



KODEN

SERVICE MANUAL

«Broadband»

Digital Sonar

KDS-6000BB

This product is specifically designed to be installed on boats and other means of maritime transport. If your country forms part to the EU, please contact your dealer for advice before attempting to install elsewhere.

KDS-6000BB Service Manual**Doc No: 0093860002****Document Revision History**

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0	0093860002-00	2015/06/25	First edition
1	0093860002-01	2015/11/20	Configuration of Equipment
2	0093860002-02	2016/05/20	Configuration of Equipment, External view and dimensions, Chapter 2, Chapter 5
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Document No. Revised Version Norm

When part of the document needs to be revised, the document has advanced revision number.

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For Your Safe Operation




Symbol used in this Service Manual

The following graphical symbols are used in this manual. The meaning of each symbols shall be well understood and apply at maintenance and inspection works.







Symbol	Meaning
 Warning	Mark for warning This symbol denotes that there is a risk of death or serious injury when not dealing with it correctly.
	Mark for danger high voltage This symbol denotes that there is a risk of death or serious injury caused by electric shock when not dealing with it correctly.
 Caution	Mark for caution This symbol denotes that there is a risk of slight injury or damage of device when not dealing with it correctly.
	Mark for prohibition This symbol denotes prohibition of the specified conduct. Description of the prohibition is displayed near the mark.

Caution items on equipment

	Be careful of a high voltage inside. A high voltage, which may risk your life, is used. This high voltage remains in the circuit after you have powered off switch. To prevent touching the high voltage circuit inadvertently, the hard cover is provided to the high voltage circuit and the high voltage caution label is affixed. Ensure to power off switch for your safety and discharge the electricity remaining in the capacity before starting to check. An engineer authorized by our company should inspect and maintain
 Warning	Be sure to power off in the boat. If the power switch is inadvertently powered on during work, you will be electrified. To prevent such accident from occurring, ensure to power off in the boat and the power of equipment. Furthermore, it is safer to hang the caution tag described as [Under Work] near the power switch of equipment.
 Warning	Be careful of dust Inhaling dust may cause A respiratory disease. When cleaning the inside of equipment, be careful not to inhale dust. Wearing a safety mask is recommended.

 Caution	Caution on location of equipment Do not install the equipment where it is excessively damp and suffers from excessive water drops.
 Caution	Measures against static electricity The static electricity may be generated from the carpet on the floor in the cabin or clothes made of synthetic fiber. The static electricity may destroy the electronic parts on the circuit board. Handle the circuit board, taking the measure of static electricity free.
 Caution	Caution at installation of a transducers Install the transducer at the location where it is not affected by bubble and noise The bubble and noise seriously degrade the performance of this unit.

Caution Items on handling

 Warning	Do not disassemble or modify. It may leads to trouble, fire, smoking or electric shock. In case of trouble, contact our dealer or our company.
 Warning	In case of smoke or fire, boat power off and the power of this unit. It may cause fire, electric shock or damage.
	Be cautious of remaining high voltage. A high voltage may remain in the capacitor for several minutes after you have powered off. Before inspecting inside, wait at least 5 minutes after powering off or discharge the remaining electricity in an appropriate manner. Then, start the work.
 Caution	The information displayed in this unit is not provided directly for your navigation. For your navigation, be sure to see the specified material.
 Caution	Use the specified fuse. If un-specified fuse is used, it may cause a fire, smoke or damage.
 Caution	Whenever transmitting, be sure to submerge the transducer in water first. If transmitted without submerging the transducer, it may be damaged.

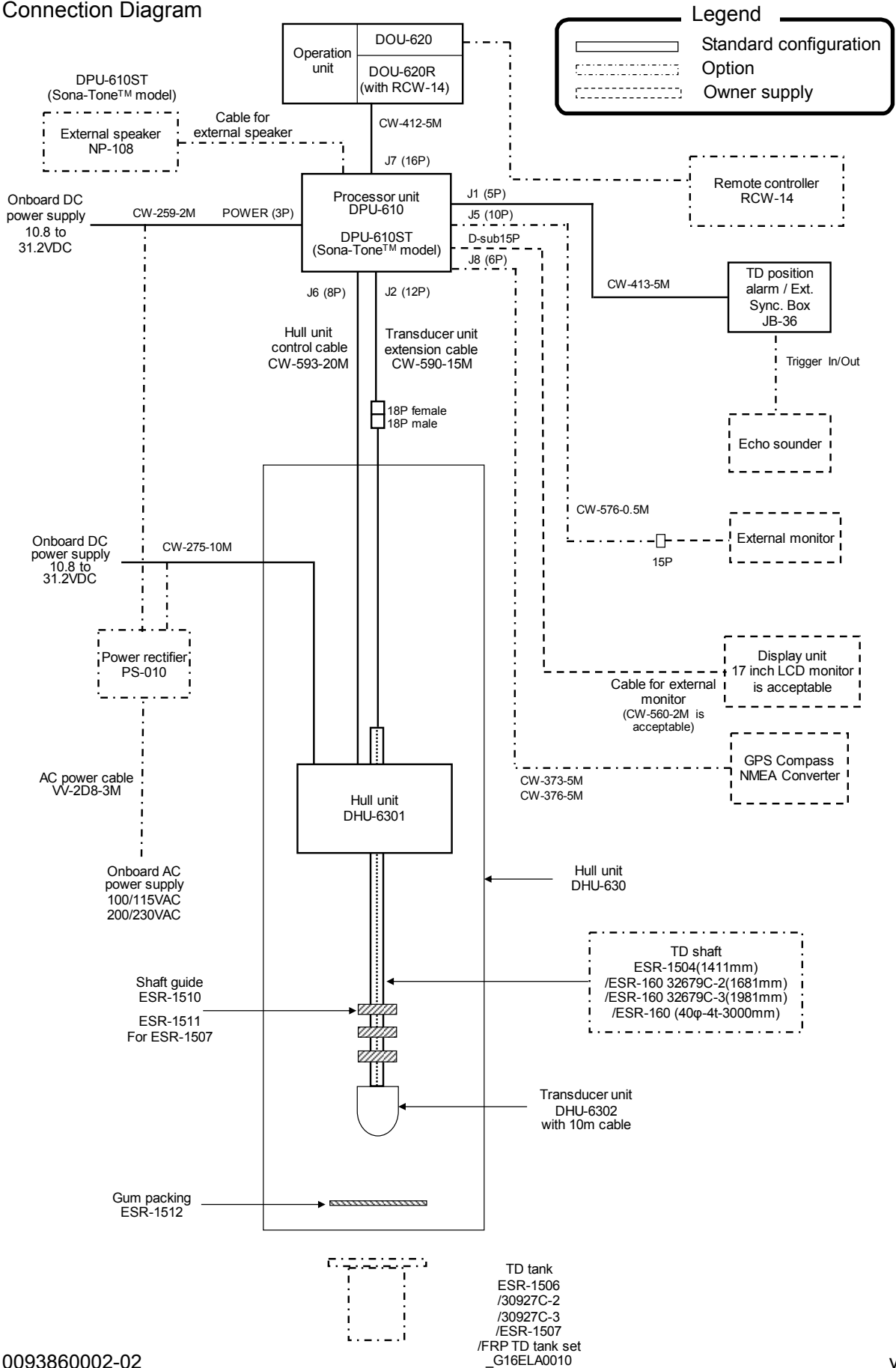
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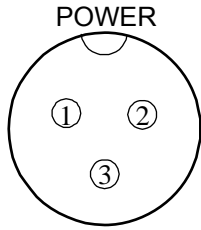
System Configuration

Connection Diagram

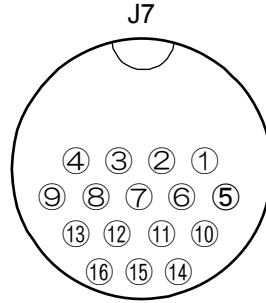


Pin assignment of rear connectors

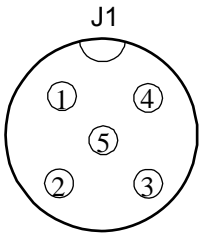
Pin assignment viewed from the rear of Processor unit (DPU-610).



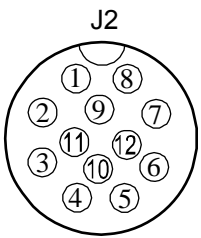
- ① Power input (-)
- ② Power input (+)
- ③ Shield



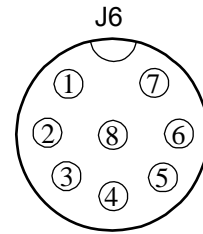
- ① KSTB
- ② PDATA
- ③ PWR SW1
- ④ PWR SW2
- ⑤ EC1BCK
- ⑥ EC1ACK
- ⑦ EC2BCK
- ⑧ EC2ACK
- ⑨ KCLK
- ⑩ PANEL BRIL
- ⑪ BUZZER
- ⑫ UP
- ⑬ DOWN
- ⑭ COM (GND2)
- ⑮ +15V
- ⑯ GND



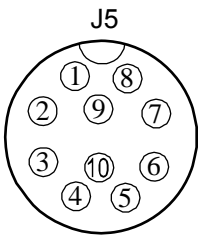
- ① External trigger input (+)
- ② GND
- ③ External trigger output (+)
- ④ GND 2
- ⑤ UP alarm



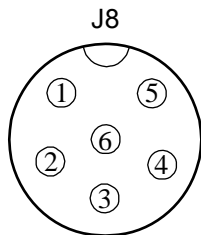
- ① NC
- ② TD1
- ③ TD2
- ④ GND
- ⑤ SCANNER PS (-)
- ⑥ SCANNER PS (-)
- ⑦ SCANNER PS (+)
- ⑧ SCANNER PS (+)
- ⑨ SCANNER TXD
- ⑩ SCANNER COM
- ⑪ NC
- ⑫ SCANNER RXD



- ① UP
- ② DOWN
- ③ COM (GND2)
- ④ GND
- ⑤ NC
- ⑥ UP SW
- ⑦ NC
- ⑧ NC



- ① R
- ② R-GND
- ③ G
- ④ G-GND
- ⑤ B
- ⑥ B-GND
- ⑦ H-SYNC
- ⑧ V-SYNC
- ⑨ NC
- ⑩ NC

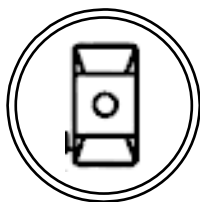


- ① GND
- ② NMEATX+
- ③ NMEA TX-
- ④ NMEA RX+
- ⑤ NMEA RX-
- ⑥ +15V

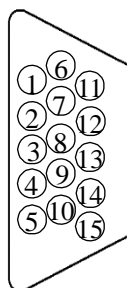


Caution: Please be careful that each wire would not contact the ship's hull ground.

USB connection

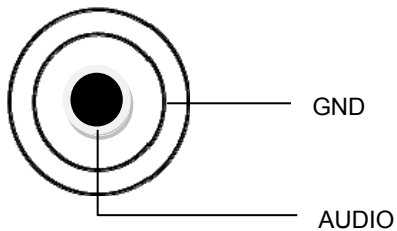


Display unit connection



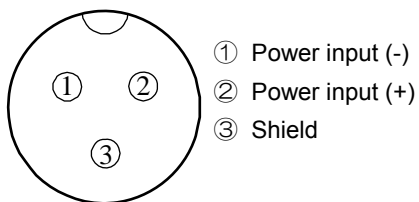
- ① R
- ② G
- ③ B
- ④ NC
- ⑤ GND
- ⑥ R-GND
- ⑦ G-GND
- ⑧ B-GND
- ⑨ NC
- ⑩ NC
- ⑪ NC
- ⑫ NC
- ⑬ H-SYNC
- ⑭ V-SYNC
- ⑮ NC

Speaker connection



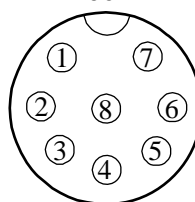
Hull unit (DHU-6301)

POWER



- ① Power input (-)
- ② Power input (+)
- ③ Shield

J6

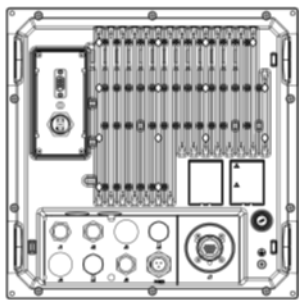

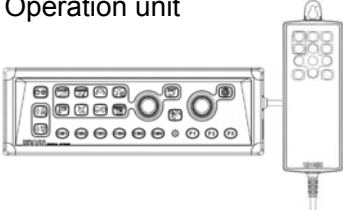
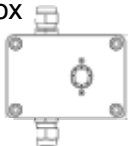
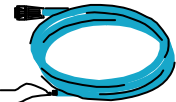

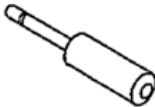



- ① UP
- ② DOWN
- ③ COM (GND2)
- ④ GND
- ⑤ NC
- ⑥ UP SW
- ⑦ NC
- ⑧ NC

Configuration of Equipment

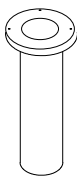

Standard Equipment Configuration List

a. DPU-610ST (Processor unit) / DOU-620 (Operation unit)

No	Name of item	Type	Remark	Weight/ Length	Qty
1	Processor unit 	DPU-610ST	No display unit VGA output	5.1kg	1
2-1	Operation unit 	DOU-620	With mounting bracket and 5m cable	1.1kg	1
2-2	Operation unit 	DOU-620R	With mounting bracket, 5m cable and Remote controller (RCW-14 with 5m cable)	DOU-620 1.1kg/ RCW-14 0.31kg	1
3	TD position alarm / Ext. Sync. Box 	JB-36	With 5m cable (CW-413-5M / With 5 pin connector and one end plain)	5m	1
4	DC power cable 	CW-259-2M	With 3 pin connector and one end plain	2m	1
5	Transducer unit extension cable 	CW-590-15M	With a 18 pin connector and a 12 pin water resistant connector	15m	1
6	Audio system plug 	MP-105LC-RoHS			1

No	Name of item	Type	Remark	Weight/Length	Qty
7	Fuse 	F-7161-10A/N30C-125V Cylinder (ø 6.4x30)	Normal fusion type for main power		3
8	Operation manual	KDS-6000BB.OM.E	English		1
9	Quick Reference	KDS-6000BB.QR.E	English		1
10	Installation manual	KDS-6000BB.IM.E	English		1

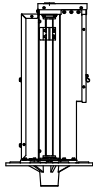

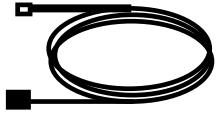
b. TD tank / TD shaft

No	Name of item	Type	Remark	Weight/Length	Qty
1	TD tank 	ESR-1506 (PVC) 1230mm 30927C-2 (PVC) 1500mm 30927C-3 (PVC) 1800mm ESR-1507 (FRP) 1500mm	Select according to equipment. *Refer to Option list.	9.0kg 11.0kg 13.0kg 12.0kg	1
2	TD shaft 	ESR-1504 ESR-160_32679C-2 ESR-160_32679C-3 ESR-160_40φ-4t-3000mm	Select according to equipment. *Refer to Option list.	1411mm 1681mm 1981mm 3000mm	1


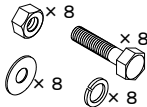
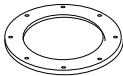




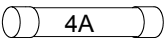
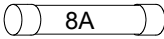

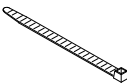


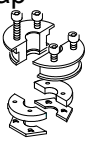


Caution: TD tank and TD shaft are options.

c. DHU-6301 (Hull unit)
Package 1-1

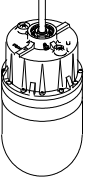
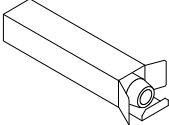

No	Name of item	Type	Remark	Weight/Length	Qty
1	Hull unit 	DHU-6301		17.0kg	1
2	DC power cable 	CW-275-10M	Cable is built into the Hull unit	10m	1
3	Hull unit control cable 	CW-593-20M	Cable is built into the Hull unit	20m	1


c. DHU-6302 (Transducer unit)
Package 2-1

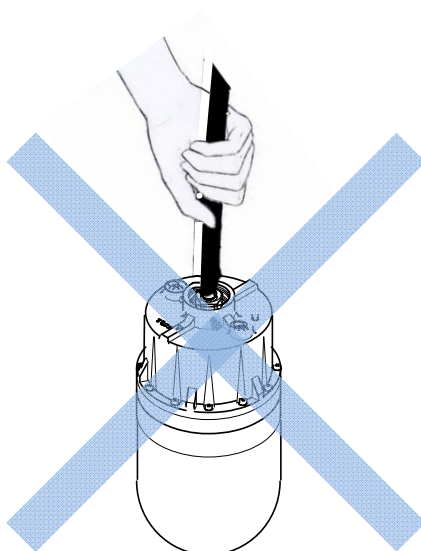
No	Name of item	Type	Remark	Weight/Length	Qty
1	Shaft guide 	ESR-1510			3
2	Bolt set 	SUS-M16-55-Assy (M16x55L, 2W16U, SW16U, N16U)			EACH 8
3	Gum packing for flange 	ESR-1512	Gum		1

No	Name of item	Type	Remark	Weight/Length	Qty
4	Crank handle 	OB-03			1
	Grease 			100g	1
	Fuse  	F-7161-4A F-7161-8A	At input of 12 V At input of 24 V		EACH 3
	ANP base 	ANP-1			2
	Binding Band 	AB-100-1000			2
5	Damper 	34924D			1
	Fixing collar 	32681D			2
	Shaft cap  1 SET	34378D			1
	Cap bolt 	CB4 X 10U			4
	HEX rod wrench 	1.5mm x 1 2.5mm x 1 3.0mm x 1			EACH 1

Package 2-2

No	Name of item	Type	Remark	Weight/Length	Qty
1	Transducer unit 	DHU-6302	With 10m cable (With 18 pin water resistant connector)	9.0kg	1
2	Bath cork 	Bath cork (White) 50g		50g	1
	HEX rod wrench 	3.0mm ×1 5.0mm ×1			EACH 1

 **Caution: Don't carry the Transducer unit (DHU-6302) by holding its cable. Such manner may cause breakage of the equipment.**

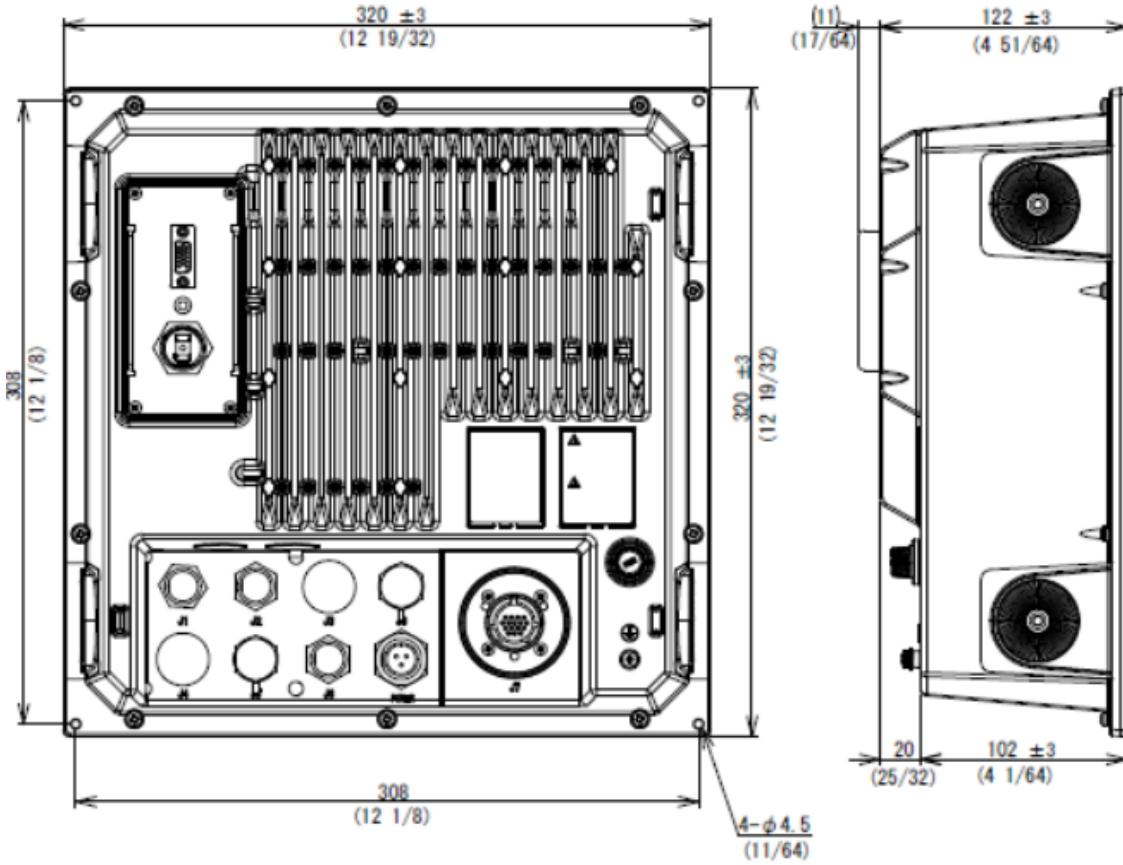


Option List

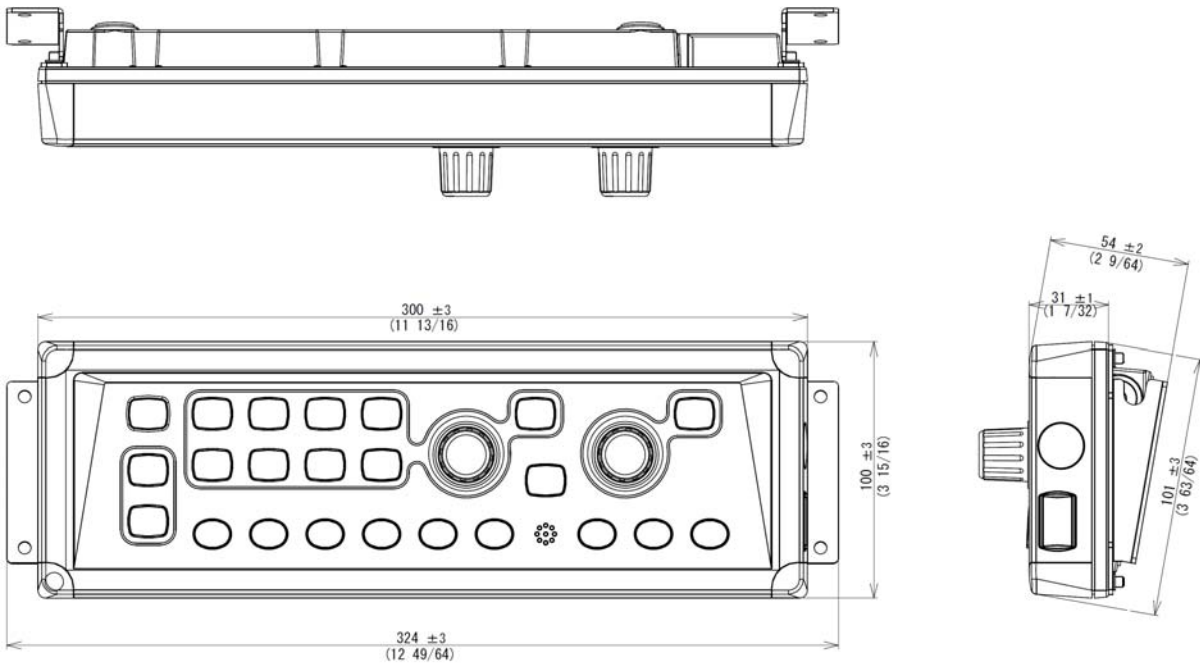
No	Name of item	Type		Remark
1	Remote controller	RCW-14		With 5m cable, (Assembled the connection cable into the Operation unit)
2	TD tank (For *xxx mm of TD shaft) *TD shaft length	ESR-1506		PVC, 1230mm (For 1411mm of TD shaft)
		30927C-2		PVC, 1500mm (For 1681mm of TD shaft)
		30927C-3		PVC, 1800mm (For 1981mm of TD shaft)
		ESR-1507		FRP, 1500mm
		FRP TD tank set (Including Shaft guide)		ESR-1507(1), ESR-1510(2), ESR-1511(2)
3	Shaft guide	ESR-1510		ESR-1506/1507
		ESR-1511		ESR-1507 (For FRP TD tank)
4	Power rectifier	PS-010		With 2 pieces of 5A fuse
5	AC power cable	VV-2D8-3M		Both ends plain
6	Connecting cable	CW-372-5M	5m	With 5 pin water resistant connector and one end plain
		CW-373-5M	5m	6 pin water resistant connectors at both ends
		CW-376-5M	5m	With 6 pin water resistant connector and one end plain
	Cable for external monitor	CW-576-0.5M	0.5m	With 10 pin water resistant connector and D-Sub connector
		CW-560-2M	2m	D-Sub 15 pin connectors at both ends
7	Junction box	JB-35		1 input, 3 outputs with CW-376-5M
8	TD shaft	ESR-1504		1411mm
		32679C-2		ESR-160_1681mm
		32679C-3		ESR-160_1981mm
		40φ-4t-3000mm		ESR-160_3000mm
9	Monitor	17inch LCD Monitor		With power cable and signal cable
10	External speaker	NP-108		With 5m cable

External view and dimensions

Processor unit (DPU-610ST)

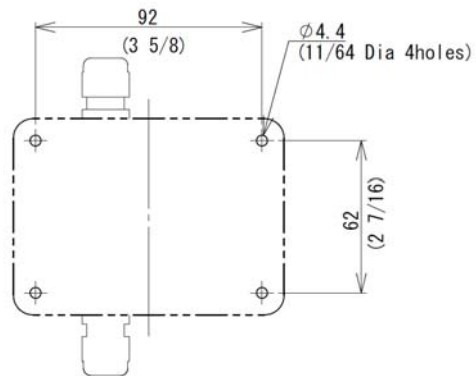
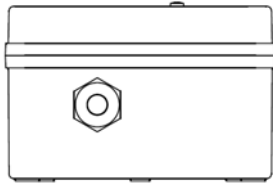
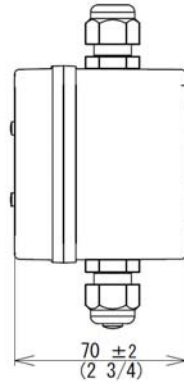
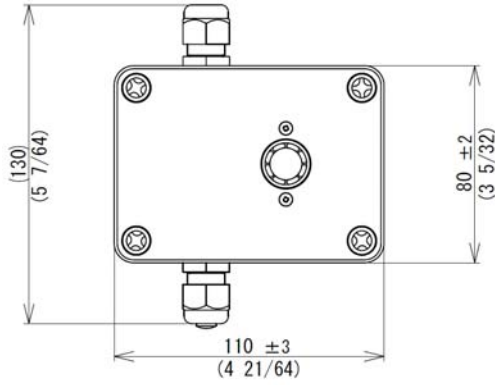


Operation unit (DOU-620)



TD position alarm / Ext. Sync. Box (JB-36)

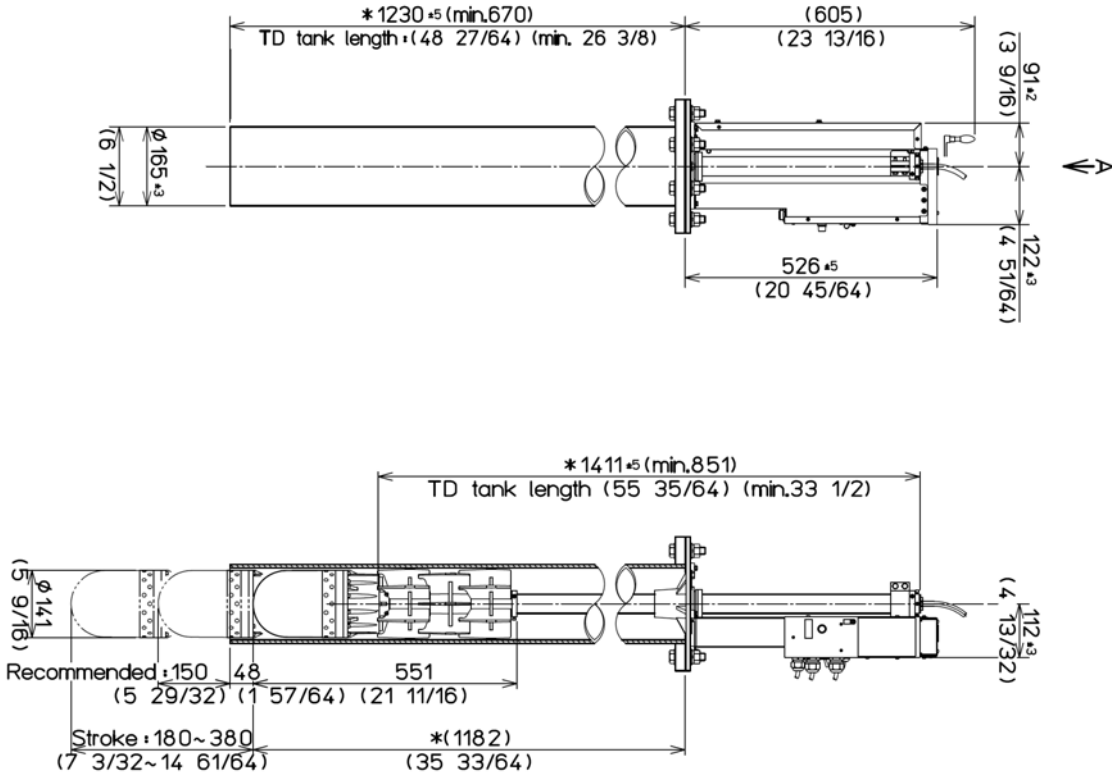
Unit: mm (inch)



Installation dimensions

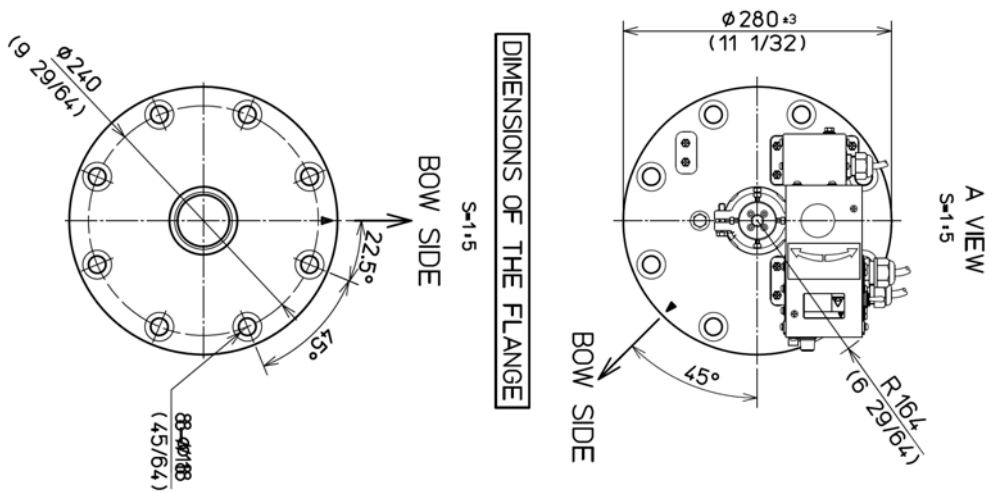
Hull unit (DHU-630)

Unit: mm (inch)

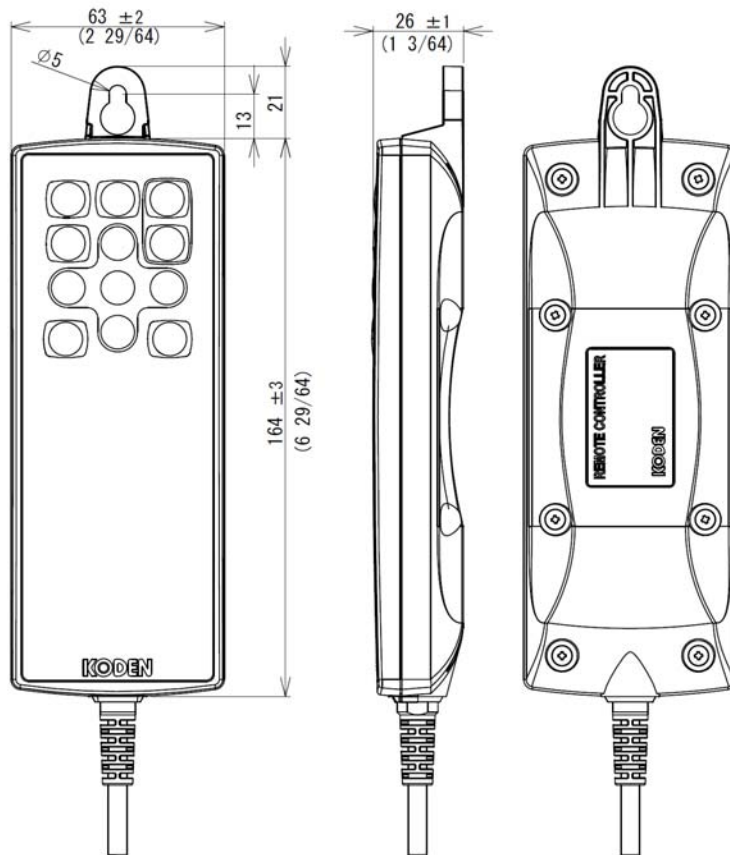


TD shaft length : mm(inch)	TD tank length : mm(inch)	Weight : kg(lb)
*1411 (55 35/64)	*1230 (48 27/64)	41 (91)
1681 (66 3/16)	1500 (59 1/16)	44 (97)
1981 (77 63/64)	1800 (70 55/64)	47 (104)

*The seal dimensions show the case of going TD shaft 1,411mm in length specifications



Remote controller (RCW-14) (Optional)



Specification

Item		Content										
Model		KDS-6000BB										
Processor unit		DPU-610										
Operation unit		DOU-620										
Hull unit		DHU-630										
Output power (RMS)		1.5 kW										
Output frequency		130 to 210 kHz (0.1 kHz step)										
Tilt angle		+5° to -90° (1°step)										
Point corner		8° to 12°										
TD stroke		150 to 380 mm (Recommended value 150 mm)										
Display size and type		Any monitor with VGA resolution (Owner supplied)										
Display resolution		640 x 480 (VGA)										
Basic ranges		10 to 1000 (m), 30 to 3000 (ft), 10 to 600 (fm), 10 to 700 (l.fm) (8 ranges can be set to users choice)										
Range units		m, ft, fm, l.fm										
Scanning sector angles	Sonar mode	5°step: 5°, 25°, 45°, 85°, 125°, 165°, 205°, 360° 10°step: 10°, 30°, 50°, 90°, 130°, 170°, 210°, 360° 15°step: 15°, 45°, 75°, 105°, 135°, 165°, 225°, 360° 20°step: 20°, 60°, 100°, 140°, 180°, 220°, 260°, 360°										
	Bottom scan mode	3°step: 3°, 27°, 45°, 63°, 93°, 117°, 147°, 177° 5°step: 5°, 25°, 45°, 65°, 95°, 115°, 145°, 175°										
360° Scanning time (extracts)	Scanning range (m)	20	40	60	80	100	120	160	180	200	240	400
	Scanning time (sec.) 5° step	6.3	8	10	11.8	14	15.8	19.5	21.6	23.5	27.5	43.3
	Scanning time (sec.) 10° step	3.7	4.7	5.6	6.5	7.6	8.6	10.6	11.5	12.5	14.4	22.4
	Scanning time (sec.) 15° step	3.3	3.7	4.3	4.9	5.7	6.4	7.9	8.2	8.9	10.3	15.7
	Scanning time (sec.) 20° step	3.3	3.4	3.8	4.2	4.8	5.2	6.4	6.6	7.3	8.1	12.2
Bearing center		1°step										
Presentation modes		Sonar, Off-center, Bottom scan, Echo sounder										
Off-center		Fore, Back, Left, Right										
Target lock		Reverse, Horizontal, Horizontal + vertical, Marker + horizontal, Marker + horizontal + vertical										
Presentation colors		16 colors, 8 colors										
Functions		TVG, Color rejection, Dynamic range, Compass display, Pulse width, Output Power Control, Noise rejection, A-scope, CM key, Frequency bandwidth, Image correction, Bearing display, TD auto up, etc.										
Language		English, Japanese, Korean, Traditional Chines, Vietnamese, Spanish, Thai										
Input data format and sentences		NMEA0183 GGA, GLL, HDG, HDM, HDT, RMC, VTG, ZDA										
Output data format and sentences		NMEA0183 DBT, DPT, GGA, GLL, MTW, RMC, TLL, VTG, ZDA										
NMEA ports		Total 1 : input / output										
Power supply	Processor unit	10.8 to 31.2 VDC										
	Hull unit	10.8 to 31.2 VDC										
Power consumption	Processor unit	70 W or less (24 VDC)										
	Hull unit	70 W or less (24 VDC)										
Operating temperature		-15 °C to + 55 °C										
Water protection		—										

Chapter 1 Function explanation and measurement

1.1 Operational Outline

Circuit configuration of KDS-6000BB is shown in Fig. 1.1 below. KDS-6000BB consists of seven printed circuit boards (PCB), and its internal electrical circuits are composed of 5 circuits as mentioned below.

Names of circuits, names of PCB and parts numbers are shown in table 1.1 below.

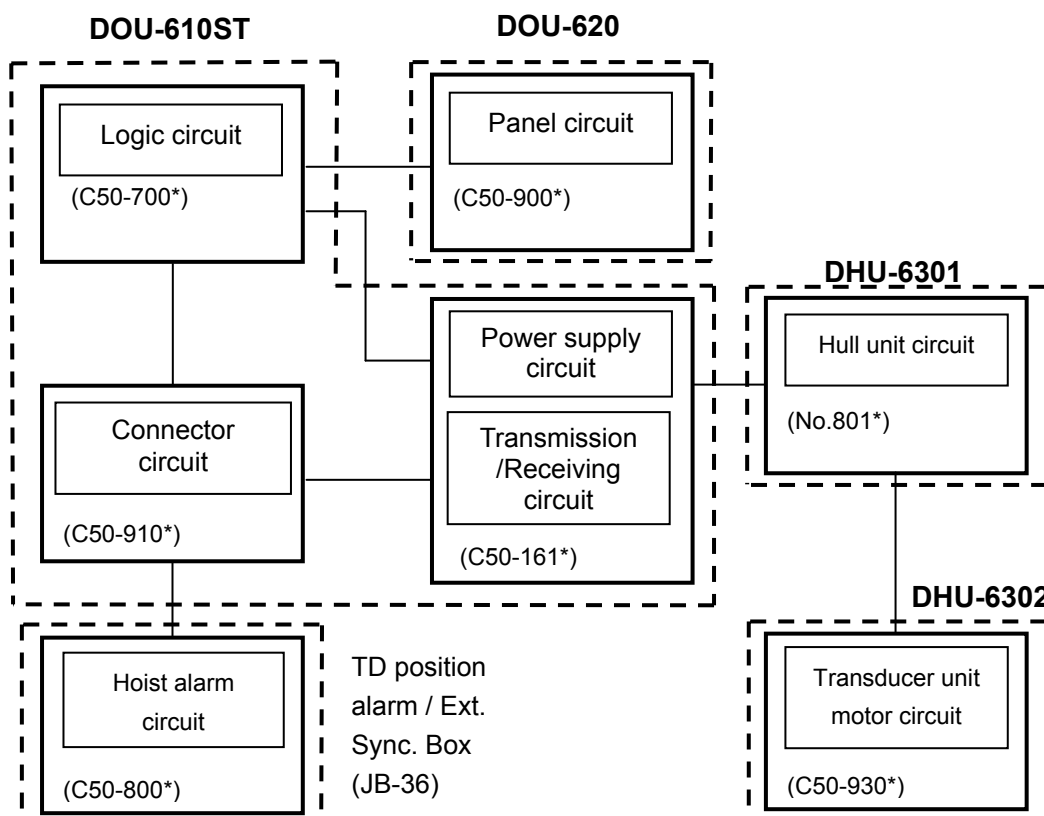


Fig. 1.1: Circuit configuration of KDS-6000BB

*Subject to version change

Table 1.1: Names of circuits

	Name of circuit	Name of PCB
(1)	Logic circuit	C50-700*
(2)	Power supply circuit	C50-161*
(3)	Transmission /Receiving circuit	
(4)	Panel circuit	C50-900*
(5)	Connector circuit	C50-910*
(6)	Hull unit circuit	No.801*
(7)	Transducer unit motor circuit	C50-930*
(8)	Hoist alarm circuit	C50-800*

① Logic circuit

The echo signals input into the logic circuit will be converted into 16 kinds of digital signals depending on the signal strength, and with a LCD controller after 16 colors have been allocated to each of the signal. It will be converted into RGB signals and connected to the rear connector of an External monitor such as an LCD monitor. RGB signals are output in the ports (Connector) circuit.

The CPU will control Echo Sounder sequence along with monitoring of echo signal processing, NMEA serial line, water temperature monitor and power supply voltage. FPGA will perform interface of various input and output signals, signal generation and controls. This circuit controls and monitors Hull unit (see below). It also controls and monitors the rotary motor and the tilt motor by receiving signals from the transducer unit. Power circuit for logic is also included.

② Power supply circuit

When power key on the panel is pressed, power circuit starts up by ON/OFF control circuit, to generate main power supply +15V, high transmission +70V, and Transducer unit voltage +20V power supply voltage, from on board power supply of 10.8 to 31.2 VDC. This circuit will generate 9V, 5.5V and 3V for analog from main voltage +15V.

PWM signal from logic varies transmission high voltage to change transmission output power.

Pressing power key while power is ON, starts the power OFF sequence. After retracting the transducer, power circuit cuts off after approximately 15 second transmission for discharging the high voltage condenser.

This power off sequence does not start when the vessel's source power turned off or power cable was disconnected. Use caution upon maintenance, as high voltage condenser is not discharged in this case.

③ Transmission/Receiving circuit

Transmission trigger transmitted by the logic circuit will drive the transmission circuit and transmit ultrasonic wave pulses via a transducer. Echo signals reflected by targets and received by the same transducer will be A/D converted to be input into the logic circuit again.

④ Panel circuit

This is composed of 24 pieces of tact switches and 2 knobs, and will perform ON/OFF of power supply and key's read control by logic circuit. With LED, this circuit will perform panel illumination and distinguish status of gain knob and CM keys by red and green.

⑤ Connector circuit

This consists of 7 pieces of waterproof connectors to be connected to external cables. On board power supply, NMEA input/output x 1, an external monitor, a TD position alarm / Ext. Sync. Box, an external synchronized input/output, Hull unit and Transducer unit will be connected to this circuit. Each signal line is equipped with a filter to suppress unnecessary radiation noise and to prevent noise entry from outside.

⑥ Hull unit circuit

Hull unit circuit receives signals from the logic circuit, controls its movement and takes the transducer to or from storage. When the motor stops, Hull unit circuit puts on the electronic brake and prevents the motor from running through inertia.

⑦ Transducer unit motor circuit

The Scanner motor circuit receives signals from the logic circuit, gives pulse signals to FET, drives

the rotary motor and the tilt motor and performs a stepping operation.

This circuit also detects the center of rotary motion. It does analog-digital transformation to signals from the temperature sensor (built in the transducer) and gives signals to the logic circuit.

⑧ TD position alarm / Ext. Sync. circuit

When the processor unit is off and the Transducer is not retracted, alarm sounds. Note that if Hull unit does not receive power from the vessel, alarm does not sound.

This circuit outputs transmission synchronization signals to synchronize with an external echo sounder and inputs remote synchronization signals into the processor unit in order to operate main unit.

1.2 Measurement

Table 1.2: Voltage measurement of power supply circuit

Item	Measuring position	Specified voltage
Transducer unit voltage	Between J1 and GND	18.5V to 20.0V
Main power	Between J2 and GND	14.5V to 15.5V
High voltage transmission	Between J4 and GND	70.0V to 78.0V(C50-160*) 55.0V to 60.0V(C50-161*)

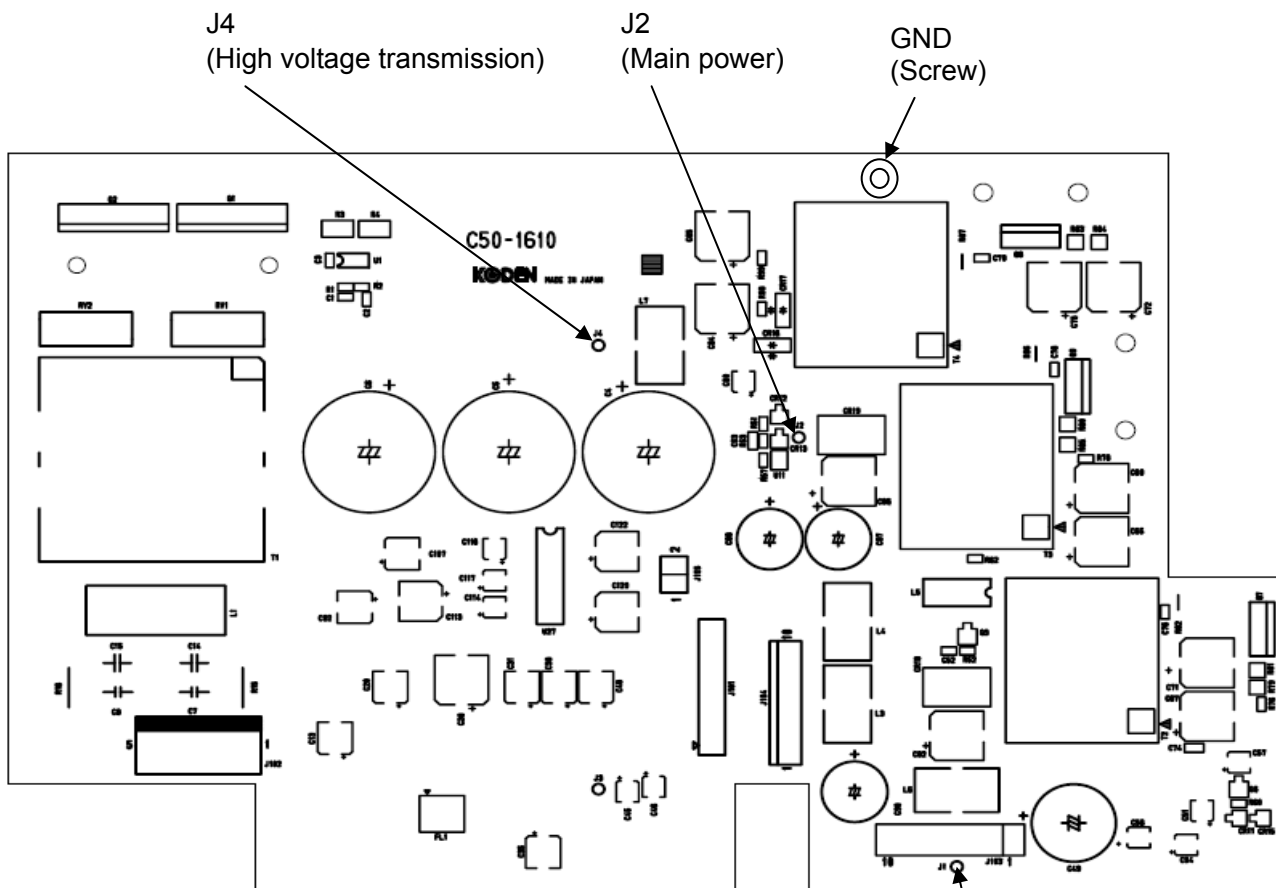


Fig. 1.2 PCB: C50-161*

J4
(Transducer unit power)

*Subject to version change

Chapter 2 Installation

2.1 Installation of KDS-6000BB Display unit

The display unit should be prepared by customers and should be installed in accordance with the installation manual attached to it. In addition, please be sure to carry out the following:

- (1) Decide the location to install the Display unit and keep the space for the maintenance works.
- (2) Energizing shall be performed after confirmation of the installation of display unit, and other components, and the completion of power cabling works for them.

2.2 Installation of KDC-6000BB Processor unit

The Processor unit can be installed on either on table or panel.

Install by the following procedure.

- (1) Please determine the place where the Processor unit will be mounted with enough space for the maintenance.
- (2) Make 4 holes at the location to be installed (See Fig. 2.1)
- (3) Install the Processor unit in the installing location (installation hole) and fix it with 4 tapping screws (4mm) (M4 or pan-head). (Prepare 4mm screws suitable for thickness of installing location.)

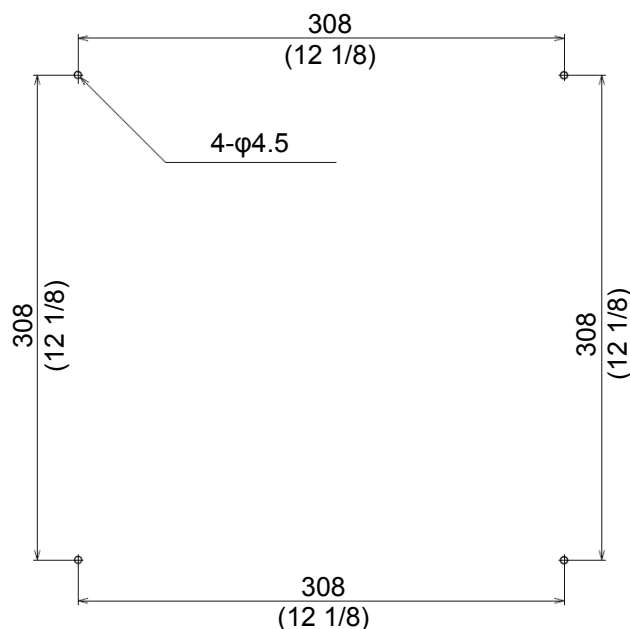


Fig. 2.1 Position of installation hole of Processor unit

Unit: mm (inch)

2.3 Installation of Operation unit

KDS-6000BB operation unit can be installed either on desk-top or flush-mounted.

Install by the following procedure.

2.3.1 Desk-top installation of Operation unit

- (1) Decide the location to install the Operation unit and keep the space for the maintenance works as shown in Fig. 2.3.
- (2) Mark the position where installation plinth is installed (See Fig. 2.2)
- (3) Remove 4 plastic corner guard caps of the Operation unit (These can be easily pulled out upwards).
- (4) Fix the clamps to the Operation unit with M4 screws (4 mm). Install the corner guard caps removed in step (3).
- (5) Confirm that the clamps matches the making position. If not matches, correct the marking position.
- (6) Install the clamps in the installing location (4 holes) and fix it with 4 tapping screws (4 mm) (M4 or pan-head). (Prepare 4 mm screws suitable for thickness of installing location.)

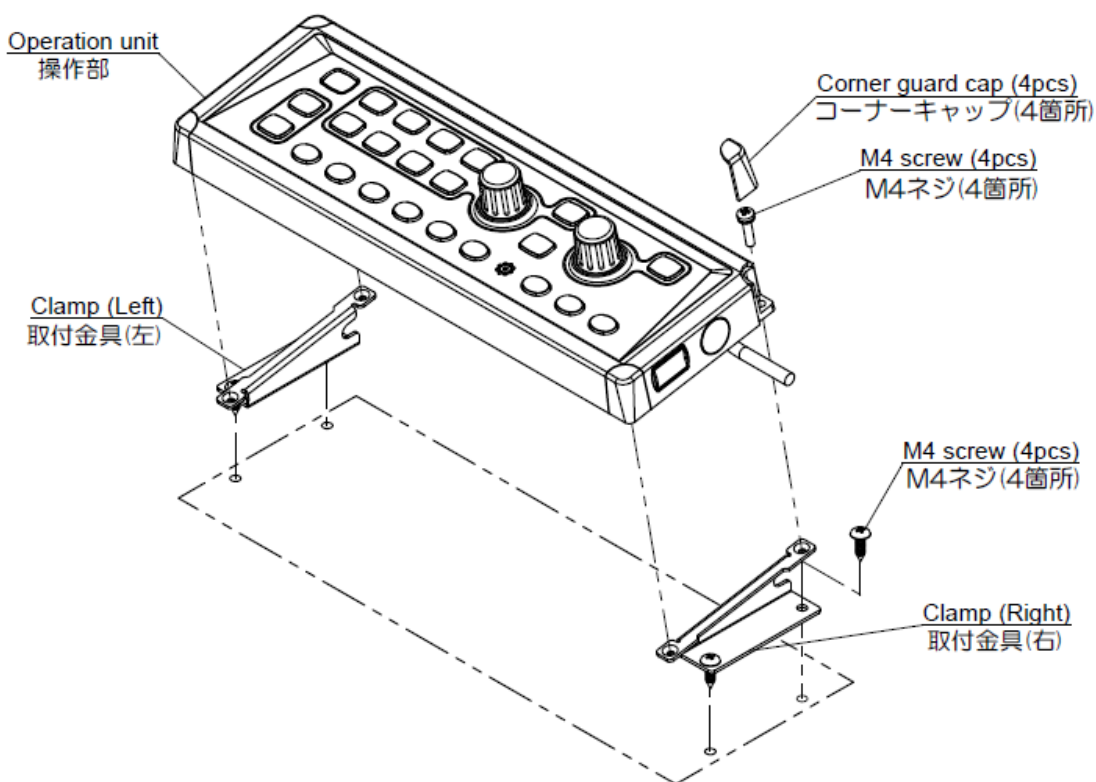
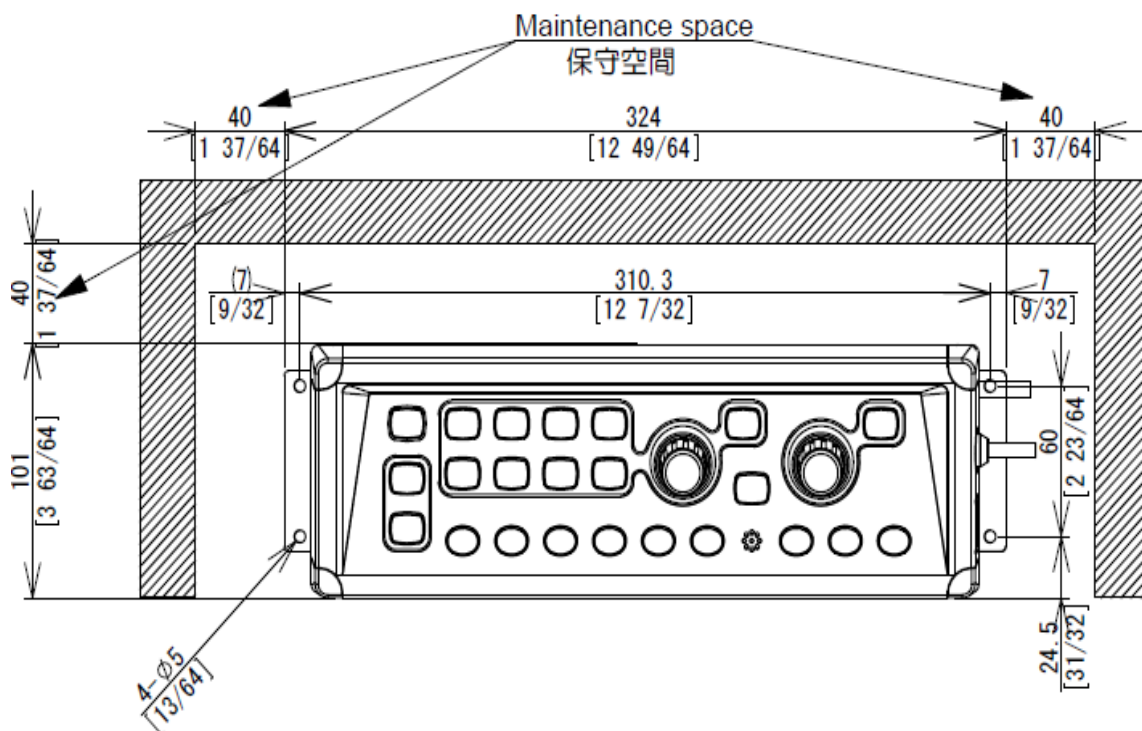


Fig. 2.2 Installation of an Operation unit on the desktop

 **Caution:** On installing on desktop, keep the maintenance space is required as shown below.



Unit: mm (inch)

Fig. 2.3 Maintenance space of desk-top installation

2.3.2 Flush-mount installation of Operation unit

- (1) Make a square hole at the location to be installed (See Fig. 2.5)
- (2) Remove 4 plastic corner guard caps of the Operation unit (These can be easily pulled out upwards).
- (3) Confirm that the Operation unit matches the mounting hole. If not matches, correct the mounting hole.
- (4) Put the Operation unit and connected cable into the mounting hole, and set it to the position in which the Operation unit becomes parallel to the install panel. (Fig. 2.4)
- (5) Install the Operation unit in the installing location (Mounting hole) and fix it with 4 tapping screws (4 mm) (M4 or pan-head). (Prepare 4 mm screws suitable for thickness of installing location.)
- (6) Install the corner guard caps removed in step (2).

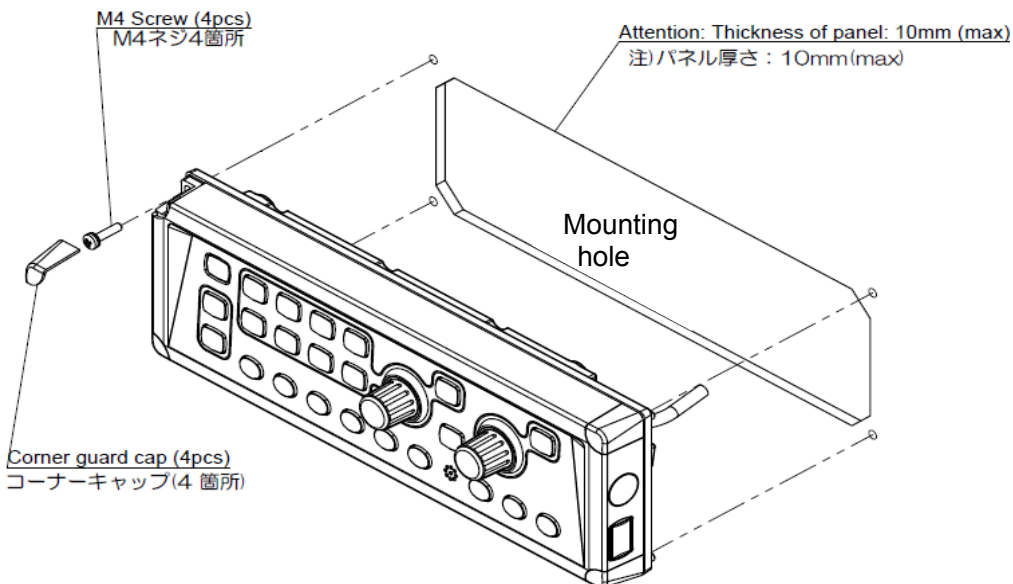


Fig. 2.4 Flush-mount installation of Operation unit

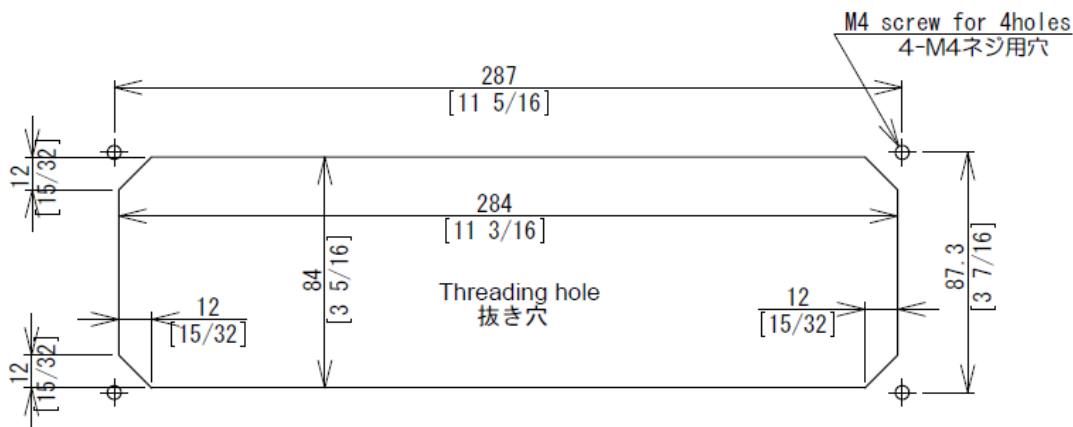


Fig. 2.5 Hole for flush-mount installation of Operation unit

Unit: mm (inch)

2.3.3 Installation of TD position alarm / Ext. Sync. Box

- (1) Install the TD position alarm / Ext. Sync. Box within the hearing range in the vicinity of the Processor unit.
- (2) Install it at a place where there is no water drops, and enough maintenance space is available.

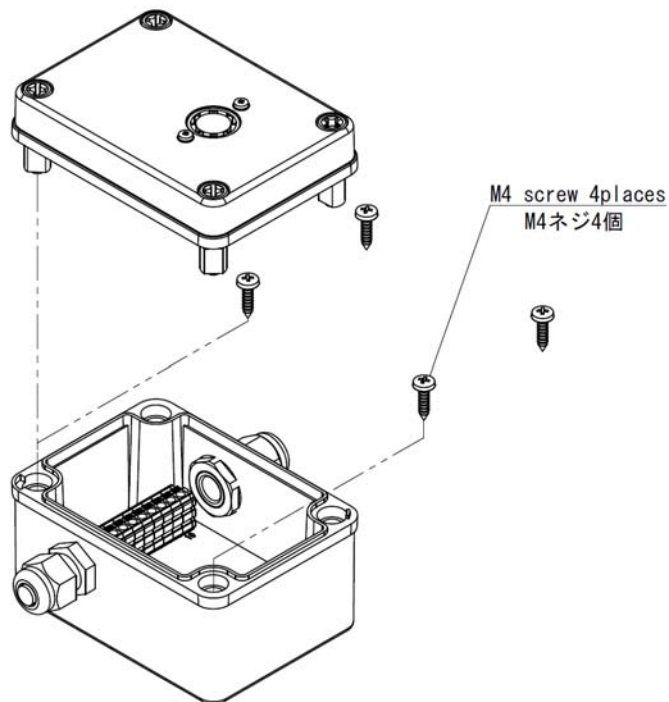
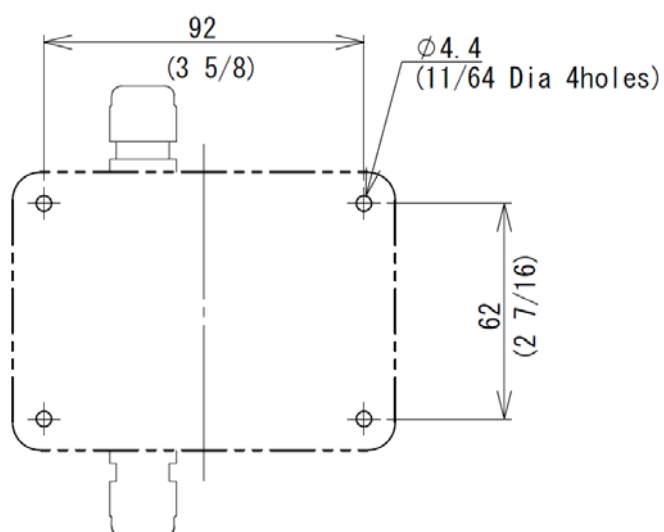


Fig. 2.6 External view of TD position alarm / Ext. Sync. Box



Unit: mm (inch)

Fig. 2.7 Position of installation hole of TD position alarm / Ext. Sync. Box

2.4 Installation of Hull unit



Caution: Satisfy the following conditions and also instructions of installation manual in deciding the TD tank mounting site.

Fully discuss about the strength with the shipyard and the installer before determining on the position and the method of installation and necessary materials.

2.4.1 Installation location of Hull unit

(1) Select a location the least influenced from air bubbles, interference or noise.

- Install the Hull unit on the keel within the range of $1/3$ to $1/2$ of the overall length from the bow.
- Alternatively, install the unit so that the center of TD tank positions within 1 m from the center of the keel.
- Install the unit so that the Flange comes above the draft at full load.

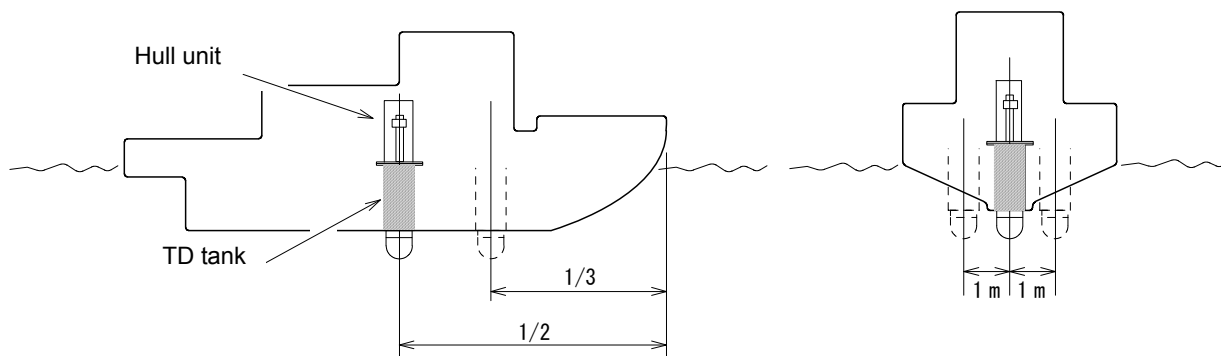


Fig. 2.8 Installation location of Hull unit

- ❌ Be sure there are no obstacles to interfere the ultrasonic beam when the Transducer unit is lowered.
- ❌ Provide sufficient clearance around the TD tank to make maintenance and inspection work.
- ❌ The bow mark (Δ) on the hull unit flange should be installed facing the bow of the vessel. However, if there may be any interference at maintenance or inspection works, install the unit to face 180° reverse direction (stern direction).

2.4.2 Maintenance space for TD tank

(1) When installing the TD tank, pay full attention to the safety (strength, waterproofness, etc.) and, at the same time, secure a space for maintenance and inspections.

- Since the Hull unit is not waterproof structure, keep it away from water drops and splashes.
- When KDS-6000BB is shipped from the factory with a standard, the length of the TD tank and TD shaft are set as follows:
 - ◇ TD tank: 1230 mm (Standard)
 - ◇ TD shaft: 1411 mm (Standard)
- When standard TD tank is installed with shortened length, the TD shaft length should be processed at least

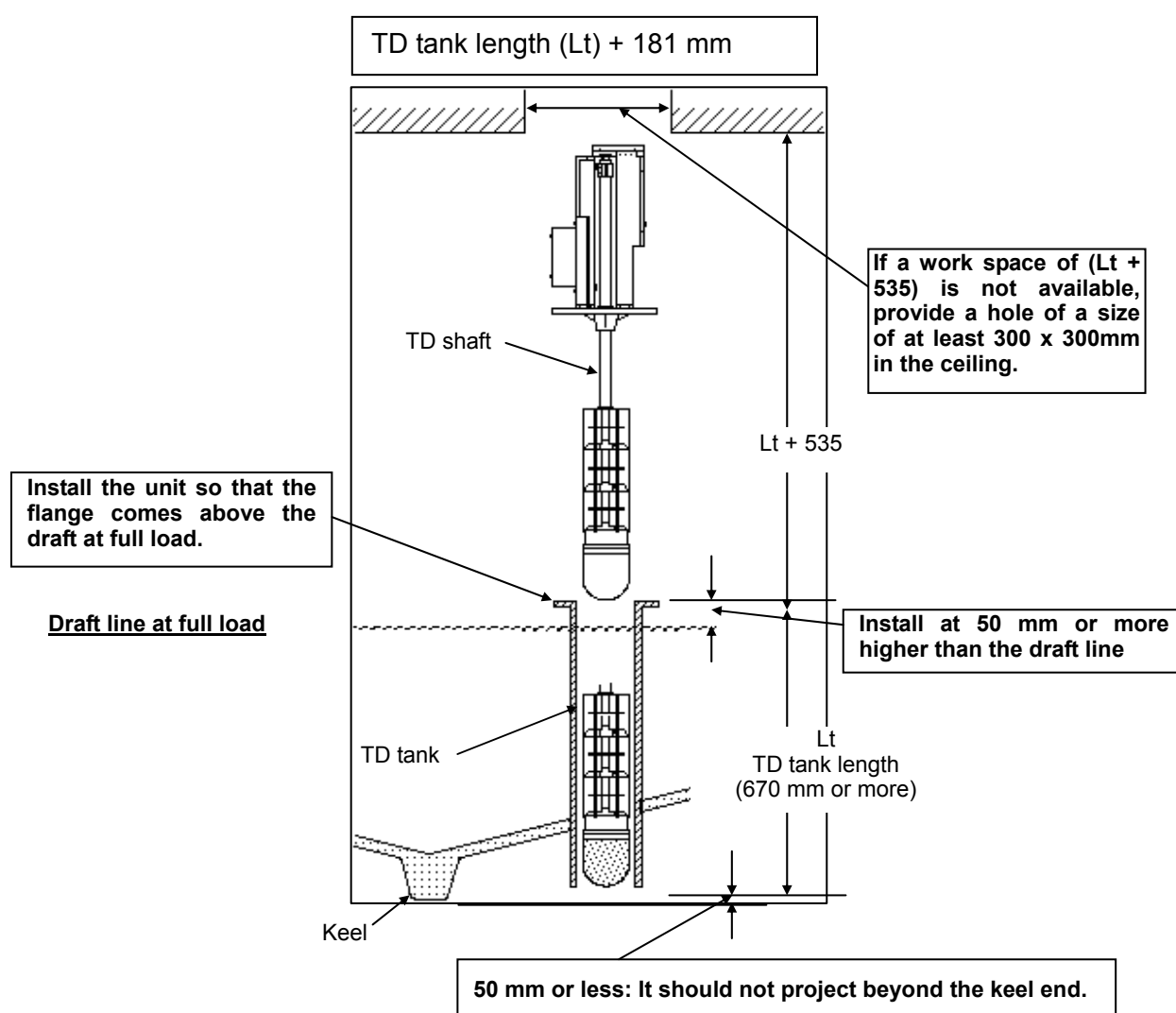
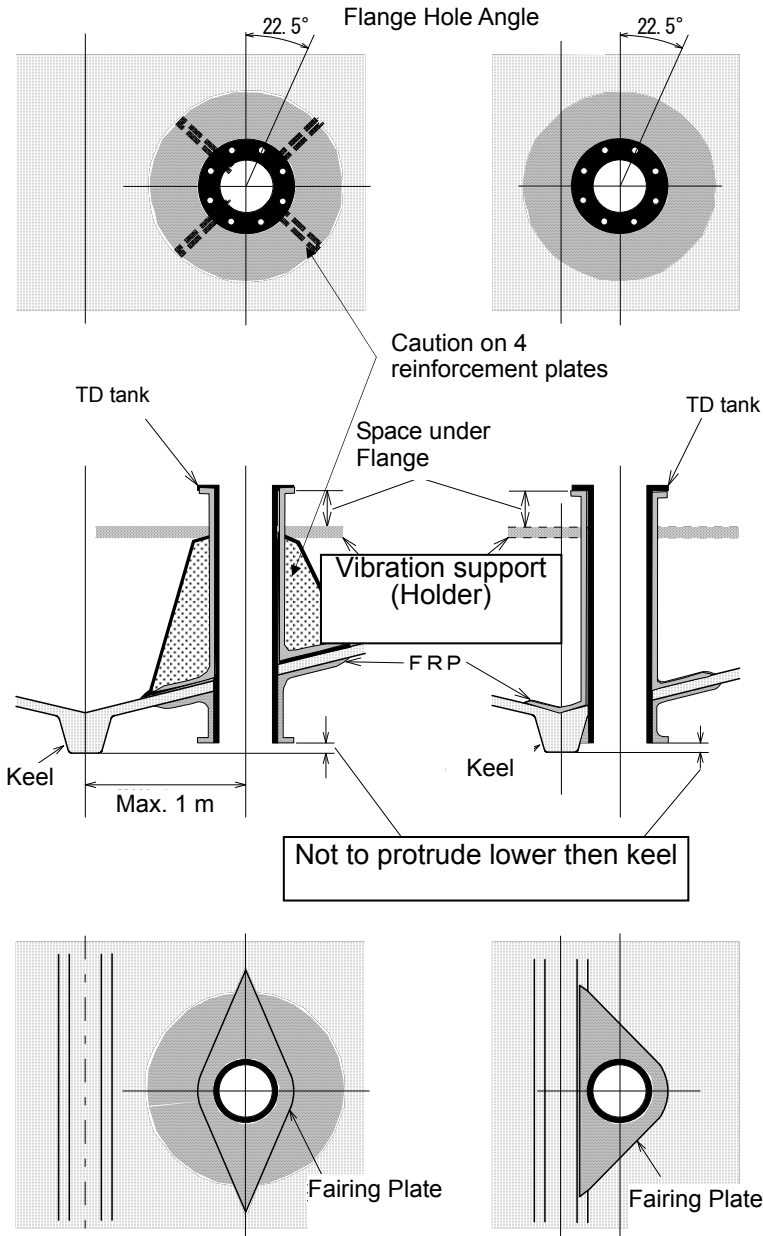


Fig. 2.9 Installation of TD tank

2.4.3 Installation conditions for a TD tank

(1) The TD tank should be installed satisfying the following conditions.

- Install the TD tank on the keel within the range of 1/3 to 1/2 of the overall length from the bow. Alternatively install the unit so that the center of the TD tank positions within 1m from the center of the keel.



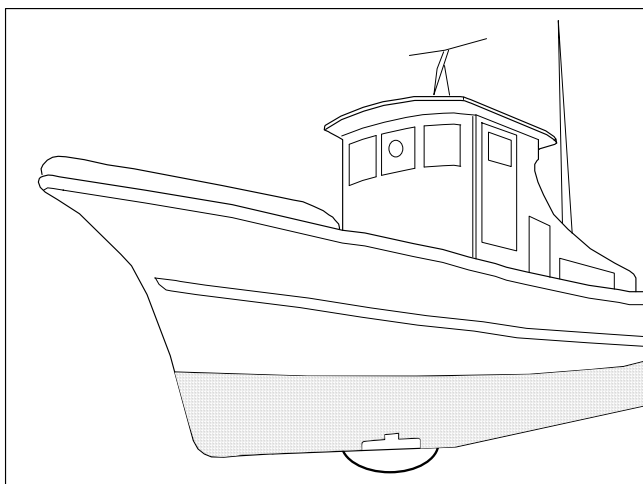
- There should be no obstacles right below the flange of the TD tank which may interrupt bolt clamping of the Flange.
 - In addition, consider to put 4 pieces of reinforcement plates at 90° pitch under the body of the TD tank depending on the circumstances.
 - The top end of the TD tank should not project below the keel end.
 - The Flange surface of the TD tank should stay level during standard cruise.
 - Apply FRP sufficiently to all the necessary sections to prevent leakage of water.
 - Make the surrounding of the TD tank projecting out from the bottom in a streamline shape and provide a fairing plate to suppress water resistance and generation of air bubbles to the minimum.
 - When necessary, install a Vibration support holder to stop shaking.
- When doing this, make sure the holder does not interfere bolt clamping of the flange.

Fig. 2.10 Installation of TD tank

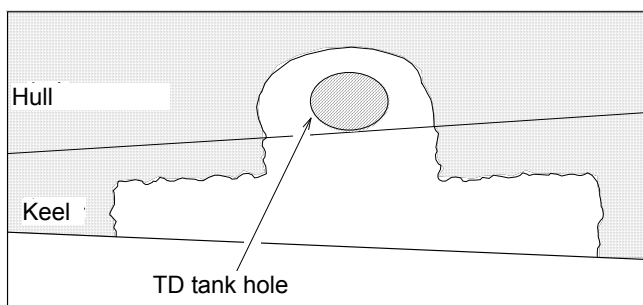
warning

Fully discuss about the strength and waterproofness with the ship owner, persons in charge in the shipyard and the installer before determining on the position and the method of installation and necessary materials.

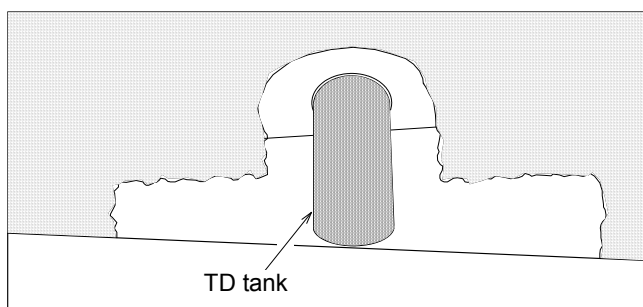
2.4.4 Example of installation of the TD tank



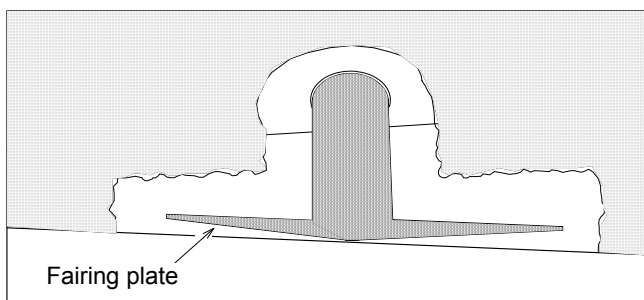
- The position to install the TD tank.



- Open a hole of the same diameter as of the TD tank along the keel in the bottom.

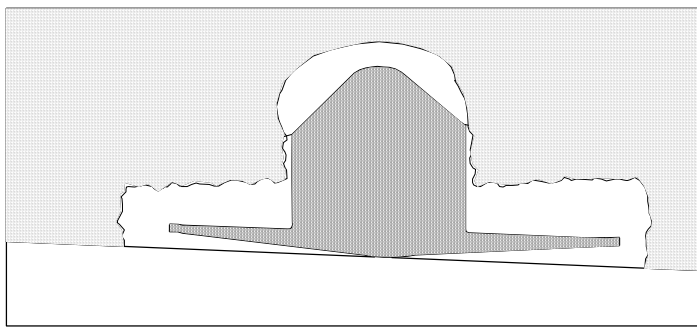
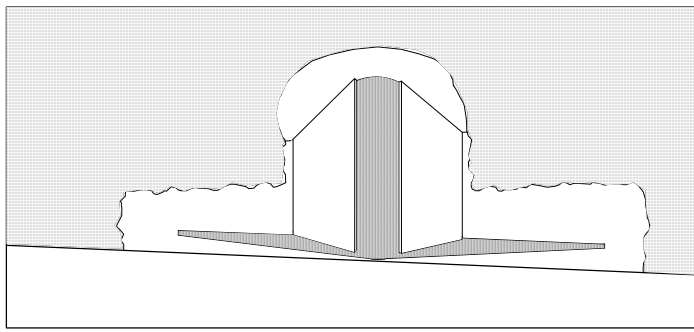


- Install the TD tank into the hole.
The Flange surface of the TD tank should stay level during standard cruise.



- Make the surrounding of the TD tank projecting out from the bottom in a streamline shape and provide a fairing plate to suppress water resistance and generation of air bubbles to the minimum.

Fig. 2.11 Example of TD tank installation – 1



- Apply FRP sufficiently to all the necessary sections to prevent leakage of water.

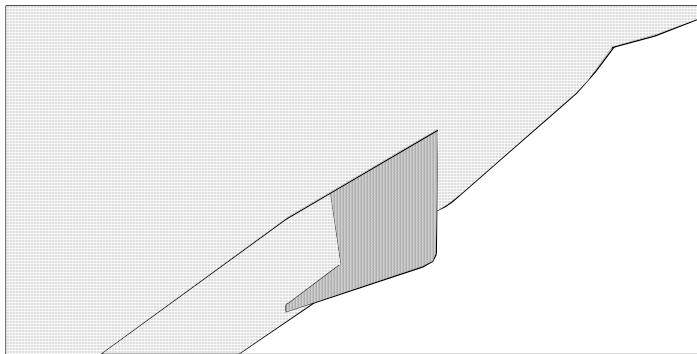


Fig. 2.12 Example of TD tank installation - 2

2.4.5 Assembly of Hull unit

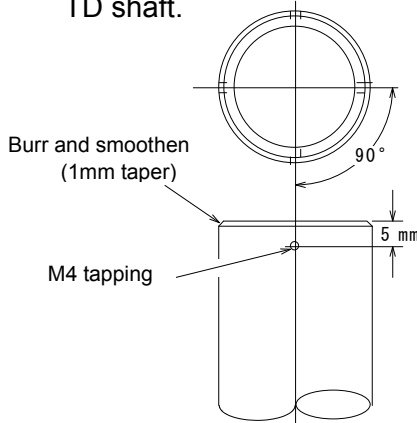
(1) Necessary length of TD shaft

- When the installed TD tank is shorter than the standard length, the TD shaft length should be also shortened.
 - TD tank: 1230 mm (Standard)
 - TD shaft: 1411 mm (Standard)
- When standard TD tank is installed with shortened length, the TD shaft length should be processed at least

Necessary length of TD shaft = TD tank length (Lt) + 181 mm

(2) Processing of TD shaft

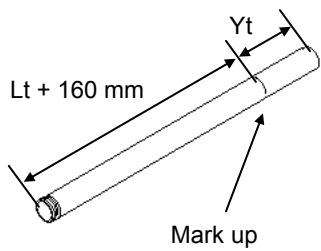
- When the TD tank with a standard length is installed, there is no need to process the TD shaft.



1. Cut the TD shaft to “TD tank length (Lt) + 181 mm”.
2. Burr the cutoff portion and finish it with 1 mm taper.
3. Make 4 holes of 3.4 mm diameter at 90° apart around the TD shaft 5 mm down from the cutoff surface, and provide M4 tapping.

Fig. 2.13 Processing of TD shaft

- When the length of a TD tank has been shortened, the TD shaft is cut off as shown above to be used. If there is enough space above the installed location, the TD shaft can be used without cutting off.



Mark up at “Lt+160mm” and align the top end of joint arm at this mark and fasten it.

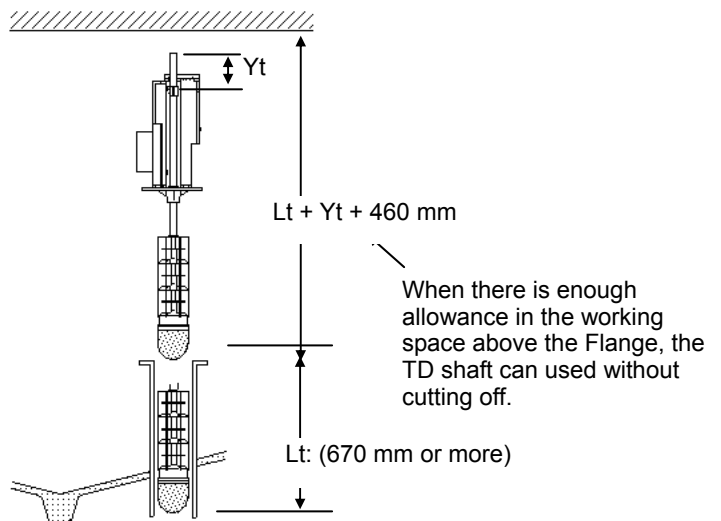
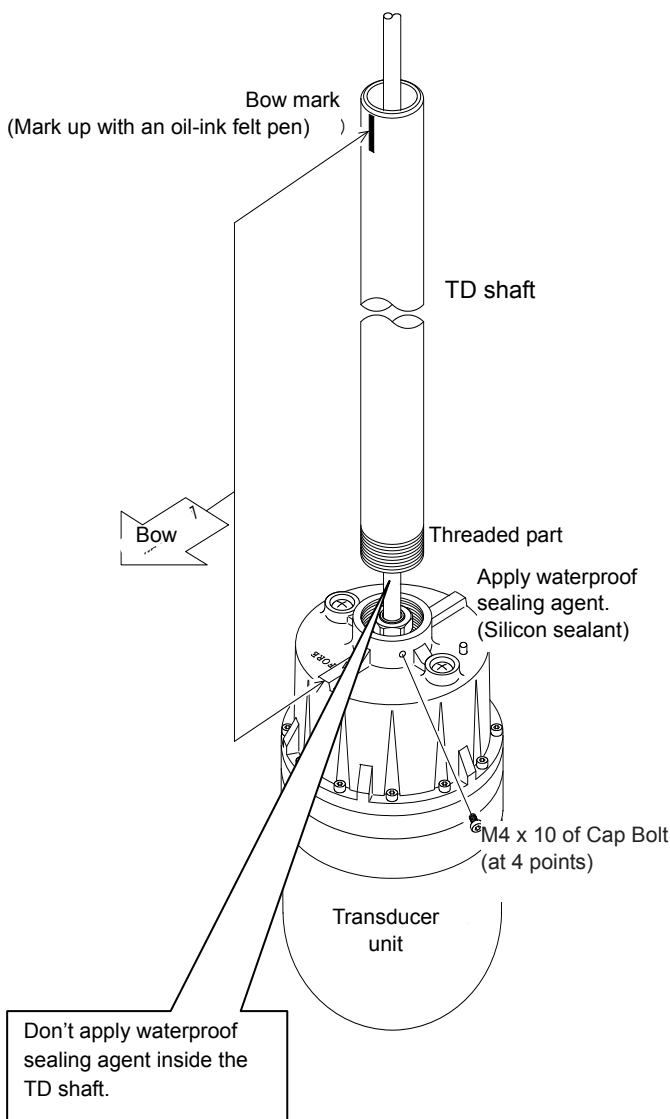


Fig. 2.14 Installation of a TD shaft

(3) Assembling the TD shaft and the Transducer unit

- 1) Fasten the TD shaft to the Transducer unit. At this time, be sure not to damage the TD shaft thread and not to twist the cable.
 - Remove stains and grease fully at the threaded part of the Transducer unit and the TD shaft, and apply the attached waterproof sealer (Bath Cork) to the threaded part only.
 - Fasten the TD shaft to the Transducer unit. As there is a packing at the Transducer unit side, fasten as far as the packing will work to the point where no slackness will occur. Be careful that excessive fastening strength causes breaking of the packing. Use the attached 4 pieces of Cap bolt to prevent loose bolt, and cover the Cap bolt with waterproof sealing agent to prevent electric corrosion.
 - After fastening of the TD shaft to the Transducer unit, please mark up the Bow mark at the top end of the TD shaft.

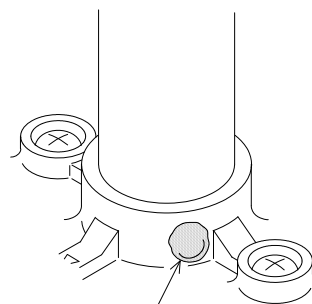


Caution

When the Transducer unit and the TD shaft are assembled or dismantled, be sure to hold on the metal portion of the Transducer unit and turn the TD shaft. If the Transducer unit is turned to be dismantled, the Transducer unit or cables may be damaged.

Caution

Do not apply or fill up the inside of the TD shaft with waterproof sealing agent. If the cable of the Transducer unit is bonded, there may be damages on the Transducer unit or the cable during dismantling for maintenance works.

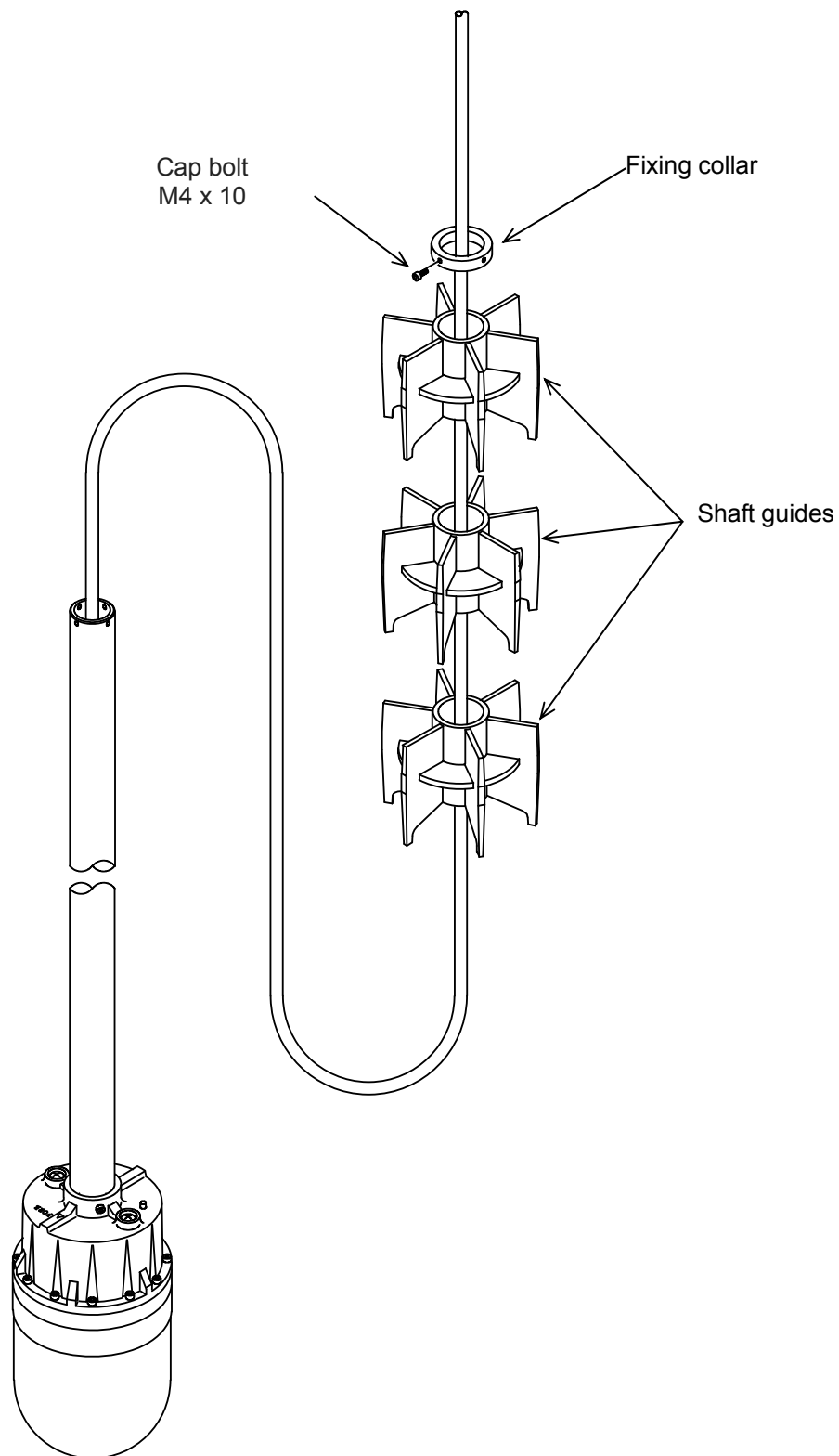


Covering 4 Cap bolt with waterproof sealing agent. (at 4 point)

Fig. 2.15 Assembling Hull unit - 1

2) Attaching the shaft guides

- Insert the 3 shaft guides over the TD shaft in the direction as shown in the drawing below.
- Insert a Fixing collar and fasten with 2 pieces of attached cap bolts to allow a little movement of the shaft guides.

**Fig. 2.16 Assembling Hull unit - 2**

3) Attaching the Transducer unit to the Hull unit.

- Apply grease to the bearing of the Flange and the inside of the waterproof nut.
- Loosening the waterproof nut and thread the TD shaft through the Flange bearing, and thread the damper. Mount them to the Joint arm matching the bow direction.
- Ensure that the TD shaft end projects 21mm from the Joint arm surface.
- In case of the length of the TD tank other than 1230mm long.
- In the use case of other TD tank, **ensure the lowest part of the Transducer unit is at least 50mm above the lowest part of the TD tank.**
- To prevent slip-out of the TD shaft, fasten the attached Fixing collar using Cap bolt (4pcs).

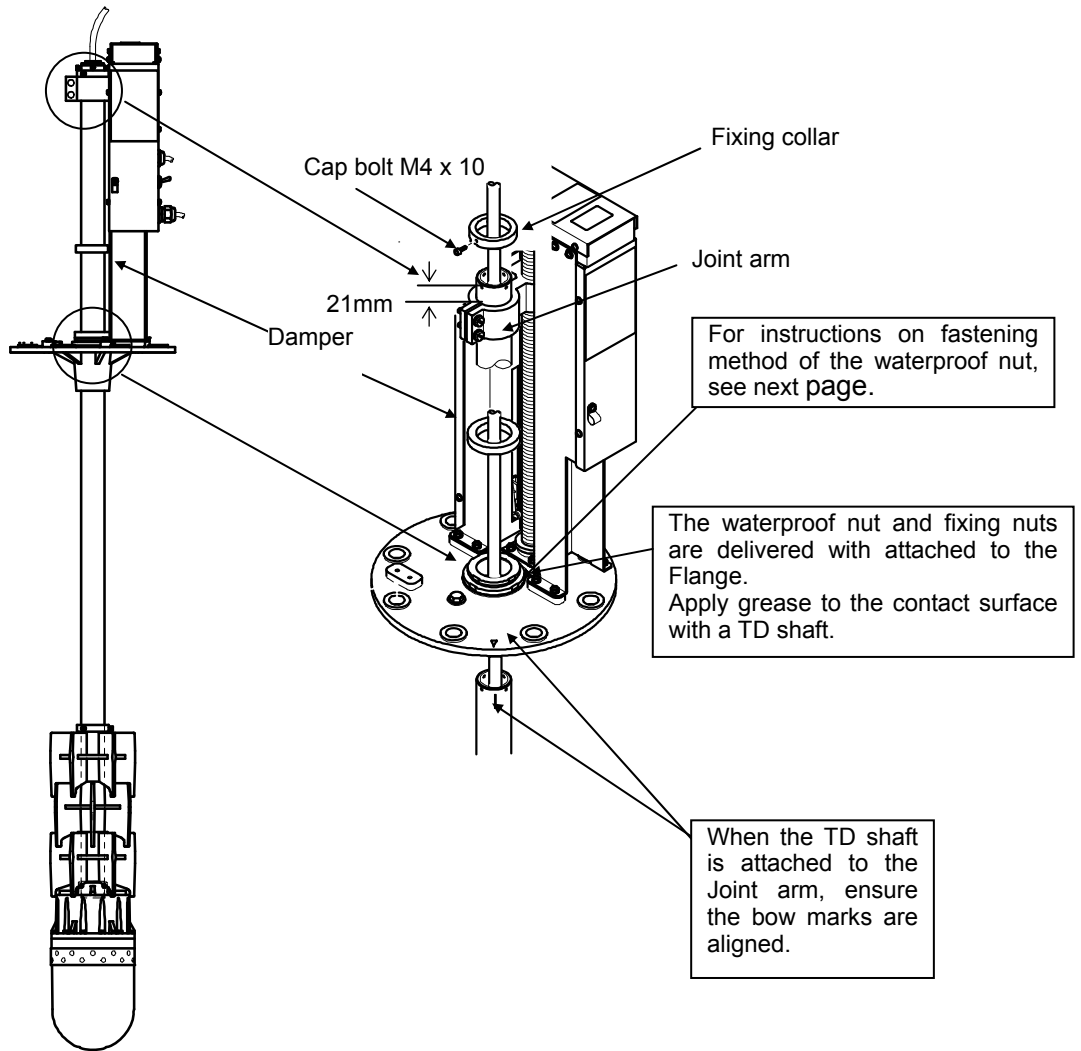


Fig. 2.17 Assembling Hull unit - 3

4) Attaching the shaft cap to the end of the TD shaft

- Insert the shaft cap into the end of the TD shaft, temporarily tighten with the Cap bolt (4 pcs of M4 x 25) attached to the shaft cap first, and then tighten them evenly. Be careful that too strong tightening may break down the cable of the Transducer unit. In addition, fix the shaft cap with 4 pieces of attached cap bolts (M4 x 10) to prevent the cap from coming off.

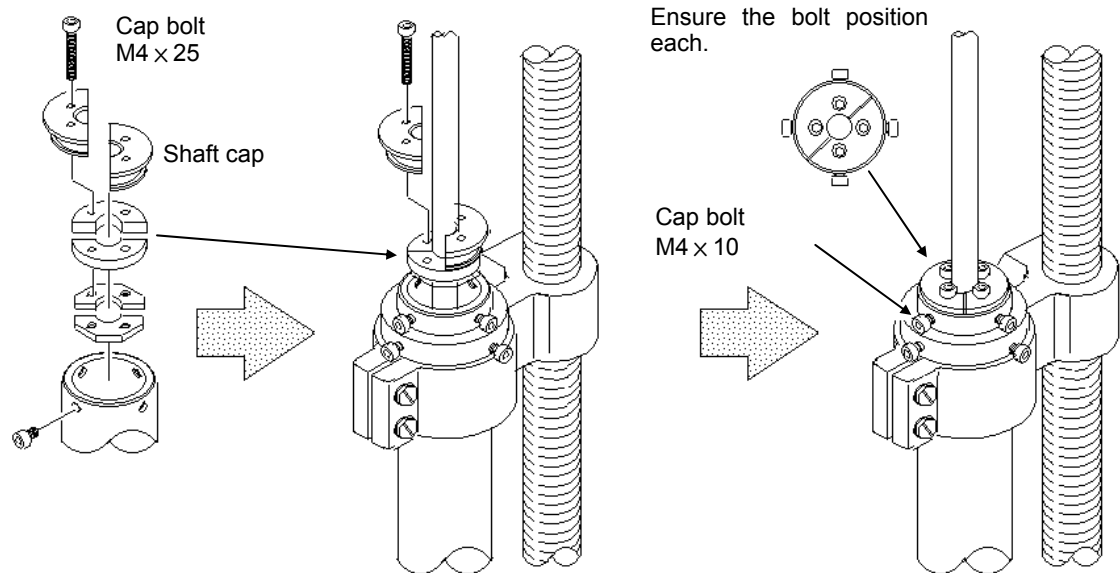


Fig. 2.18 Assembling Hull unit – 4

5) How to tighten Waterproof nut and Lock nut

- Lift up the Lock nut as shown in the left side figure below. Tighten the Waterproof nut firmly by hand into the Flange opening. Turn the waterproof nut 180° by striking a flathead screwdriver and a hammer. At this time, not to over tighten the waterproof nut.
- The Lock nut is used to prevent slip-out of the waterproof nut.
- Apply a flathead screwdriver at a groove provided on the fixing nut and strike the flathead screwdriver' head by a hammer, and turn the nut clockwise to fasten fast.

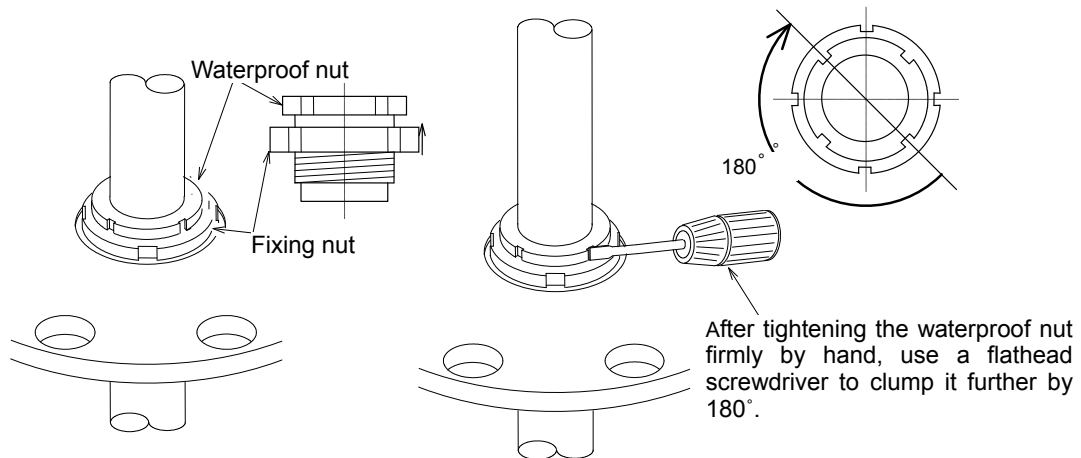


Fig. 2.19 Assembling Hull unit – 5

6) Hull unit and TD tank attachment

- Insert a Flange GUM packing for a flange between the Hull unit and the TD tank, fasten the Hull unit to the TD tank with 8 pcs of attached Hexagon bolts (M16 x 55) . When clamping bolts for fitting the Hull unit to the TD tank, make tentative clamp and try to move the Transducer unit up and down for several times to confirm the alignment when making the final clamping evenly at the position of smooth vertical movement.

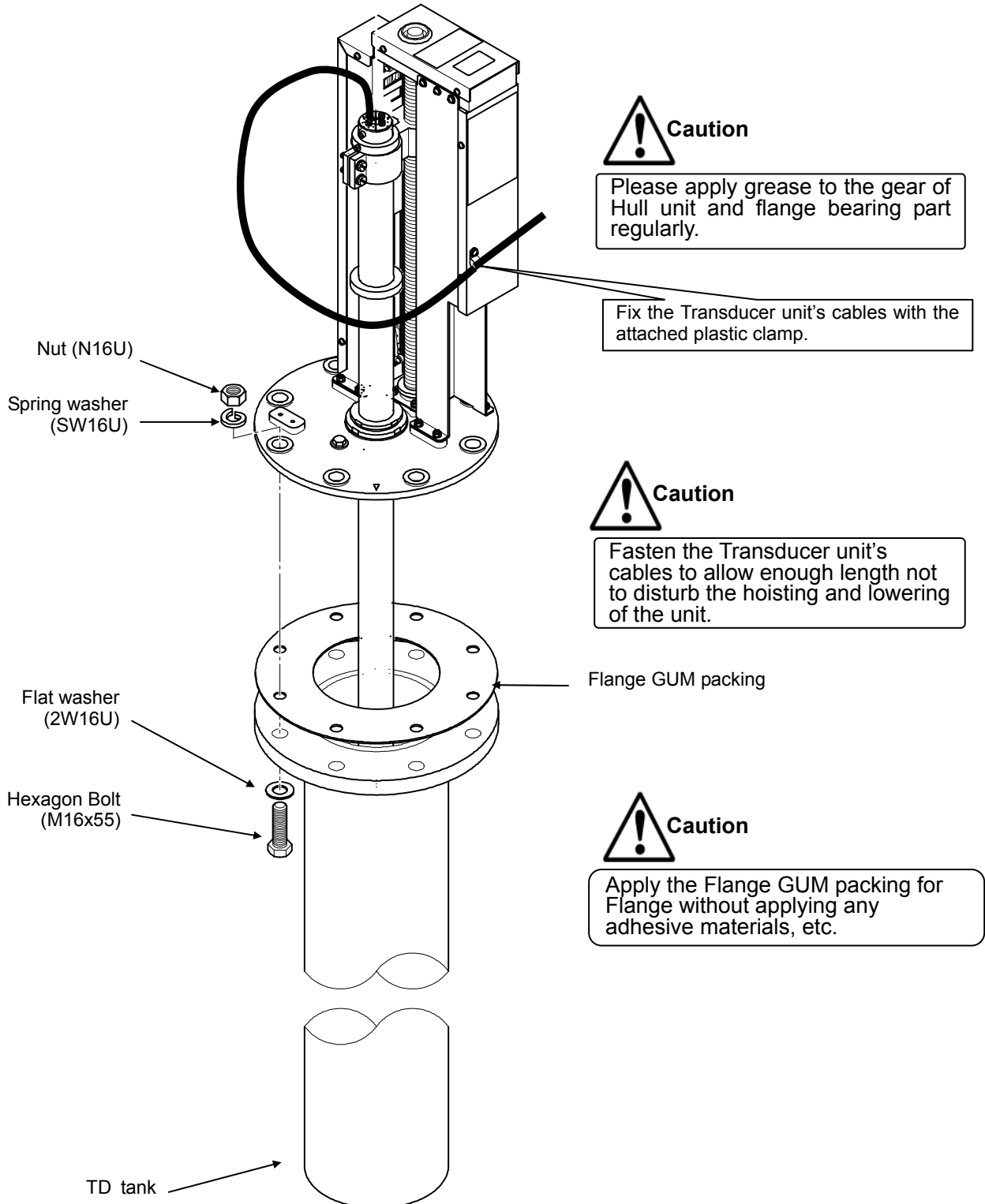
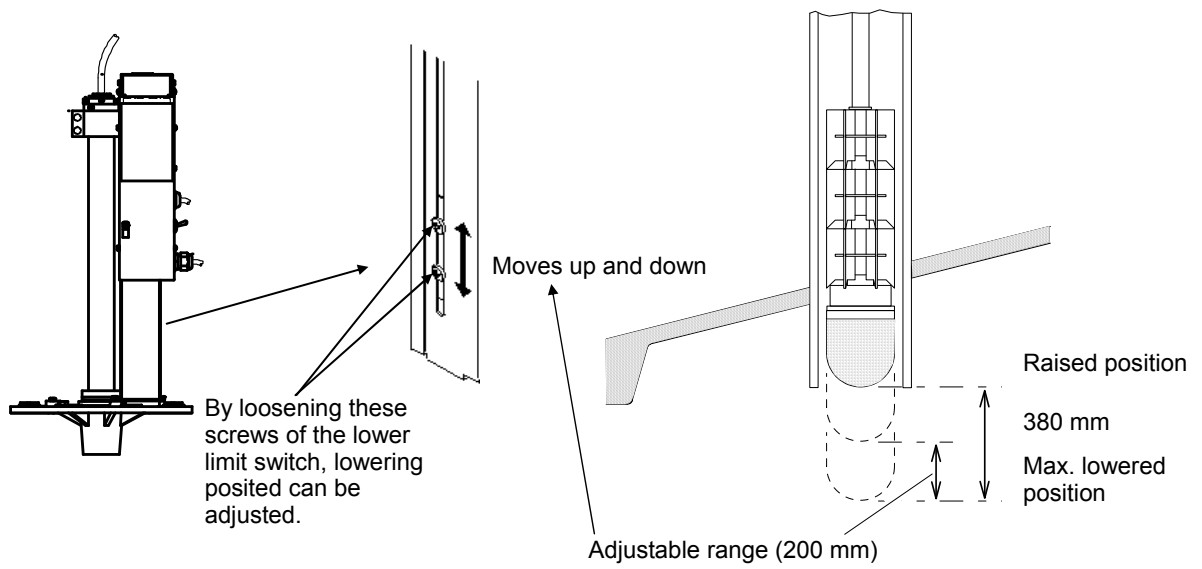




Fig. 2.20 Assembling Hull unit – 6

(4) Adjustment of hoisting and lowering stroke

- By adjustment of the lower limit switch as shown below, the hoisting and lowering stroke of the Transducer unit can be changed from min. 150 mm to max. 380 mm.
- To lower the Transducer unit to an approximate position, please adjust the unit with this lower limit switch.
- When the limit switch is raised, please fix the wires by ANP base and the binding bands attached so as to prevent the wires from touching with the hoist gears.

**Fig. 2.21 Adjustment of hoisting and lowering stroke**

(5) Manual hoisting and lowering of a Transducer unit

- When the Transducer unit cannot be hoisted due to a trouble occurrence, it can hoist the Transducer unit by use of the attached crank handle after taking off the rubber cap.
- When the crank handle is used, press  on the Operation unit to be lowered the Transducer unit. After that please turn the hoist switch OFF and keep pressing  on the Operation unit for more than 3 seconds.
- After a specified period (approx. 60 minutes), the electromagnetic brake works and handle operation becomes heavy.
- When the power source cannot be supplied to the Hull unit due to a trouble in inboard power source;
 - 1) Turn the Hoist switch off and remove the main fuse of the Hull unit.
 - 2) Open the upper cover by removing the two fixing screws with a Phillips-head screwdriver.
 - 3) Take off the gear indicated by an arrow shown in the figure below.

You can move the Transducer unit up and down easily with the attached crank handle by performing the above procedures.
 * After completion, return to the original state following the above procedures in reverse order.

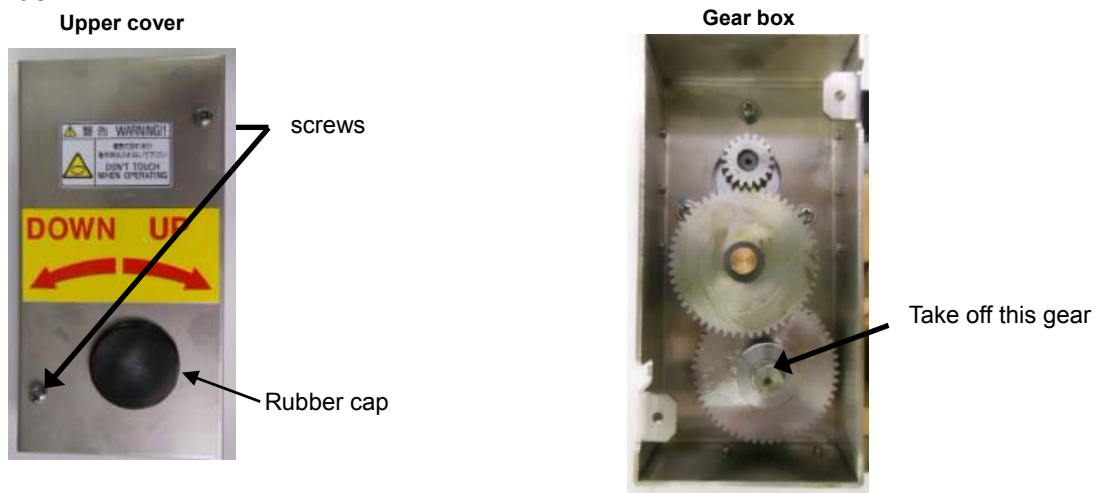


Fig. 2.22 Upper part of a Transducer unit

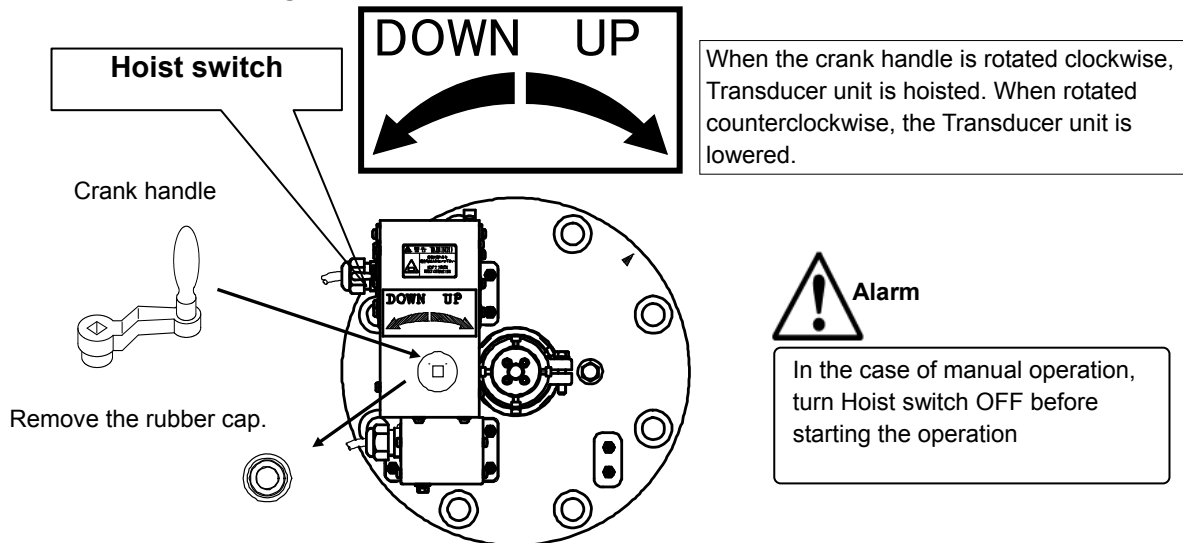


Fig. 2.23 Operation of a crank handle

To prevent electric corrosion, connect a wire between the flange and the ship's ground.

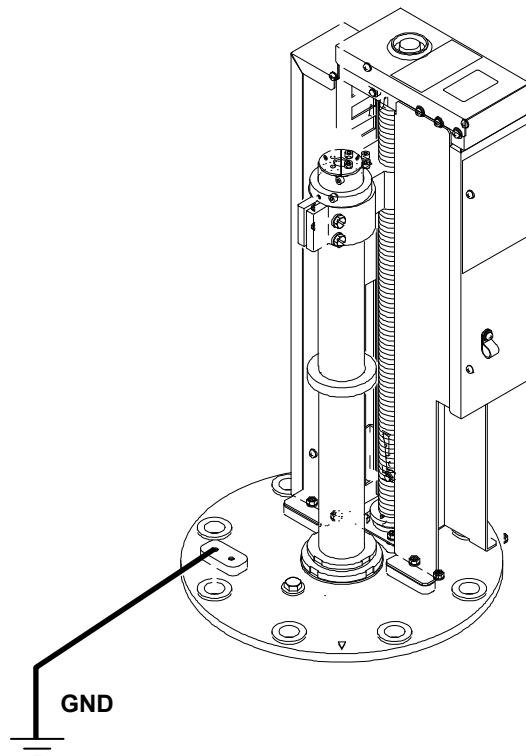


Fig. 2.24 Connection of a wire between the flange and the ship's ground



warning

*** After completion of the installation, please confirm that the voltage between the Flange and the ship's ground does not exceed 0.65V.
When the voltage is high, connect with a thicker power cable to reduce the voltage under the specified value. If the voltage remains high, the Transducer unit may be damaged due to electric corrosion.**

2.5 Wiring

2.5.1 Connection of cables to Processor unit

Connect the power cable and cables from the Hull unit to the connectors on the Processor unit.

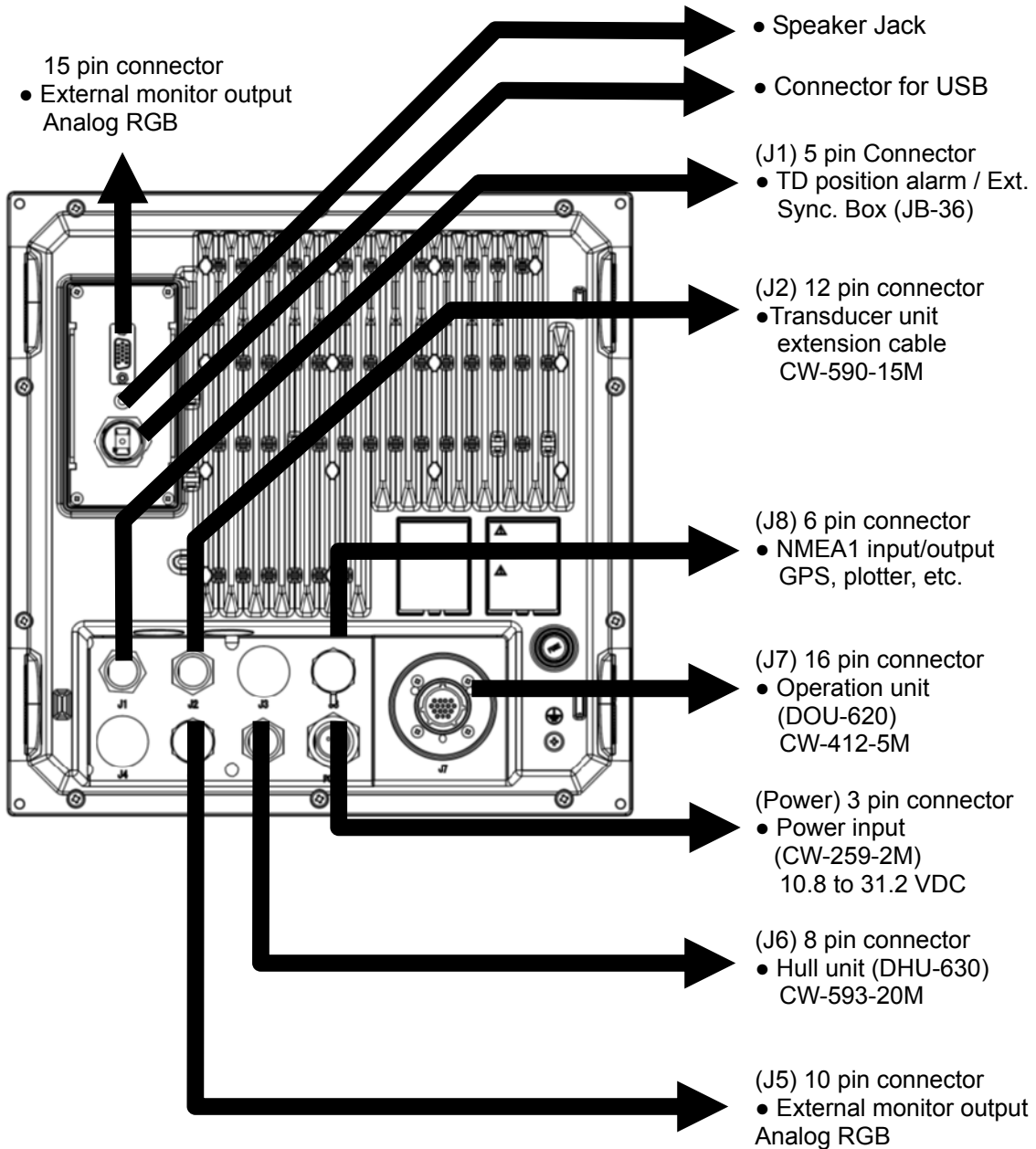


Fig. 2.25 Cable Connections

Connection of power cable (CW-259-2M)

Connect the power cable to the [POWER] connector at the rear of the Processor unit (DPU-610).

Connection of DC power cable (CW-259-2M)

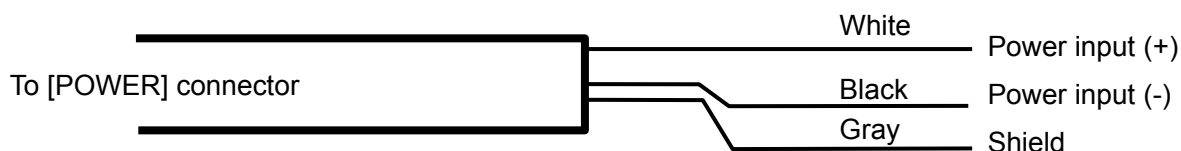


Fig. 2.26 Connection of a DC power cable



Caution: Confirm the main switch-board off before connecting power cable.

Connection of Hull unit (DHU-630)

In the case of connection of Hull unit:

Be sure to confirm the following points after completion of installation of Display unit, Processor unit, Operation unit, TD position alarm / Ext. Sync. Box and Hull unit.



- ※ DC power range for this equipment is as follows:
 - Display unit (Owner supply): Depends on the instruction manual for the unit
 - Processor unit (DPU-610): 10.8 to 31.2 V
 - Hull unit (DHU-630): 10.8 to 31.2 V
 Connect to the specified power source. If un-specified power source is used, it may cause a damage, fire or electric shock.
- ※ Use the specified power cables. If un-specified power cable is used, it may cause heat generation or fire.
 - After completion of connection, please confirm that a voltage between the Flange of the Hull unit and the ship's ground does not exceed 0.65V.
 - When the voltage is high, connect with a thicker power cable to reduce the voltage under the specified value.
 - If the voltage remains high, Transducer unit may be damaged due to electric corrosion.
- ※ Be sure to plug and unplug the cables by holding the connector part with hands after turning off the power source. If the cables are plugged or unplugged by holding it directly with hands, the cables may be damaged and may lead to fire or electric shock. Do not do this practice on any terms.
- ※ Run the cables not to touch the rotary obstacles or disturb the operation, and are not bended, twisted or pulled by force, and no heavy objects are put on them. Be careful such a cabling may lead to injury, heat generation or fire cause.

Connection of a Hull unit (DHU-6301)

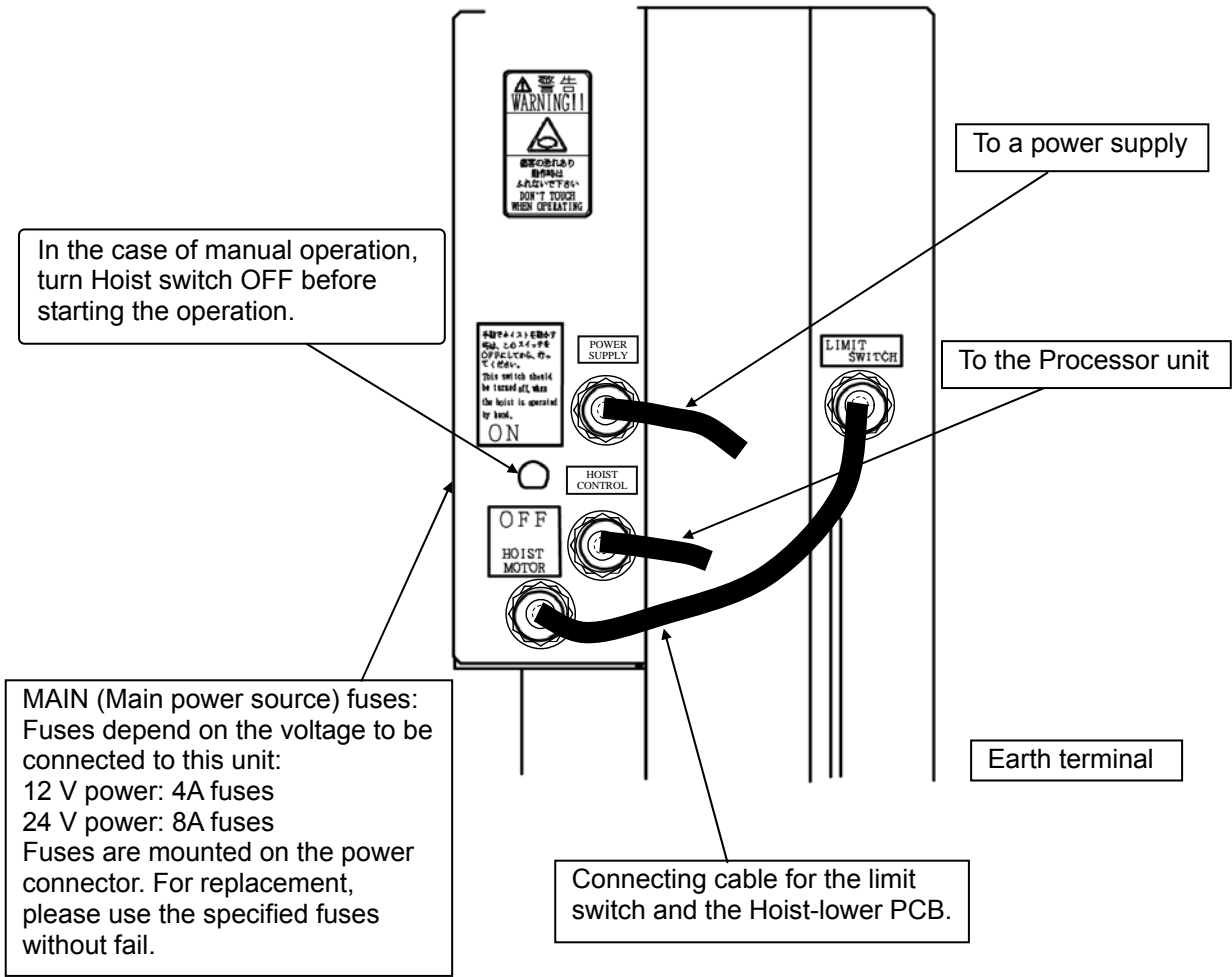
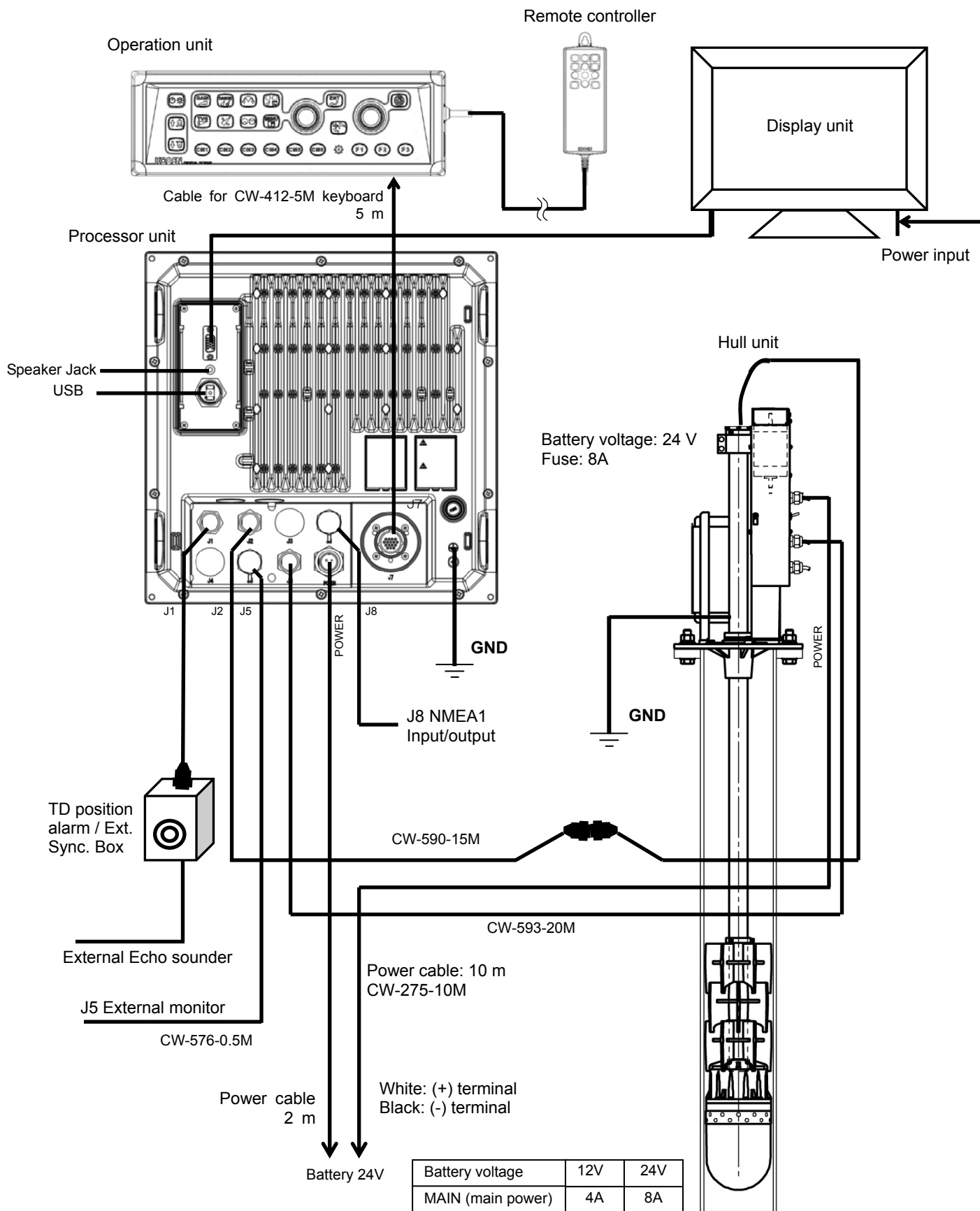


Fig. 2.27 Connection of Hull unit

General connection



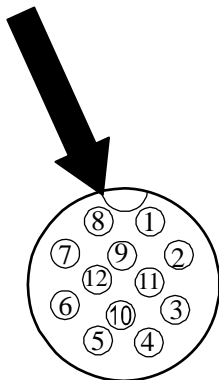
※The cable lengths include the pull in (max. 60 cm) to each unit.

Fig.2.28 KDS-6000BB general connection

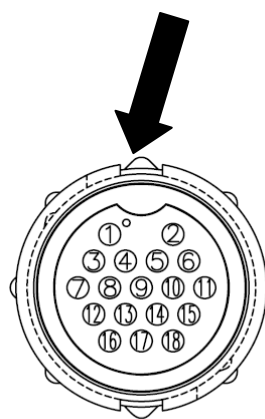
Connection of Transducer unit extension cable (CW-590-15M) and Transducer unit

Connection table of Transducer unit extension cable (CW-590-15M) and Transducer unit

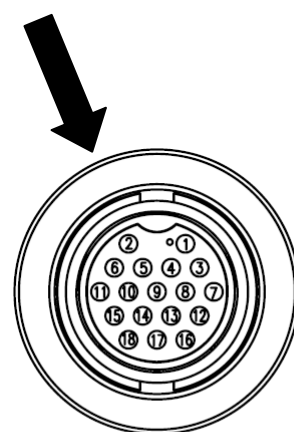
Transducer unit extension cable (CW-590-15M)			Transducer unit (DPU-6302) cable		
Be connected with J2 connector of Processor unit (DPU-610)		Connectors of Transducer	Pin No.	Pin No.	Color of cable
Pin No.	Name of signal	Color of cable	Pin No.	Pin No.	Color of cable
1	NC	-	15	15	-
2	TD1	White	16	16	Black
3	TD2	Black	18	18	White
4	GND (TD Shield)	Shield	8	8	Shield
5	SCANNER PS-	Green	3	3	Black
6	SCANNER PS-	Shield	4	4	White
7	SCANNER PS+	Red	1	1	Red
8	SCANNER PS+ (NC)	-	17	17	-
9	SCANNER TXD	Yellow	5	5	Yellow
10	SCANNER COM	Blue	7	7	Blue
11	NC	-	11	11	-
12	SCANNER RXD	Brown	6	6	Brown
-	-	-	2	2	-
-	-	-	9	9	-
-	-	-	10	10	-
-	-	-	12	12	-
-	-	-	13	13	-
-	-	-	14	14	-



Pin assignment
CW-590-15M
12 pin side



Pin assignment
CW-590-15M
18 pin side



Pin assignment
Transducer unit
cable

 **Caution: Pins assignment from front side of connector**

Connection of TD position alarm / Ext. Sync. Box (JB-36)

For the TD position alarm / Ext. Sync. Box (JB-36), the equipped buzzer sounds for alarming when the Transducer unit remains as projected at the time of power OFF of the Processor unit.

Connection table of TD position alarm / Ext. Sync. Box (JB-36)

TD position alarm / Ext. Sync. Box (JB-36)			Cable		Processor unit (DPU-610)							
Terminal No. and name of signal			Color of cable	Name of cable	Connector No.	Pin No.	Name of signal					
J1 (C50-800*)	1	TRIG.IN	Trigger signal from external echo sounder	External echo sounder	J1							
	2	GND	—									
	3	TRIG.OUT	Trigger output to external echo sounder									
	4	GND2	Black	CW-413-5M				4	GND2			
	5	UP ALARM	Orange					5	UP ALARM			
	6	BUZZ-	Black	Buzzer				J1				
	7	BUZZ+	Red									
	8	TRIG.OUT	Red	CW-413-5M							3	TRIG.OUT
	9	GND	Brown or White + Brown								2	GND
	10	TRIG.IN	Blue								1	EXT.TRIG

* Subject to version change

※ Terminals from 4 to 10 have been connected at shipping from factory.

(1) Connection to the TD position alarm / Ext. Sync. Box (JB-36) and J1 of the Processor unit (DPU-610).

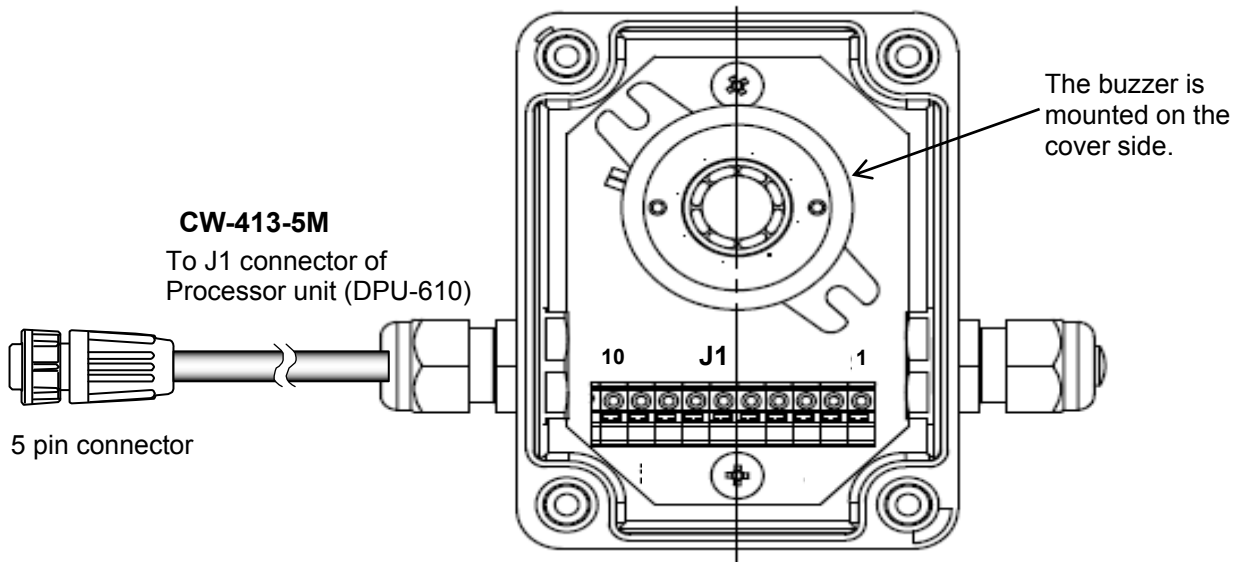


Fig. 2.29 Connection of KDS-6000BB – TD position alarm / Ext. Sync. Box

(2) Connection to external echo sounder and the TD position alarm / Ext. Sync. Box (JB-36)

It is likely to observe mutual interference when the transmit frequency of an external echo sounder and KDS-6000BB is the same or close. Interference can be decreased by synchronizing the KDS-6000BB transmission with the trigger of the external echo sounder. Refer to the following for the connection.

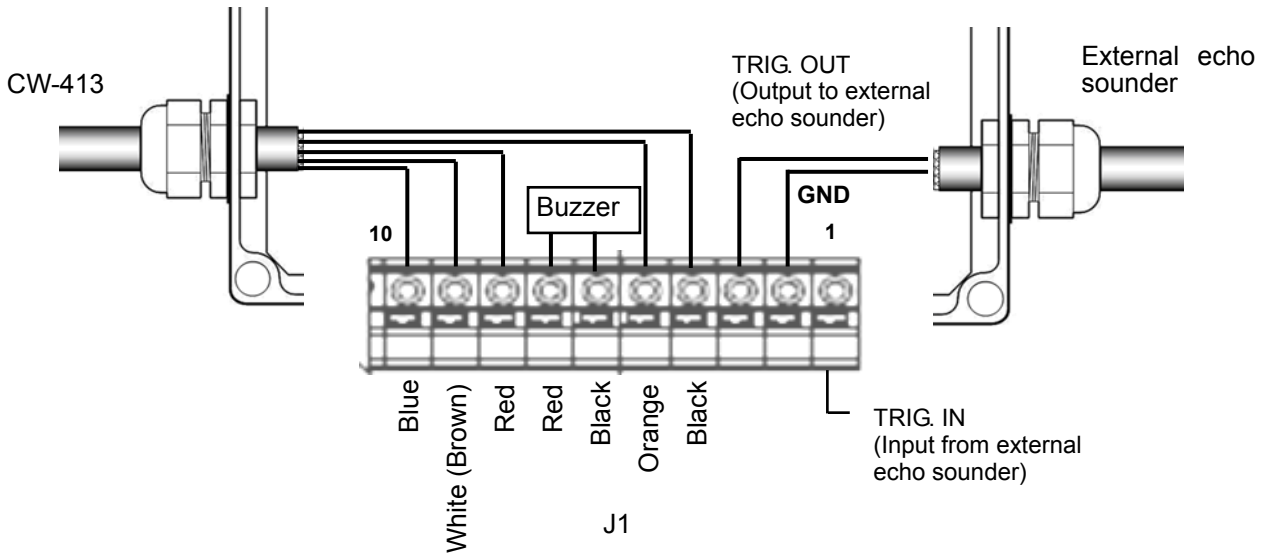
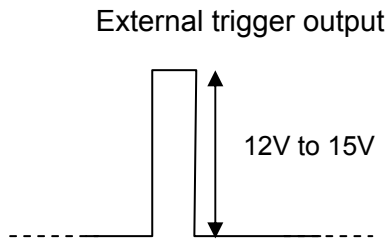


Fig. 2.30 Connection of an external echo sounder (JB-36)



 **Caution: Wind the insulation tape around the un-used lead wire for core-wired not to contact each other.**

Connection of Display unit [Owner supply]

When installing Display unit (VGA monitor, analog RGB input), connected it via external monitor cable (owner Supply) to the connector on the Display unit.

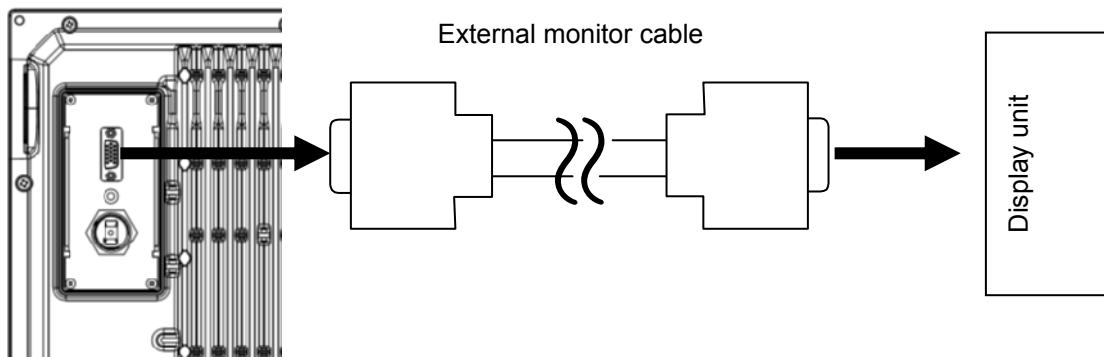


Fig. 2.31 Connection of Display unit

Connection of External monitor (J5) [Owner supply]

When installing an external monitor (VGA monitor, analog RGB input), connect it via CCCW-576-0.5M to J J5 connector. Refer to the illustration below for the wiring.

Structure of CW-576-0.5M

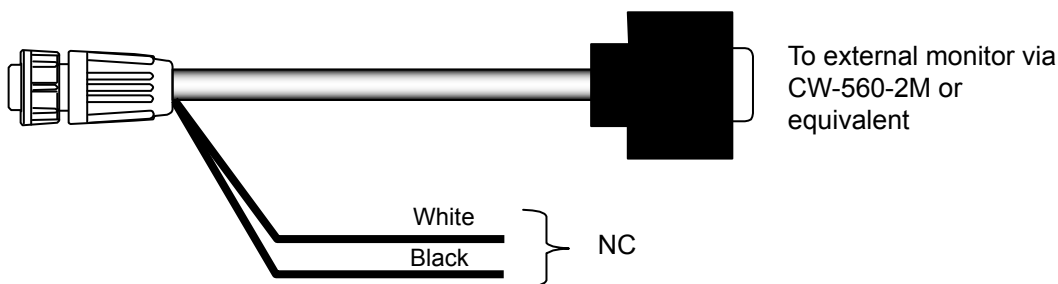


Fig 2.32 Connection of External monitor

Connection with navigation equipment (J8)

The NMEA data can be output from KDS-6000BB to an external navigation equipment, and the NMEA data can be input from an external navigation equipment to KDS-6000BB. Refer to the following for the connection.

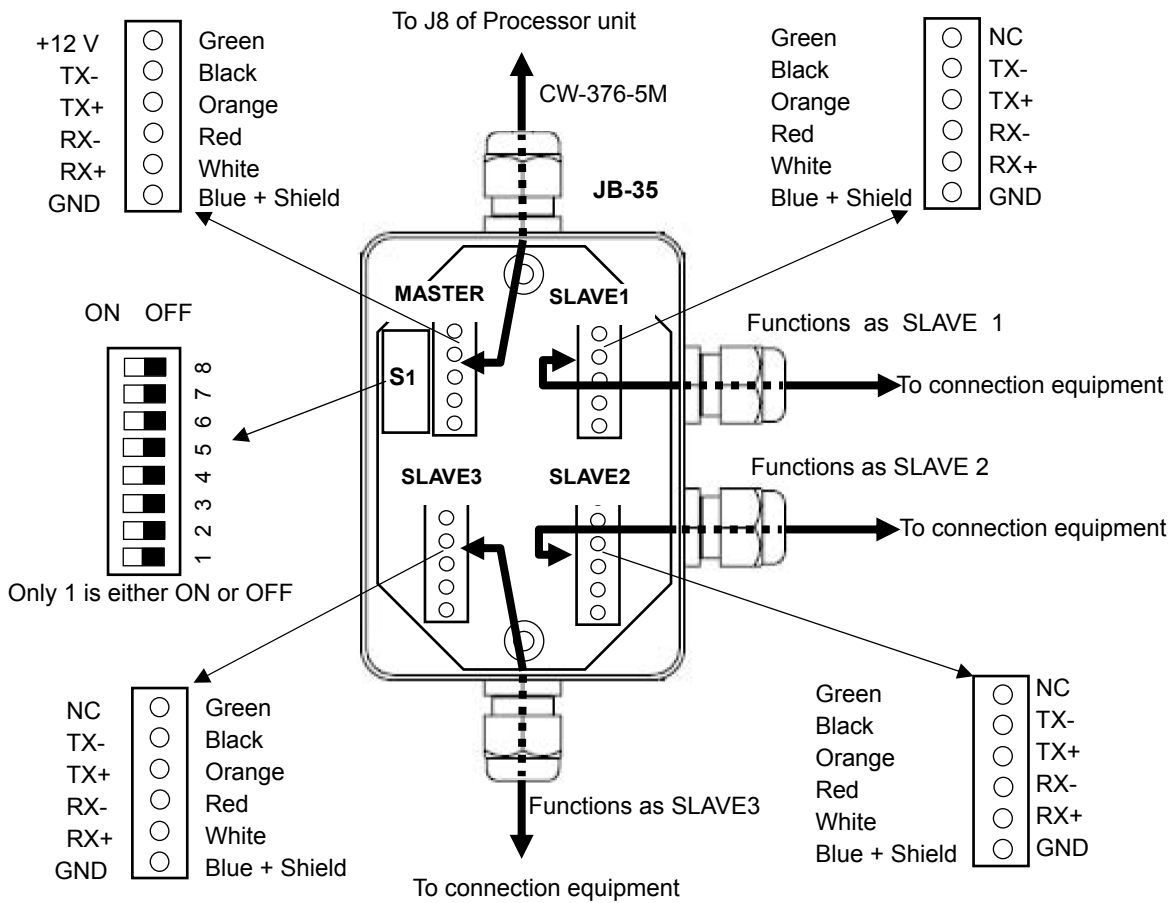
Connector	Pin	Remarks
L8	①	GND
	②	NMEA TX+
	③	NMEA TX-
	④	NMEA RX+
	⑤	NMEA RX-
	⑥	+15V

Connection with Junction box JB-35

To extend the ports, connect the Junction box JB-35 to the data connectors as shown in the figure below.

Set the DIP switch (S1) as shown in the figure below.

Wire the cables with the CW-376-5M (option) as shown in the following color chart.



Connection of USB memory (Owner supply)

A USB memory can be connected to the Processor unit.

Pullout the USB connector cap at the rear panel of the Processor unit and insert a USB Memory.

Put the cover firmly when a USB Memory is not connected. Without the cap, the Processor unit may cause failure.

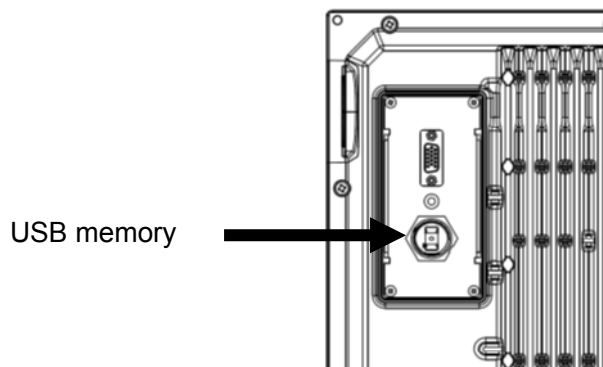


Fig 2.33 Connection of USB memory



Caution: Connect / Disconnect the USB memory after turning power supply OFF.



Caution: The liquid ingress protection grade of the Processor unit is no protection (IPX0), so waterproof property is not guaranteed.

Connection of External Speaker

Connect the External Speaker (NP-108: optional) to the Processor unit by Audio system plug.

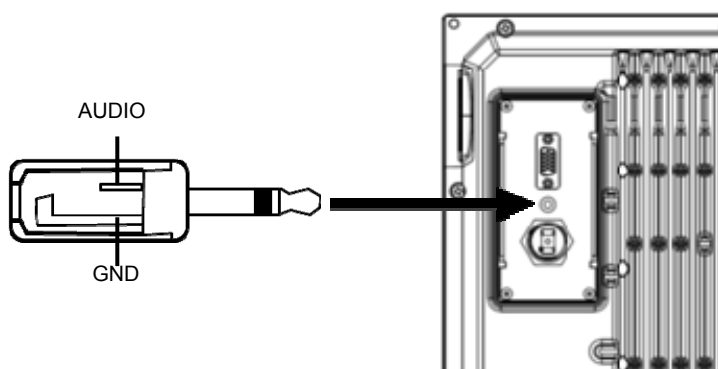


Fig 2.34 Connection of External Speaker


NMEA output setting to external equipment

Setup of baud rate of NMEA1 (J8)

This is to set the baud rate of NMEA1 (J8).

The baud rate should match the externally connected equipment.


1. Press  to display [Menu3].


2. Turn  (knob/left) to select [Baud rate].

Menu3	
Baud rate	4800
DBT output	Off
DPT output	Off
GGA output	Off
GLL output	Off
MTW output	Off
RMC output	Off
TLL output	On
VTG output	Off

3. Press  (knob/left) or  to move setting value box.



Baud rate	4800
-----------	------

4. Turn  (knob/left) to select the setting value from [4800], [9600], [19200] or [38400].

5. Press  to close the menu.

Selection of NMEA Output


The output of NMEA sentence can be set to On/Off.

1. Press  to display [Menu3].
2. Turn  (knob/left) to select [Optional output].

Menu3	
Baud rate	4800
DBT output	Off
DPT output	Off
GGA output	Off
GLL output	Off
MTW output	Off
RMC output	Off
TLL output	On
VTG output	Off

3. Press  (knob/left) or  to move setting value box.


DBT output	Off
------------	-----

4. Turn  (knob/left) to select the setting value from [On] or [Off].

[On]: Enable the output

[Off]: Disable the output

5. To set other output, repeat the steps 2 to 4.

6. Press  to close the menu.

2.6 List of input/output sentences

2.6.1 Input sentences

The Sentences of GGA, GLL, HDG, HDM, HDT, RMC, VTG and ZDA can be received. Possible input formats are: NMEA0183 Ver. 1.5, Ver. 2.0 and Ver. 3.0.

Information	Priority Order of sentences	Information	Priority Order of sentences
Latitude, Longitude	GGA>RMC>GLL	Date	ZDA>RMC
Heading	HDT>HDG>HDM>VTG>RMC	Time	ZDA>GGA
Speed	VTG>RMC		

2.6.2 Output sentences

The sentences of DBT, DPT, GGA, GLL, MTW, RMC, TLL, VTG and ZDA can be transmitted. The output format is NMEA0183 Ver. 2.0. However, the DBT output is in Ver. 1.5.

Sentence	Information	Sentence	Information
DBT	Water depth	RMC	Latitude / Longitude, Course, Ground Speed, Date
DPT	Water depth from the Transducer unit	TLL	Target position
GGA	Latitude / Longitude, Time	VTG	Course, Ground Speed
GLL	Latitude / Longitude	ZDA	Date, time
MTW	Water temperature		

Chapter 3 Maintenance

3.1 Inspection


The daily maintenance and inspection extend the life of equipment. To keep the equipment always in the best conditions, implement the periodical inspection shown in the table below.

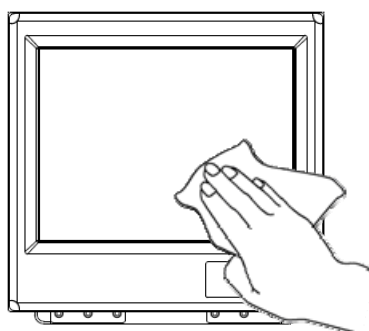
Item	Inspection item
Connectors at the rear of the Display unit, Hull unit and Processor unit	Check the looseness
Wiring of cables	Check the wiring of cables connecting the equipment and the damage of cable
Grounding of Display unit, Hull unit and Processor unit.	Scrape the rust off the ground terminal and keep good contact.

3.2 Cleaning

3.2.1 Monitor / Processor units

Contamination on the screen may cause faint images. For cleaning the screen, wipe it with soft and clean cloth dipped in diluted neutral detergent. Pay full attention as the screen gets scratched easily. No solvent such as thinner shall be used.

 Caution	<p>The display screen has a special coating. Do not use a solvent such as paint thinner, acetone, alcohol, and benzene, etc. Strong rubbing may cause scratch.</p>
--	---



Example of Monitor unit: Owner supply

For cleaning the chassis, do not use solvent such as thinner or alcohol. Painting on the surface and characters at the operation unit may be dissolved. After wiping with soft and clean cloth dipped with diluted neutral detergent, wipe away with dry soft and clean cloth.

3.2.2 Hull unit

As for the inspection of the TD tank and the TD shaft, inspect the appearance and the hoisting and lowering operation. When the mooring period becomes long, shells and oil may adhere to the inside of the TD tank. Pay attention that some adherence may cause abnormal operation.

3.3 Fuse replacement



Warning


Use the specified fuse. If you use a fuse other than specified one, it may cause a serious accident.

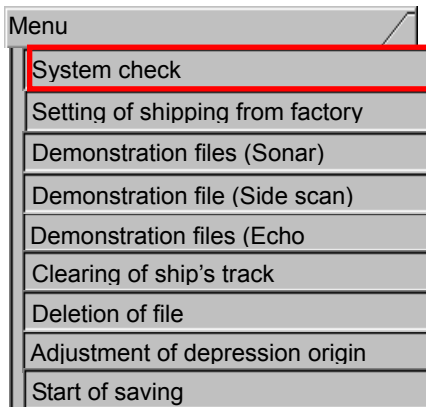
Fuse blows out when such as a trouble occurs inside at too high input voltage or over current. The fuse is located on the back panel of the Processor unit and Hull unit. Please replace with the fuse listed in the list of standard components.


3.4 Self-Diagnosis

3.4.1 System check


The system can be checked by maintenance menu.

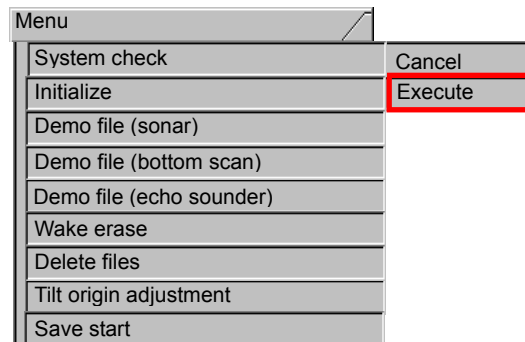
1. Press  for a while to display the maintenance menu.





2. Turn  (knob/left) to select [System check].

3. Press  or .

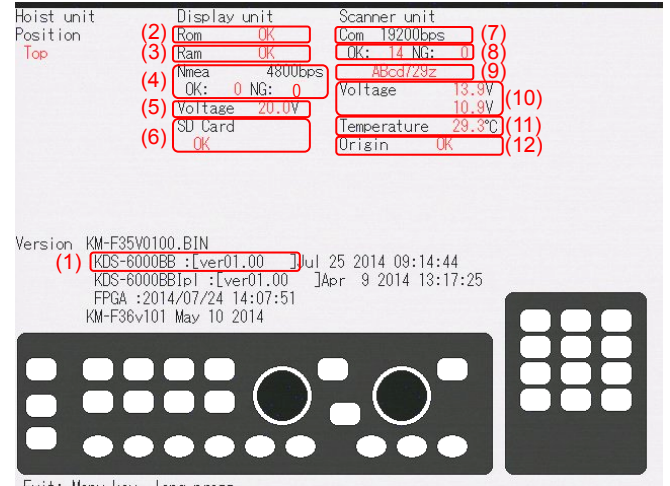
4. Turn  and select [Execute] to conduct system check or [Cancel] not to conduct system check.



5. Press  or  to confirm.


When [Cancel] is selected, the screen returns to the maintenance menu.

When [Execution] is selected, the system check screen is displayed.










The system condition is displayed as shown in the figure above.

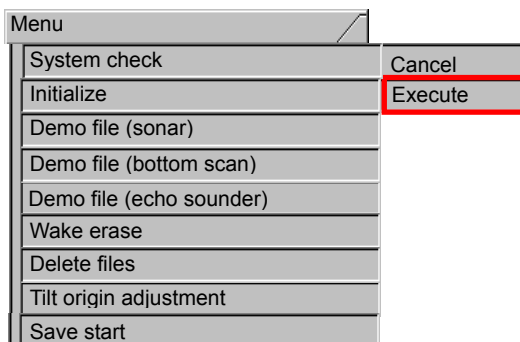
- (1) KDS-6000BB: [ver.**.**]
Program version
- (2) ROM check
- (3) RAM check
- (4) NMEA I/O output: Loop check
- (5) Voltage check: 10.8 to 31.2 V
- (6) SD card check
- (7) Baud rate of Transducer unit
- (8) Communication state of Processor unit:
At normal: Count of number of OK
At abnormal: Count number of NG
- (9) Receiving data
- (10) Confirmation of voltage (Transducer unit)
Upper: High, Lower: the value of 15.5V or higher is indicated.
- (11) Water temperature: ± 2°C
Value of temperature
- (12) Origin (Condition of origin detection)
At normal: OK
At abnormal: NG

6. Press  for a while to display the maintenance menu

3.4.2 Setting at factory

This is the setting to return the various settings to the state at shipping from the factory.

1. Press  for a while to display the maintenance menu.
2. Turn  (knob/left) to select [Setting at shipping from factory].
3. Press  or .
4. Turn  and select [Execute] to initialize or [Cancel] not to initialize.
5. Press  or  to confirm.



When [Cancel] is selected, the screen returns to the maintenance menu.

When [Execute] is selected, initialization is conducted and a message of "Executed" is displayed to return to the maintenance menu.

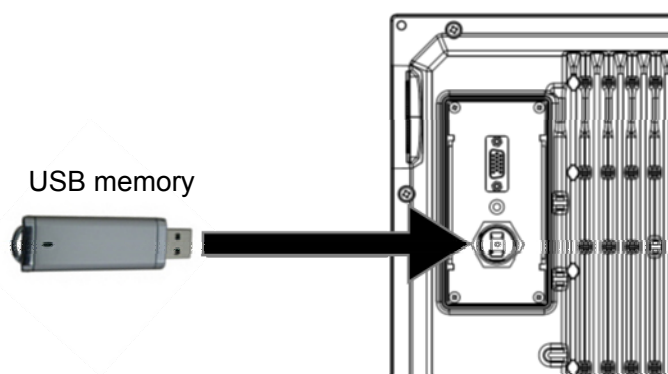
3.4.3 Update of programs

The updating of programs can be performed (Please consult with the selling agent).

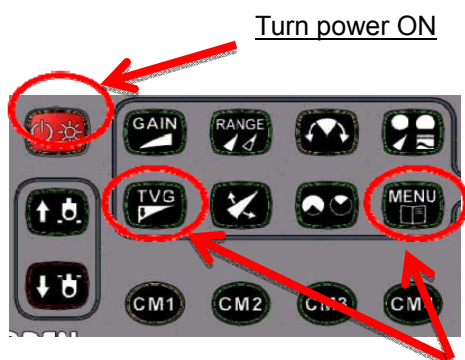
The items to be prepared:

- Software: F35 VXXXX.bin
- Media: USB memory

1. Store the F35VXXXX.bin file into the root directory of the USB memory.
2. Insert the USB memory into the USB connector provided on the back panel of KDS-6000BB Processor unit (DPU-610).
(Do not use a USB Hub because it may lead to failures.)

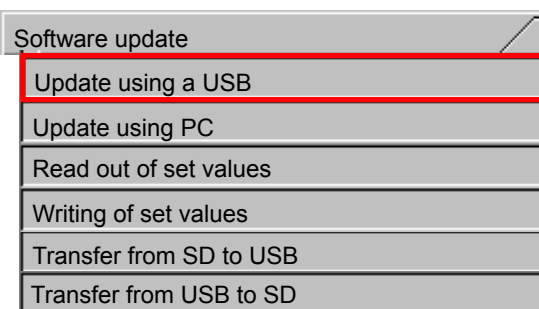



3. Turn power ON with [MENU] and [TVG] keys pressed simultaneously.

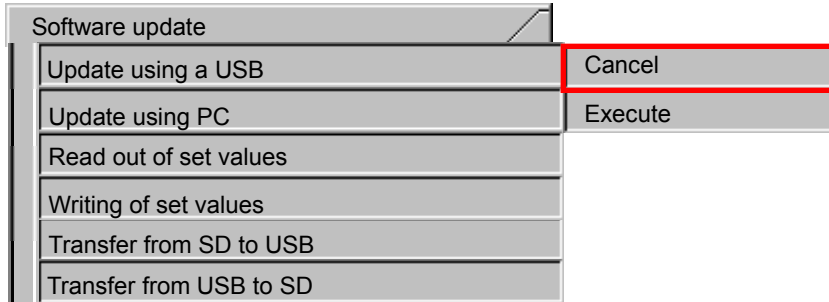



with [MENU] and [TVG] keys pressed simultaneously.

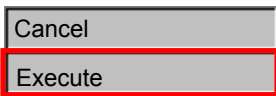
4. The following menu appears:



- 5. Select [Update using USB] and press  .
- 6. The following screen is displayed.



- 7. Select [Execute] and press  .




- 8. The flowing screen is displayed and the effective software in the USB memory is searched.




* When software in the USB is searched again, please press GAIN key.

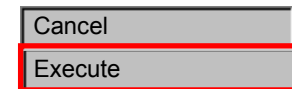
- 9. If a file is found, the selected item is displayed.



- 10. Select the file to be updated and press  .



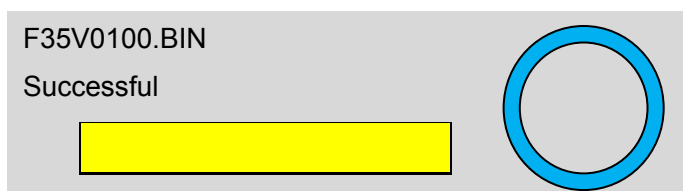
- 11. Select [Execute] and press  .





Update starts. Please wait for a while.



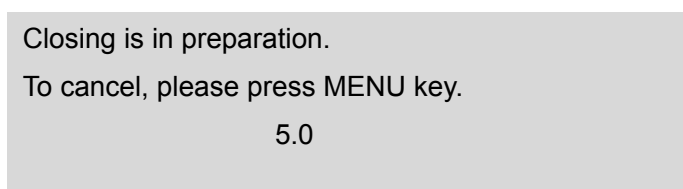
12. When update is successful, the following display appears.



Press  for a while to switch OFF the power.

※ Power OFF can be cancelled by .

When the power is OFF, the following screen is displayed:



13. When closing failed, the following screen appears:



After the above screen has been displayed, try again the update without switching off the power.

※ When USB memory is changed, press GAIN key to search the software. Repeat the steps of Items 8 to 13.

When the update is completed, press  for a while to turn OFF the power.



Caution: After confirmation of the power OFF, pull out the USB memory from the connector.

3.5 For other functions

Update by PC	Using PC and COM port, software update is performed.
Read-out of setting values	The set values of KDS-6000BB is read into a USB. They are stored in the file named " F35SET00.SAV".
Write-in of setting values	The set values stored by "Read-out of the set values" are reflected in KDS-6000BB main body. The files of F35XXXXX.SAV are searched through USB route folder. Plural files can be selected by renaming of F35SET00.SAV files. XXXXX is arbitrary alphabets or numerical figures.
Transfer from SD to USB	The files in particular folders of the internal SD are downloaded to a USB. Particular folders (¥DEMO, ¥SYSTEM)
Transfer from USB to SD	The files in particular folders of the USB are uploaded into the internal SD. Particular folders (¥DEMO, ¥SYSTEM)

Chapter 4 Troubleshooting

4.1 Failure diagnostics

Failure locations will be identified using following failure diagnostics table, and necessary actions shall be implemented.



Caution: Do not disconnect power source. To power off correctly, hold the power key for 3 seconds until [Preparing to shutdown] is displayed on the screen. After that, release the power key immediately. Refer to “Operation Manual Chapter 1 1.2.2 Power off”

Index	Contents	page
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4.3.5	Bearing speed is very slow	4-5
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4.3.7	No display of sonar images or oscillation line	4-6
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4.3.10	No display of water temperature	4-9
4.3.11	No display of serial data	4-9
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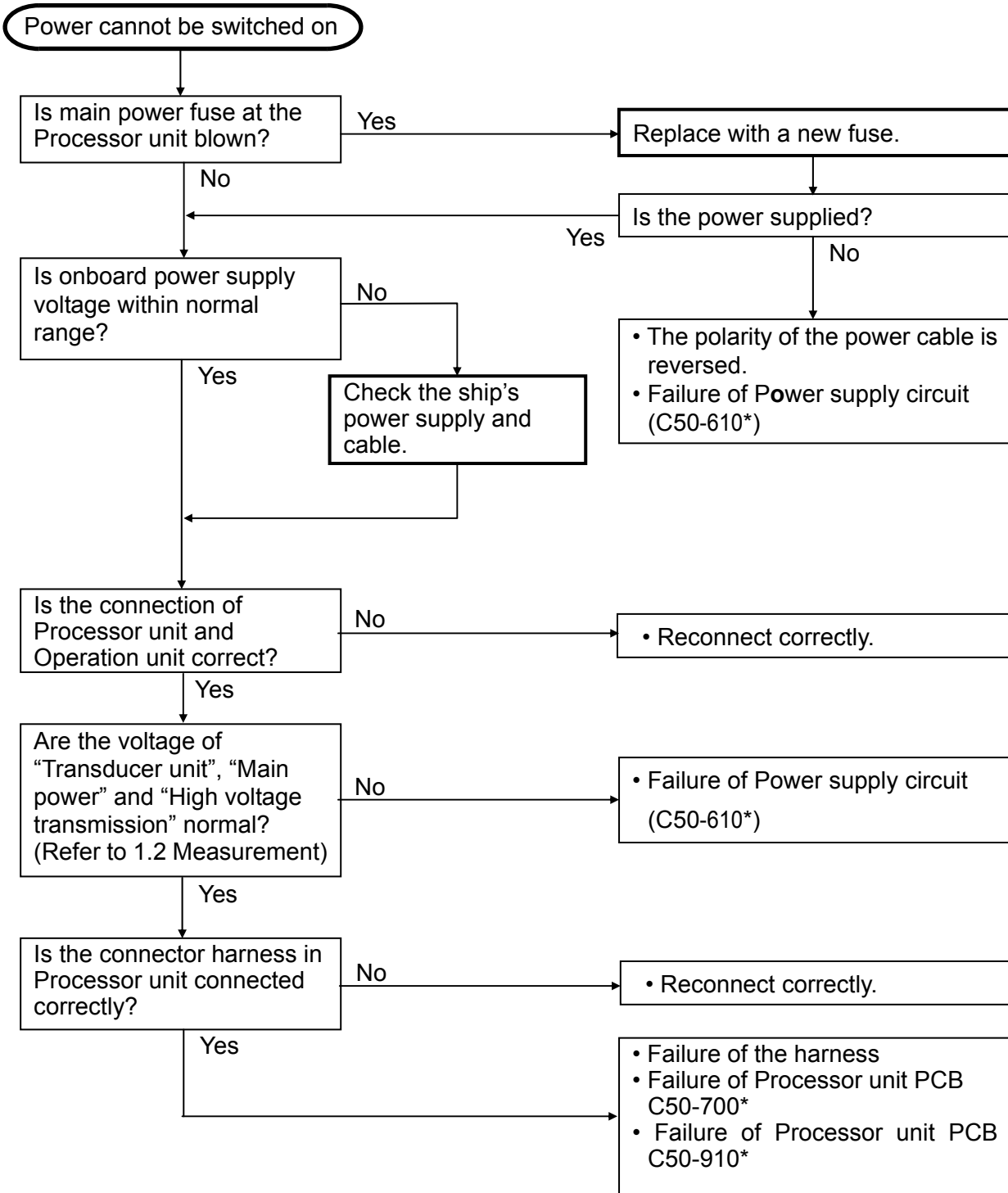
4.2 Necessary information at the time of repair request

Please inform of the following points:

- (1) Name of ship, and telephone number, if a satellite communication system is equipped.
- (2) Failed equipment name and type name
- (3) Equipment serial number
- (4) “System software version number” displayed on “Title screen”
- (5) Next calling port and name of sales agent, telephone number, Fax number, e-mail address, etc.
- (6) Details of failure (as much as possible) and failure diagnostics results on board, as well as operation conducted, in particular, until the failure or when the failure occurred.

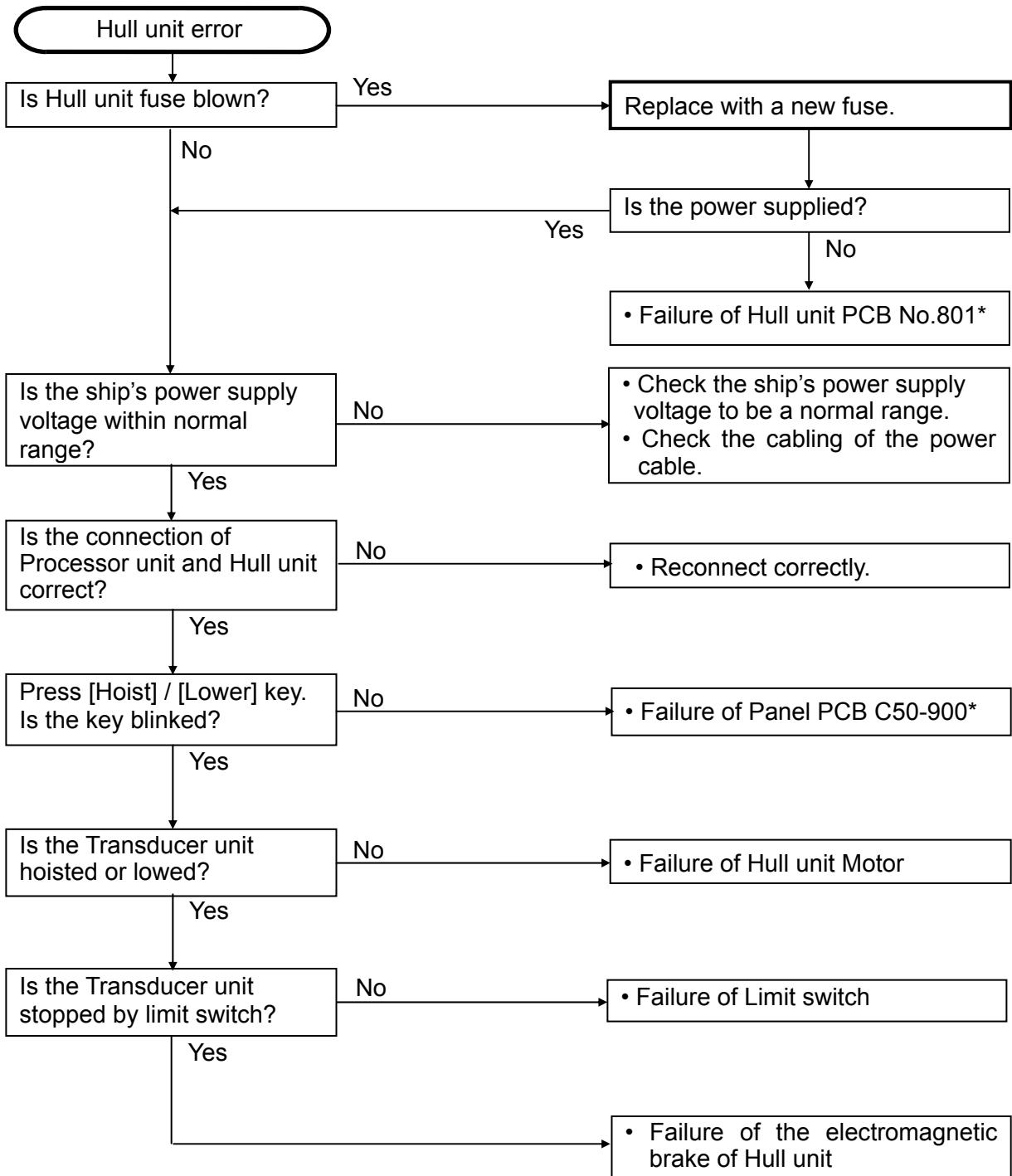
4.3 Failure diagnostics flowchart

4.3.1 Machine not powering on



*Subject to version change

4.3.2 [Hull unit error] is displayed

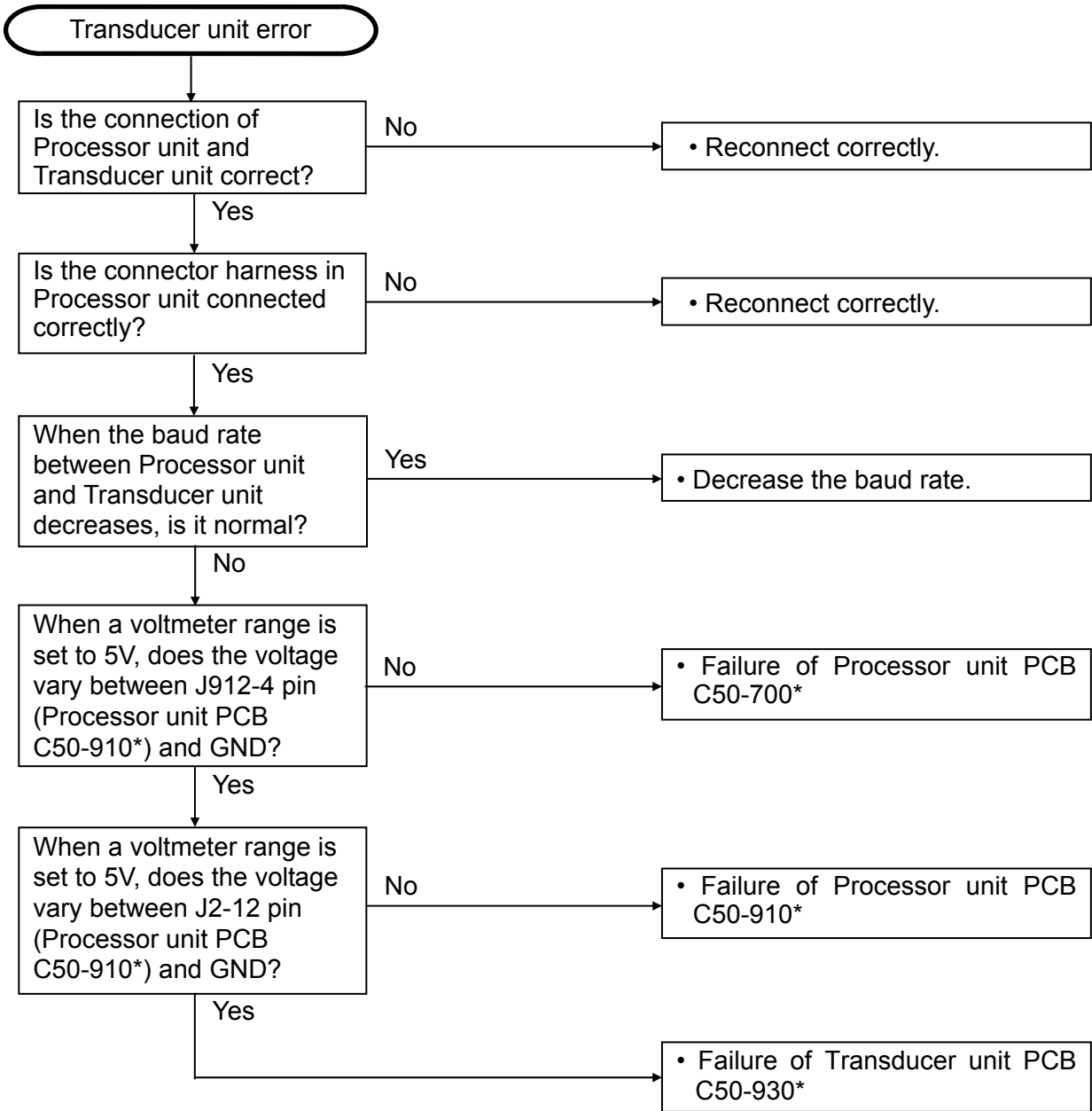


*Subject to version change



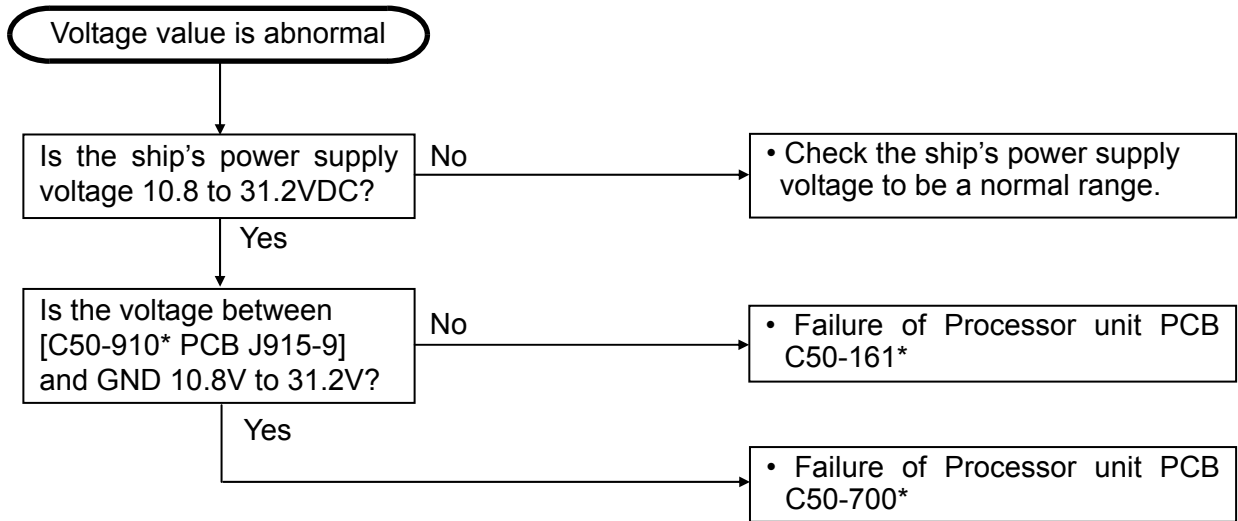
Caution: When the mooring period becomes long, shells and oil may adhere to the inside of the TD tank. Pay attention that some adherence may cause abnormal operation.

4.3.3 [Transducer unit error] is displayed



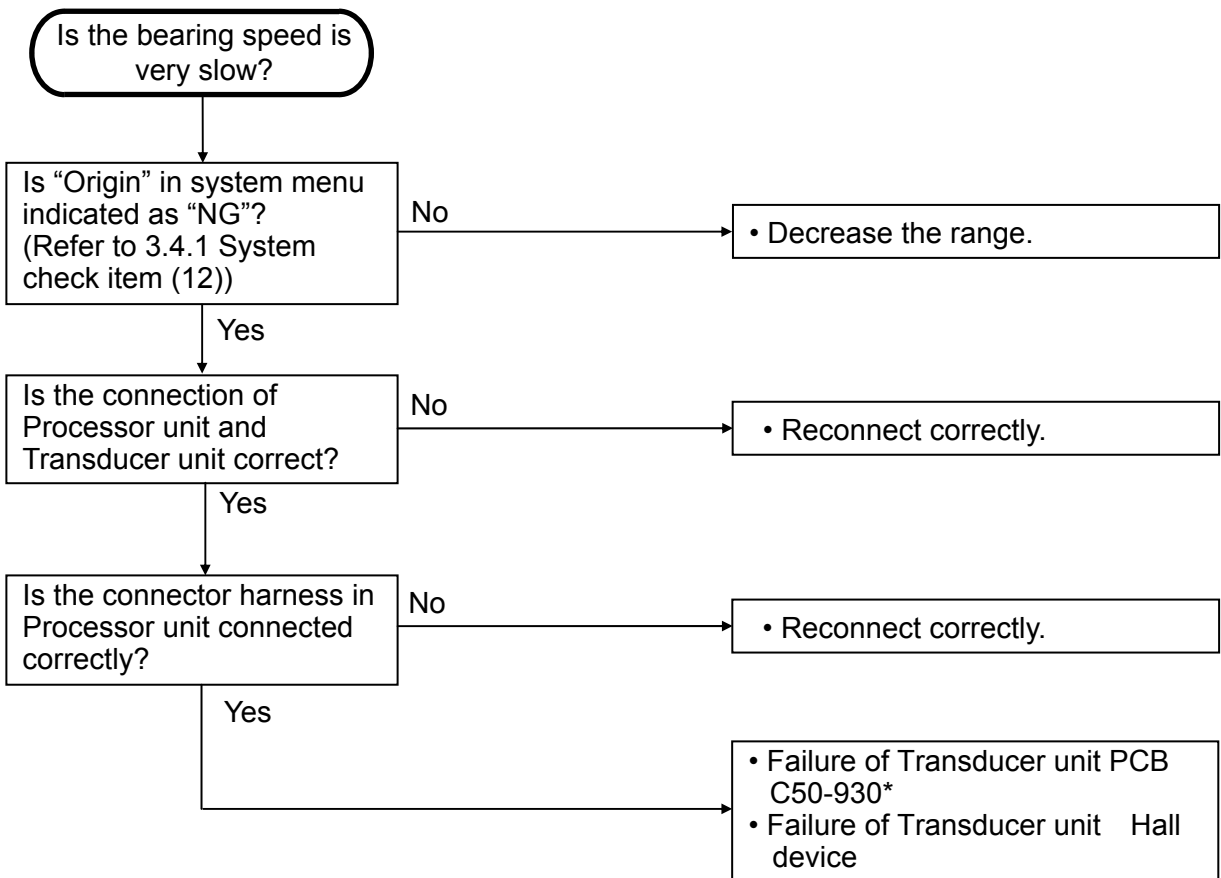
*Subject to version change

4.3.4 [Voltage value is abnormal] is displayed



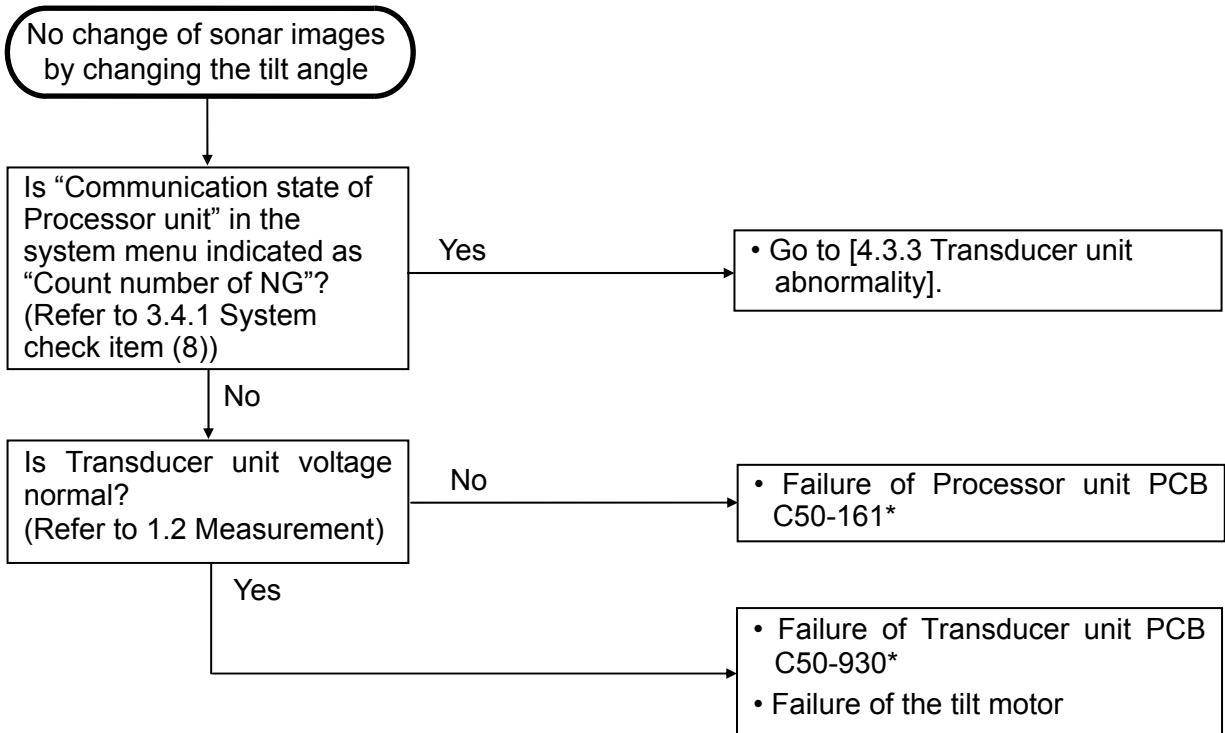
*Subject to version change

4.3.5 Bearing speed is very slow



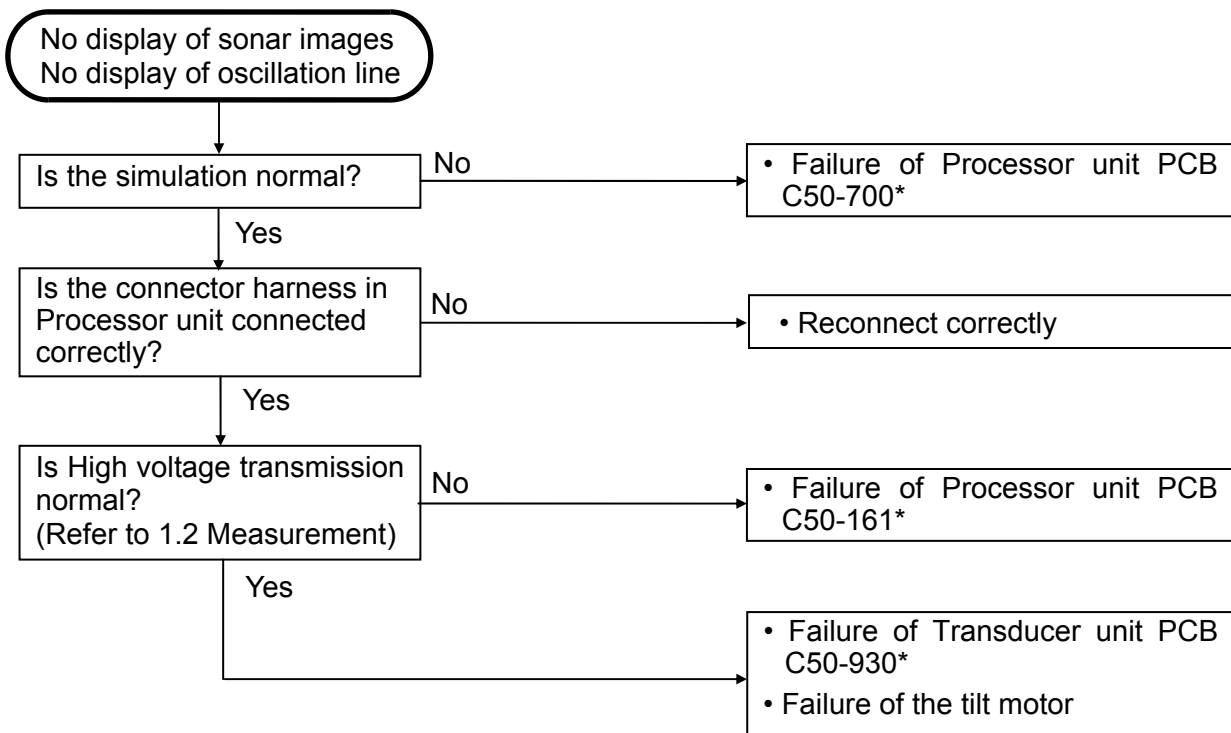
*Subject to version change

4.3.6 No change of sonar images by changing the tilt angle



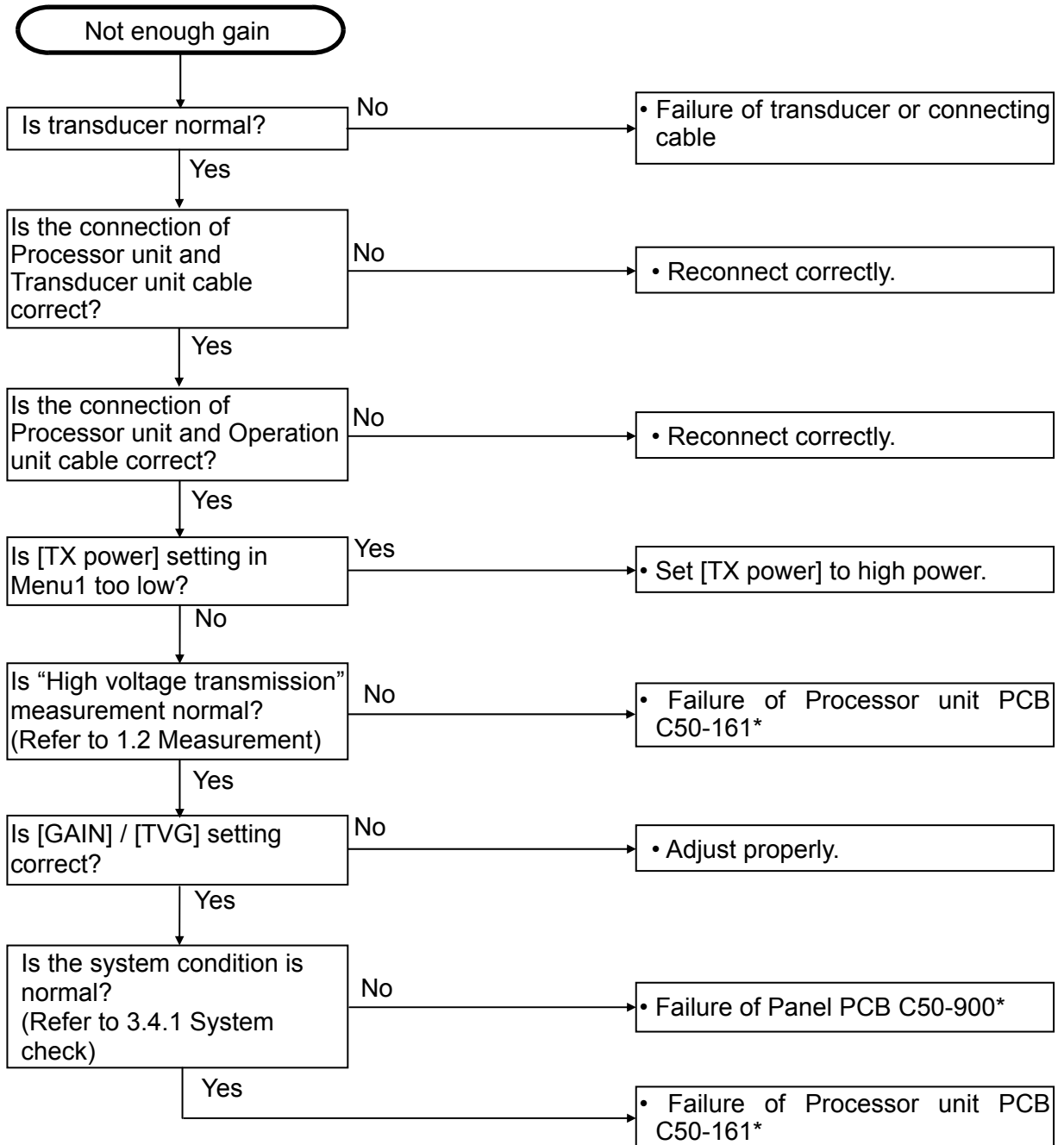
*Subject to version change

4.3.7 No display of sonar images or oscillation line



*Subject to version change

4.3.8 Not enough gain



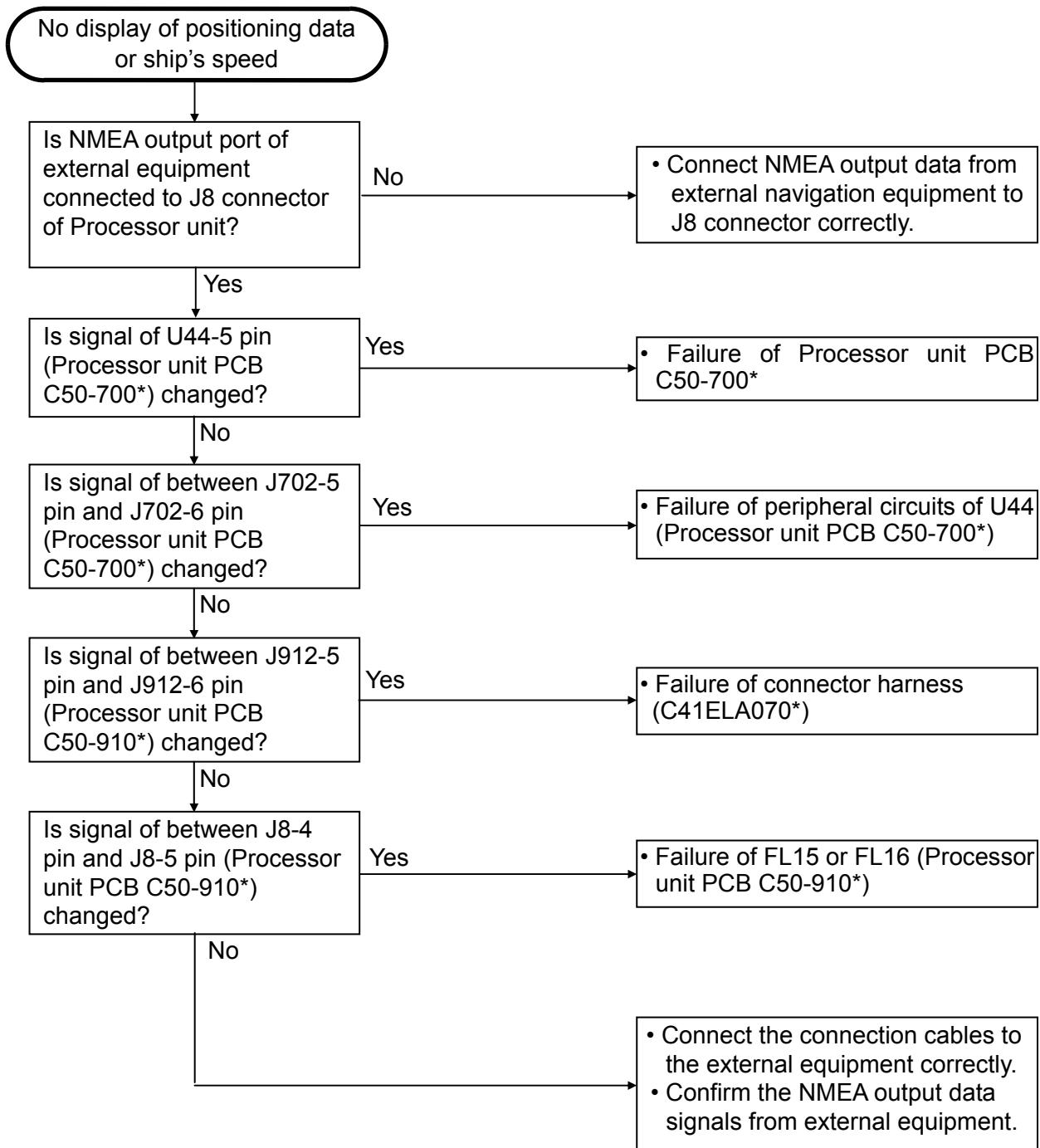
*Subject to version change

[Inspection of transducer]

Pull the connector plug connected J911 on Processor unit PCB C50-910*, and measure the resistance value between J911-4 pin and J911-5 pin. If the value is 10MΩ or more, it's normal.

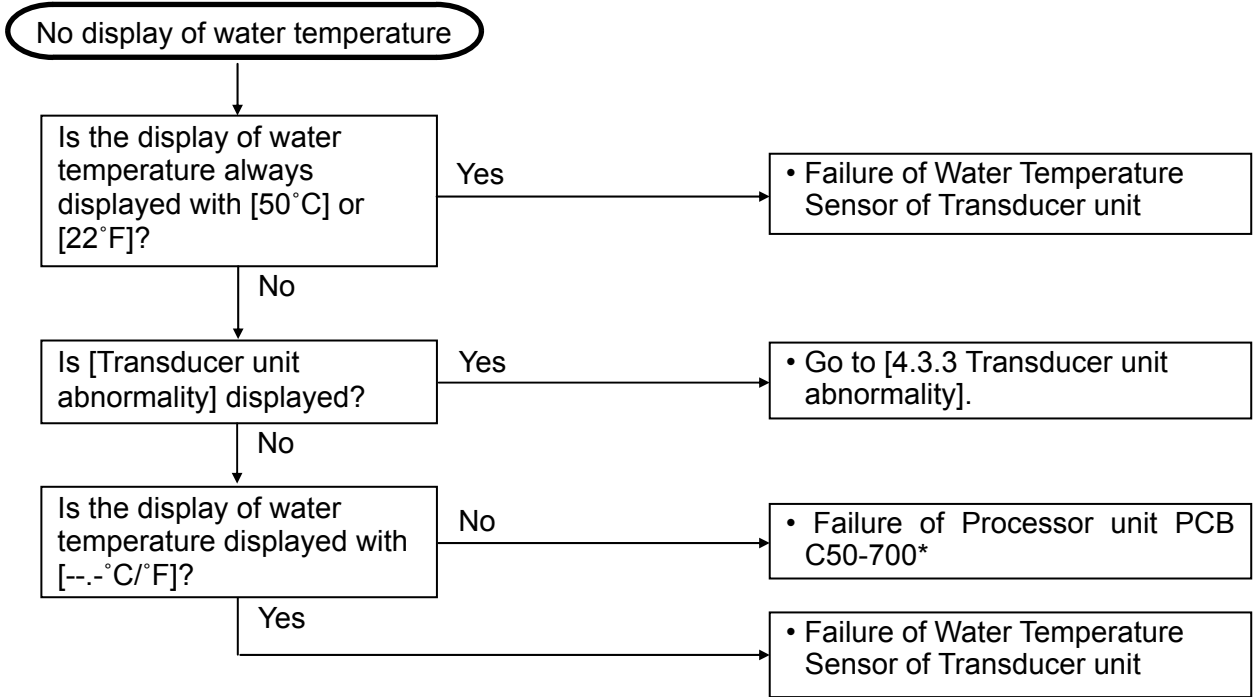
If different value, the transducer may have failed or sea water may have entered transducer housing.

4.3.9 No display of positioning data or ship's speed



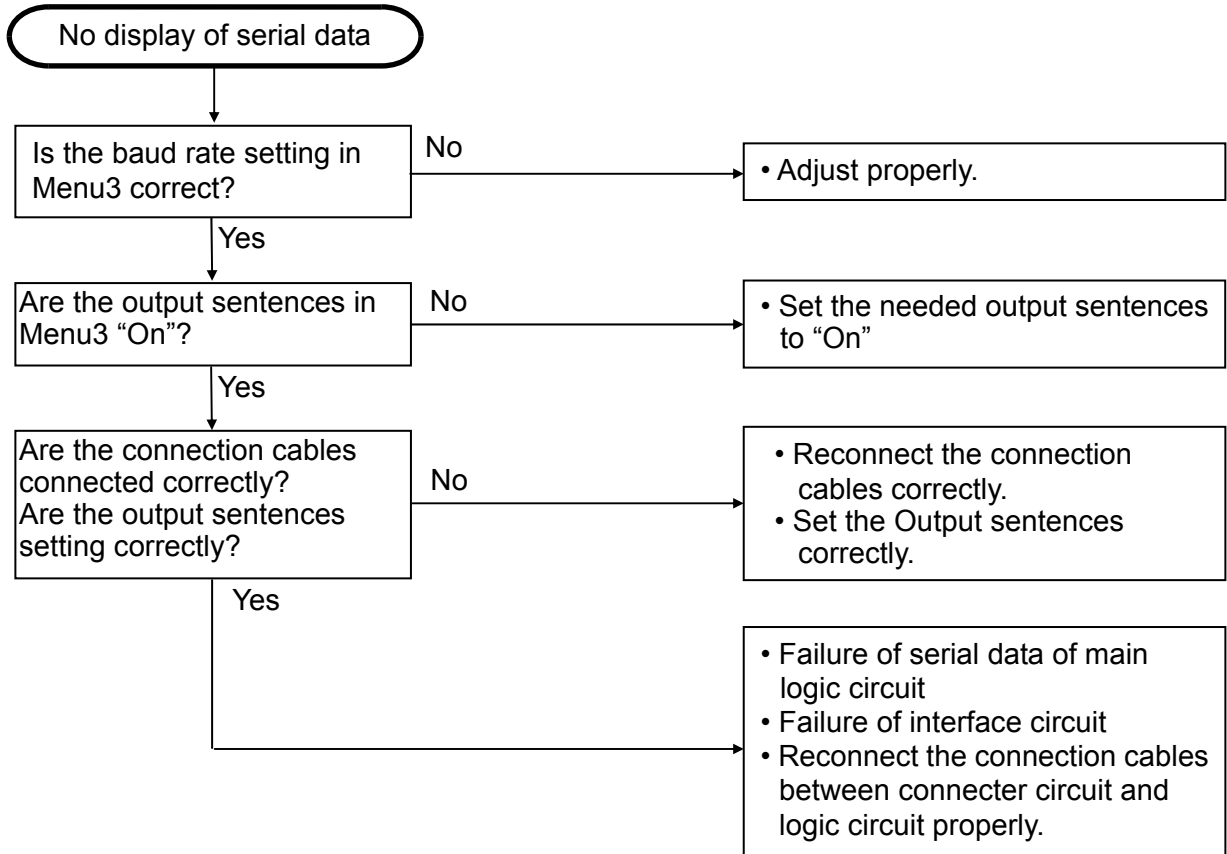
*Subject to version change

4.3.10 No display of water temperature



*Subject to version change

4.3.11 No display of serial data





4.3.12 Initialize

When different issues occur with the system and hardware is suspected, for example no gain or sonar image is not displayed on external monitor, possible internal memory error may be present causing unstable operations. In this case please initialize the system.

For the initialization, refer to [3.4.2 Setting at factory] or carry out the following method.

[Initializing]

Keep pressing  and  while powering system on until [Initialization] will be displayed.

Select a language after [Language] screen is displayed



Caution: When unit initialized all settings will return to factory default and user must re-enter them in the system manually. In this case following procedure is recommended to save all settings to external USB and restore from USB after initializing.

Export settings to USB

- 1. Insert the USB memory into the USB connector provided on the back panel of KDS-6000BB Processor unit (DPU-610).
(Do not use a USB Hub because it may lead to failures.)**
- 2. Keep pressing [MENU] and [TVG] to power on until [Software update] will be displayed on the screen.**
- 3. Select [Read-out of setting values] and press [ENT] key.
=> The setting values of KDS-6000BB are read into the USB memory.**
- 4. After initialization, turn power off and carry out above 1. and 2.**
- 5. Select [Write-in of setting values] and press [ENT] key.
=> The settings exported by “Read-out of the set values” are imported in KDS-6000BB main memory. (Refer to 3.5 For other functions)**

Chapter 5 Technical references

5.1 Maintenance parts list

Maintenance parts list of KDS-6000BB

“No.” corresponds to “Exploded view of Processor Unit, C50BG1202*”.

No.	Parts Code	Name	Description	Q'ty	Remarks
5	0060710692	PCB ASSY	C50-161*	1	Transmission/Receiving BOARD
6	0060710652	PCB ASSY	C50-910*	1	Connector BOARD
10	0060710672	PCB ASSY	C50-700*	1	Main BOARD
/	0035282590	DC power cable	CW-259-2M	1	

“No.” corresponds to “Exploded view of Operation Unit, C50BG2002*”.

No.	Parts Code	Name	Description	Q'ty	Remarks
7	0060710662	PCB ASSY	C50-900*	1	Panel BOARD

“No.” corresponds to “Exploded view of Hull Unit, 37174C 1/2”.

No.	Parts Code	Name	Description	Q'ty	Remarks
A14		PCB ASSY	No.801*	1	Hoist BOARD
/	0035282620	DC power cable	CW-275-10M	1	

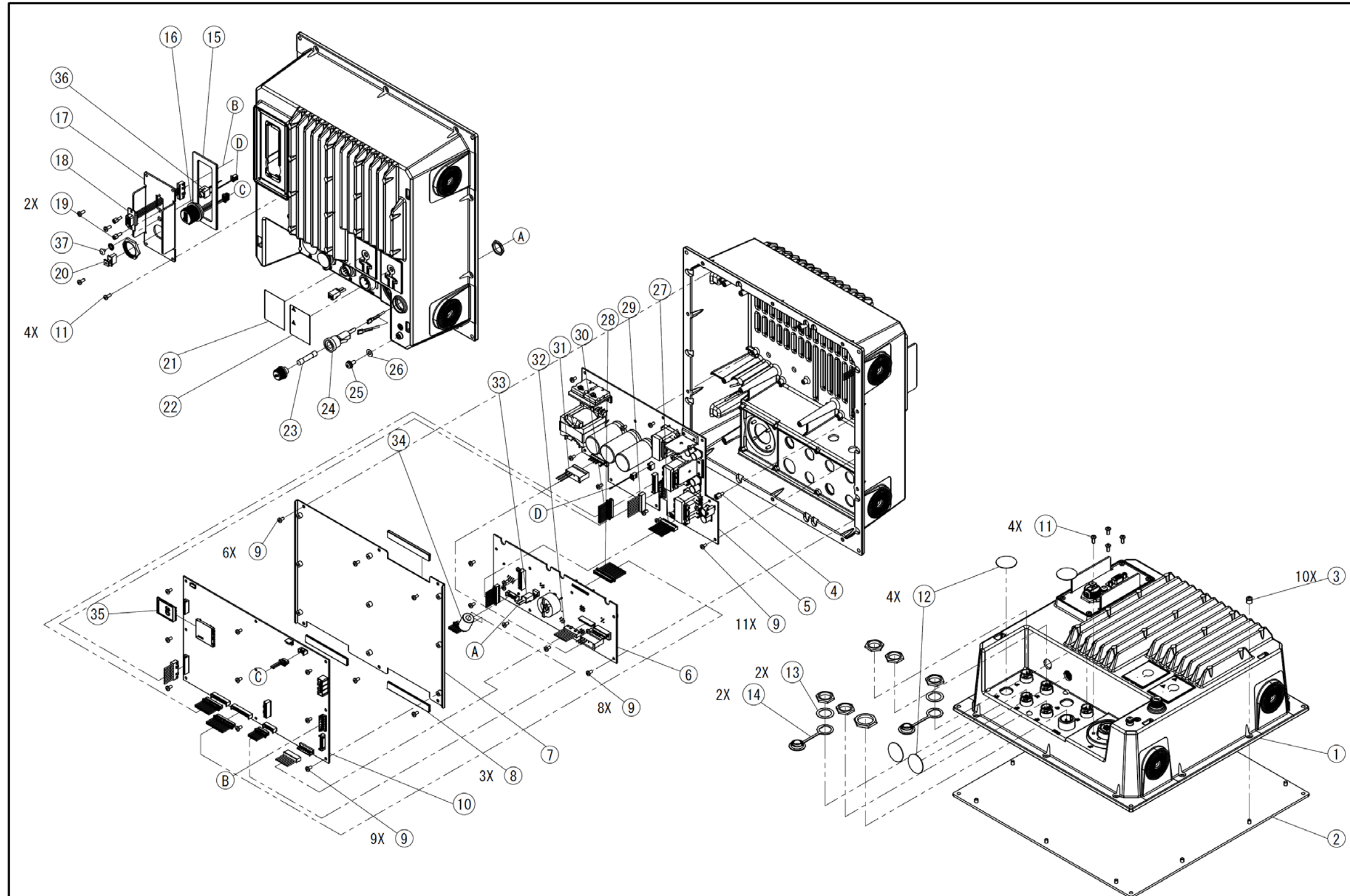
*Subject to version change

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5.2 Exploded view drawings

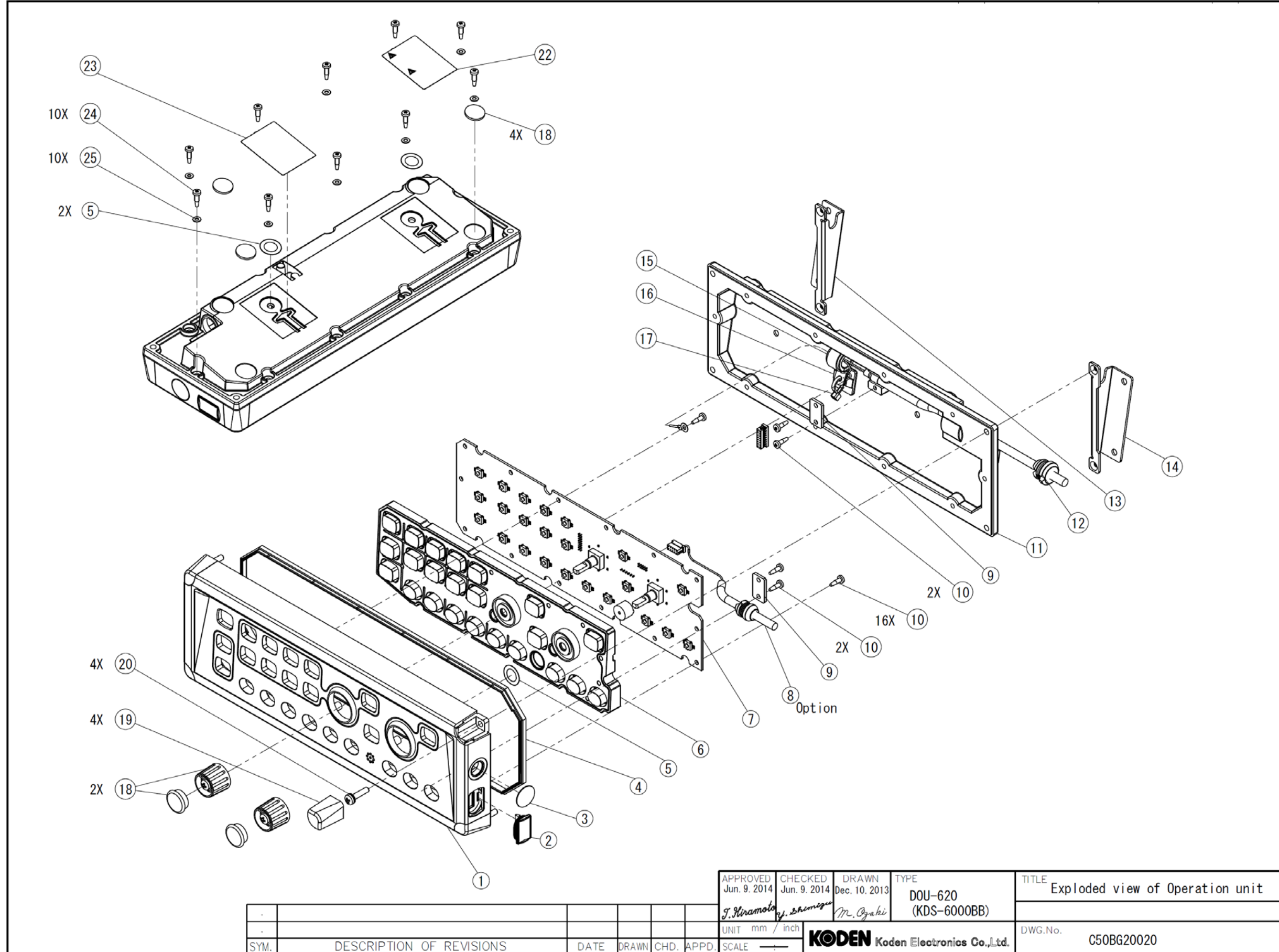
Exploded view of Processor Unit (DPU-610ST), C50BG1202*

*Subject to version change

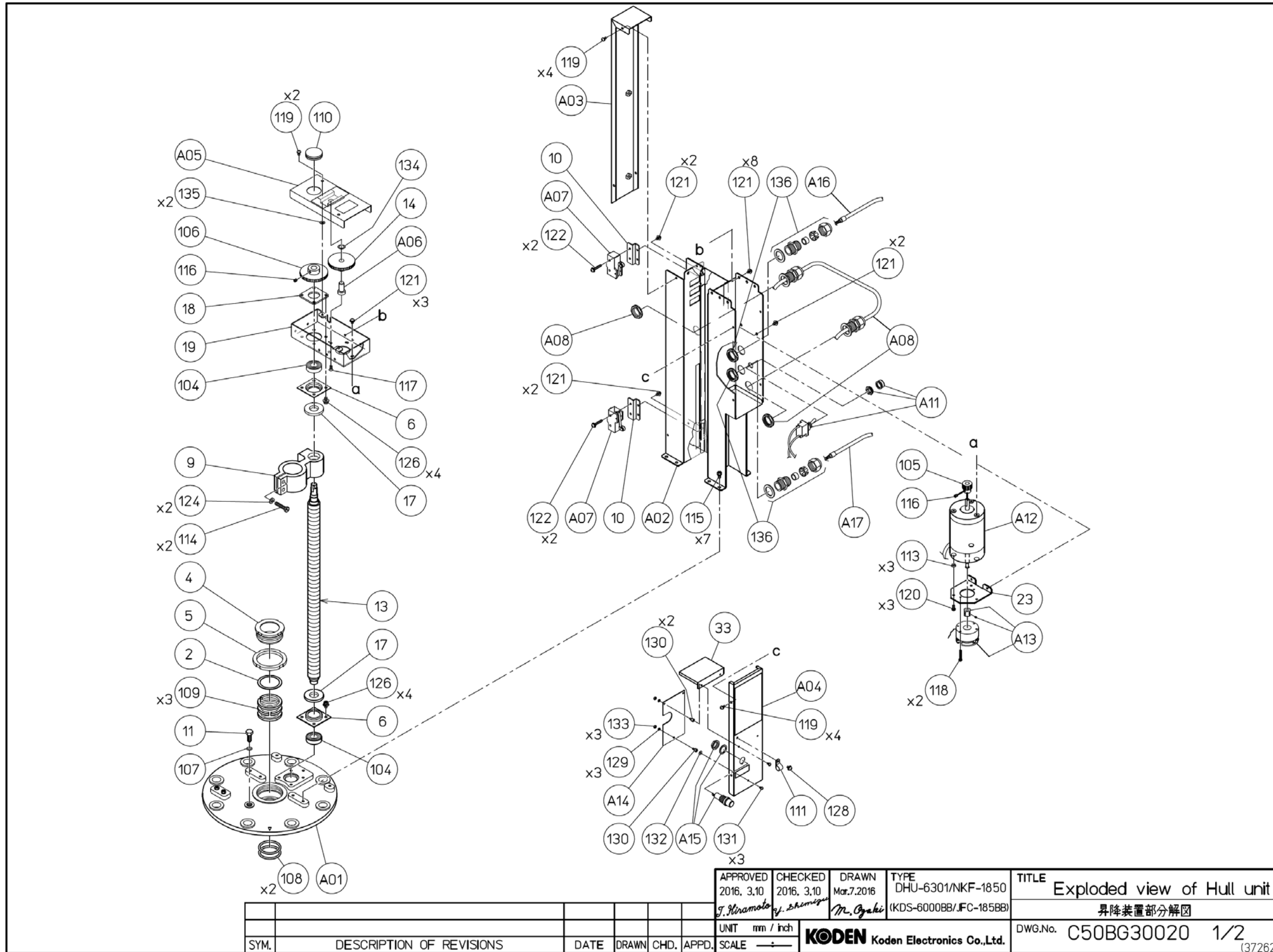


APPROVED Jan.27.2015 <i>J. Hiramoto</i>	CHECKED Jan.27.2015 <i>gc. Kogusumi</i>	DRAWN Jan.23.2015 <i>M. Ozaki</i>	TYPE DPU-610 (KDS-6000BB)	TITLE Exploded view of Processor unit		
UNIT mm / inch			KODEN Kodon Electronics Co.,Ltd.	DWG.No. C50BG12020		
SYM.	DESCRIPTION OF REVISIONS	DATE	DRAWN	CHD.	APPD.	SCALE

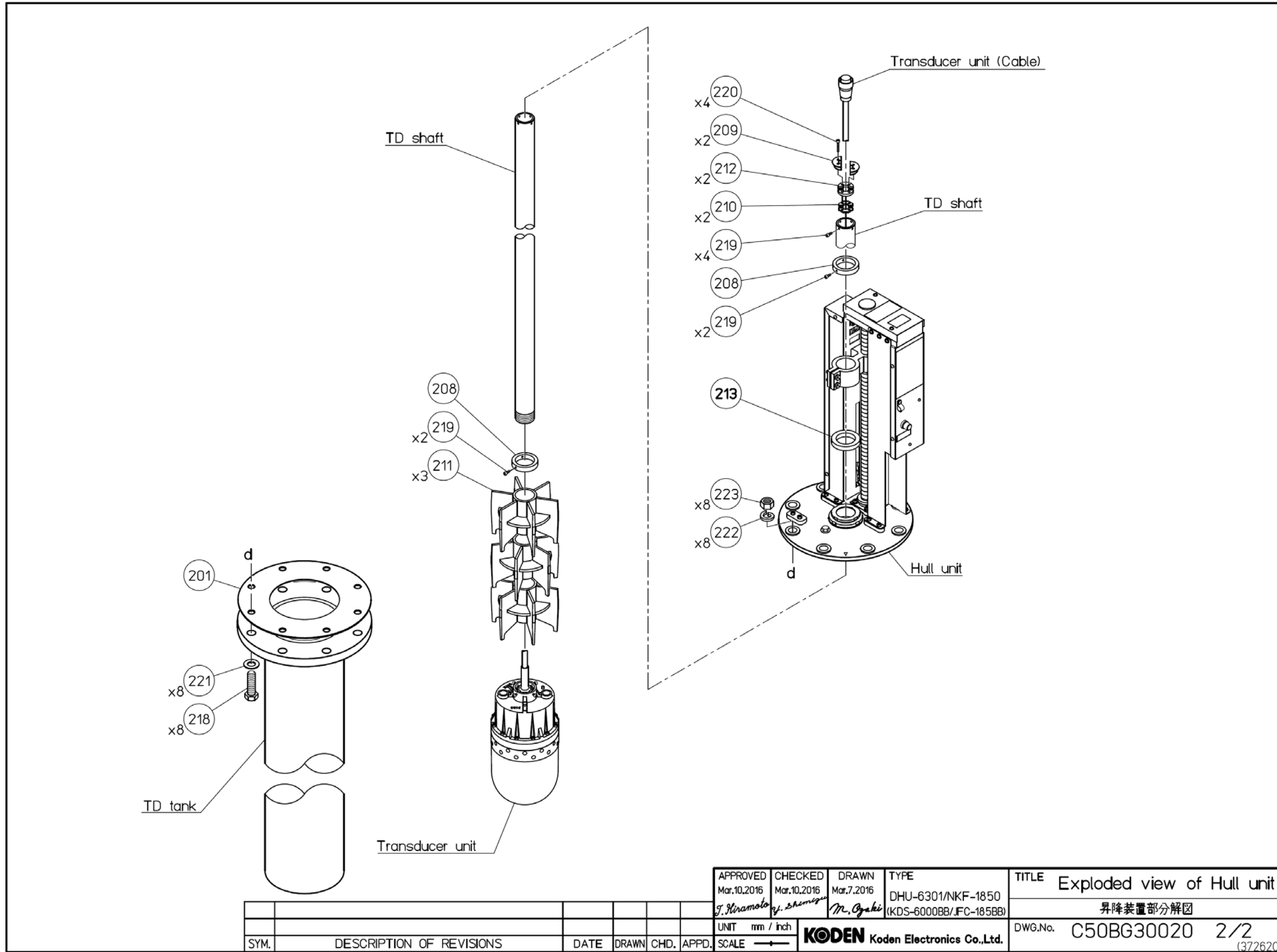
Exploded view of Operation Unit (DOU-620), C50BG2002*



Exploded view of Hull Unit, C50BG3002* 1/2

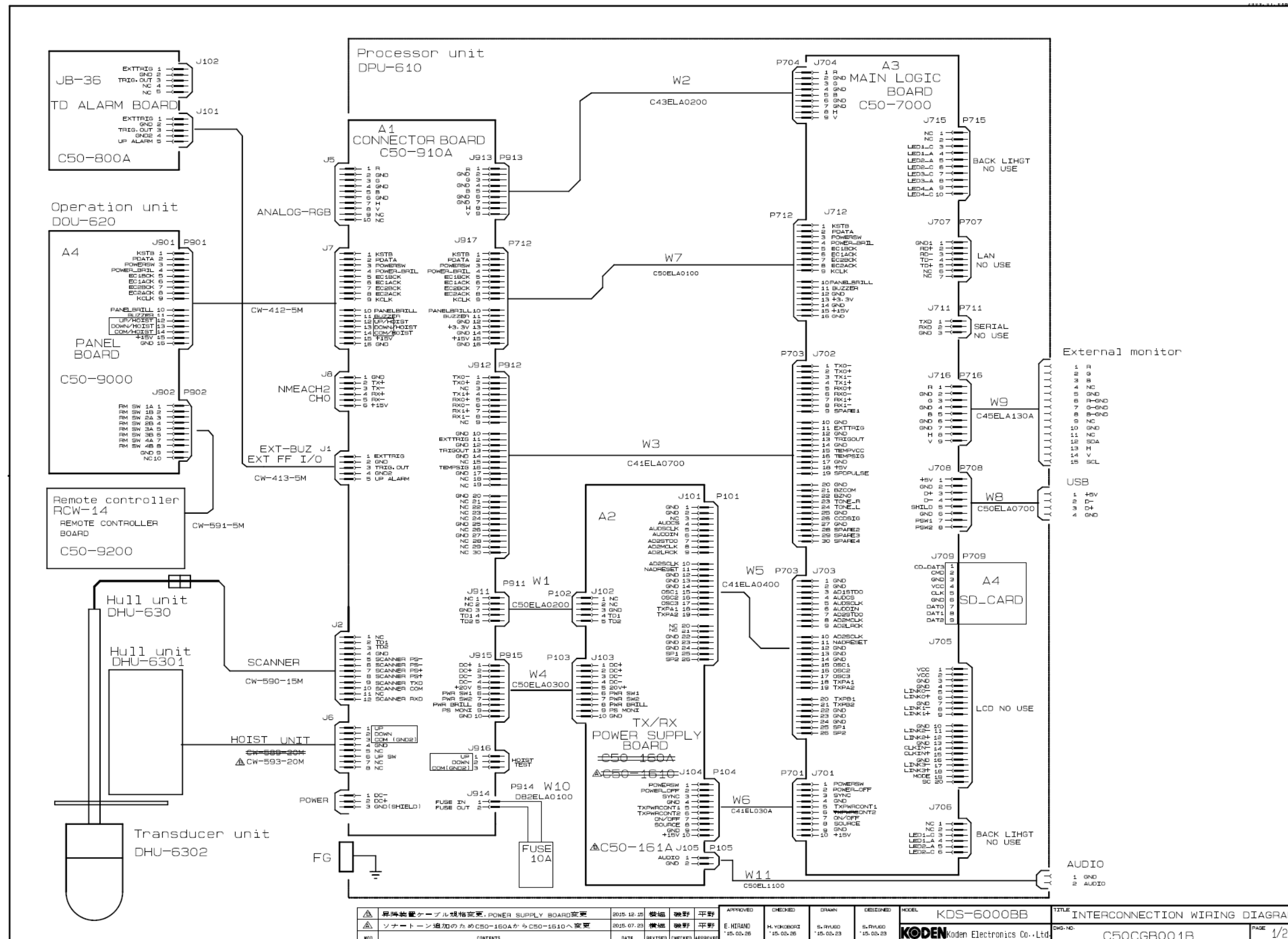


Exploded view of Hull Unit, C50BG3002* 2/2

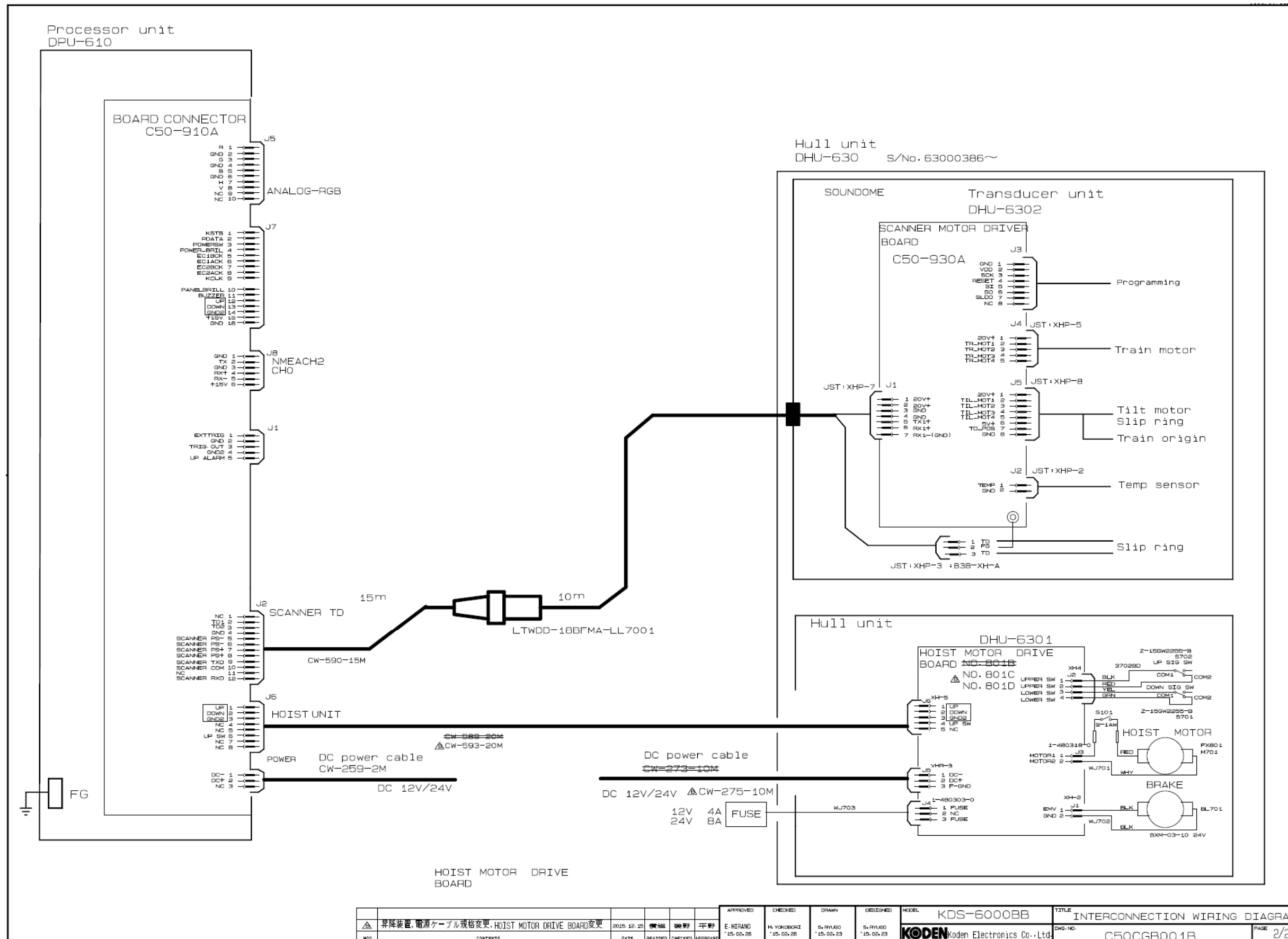


5.3 Circuit diagrams

Interconnection wiring diagram, C50CGB001* 1/2



Interconnection wiring diagram, C50CGB001* 2/2



NO.	CONTENTS	DATE	REVISED	CHECKED	APPROVED	APPROVED	CHECKED	DRAWN	DESIGNED	MODEL	TITLE	PAGE
△	昇降装置、電源ケーブル規格変更、HOIST MOTOR DRIVE BOARD変更	2015.12.25		横堀	磯野	平野	E. HIRANO	H. YOKOYAMA	S. RYUGO	S. RYUGO	KDS-6000BB INTERCONNECTION WIRING DIAGRAM	2/2
										KODEN Koden Electronics Co., Ltd.	C50CGB001B	



Koden Electronics Co., Ltd.

Tamagawa Office:

2-13-24 Tamagawa, Ota-ku, Tokyo, 146-0095 Japan

Tel: +81-3-3756-6501 Fax: +81-3-3756-6509

Uenohara Office:

5278 Uenohara, Uenohara-shi, Yamanashi, 409-0112 Japan

Tel: +81-554-20-5860 Fax: +81-554-20-5875

www.koden-electronics.co.jp