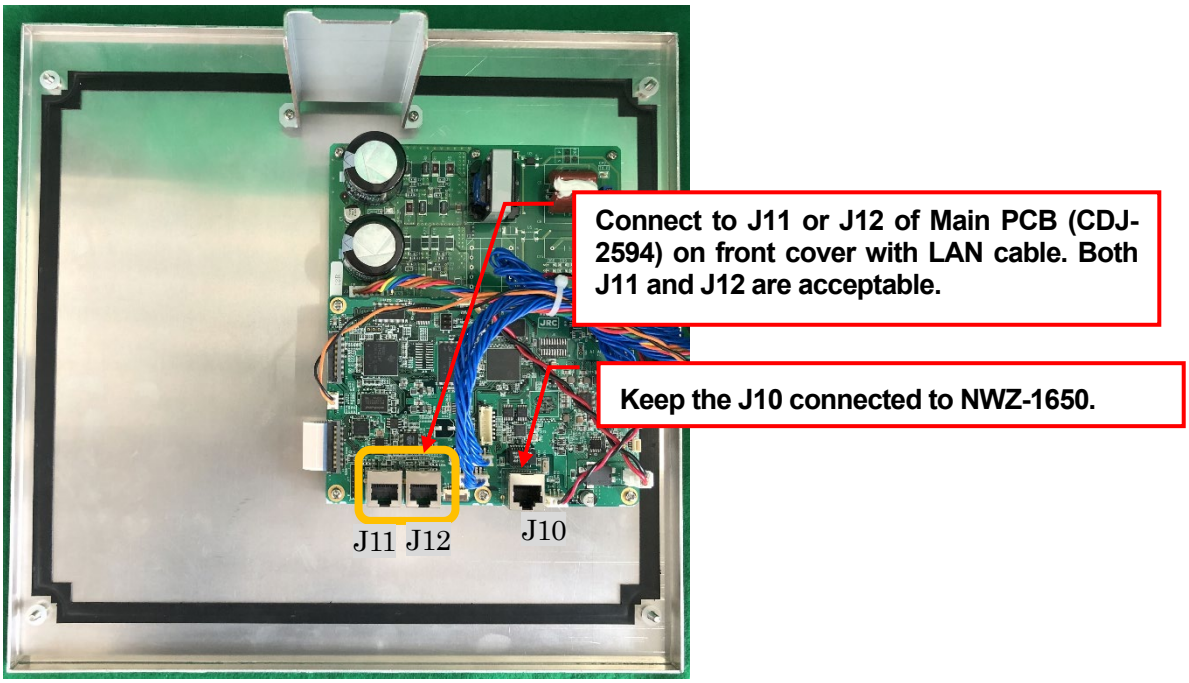
1) Turn off the power: Press the power switch  at the bottom of the display unit.



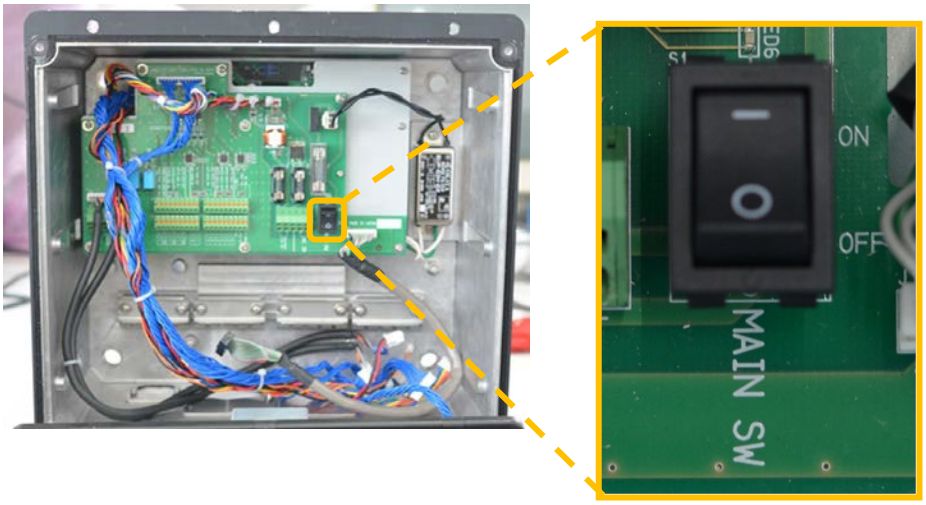
2) Refer to "Before maintenance" in chapter2. Remove the front panel and turn off the main switch.

3) 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.

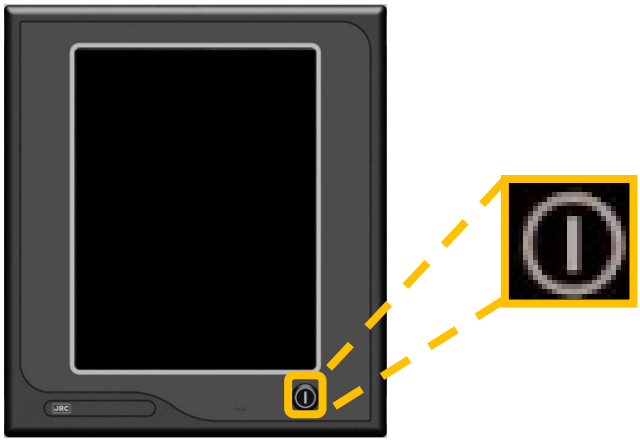
Note: When the LAN cable is already wired, temporarily disconnect and change it to the LAN cable that connects to the PC.




4) Turn on main SW mounted on I/F PCB(CQD-2348) in rear case.




5) Press the power switch at the bottom of the processing unit to start up.

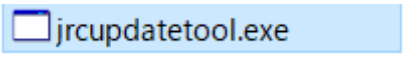


## 3.4 Procedure of execute update tool

**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.

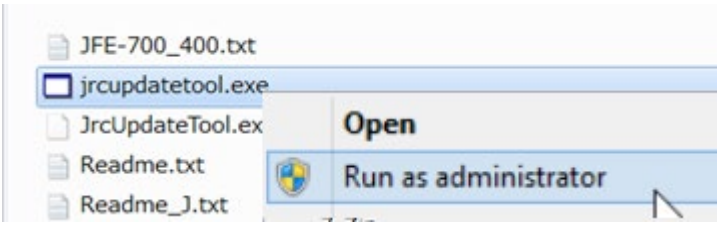


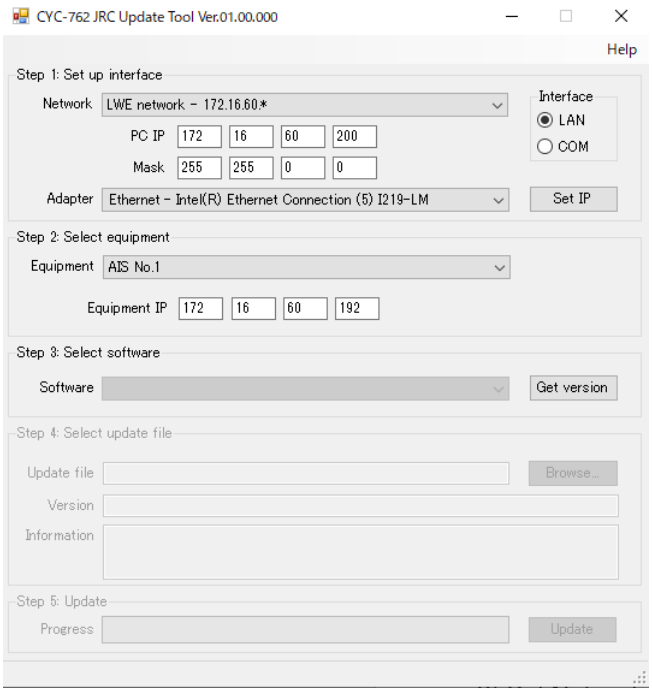

Procedure for starting with administrator

(I) Log in to Windows as an administrator.

(II)Right-click "jrcupdatetoo.exe".

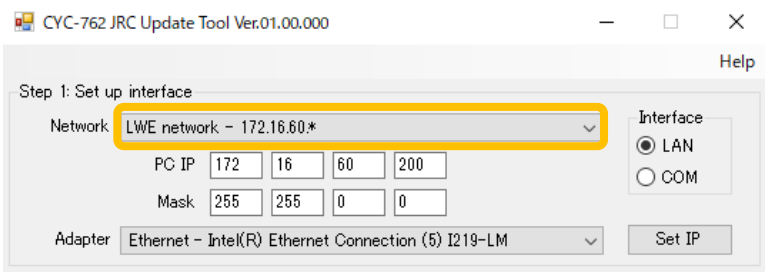
(III)Left-click "Run as administrator".



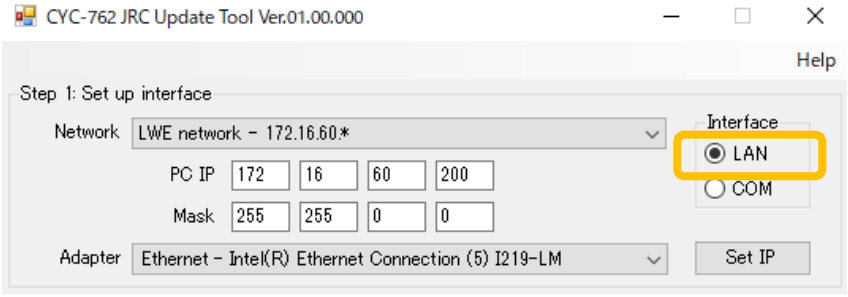




JRC Update Tool

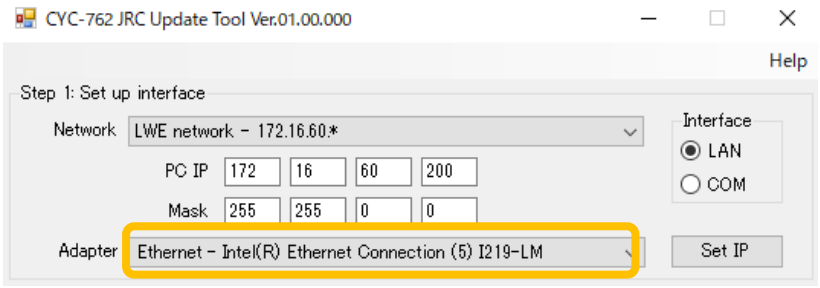
2) Set Network to "LWE network – 172.16.60. *"in "Step1: Set up interface".



3) Set Interface to "LAN" in "Step1: Set up interface".

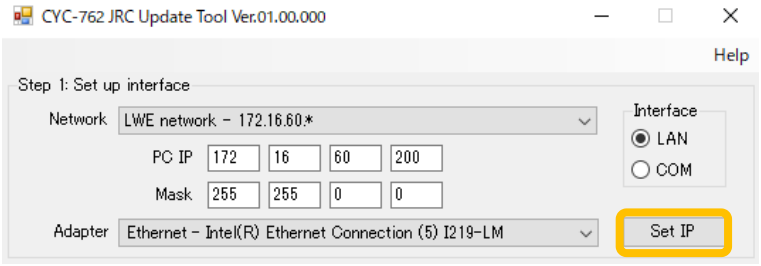



4) Set Adapter to adapter connected to echo sounder in "Step1: Set up interface".




This adapter is example

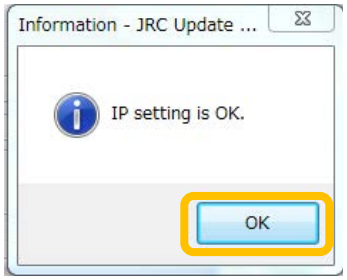
5) Press “Set IP” button in Step1: Set up interface



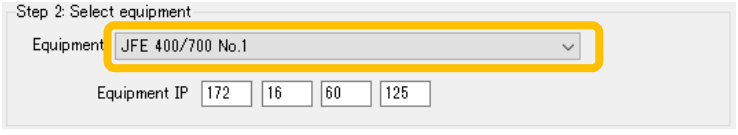

Note: When press "Set IP", the IP address will be set automatically to connect echo sounder.

When press "Recovery IP", it will return to your previous IP address setting.

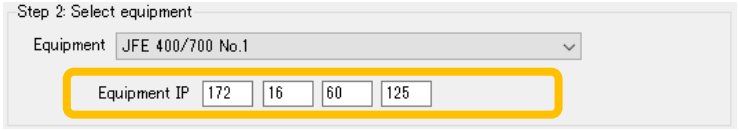
6) Press OK button when 「IP setting is OK」 is displayed.



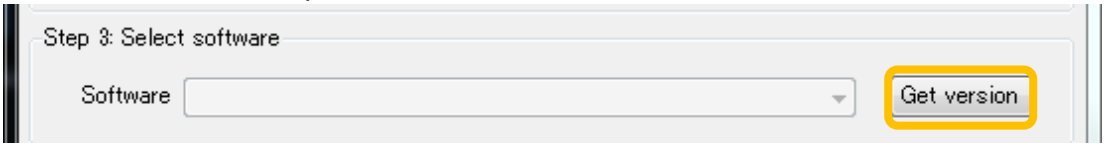

7) Select “JFE 400/700 No.1” in “Step2：Select equipment” of Equipment.



8) Confirm Equipment IP is 172.16.60.125 in “Step2：Select equipment”.

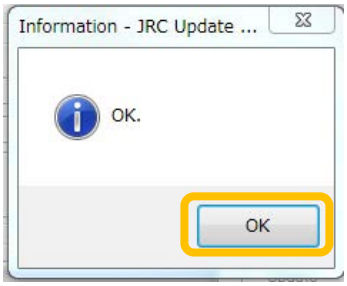



9）Press “Get version” in “Step3：Select software”.

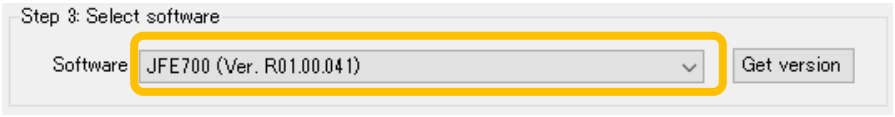



Note: When "Get version" function fails, refer to 3.5 Software update with Manual IP Settings.

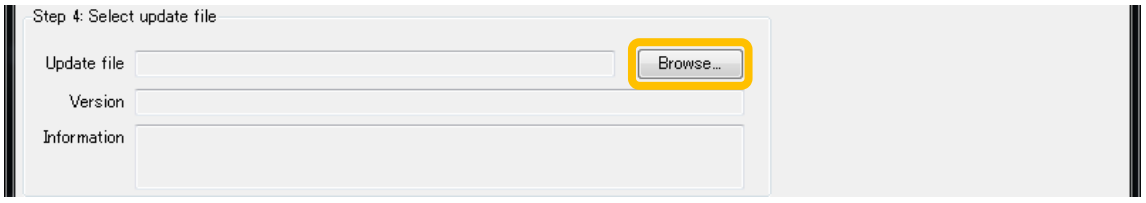
10) When OK dialog is displayed, press “OK” button.



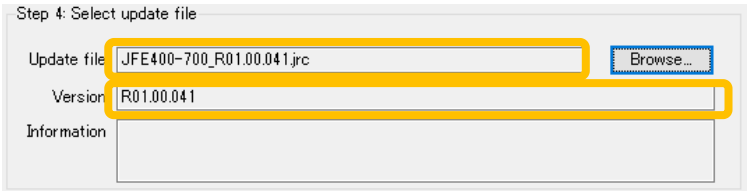

11) Confirm that the software version confirmed in Chapter 3.2 is displayed in "Software" of Step3: Select software.




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



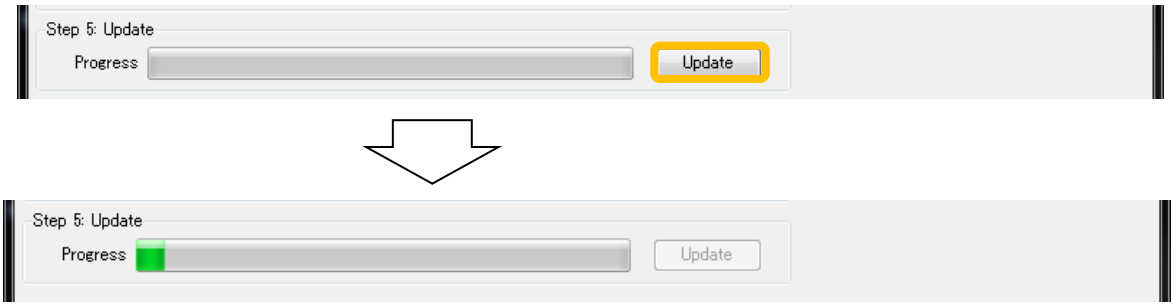

13) Confirm the file selected in (Step12) is displayed in "Update file" and "Version" of Step4: Select update file
(The version shown below is example).




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 3.2, 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.

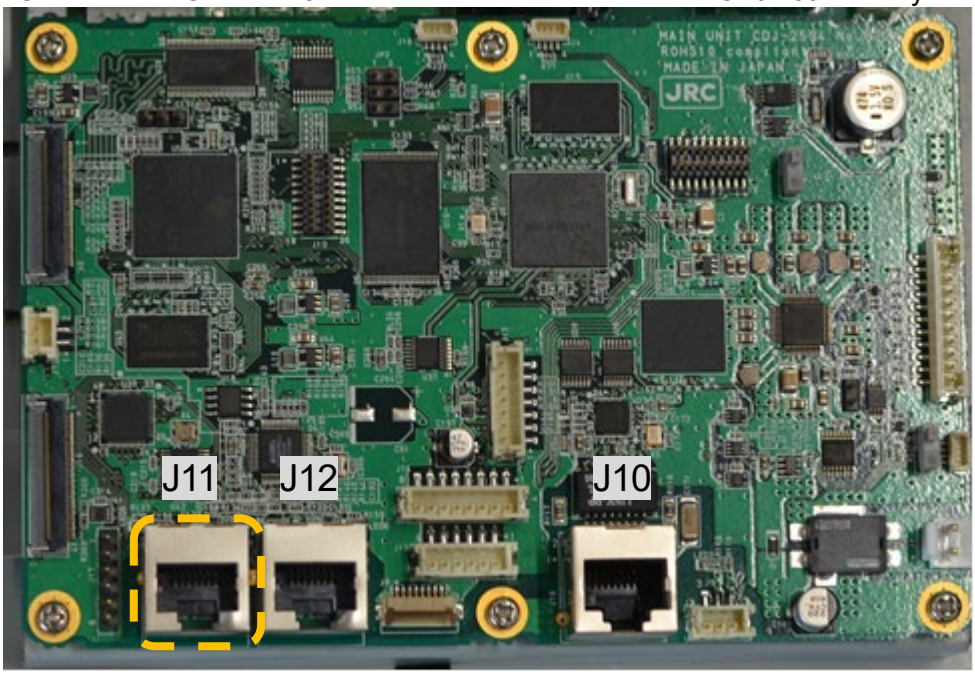
*Note: When fitting the front cover to the rear case, be careful not to pinch the cable.

## 3.5 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 3.4 Procedure of execute update tool.

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

# Chapter 4 Replacing Matching Box

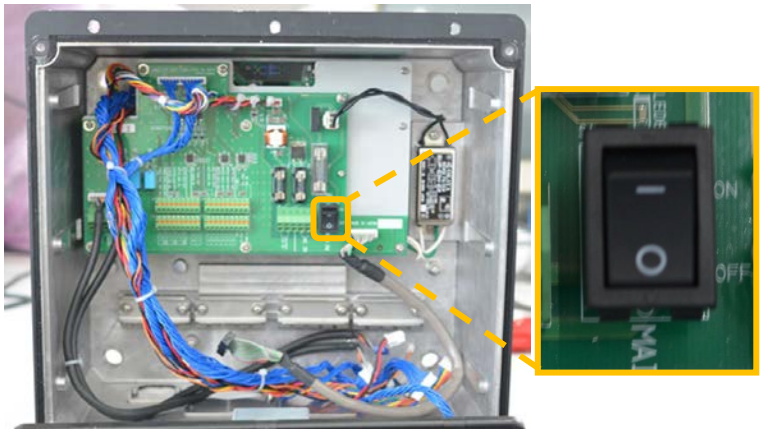
## 4.1 Preparation Tool

| Equipment | Preparation tool | Qty. |
|---|---|---|
| NQD-2597/2598 | Phillips screwdriver (For M4) | 1 |
| AW-154 | Phillips screwdriver (For M4)<br>Flathead screwdriver(No.5) | 1<br>1 |

**⚠ CAUTION**

Be sure to turn off the MAIN SW of the processing unit when replacing the matching box.

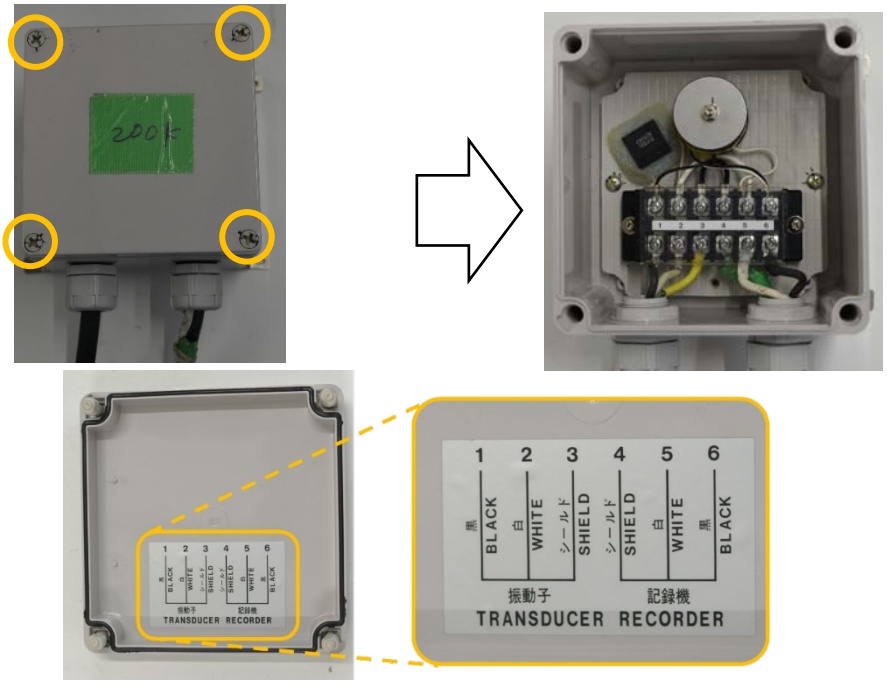
Removing the front cover according to “Before maintenance” in chapter 2 and the switch mounted on Interface unit (CQD-2348) is off.



## 4.2 Procedure of replacing matching box NQD-2597/2598

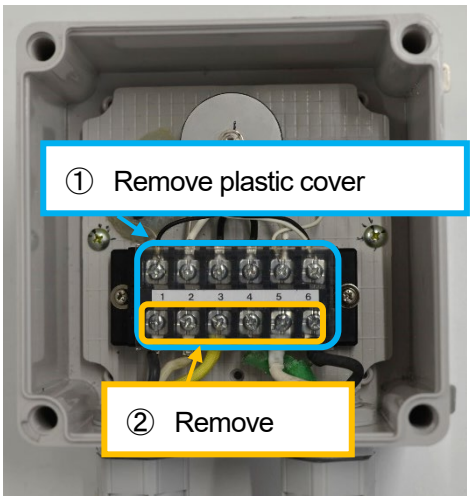
1) Loosen the four screws(M4) on the four sides of the matching box and remove the cover.

* The connection method is described on the back of the cover of the matching box.

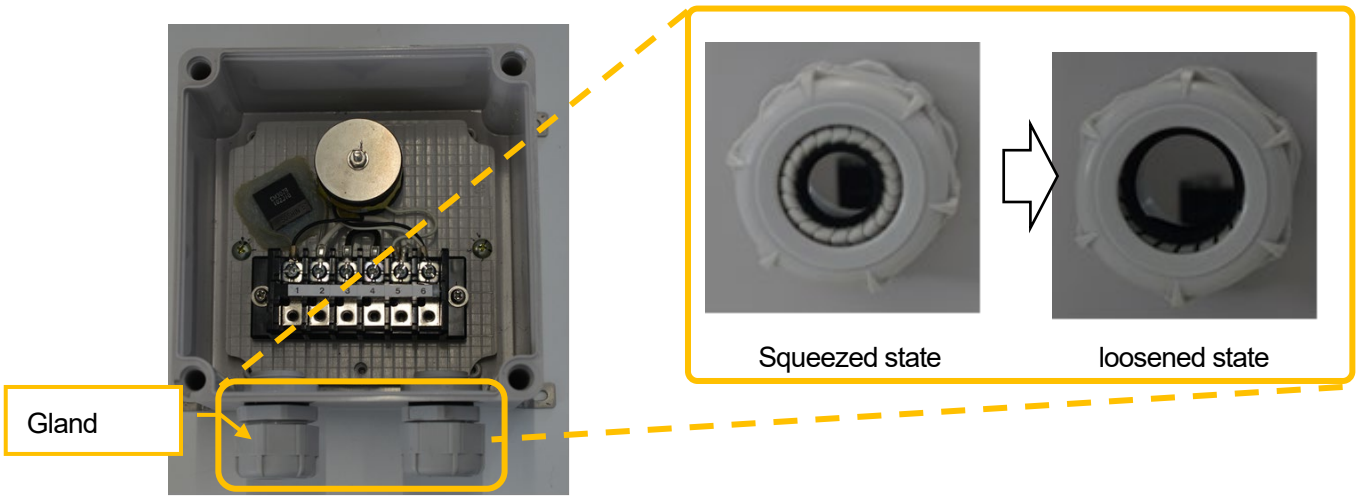



NQD-2597/2598 back of the cover

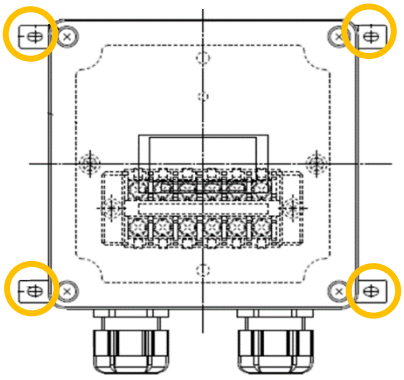
2) Remove the plastic cover that covers the terminal block and remove the screw (M4x6) on the underside of the terminal block.




3) Turn the gland to loosen it and disconnect the cable.




4) Loosen the screws (M4x4) on the four sides of the matching box and remove the matching box from the wall.

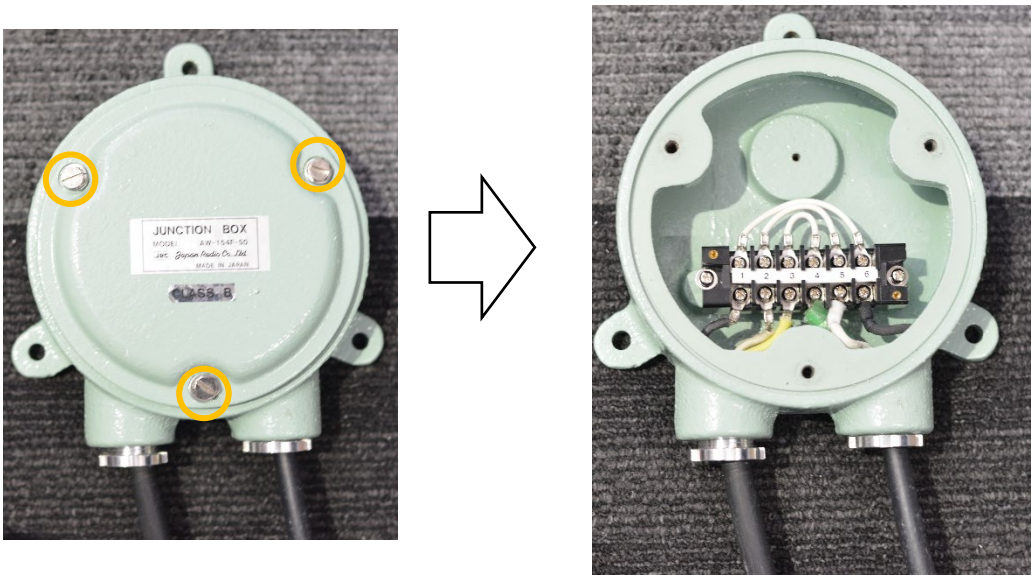


5) Replace the matching box and install and wire in the reverse order.

## 4.3 Procedure of replacing matching box AW-154/154F

1) Loosen the three Slotted screw(M4) on the matching box and remove the cover.

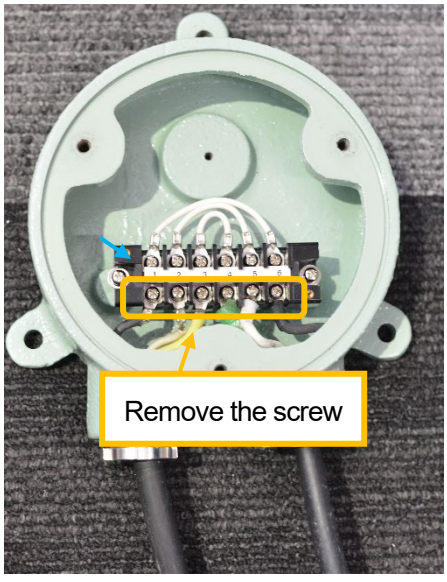
* The connection method is described on the back of the cover of the matching box



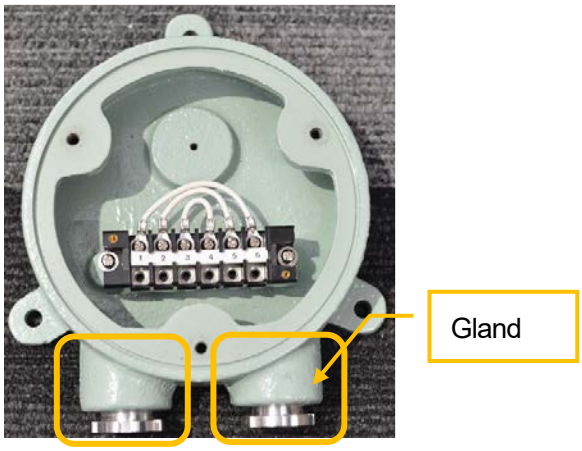


AW-154F/-50 back of the cover

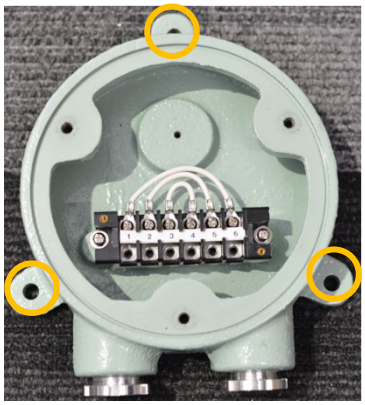
2) Remove the screw (M4x6) on the underside of the terminal block.



3) Turn the gland to loosen it and disconnect the cable.




4) Loosen three bolts(M8) on the outer circumference of the matching box, and remove the matching box from the wall.



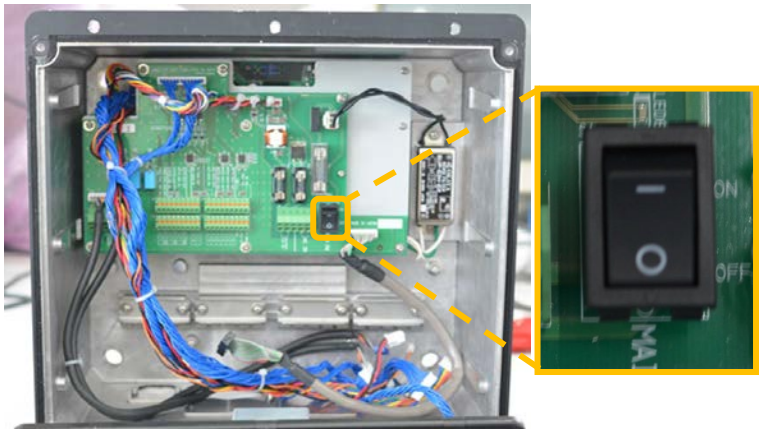
5) Replace the matching box and install and wire in the reverse order.

# Chapter5 Replacing Transducer

**⚠ CAUTION**

Be sure to turn off the MAIN SW of the processing unit when replacing the transducer.

Removing the front cover according to “Before maintenance” in chapter 2 and the switch mounted on Interface unit (CQD-2348) is off.




## 5.1 Transducer NKF-349/350

This chapter describes the procedure when the transducer needs to be replaced due to failure after the start of operation. In principle, NKF-349 / 350 cannot be exchanged at offshore. **It need to replace in dry dock.**

After replacing the transducer, be sure to check transducer according to Chapter 2.2.4.2 Measurement of resonance frequency using a measuring instrument and 2.2.4.3 Measurement of insulation resistance using a measuring instrument before the undercarriage.

### 5.1.1 Preparation Tool

| Preparation tool | Q’ty | Remarks |
|---|---|---|
| Grinder | 1 | Grinding of weld beads(if necessary) |
| Polyester putty / silicone bond / asphalt | - | Bolt hole putting |
| Masking material | - | For painting |
| Box wrench (For M6) | 1 | For bolt fastening |
| Wrench (For M16) | 1 | For bolt fastening |
| Hook spanner | 1 | For gland fastening |

## 5.1.2 Replacing procedure of NKF-349/350 Transducer

1) Remove the wiring of transducer at matching box according to installation manual.

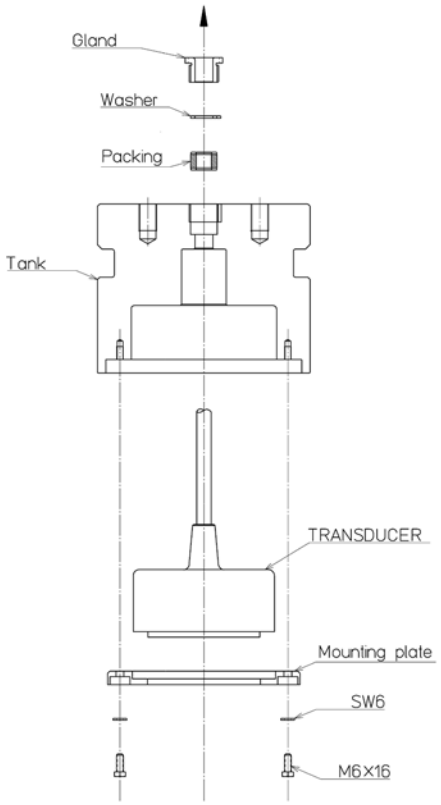
2) Remove the resin filled in the mounting holes of the mounting plate (6points).

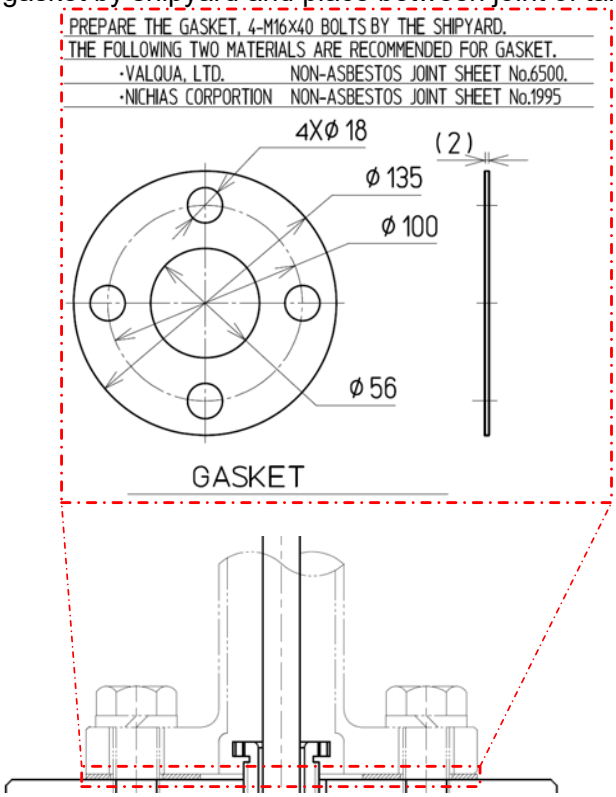
3) Loosen a gland (When cable is piped, remove the piping.)

4) Remove the mounting plate and existing transducer

5) Install new transducer and fix to tank by mounting plate.

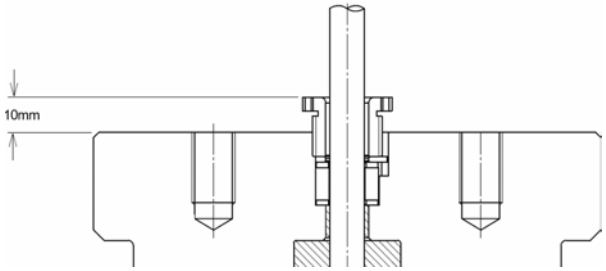
6) Pass through the transducer cable in the order of packing, washier and gland.
(When cable is piped, prepare a new gasket by shipyard and place between joint of tank and pipe.)




When cable is piped, place a new gasket.

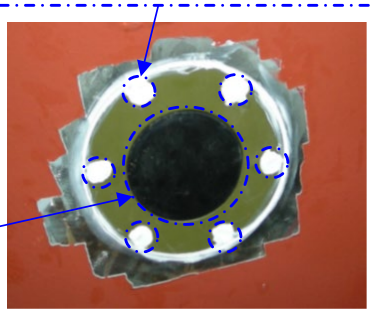
7) Tighten until GLAND becomes 10mm from the upper surface of the tank by using hook spanner.
When cable is piped, install and fix the pipe.




8) Fill the mounting hole with the resin.
Recommendation: KONISHI CO., LTD UNDERWATER BOND #16456
Usage: Mix the main ingredient and the hard ening ingredient.

**Do not fill the resin inside of tank.**

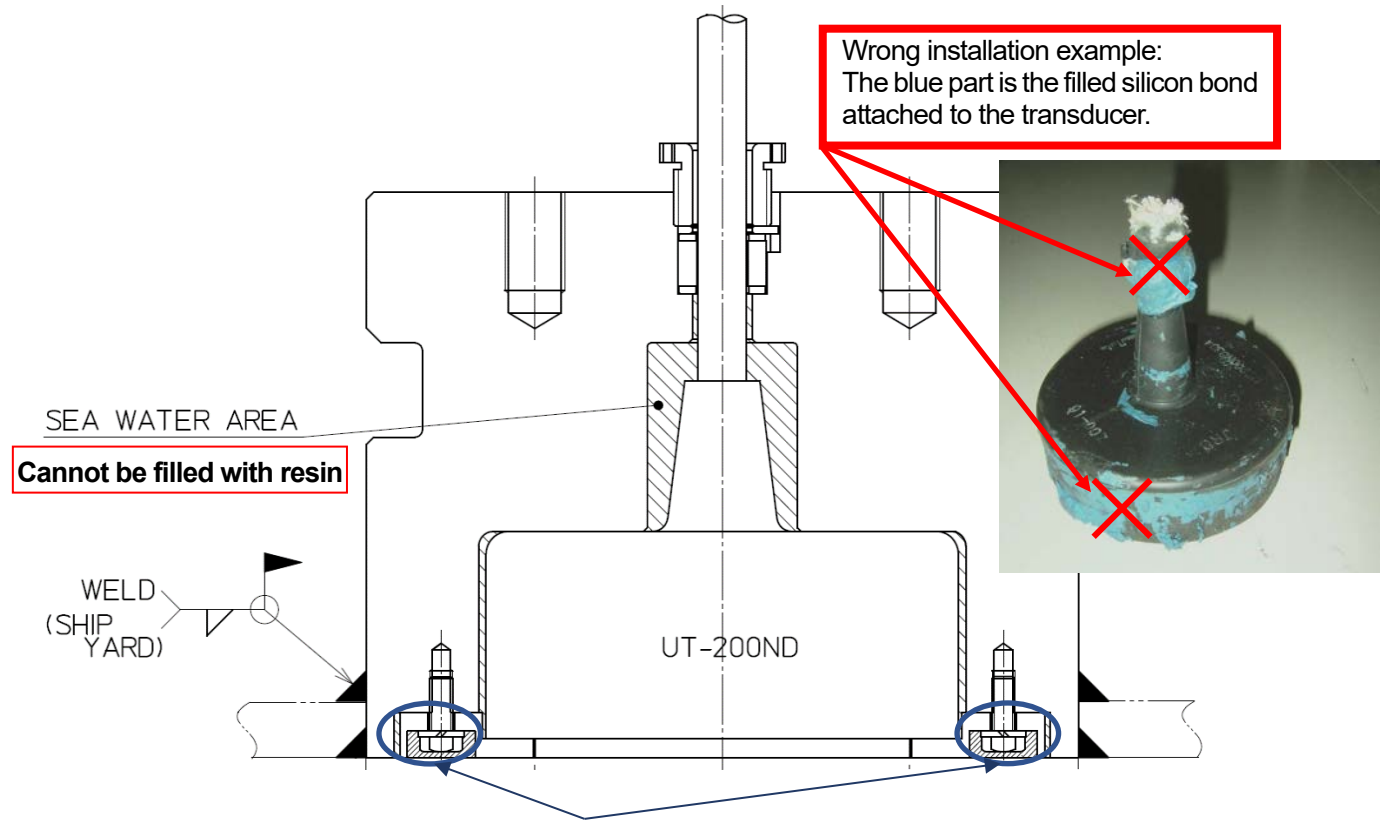
Be sure to fill the 6 bolt holes with resin.



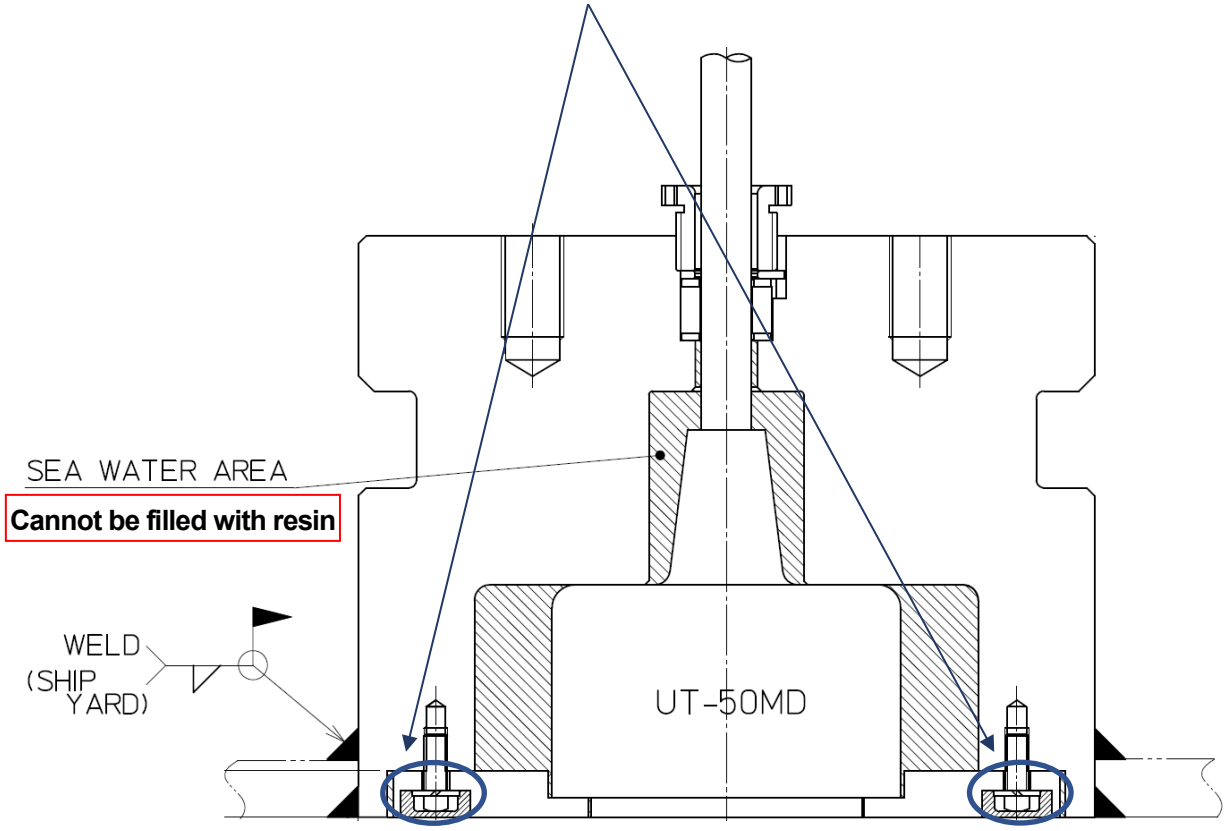
9) Reconnect the transducer cable at matching box according to installation manual.

## 5.1.3 Important point

- 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.

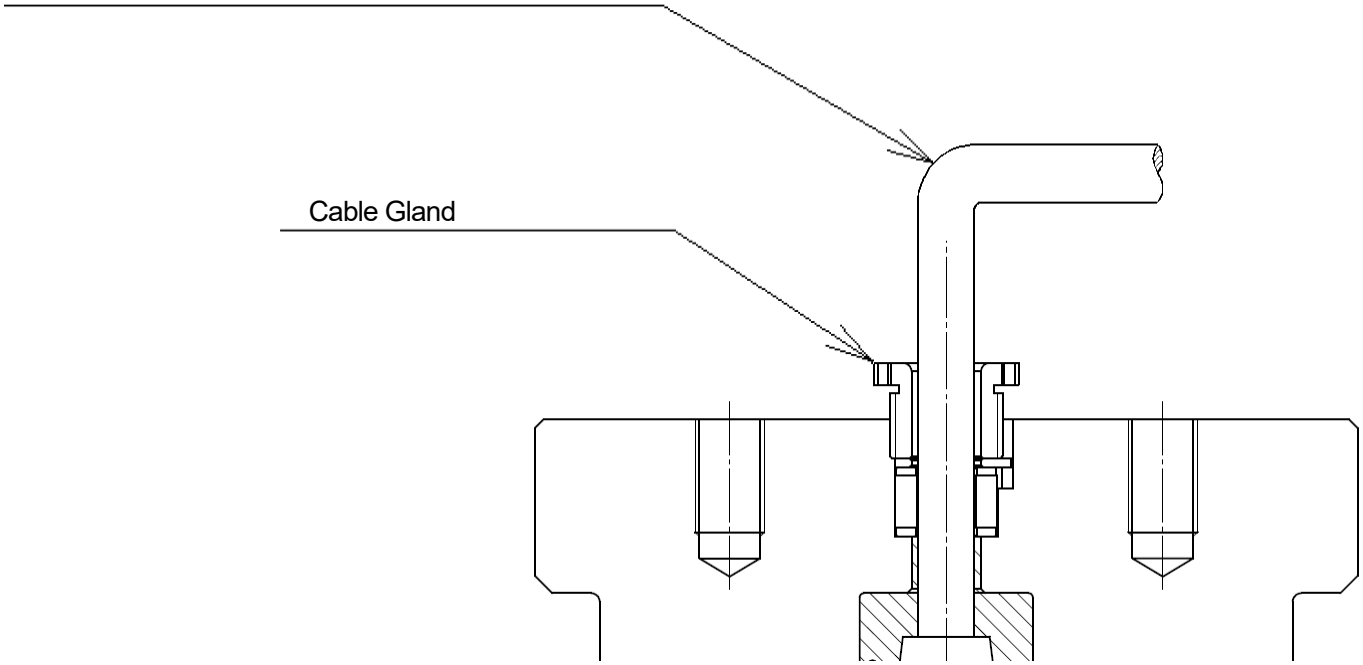



After tightening the bolts, fill with resin (polyester putty or silicon bond or asphalt).



- 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).

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




After replacing the transducer, be sure to check transducer according to Chapter 2.2.4.2 Measurement of resonance frequency using a measuring instrument and 2.2.4.3 Measurement of insulation resistance using a measuring instrument before the undercarriage.

## 5.2 Transducer NKF-341/345

This chapter describes the procedure when the transducer needs to be replaced due to failure after the start of operation. In principle, NKF-349 / 350 cannot be exchanged at offshore. **It need to replace in dry dock.**

After replacing the transducer, be sure to check transducer according to Chapter 2.2.4.2 Measurement of resonance frequency using a measuring instrument and 2.2.4.3 Measurement of insulation resistance using a measuring instrument before the undercarriage.

### 5.2.1 Preparation Tool

| Preparation tool | Q'ty | Remarks |
|---|---|---|
| Grinder | 1 | Grinding of weld beads(if necessary) |
| Polyester putty / silicone bond / asphalt | - | Bolt hole putting |
| Masking material | - | For painting |
| Box wrench (For M6) | 1 | For bolt fastening |
| Wrench (For M16) | 1 | For bolt fastening |
| Hook spanner | 1 | For gland fastening |

## 5.2.2 Replacing procedure of NKF-341/345 Transducer

1) Remove the wiring of transducer at matching box according to installation manual.

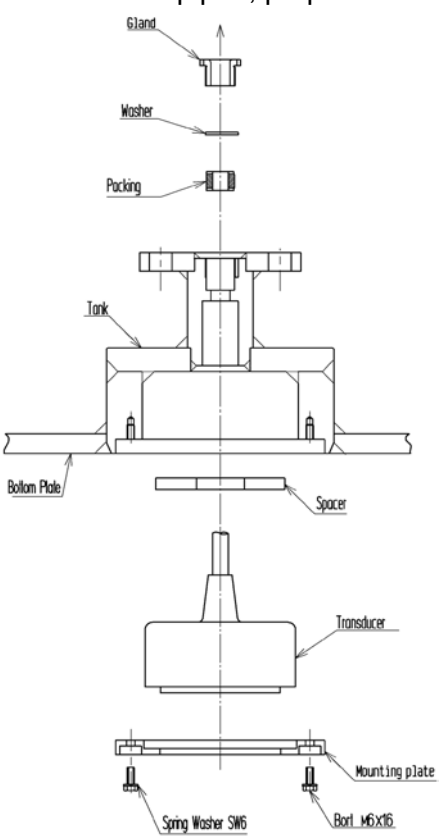
2) Remove the resin filled in the mounting holes of the mounting plate (6points).

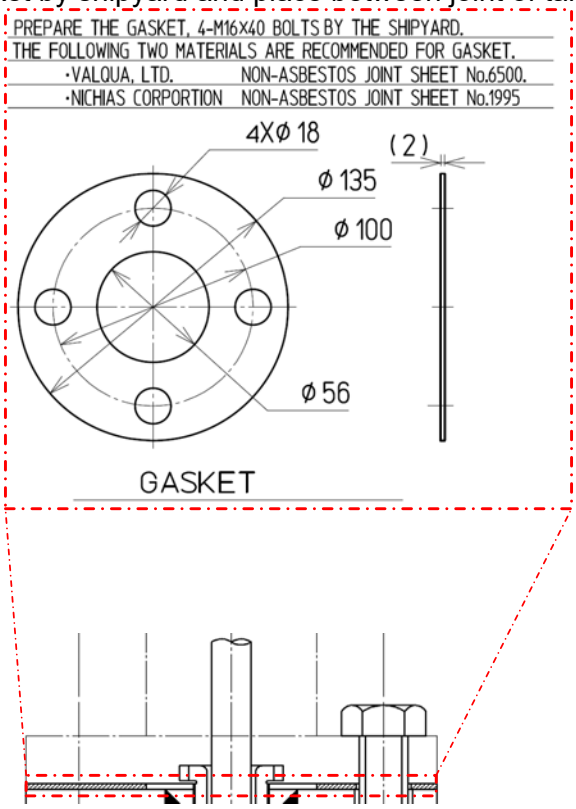
3) Loosen a gland (When cable is piped, remove the piping.)

4) Remove the mounting plate and existing transducer

5) Install new transducer and fix to tank by mounting plate.

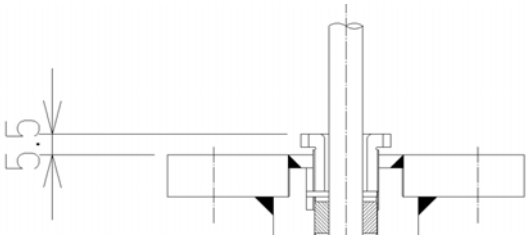
6) Pass through the transducer cable in the order of packing, washier and gland.
(When cable is piped, prepare a new gasket by shipyard and place between joint of tank and pipe.)



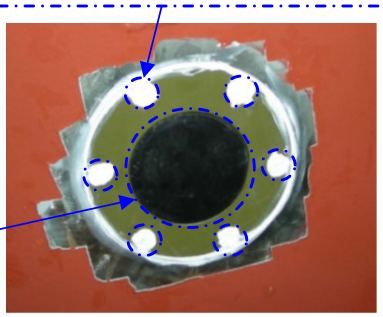

When cable is piped, place a new gasket.

7) Tighten until GLAND becomes 5.5mm from the upper surface of the tank by using hook spanner.
When cable is piped, install and fix the pipe.




8) Fill the mounting hole with the resin.
Recommendation: KONISHI CO., LTD UNDERWATER BOND #16456
Usage: Mix the main ingredient and the hard ening ingredient.

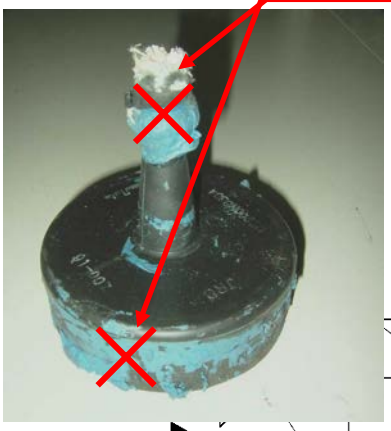
**Do not fill the resin inside of tank.**




9) Reconnect the transducer cable at matching box according to installation manual.

## 5.1.3 Important point

- 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.



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

SEAWATER AREA

**Cannot be filled with resin**

WELD (SHIP YARD)

UT-200ND

WELD (SHIP YARD)

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

SPACER

SEAWATER AREA

**Cannot be filled with resin**

WELD (SHIP YARD)

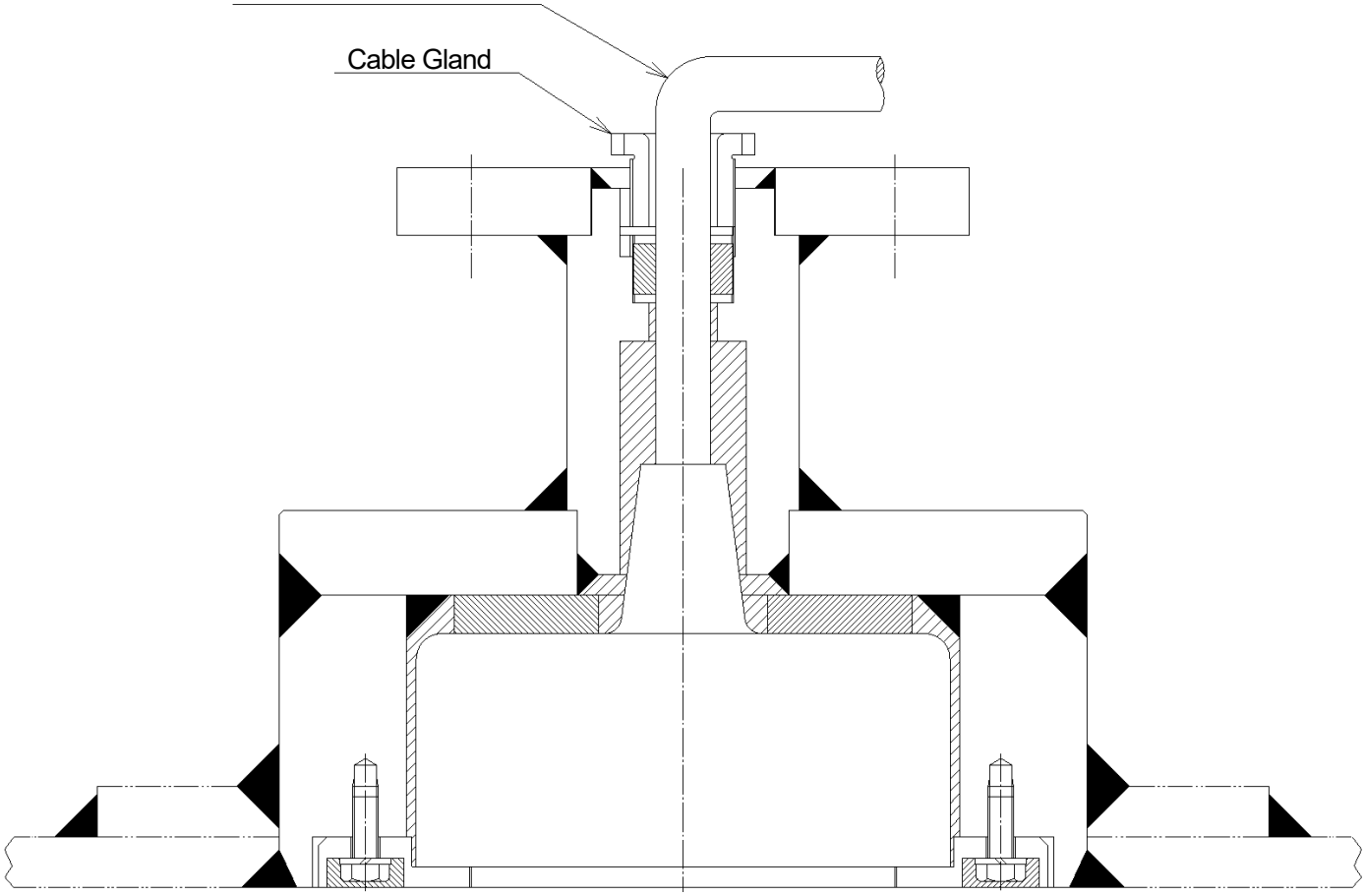
WELD (SHIP YARD)

UT-50MD

WELD (SHIP YARD)

- 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).

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




Perform to transducer self-test according to 2.2.4.1 Measurement of resonance point of frequency using self-test of transducer.

## 5.3 Gate valve NKF-394/396

This chapter describes the procedure when the transducer needs to be replaced at sea due to damage after the start of operation. Always carry a gas detector with you when you go to the bottom of the ship to make sure you have enough oxygen.

After replacing the transducer, be sure to check transducer according to Chapter 2.2.4.1 Measurement of resonance point of frequency using self-test of transducer, 2.2.4.2 Measurement of resonance frequency using a measuring instrument and 2.2.4.3 Measurement of insulation resistance using a measuring instrument before the undercarriage.

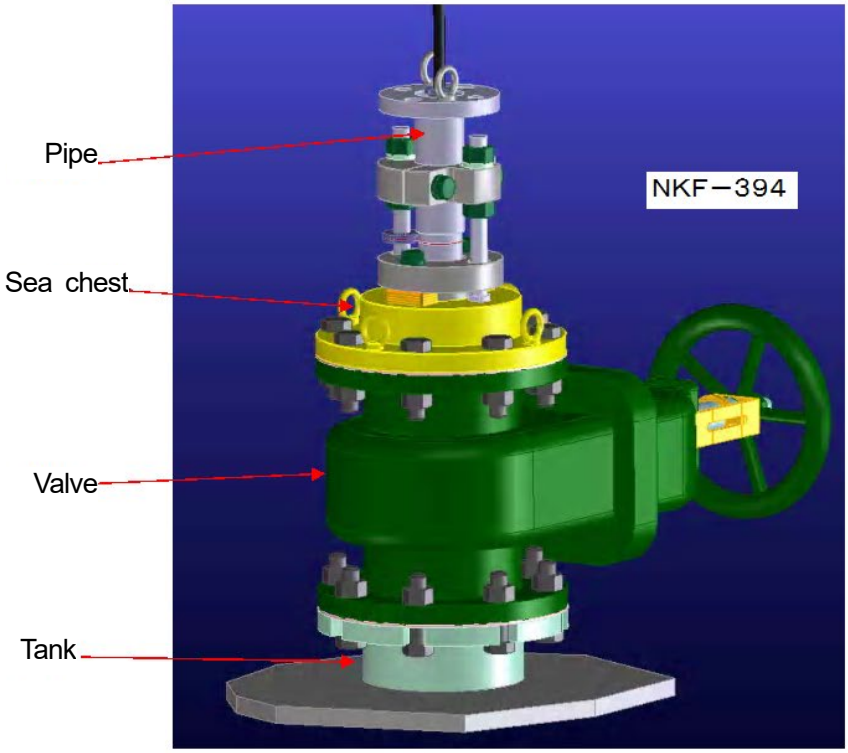
### 5.3.1 Preparation Tool

| Preparation tool | Q'ty | Remarks |
|---|---|---|
| Chain blocks | 1-2 | |
| Gasket MPPK30863 | 1 | |
| Valve handle turning tool | 1 | |
| Liquid sealing | - | Liquid gasket for oil resistance and packing application |
| For spanner M8 | 1 | For bolt fastening |
| For spanner M20 (wrench NO.30) | 2 | For bolt fastening |
| Hook spanner | 1 | For gland fastening |
| Gas detector | 1 | |

## 5.3.2 Replacing procedure of NKF-394/396

1) NKF-394

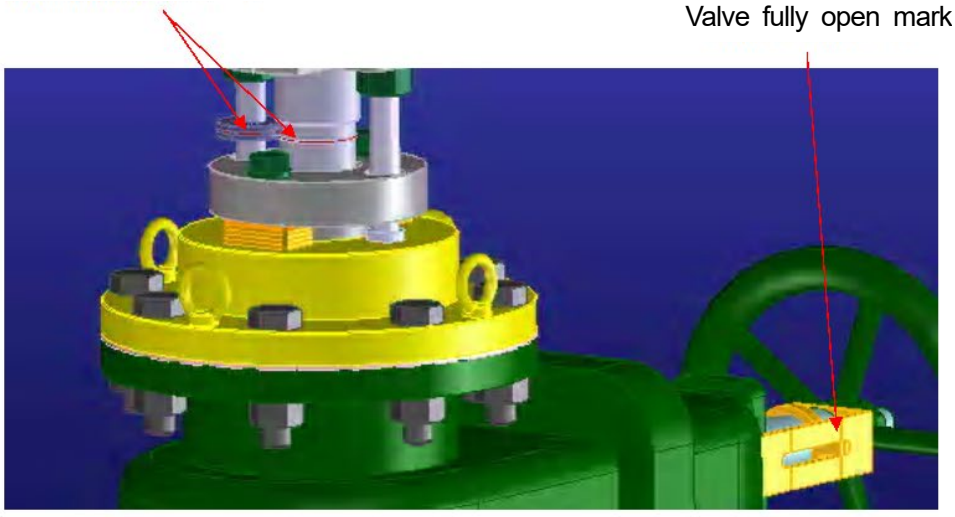
Replacing procedure of NKF-394 gate valve and transducer




1. Confirmation mark: Confirm that the transducer insertion position mark and the valve fully open mark match.

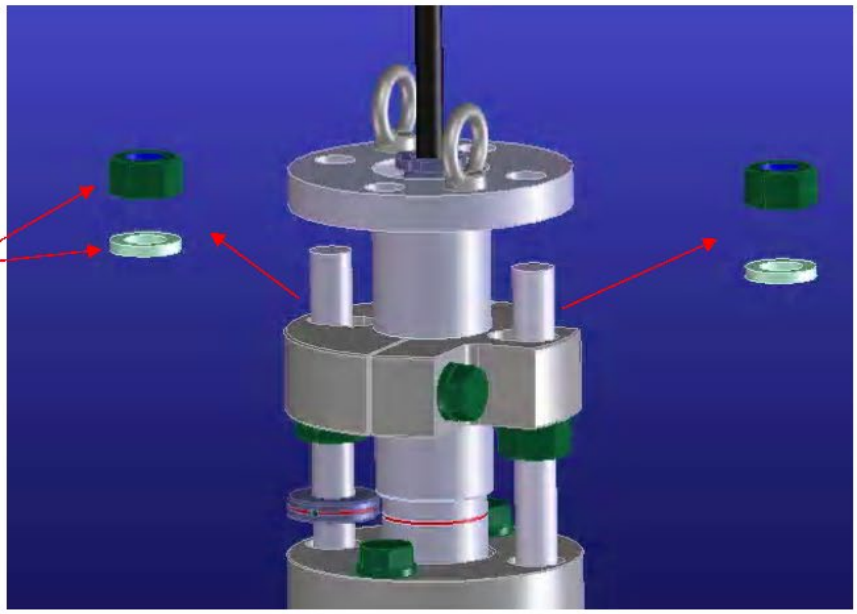
Transducer insertion position mark

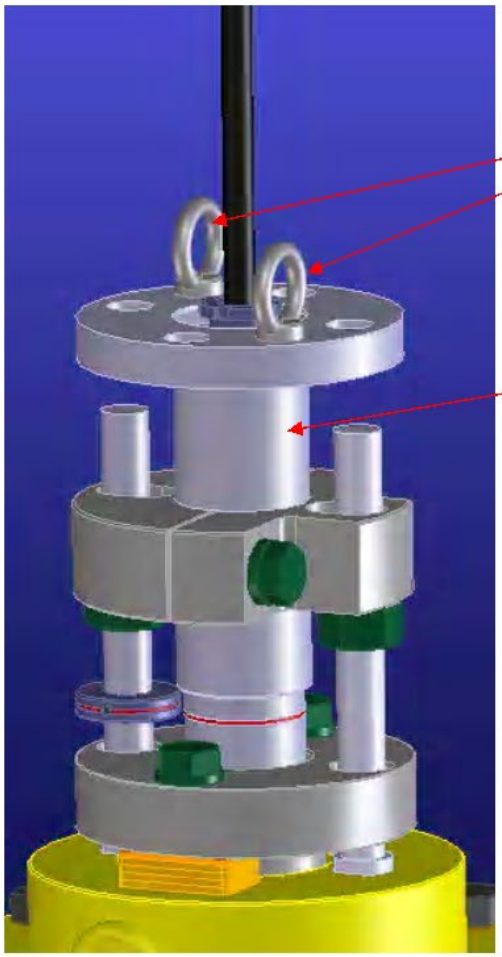
Valve fully open mark



2.Nut removal: Remove the sea chest nut.

Remove the nut M20
(spring washer)

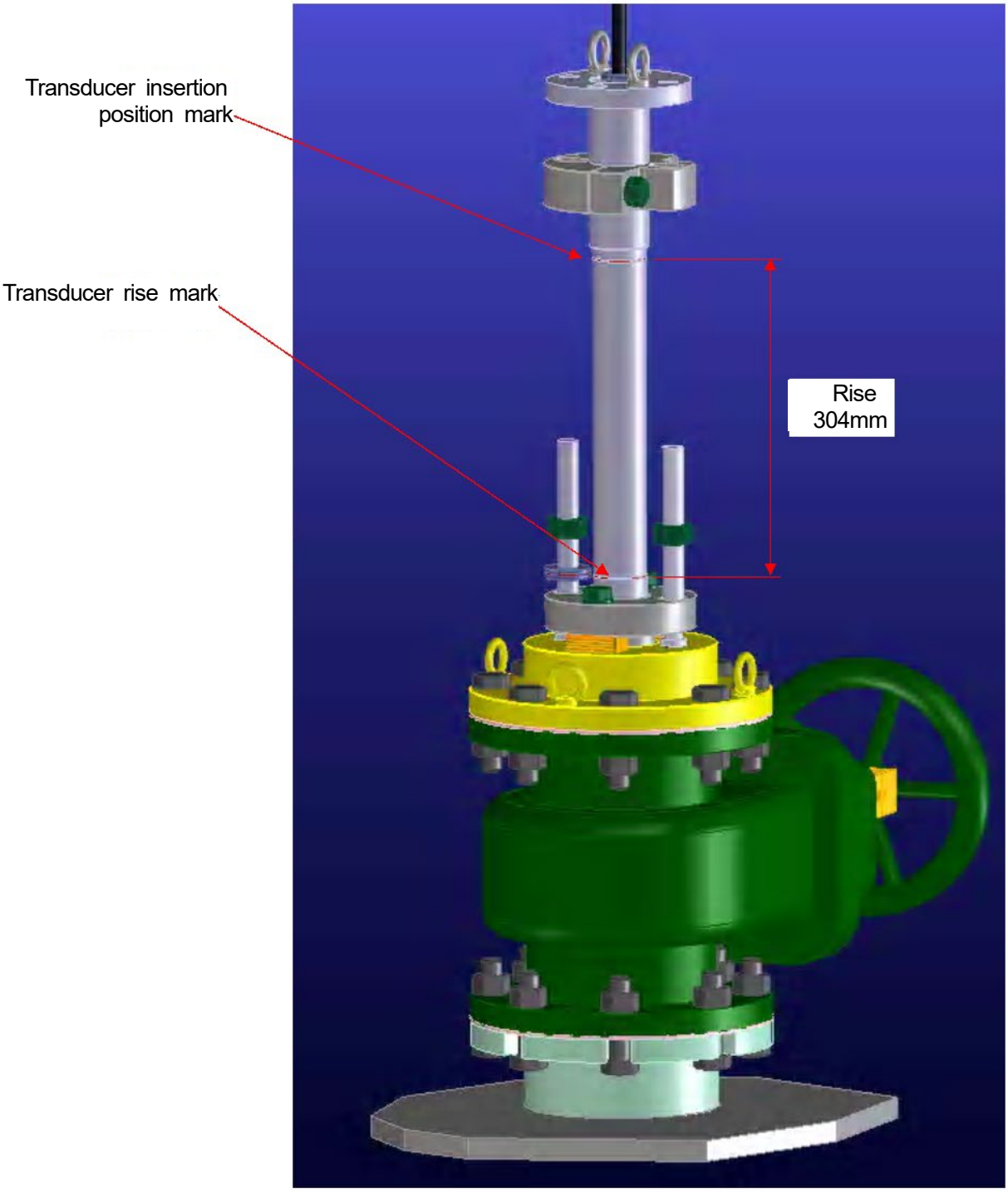




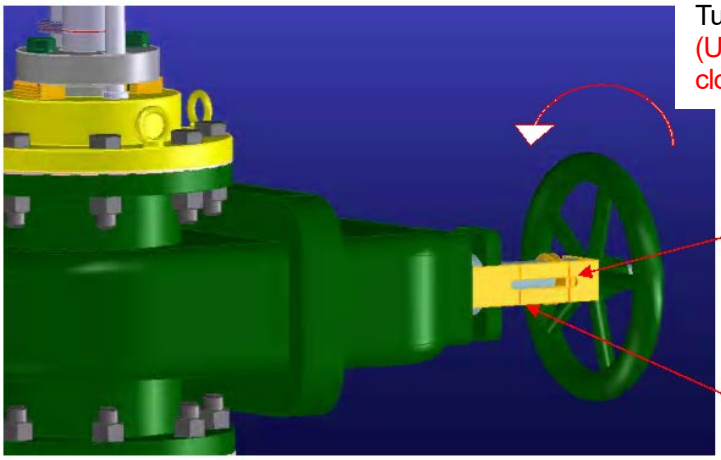
Pull up the pipe with
chain locks

Pipe

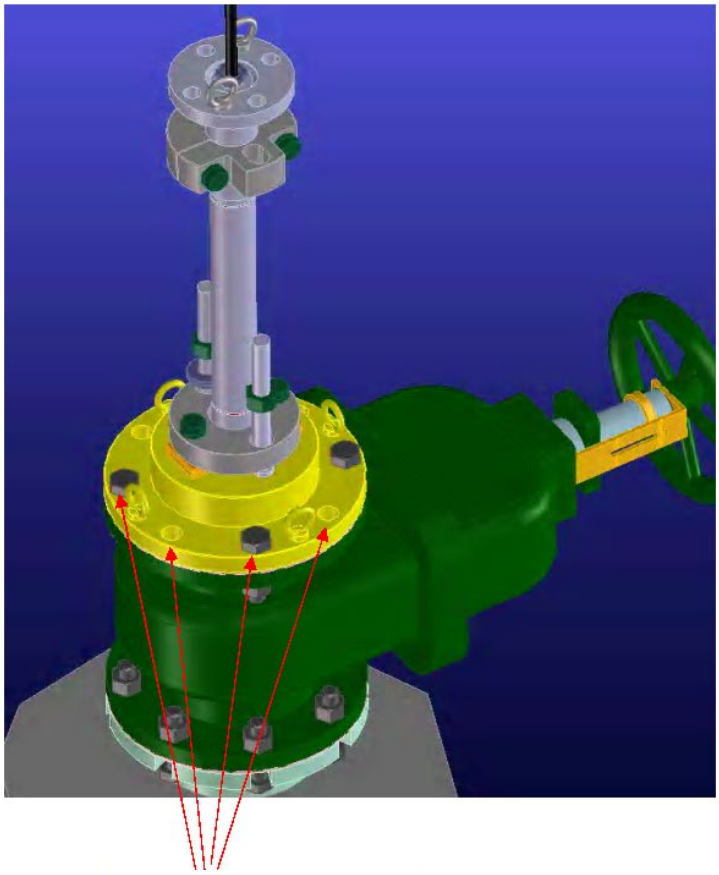
3. Mark confirmation: Pull up the pipe and check the transducer rise mark.



4. Close the valve and check the mark: Close the valve.




5. Bolt and Nut Removal: Remove only 4 bolts and nuts.

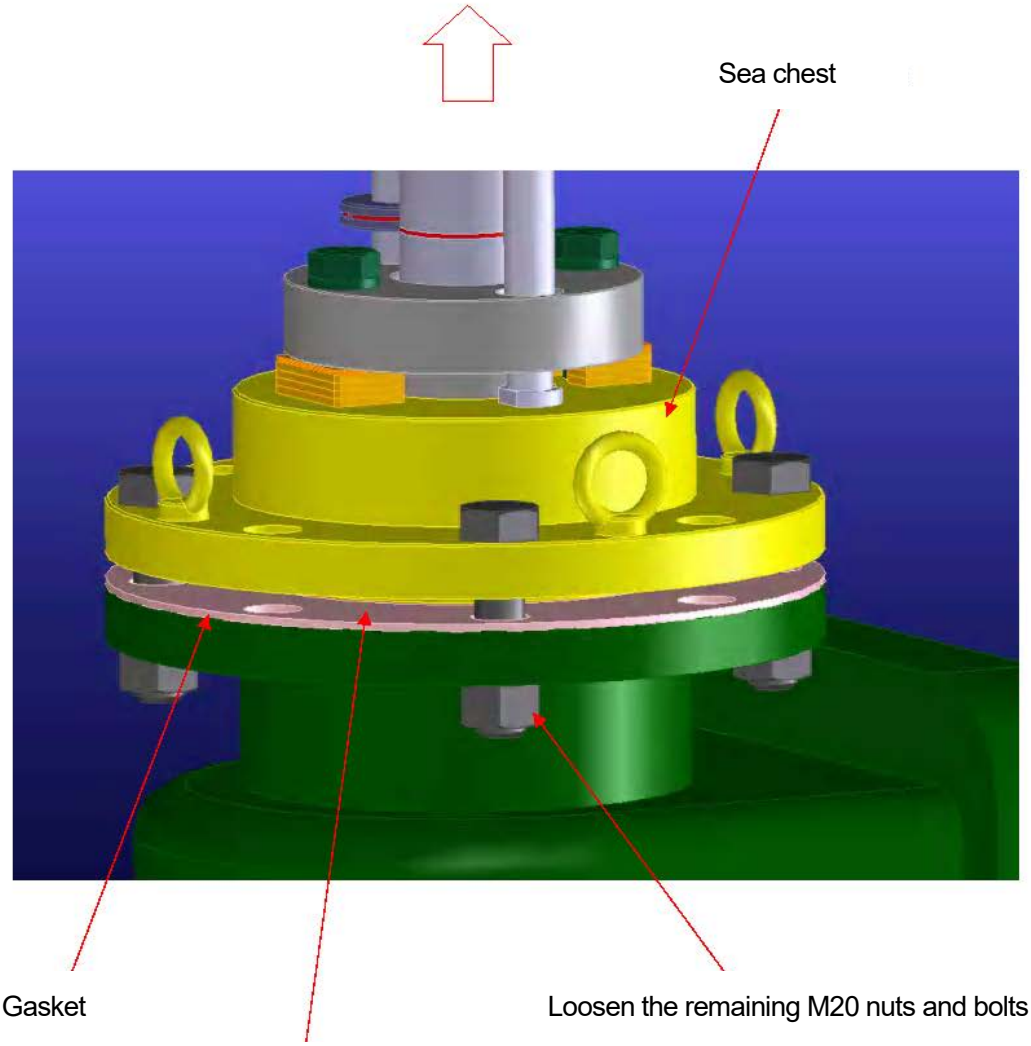


Remove M20 bolts and nuts in only 4 places of 8 places. Leave diagonal 4 places.

**For safety, it is strictly forbidden to remove everything.**

6. Sea chest removal: Pull up the sea chest

4-20M Loosen bolts and nuts and pull up the sea chest.




Make a gap. The remaining water in the valve is discharged.

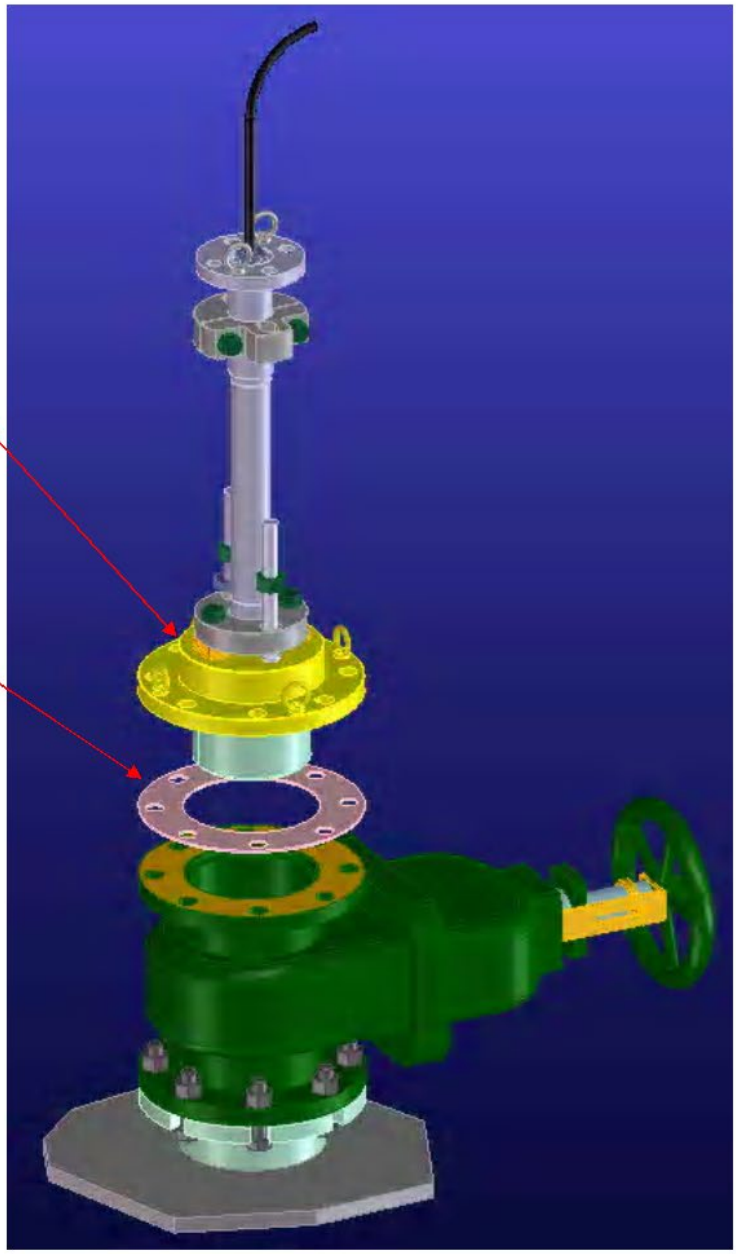
**If a large amount of water is discharged, tighten the bolts and nuts and check the opening and closing of the valve.**

The sea chest and gasket may be in close contact and cannot be easily removed.

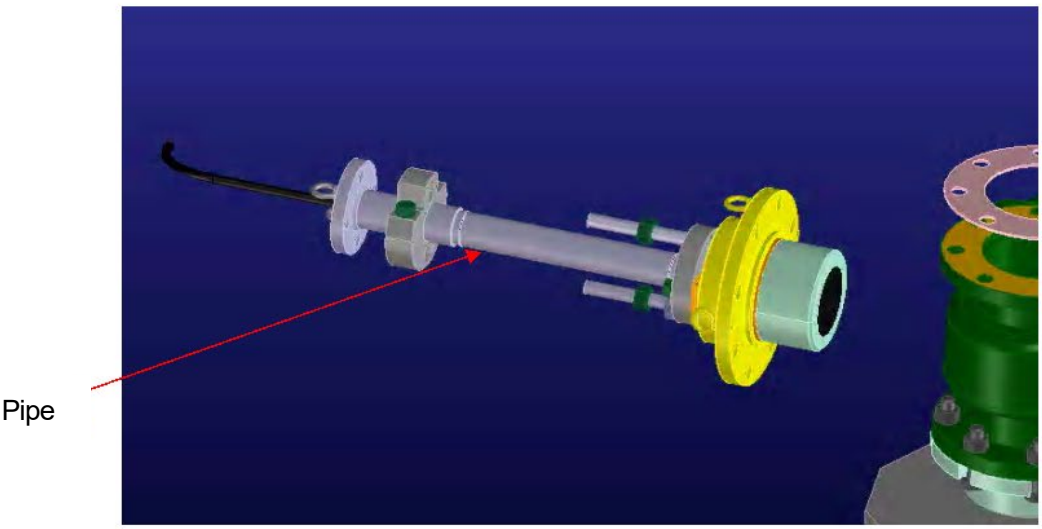
7. Sea chest separation: Remove the sea chest completely

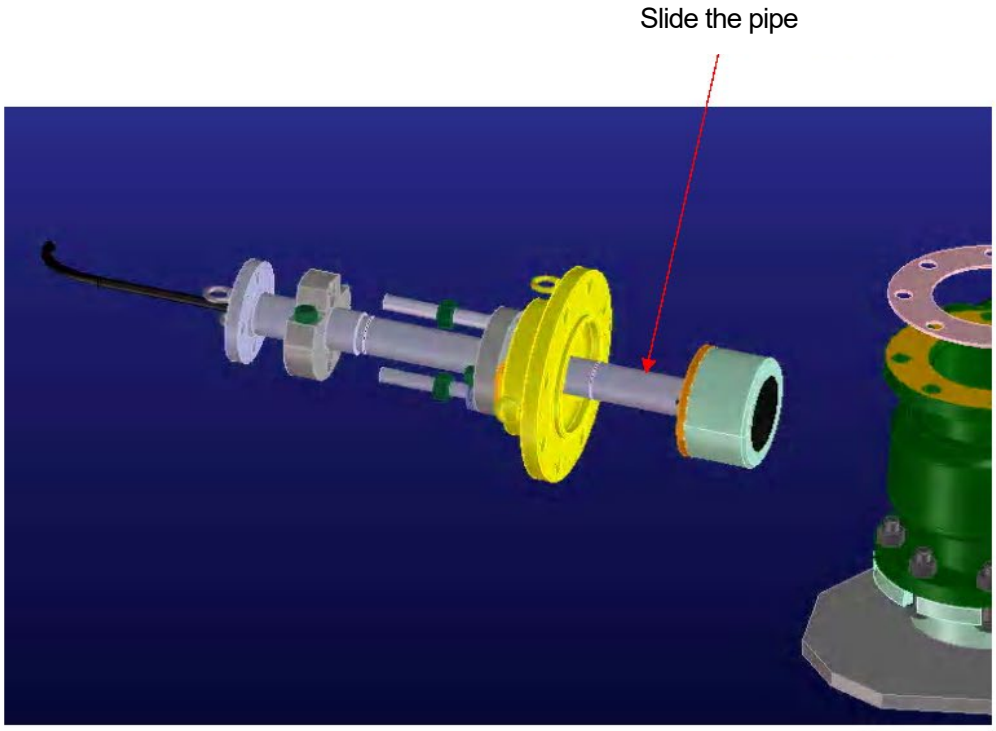
Separate sea chest

Replace the gasket with a new one (MPPK30863).
A liquid sealing is applied to the surface of the gasket.

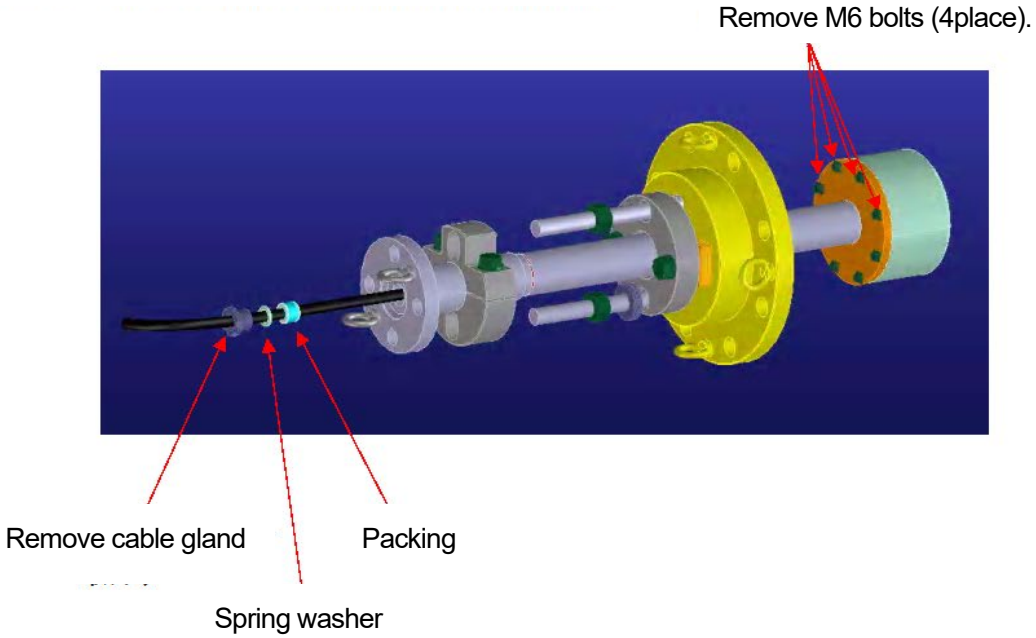


8. Pipe moving: slide the pipe

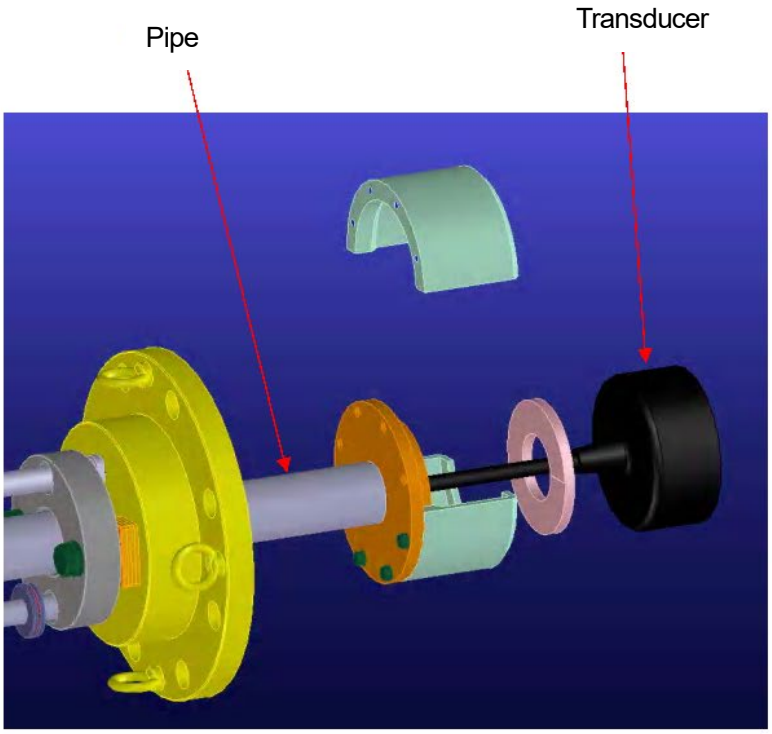


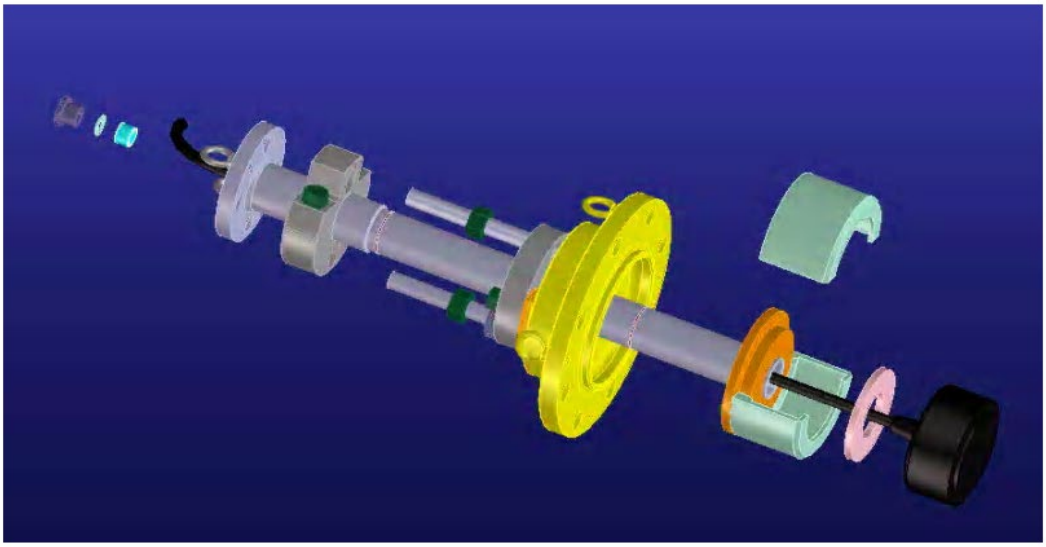
9. Cable gland and transducer mounting bolt removal



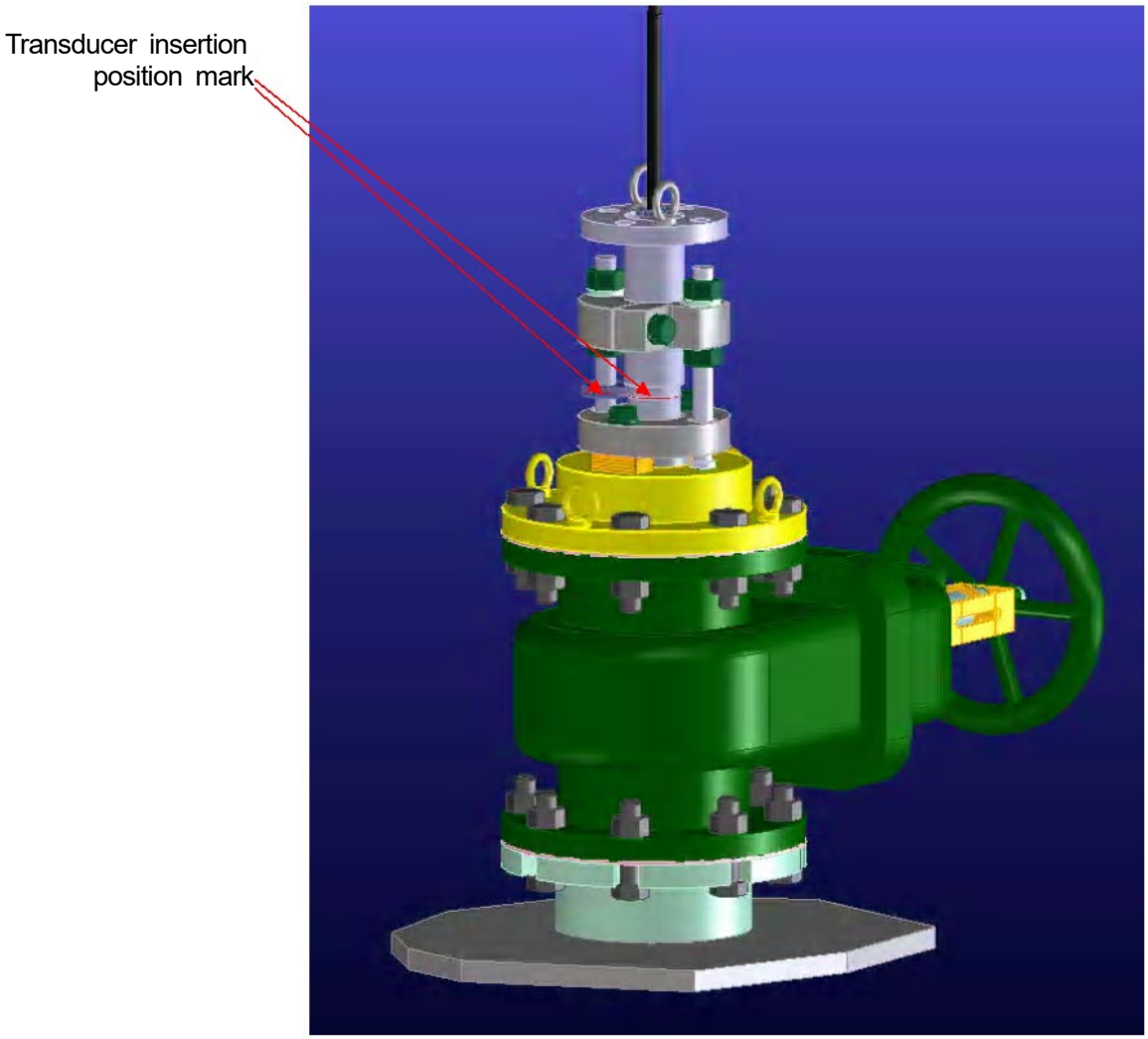

10. Transducer removal: Pull out the transducer from the pipe



11. Reassembly: Replace the oscillator and assemble in the reverse order of disassembly.



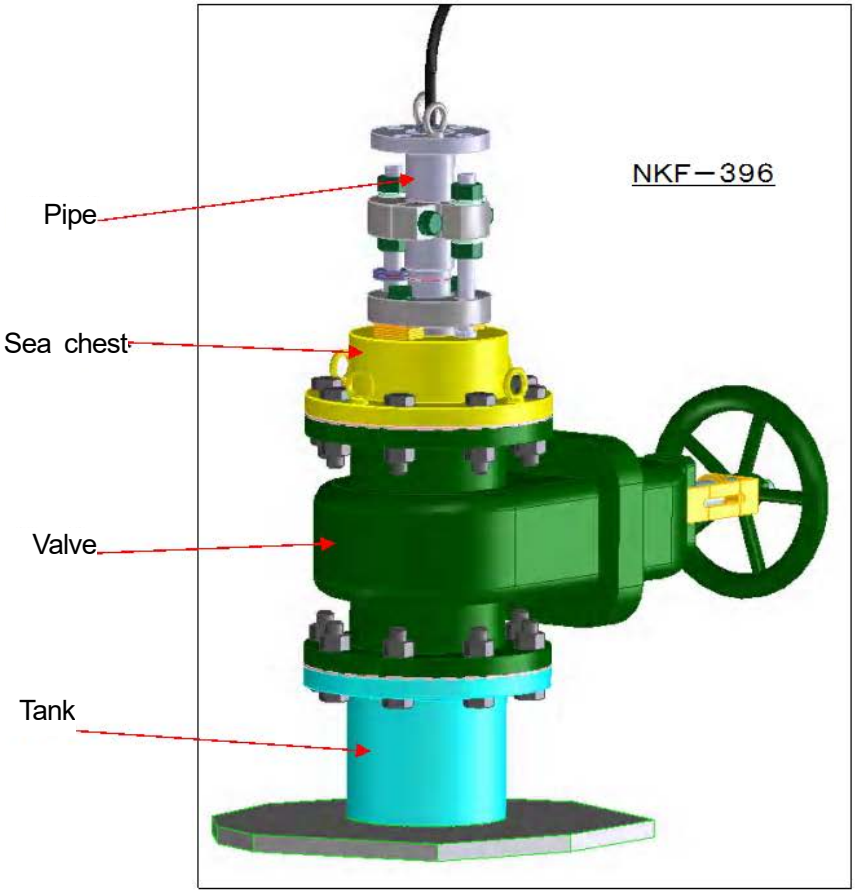
12. Final confirmation



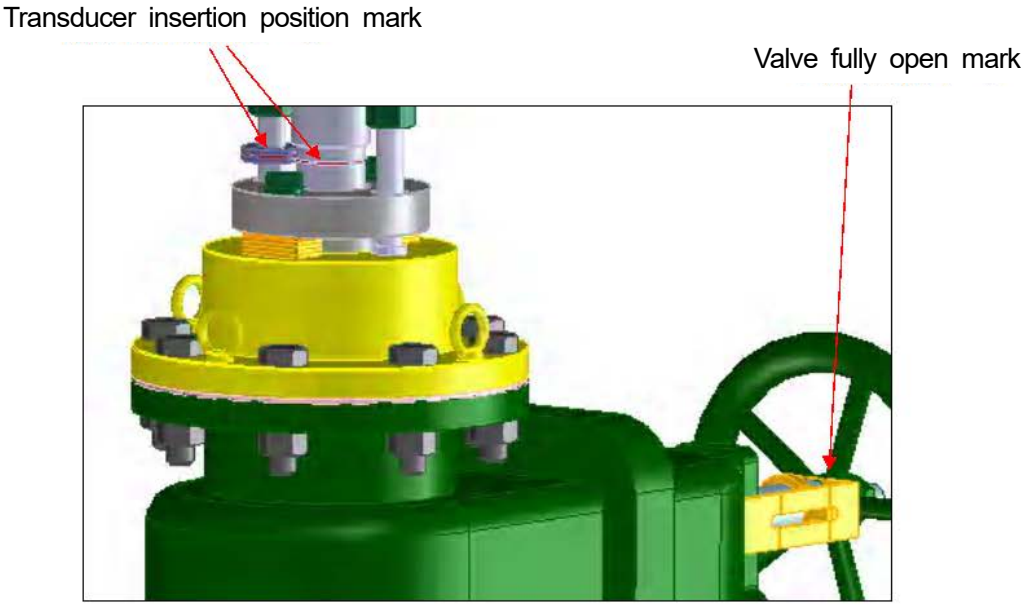

13. After replacing the transducer, be sure to check transducer according to Chapter 2.2.4.1 Measurement of resonance point of frequency using self-test of transducer, 2.2.4.2 Measurement of resonance frequency using a measuring instrument and 2.2.4.3 Measurement of insulation resistance using a measuring instrument before the undercarriage.

2) NKF-396

Replacing procedure of NKF-396 gate valve and transducer

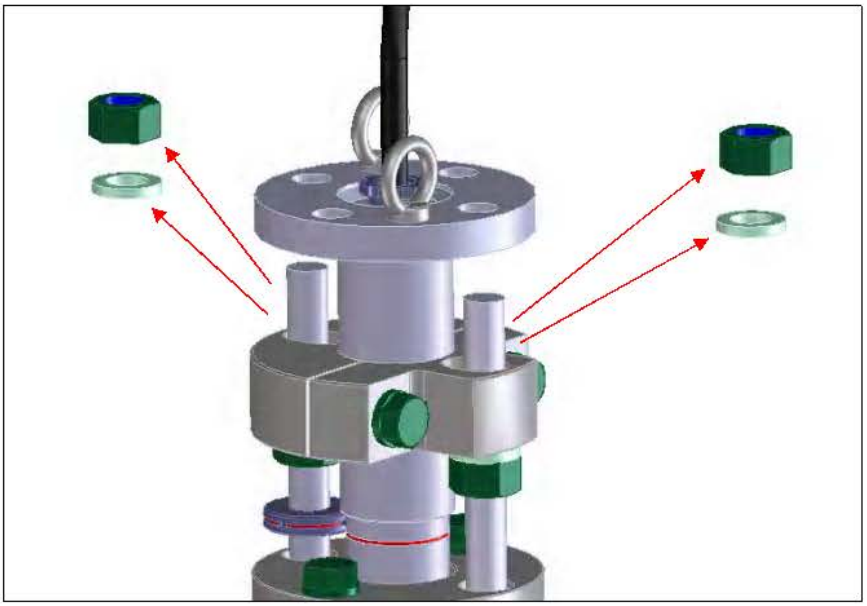


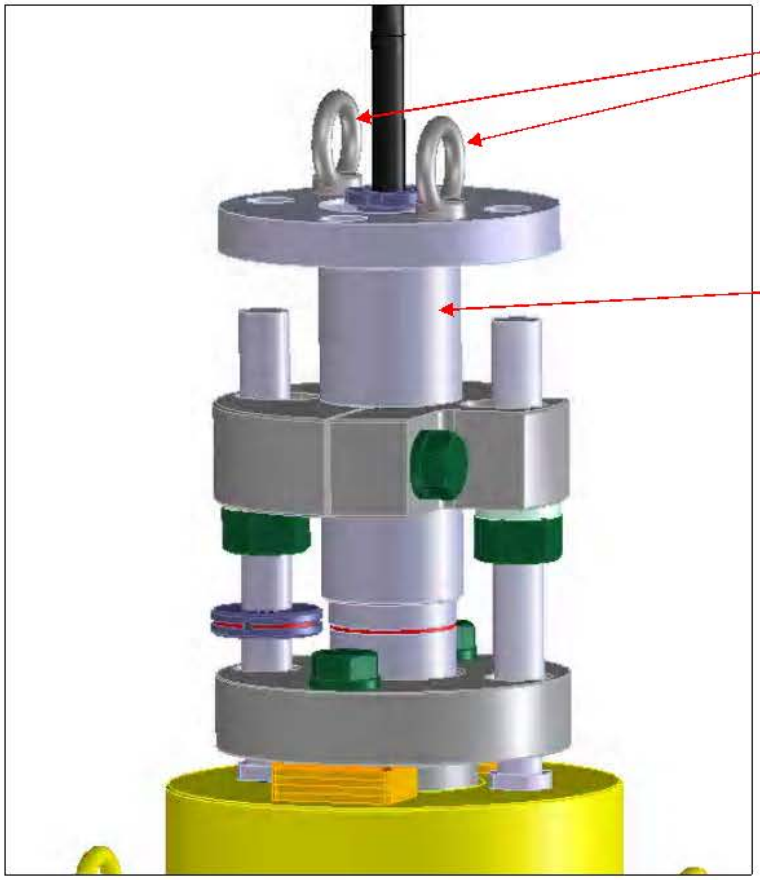

1. Confirmation mark: Confirm that the transducer insertion position mark and the valve fully open mark match.



2.Nut removal: Remove the sea chest nut.

Remove the nut M20
(spring washer)

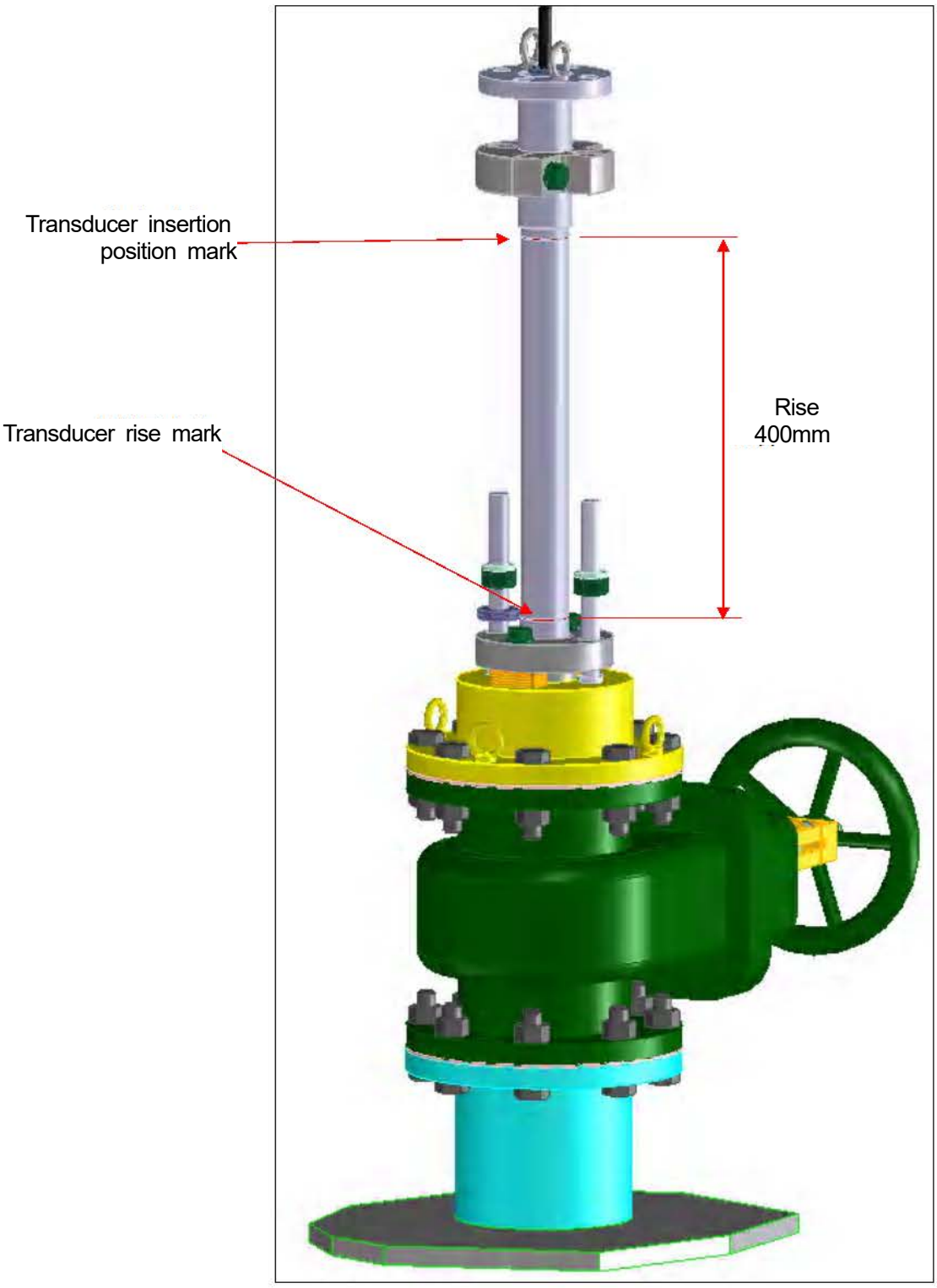




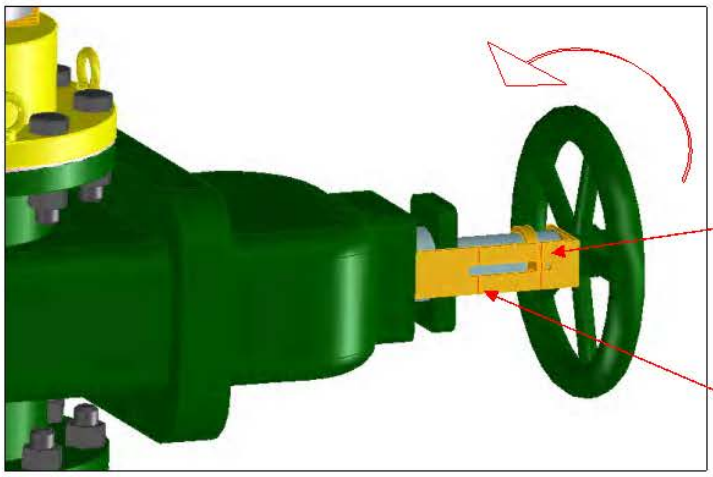
Pull up the pipe with
chain locks

Pipe

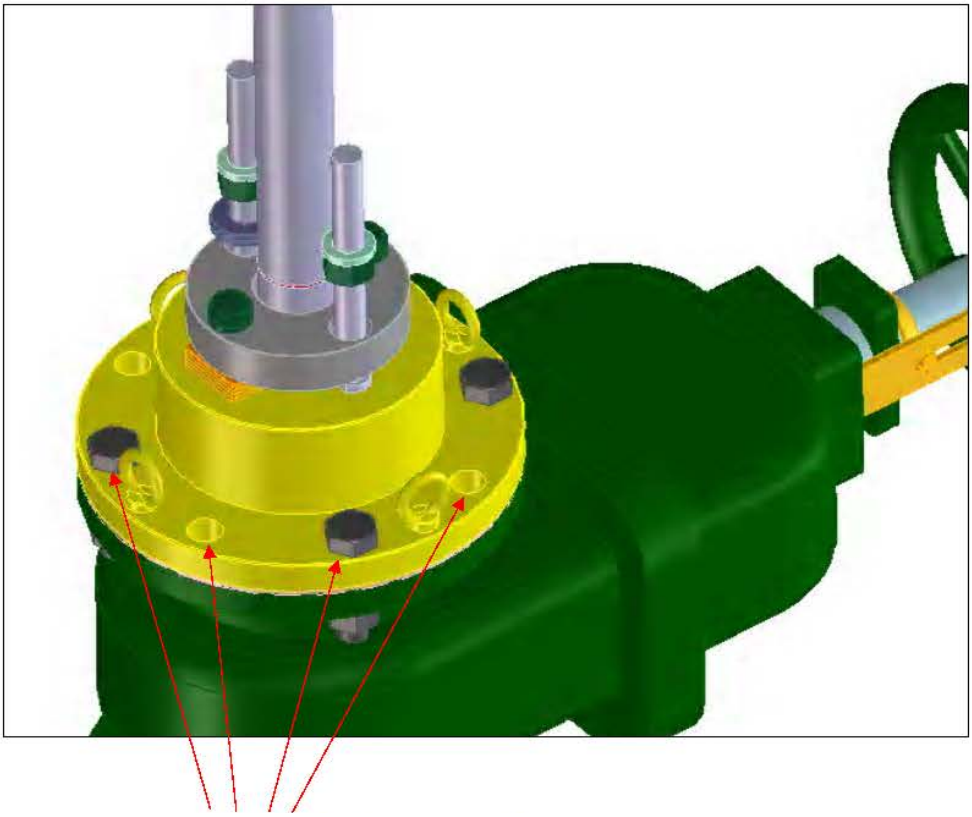
3. Mark confirmation: Pull up the pipe and check the transducer rise mark.



4. Close the valve and check the mark: Close the valve.




5. Bolt and Nut Removal: Remove only 4 bolts and nuts.

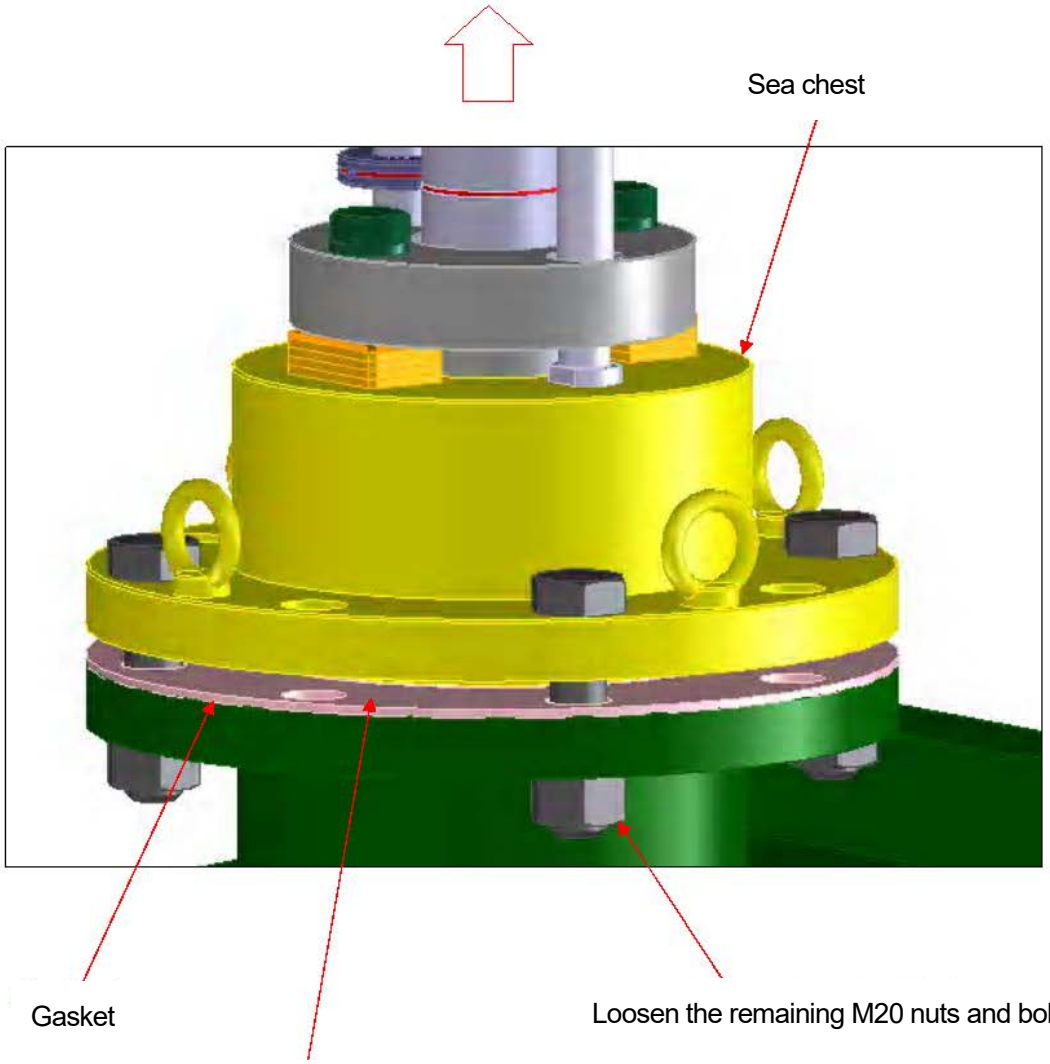


Remove M20 bolts and nuts in only 4 places of 8 places. Leave diagonal 4 places.

**For safety, it is strictly forbidden to remove everything.**

6. Sea chest removal: Pull up the sea chest

4-20M Loosen bolts and nuts and pull up the sea chest.




Make a gap. The remaining water in the valve is discharged.

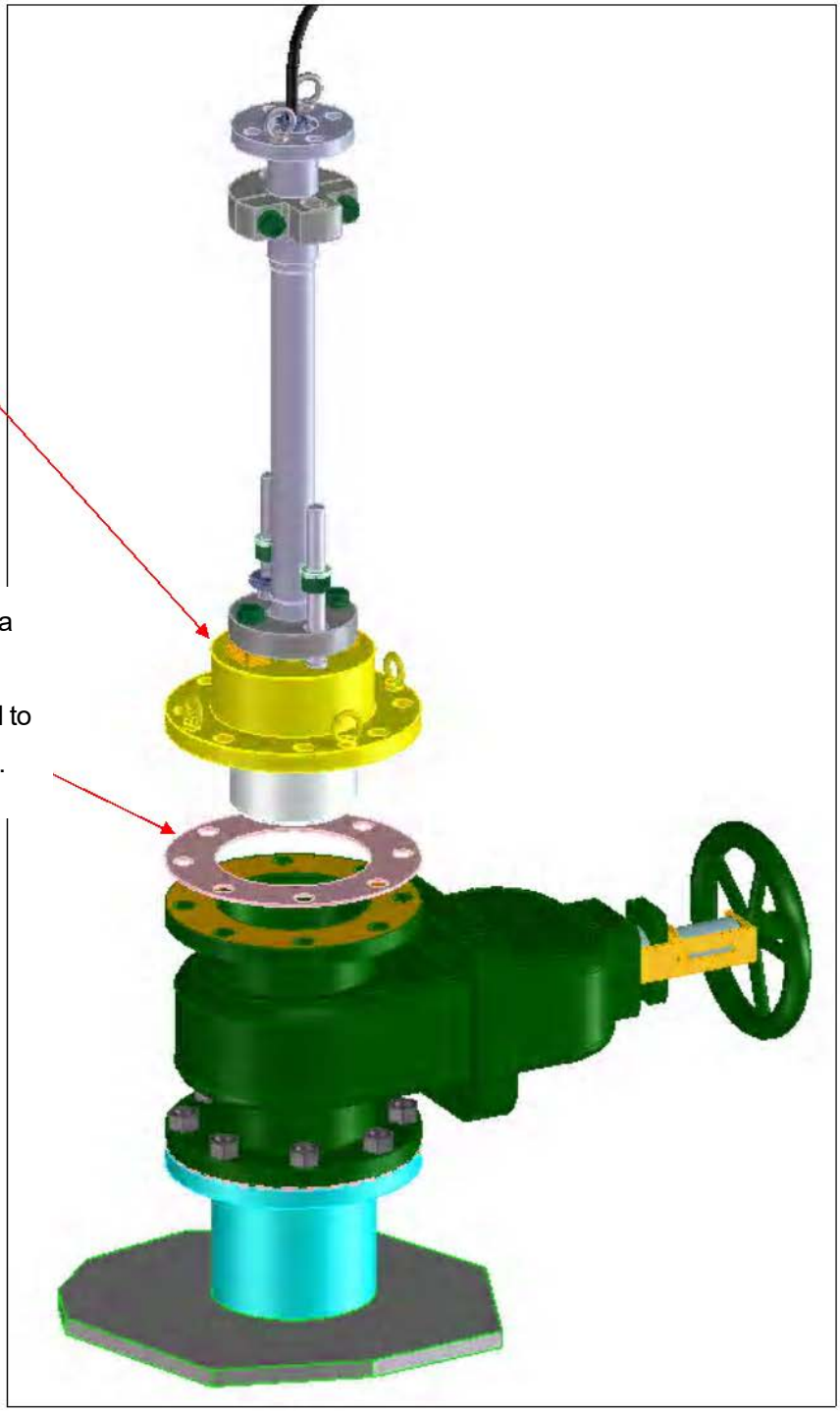
**If a large amount of water is discharged, tighten the bolts and nuts and check the opening and closing of the valve.**

The sea chest and gasket may be in close contact and cannot be easily removed.

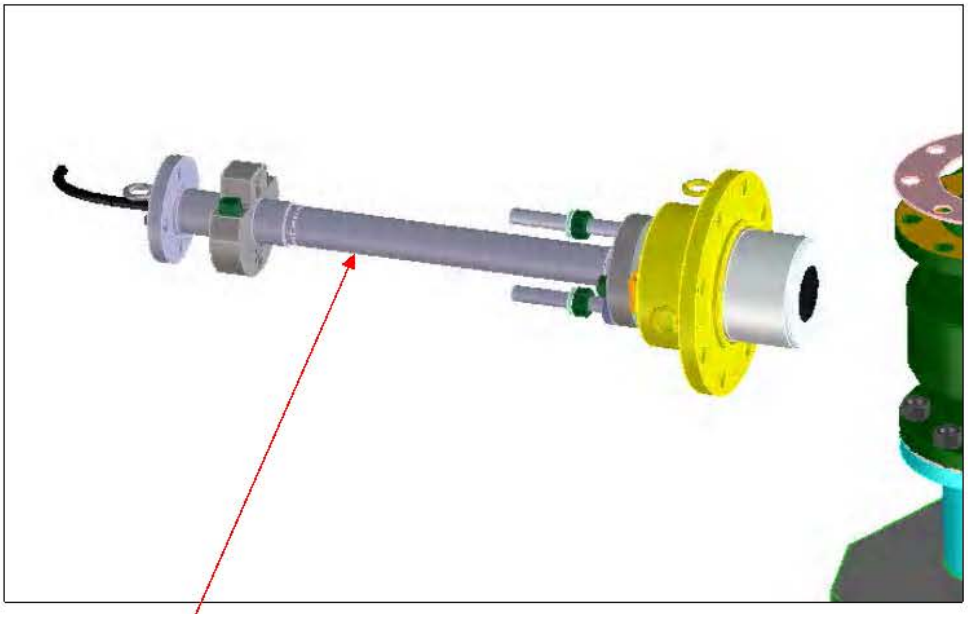
7. Sea chest separation: Remove the sea chest completely

Separate sea chest

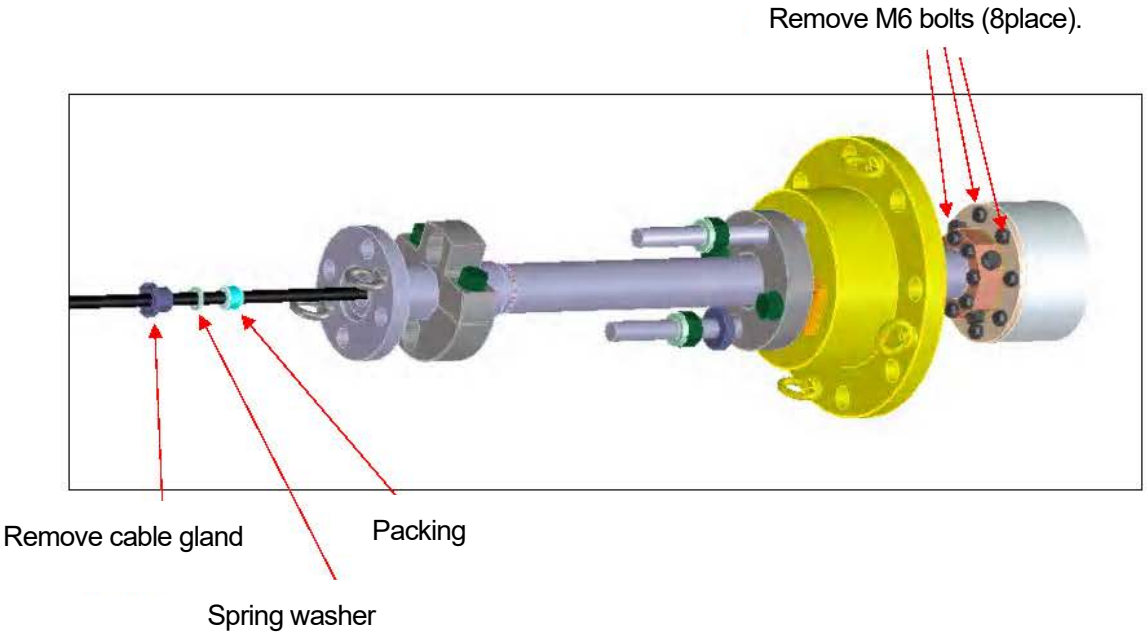
Replace the gasket with a new one (MPPK30863).
A liquid sealing is applied to the surface of the gasket.



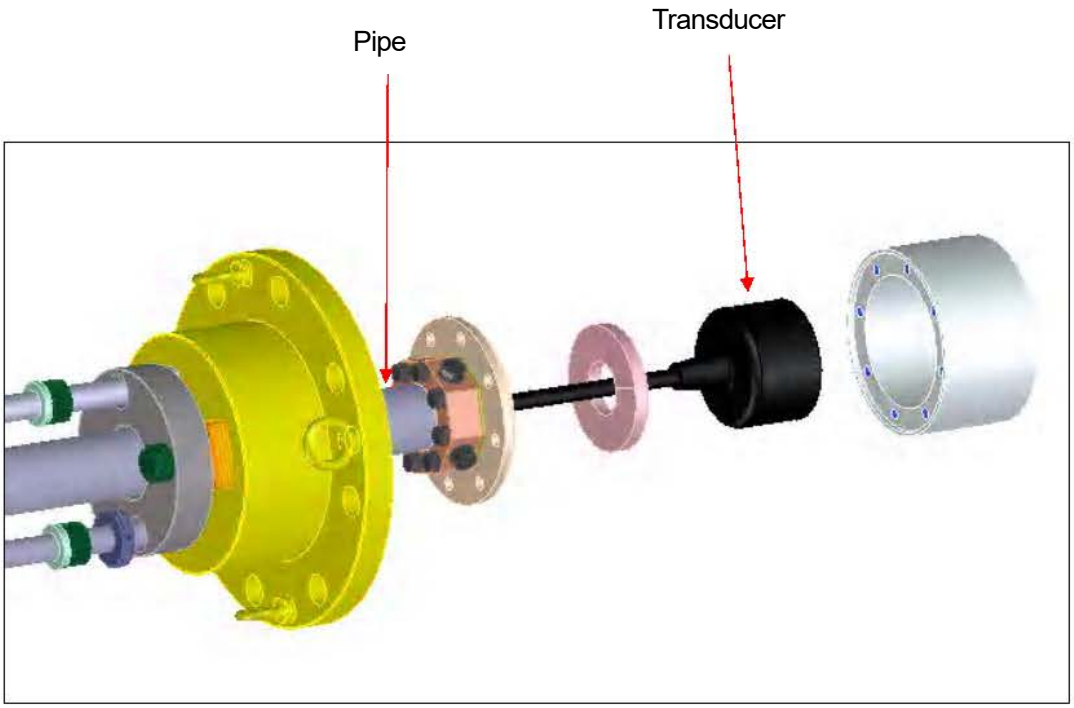
8. Pipe moving: slide the pipe



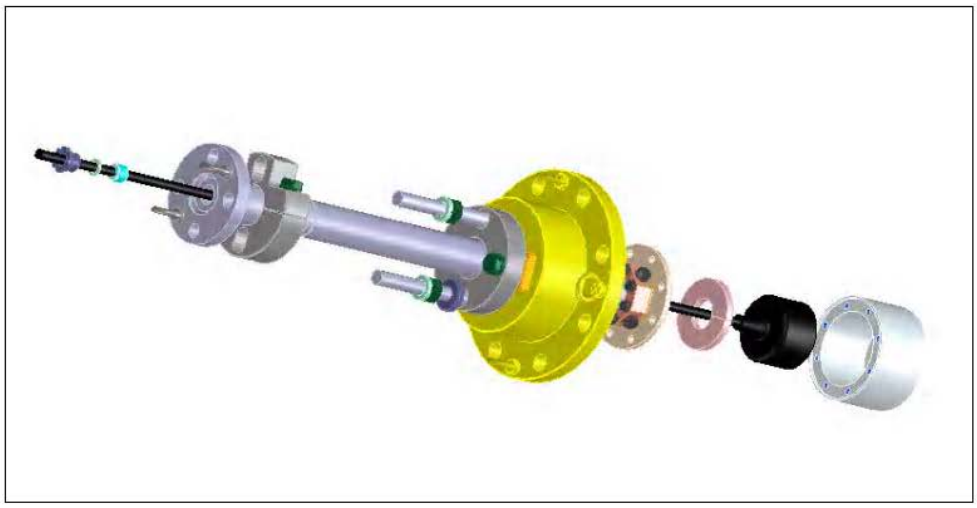

9. Cable gland and transducer mounting bolt removal



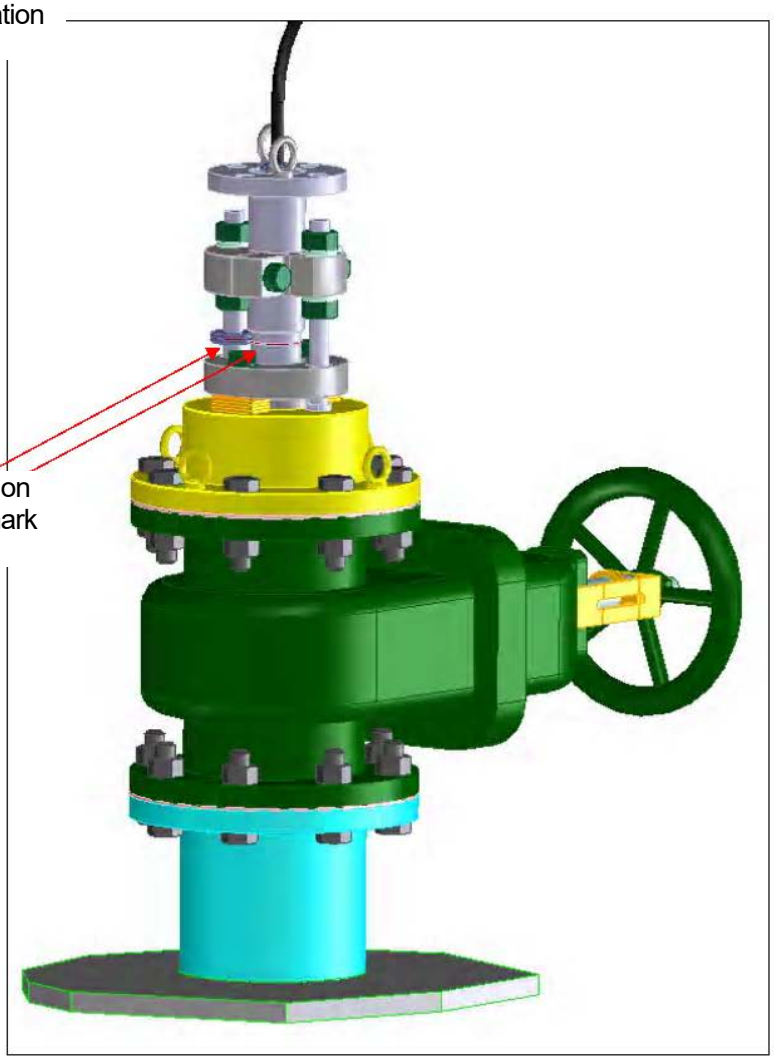

10. Transducer removal: Pull out the transducer from the pipe



11. Reassembly: Replace the oscillator and assemble in the reverse order of disassembly.



12. Final confirmation




13. After replacing the transducer, be sure to check transducer according to Chapter 2.2.4.1 Measurement of resonance point of frequency using self-test of transducer, 2.2.4.2 Measurement of resonance frequency using a measuring instrument and 2.2.4.3 Measurement of insulation resistance using a measuring instrument before the undercarriage.

# Chapter6 Replacing parts of NQA-4327 Processing unit

## 6.1 Parts to be replaced

| Circuit Name | Type No. | Code No. | Remarks |
|---|---|---|---|
| Main Unit | CDJ-2594 | CDJ2594 | |
| TX/RX Unit (Select one from the right) | CMN-869-20 | CMN869-20 | 200kHz |
| | CMN-869-50 | CMN869-50 | 50kHz |
| | CMN-869-22 | CMN869-22 | 200kHz / 200kHz |
| | CMN-869-25 | CMN869-25 | 200kHz / 50kHz |
| | CMN-869-55 | CMN869-55 | 50kHz / 50kHz |
| Power Supply Unit | CBD-2016 | CBD2016 | |
| Interface Unit | CQD-2348 | CQD2348 | |

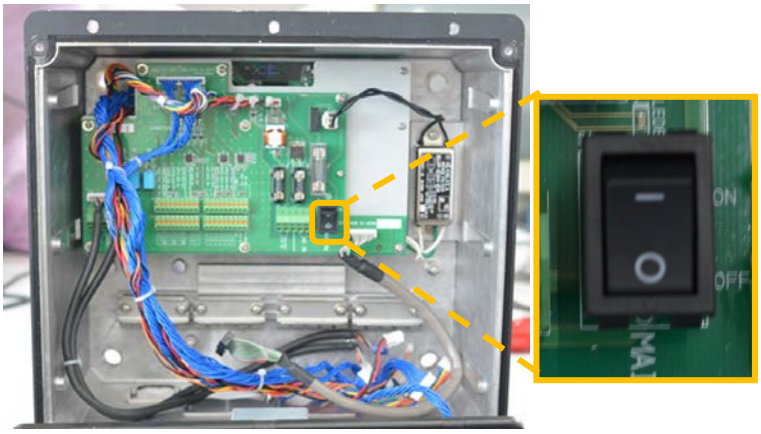
## 6.2 Preparation Tool

| Type No. | Qty. | Remarks |
|---|---|---|
| Phillips screwdriver No.2 (For M3 and M4) | 1 | |
| Nut driver(4mm, 5.5mm, 7mm) | 1 | |
| Hex key (2.5mm) | 1 | |
| Flathead screwdriver (Width 3.5 × Thick 0.5mm recommended) | 1 | |

**⚠ CAUTION**

Be sure to turn off the MAIN SW of the processing unit when replacing each parts.

Removing the front cover according to “Before maintenance” in chapter 2 and the switch mounted on Interface unit (CQD-2348) is off.

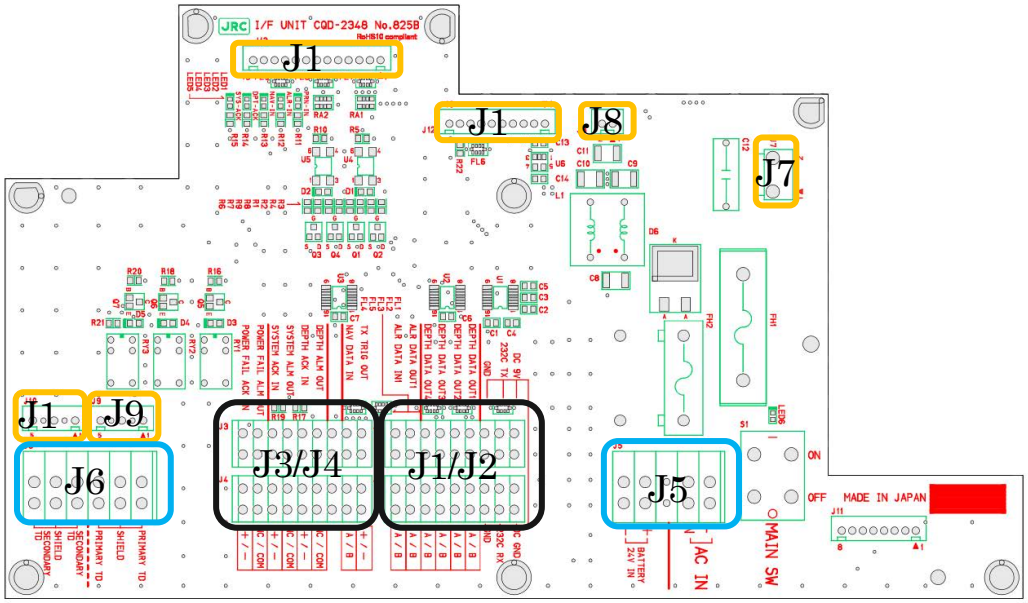


## 6.3 Parts replacement procedure

### 6.3.1 Interface unit CQD-2348

Removing the front panel according to “Before maintenance” in chapter 2 and the switch mounted on Interface Unit (CQD-2348) is off.

1) Remove the cable connected to the Interface unit CQD-2348 in the rear case.

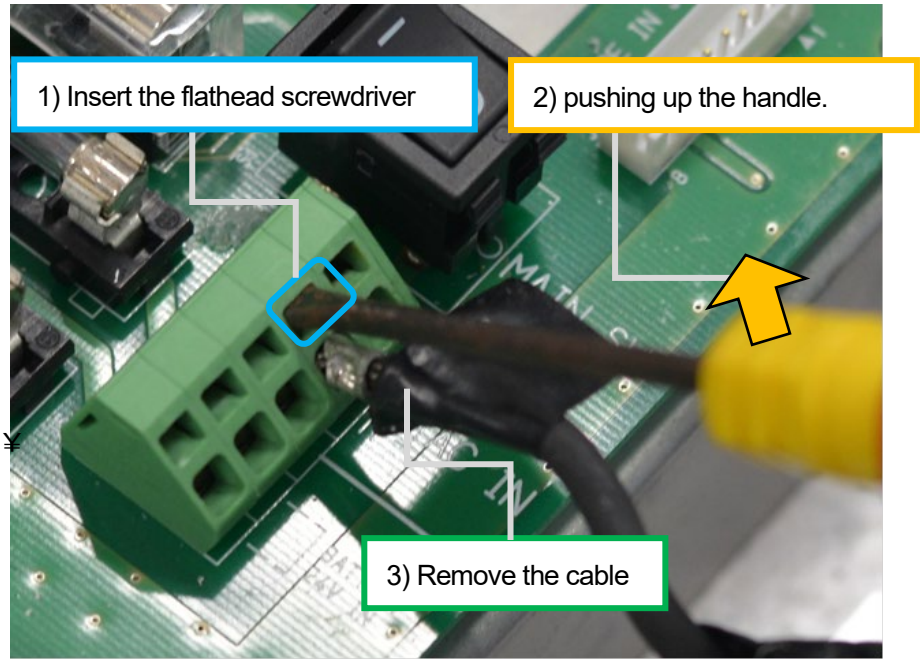



●How to remove the J5 and J6 cables

**Make sure that the breaker on the ship’s power supply board that is wired to AC input is turned off.**

The cable at the bottom of the connector can be removed by pushing a flathead screwdriver with a fine tip into the hole at the top of the connector and pushing up the handle.

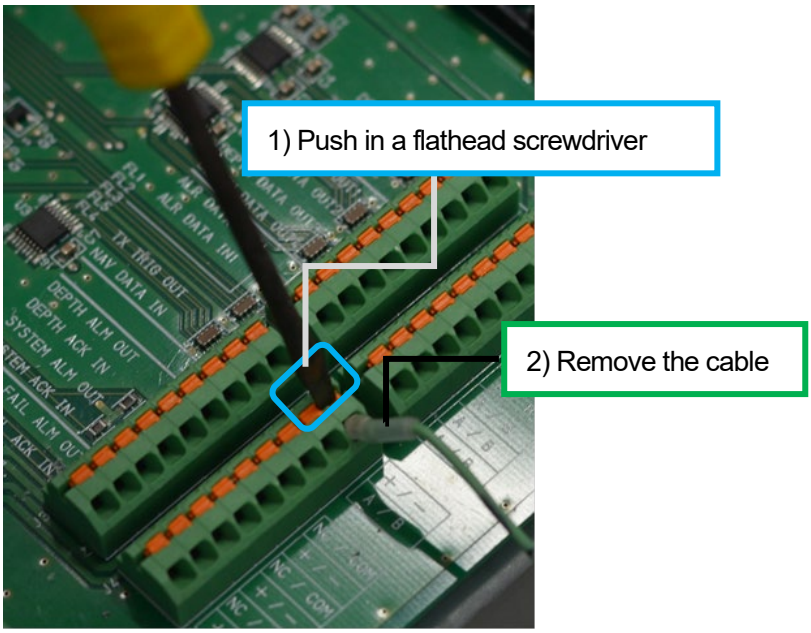
* Flathead screwdriver: Width 3.5 × Thick 0.5mm recommended



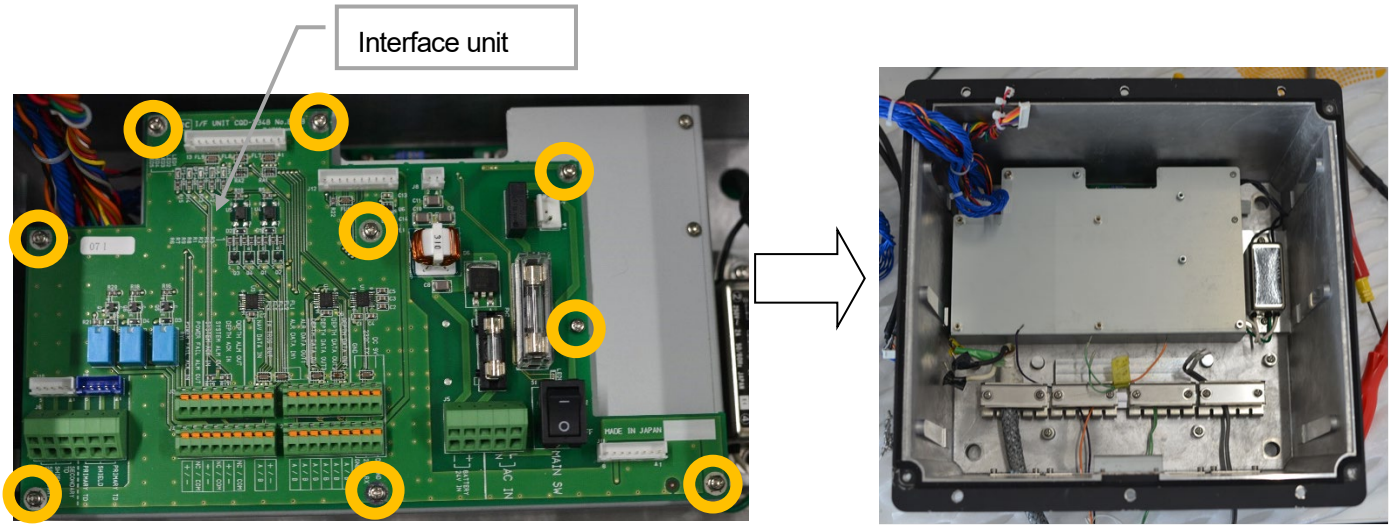
●How to remove the J1/J2 andJ3/ J4 cables

The cable at the bottom of the connector can be removed by pushing the button at the top of the connector with a flathead screwdriver.

* Flathead screwdriver: Width 3.5 × Thick 0.5mm recommended




2） Remove the screws (M4 x 9) that fix the Interface unit CQD-2348, and remove the Interface unit.



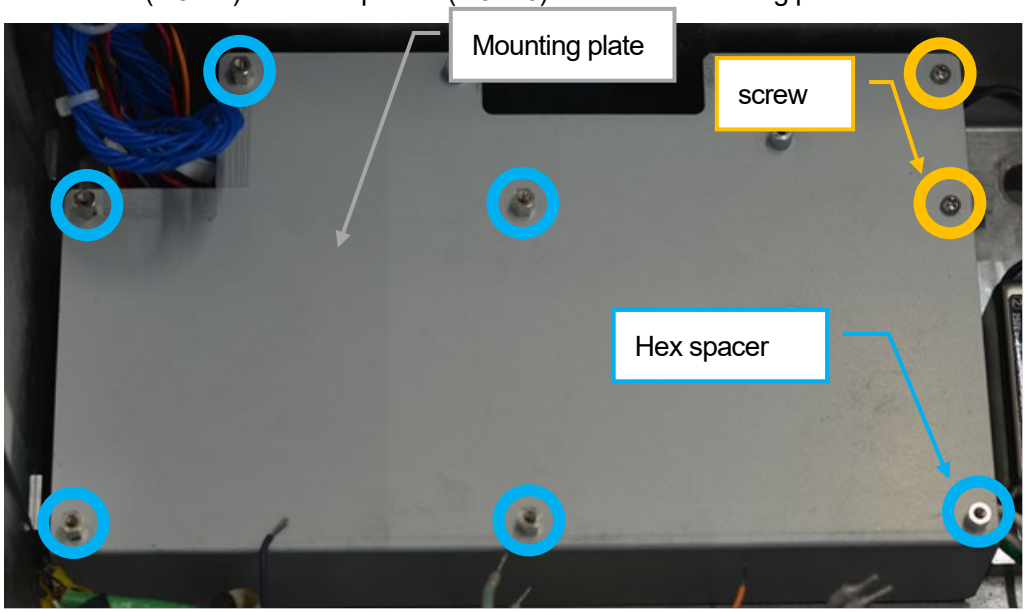

3) Replace the Interface unit CQD-2348 and assemble in the reverse order.

## 6.3.2 Power supply unit CBD-2016

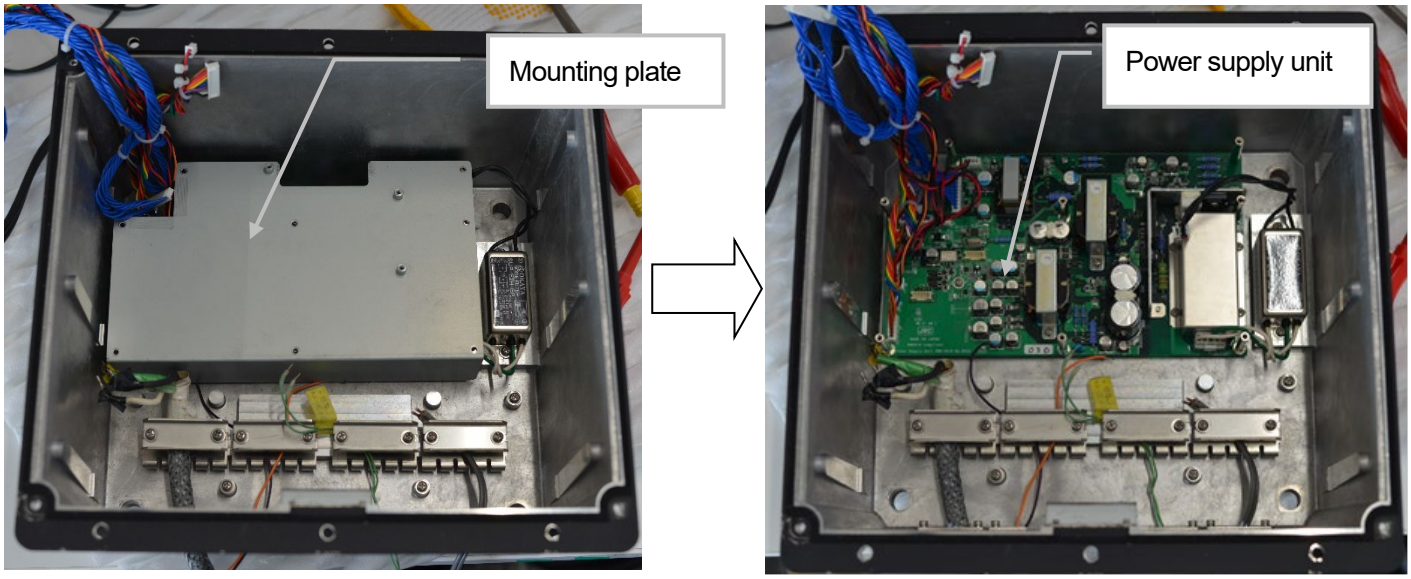
Removing the front panel according to “Before maintenance” in chapter 2 and the switch mounted on Interface Unit (CQD-2348) is off.

1) Remove the Interface unit according to Section 6.3.1.

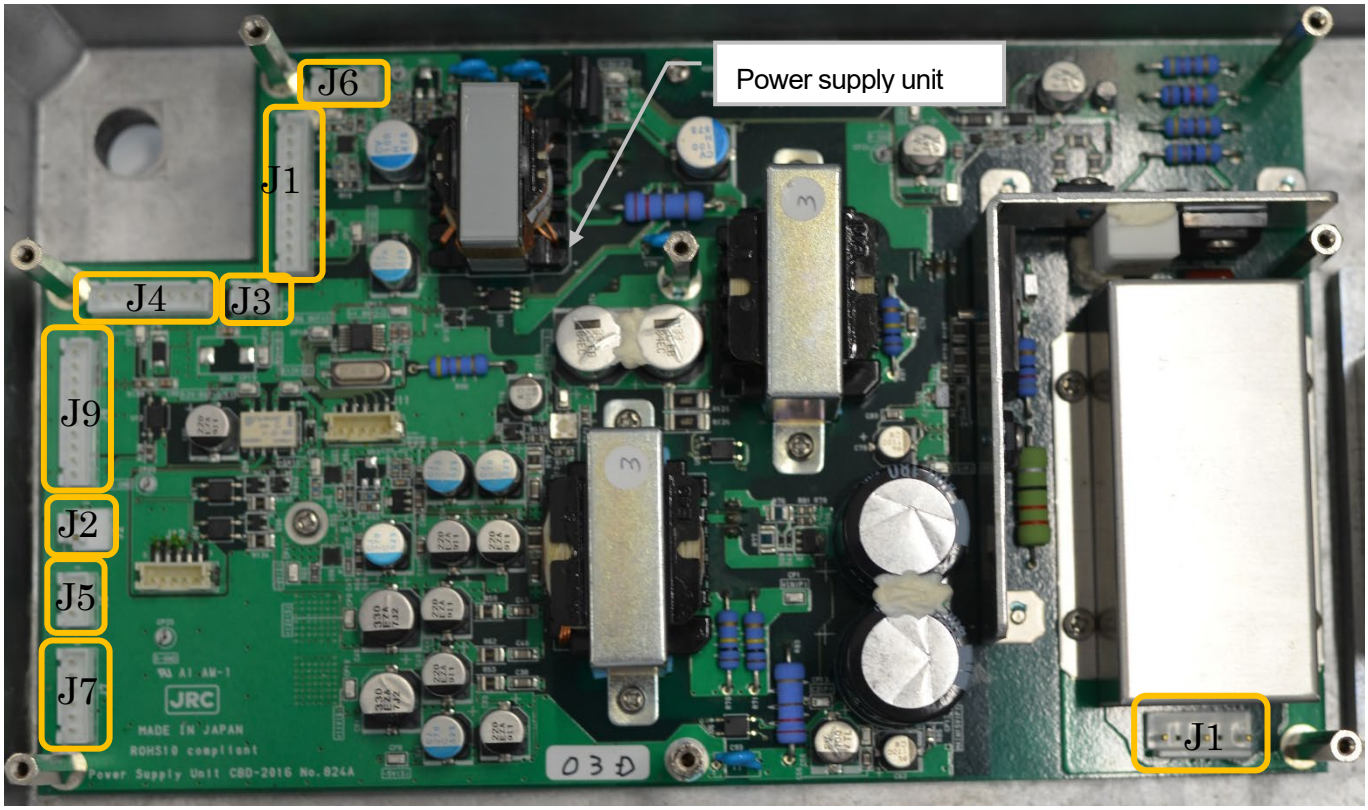
2) Remove the screws (M3 x 2) and hex spacers (M3 X 6) that fix the mounting plate.



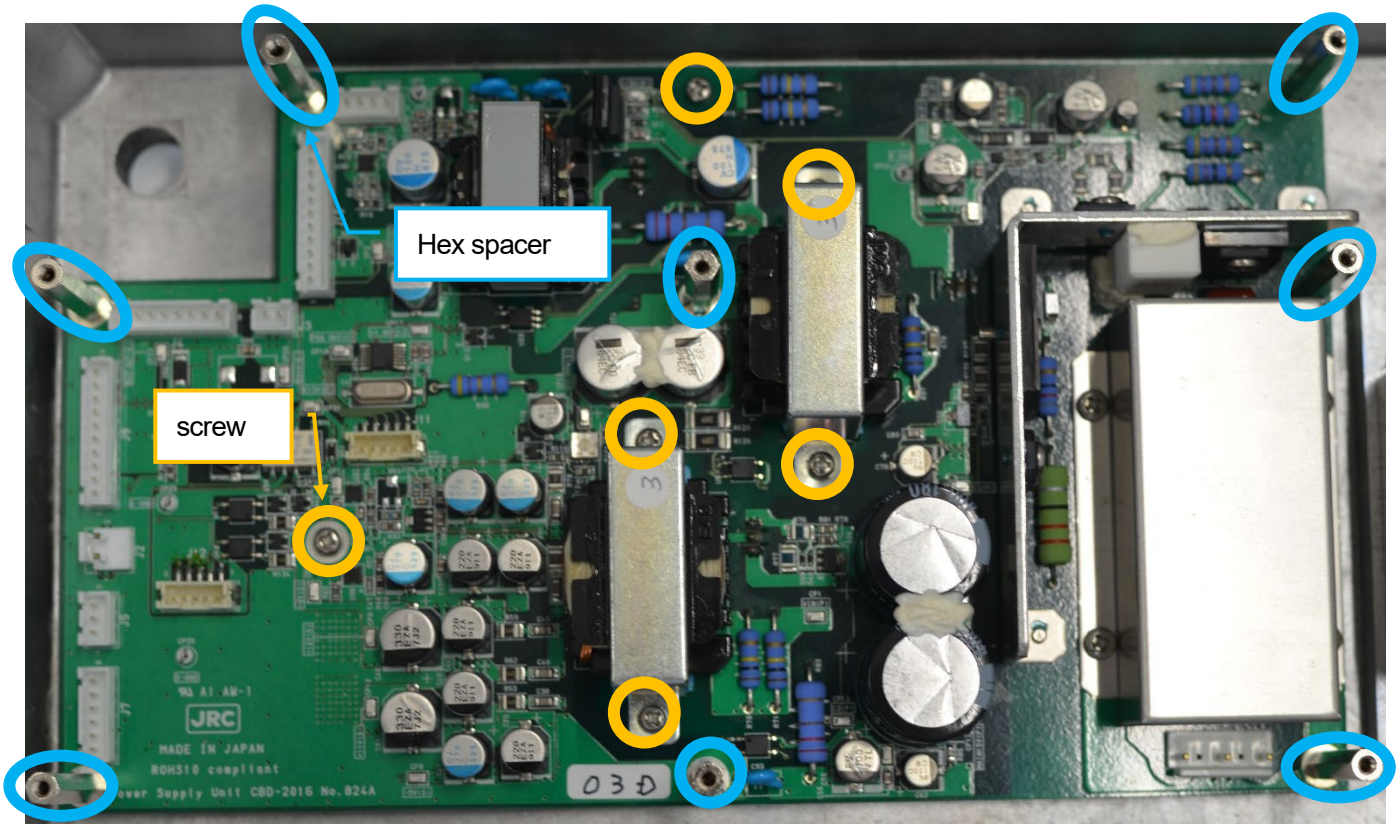

3) Remove the mounting plate



4) Remove the cables (8 cables) connected to the Power supply unit CBD-2016.

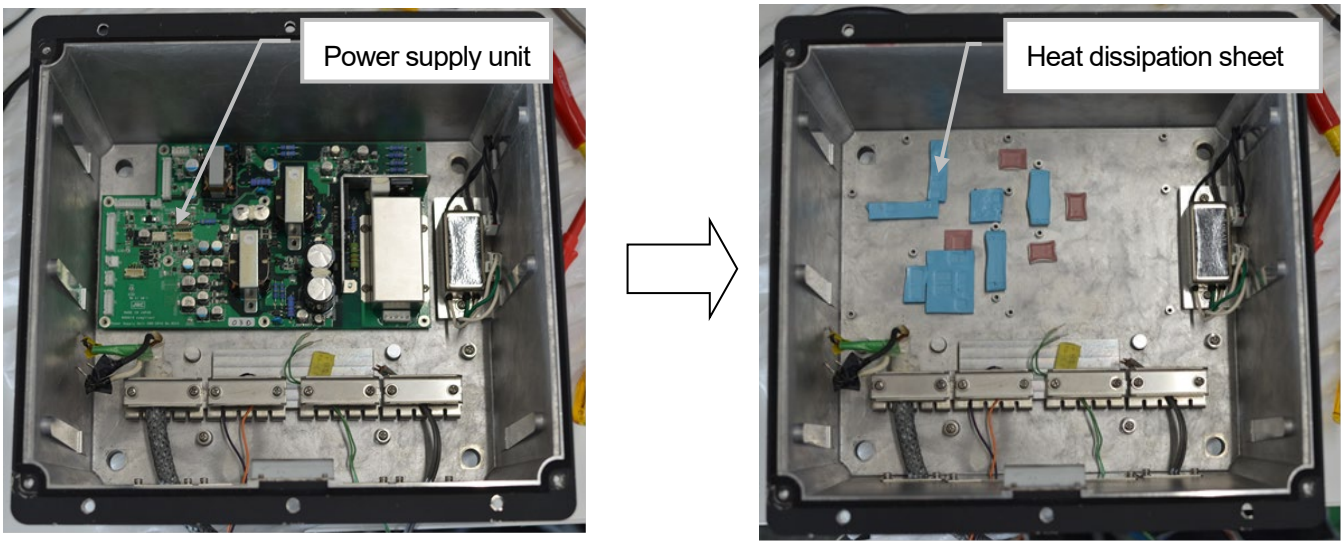



5) Remove the screws (M3 x 6) and hex spacers (M3 x 8) that fix the Power supply unit CBD-2016.



6) Remove the Power supply unit CBD-2016.

* Note: The heat dissipation sheet can be reused. When the heat dissipation sheet adheres to the Power supply unit, refer to the figure on the lower right and attach the heat dissipation sheet to the rear case.

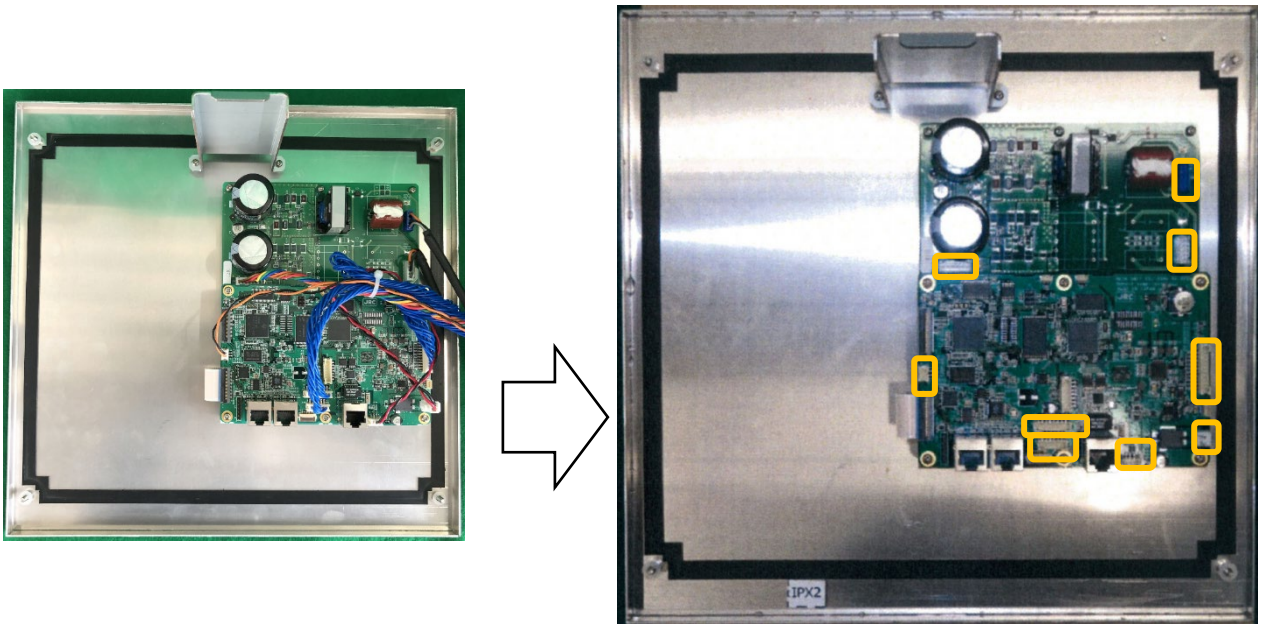



7) Replace the Power supply unit CBD-2016 and assemble in the reverse order.

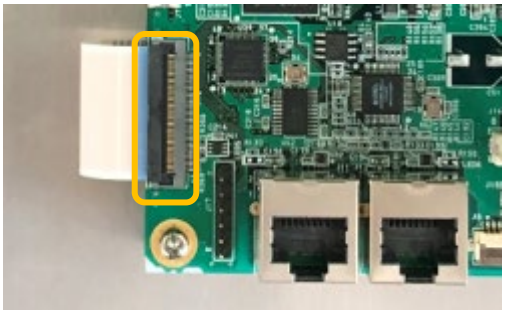
## 6.3.3 Main unit CDJ-2594

Removing the front panel according to “Before maintenance” in chapter 2 and the switch mounted on Interface Unit (CQD-2348) is off.

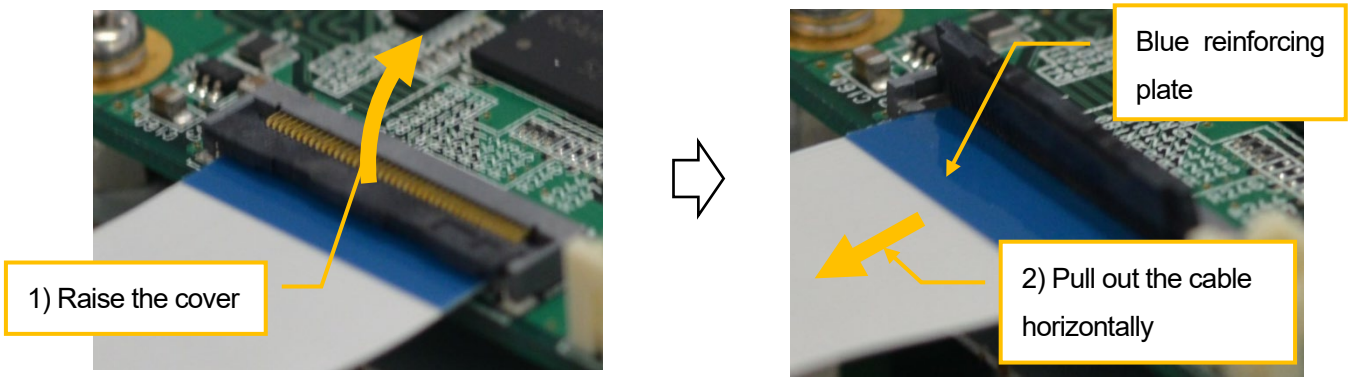
1) Remove the front cover cables (9cables) connected to the rear case.



2)Remove the one FFC cable of the Main unit CDJ-2594.

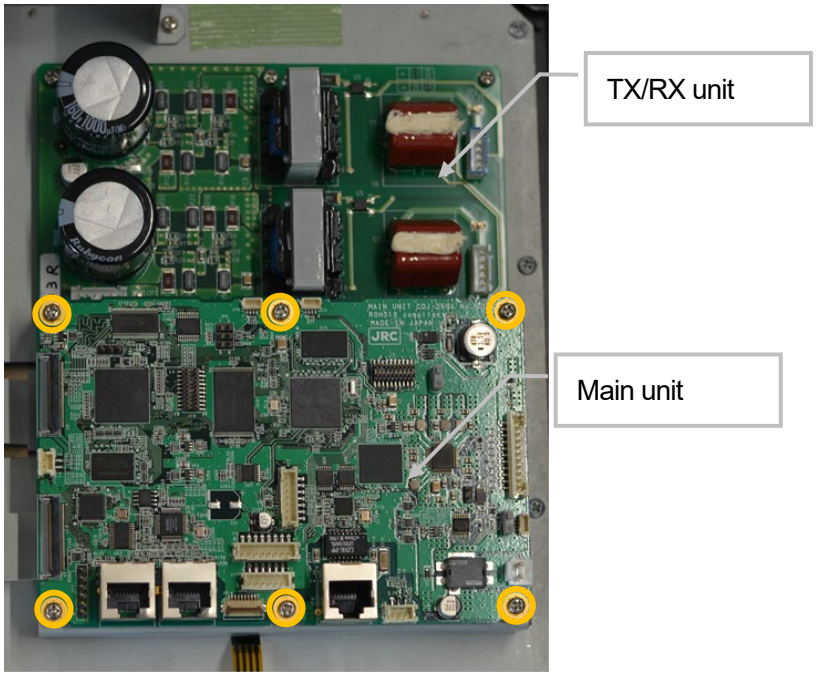


・How to remove FFC cable




* Note: When connecting the cable, make sure that the blue reinforcing plate is on the upper side (do not put the blue reinforcing plate on the board side).

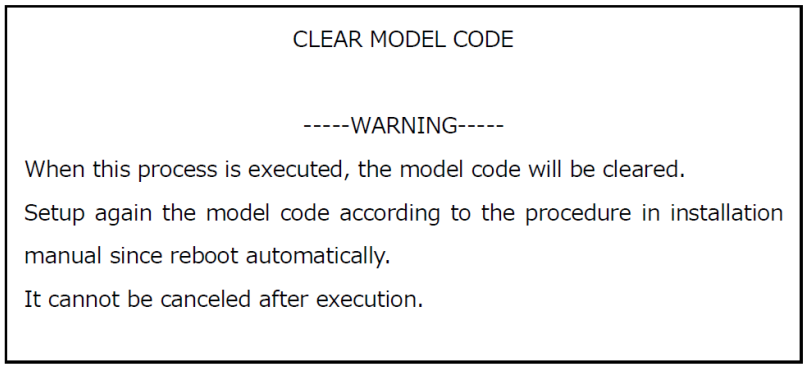
3) Remove the screws (M2 x 6) of the Main unit CDJ-2594.




4) Replace the main unit CDJ-2594 and assemble in the reverse order.

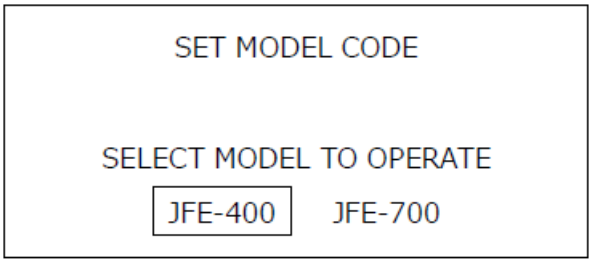
*** After replacing the main unit, set the model type. When the settings are made on the "SET MODEL CODE" screen when the power is turned on after replacement, the work after 5) is unnecessary.**

5) After turning on the power, enter "7891" in Code Input from the Menu to display the model code clear dialog.




6) Press ✓ the button.

7) Reboot the equipment.




8) The model selection screen will appear, so select the target device.

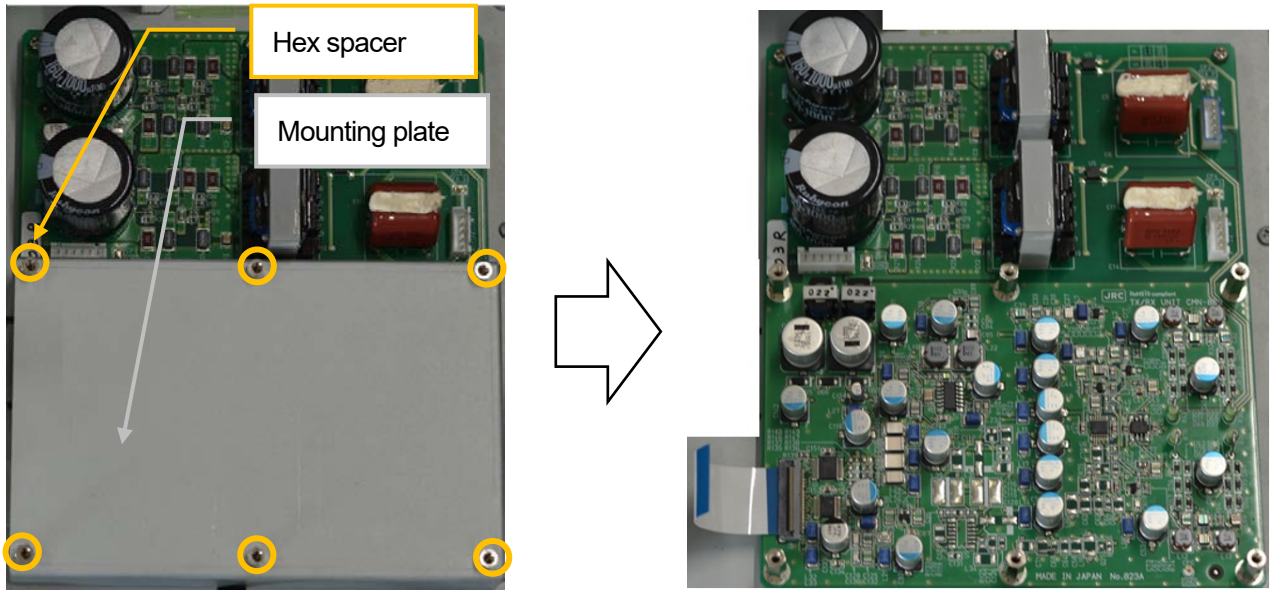
This completes the replacement of the CDJ-2594.

## 6.3.6 TX/RX unit CMN-869

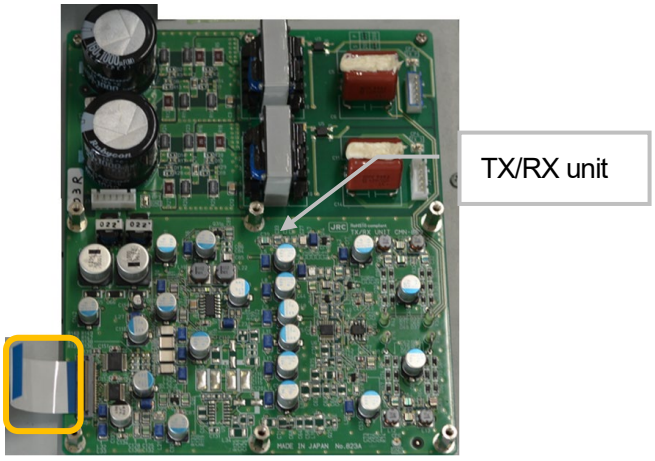
Removing the front panel according to “Before maintenance” in chapter 2 and the switch mounted on Interface Unit (CQD-2348) is off.

1) Remove the Main unit according to Section 6.3.5.

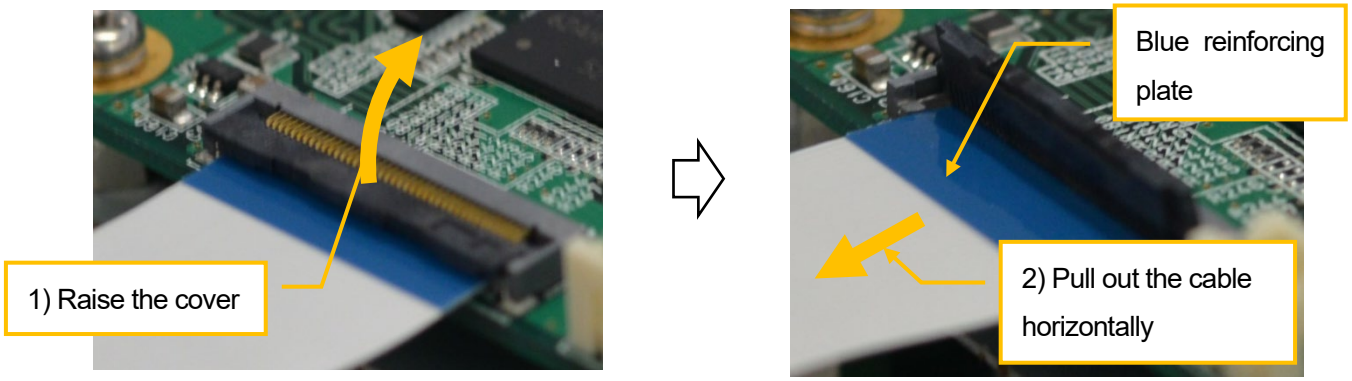
2) Remove the hex spacers (M3 x 6) and remove the mounting plate.




3) Remove one ribbon cable from the TX/RX unit CMN-869.



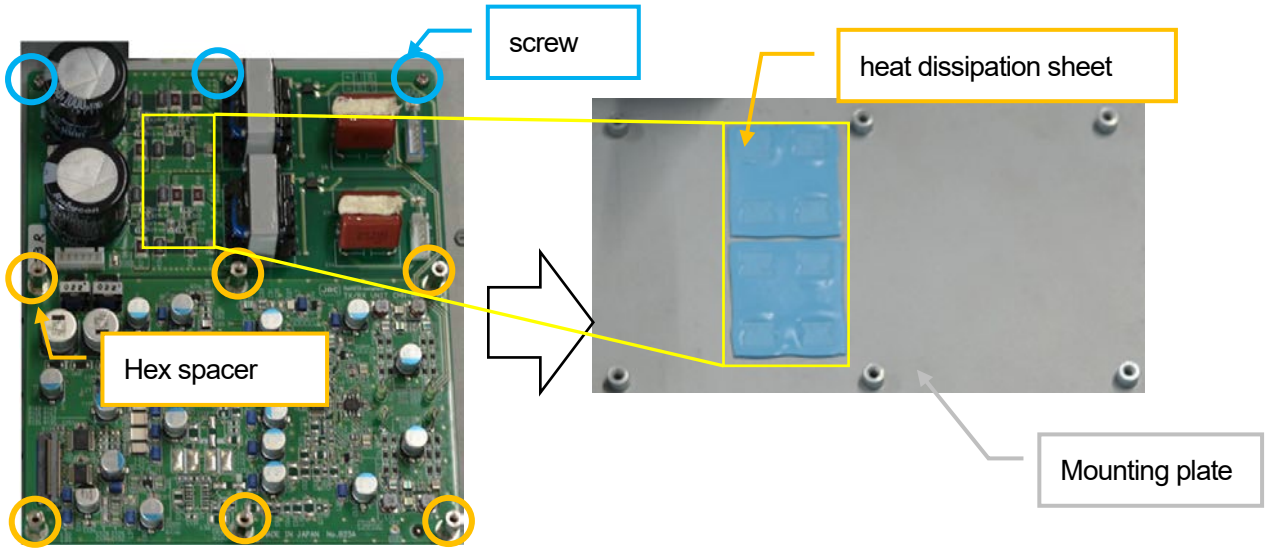

・How to remove FFC cable




* Note: When connecting the cable, make sure that the blue reinforcing plate is on the upper side (do not put the blue reinforcing plate on the board side).

4) Remove the screws (M3 x 3) and hex spacers (M3 x 6) that fix the TX/RX unit CMN-869.

* Note: The heat dissipation sheet can be reused. When the heat dissipation sheet adheres to the Power supply unit, refer to the figure on the lower right and attach the heat dissipation sheet to the mounting plate.




5) Replace the TX/RX unit CMN-869 and assemble in the reverse order.

# Chapter7 Replacing parts of NWZ-1650 Display unit

**⚠ CAUTION**

The Display unit NWZ-1650 is used as a common display, but the display unit of other models and the internal "processing unit CMJ-612" cannot be used as the Echo Sounder JFE-400.

When replacing the display unit or processing unit, order the Echo Sounder-dedicated display or CMJ-612-E.

## 7.1 Parts to be replaced

| Circuit Name | Type No. | Code No. | Remarks |
|---|---|---|---|
| Processing unit | CMJ-612-E | CMJ612-E | Echo sounder dedicated model |
| LCD front panel Unit | CCN-1650-U | CCN-1650-U | Including following unit<br>CGC-600 Buzzer unit<br>CMH-2501 LCD interface unit<br>CCN-1650 LCD unit<br>This unit can use the same unit using in GPS. |

## 7.2 Preparation Tool

| Type No. | Qty. | Remarks |
|---|---|---|
| Phillips screwdriver No.2 (For M3) | 1 | |
| Flathead screwdriver<br>(Width 3.5 × Thick 0.5mm recommended) | 1 | |

## 7.3 Parts replacement procedure

**⚠ CAUTION**

Be sure to disconnect the LAN cable to stop the power supply to the display unit when replacement each unit.

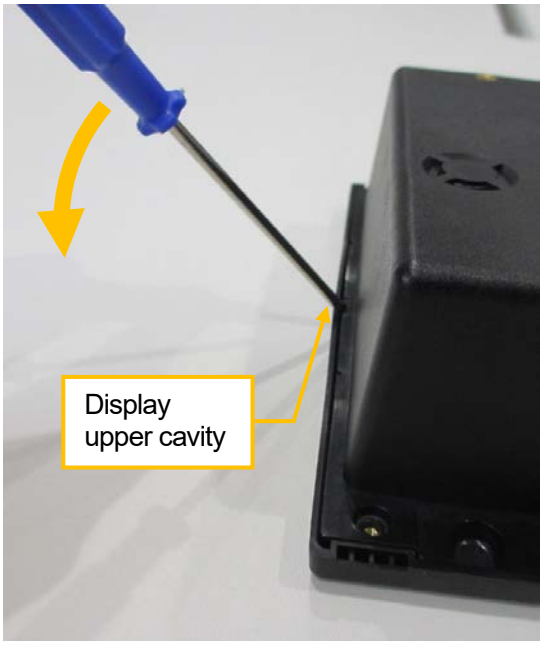
### 7.3.1 Processing unit CMJ-612-E

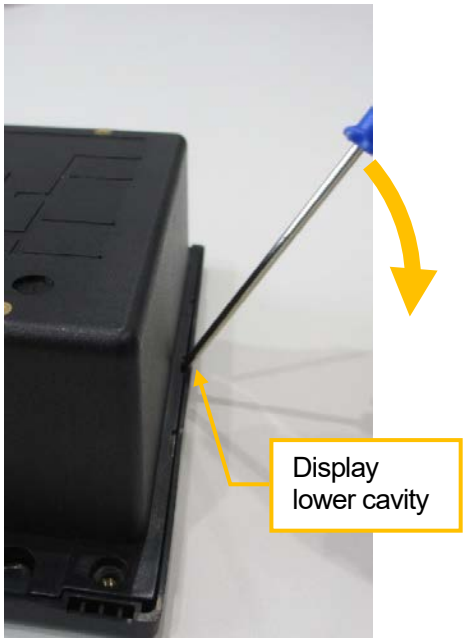
The processing unit replacement unit is fixed to an aluminum sheet. Replace the unit together with the aluminum sheet.

1) Remove the display.

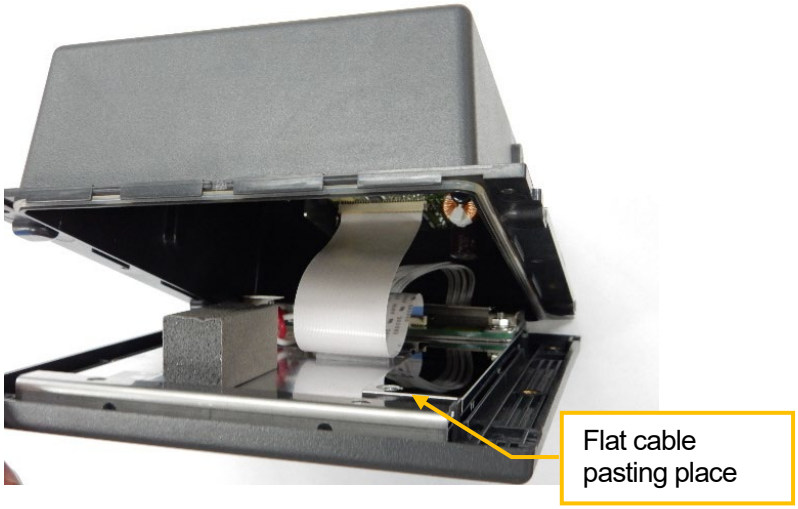
2) Remove the 6 screws from the back.


3) Insert a flathead screwdriver into the upper and lower cavities and open the frame by pushing up.

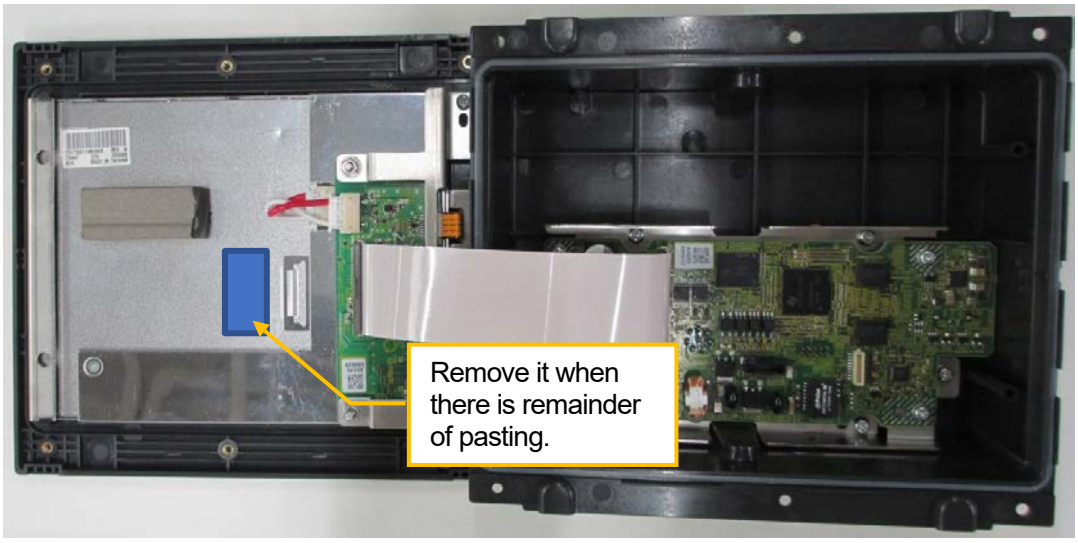


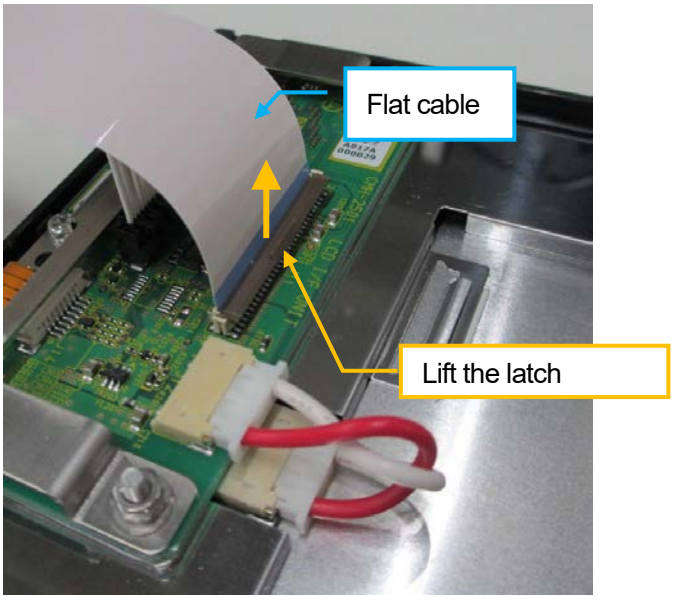
4) Peel the pasted flat cable. Be careful not to damage the LCD when peeling off.



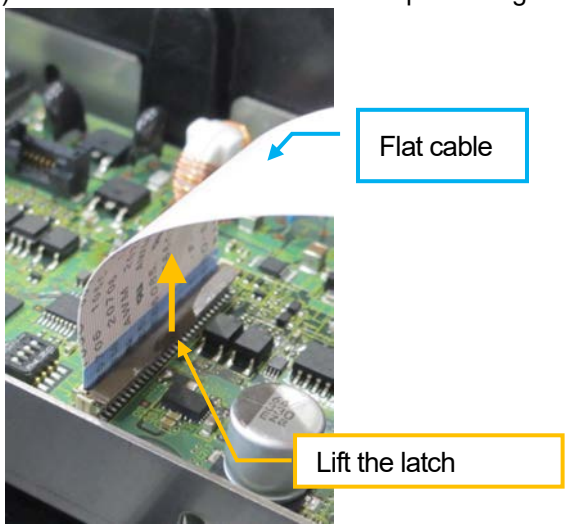

Opened frame



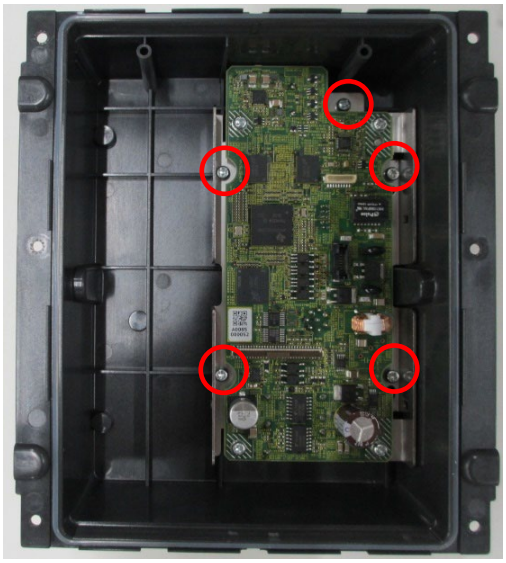

5) Lift the latch of the connector on the LCD side and remove the flat cable.

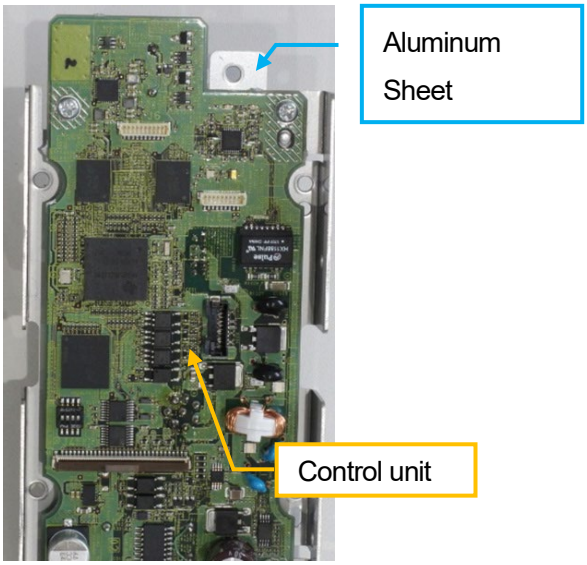


6) Lift the latch of the connector of the processing unit and remove the flat cable. Discard the removed flat cable.




7) Remove the 5 screws from the aluminum sheet on which the control unit is fixed and remove the control unit.

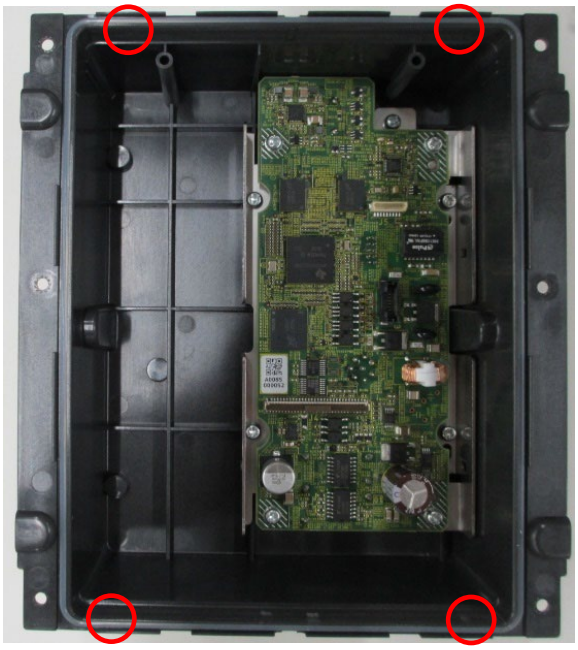





8) Remove the thumb screw at the rear. Remove the hexagonal nuts by using a hexagonal wrench.

9) Replace the control unit. When installing a flat cable, bring down the latch and fix it.

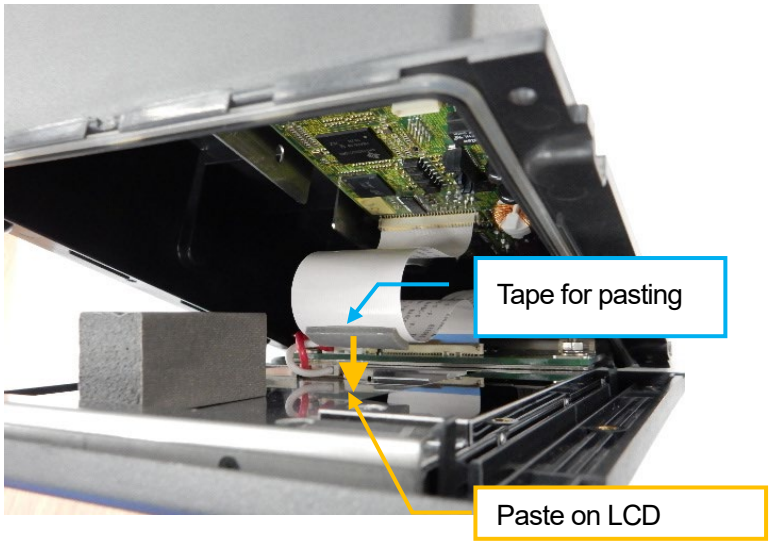
10) Mount a waterproof packing. Match the positions with the 4 positioning projections.



11) Install the flat cable. Lower the latch and fix.

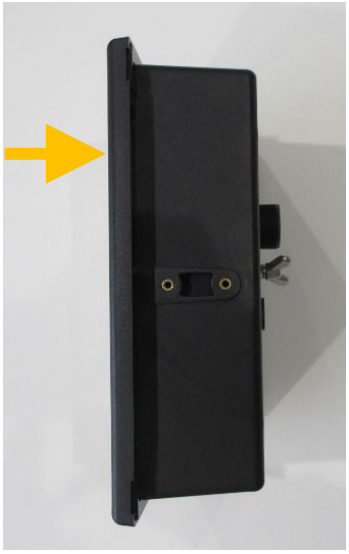
Casing in mounted state.

12) Paste the flat cable. Hold down for about 5 seconds.



13) Close the LCD and push it in.

Push in



14) Tighten the screws.

## 7.3.2 LCD panel unit CCN-1650-U

When replacing the LCD, the entire LCD front panel unit shall be replaced.

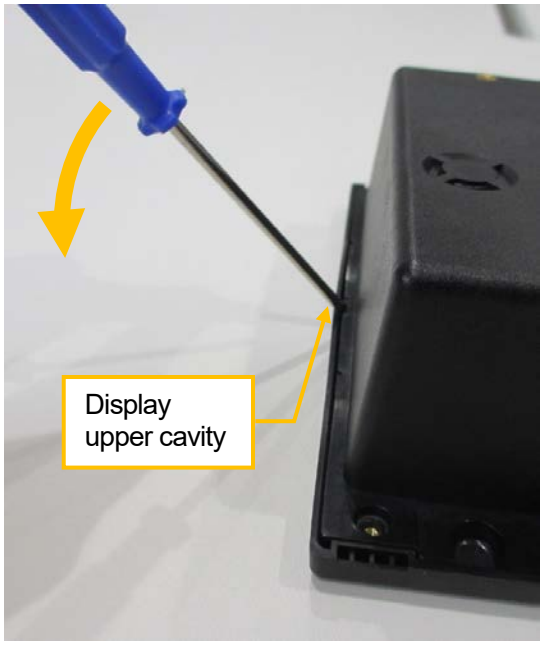
The LCD front panel unit (CCN-1650-U) comprises the following units.

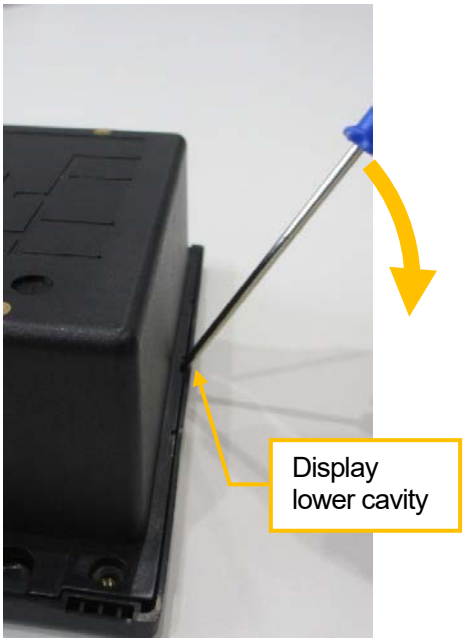
| Type | Model name | Remarks |
|---|---|---|
| CGC-600 | Buzzer unit | Circuit board of the built-in buzzer |
| CMH-2501 | LCD interface unit | Interface between the processing unit and LCD |
| CCN-1650 | LCD unit | LCD |

1) Remove the display.

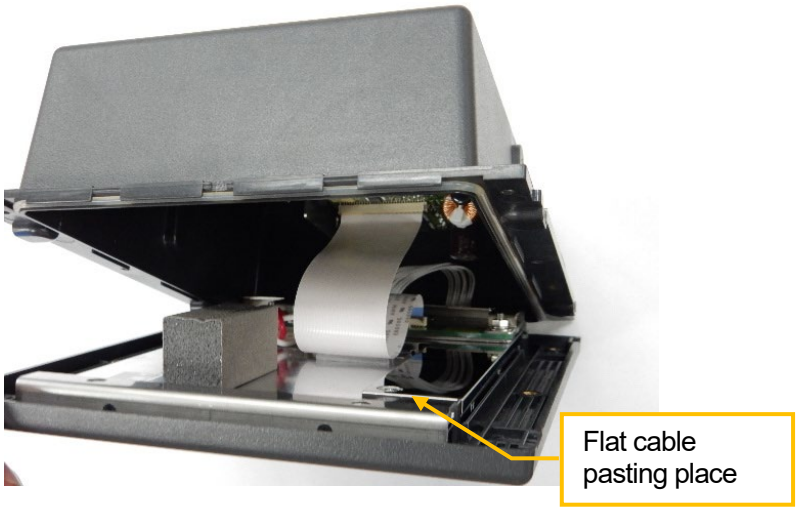
2) Remove the 6 screws from the back.

3) Insert a flathead screwdriver into the upper and lower cavities and open the frame by pushing up.



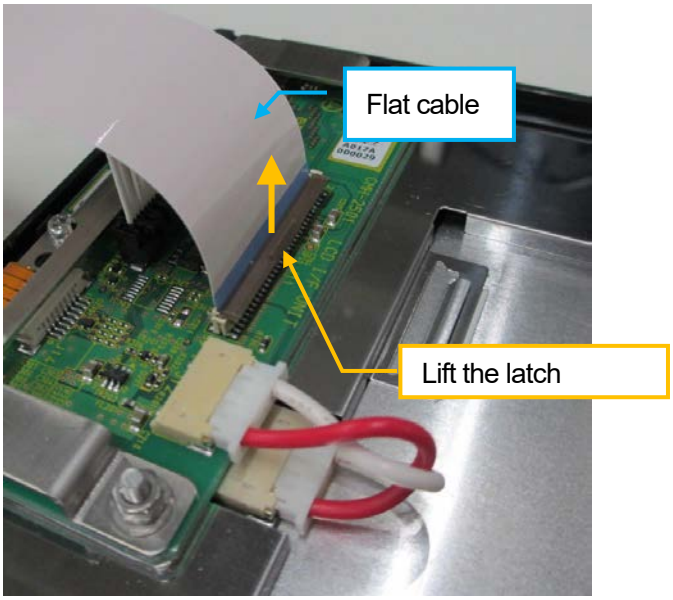




4) Peel the pasted flat cable. Be careful not to damage the LCD when peeling off.

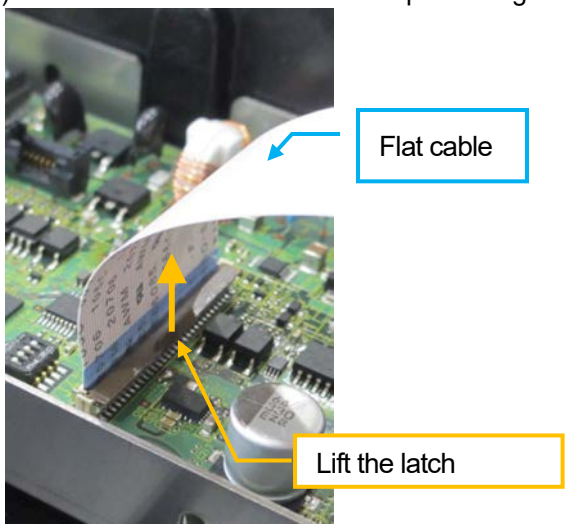



Opened frame

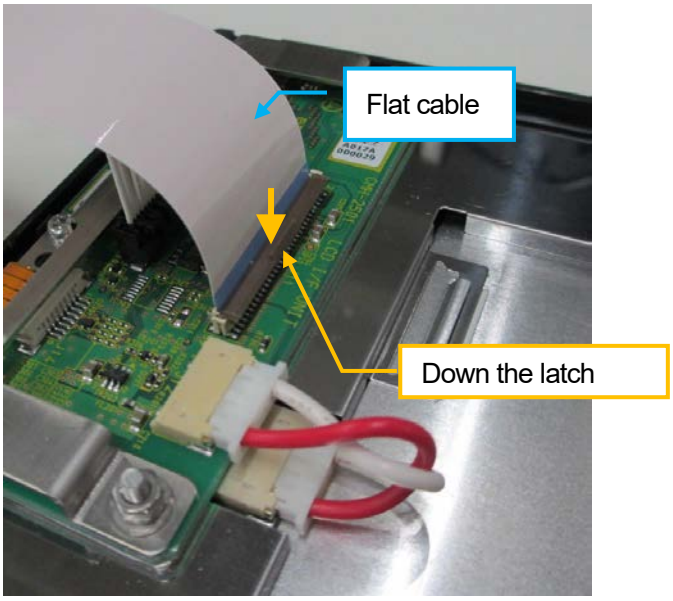
5) Lift the latch of the connector on the LCD side and remove the flat cable.



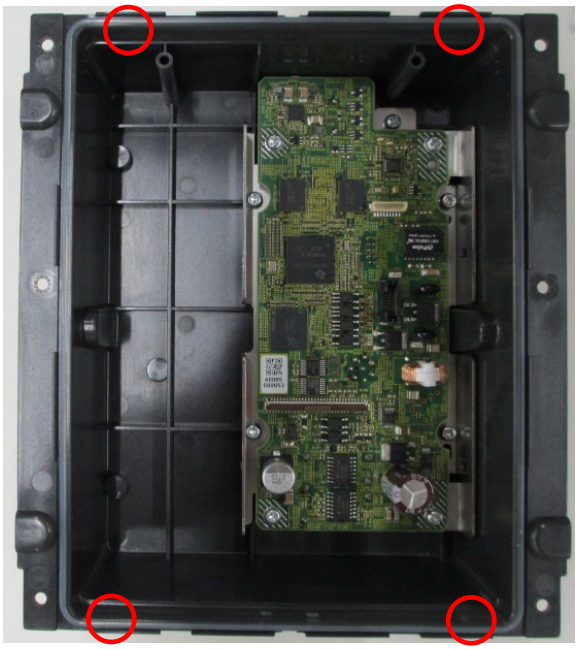

6) Lift the latch of the connector of the processing unit and remove the flat cable. Discard the removed flat cable.




7) Replace LCD front panel and installing the flat cable, bring down the latch and fix it.



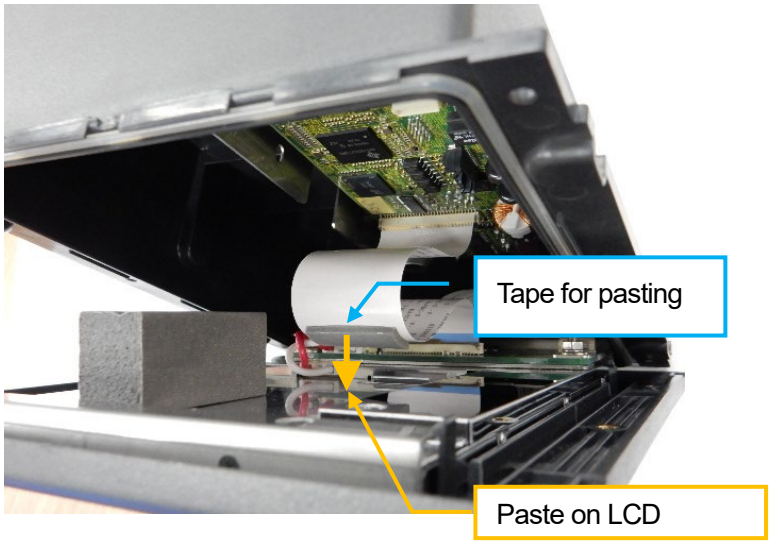
8) Mount a waterproof packing. Match the positions with the 4 positioning projections.



9) Install the flat cable. Lower the latch and fix.

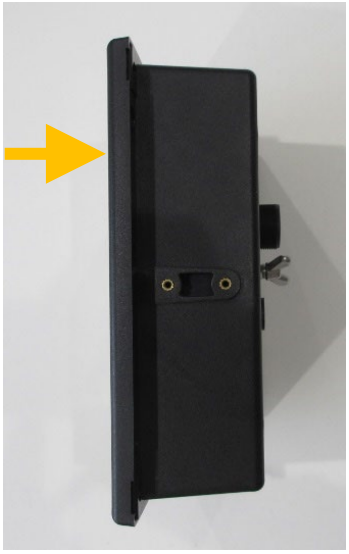
Casing in mounted state.

10) Paste the flat cable. Hold down for about 5 seconds.



11) Close the LCD and push it in.

Push in



12) Tighten the screws.

# Chapter8 Replacing NKG-901 Printer

## ⚠ CAUTION

When replacing NKG-901 printer, be sure to turn off the MAIN SW of the display.
(Refer to Chapter 2 before maintenance)

## 8.1 Parts to be replaced

| Circuit Name | Type No. | Code No. | Remarks |
|---|---|---|---|
| Printer | NKG-901 | NKG901 | |

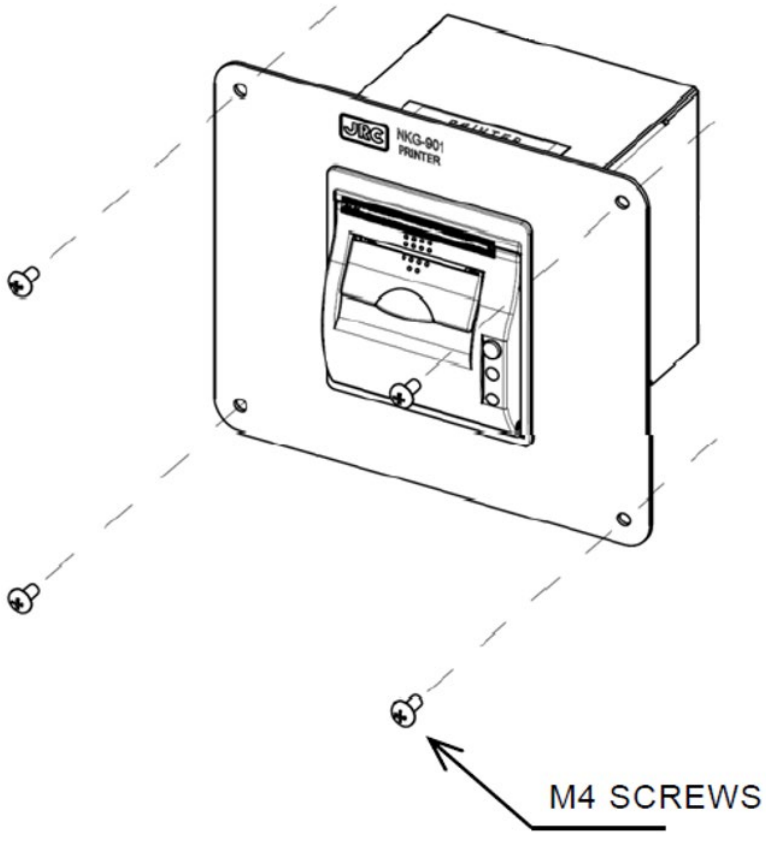
The NKG-901 printer has no internal replacement parts, and the entire unit shall be replaced.

## 8.2 Preparation Tool

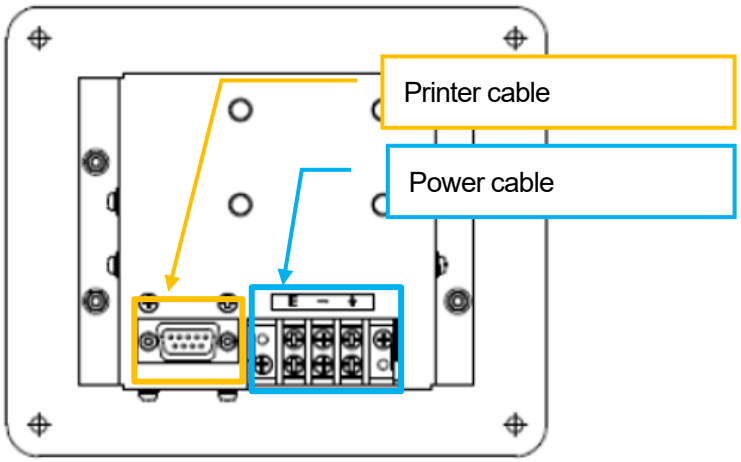
| Type No. | Qty. | Remarks |
|---|---|---|
| Phillips screwdriver No.1 (For M2) | 1 | |
| Phillips screwdriver No.2 (For M4 and M3) | 1 | |

## 8.3 Unit replacement procedure

1) Remove the 4 screws (M4) at the four corners of the NKG-901.



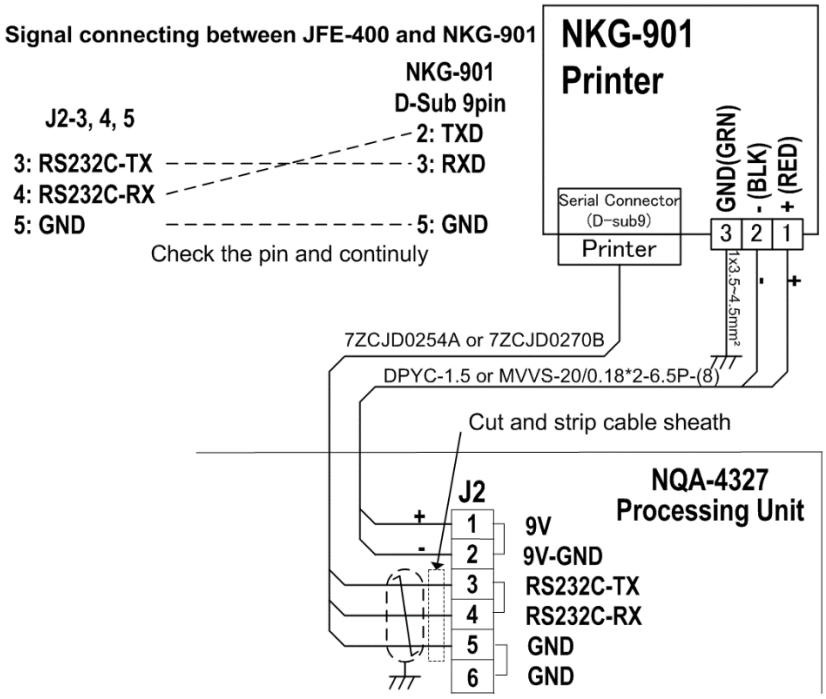
2) Remove the power cable and printer cable on the back of NKG-901.




# ⚠ CAUTION

The removed power cable should not be short.

3) Wire to the replaced unit as shown in the figure below..




4) Re- install and tighten 4 screws (M4) at the four corners of the NKG-901.

# Appendix A Setting Value List

| MENU | MENU 1 | MENU 2 | Setting Value | User setting | | |
|---|---|---|---|---|---|---|
| | | | | Current | 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**<br>7color + WHITE<br>7color + BLUE<br>MONO AMBER<br>MONO YELLOW<br>MONO WHITE | | | Day screen color |
| | | DUSK | **7color + BLACK**<br>7color + WHITE<br>7color + BLUE<br>MONO AMBER<br>MONO YELLOW<br>MONO WHITE | | | Dusk screen color |
| | | NIGHT | **7color + BLACK**<br>7color + WHITE<br>7color + BLUE<br>MONO AMBER<br>MONO YELLOW<br>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**<br>/ DD MM,'YY<br>/ 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 | PRINTER | | | 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<br>**SHORT** MIDDLE LONG<br>**5m** 10m 100m 200m 500m 800m<br>0 **1** 2 3 4 5 6 7 | | | Setting of each frequency of band width |
| | | POWER REDUCTION | | **OFF** ON | | | Setting of transducer power reduction |
| | COMMUNICATION | 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 | | Description |
|---|---|---|---|---|---|---|---|
| | | | | | Current | Change | |
| 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 | MAINTENANCE DATA | 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**<br>7color + WHITE<br>7color + BLUE<br>MONO AMBER<br>MONO YELLOW<br>MONO WHITE | ✓ | ✓ | | ✓ |
| | | DUSK | **7color + BLACK**<br>7color + WHITE<br>7color + BLUE<br>MONO AMBER<br>MONO YELLOW<br>MONO WHITE | ✓ | ✓ | | ✓ |
| | | NIGHT | **7color + BLACK**<br>7color + WHITE<br>7color + BLUE<br>MONO AMBER<br>MONO YELLOW<br>MONO WHITE | ✓ | ✓ | | ✓ |
| | DATE TIME | DATE | 01/09/2011 | | | | |
| | | TIME | 0:00:00 | | | | |
| | | DIFF | ±00:00 | | | | |
| | | FORMAT | **YY-MM-DD** / DD MM,'YY<br>/ 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 | MAINTENANCE DATA | USER DATA |
| EQUIP | PRINTER | | | 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<br>**SHORT** MIDDLE LONG<br>**5m** 10m 100m 200m 500m 800m<br>0 **1** 2 3 4 5 6 7 | | ✓ | ✓ | |
| | | POWER REDUCTION | | **OFF** ON | | ✓ | ✓ | |
| | COMMUNICATION | 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 | Master 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 ALERT | "Install position" depth, take grounding avoidance | 3031 | 1 | Alarm | A | Yes | No | N/A | Yes |
| 2 | DEPTH ALERT | "Install position" depth, take grounding avoidance | 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 and display unit 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 |

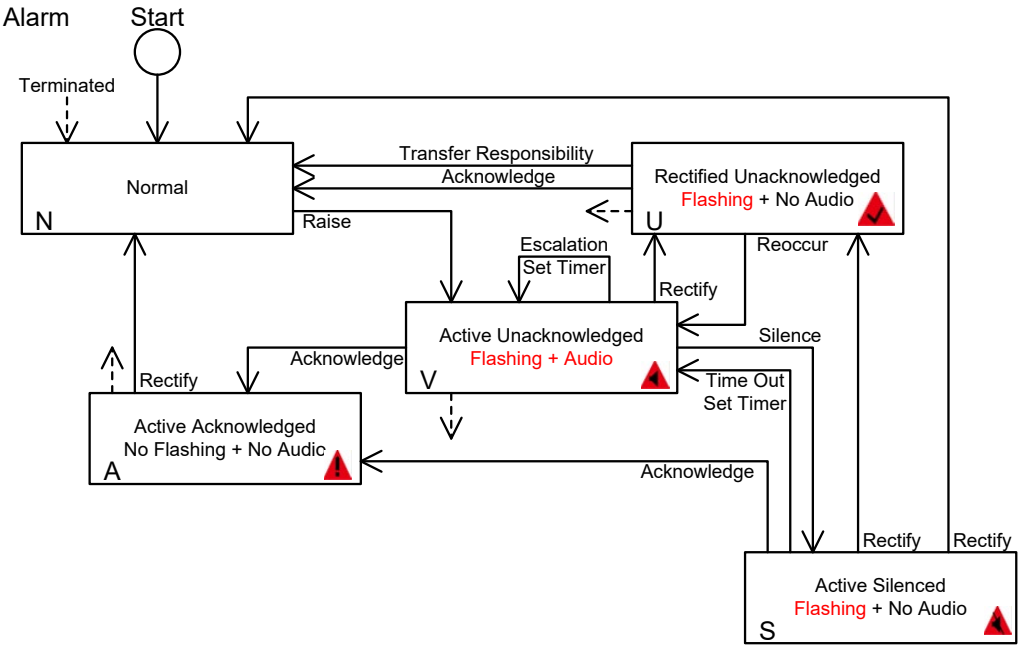
11 Lost processor alert only occurs on JFE-400

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

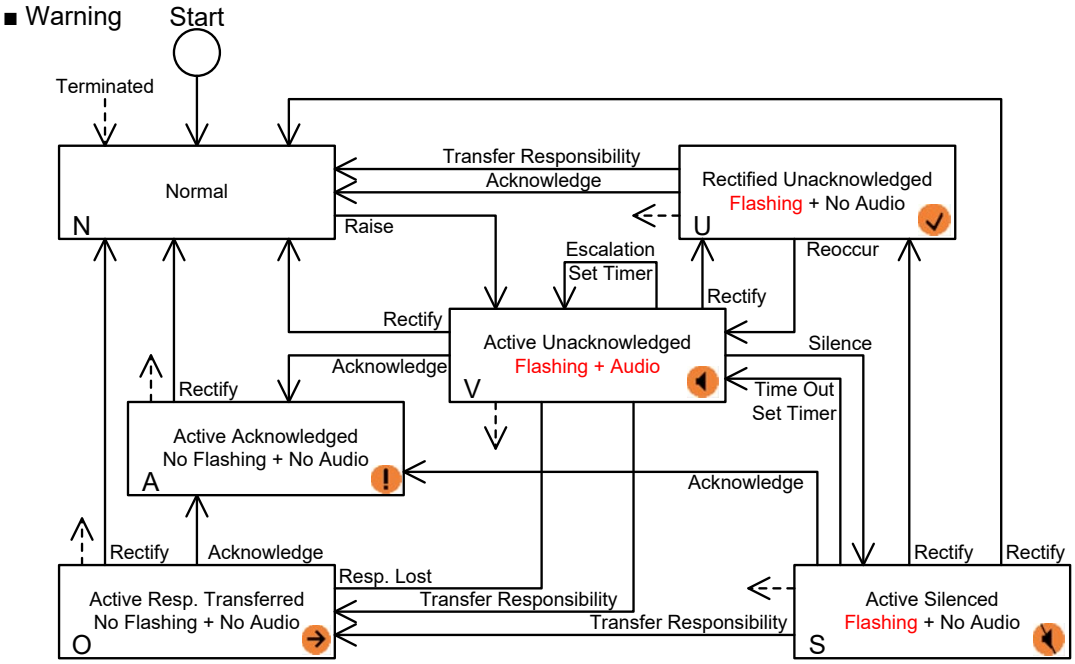
| No. | Name of alert icon | Functional outline | Alert icon |
|---|---|---|---|
| 1 | Active - unacknowledged alarm | A flashing red triangle.<br>A symbol of loudspeaker in the middle of the triangle. |  |
| 2 | Active - silenced alarm | A flashing red triangle.<br>A symbol as in icon number 1 with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

◎Each alert sequence is as shown below.

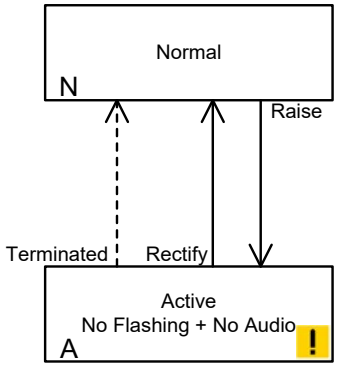
■ Alarm



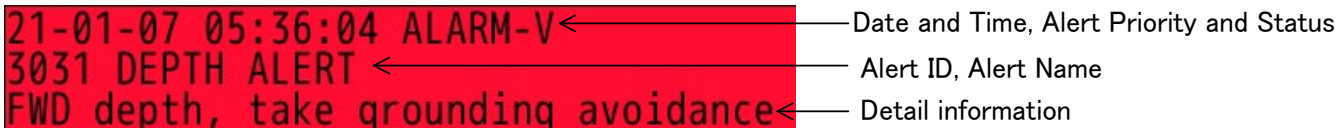

■ Warning




■ Caution



◎Alert Detail (ex; Depth Alert)




◎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 BAM 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<br>Only Serial use: DEPTH OUT<br>Only LAN use: LAN | Direction: Output<br>Serial: J2-7/8, J2-9/10, J2-11/12, J2-13/14<br>LAN:J11(Main), J12(Sub) |
| 2 | DBT | NMEA VER. :ALL or Ver.1.5<br>Depth Disp mode: XDCR (User menu) | | |
| 3 | DBK | NMEA VER. :ALL or Ver.1.5<br>Depth Disp mode: KEEL (User menu) | | |
| 4 | DBS | NMEA VER. :ALL or Ver.1.5<br>Depth Disp mode: SURF (User menu) | | |
| 5 | PJRCU | - | | |
| 6 | ALR | ALRT OUT TYPE: ALR | Serial use: ALR OUT<br>(Unable to use LAN) | Direction: Output<br>Serial: J2-15/16 |
| 7 | ALC | ALRT OUT TYPE: ALF | Serial and LAN use: BOTH<br>Only Serial use: ALR OUT<br>Only LAN use: LAN | Direction: Output<br>Serial: J2-15/16<br>LAN:J11(Main), J12(Sub) |
| 8 | ALF | | | |
| 9 | ARC | | | |
| 10 | HBT | - | - | - |
| 11 | SRP | - | - | - |
| 12 | RMC | LAT/LON: ON (User menu) | - | Direction: Input<br>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<br>Only Serial use: ALR OUT<br>Only LAN use: LAN | Direction: Input<br>Serial: J2-17/18<br>LAN:J11(Main), J12(Sub) |
| 17 | ACK | ALRT OUT TYPE: ALR | Serial use: ALR OUT<br>(Unable to use LAN) | Direction: Input<br>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.

アスベストは使用しておりません
Not use the asbestos

*For further information,contact:*

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