



KODEN

INSTALLATION MANUAL

Digital Sector Sonar

(((Broadband)))

KDS-8000BB

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-8000BB Installation Manual**Doc No: 0092680002****Document Revision History**

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0	0092680002-00	2018/01/17	First edition
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2	0092680002-02	2018/07/25	External View, Chapter 1, Chapter 2
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Document No. Revised Version Norm

When part of the document needs to be revised, the document has advanced revision number. The document No. is indicated at the lower right side on the cover and at the left or right side of the footer region of each page.

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For Your Safe Operation




Symbol used in this Installation Manual

The following pictograms are used in this manual. The meaning of each symbols shall be well understood and the maintenance and inspection shall be carried out.







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 of 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 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.

 <p>Caution</p>	<p>Caution on location of equipment</p> <p>Do not install the equipment where it is excessively damp and suffers from excessive water drops.</p>
 <p>Caution</p>	<p>Measures against static electricity</p> <p>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.</p>
 <p>Caution</p>	<p>Caution at installation of a transducers</p> <p>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.</p>

Cautions on handling

 <p>Warning</p>	<p>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.</p>
 <p>Warning</p>	<p>In case of smoke or fire, boat power off and the power of this unit. It may cause fire, electric shock or damage.</p>
	<p>Be cautious of remaining high voltage</p> <p>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.</p>
 <p>Caution</p>	<p>The information displayed in this unit is not provided directly for your navigation. For your navigation, be sure to see the specified material.</p>
 <p>Caution</p>	<p>Use the specified fuse. If un-specified fuse is used, it may cause a fire, smoke or damage.</p>
 <p>Caution</p>	<p>Whenever transmitting, be sure to submerge the transducer in water first. If transmitted without submerging the transducer, it may be damaged.</p>

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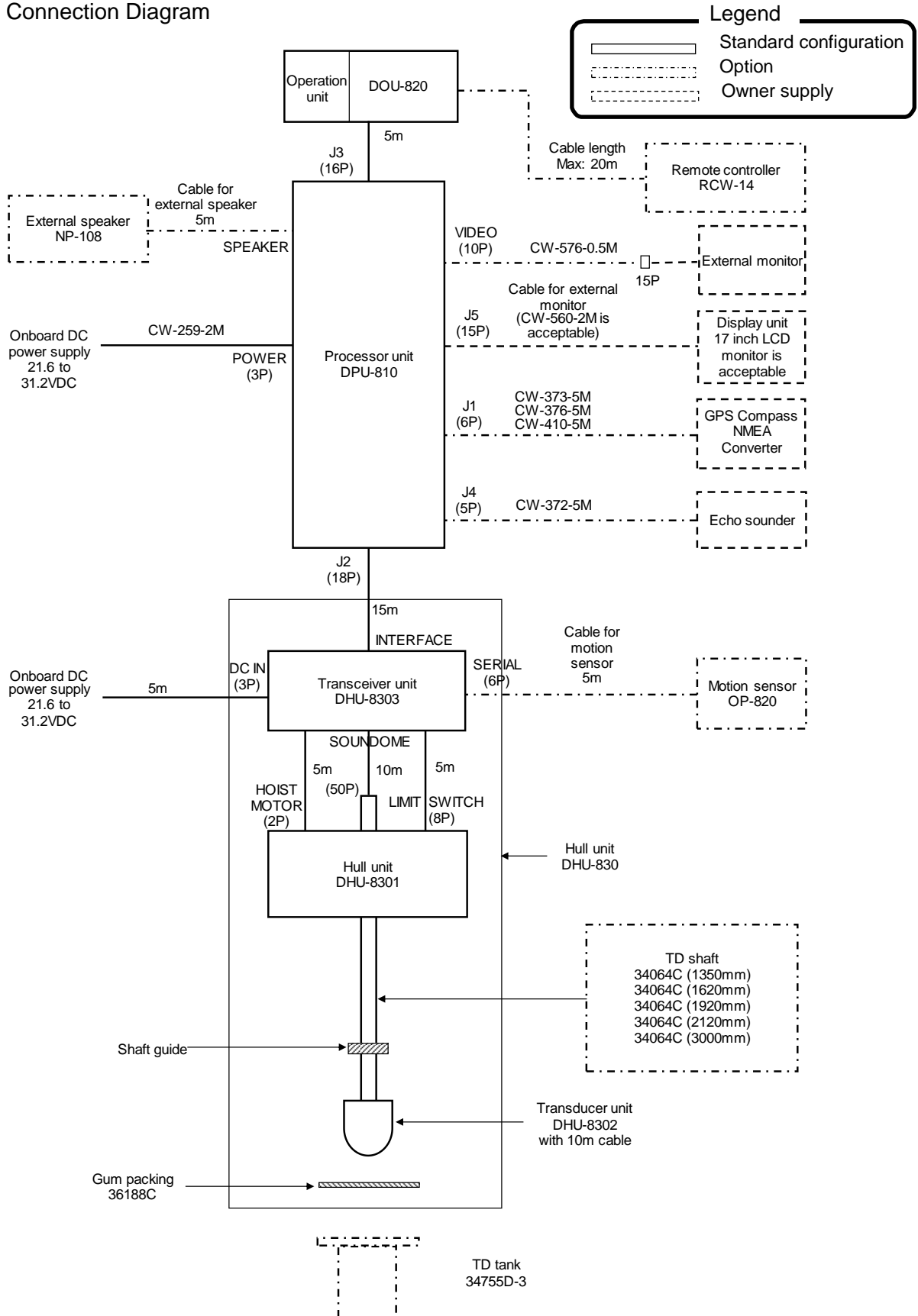
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System Configuration

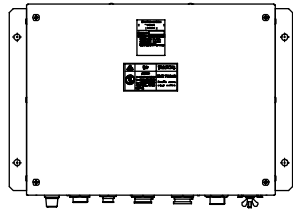


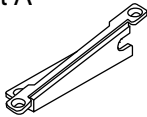
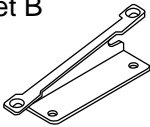

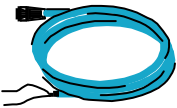
Connection Diagram

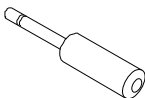
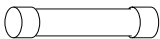


Configuration of Equipment

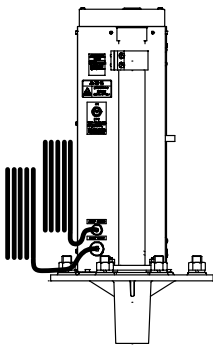
Standard Equipment Configuration List

a. DPU-810 (Processor unit), DOU-820 (Operation unit)

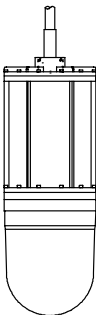
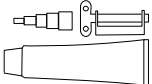
No	Name of item	Type	Remark	Weight/ Length	Qty
1	Processor unit 	DPU-810	No display unit VGA output	2.5kg	1
2	Operation unit 	DOU-820	With mounting bracket and 5m cable	1.1kg	1
3	Truss tapping screw 	M6 x 20 (SUS)			4
4	Bracket A 	C45MP24051.1			1
5	Bracket B 	C45MP24061.1			1
6	4mm Screw 	PWSM4 x 18U			4
7	DC power cable 	CW-259-2M	With 3 pin connector and one end plain	2m	1


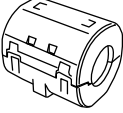
No	Name of item	Type	Remark	Weight/Length	Qty
8	Audio system plug 	MP-105LC-RoHS			1
9	Fuse 	F-7161-5A Cylinder (φ6.4 x 30)	Normal fusion type for main power		3
10	Operation manual	KDS-8000BB.OM.E	English		1
11	Quick Reference	KDS-8000BB.QR.E	English		1
12	Installation manual	KDS-8000BB.IM.E	English		1

DHU-8301 (Hull unit)

No	Name of item	Type	Remark	Weight/Length	Qty
1	Hull unit 	DHU-8301	With limit switch cable (5m) / With motor power cable (5m)	25.4kg	1

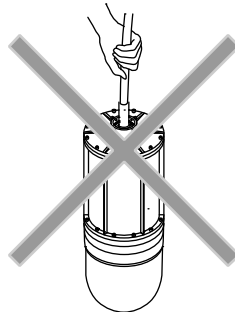
DHU-8302 (Transducer unit)

No	Name of item	Type	Remark	Weight/Length	Qty
1	Transducer unit 	DHU-8302	With connecting cable (10m)	27.8kg	1
2	Bath cork 	Bath cork (White) 50g		50g	1

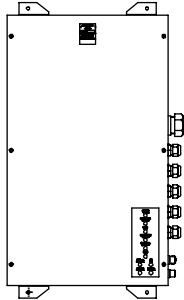
No	Name of item	Type	Remark	Weight/Length	Qty
3	HEX rod wrench 		1.5mm 2.0mm 2.5mm 3.0mm		EACH 1
4	Ferrite clamp 	RFC-20			2





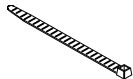
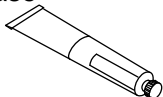



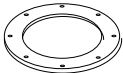
Caution: Don't carry the Transducer unit (DHU-8302) by holding its cable. Such manner may cause breakage of the equipment.



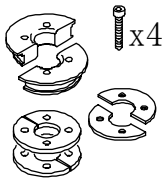
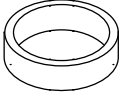
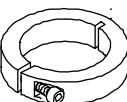

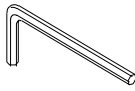
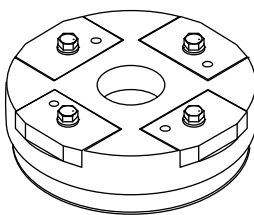
DHU-8303 (Transceiver unit)

No	Name of item	Type	Remark	Weight/Length	Qty
1	Transceiver unit 	DHU-8303	With Power cable (32355D 5m) and CW-597-15M (15m)	12.0kg	1


DHU-8303 (Transceiver unit)
 Package 2-1

No	Name of item	Type	Remark	Weight/Length	Qty
1	Fuse 	F-7161-0.5A Cylinder (φ6.4 x 30)	0.5A		3
		F-7161-8A Cylinder (φ6.4 x 30)	8A		6
2	ANP base 	ANP-1			2
3	Binding Band 	AB-100-1000			2
4	Grease 	Paste 560			1
5	Crank handle 	OB-03			1
6	Grease 	G-100		100g	1
7	Bolt set 	Hexagon bolt M20-80 (SUS) Spring washer φ20 (SUS) Flat washer φ20-40-3 (SUS) Hexagon nut M20 (SUS)			EACH 8
8	Gum packing for flange 	36188C			1

Package 2-1

No	Name of item	Type	Remark	Weight/Length	Qty
9	Shaft cap 	Cap bolt M4-25 (SUS) x 4 Shaft head 37412D x 2 Packing 37413D x 2 37414D x 2			1
10	Damper Fixing collar 	37390D			1
11	Fixing collar 	34062D	With cap bolt M5-20 (SUS)		2
12	Screw 	M4-6			4
13	HEX rod wrench 		1.5mm 2.0mm 2.5mm 3.0mm 4.0mm		EACH 1
14	Shaft guide assembly 	Shaft guide 34272D x 4 Shaft guide base 34271C x 1 Spring washer $\phi 8$ (SUS) x 4 Flat washer $\phi 8-18-1.6$ (SUS) x 4 Hexagon bolt M8-30 (SUS) x 4	Hexagon bolt M5-35 (SUS) x 4 Spring washer $\phi 5$ (SUS) x 4 Flat washer $\phi 5-12-0.8$ (SUS) x 4 Nut M5 (SUS) x 4		1

Option
Package of TD shaft

No	Name of item	Type	Remark	Weight/Length	Qty
1	TD shaft 	34064C (L=1350) 34064C (L=1620) 34064C (L=1920) 34064C (L=2120) 34064C (L=3000)	Select according to equipment.	1350mm 1620mm 1920mm 2120mm 3000mm	1



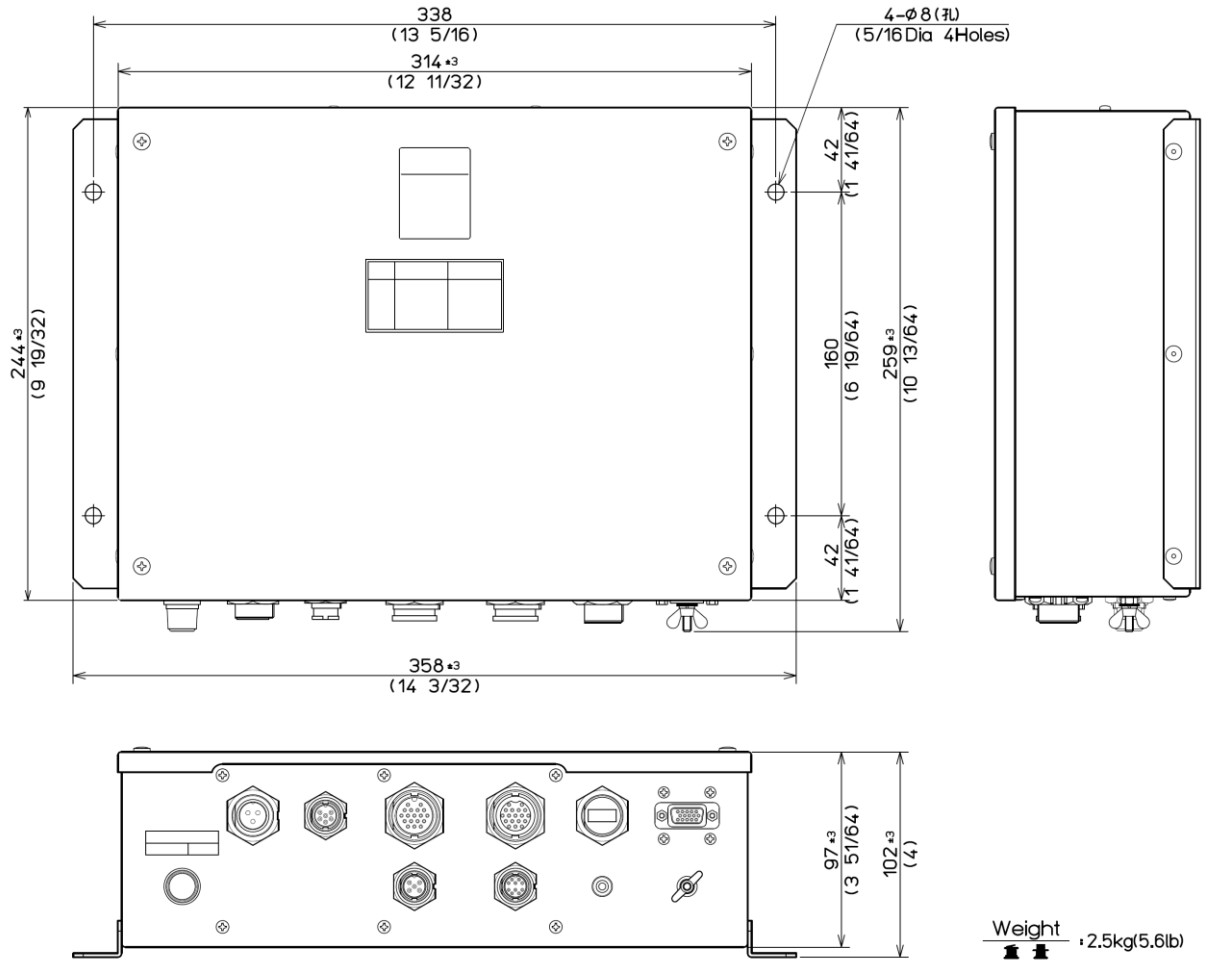
Caution: TD shaft are option.

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	Motion sensor	OP-820	With 5m cable	
3	TD tank	34755D-3	FRP (For 1350mm of TD shaft)	
4	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
		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
		CW-410-5M	5m	6 pin water resistant connectors at both ends. Connected only on one side of the shielded wire.
5	Monitor	17inch LCD Monitor	With power cable and signal cable	
6	External speaker	NP-108	With 5m cable	

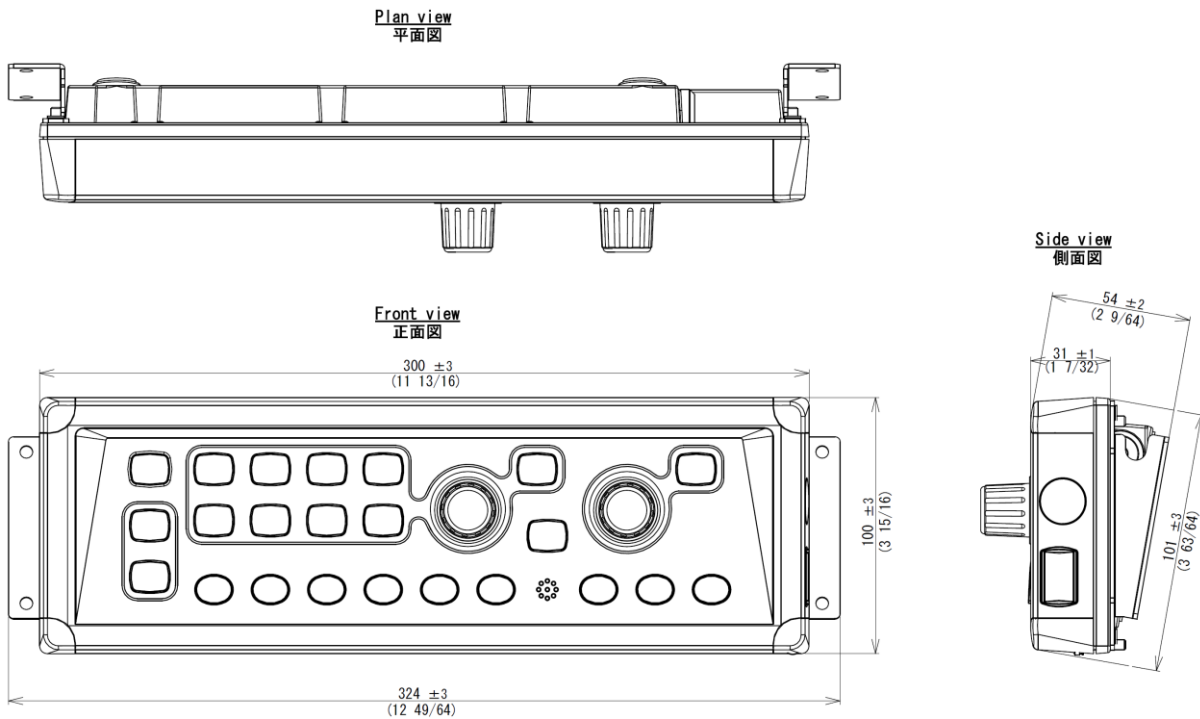
External View

Processor unit (DPU-810)



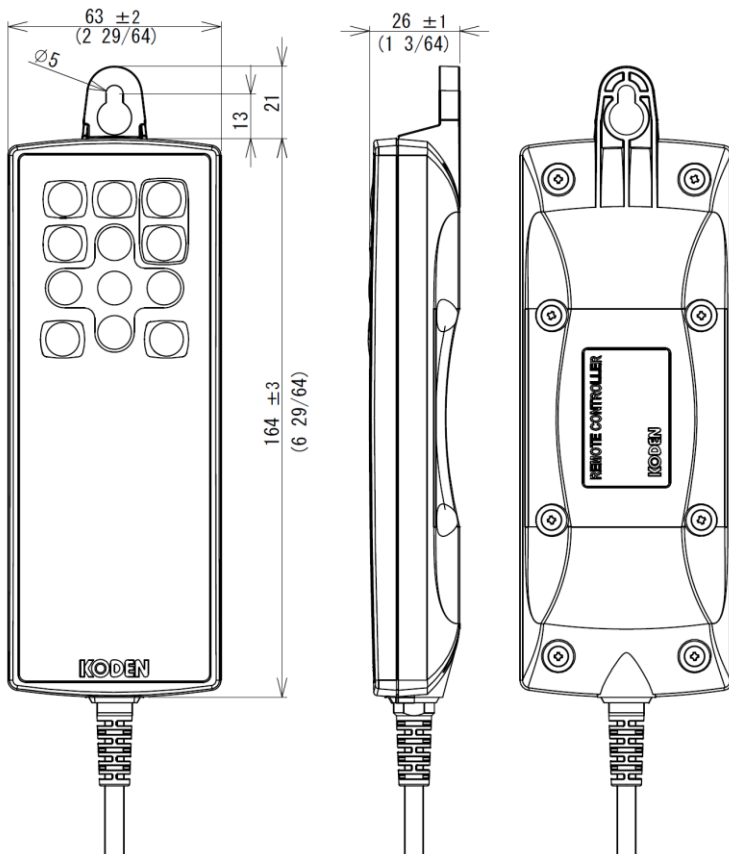
Unit: mm

Operation unit (DOU-820)



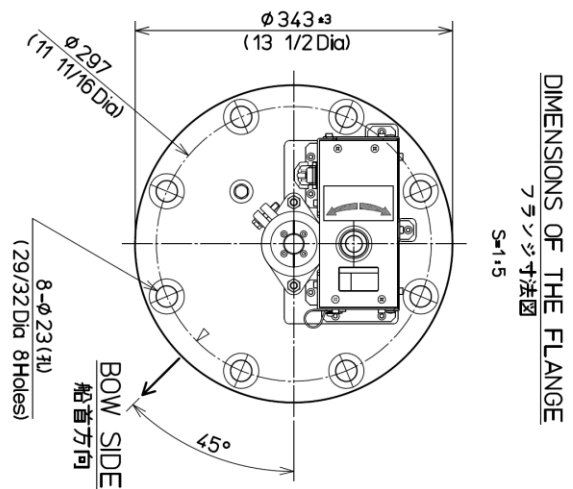
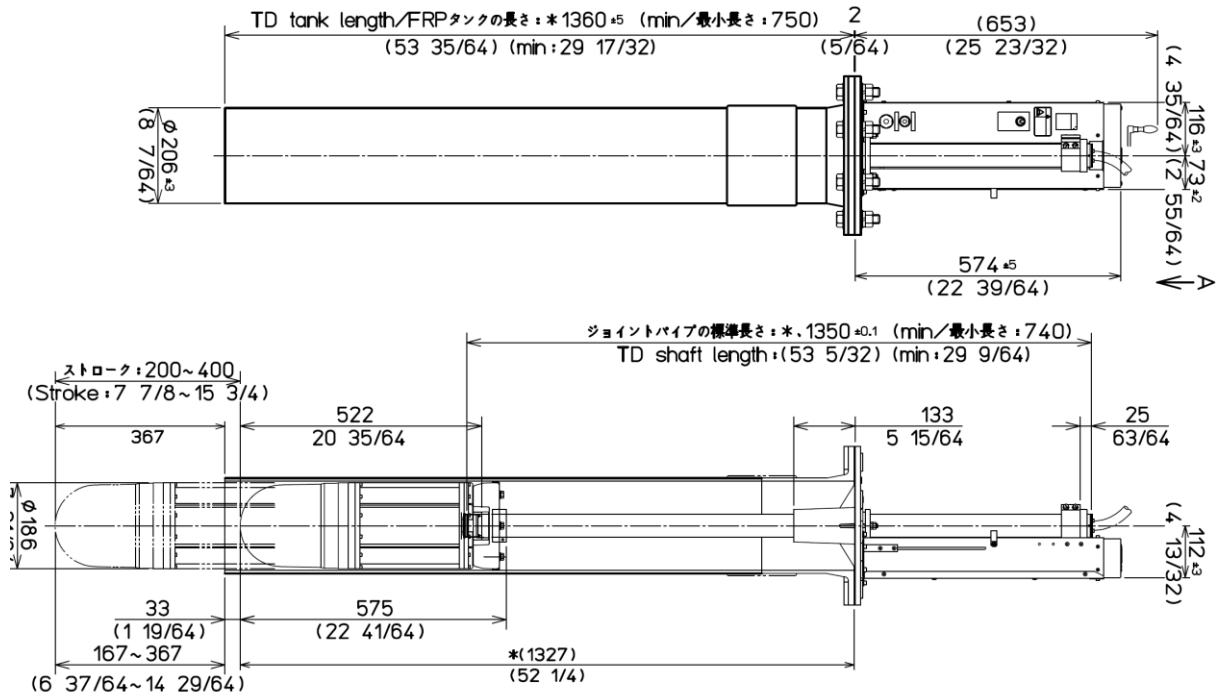
Weight: 1.1kg (2.5lb) [inclusive base and 5M connecting cable / 架台及び5M接続ケーブル含む]
重量

Remote controller (RCW-14) (Optional)



Unit: mm (inch)

Hull unit (DHU-830)

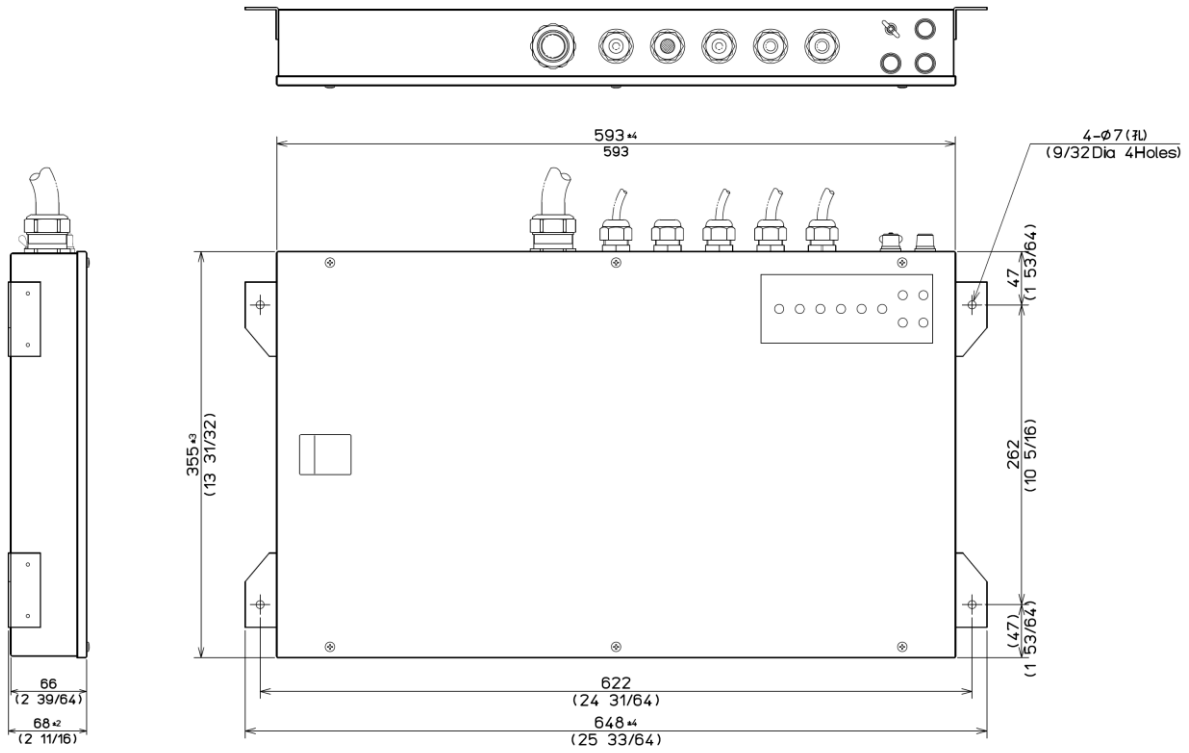


TD shaft length パイプの長さ	TD tank length タンクの長さ	Weight 重量
*1,350mm/(53 5/32inch)	*1,360mm/(53 35/64inch)	60kg/(132lb)
1,620mm/(63 25/32inch)	1,630mm/(64 11/64inch)	62kg/(135lb)
1,920mm/(75 19/32inch)	1,930mm/(75 63/64inch)	63kg/(139lb)
2,120mm/(83 15/32inch)	2,130mm/(83 55/64inch)	64kg/(141lb)
3,000mm/(118 7/64inch)	3,010mm/(118 1/2inch)	68kg/(150lb)

* Dimensions in the drawing show 1,360mm TD tank and 1,350mm TD shaft specifications.

Unit: mm (inch)

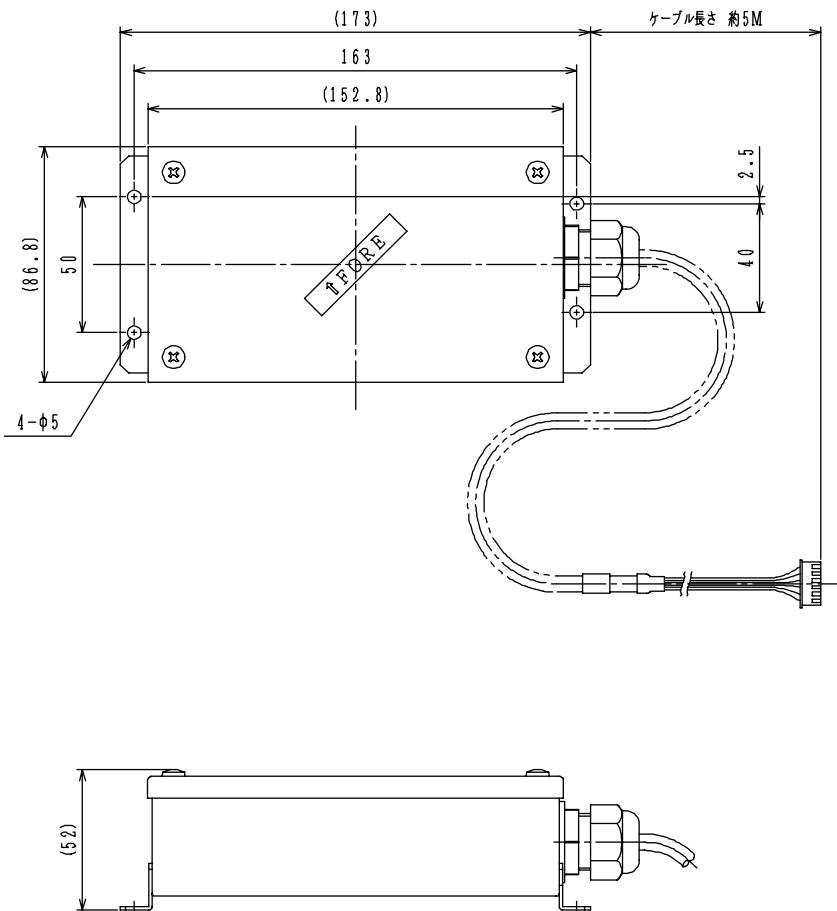
Transceiver unit (DHU-8303)



Weight : 12kg(26.5lb)

Unit: mm (inch)

Motion sensor (OP-820) (Optional)



Unit: mm

Specification

Item		Content									
Model		KDS-8000BB									
Processor unit		DPU-810									
Operation unit		DOU-820									
Hull unit		DHU-830									
Method		Sector scan									
Output power (RMS)		1.0kW									
Output frequency		130kHz to 210kHz (0.1kHz step)									
Tilt angle		-5° to 90° (1° step)									
Beam angle		Horizontal: 6°, 12°, 18°, 45°									
		Vertical: 8.4° (130Hz) to 5.2° (210kHz)									
Display resolution		XGA (1024×768) or HD(720p)(1280×720) (Owner supplied)									
Basic ranges		10 to 1200m, 30 to 4000ft, 10 to 700fm, 10 to 800l.fm (8 ranges can be set to users choice)									
Range units		m, ft, fm, l.fm									
Scanning sector angles		Sector scan mode		(45° step) 45° 90° 135° 180° 225° 360°							
		Sonar mode		(6° step) 6° 30° 54° 102° 150° 198° 246° 360°							
				(12° step) 12° 36° 60° 108° 156° 204° 252° 360°							
				(18° step) 18° 54° 90° 126° 162° 198° 234° 360°							
		Bottom scan mode		(6° step) 6° 30° 54° 78° 102° 126° 150° 174°							
				(12° step) 12° 36° 60° 84° 108° 132° 156° 180°							
360° Scanning time (extracts)		Scanning range (m)		40	100	160	200	240	280	320	400
		Scanning time (sec.) 45° step		3.9	4.5	5.2	5.6	6.0	6.5	6.9	7.7
		Scanning range (m)		40	100	160	200	240	280	320	400
		Scanning time (sec.) 18° step		5.3	6.9	8.6	9.7	10.8	11.8	12.9	15.0
Bearing center		1° step									
Presentation modes		Sonar, Off-center, Bottom scan, Echo sounder, Sonar x2									

Off-center	Fore, Back, Left, Right	
Target lock	Reverse, Mode 1, Mode 2, Marker + Mode 1, Marker + Mode2	
Presentation colors	16 colors, 8 colors	
Functions	TVG, Color rejection, Dynamic range, Compass display, Pulse width, Output Power Control, Noise reduction, A-scope, CM key, Image correction, Bearing display, TD auto up, Hull unit TD position alarm (Display LED red on Operation unit), etc	
Language	Japanese, English, Korean, Traditional Chinese, Thai, Spanish, Myanmar, Italian, Portuguese, Greek and others	
Input data format and sentences	NMEA0183 GGA, GLL, HDG, HDM, HDT, RMC, THS, 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	21.6 to 31.2 VDC
	Hull unit	21.6 to 31.2 VDC
Power consumption	Processor unit	80w or less (24VDC)
	Hull unit	Stop: 350W or less (24VDC)
		UP / DOWN: 350W + 100W or less (24VDC)
Operating temperature	-15 to +55°C	
Water protection	Processor unit: IPX0 Operation unit: IPX5 Transceiver unit: IPX2	
Dimension of equipment	Processor unit: 354x244x104mm Operation unit: 100x324x54mm Hull unit: ϕ 343x709mm, Transducer unit : ϕ 186x522mm, Transceiver unit: 648x355x71mm	
Weight	Processor unit: 2.5kg Operation unit: 1.1kg Hull unit: 25.4kg, Transducer unit: 27.8kg, Transceiver unit: 12kg	

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Chapter 1 Installation

1.1 Installation precautions

In order to obtain the maximum performance of the digital broadband sector sonar, this digital broadband sector sonar should be installed by a qualified engineer in charge of installation and maintenance. Installation procedures include the following:

- (1) Unpacking of components
- (2) Inspection of composition units, spare parts, accessories and installation materials.
- (3) Checking of supply voltage and current capacity.
- (4) Selection of location for installation.
- (5) Installation of Display unit, Processor unit, Operation unit and Hull unit.
- (6) Attachment of accessories.
- (7) Planning and implementation of cable lying and connection.
- (8) Coordination after installation.

1.1.1 Unpacking of components

Unpack the components and check that all the items correspond with the description of the packing list. When a discrepancy or damage has been found, contact the dealer you purchased of our sales company.

1.1.2 Appearance verification of each unit and accessories

Inspect the appearance of each components and accessories and check that no dents or damages exist.

If any dents or damages exist and they are believed to be caused by accident during transportation, contact the transportation and insurance company and consult our sales company or our dealer nearest to you.

1.1.3 Selection of location for installation

In order to obtain the maximum performance of the unit, it is necessary to install in consideration of matters described below:

- (1) The Processor unit is not waterproof. Do not set it up in the place where water splashes.
- (2) Keep enough space for maintenance for the Processor unit and the Hull unit. Especially, secure enough space at the rear panel where many cables are connected.
- (3) The Processor unit, Operation unit and an external monitor shall be set up within the distance the connection cables are not too stretched.
- (4) Keep the equipment as far away from wireless transmitter/receivers as possible.

1.1.4 Laying and connection of cables

- (1) Keep the cables related with the Hull unit and the power cable as far away from the cables of other electronic equipment as possible.
- (2) The cabinet of the display unit and the Processor unit shall be securely grounded to the hull, using the grounding terminal on the rear panel.



Caution All chassis shall be securely grounded as a means of noise suppression. The – (negative) output is isolated (floating) output.

- (3) If you connect the power cable directly to the battery, interference from the other electronics equipment is expected to be less. (See Fig. 1.1)

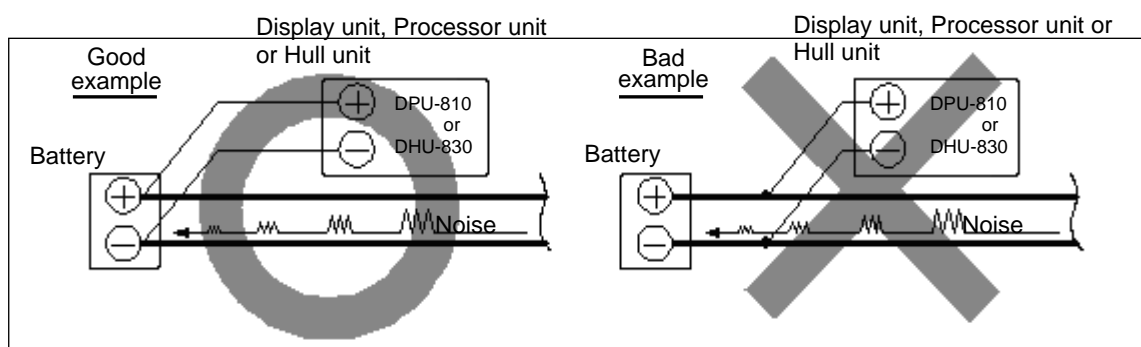


Fig. 1.1 KDS-8000BB Connection of power line

1.1.5 Confirmation after installation

Be sure to confirm the following points before starting. The confirmation is mandatory to operate the equipment normally:

- (1) Is the power voltage in the boat within the appropriate voltage range? Is the current capacity enough?
(Voltage range: 21.6 VDC to 31.2 VDC measured at the power connector.)
- (2) Is the electric current capacity sufficient?
(Power consumption: Processor unit (DPU-810)/80W, Hull unit (DHU-830) /450W)
- (3) Is the cabling from the Hull unit correct? Is the wiring shorted?

1.2 Installation of 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.

1.3 Installation of Operation unit

KDS-8000BB Operation unit can be installed either on desk-top or flush-mounted.

Install by the following procedure.

1.3.1 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. 1.3.
- (2) Mark the position where installation plinth is installed (See Fig. 1.2)
- (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.)

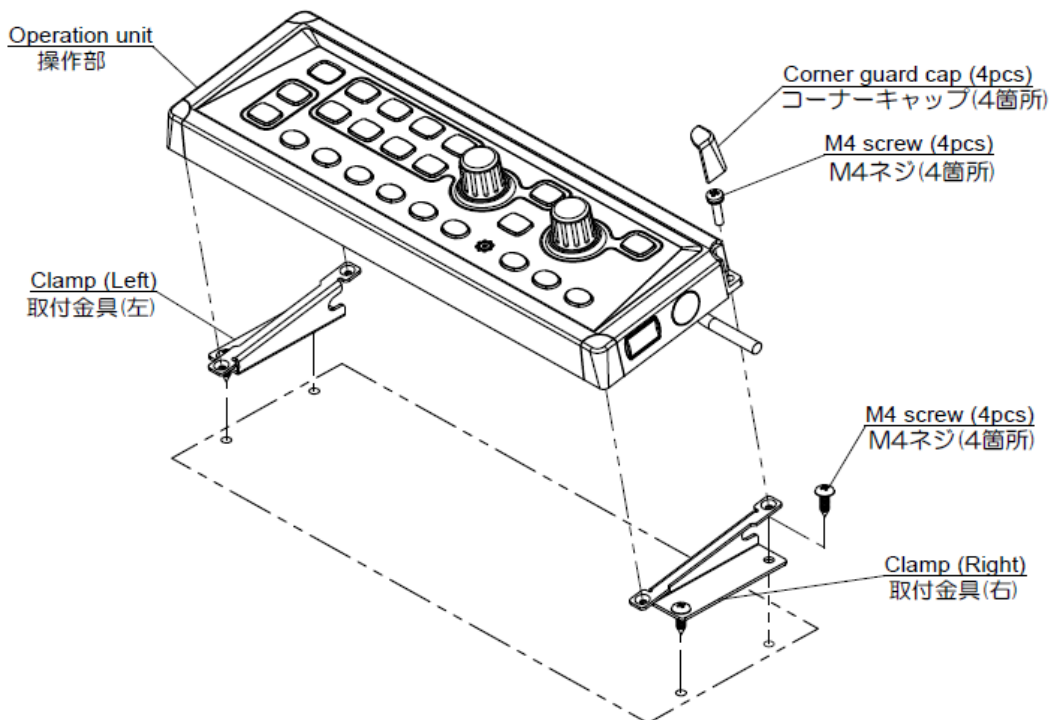
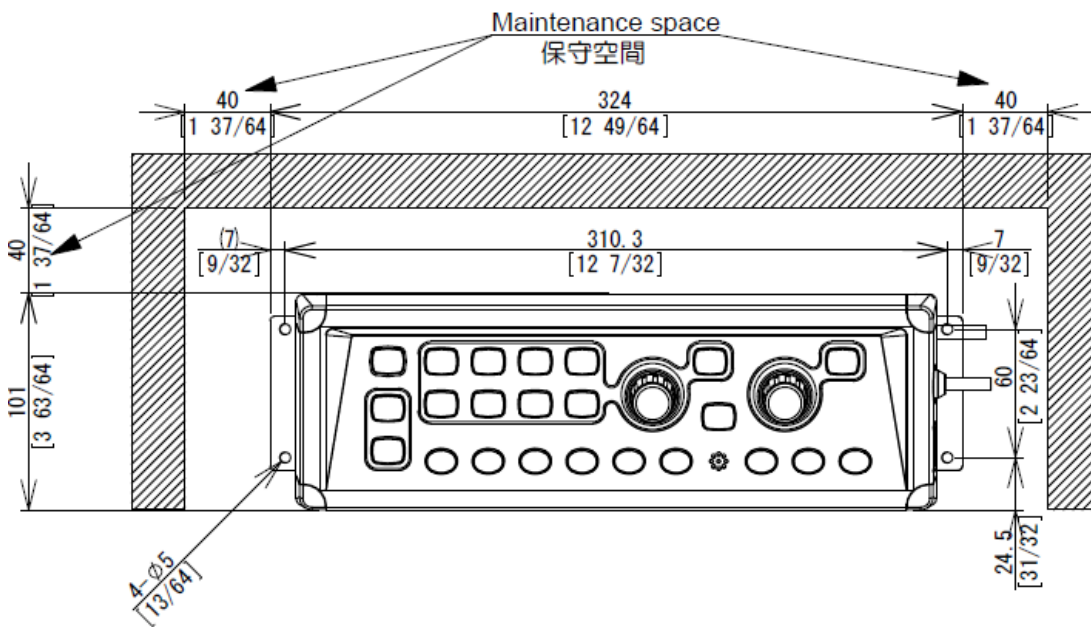


Fig. 1.2 Installation of an Operation unit on the desktop



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



Unit: mm (inch)

Fig. 1.3 Maintenance space of desk-top installation

1.3.2 Flush-mount installation of Operation unit

- (1) Make a square hole at the location to be installed (See Fig. 1.5)
- (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. 1.4)
- (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).

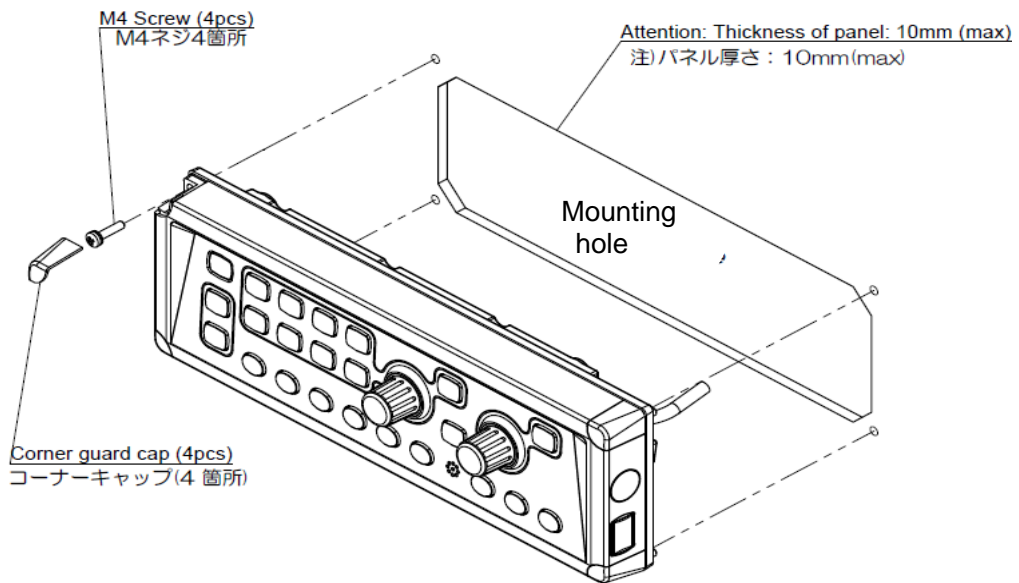


Fig. 1.4 Flush-mount installation of Operation unit

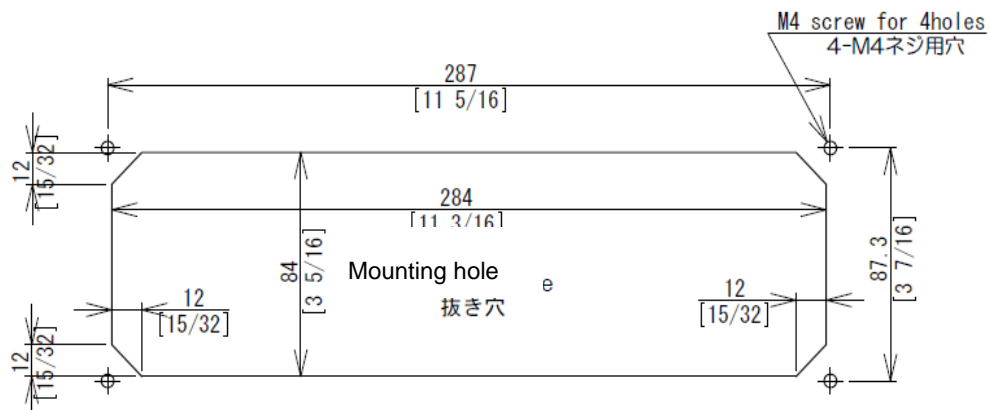


Fig. 1.5 Hole for flush-mount installation of Operation unit

Unit: mm (inch)

1.4 Installation of 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. 1.6)
- (3) Install the Processor unit in the installing location (installation hole) and fix it with 4 tapping screws (6mm) (M6 x 20 (SUS)). (Prepare 6mm screws suitable for thickness of installing location.)

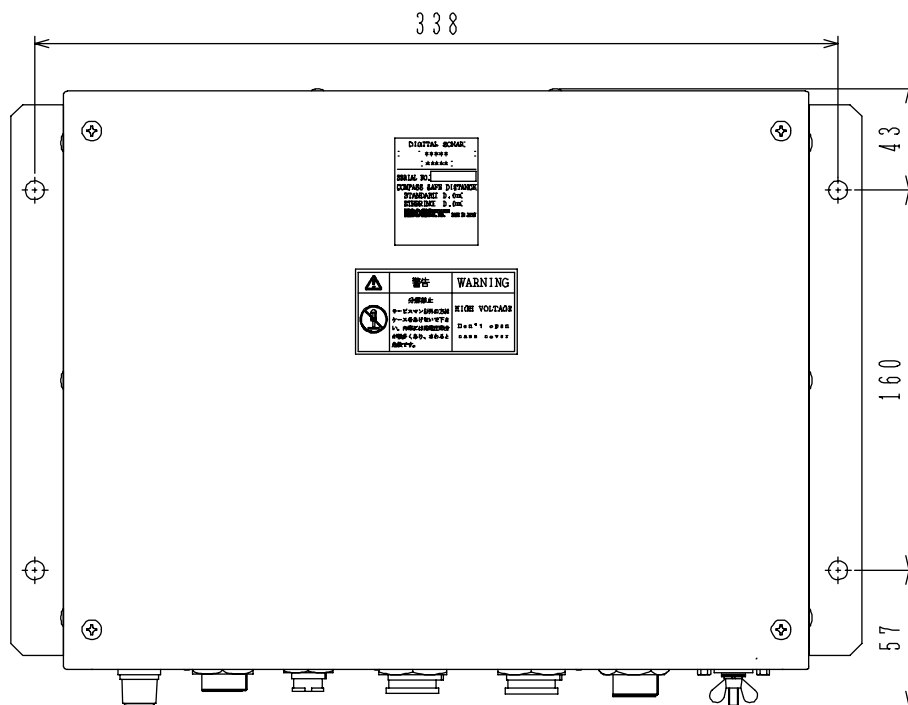


Fig. 1.6 Installation of Processor unit

Unit: mm

1.6 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.

1.6.1 Installation location of Hull unit

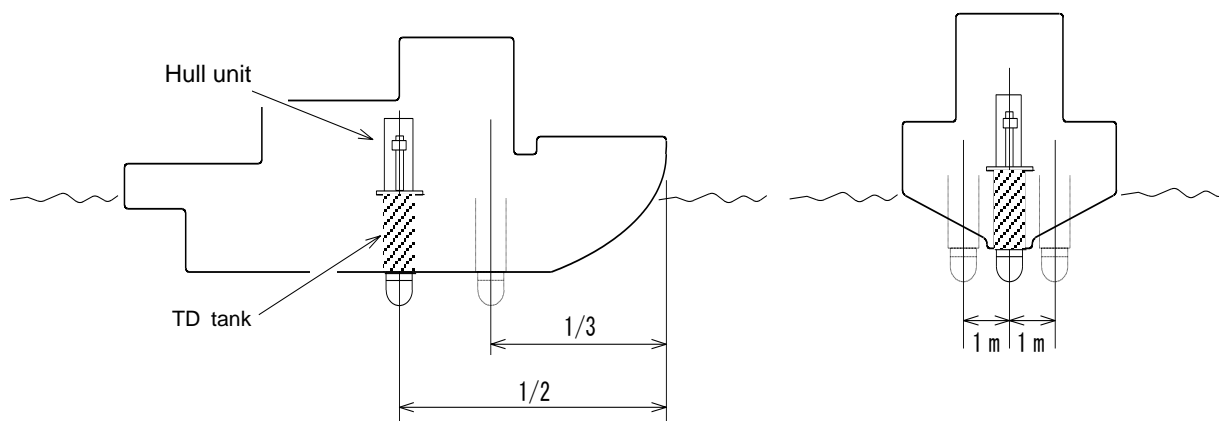


Fig. 1.8 Installation location of Hull unit



Caution:

- 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.
- 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.
- Install the unit so that the Flange comes above the draft at full load.
- 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).

1.6.2 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-8000BB is shipped from the factory with a standard shaft, the length of TD shaft are set as follows:

✧ **TD shaft: 1350mm (Standard)**

- When standard TD shaft is installed, the TD tank length is:

✧ **TD tank (Lt) : 1350 - 120 = 1230 mm**

[TD tank length (Lt) = TD shaft length – 120mm]

- **TD tank length (FRP, optional) is 1800mm**

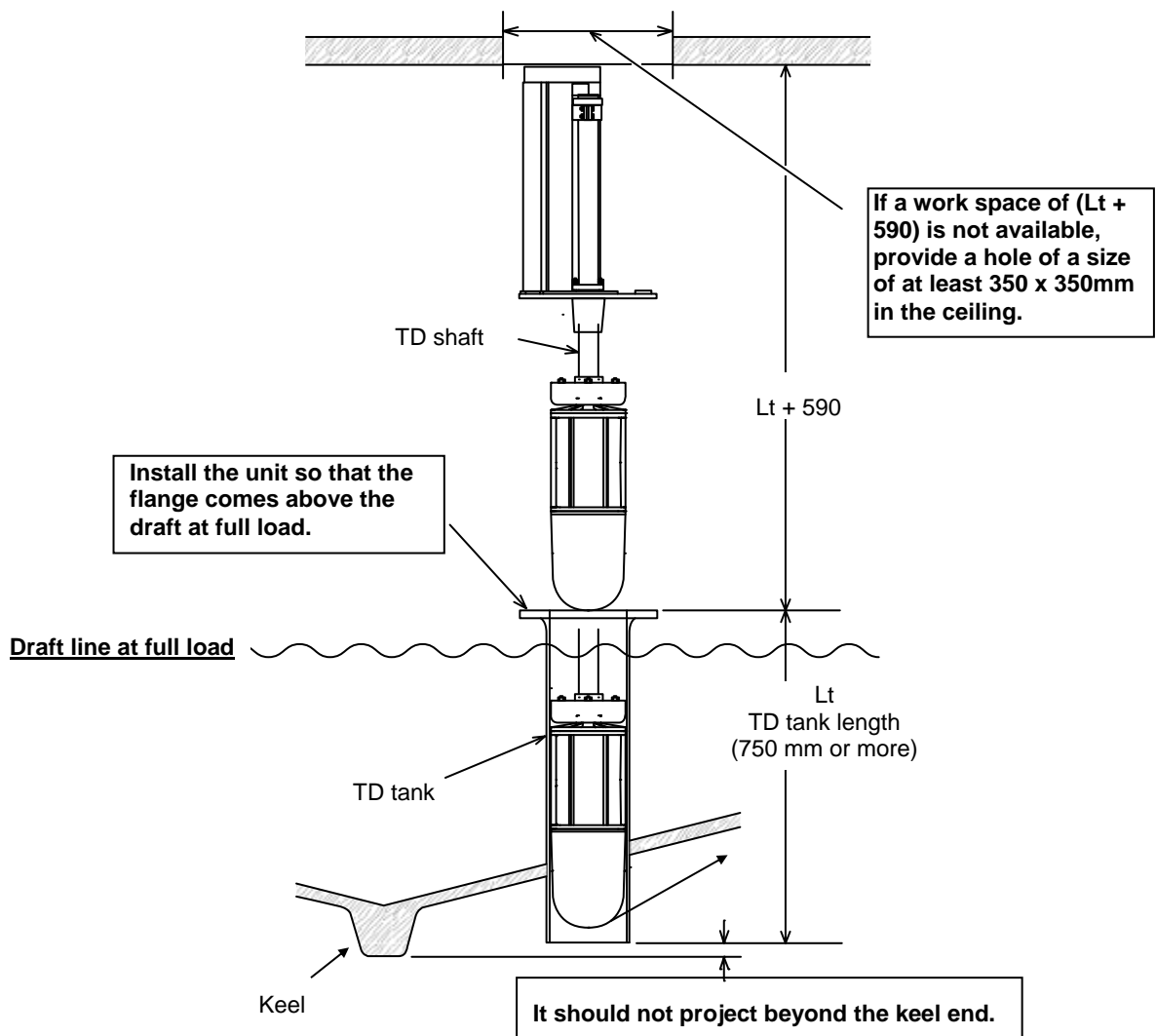
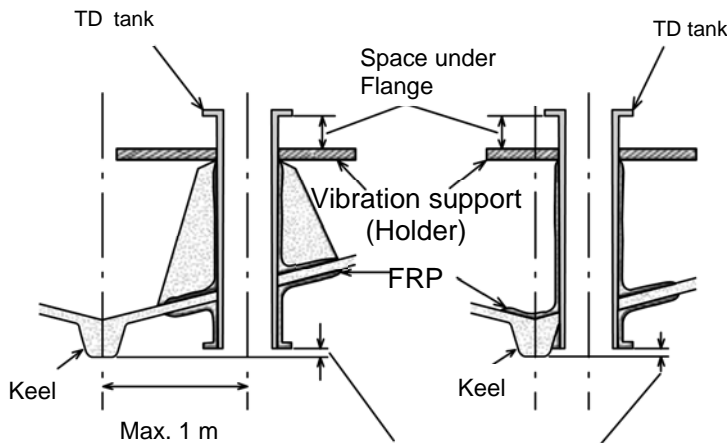
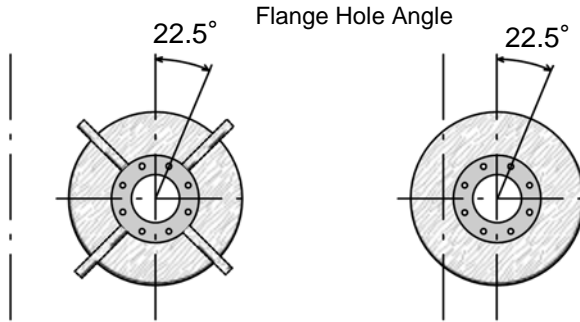


Fig. 1.9 Installation of TD tank

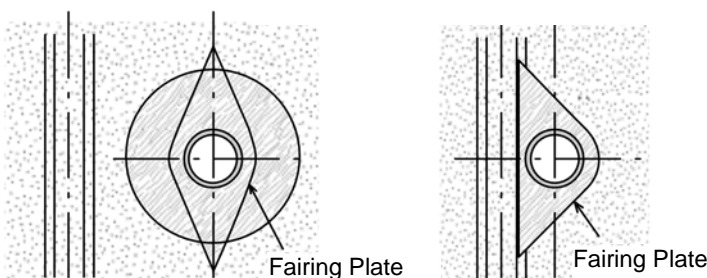
1.6.3 Installation conditions for a TD tank

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

- Install the TD tank on the keel within the range of 1/2 to 1/3 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.



Not to protrude lower than keel



- There should be no obstacles right below the flange of the TD tank which may interrupt bolt clamping of the Flange.

- 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.

- Apply FRP to 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.

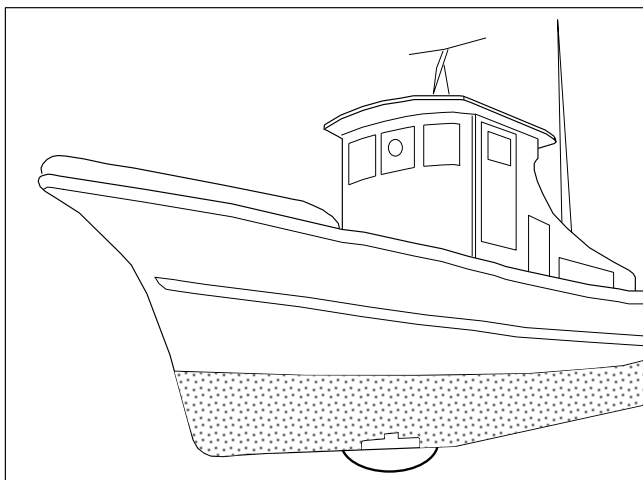
- When necessary, install a Vibration support holder to stop shaking.

When doing this, make sure the holder does not interfere bolt clamping of the flange.

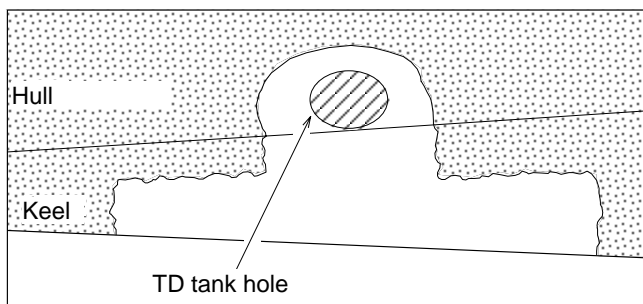


Fully discuss about the strength and waterproofness with the ship owner, persons in charge in the shipyard and the installer before determining on the position and the method of installation and necessary materials.

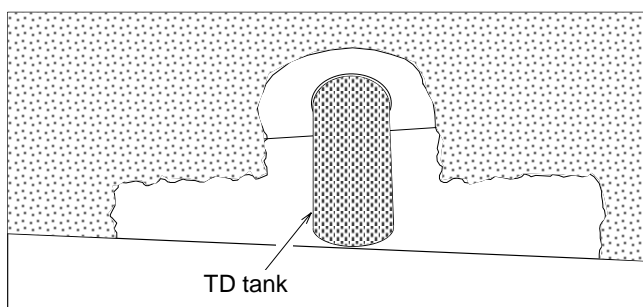
1.6.4 Example of installation of the TD tank



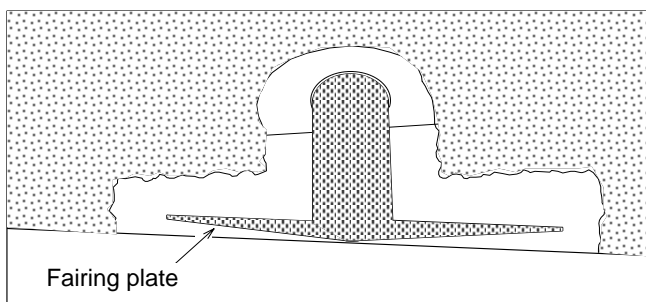
- The position to install the TD tank.
(Refer to page 1-8)



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

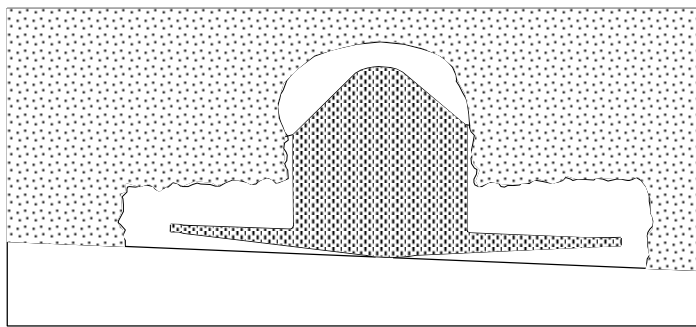
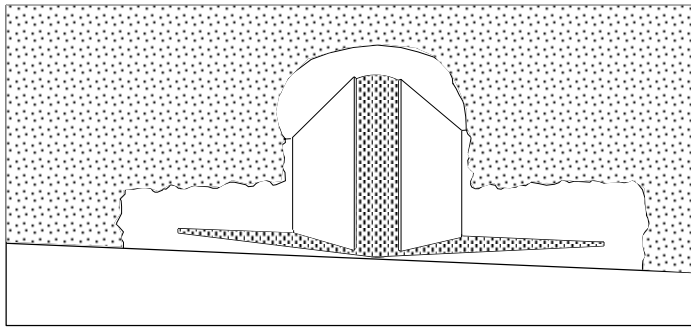


- Install the TD tank into the hole.
The Flange surface of the TD tank should stay level during standard cruise.



- 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. 1.10 Example of TD tank installation – 1



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

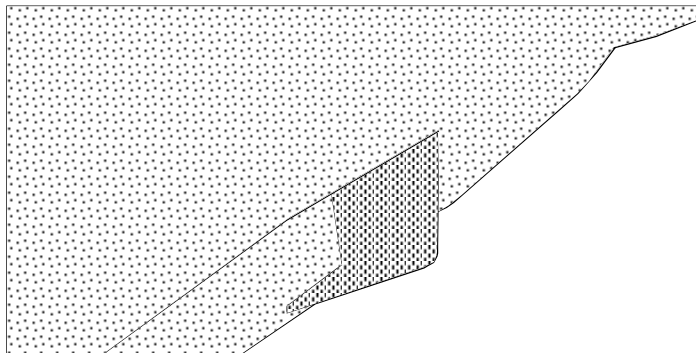


Fig. 1.11 Example of TD tank installation - 2

1.6.5 Assembly of Hull unit

When there is enough space above the installed location, the TD shaft can be used without being cut off. If there is not enough space, the length of a TD tank and the TD shaft can be cut off as shown below.

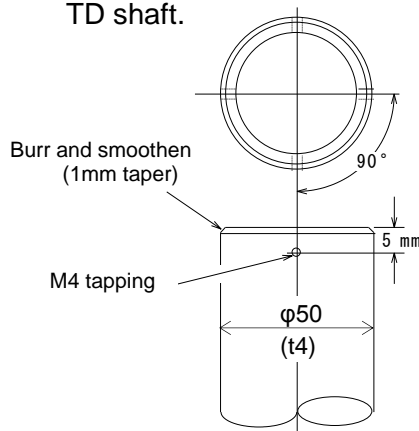
(1) Necessary length of TD shaft

- The length of TD shaft depends on the length of TD tank.
- When the TD tank length is fixed, the TD shaft length should be processed as follows.

Necessary length of TD shaft = TD tank length (Lt) + 120 mm

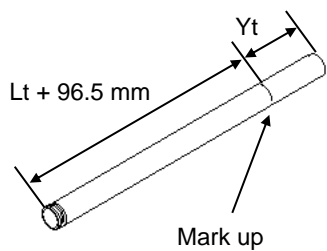
(2) Processing of TD shaft

- 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) + 120 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. 1.12 Processing of TD shaft



Mark up at “Lt+96.5mm” and align the top end of joint arm at this mark and fasten it.

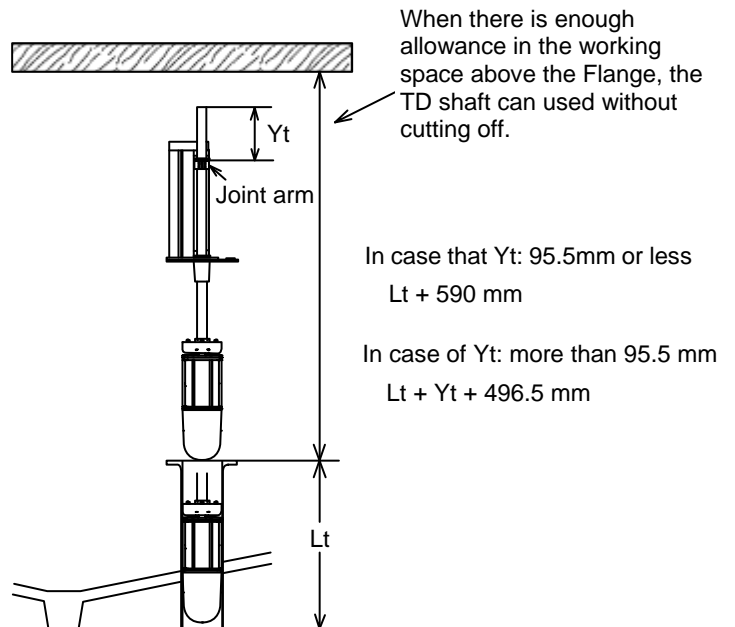


Fig. 1.13 Installation of a TD shaft

(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 strongly the TD shaft to the Transducer unit. 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.

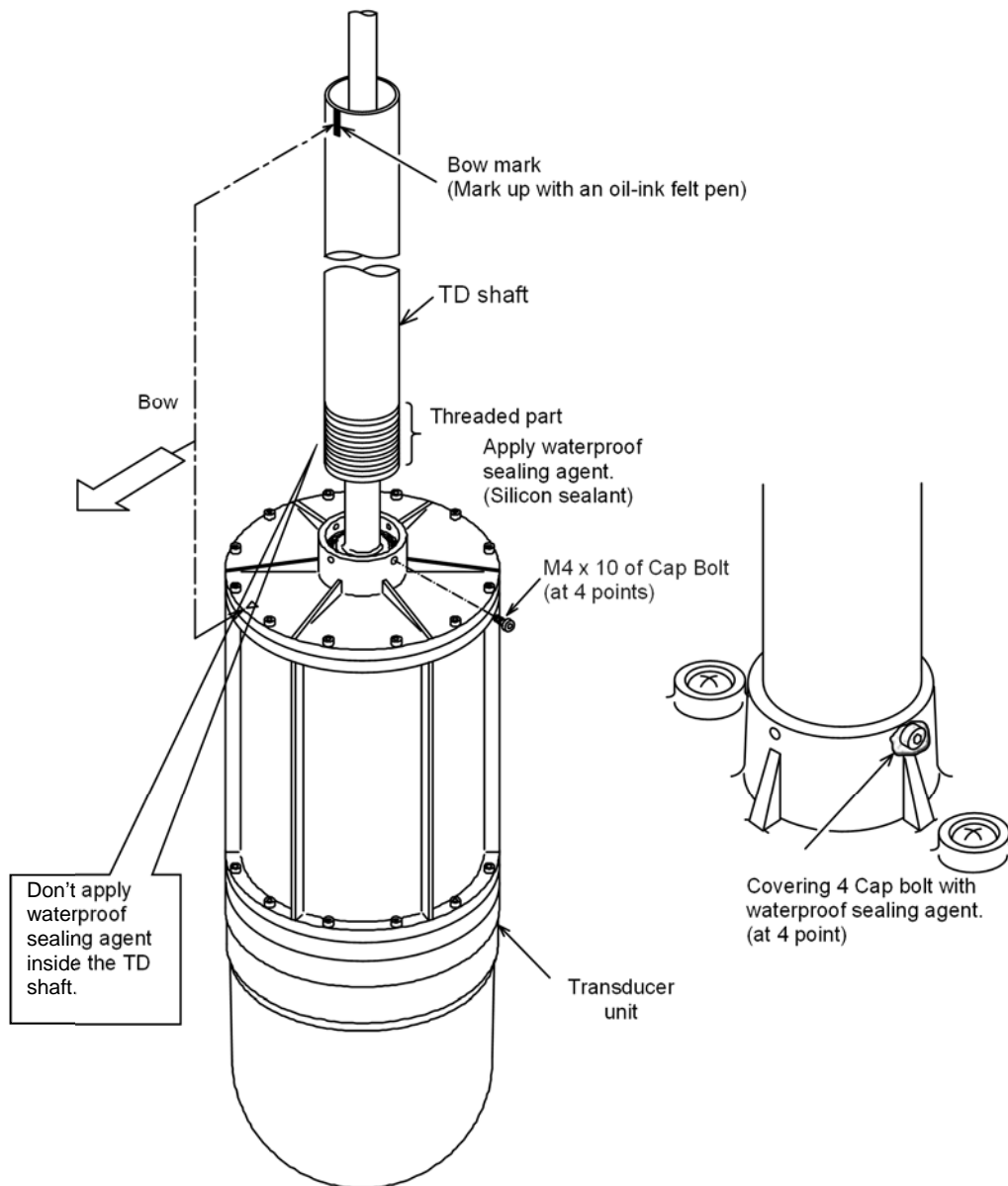
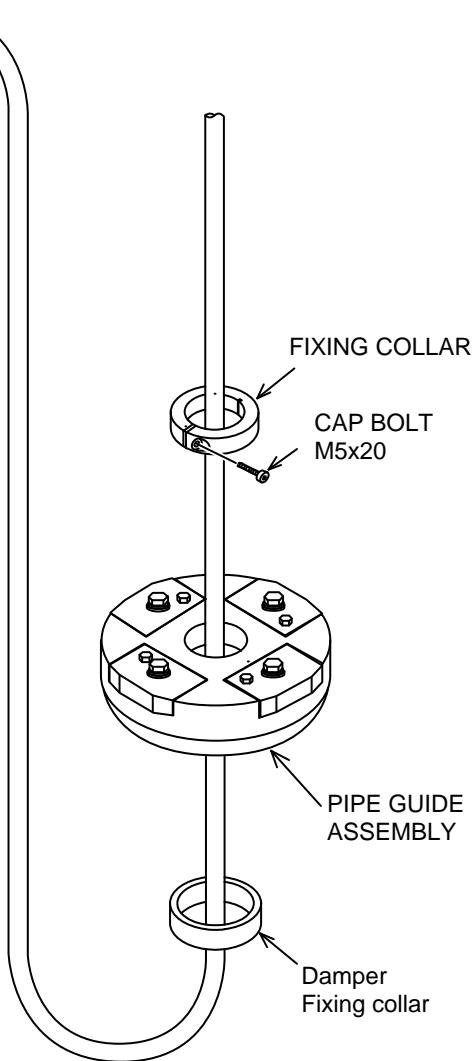
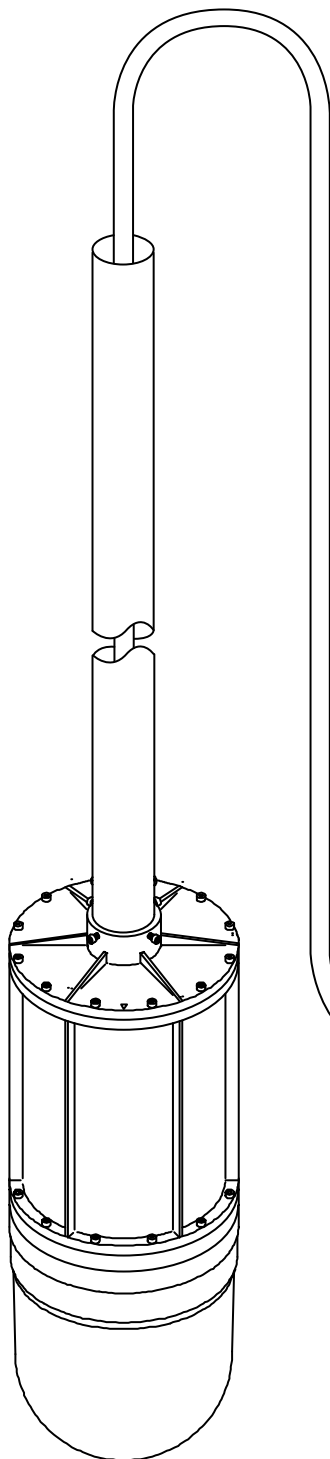


Fig. 1.14 Assembling Hull unit - 1

2) Attaching the shaft guides



- Pipe guide should match with the inside diameter of the trunk pipe and tighten hexagonal bolts (M8).

At this time the hole of the base should be centered in the trunk pipe.

- Make 4 holes on the Pipe guide base with the same diameter $\phi 5.5$ as the pipe guide and tighten the attached hexagonal bolts (M8x35) and nuts.

- Pass the pipe guides through the pipe and fasten the pipe guide using the fixing collar.

Use the pan head screw fix the collar.

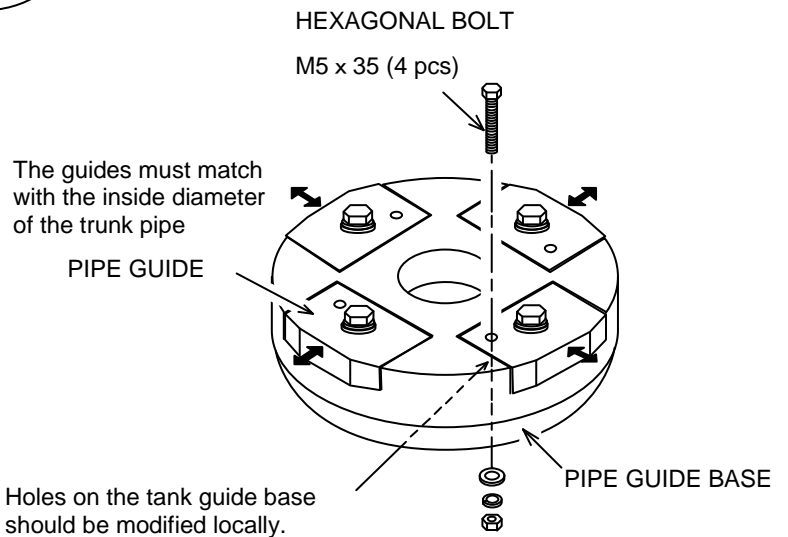


Fig. 1.15 Assembling Hull unit - 2

3) Attaching the Transducer unit to the Hull unit.

- Apply grease to the bearing of the Flange.
- Thread the TD shaft through the Flange bearing. Mount them to the Joint arm matching the bow direction.
- Ensure that the TD shaft end projects 25mm from the Joint arm surface.
- In the use case of other TD tank, **ensure the lowest part of the Transducer unit is at least 35mm above the lowest part of the TD tank.**
- To prevent slip-out of the TD shaft, fasten the attached Fixing collar using Cap bolt.

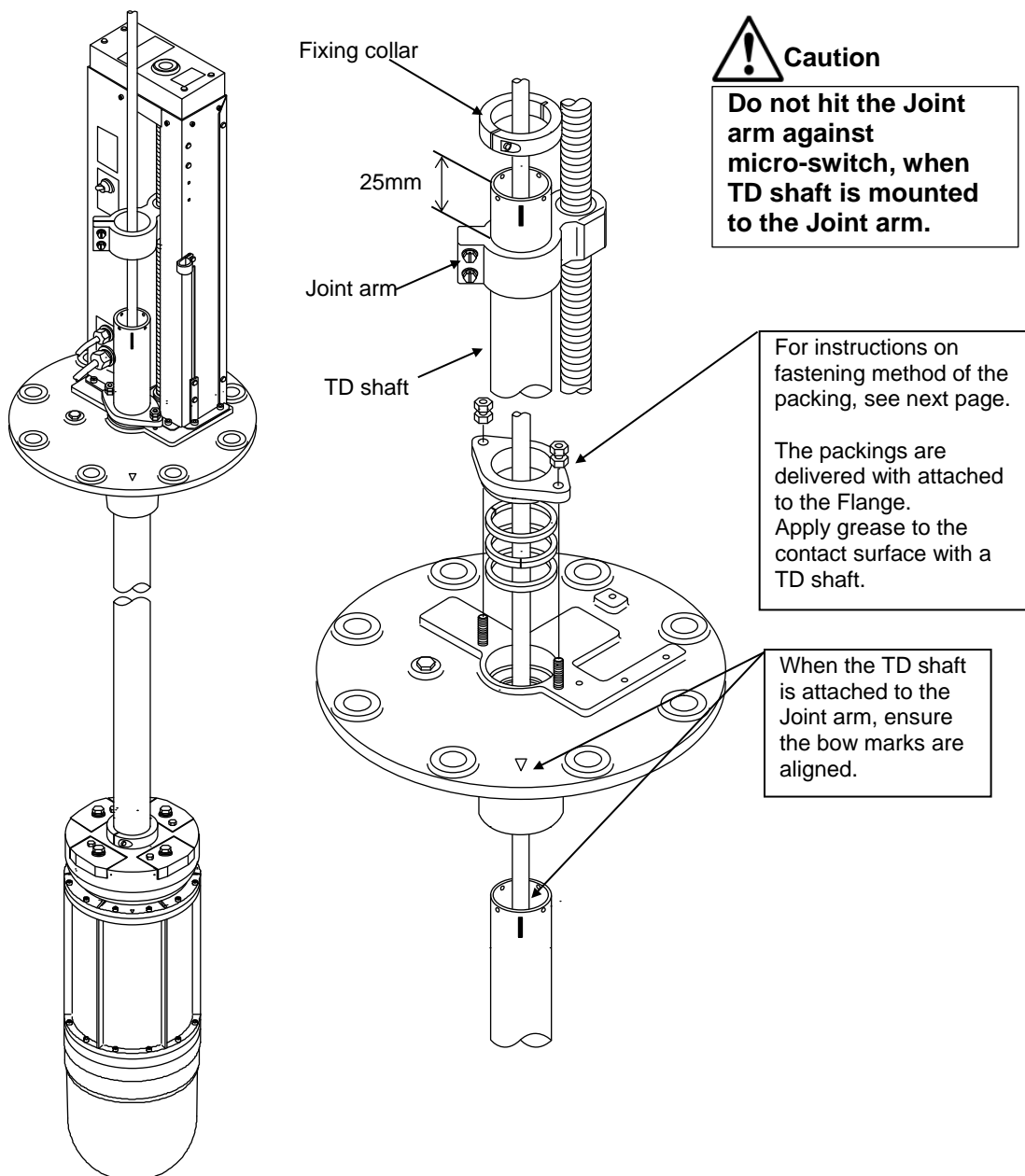


Fig. 1.16 Assembling Hull unit - 3

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

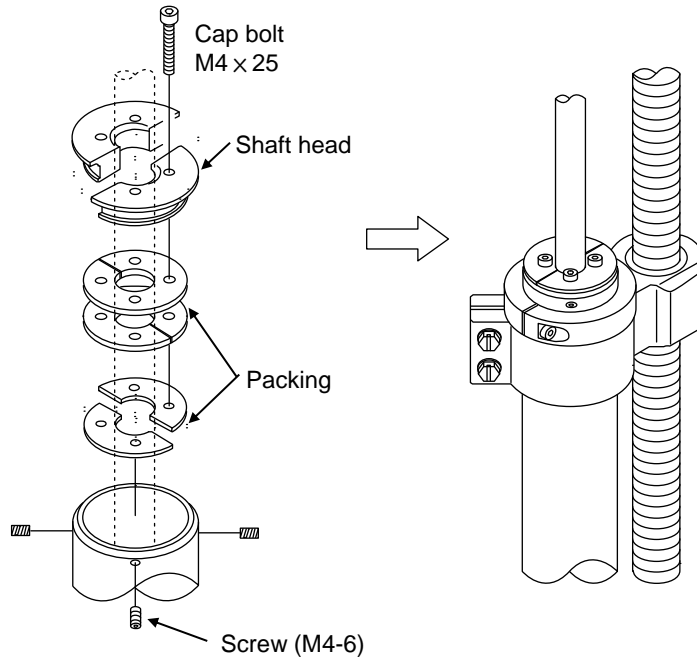


Fig.1

- Attach the shaft head to the cable of the Transducer with the Cap bolts (4 pcs of M4 x 25). The Cap bolts need to be tightened temporarily. (Refer to Fig. 1).
- Insert the shaft head into the end of the TD shaft, and tighten the Cap bolts evenly.
- In addition, fix the shaft head with 4 pieces of attached the screws (M4-6) to prevent the cap from coming off.

Fig. 1.17 Assembling Hull unit – 4

5) How to tighten Waterproof nut and Lock nut

- Remove 2 upper of double nuts tightening the packing of the flange. Then tighten 2 lower of double nuts to adjust the space to 4 or 5 mm between the packing and the flange. At this time, tighten them to the average so that both gaps are the same.
- When tightening is completed, tighten 2 upper of double nuts which were removed as above to prevent loosening when in operation.
- If sea water leaks after launching, tighten the packing again as above process.

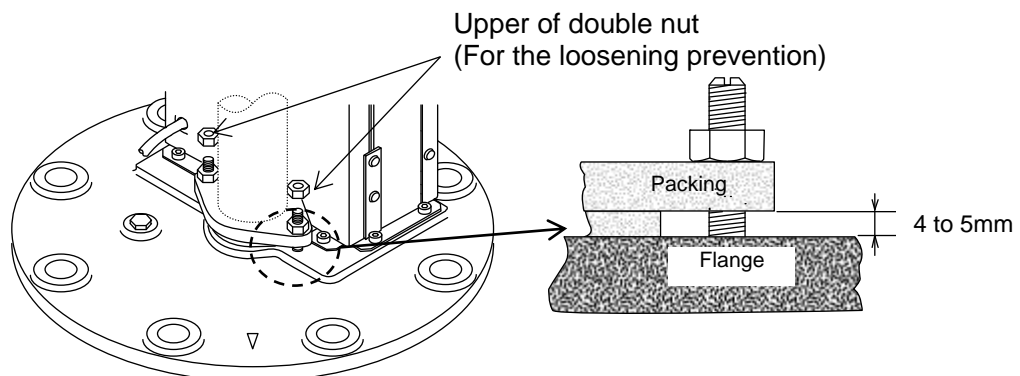


Fig. 1.18 Assembling Hull unit – 5

6) Hull unit and TD tank attachment

- Fasten the Hull unit to the TD tank with 8 pcs of attached Hexagon bolts (M20 x 80). 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.

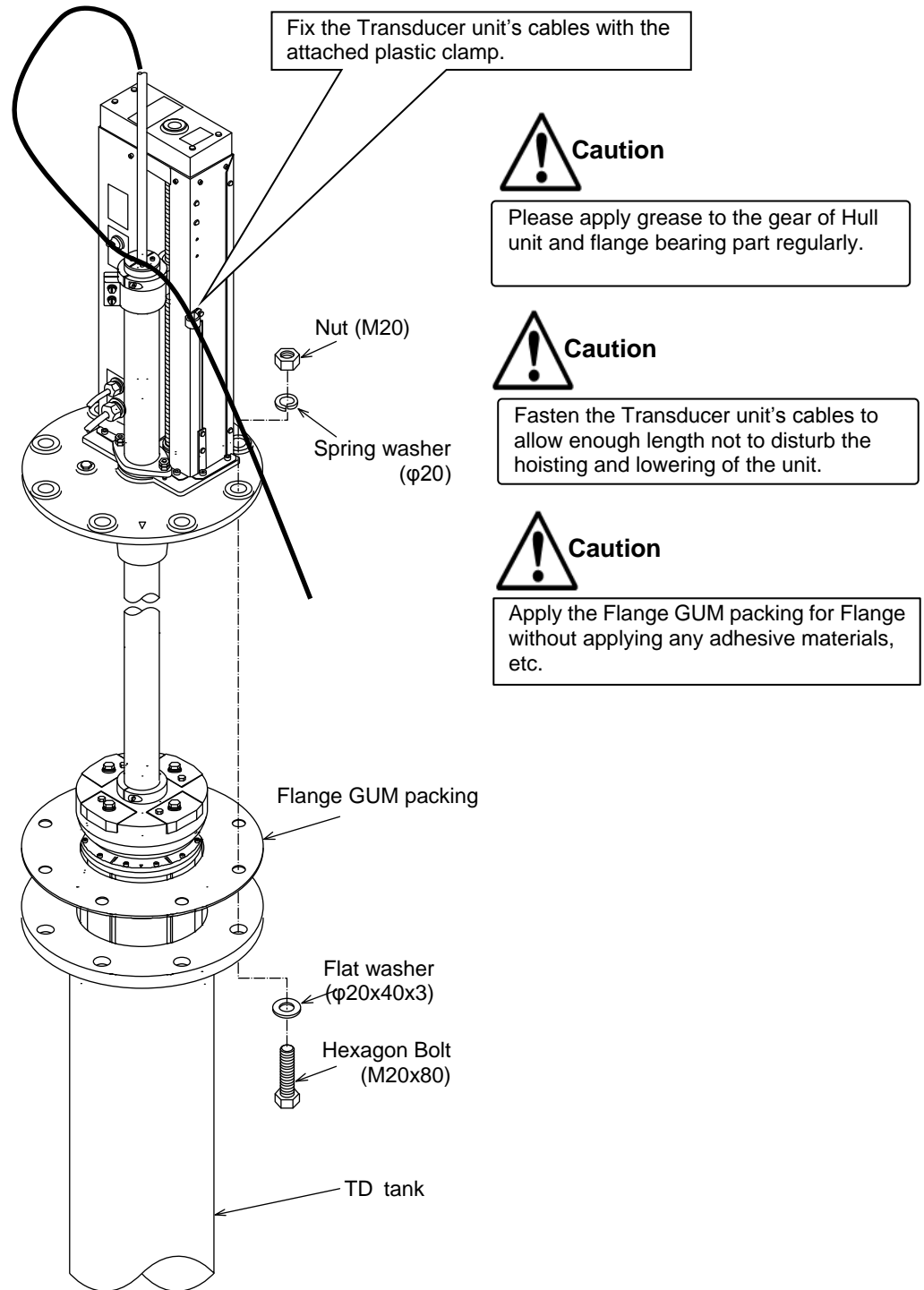


Fig. 1.19 Assembling Hull unit – 6

(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. 200 mm to max. 400 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.

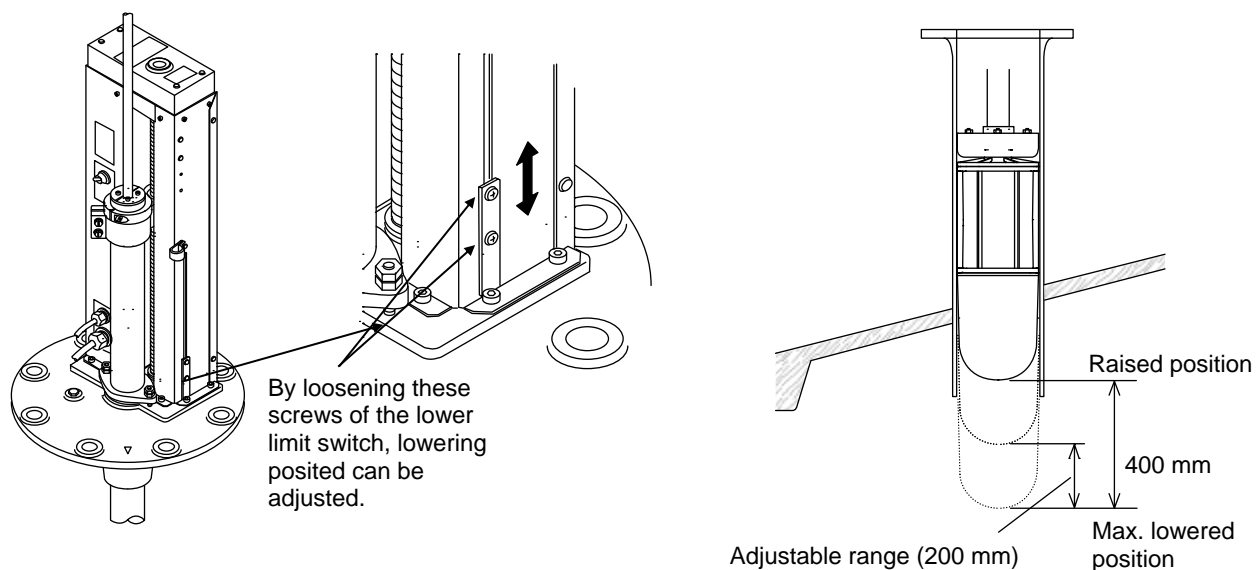


Fig. 1.20 Adjustment of hoisting and lowering stroke

(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. (Refer to Fig. 2)
- When the crank handle is used, pull down the switch lever and turn the hoist switch OFF before starting the operation.



If the hoist switch do not power OFF, the hoist motor will be start and the handle turns around in reverse. To prevent such accident from occurring, ensure to power off.

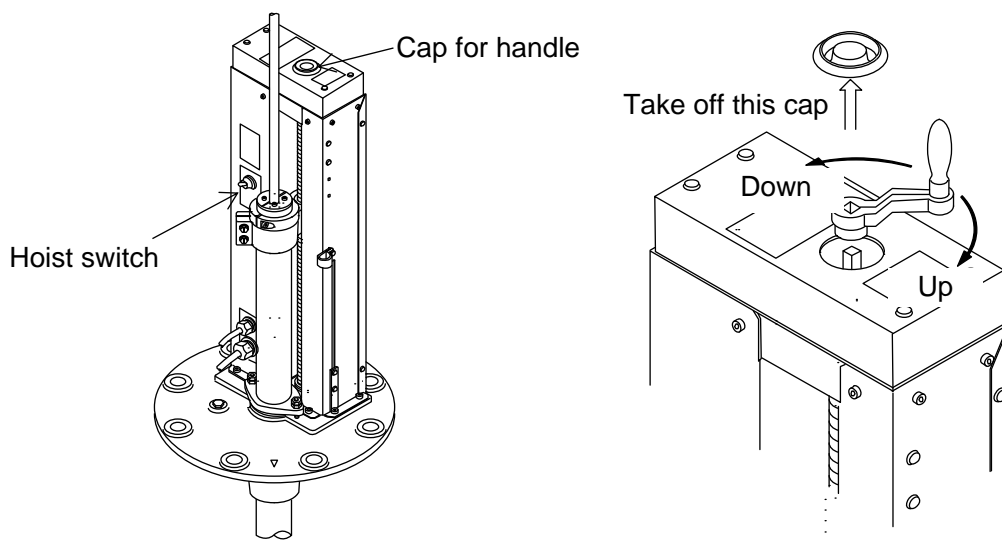


Fig.2

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

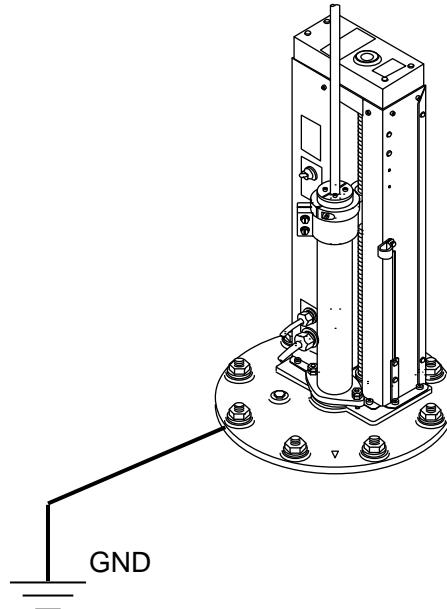


Fig. 1.21 Connection of a wire between the flange and the ship's ground



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.

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, pull down the switch lever and turn the hoist switch OFF.

The power switch ON, the electromagnetic brake is released.

When the crank handle is rotated clockwise, Transducer unit is hoisted. When rotated counterclockwise, the Transducer unit is lowered.

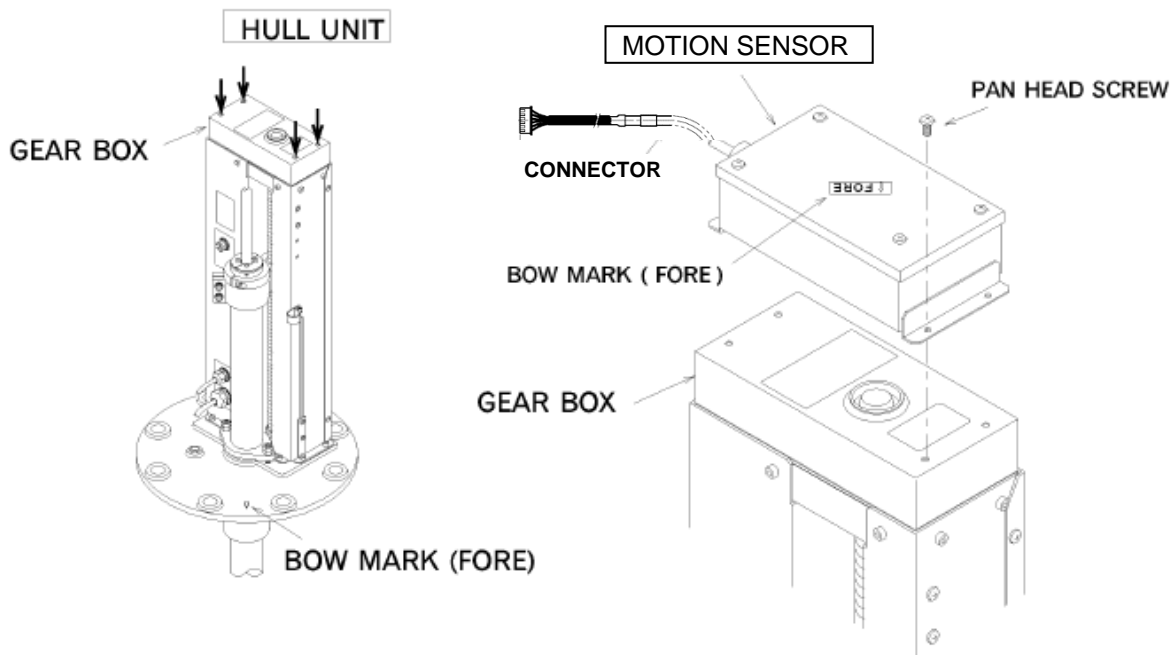
In the case of manual operation, turn the power switch OFF before starting the operation.

1.6.6 Motion sensor

By connecting the Motion sensor (OP-820) the influence by the shake of ships such as pitching and rolling, can be suppressed.

How to install the Motion sensor.

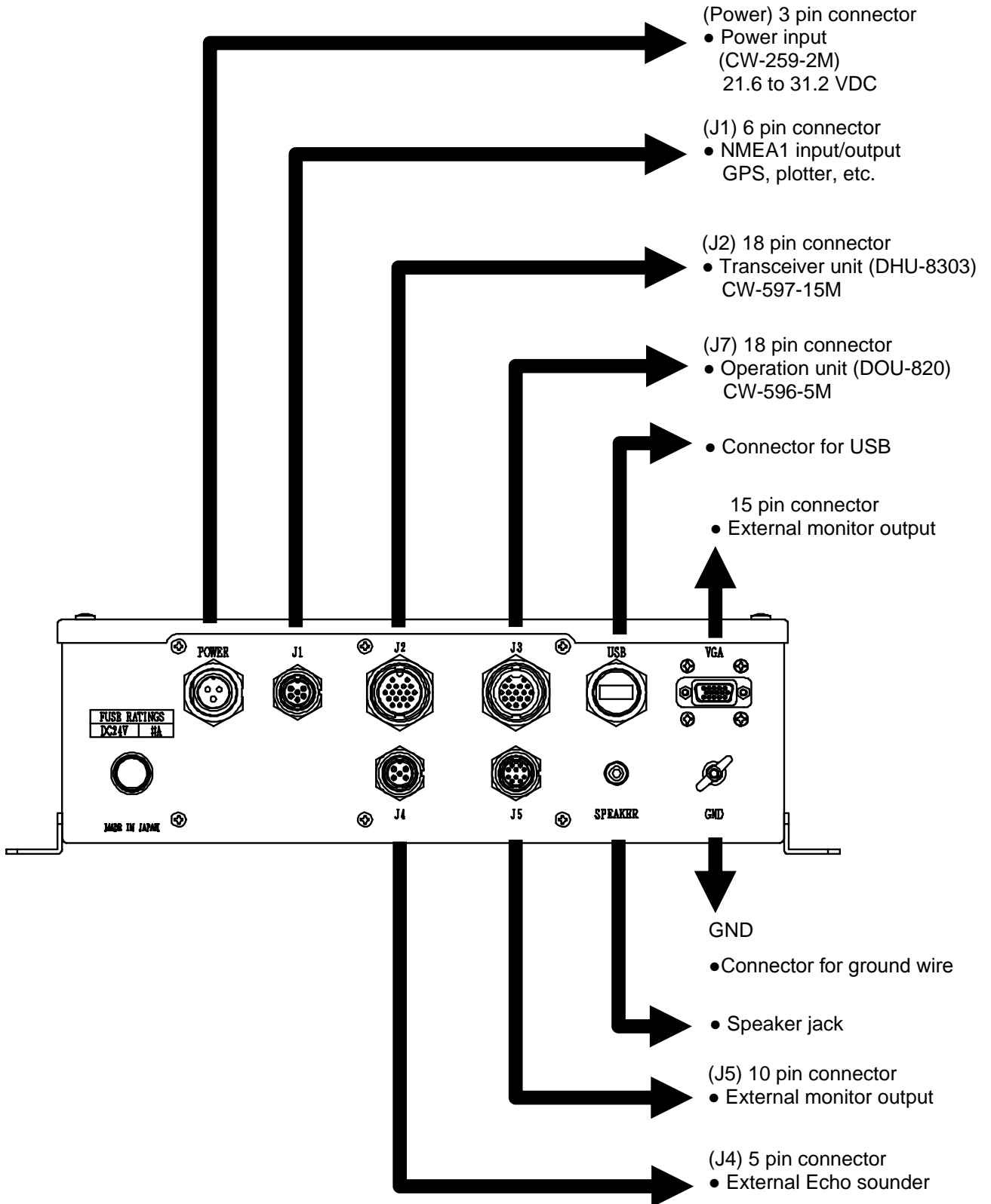
- (1) Remove four pan head screws tightening the gear box cover shown with ↓ in the drawing below.
- (2) In accordance with the arrow-directions of the FORE marks the Motion sensor and the gear box may be tighten with 4 screws removed previously in the item (1).
- (3) Connections between the Motion sensor and DHU-8303 unit are accomplished by means of the cable that is terminated in connector.
Connect the end of the cable to the terminal stated "J203" on the DHU-8303 unit.



1.7 Wiring

1.7.1 Connection of cables to Processor unit

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



Pin assignment of rear connectors

Pin assignment viewed from the rear of Processor unit (DPU-810).

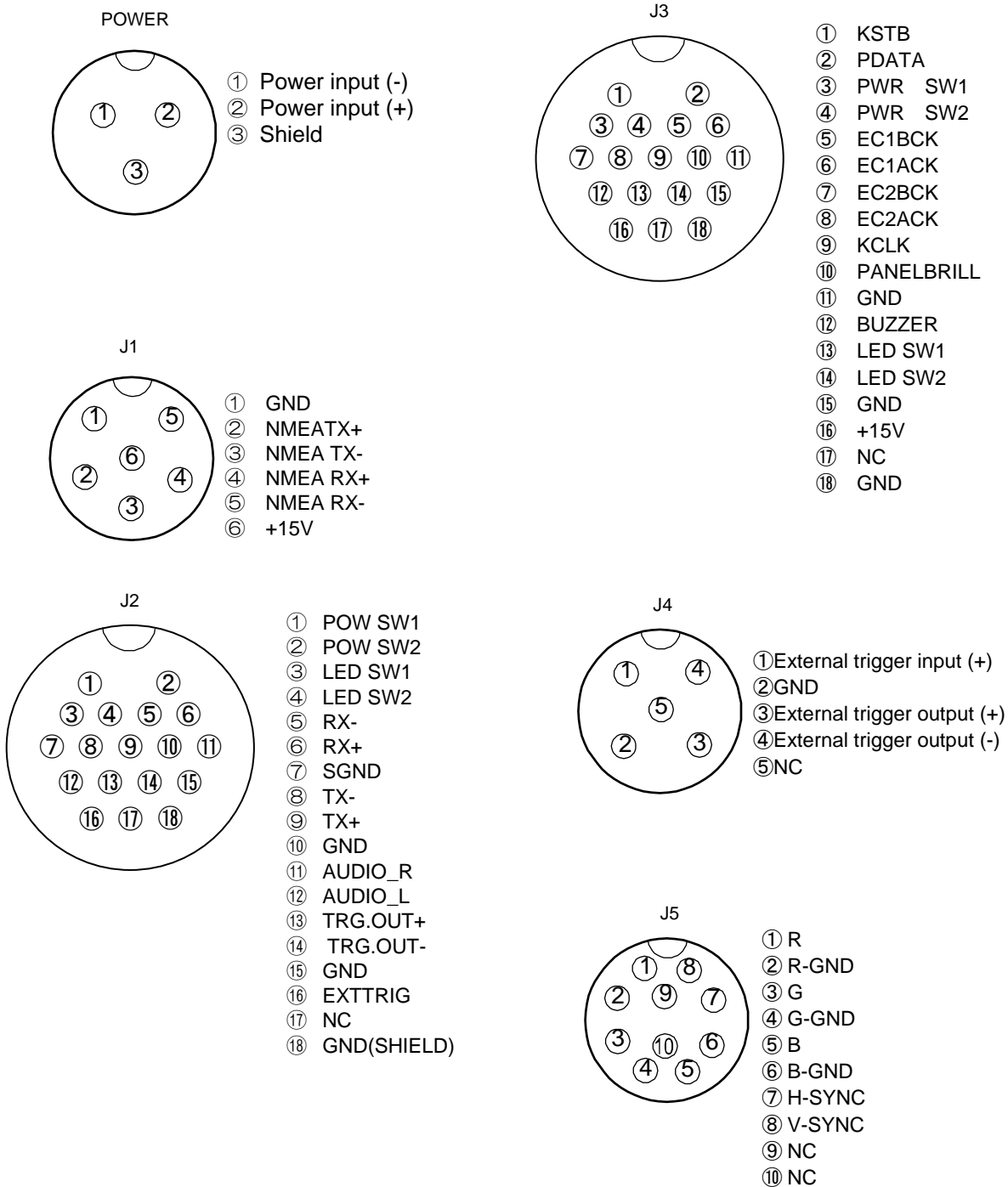


Fig. 1.22 Pin Assignment of rear connectors - 1

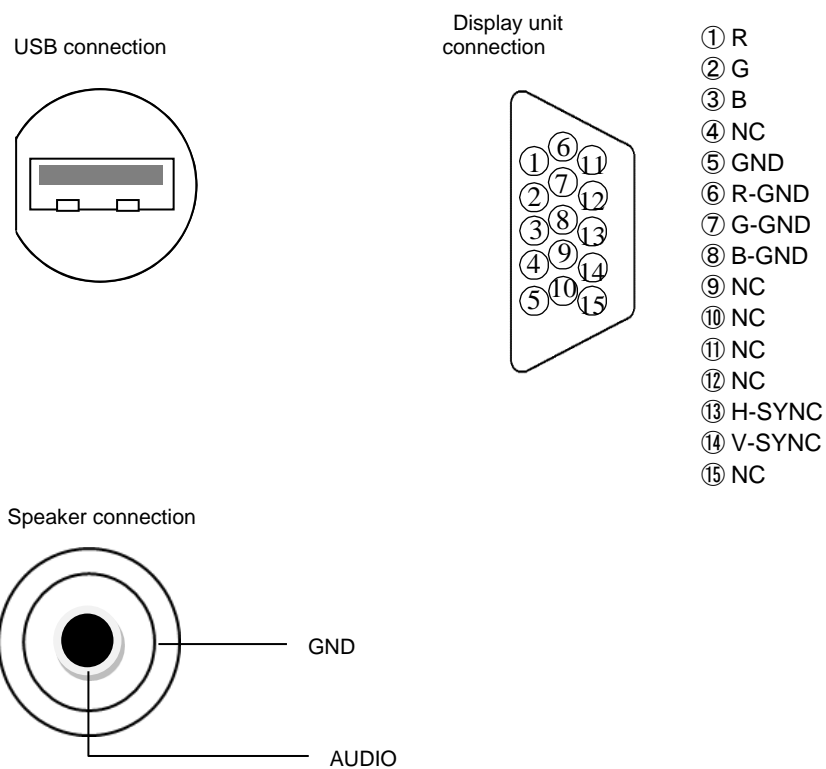


Fig. 1.23 Pin Assignment of rear connectors - 2

⚠ Caution: Do not connect each wire to ship's earth.

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

Connect the power cable to the [POWER] connector at the rear of the Processor unit (DPU-810).

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

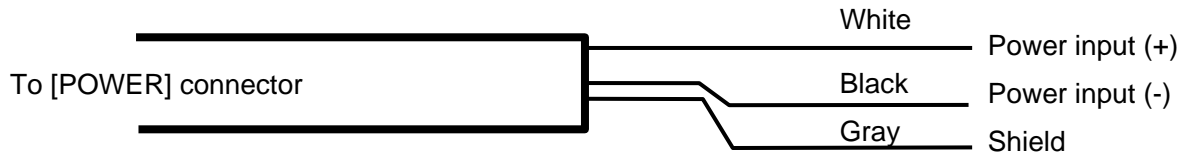


Fig. 1.24 Connection of a DC power cable



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

Connection of Hull unit (DHU-830)

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-810): 21.6 to 31.2 V
 - Hull unit (DHU-830): 21.6 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.

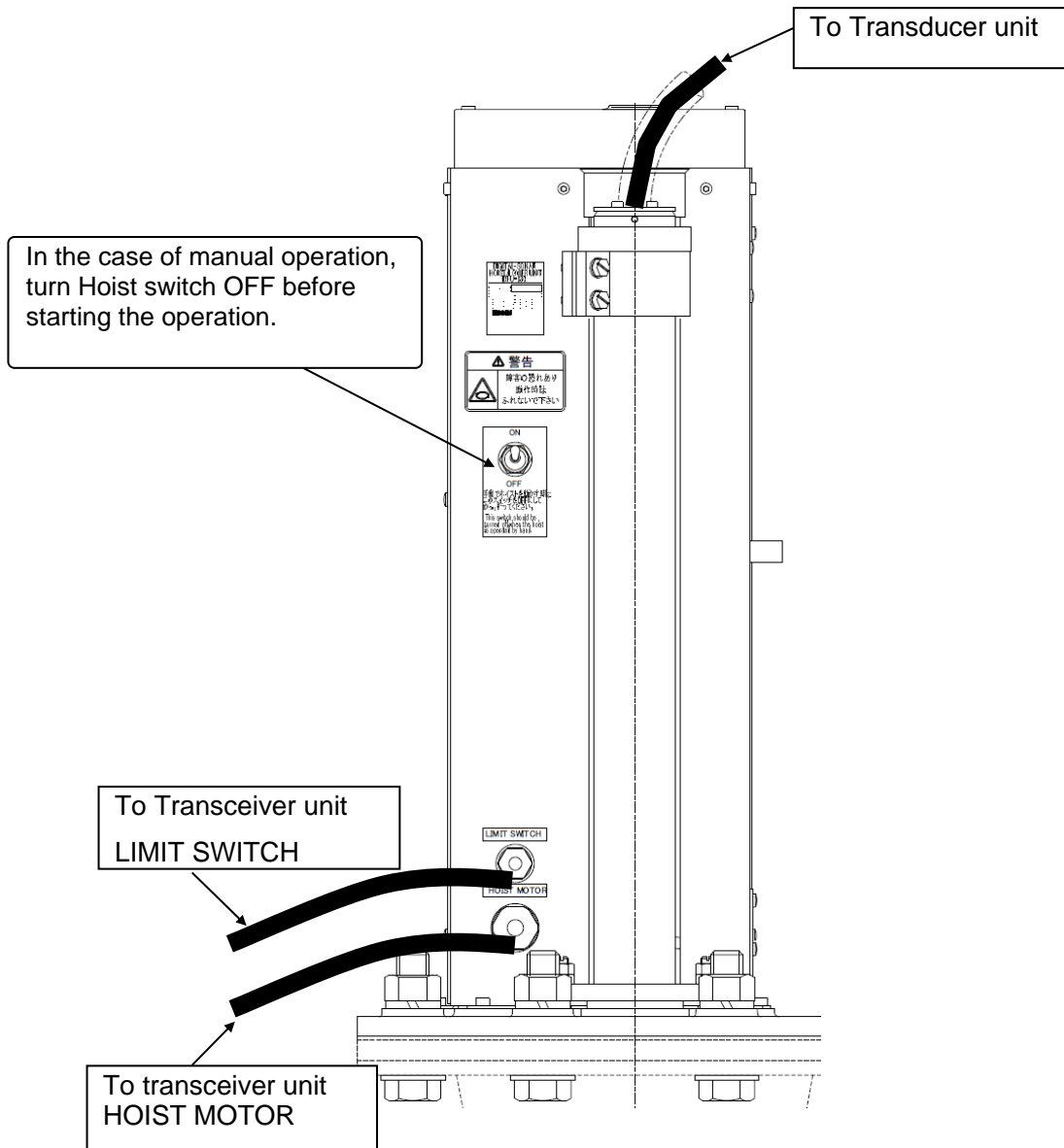
After completion of connection, please confirm that a voltage between the Flange of the Hull unit and the ship's ground does not exceed 0.65V.

When the voltage is high, connect with a thicker power cable to reduce the voltage under the specified value.

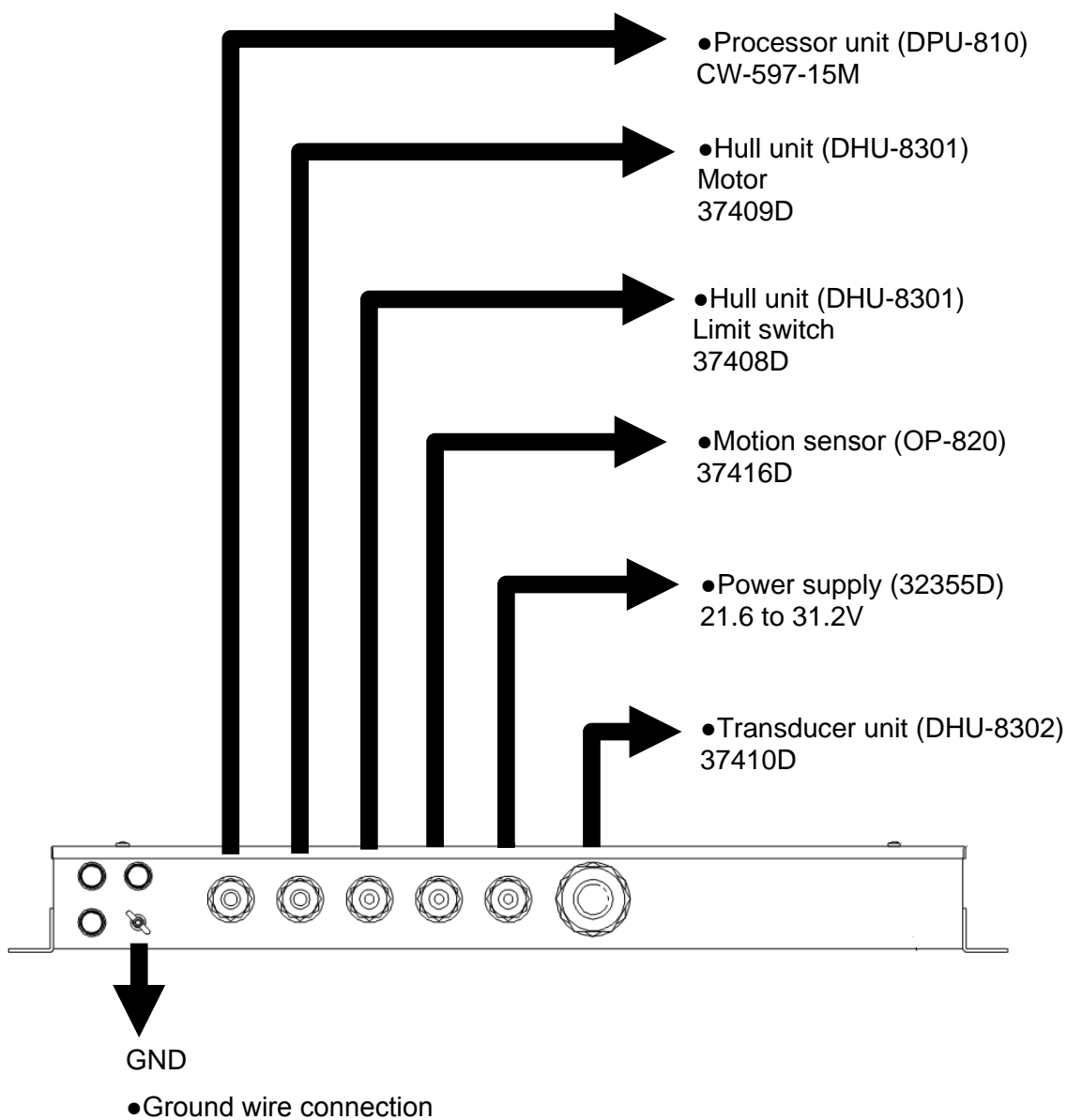
If the voltage remains high, Transducer unit may be damaged due to electric corrosion.
- Be sure to plug and unplug the cables by holding the connector part with hands after turning off the power source. If the cables are plugged or unplugged by holding it directly with hands, the cables may be damaged 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-8301)

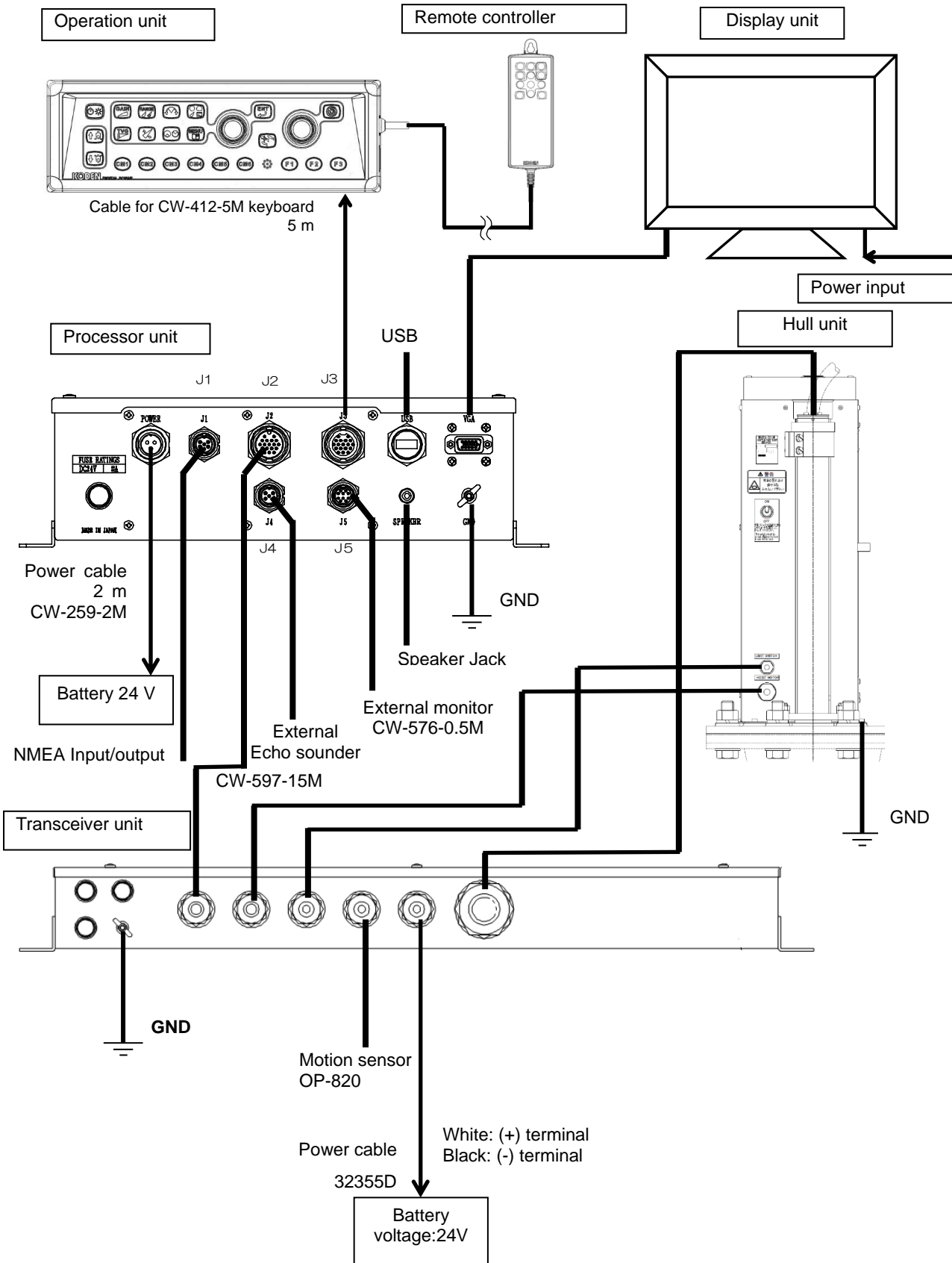
In the case of manual operation, turn Hoist switch OFF before starting the operation.



Connection of a Transceiver unit (DHU-8303)

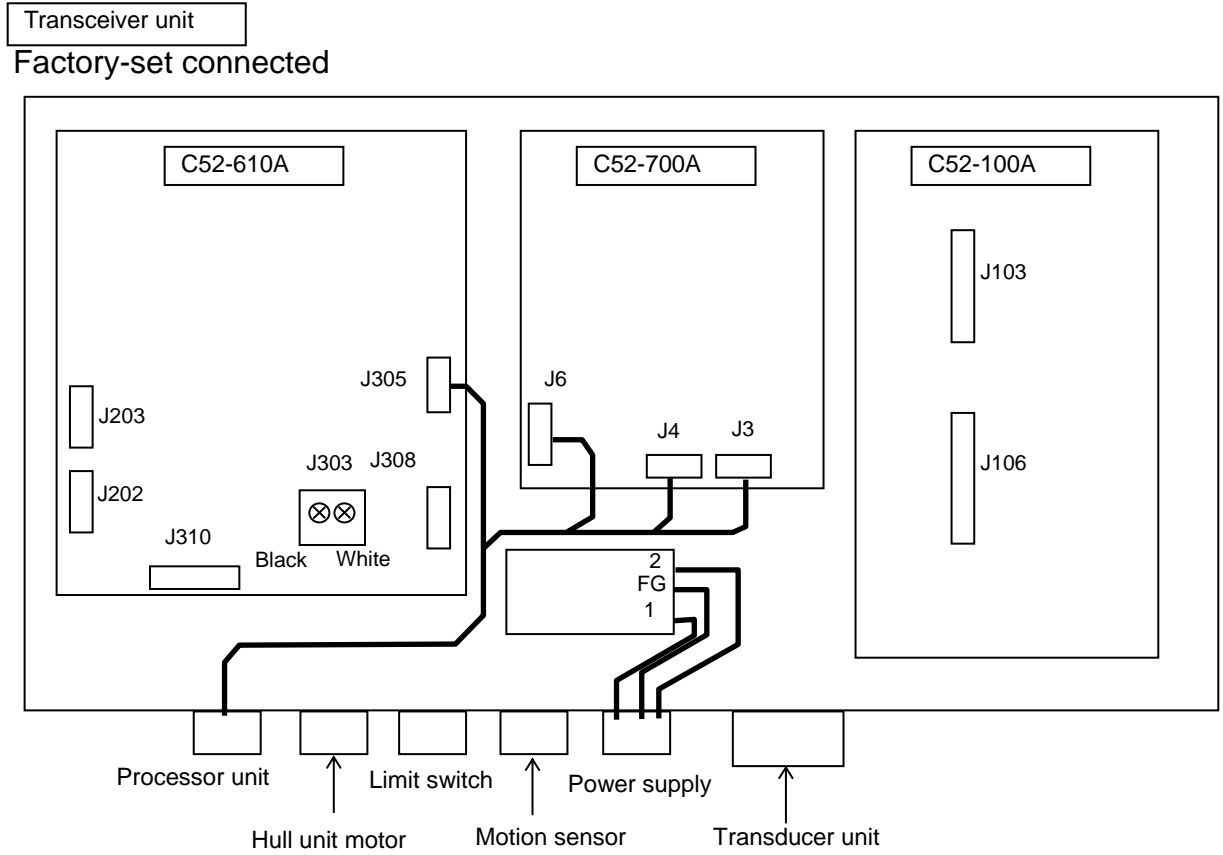


General connection

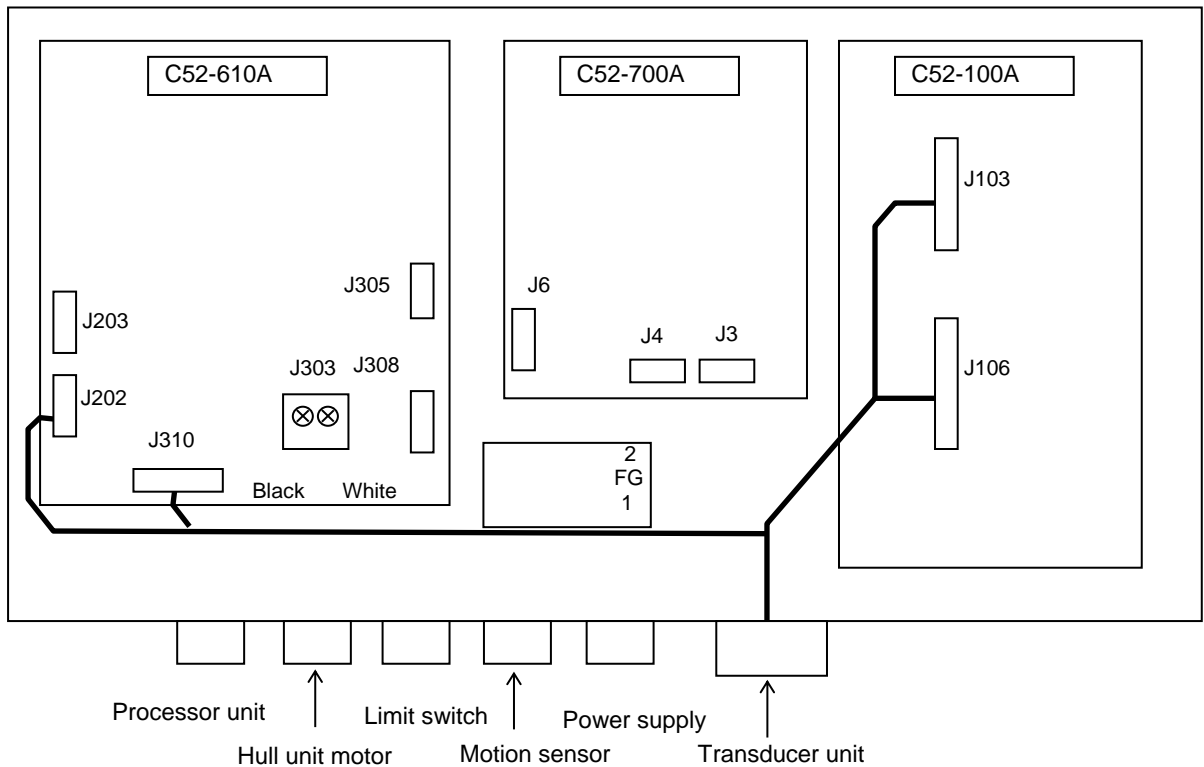


Transceiver unit Connection of internal harness

The internal harness of Transceiver unit is connected to the specified connectors according to below diagram.



Connection of Transceiver unit



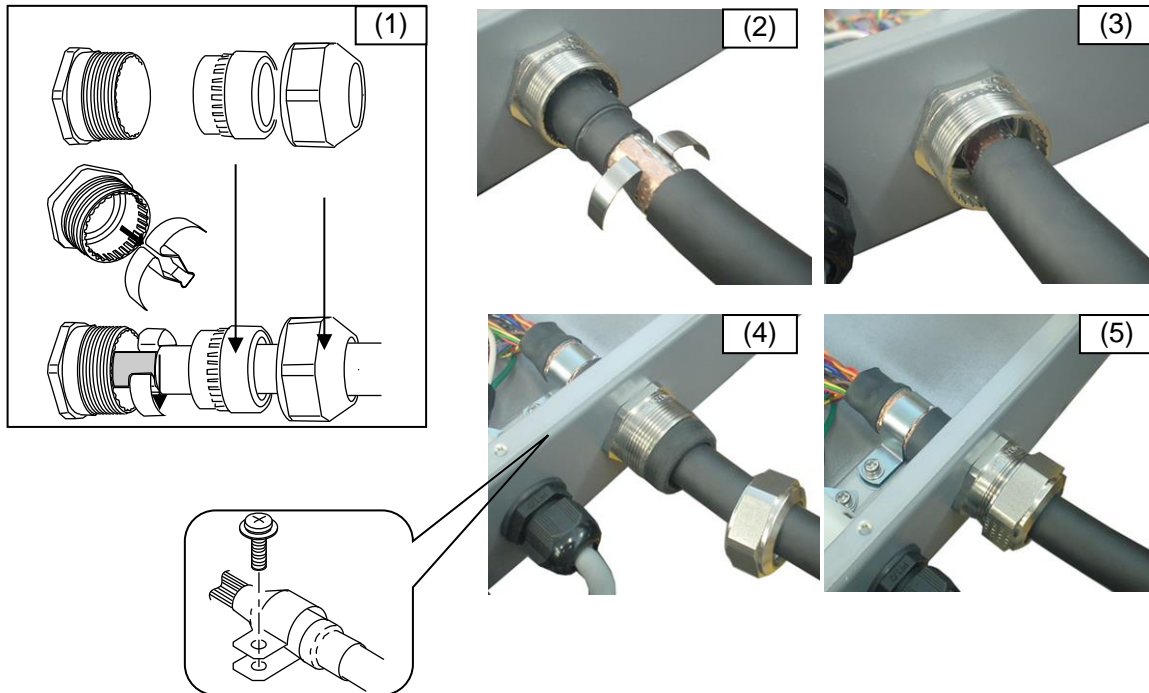


Fig. 1.25 Transducer unit cable connection -1

Attach the ferrite clamp of Transducer unit component (DHU - 8303).

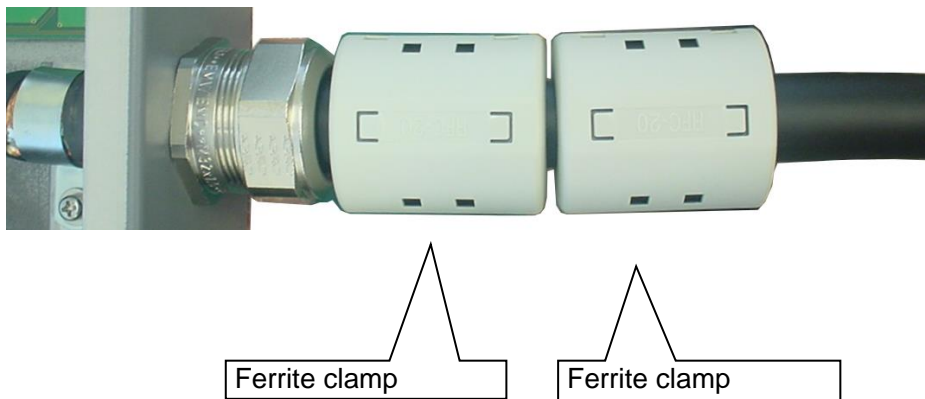
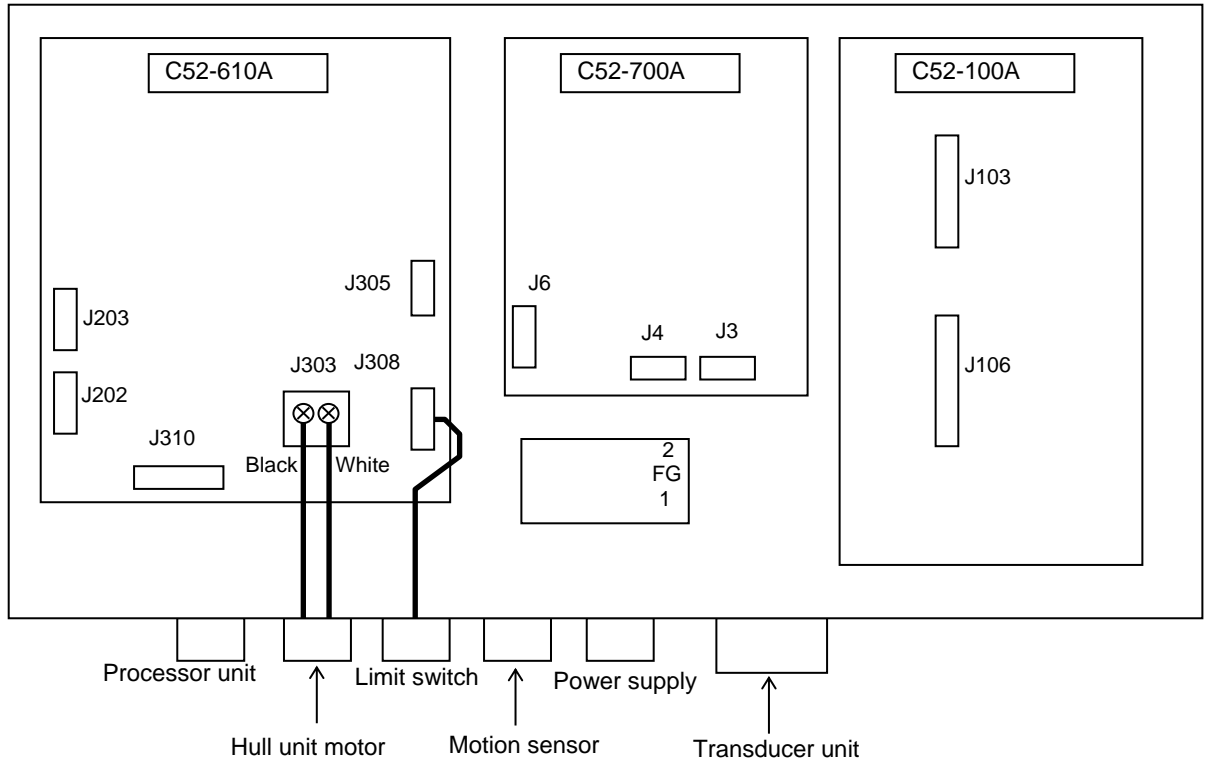
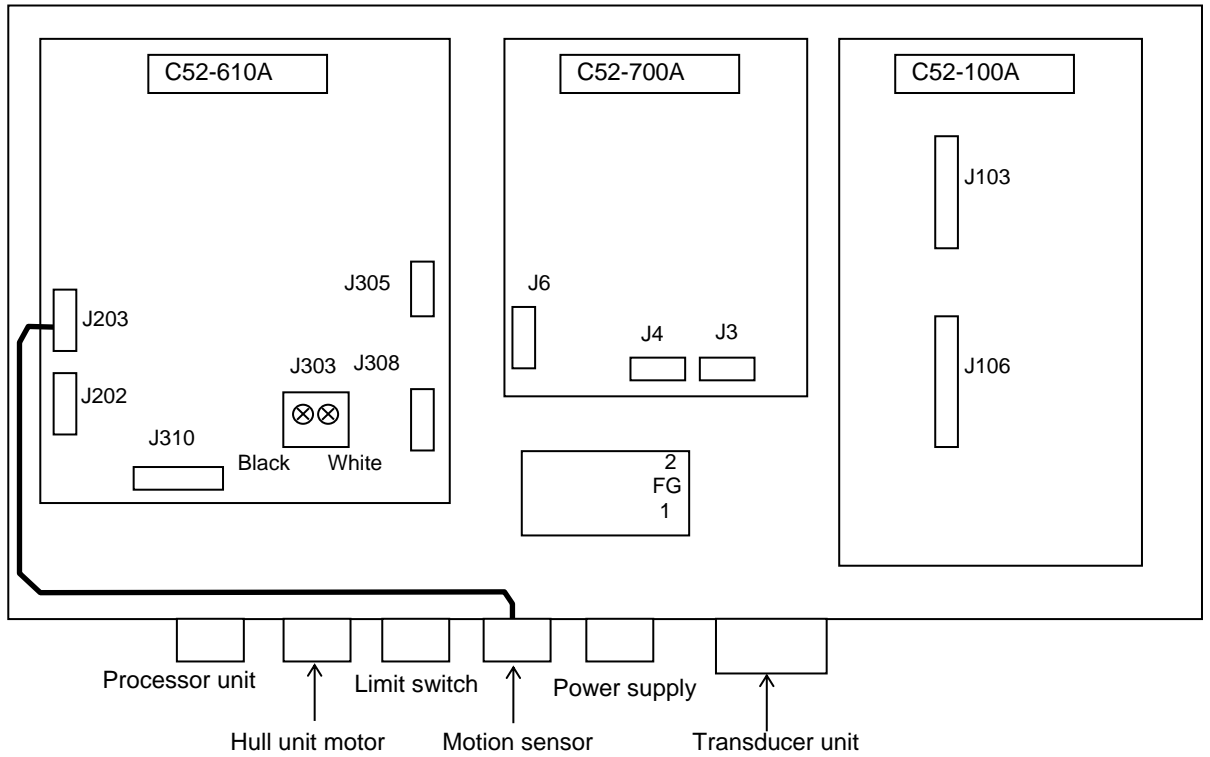


Fig. 1.26 Transducer unit cable connection -2

Connection of Motor and limit switch



Connection of Motion sensor (option)



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.

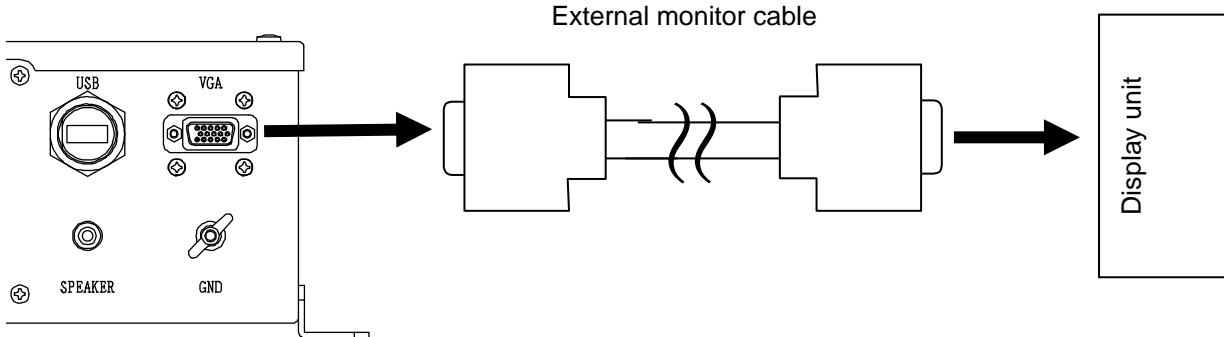


Fig. 1.27 Connection of Display unit

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

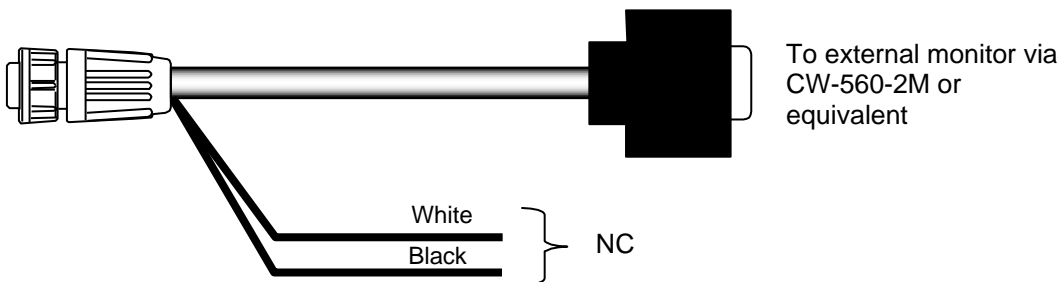


Fig 1.28 Connection of External monitor

Caution: If the display of external monitor suddenly disappears, please attach ferrite core to CW-576-0.5M.

Recommended Ferrite core: GRFC-13 (KITAGAWA)
ESD-SR-250 (Tokin)
ZCAT2132-1130 (TDK)

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.

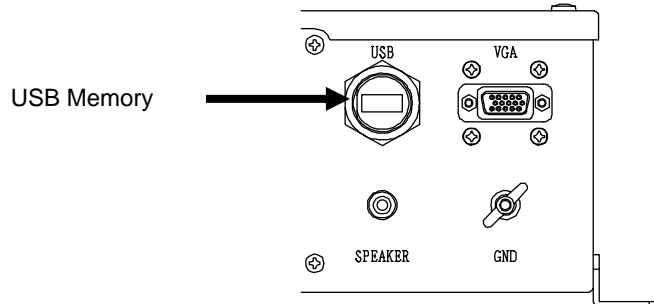


Fig 1.29 Connection of USB memory



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

Connection of External Speaker

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

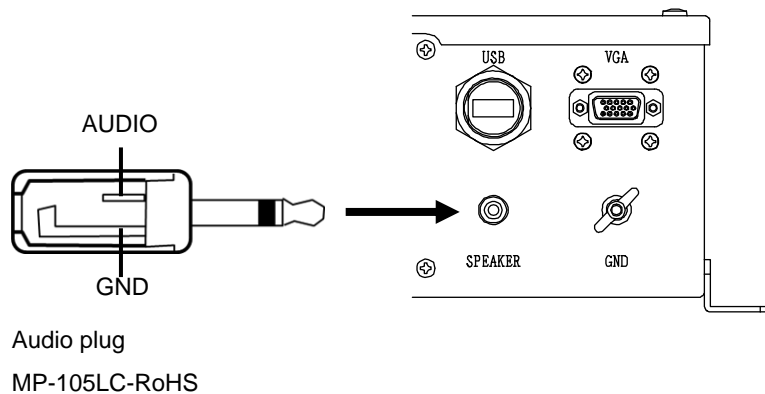



Fig 1.30 Connection of External Speaker


NMEA output setting to external equipment

Setup of baud rate of NMEA1 (J1)

This is to set the baud rate of NMEA1 (J1).

The baud rate should match the externally connected equipment.


1. Press  to be displayed [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 be displayed [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.

1.8 List of input/output sentences

1.8.1 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	THS>HDT>HDG>HDM>VTG>RMC	Time	ZDA>GGA
Speed	VTG>RMC		

1.8.2 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 2 Adjustment



2.1 Setup of frequency of Transducer unit

On KDS-8000BB, the frequencies can be set in a range of 130 to 210 kHz.


2.1.1 Setting of frequency

1. Press  to be displayed [Menu1].
2. Turn  (knob/left) to select [Freq select].

Menu1	
Freq select	130.0
Dynamic range	26 dB
Pulse width	Middle
TX power	Auto
Color rejection	0 %
Noise reduction	0
Color	A-1
Background color	
Image correct	1

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

The setting value will be displayed in red color box.

4. Turn  (knob/left) to select frequency.

Freq select	130.0
-------------	-------

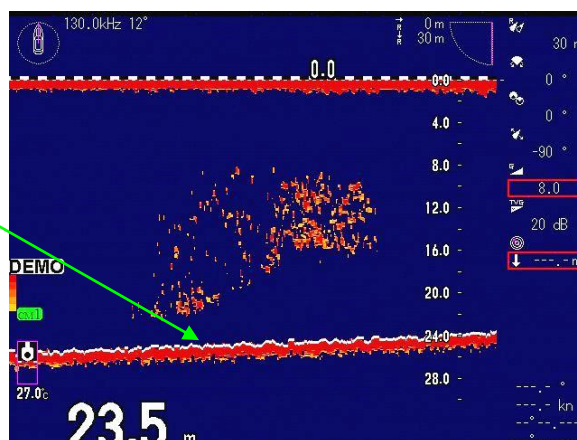
5. Press  to close the menu.

2.2 Setting of gain of Transducer unit

Gain (TD)

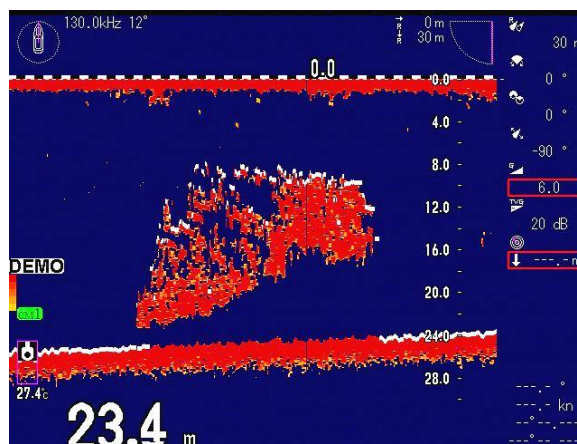
When the bottom cannot be detected or when the bottom is of mud pool or seaweed, [Gain (TD)] shall be turned up. When transfer to fish schools, etc. frequently occurs, [Gain (TD)] shall be turned down.

Adjustment shall be made under conditions where the white line is displayed. To display the white line, select [White line] in [Menu2].





At appropriate Gain (TD), the white line is displayed on the sea bottom.



White line should have the same thickness as the (darkest) color for the strongest signal.



When sensitivity (TD) has increased too much, the white line also moves to fish school.



1. Press  to be displayed [Menu1].
2. Turn  (knob/left) to select [GAIN (TD)].

Menu1	
Dynamic range	26 dB
Pulse width	Middle
TX power	Auto
Color rejection	0 %
Noise reduction	0
Color	A-1
Background color	
Image correct	1
Gain (TD)	0

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

The setting value will be displayed in red color box.


Gain (TD)	0
-----------	---


4. Turn  (knob/left) to select [GAIN (TD) setting value].
5. Press  to close the menu.



2.3 Setup of TX power

The output power of the ultrasonic sound wave may be selected.


2.3.1 Display of TX power menu

1. Press  to be displayed [Menu1]
2. Turn  (knob/left) to select [TX power]

Menu1	
Freq 2 select	130.0
Dynamic range	26 dB
Pulse width	Middle
TX power	Auto
Color rejection	0 %
Noise reduction	0
Color	A-1
Background color	
Image correct	1

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

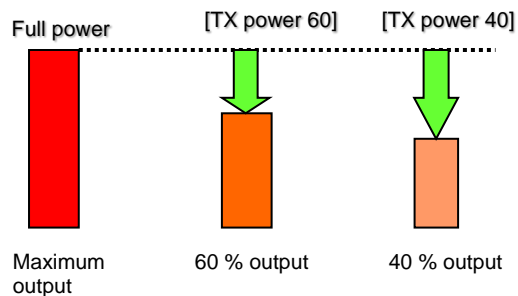
TX power	Auto
----------	------

4. Turn  (knob/left) to select the setting value from [Auto] or [20] to [100]. In crowded fishing areas, this function may be used to reduce power and avoid interference to other fishing boat's sonars and echo sounders.

[100] indicates the maximum power and then gradually reduced by moving from [20] → [30] → [40] → → → [100] that is the minimum power.


5. Press  to close the menu.


* For instance, when the value of [TX power] is 60, actual output is 60% from the original output power.




2.4 Train correct



The bow direction (0°) can be corrected by the use of the bearing center function.

Move to Sonar mode and set the bearing center by pressing  at which the bow direction (0°) to be set.


1. Press  to be displayed [Menu2].


2. Turn  (knob/left) to select [Train correct].

Menu2	
Depth unit	m
Range & Speed unit	NM kn
Temperature unit	°C
Temperature adjustment	0.0
Train correct	0.00
Ext synchronized	Off
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	1


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


Train correct	0.00
---------------	------

4. Turn  (knob/left) to select the setting value from [-180.00] to [180.00].

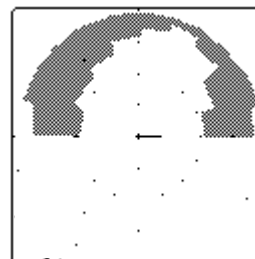
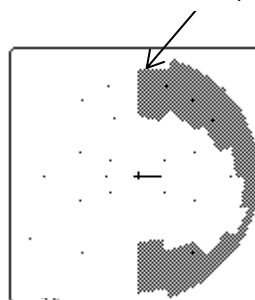
5. Press  to close the menu.

Example: How to correct the bow direction (90° setting)

1. Turn  (knob/left) to select the value of [90.00].

2. Press  to close the menu.

Bow direction (0°)




The display is turned by 90° counterclockwise.

2.5 Stabilizer



The stabilizer function reduces the disturbance of sonar display caused by the pitch and roll of the vessel.

To use [Stabilizer] function, the connection with an optional Motion sensor (OP-820) is necessary.


1. Press  to be displayed [Menu3].

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

Menu3	
Menu (transparent)	15
Message (transparent)	10
Sub-screen (transparent)	0
Information display	Lat / long
Localtime offset	9.0
Dynamic range standard	Top
The origin detection	On
Stabilizer	Off
Screen	XGA

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

Stabilizer	Off
------------	------------

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

[On]: Enable the stabilizer function.

[Off]: Disable the stabilizer function.

5. Press  to close the menu.



Caution: Install the Motion sensor according to 1.6.6 Motion sensor. When installed according to the above procedure, set pitching and rolling to 0.

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.

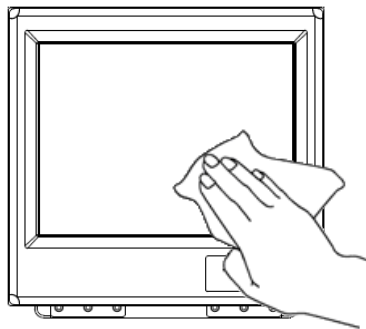
Item	Inspection item
Connectors at the rear of the Display unit, Hull unit and Processor unit	Check the looseness
Wiring of cables	Check the wiring of cables connecting the equipment and the damage of cable
Grounding of Display unit, Hull unit and Processor unit.	Scrape the rust off the ground terminal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



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. One fuse is located in Processor unit and three fuses are located in Transceiver unit. Please replace with the fuse listed in the list of standard components.

3.4 Diagnostics of troubles

In this section, simple procedures to find out troubles are mentioned to locate the troubles on boat.


3.4.1 Necessary information for requesting repair

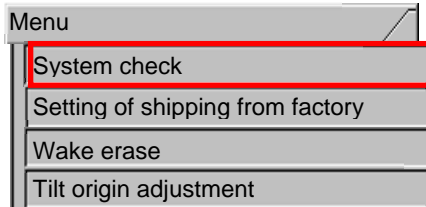
Please inform of the following points:

- (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) "Version number. of system software" 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.





3.4.2 System check

The system can be checked by maintenance menu.

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



Tilt origin adjustment

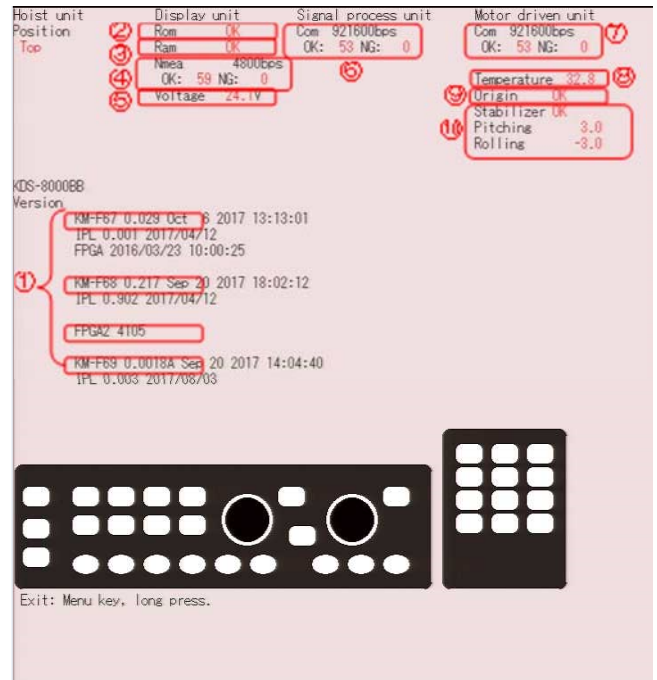
2. Turn  (knob/left) to select [System check].
3. Press  or .
4. Turn  and select [Execute] to conduct system check or [Cancel] not to conduct system check.



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-8000BB program version
KM-F67, FPGA,
KM-F68, FPGA,
KM-F69
- ② ROM check
- ③ RAM check
- ④ NMEA I/O output: Loop check
- ⑤ Voltage check: 21.6 to 31.2 V
- ⑥ Communication status between F67 and F68
At normal: Count of OK
At abnormal: NG counts
- ⑦ Communication status between F67 and F69
At normal: Count of OK
At abnormal: NG counts
- ⑧ Water temperature: $\pm 2^{\circ}\text{C}$
Value of temperature
- ⑨ Origin (Condition of origin detection)


At normal: OK

At abnormal: NG

⑩ Stabilizer test








At normal: OK

At abnormal: NG

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

3.4.3 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.



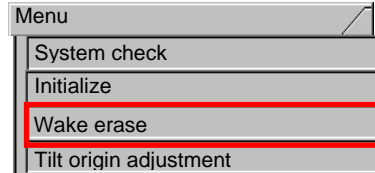
When [Cancel] is selected, the screen returns to the maintenance menu.

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

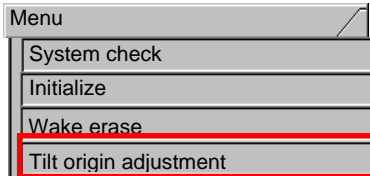
3.4.4 Other maintenance menu

Other maintenance menus are as follows:

1. Wake erase



2. Tilt origin adjustment



3.4.5 Update of programs

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

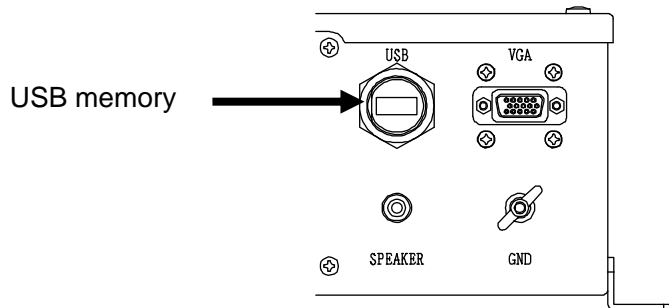
The items to be prepared:

- *Software:
F67VXXXX.bin, F68VXXXX.bin, F681XXXX.bin, F69VXXXX.bin
- Media: USB memory

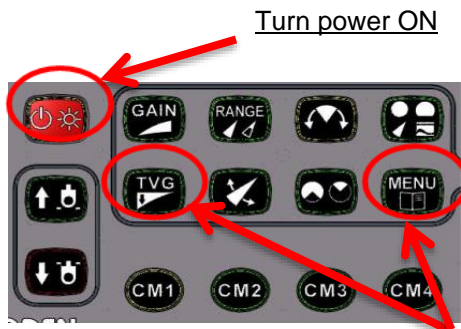
*Prepare the necessary files for the software.

The following description is in case of F67VXXXX.bin.

1. Store the F67VXXXX.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-8000BB Processor unit (DPU-810).
(Do not use a USB Hub because it may lead to failures.)

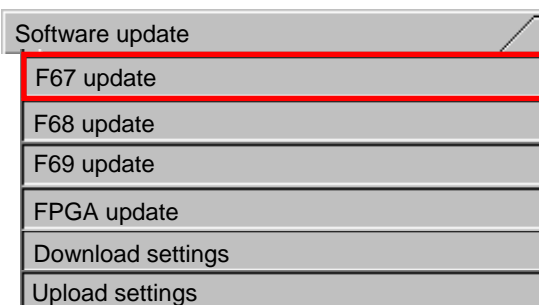


3. Turn power ON with [MENU] and [TVG] keys pressed simultaneously.



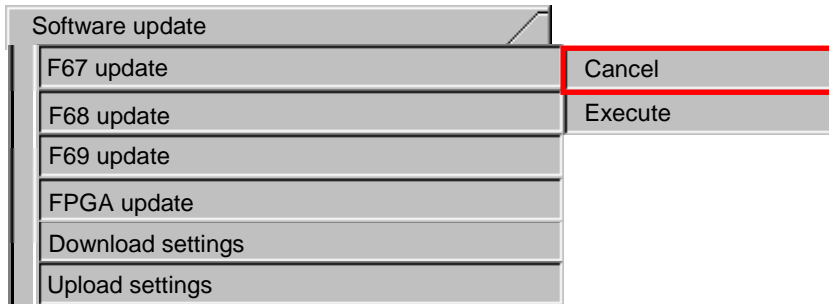
with [MENU] and [TVG] keys pressed simultaneously.


4. The following menu appears:

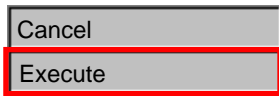


5. Select [F67 update] and press  .

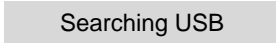
6. The following screen is displayed.



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.

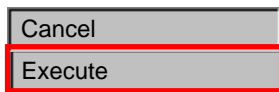
9. If a file is found, the selected item is displayed.



10. Select the file to be updated and press  .



11. Select [Execute] and press  .





Update starts. Please wait for a while.



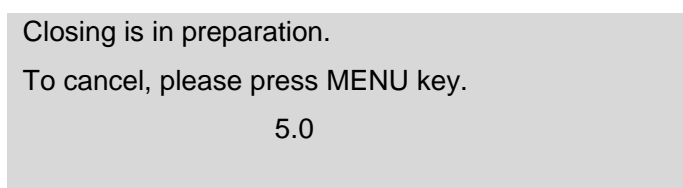
12. When update is successful, the following display appears.



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.**

14. For other functions

Down load settings	The set values of KDS-8000BB is read into a USB. They are stored in the file named “ F67SET00.SAV”.
Upload settings	The set values stored by “Read-out of the set values” are reflected in KDS-8000BB main body. The files of F67XXXXX.SAV are searched through USB route folder. Plural files can be selected by renaming of F67SET00.SAV files. XXXXX is arbitrary alphabets or numerical figures.
From SD to USB	The files in particular folders of the internal *SD card are downloaded to a USB. Particular folders (¥DEMO, ¥SYSTEM) *SD card is owner supply.
From USB to SD	The files in particular folders of the USB are uploaded into the internal *SD card. Particular folders (¥DEMO, ¥SYSTEM) *SD card is owner supply.

3.5 If you suspect a trouble

Symptom	Possible cause of failure	Measure
Power is on, but nothing is displayed.	<ul style="list-style-type: none"> ▪ Fuse is melted down. ▪ Power voltage is outside of the specified range (21.6 to 31.2 VDC). ▪ The connection between a power cable and battery is faulty. 	<ul style="list-style-type: none"> ▪ Replace the fuses. (Refer to “3.3 Fuse replacement”) ▪ Use power source within the specified range. ▪ Check the connection between the power supply cable and the battery.
Starting up, but nothing is displayed.	<ul style="list-style-type: none"> ▪ The connections to a monitor unit, Processor unit and Hull unit are faulty. ▪ The LCD on a monitor unit is faulty. 	<ul style="list-style-type: none"> ▪ Check the connections to the monitor unit, Processor unit and Hull unit. ▪ Please report to the selling agent or a sales office.
Interference and noise are severe.	<ul style="list-style-type: none"> ▪ The Transducer unit system is faulty. ▪ Interference from echo sounders on other ships 	<ul style="list-style-type: none"> ▪ Check the installation of the Transducer unit, etc. (Refer to “1.5 Installation of Hull unit”) ▪ Implement interference elimination.
Displays of water temperature and ship's speed are abnormal or they are not displayed.	<ul style="list-style-type: none"> ▪ The connections at connectors of a Transducer unit are faulty. ▪ The input sources of water temperature and ship's speed are abnormal. 	<ul style="list-style-type: none"> ▪ Check the connection to the connector of the Transducer unit. ▪ Check the input source.
Display of the present position and the course is abnormal or they are not displayed.	<ul style="list-style-type: none"> ▪ The connection between this equipment and the navigation equipment is faulty. 	<ul style="list-style-type: none"> ▪ Check the connection between this equipment and the navigation equipment.



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