FURUNO

Installation Manual
COLOR SCANNING SONAR CSH-8L

FURUNO ELECTRIC CO., LTD.

www.furuno.com

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The paper used in this manual
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SAFETY INSTRUCTIONS

The user and installer must read the appropriate safety instructions before attempting to install or operate the equipment.

DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Warning, Caution Prohibitive Action Mandatory Action

WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment unless totally familiar with electrical circuits and service manual.

Only qualified personnel should work inside the equipment.

Turn off the power at the switchboard before beginning the installation.

Fire or electrical shock can result if the power is left on.

Do not install the equipment where it may get wet from rain or water splash.

Water in the equipment can result in fire, electrical shock or equipment damage.

Be sure no water leaks in at the transducer installation site.

Water leakage can sink the vessel. Also confirm that the transducer will not loosen by ship's vibration. The installer of the equipment is solely responsible for the proper installation of the equipment. FURUNO will assume no responsibility for any damage associated with improper installation.

WARNING

Install the specified transducer tank in accordance with the installation instructions. If a different tank is to be installed the shipyard is solely responsible for its installation, and it should be installed so the hull will not be damaged if the tank strikes an object.

The tank or hull may be damaged if the tank strikes an object.

When assembling the hull unit, fasten the shaft retainer and fastening band with the torques shown below.

Shaft retainer: 20 to 25 N•m
Jubilee clip: 6 to 8 N•m

If torques are less than the above, water leakage may occur because the shaft may loosen and fall.

⚠ CAUTION

Turn off the POWER switch on the hull unit before using the hand crank.

Bodily injury can result if the hand crank rotates unexpectedly, because the raise/lower motor may start up.

Observe the following compass safe distances to prevent interference to a magnetic compass:

	Standard compass	Steering compass
Processor unit	0.4 m	0.3 m
Control unit	0.3 m	0.3 m
Transceiver unit	1.4 m	1.05 m
DC-AC inverter	1.4 m	0.9 m

Observing the following speed limits when testing the equipment at sea trial:

Raising/lowering transducer: 16 kts max.
Transducer completely lowered: 18 kts max.

Exceeding above limits will damage the equipment and void the warranty.

The zinc block near the transducer must be replaced yeary.

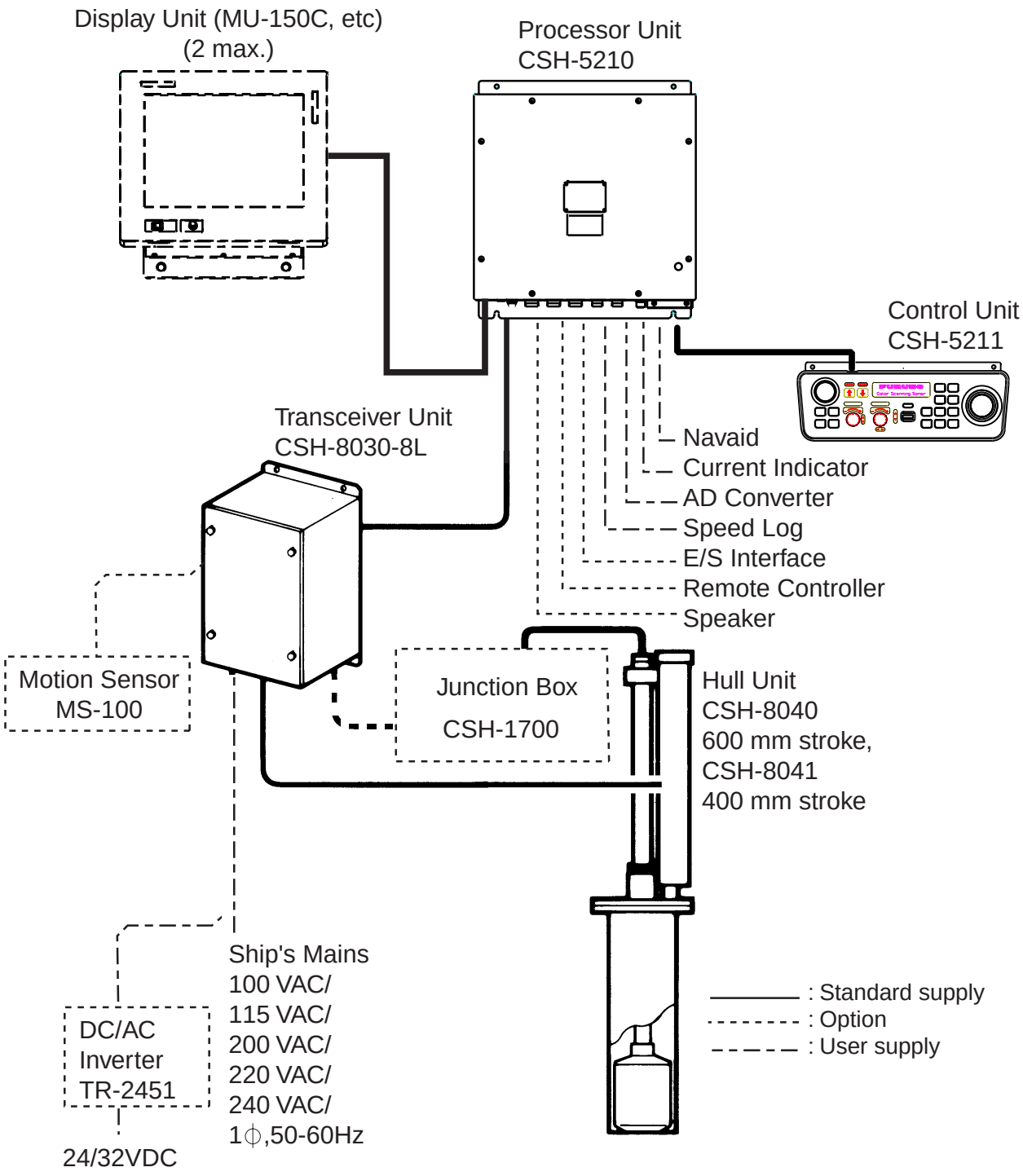
The junction between the transducer and main shaft may corrode, which can result in loss of the transducer or water leakage inside the ship. Replace the zinc block yeary.

⚠ CAUTION

Attach protection earth securely to the ship's body.

The protection earth is required to the transceiver unit and DC-AC inverter (option) to prevent electrical shock.

SYSTEM CONFIGURATION



EQUIPMENT LISTS

Standard Supply

Name	Type	Code No.	Qty	Remarks
Processor Unit	CSH-5210	-	1 set	
Control Unit	CSH-5211	-	1 set	
Transceiver Unit	CSH-8030-8L	-	1 set	
Hull Unit	CSH-8040	-	1 set	600 stroke
	CSH-8041	-		400 stroke
Installation Materials	CP10-05201	006-910-940	1 set	For processor unit
	CP10-05501	006-911-000	1 set	For transceiver unit
Installation Materials	Combinations of the cable are shown below.			
Accessories	FP10-02701	006-905-030	1 set	For control unit
Spare Parts	SP10-02901	006-907-700	1 set	For processor unit
	SP10-03001	006-910-950	1 set	For transceiver unit

Installation materials (Cable combination)

Type	Code No.	Transceiver/ Hull units	Processor/ transceiver units	Monitor/processor units
CP10-05500	000-069-281	S10-15-5	S10-6-15	3COX-2P-6C 5 m
CP10-05510	000-069-282		S10-6-30	
CP10-05520	000-069-283		S10-6-50	
CP10-05530	000-069-284	S10-15-10	S10-6-15	
CP10-05540	000-069-285		S10-6-30	
CP10-05550	000-069-286		S10-6-50	
CP10-05600	000-069-287	S10-15-5	S10-6-15	3COX-2P-6C 10 m
CP10-05610	000-069-288		S10-6-30	
CP10-05620	000-069-289		S10-6-50	
CP10-05630	000-069-290	S10-15-10	S10-6-15	
CP10-05640	000-069-291		S10-6-30	
CP10-05650	000-069-339		S10-6-50	

Name	Type	Code No.	Qty	Remarks	
HULL cable	S10-15-5	006-800-510	1	5 m	Between transceiver and hull units
	S10-15-10	006-800-520		10 m	
Processor cable	S10-6-15	006-976-580	1	15 m	Between processor and transceiver units
	S10-6-30	006-976-590		30 m	
	S10-6-50	006-976-600		50 m	
Display cable	3COX-2P-6C 5 m	000-146-500	1	5 m	Between display and processor units
	COX-2P-6C 10 m	000-146-501		10 m	

How to select transducer unit combinations

CSH – 8030 - 8L - [(1)] – [(2)]

(1): Input voltage 60 (100 VAC), 72 (220 VAC)
(2): Frequency 107 kHz, 85 kHz

How to select hull unit combination

CSH - [(1)] – [(2)] – [(3)] – [(4)]

(1): Stroke 8040 (600 mm), 8041 (400 mm)
(2): Frequency 107 kHz, 85 kHz
(3): Tank N; No tank, S; Steel, F; FRP
(4): Shaft length 13 (1300 mm), 15 (1500 mm), 23 (2350 mm), 40 (4065 mm), 94 (945 mm)

Optional Supply

Name	Type	Code No.	Qty	Remarks
DC-AC Inverter	TR-2451	-	1 set	
E/S Interface Unit	VI-1100A	-	1 set	
Retractable Tank	OP10-5	-	1 set	Made of aluminum
Speaker	SEN-21Q	-	1 set	
Transducer Cable Extension Kit	CSH-1700	000-068-207	1 set	Junction box, cable assy
Motion Sensor	MS-100	-	1 set	
Remote Controller	CSH-7040	-	1 set	
Fairing	06-021-4502	001-159-790-10	1 set	For an FRP ship

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1. MOUNTING

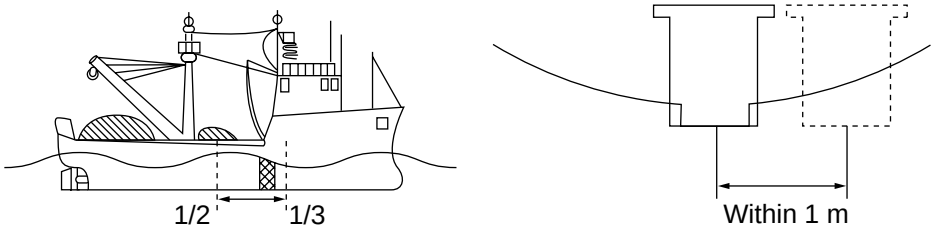
NOTICE
Be sure the power supply matches equipment voltage rating. Improper power supply will damage the equipment.
Locate the transducer where the effects of noise and air bubbles are minimal. Noise and air bubbles will affect performance.
When selecting a mounting location keep the following points in mind: • Keep equipment out of direct sunlight. • Keep equipment away from air conditioner. • Provide sufficient ventilation. • Select locaion where vibration is minimal. • Locate the equipment away from magnets or equipment generating magnetic fields.
Keep the transducer cable away from oil. Oil can corrode the transducer cable.
Do not expose the transducer to hot water. Hot water can damage the transducer.
Do not turn on the equipment with the transducer exposed to air. Exposing the transducer to air may damage it.

1.1 Hull Unit

1.1.1 Mounting location

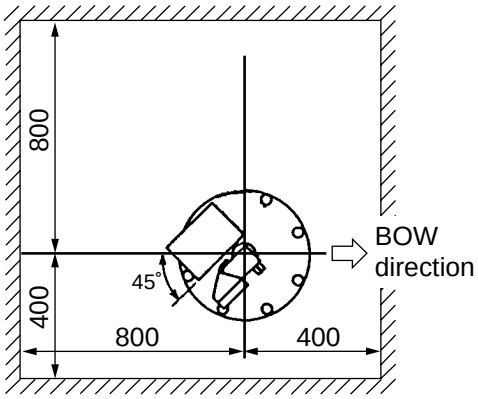
Discussion and agreement are required with the dockyard and ship owner in deciding the location for the hull unit. When deciding the location, take into account the following points:

- Select an area where propeller noise, cruising noise, bubbles and interference from turbulence are minimal. Generally, the point at 1/3 to 1/2 of the ship's length from the bow or near the keel is the best. On-the-keel installation is advantageous for minimizing oil consumption in comparison with off-the-keel. If the hull unit cannot be installed on the keel, the center of the retraction tank should be within 1 meter of the keep to prevent a rolling effect.



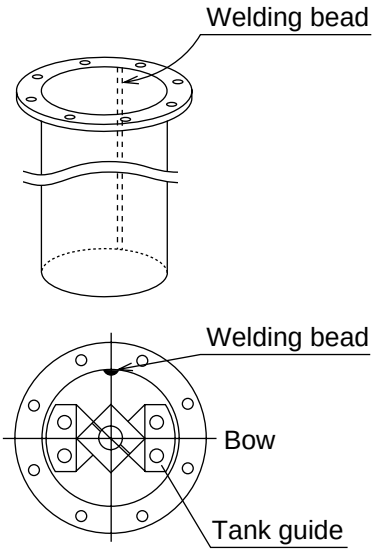
Installation location for hull unit

- Select a place where interference from the transducers of other sounding equipment is minimal. The hull unit should be at least 2.5 meters away from the transducers of other sounding equipment.
- An obstacle in the fore direction not only causes a shadow zone but also aerated water, resulting in poor sonar performance. Be sure to locate the transducer well away from any obstacle in the fore direction.
- The space shown in the illustration below is required around the hull unit for wiring and maintenance. If the transducer is to be operated in ambient temperature below 0°C, the sonar compartment must be provided with a heater to keep the temperature above 0°C.



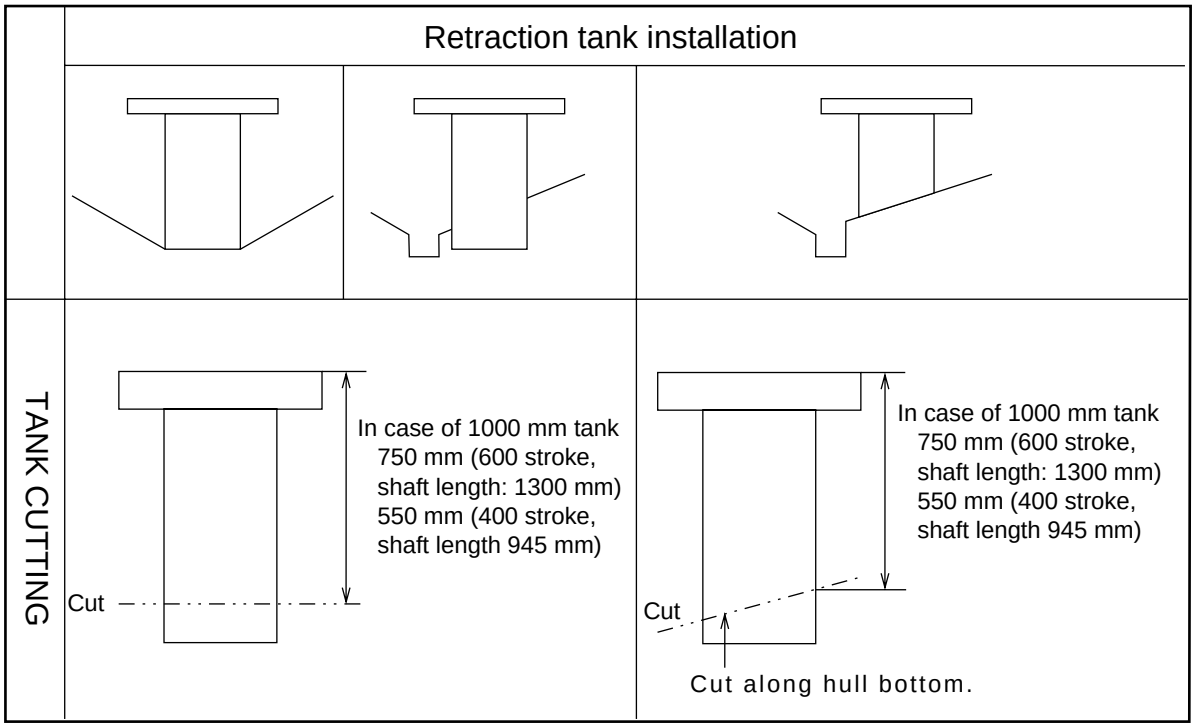
Hull unit maintenance space

When the retraction tank is made locally, finish it so that the welding bead does not protrude on the inner surface of the tank. The tank guide will hit the bead, causing motor born-out. The gap between the tank and tank guid is 1 mm. Also when installing the tank, orient the welding bead so it faces the port or starboard direction.



1.1.2 Installation of the retraction tank

The retraction tank is 1000 mm in length as supplied. Shorten the tank referring to the table below so the transducer fully protrudes beyond the keel when it is lowered. Refer to the installation procedure at the back of this manual for details.



Note: It is not necessary to cut the main shaft when there is enough space above the hull unit.

How to shorten the retraction tank

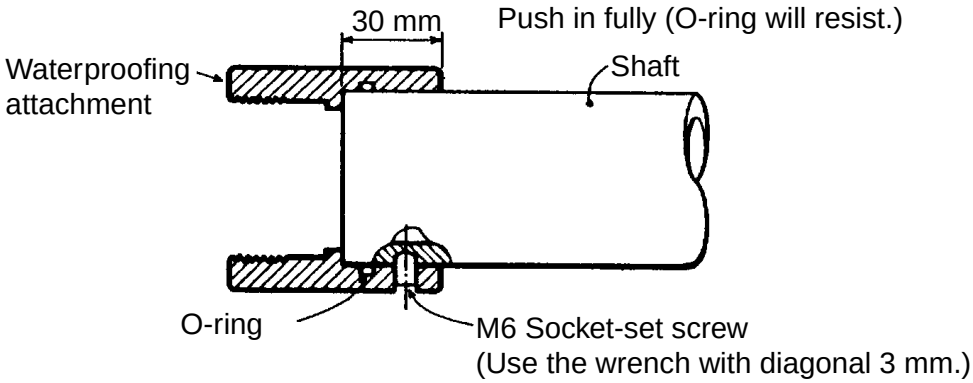
1.1.3 Assembly and installation of the hull unit

The hull unit is shipped disassembled as the parts shown on page 1-11 through 1-13. Assemble the hull unit as follows:

Necessary tools

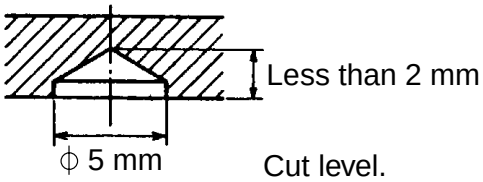
Tool	Rating	Remarks
Wrench	M10 (Diagonal 17 mm)	
Wrench	M10 (Diagonal 30 mm)	
Pipe Wrench	Ø55 mm	For tightening gland
Hex Wrench	M6 (Diagonal 3 mm)	For tightening transducer flange

1. Temporarily install the waterproofing attachment on the top of the main shaft and drill holes for socket-set screws.

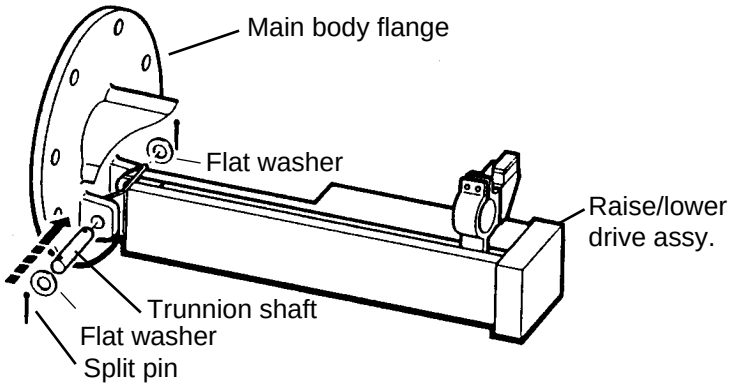


Installation of waterproofing attachment

a) Mark drilling point on the shaft surface by tightening M6 socket-set screws (2 pcs.)
b) Remove the waterproofing attachment.
c) Drill holes less than 2 mm in depth. Use a drill with a Ø5, 120° tip. Do not drill holes through the shaft. Use low rpm drill designed for stainless steel with cutting oil.

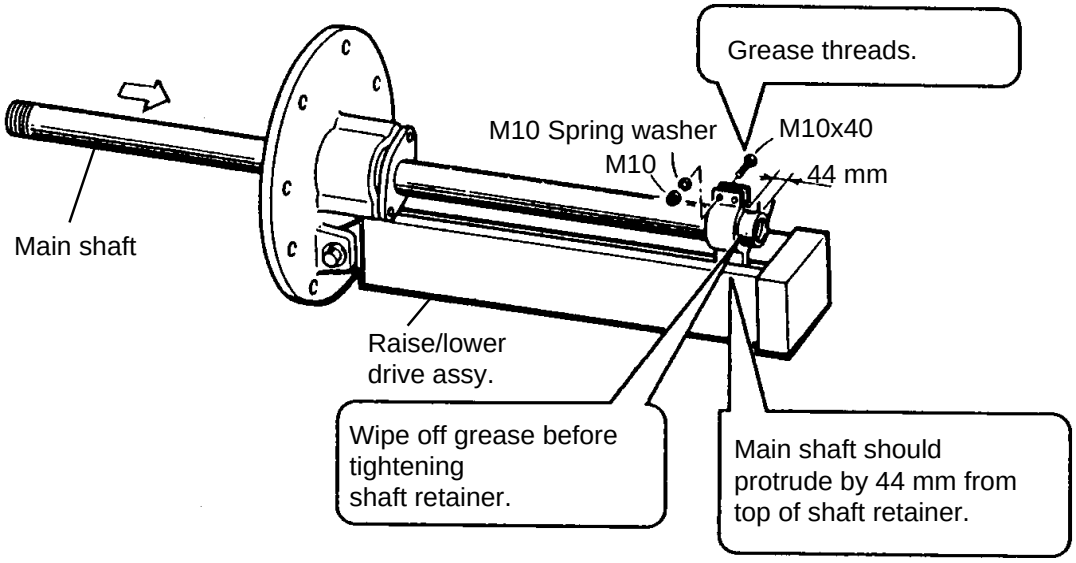


2. Fasten the raise/lower drive assembly to the main body flange with the trunnion shaft.



Passing main shaft through the raise/lower drive assy.

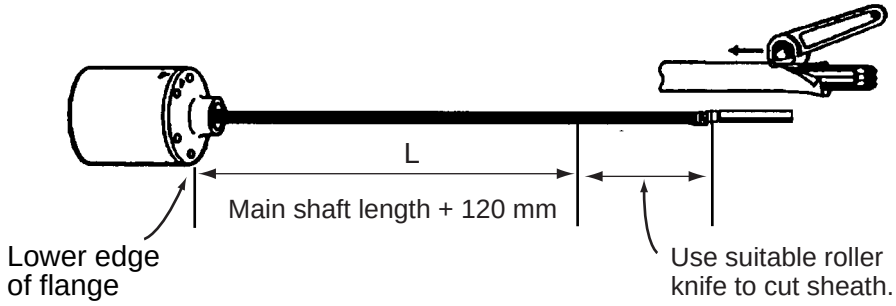
3. Coat the top of the main shaft with a small amount of grease. Pass the main shaft through the main body flange, and fix it temporarily with the shaft retainer. (The shaft retainer should be secure enough to prevent shaft rotation.)



Passing main shaft through the raise/lower drive assy.

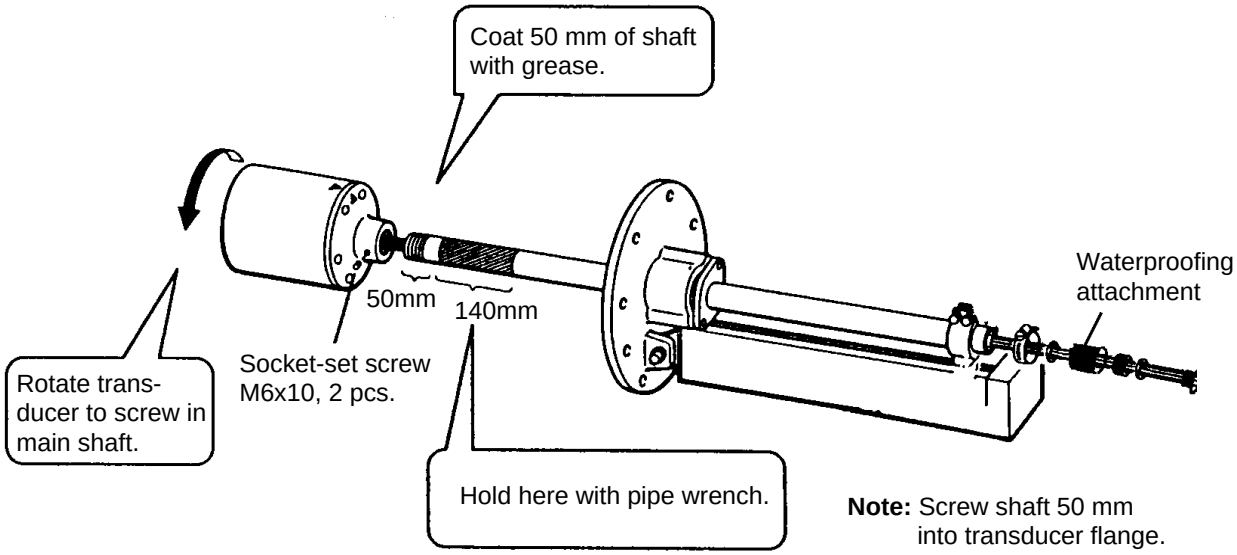
4. Tape the end of the transducer cable with vinyl tape to pass the cable through the main shaft. Remove sheath of transducer cable by the length shown below with roller knife.

   Note: Care should be taken not to damage inner wires when cutting the cable sheath, only paper tape exists between the cable sheath and inner wires.



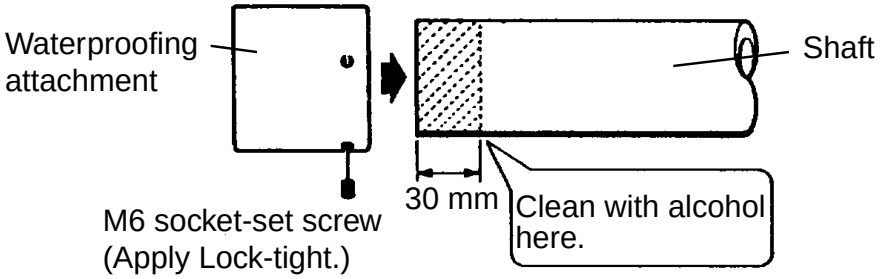
Transducer cable

5. After screwing the transducer into the main shaft, fasten two socket-screws (M6x10, supplied).



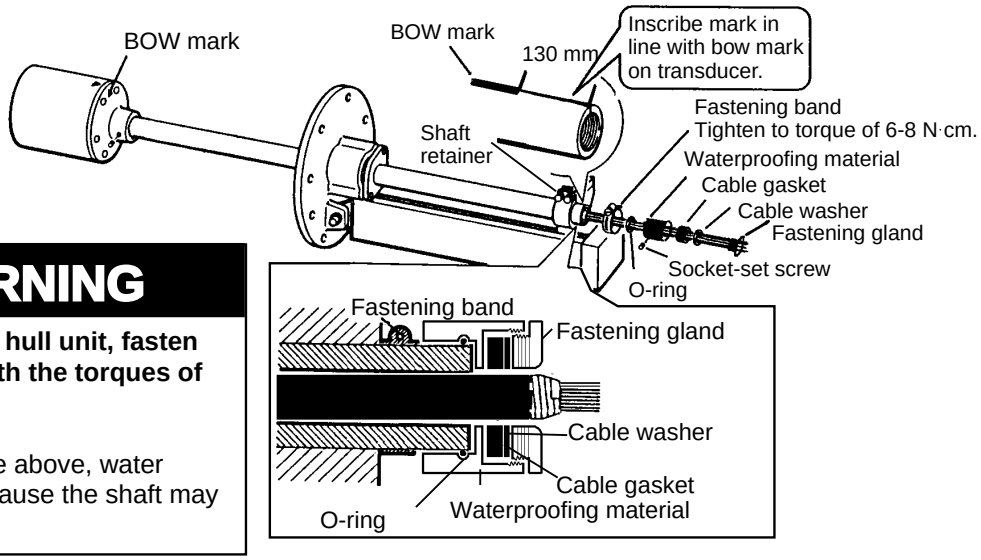
Fastening main shaft to transducer

6. Clean the top of the shaft with alcohol, install the waterproofing attachment and apply Lock-tight (supplied) to the socket screw.



Cleaning the shaft

7. Inscribe bow mark on the top end of the main shaft and install the fastening band, O-ring, waterproofing material, cable gasket, cable washer and fastening gland. Use two socket-set screws (M6x8) to fasten the waterproofing material.



⚠ WARNING

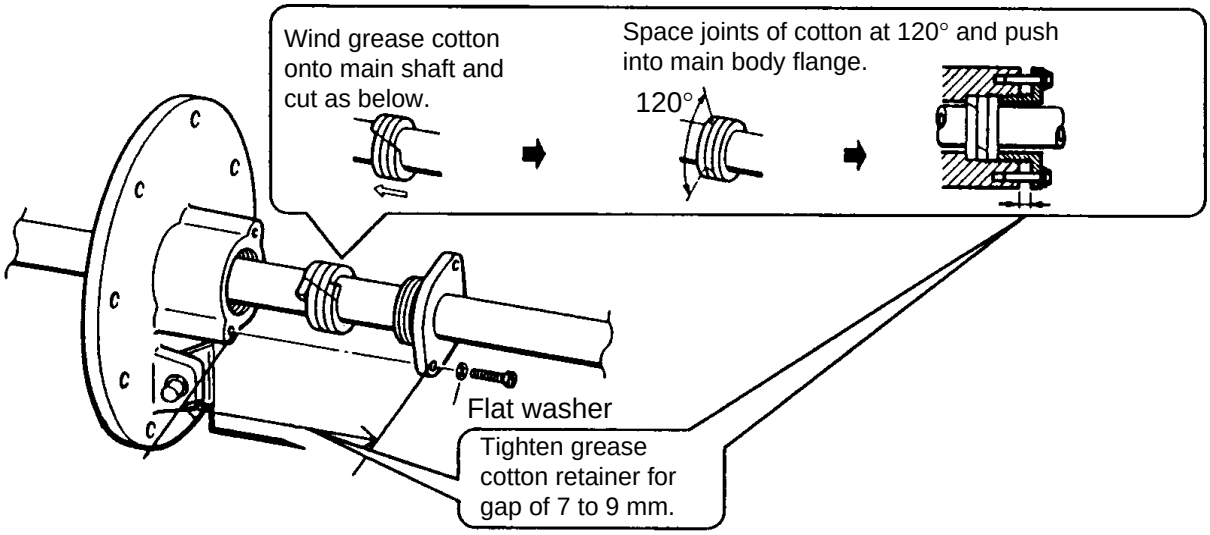
When assembling the hull unit, fasten the fastening band with the torques of 6 to 8 N•m.

If torque is less than the above, water leakage may occur because the shaft may loosen and fall.

Installing fastening band and cable gland

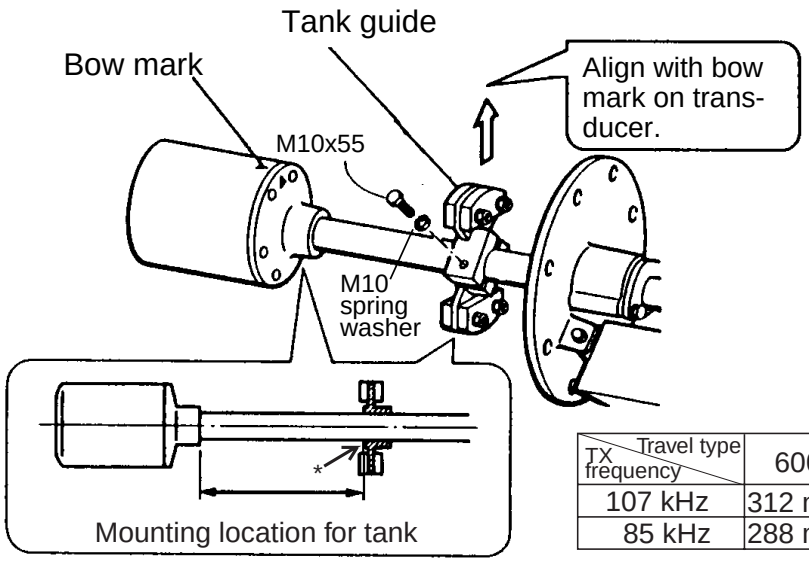
Note: Tighten hex bolts to torque of 3.92 N·m to 4.90 N·m.

8. Install grease cotton on the main body as below.
   a) Wind grease cotton onto main shaft.
   b) Mark on the cotton as below.
   c) Remove the cotton from the shaft, and then cut it at the position of the mark. Discard the ends.
   d) Wind cottons as shown below.
   e) Push cottons into the main body flange.
   f) Tighten the grease cotton retainer.



Setting grease cotton

9. Attach the tank guide.



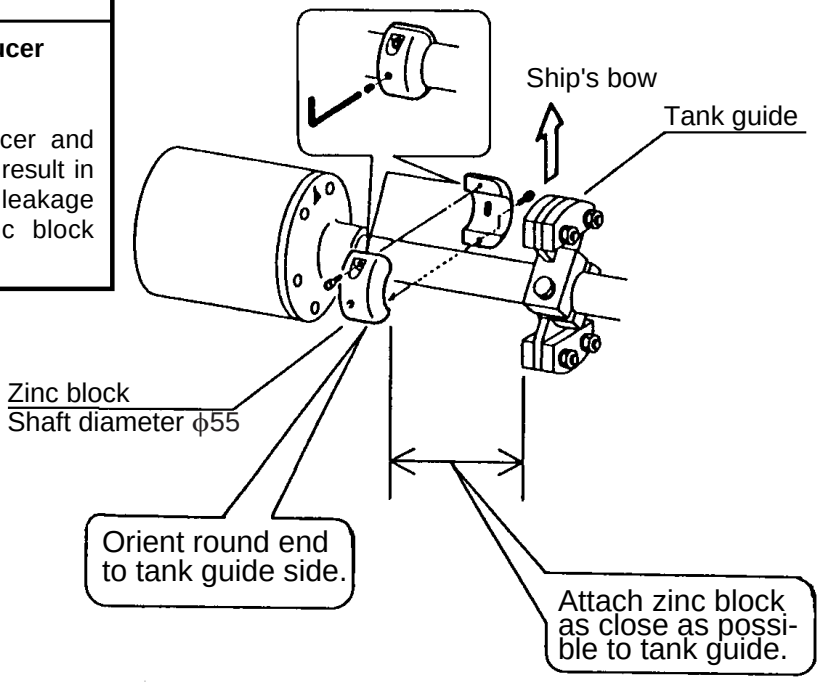
TX frequency \ Travel type	600	400
107 kHz	312 mm	112 mm
85 kHz	288 mm	88 mm

*: Measure between the top of the transducer flange and inner edge of the tank guide.

Installing the tank guide

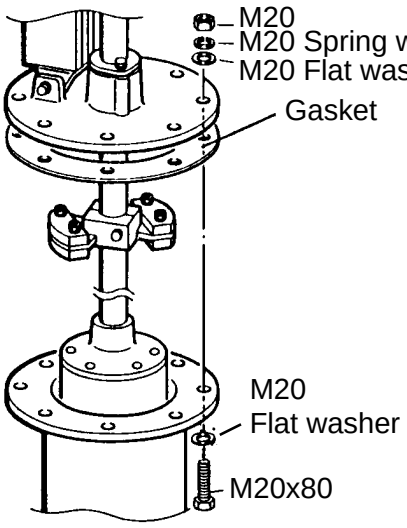
10. Attach zinc block to main shaft.

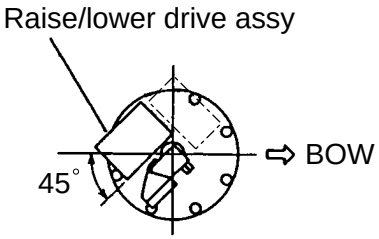
> **⚠ CAUTION**
>
> **The zinc block near the transducer must be replaced yeary.**
>
> The junction between the transducer and main shaft may corrode, which can result in loss of the transducer or water leakage inside the ship. Replace the zinc block yeary.



Attaching zinc block

11. Fasten the hull unit to the retraction tank.



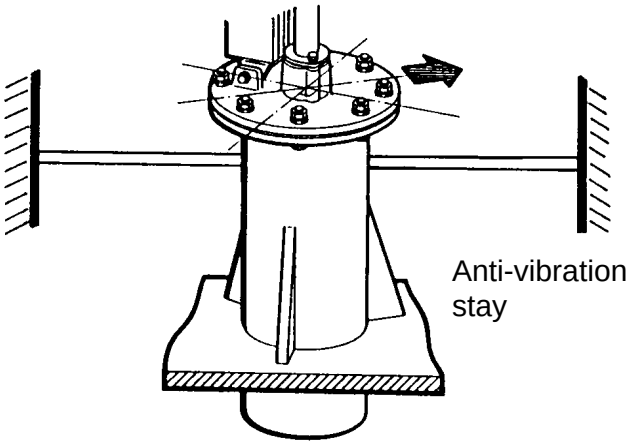


Orient the hull unit as shown. This will reduce shock and vibration, caused by ship's pitching and rolling, at the raise/lower drive assy.

Fastening the hull unit to the retraction tank

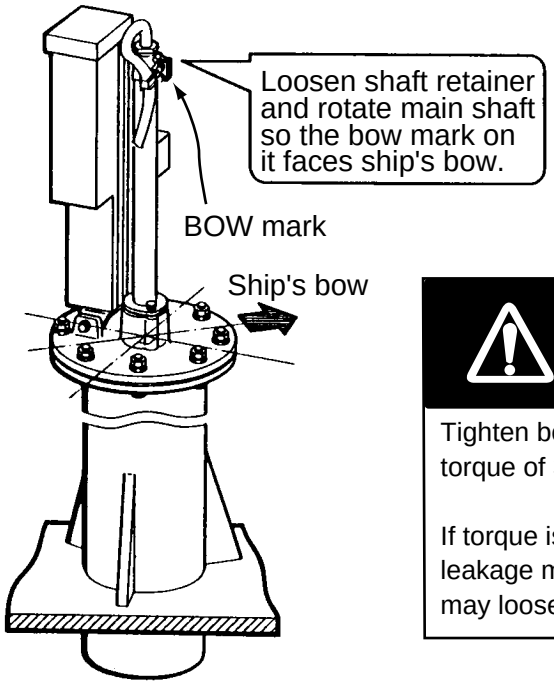
12. Fix anti-vibration stays to the retraction tank.

Anti-vibration stays should be fixed to directions of ship's bow – stern and port – starboard.



Fixing anti-vibration stays to retraction tank

13. Orient the main shaft so that the bow mark faces ship’s bow and fix it securely with the shaft retainer.



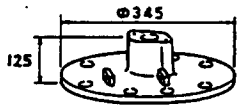
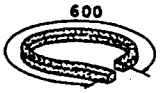
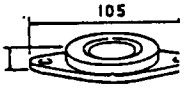
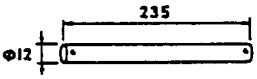
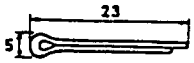
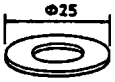
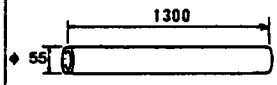
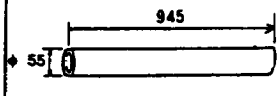
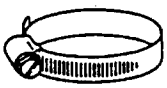
⚠ WARNING

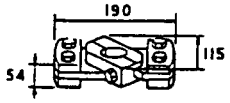
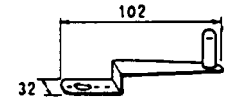
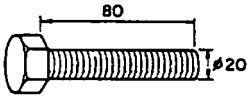
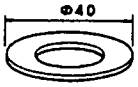
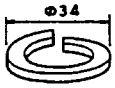
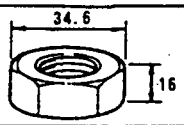
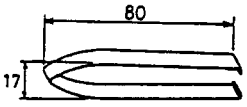
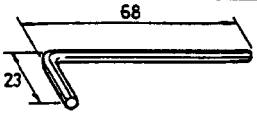
Tighten bolts fixing shaft retainer for torque of 35 to 38 N·m.

If torque is less than the above, water leakage may occur because the shaft may loosen and fall.

Orienting the main shaft

Hull unit shipment lists

番号 No.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	上下動部 RAISE/LOWER DRIVE ASSEMBLY		CODE No.	1	
2	送受波器 TRANSDUCER ASSEMBLY		CODE No.	1	
3	フランジ圧入品 MAIN BODY FLANGE		10-044-2201 CODE No. 100-112-540	1	
4	グリスコットン GREASE COTTON		□9.5 *0.7M* CODE No. 000-801-891	1	
5	グリスコットン押え GREASE COTTON RETAINER		10-044-2204 CODE No. 100-112-572	1	フランジ圧入品に仮止め出荷 Temporarily fitted to main body flange
6	トラニオン軸 TRUNNION SHAFT		10-044-2205 CODE No. 100-112-582	1	同上 Ditto
7	フランジパッキン GASKET		SHJ-0009-1 CODE No. 661-000-091	1	同上 Ditto
8	割りピン SPLIT PIN		3×25 SUS304 CODE No. 000-801-702	2	同上 Ditto
9	ミガキ平座金 FLAT WASHER		M12 SUS304 CODE No. 000-864-132	2	同上 Ditto
10	上下シャフト MAIN SHAFT		10-044-2301 CODE No. 100-112-591	1	600 ストローク用 For 600mm travel
11	上下シャフト MAIN SHAFT		10-044-2305 CODE No. 100-112-630		400 ストローク用 For 400mm travel
12	ジュビリークリップ FASTENING BAND		2×SU304 CODE No. 000-801-924	1	
			CODE No.		

番号 No.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
			CODE No.		
			CODE No.		
13	タンクガイド組品 TANK GUIDE		CODE No. 006-979-160	1	
14	手動ハンドル HAND CRANK		10-044-2411 CODE No. 006-979-150	1	
15	六角ボルト HEX. BOLT		M20×80 SUS304 CODE No. 000-801-893	8	
16	ミガキ平座金 FLAT WASHER		M20 SUS304 CODE No. 000-864-136	16	
17	バネ座金 SPRING WASHER		M20 SUS304 CODE No. 000-864-270	8	
18	六角ナット HEX. NUT		M20 SUS304 CODE No. 000-863-116	8	
19	XH抜き工具 CONNECTOR PULLER		10-044-2431 CODE No. 100-122-480	1	
20	配線バンド CABLE FIXING BAND		HP-18N CODE No. 000-113-838	5	
21	配線バンド CABLE FIXING BAND		HP-5N CODE No. 000-570-003	2	
22	六角レンチ SOCKET SCREW WRENCH		対辺 3mm HEX.SIZE 3mm CODE No. 000-830-131	1	
23	プロペラ用保護亜鉛 ZINK BLOCK		ジクケイφ55mm 000-802-966	1	

No.	NAME	OUTLINE	DESCRIPTIONS		Q'TY	REMARKS
24	WATERPROOFING METAL		10-067-3221-1		1	For waterproofing main shaft
			CODE No.	100-273-901		
25	CABLE GLAND		10-067-3222-1		1	Ditto
			CODE No.	100-273-911		
26	GASKET		10-067-3223-1		1	Ditto
			CODE No.	100-273-920		
27	FALT WASHER		10-067-3224-0		1	Ditto
			CODE No.	100-273-930		
28	O RING		JISB2401-1A-G55		1	Ditto
			CODE No.	000-851-308		
29	SOCKET-SET SCREW		M6X8		1	Ditto
			CODE No.	000-802-032		
30	JUNCTION BOX		10S1982		1	For connection of hull cable
			Code No.	000-808-747		
31	JUNCTION BOX FIXING PLATE		10-067-3103		1	Ditto
			CODE No.	100-272-661		

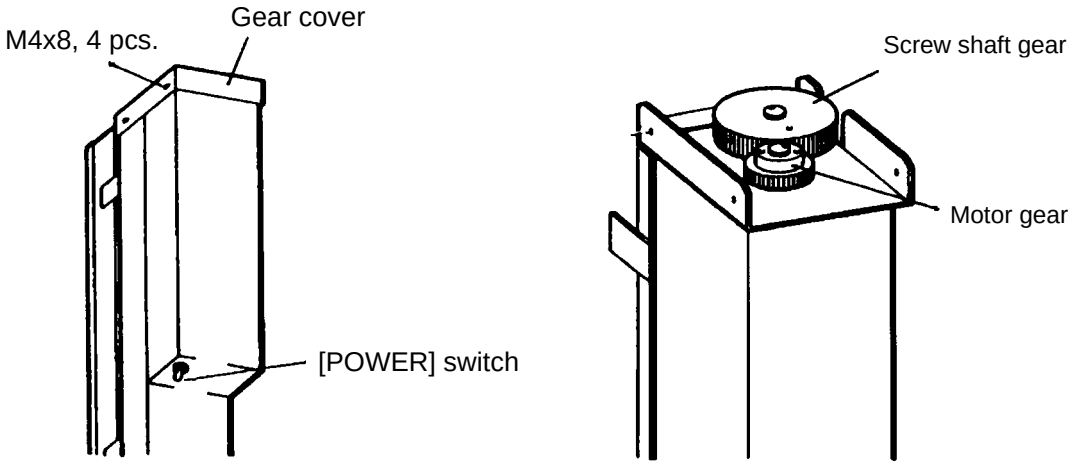
1.1.4 Confirmation of transducer movement

After the hull unit installation, confirm that the transducer moves upward and downward smoothly using the hand crank. The hand crank is attached to the hull unit.

Note: When moving the transducer downward, make sure that there is enough space below the ship's bottom.

> **⚠ CAUTION**
>
> **Turn off the POWER switch on the hull unit before using the hand crank.**
>
> Bodily injury can result if the hand crank rotates unexpectedly, because the raise/lower motor may start up.

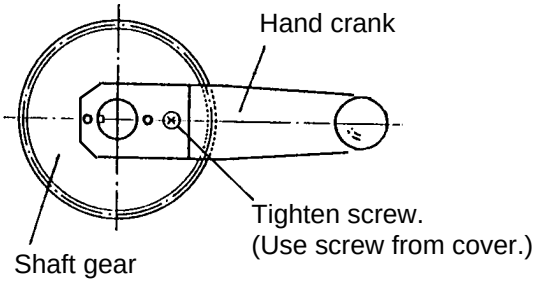
1. Open the gear cover on the hull unit.



Hull unit

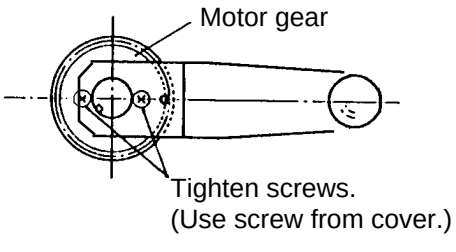
2. Attach the hand crank onto shaft gear or motor gear depending on circumstance.

a) When crank is atached to shaft gear
(Requires greater force but less turns.)



Shaft moves 600 mm per 120 turns of crank.

b) When crank is atached to motor gear
(Requires less force but more turns.)



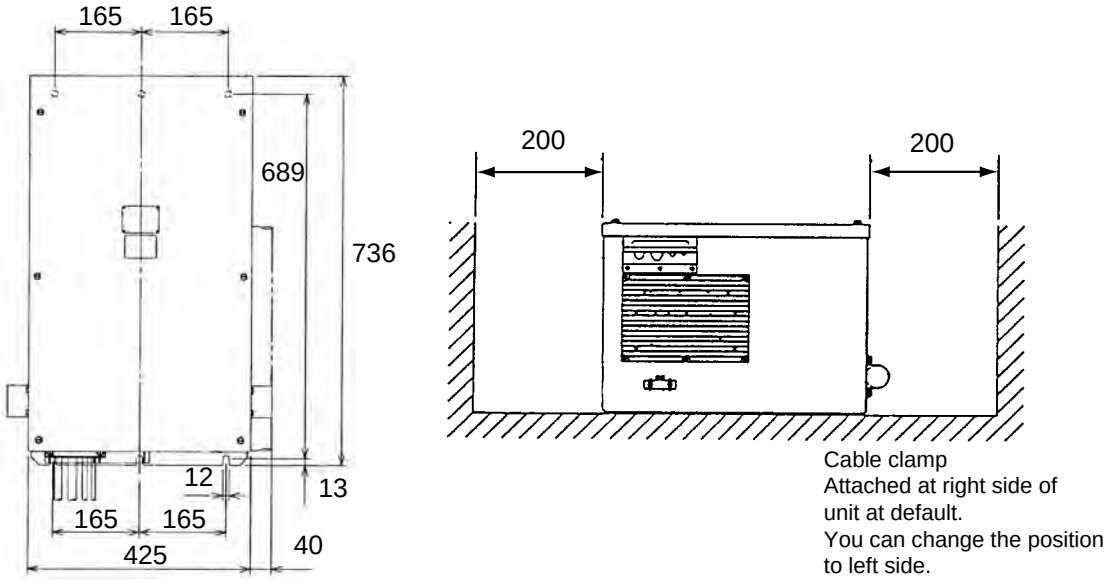
Shaft moves 600 mm per 210 turns of crank.

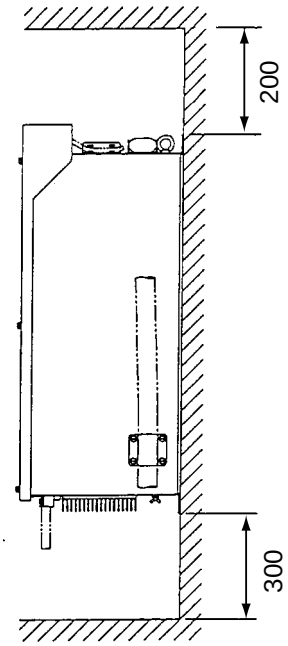
3. Turn the hand crank in both clockwise and counterclockwise directions. Confirm that transducer is raised and lowered smoothly.

1.2 Transceiver Unit

- The transceiver unit generates heat so the mounting location should be well ventilated and dry.
- The unit is only designed for bulkhead mounting. The unit weighs 40 kg so reinforce the mounting location if necessary.
- The length of the cable between the hull unit and the transceiver unit is 5 or 10 m, and the length of the transducer cable is about 6 m. Determine mounting location considering these cable lengths.
- Secure the maintenance space shown in the figure below for ease of maintenance and service.

Fasten the transceiver unit to the mounting location with M10 bolts and nuts.



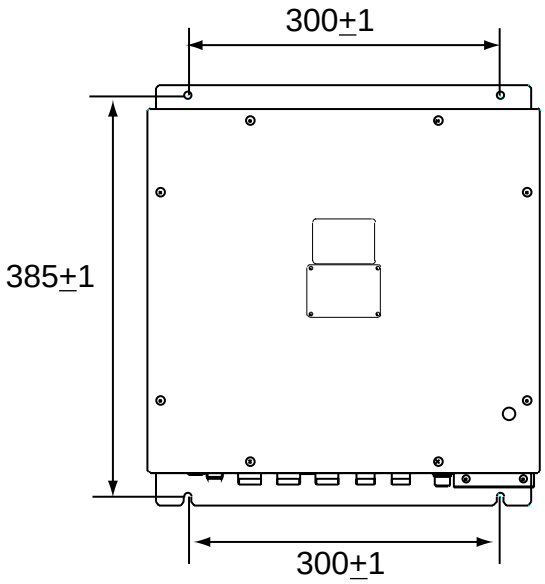


Transceiver unit, mounting dimensions

1.3 Processor Unit

Fasten the unit with four M6 bolts or tapping screws. For location, consider the length of the following cables.

- Cable between processor unit and monitor unit: Max. 10 m
- Cable between processor unit and transceiver unit: Max. 50 m



Processor unit mounting, dimensions

1.4 Control Unit

The control unit may be permanently mounted on a desktop, with or without the KB fixing plate (supplied as accessories), which tilts the control unit at 15° angle. Also, the rubber feet can be used when the unit not permanently fixed.

1.4.1 Non-permanent mounting

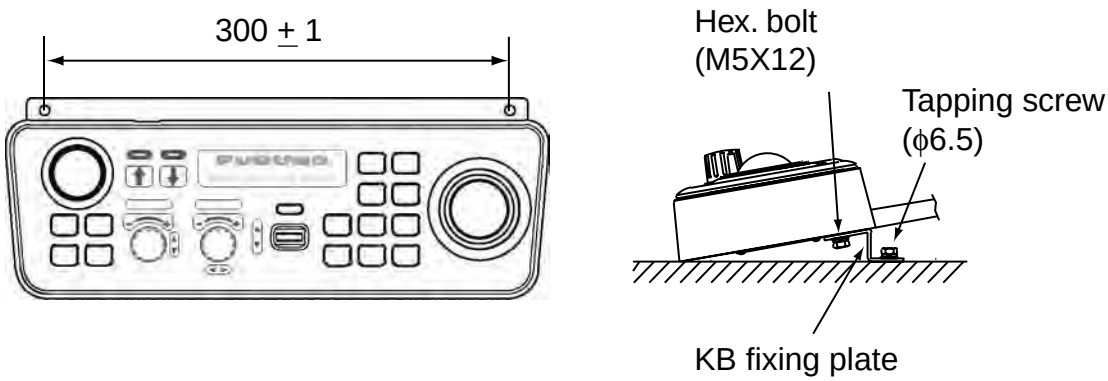
Attach four rubber feet (supplied) at the bottom of the control unit, and then place the unit on the selected location.

1.4.2 Permanent mounting

The control cable can be passed from the hole at the bottom of the control unit.

Installing with the KB fixing plate

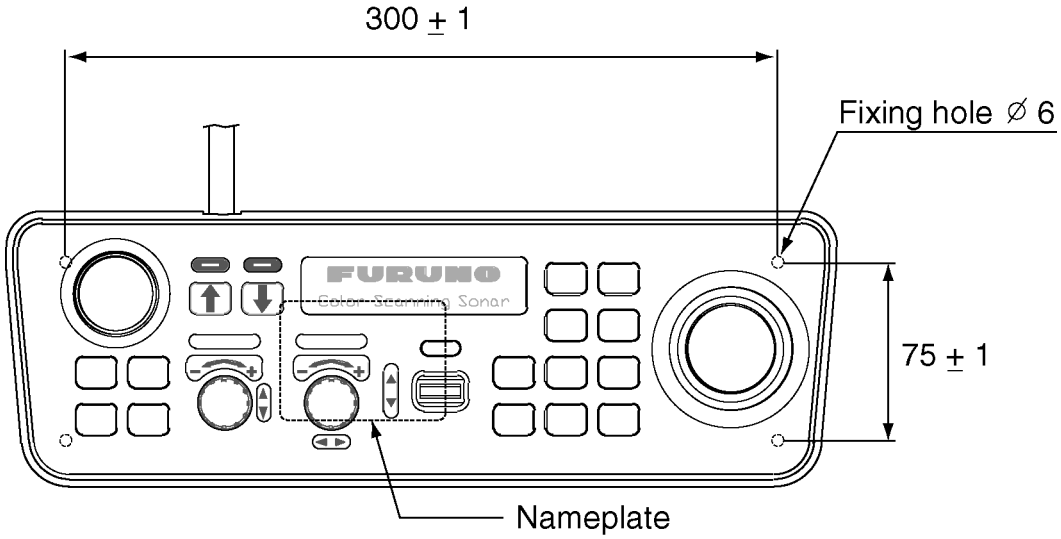
1. Attach the connector sticker to the unused cable hole.
2. Fix the KB fixing plate (supplied as accessories) to the bottom of the control unit with two hex. bolts (supplied).
3. If necessary, make a hole of diameter 30 mm through the desktop to pass the control cable from the bottom of the control unit.
4. Fasten the KB fixing plate with two tapping screws (Ø6.5, local supply).



How to attach KB fixing plate

Installation without KB fixing plate

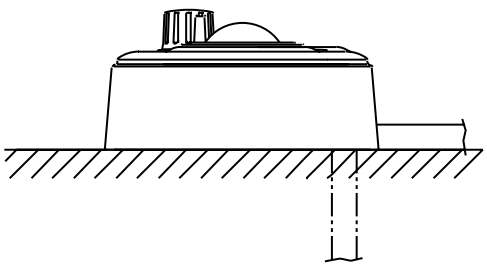
1. Make four holes of 6 mm in diameter referring to the figure below.



Control unit, dimensions for directly mounting

2. Make an indentation in the desktop to accommodate the nameplate (approx. 2 mm thickness) at the bottom of the control unit.
3. If necessary, make a hole 30 mm in diameter in the tabletop to pass the control cable from the bottom of the control unit. To run the able from the bottom of the control unit, see the next page.
4. Screw in four hex. bolts (M5x12, supplied as accessories) from the under side of the table to fix the control unit.

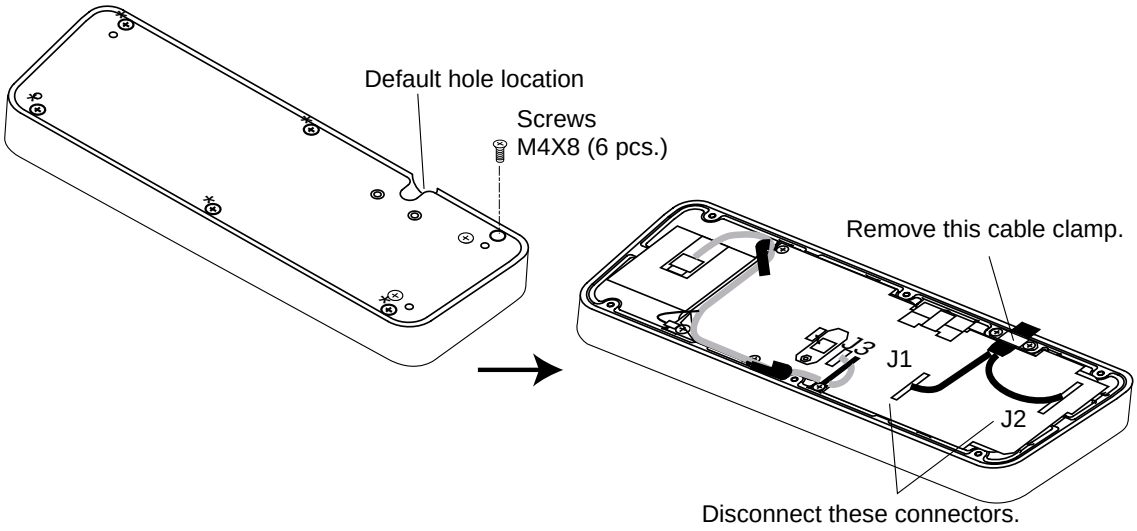
   When the above bolts are not long enough, use locally supplied bolts, with their length the thickness of the desktop plus 5 to 8 mm.



Mounting control unit directly

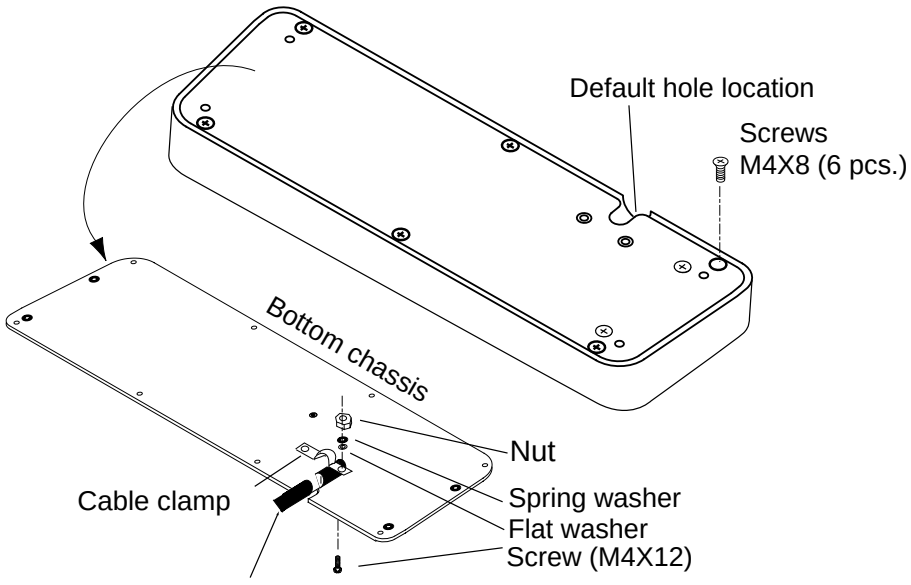
Changing the cable entrance location

1. Unfasten six screws (M4x8) at the bottom of the control unit.
2. Unfasten two screws (M4x10) fixing the cable clamp.
   Discard these screws.
3. Unplug connectors from J1 and J2 on the KEY Board 10P6951.



Control unit

4. Attach the cable clamp removed at step 2 with two screws, spring washers, flat washers and nuts (supplied with accessories) to fix the control cable shown below.



Fix the cable with cable clamp here.

Control head

5. Reattach connectors J1 and J2.
6. Fasten six screws to assemble the control unit.

1.5 Ground

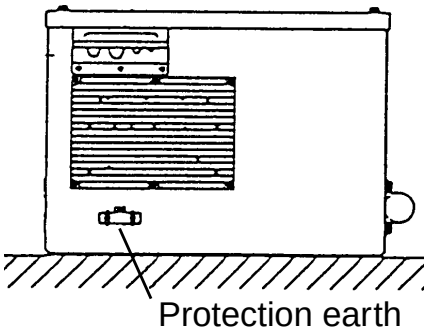
Ground the equipment with copper straps (supplied) or earth wire as appropriate.

Note: If the ground is not properly, operation error or bad video may occur.

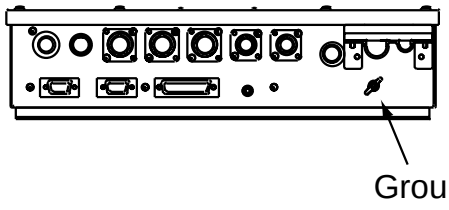
⚠ CAUTION

Attach protection earth securely to the ship's body.

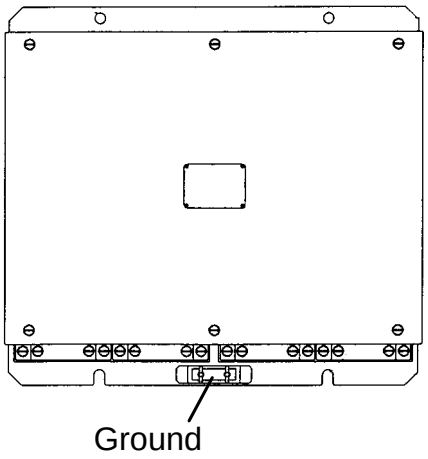
The protection earth (ground) is required for the transceiver unit and DC-AC inverter (option) to prevent electrical shock.



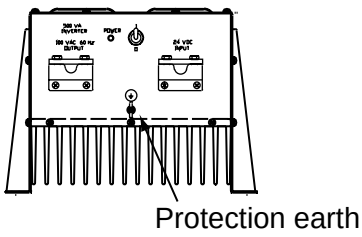
Transceiver unit



Processor unit



Junction Box



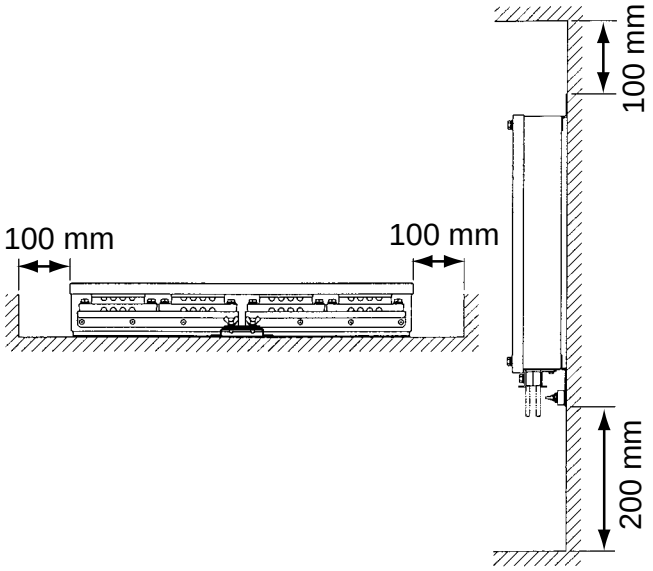
DC-AC inverter

1.6 Transducer Cable Extension Kit CSH-1700 (Optional Junction Box)

This optional kit provides for extension of the transducer cable by 6.6 m, and can be mounted on a deck or the bulkhead. Determine mounting location considering length of cable assy. Maintenance space around the unit should be as shown below.

Name: Transducer cable extension kit, Type: CSH-1700, Code No.: 000-068-207

Name	Type	Code No.	Qty
Junction box	CSH-1700	006-800-000	1
Cable assy	10S1950	000-141-817	6.6 m



Junction box

1.7 Motion Sensor MS-100 (option)

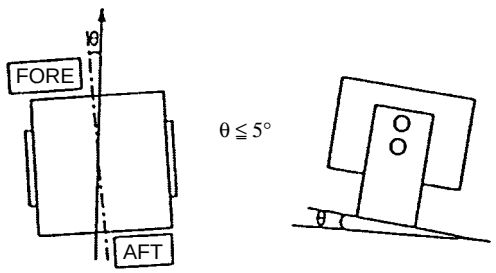
The optional motion sensor MS-100 measures ship's pitching and rolling angles with a sensor, using the principles of the gyrocompass. Because it is free from error caused by ship's vertical and horizontal motion, it can be installed at any convenient location. However, ship's semi-permanent inclination due to loading imbalance be detected.

1.7.1 Mounting considerations

- Vibration in the mounting area should the minimal.
- Locate the unit away from areas subject to water splash.
- The ambient temperature should not exceed 50°C.

1.7.2 Mounting procedure

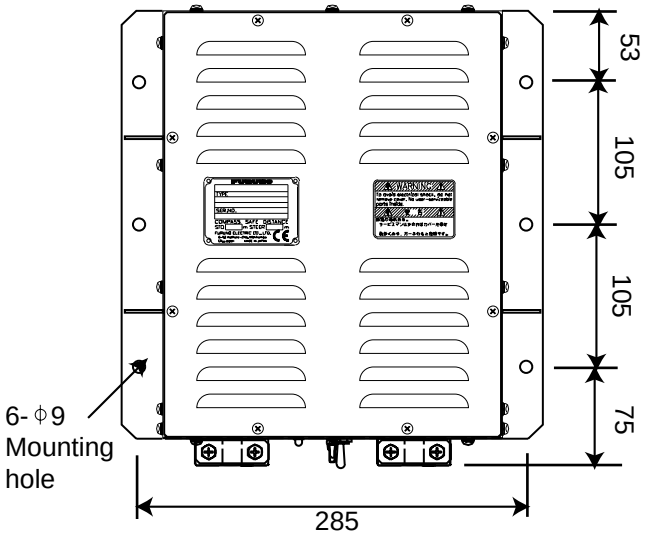
Orient the FORE mark on the unit toward the ship's bow and mount the unit within 5° of horizontal in all directions. For the offset, see Chapter 3.



Mounting the motion sensor MC-100

1.8 DC-AC Inverter (option)

The optional DC-AC inverter is required when the ship's mains is 24 VDC. The DC-AC inverter should be mounted on a bulkhead (weight of unit: 15 kg) with sufficient vibration. Install the unit so that the cable entrances are facing downward.



DC-AC inverter

2. WIRING

2.1 Cabling Outline

Cabling between processor unit and transceiver unit

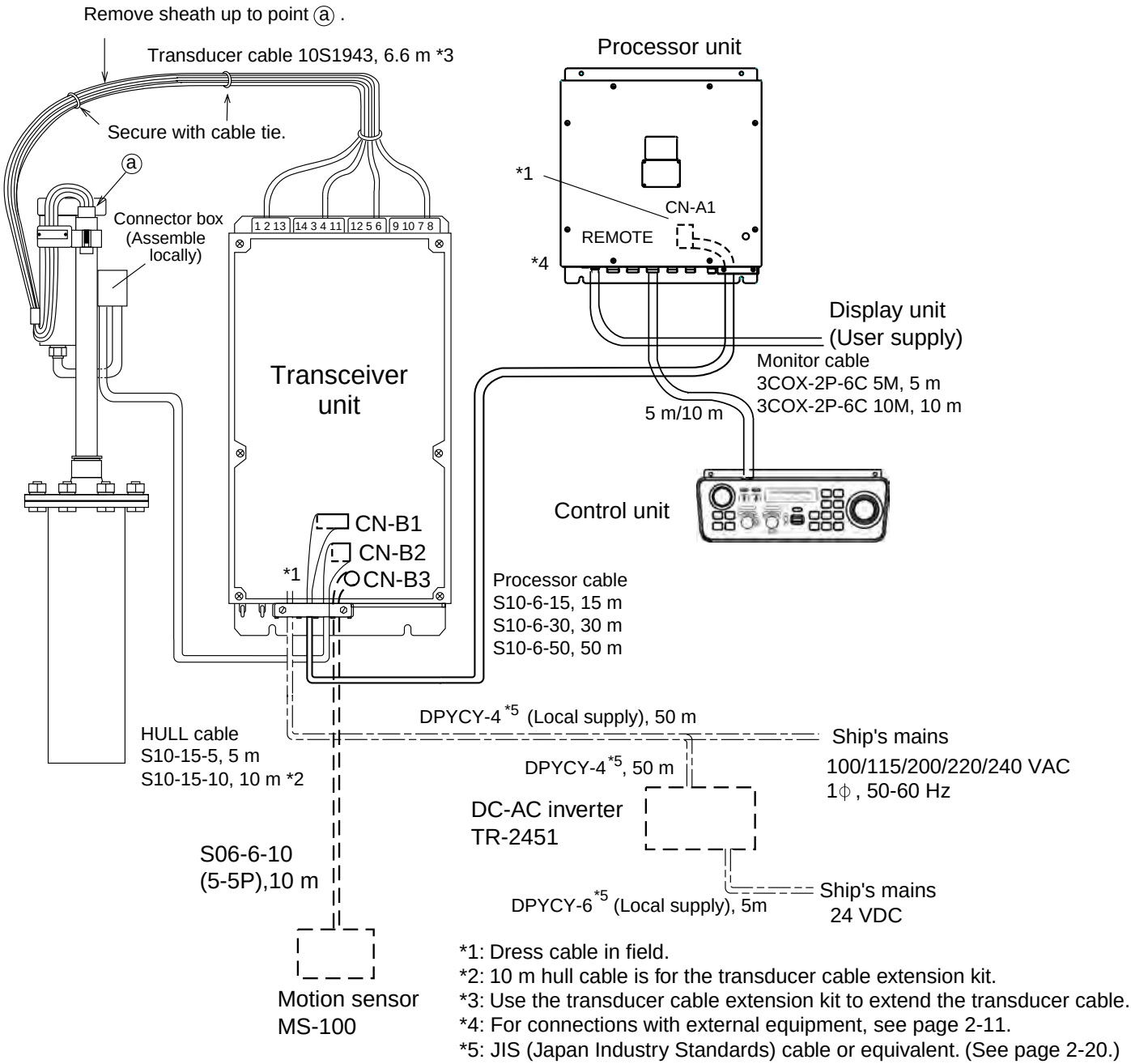
The cable between the processor unit and transceiver unit comes in lengths of 15 m, 30 m or 50 m. A connector is pre-fitted at the factory for connection at the transceiver unit. Fit a connector to the other end of the cable. The cable may be shortened as necessary.

Cabling between the transceiver unit and hull unit

Connectors are pre-fitted at the factory. The length of the cable is 5 or 10 m.

Transducer cable

A connector is pre-fitted for connection to the transducer. Attach a connector to the other end of the cable for connection to the transceiver unit. For cable extension, use the optional transducer cable extension kit. It enables extension of the transducer cable up to 6.6 m.



*1: Dress cable in field.
*2: 10 m hull cable is for the transducer cable extension kit.
*3: Use the transducer cable extension kit to extend the transducer cable.
*4: For connections with external equipment, see page 2-11.
*5: JIS (Japan Industry Standards) cable or equivalent. (See page 2-20.)

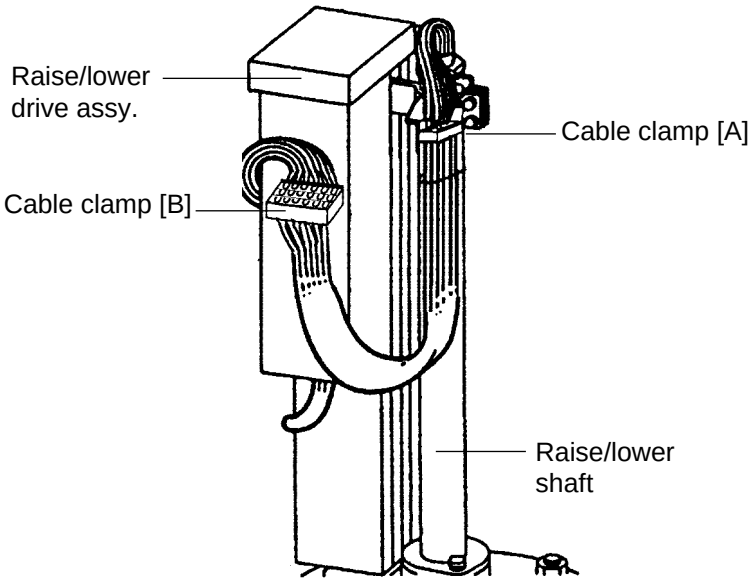
Wiring diagram

2.2 Hull Unit

2.2.1 Wiring of transducer cable

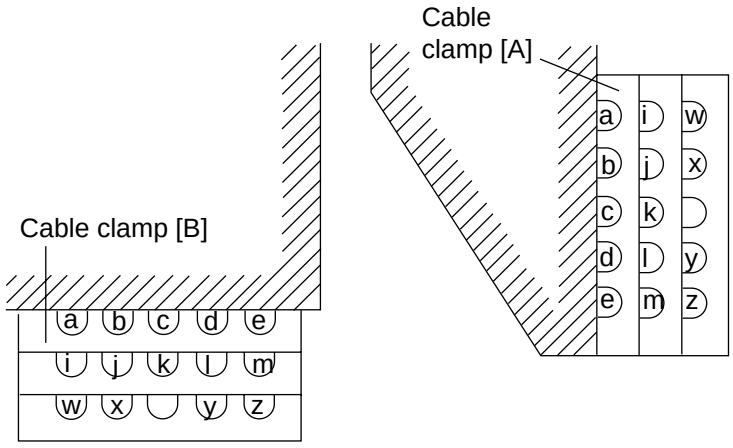
Wire the transducer cable (14 cores) as below to prevent undue stretching during raising or lowering operation. Fix the cable with the cable clamp on the raise/lower drive assy.

1. Fix the transducer cable from raise/lower drive assy with cable clamp [A].



Hull unit, cable clamp

2. Run the cables to cable clamp [B] on the raise/lower drive assy and position it as shown below. Temporarily tighten clamp [B].



Example: Wire ⓐ of clamp [A] to ⓐ of clamp [B].

Cable clamps and positioning of cables

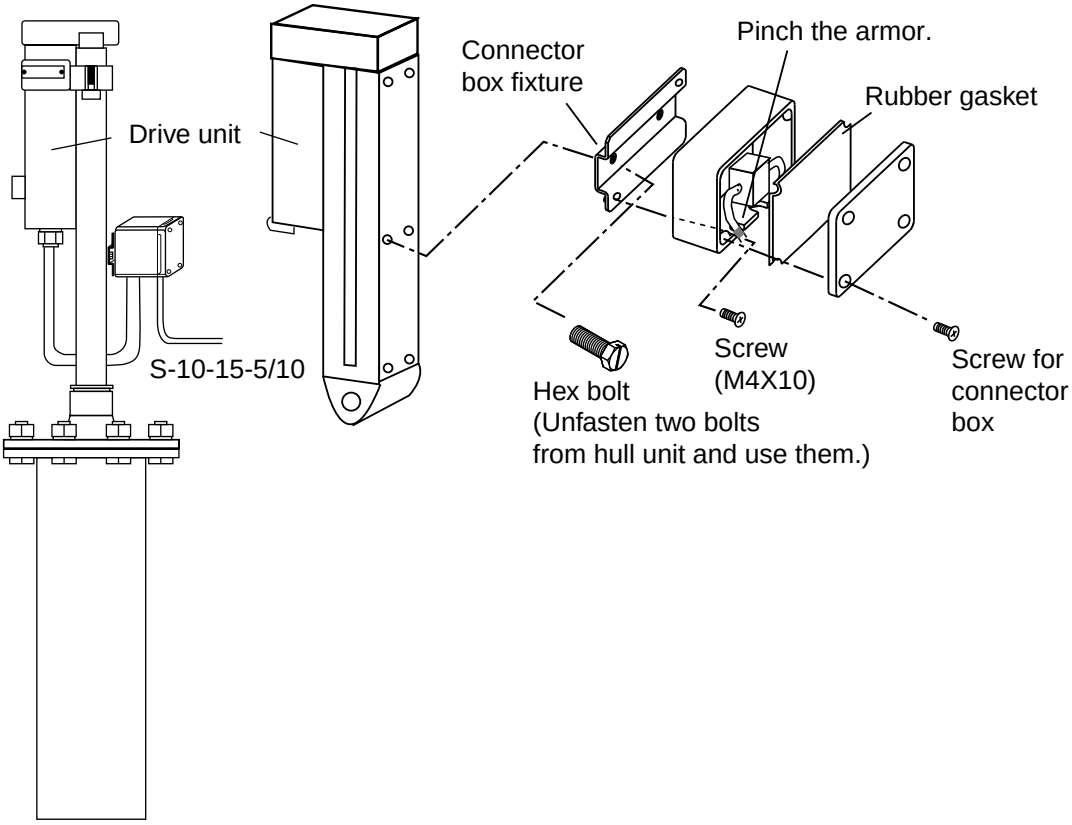
3. Adjust the cable lengths between cable clamps [A] and [B] as follows:

	600 stroke	400 stroke
Between ⓐ of clamp [A] and ⓐ of clamp [B]	660 mm	580 mm
Between ⓘ of clamp [A] and ⓘ of clamp [B]	690 mm	610 mm
Between ⓦ of clamp [A] and ⓦ of clamp [B]	720 mm	640 mm

4. Adjust slack of 12 other cables so it is the same as the ones adjusted at step 3, and then tighten the clamps [A] and [B].

2.2.2 Connector box for hull unit cable

Fasten the connector box on the side of the hull unit opposite the cable clamp [B]. Its purpose is to act as relay for the cable which sends control signals from the transducer unit to the hull unit. Be sure to run the thinner cable to the direction opposite to the raise/lower drive assy as shown in the figure below.



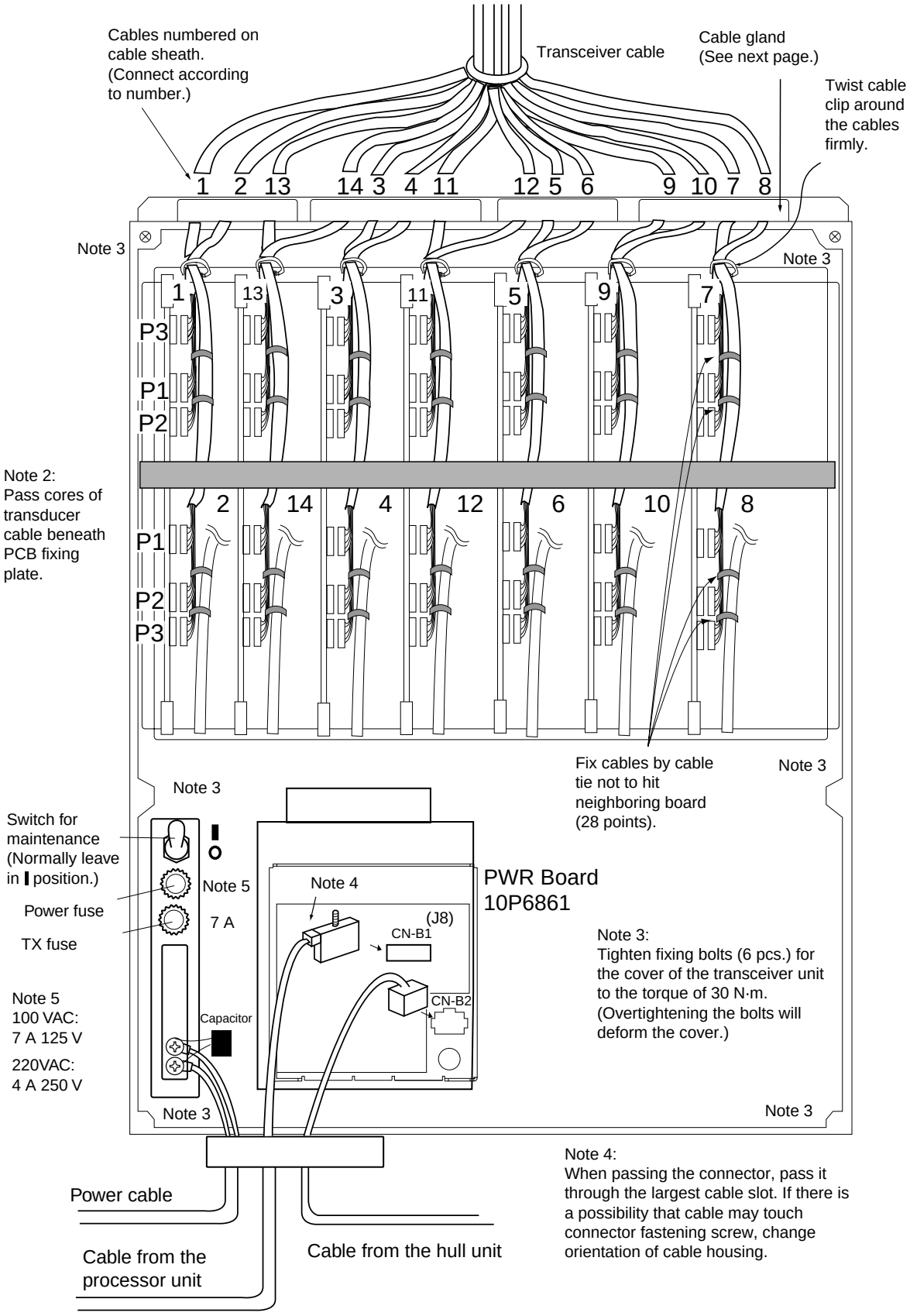
Hull unit, connector box

1. Unfasten two hex bolts from the hull unit and use them to fasten the connector box fixture to the hull unit.
2. Fasten connector box to the connector box fixture with two screws.
3. Connect connector MLP-15 from the drive section to the connector ELR-15 (or MLR-15) at the end of the S10-15-5 (or S10-15-10) from the transducer unit. Set the cable in the connector box.
4. Fasten the lid of the connector box with four screws so that lid pinches the armor of the cable.

   Remember to insert the rubber gasket.

2.3 Transceiver Unit

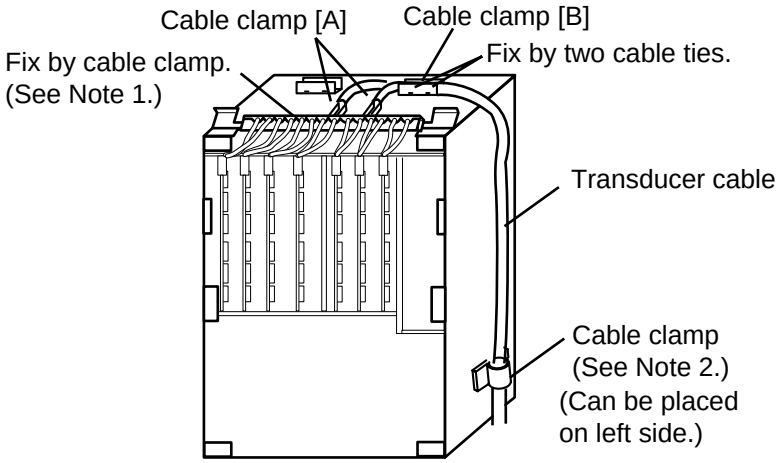
Except the power cable, all cables connected to the transceiver unit are pre-fitted with connectors.



Wiring in transceiver unit

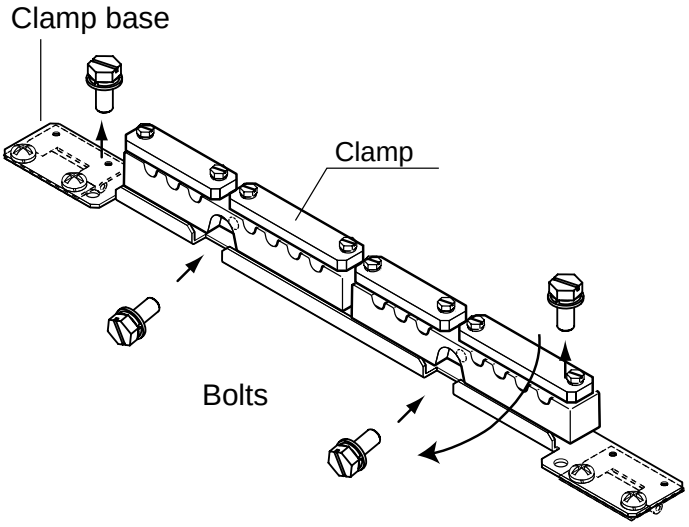
2.3.1 Transducer cable wiring

Separate the cable in two, pass it through cable clamp [A] and fix it with a cable tie. Pass the cable through cable clamp [B] and fix with cable tie. Pass cable through cable clamp at the side of the transceiver unit.



Transceiver unit, upper view

Note 1: Wire unit with cable clamps in horizontal position. Lay cable clamp after finishing wiring.

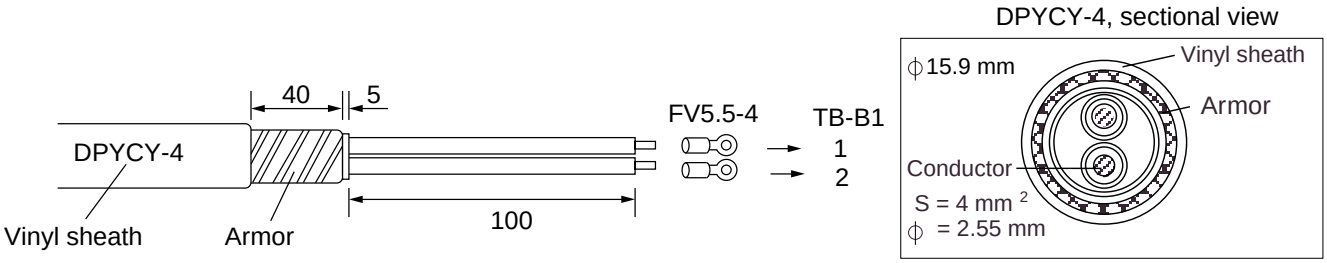


1. Lay braided shields of transducer cable in cable clamp. Each cable is numbered; connect referring to the illustration on the preceding page.
2. Unfasten two bolts.
3. Set the clamp and fasten it with two bolts removed at step 2.

Cable clamp

Note 2: When fixing transducer cable with cable clamp, wrap with vinyl tape before fixing, or wrap the cable with a piece of the outer sheath of the cable and fix by cable clamp.

2.3.2 Power cable



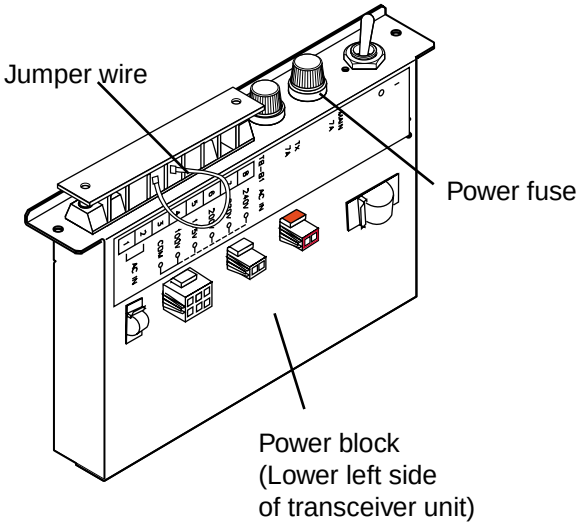
Fabrication of power cable

Note: When connecting the power cable, the crimp on lug of the capacitor is removed. Do not forget to reattach the crimp on lug of the capacitor to the terminal board.

2.3.3 Changing the power specification

Change jumper wires on the transceiver unit according to ship's mains. Follow the label on the power block in the transceiver unit. Attach the other end of the wire plugged in #3 (COM) into one of #4 (100 V) thru #8 (240 V) depending on ship's mains. Also, change the power fuse appropriately. On the stickers at the terminal board and back of the front lid of the transceiver unit, change the mark position for the used fuse.

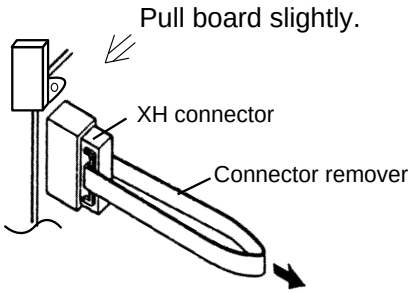
Ship's mains	Fuse
100 VAC series (100/110/115 VAC)	7 A 125 V
220 VAC series (200/220/240 VAC)	4 A 250 V



Transceiver unit power block

2.3.4 How to unplug the XH connector

If making a wrong connection of XH connector, use XH connector remover to unplug the XH connector.

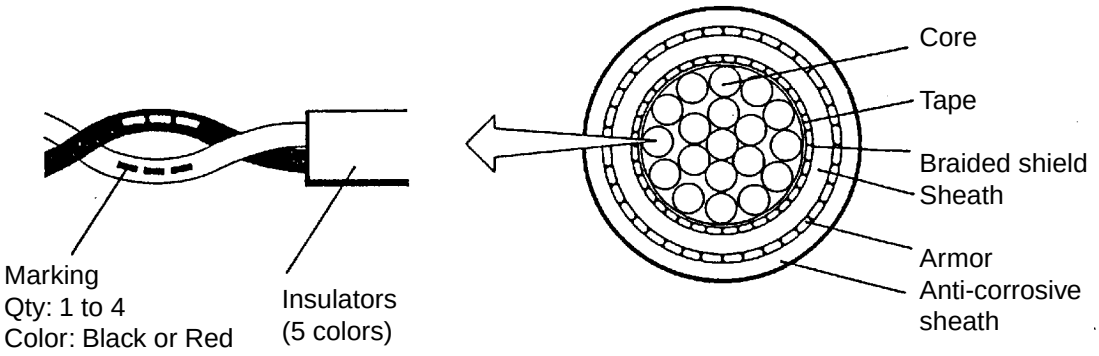


XH connector remover

2.4 Processor Unit

2.4.1 Wiring with transceiver unit

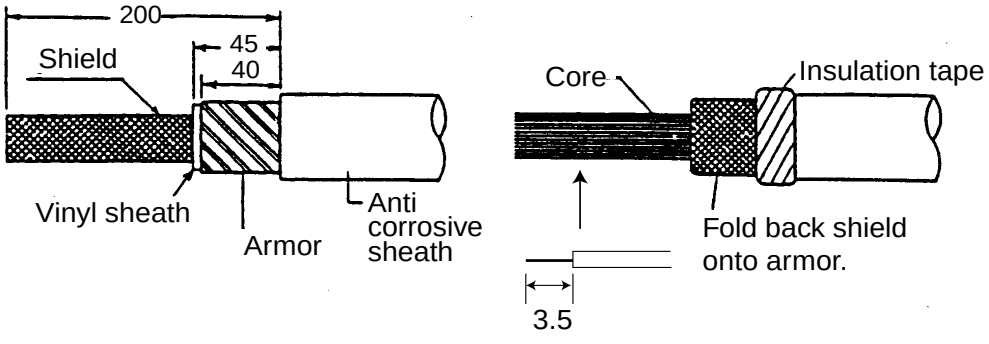
Attach a 38P connector to the end of the cable connected to the processor unit. Plug in this connector to CN-A1 on the MAIN Board.



Construction of cable between processor and transceiver units

Fabricating cable between processor and transceiver units

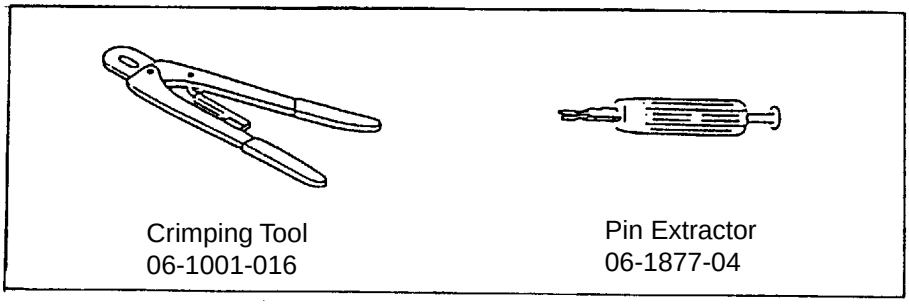
Remove the anticorrosive sheath, armor and vinyl sheath as shown below.



Fabrication of cable between processor and transceiver units

Connecting contact pins

A special crimping tool is necessary for connection of wires to the contact pins of the 38P connector. In addition, a pin extractor should be used to remove the contact pin from the connector housing.

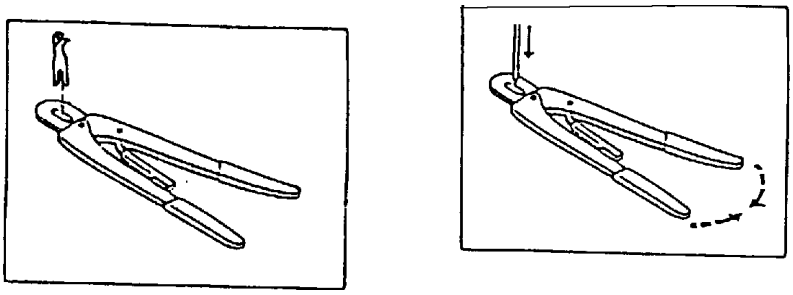


Crimping Tool
06-1001-016

Pin Extractor
06-1877-04

How to use the crimping tool

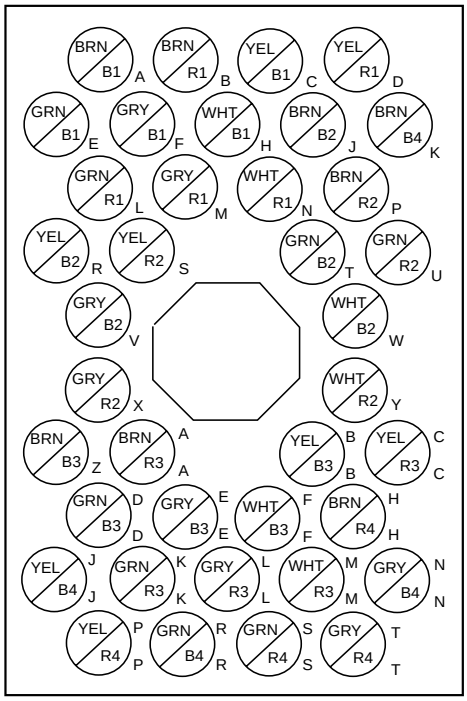
1. Strip the vinyl sheath of the wire to expose the core by 3.5 mm.
2. Hold the crimping tool horizontally and insert the contact pin with its slit facing downward into the crimp hole on the crimping tool.
3. Insert the wire onto the contact pin and squeeze the handle until the ratchet releases. (Place wire deep enough into the contact pin so that its end comes contact with the stopper plate of the crimping tool.
4. With crimping completed, pull the wire while holding the contact pin to make sure that it is fastened tightly.



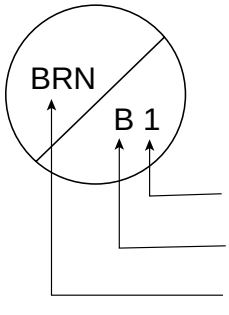
How to insert contact pin

Inserting contact pin into connector housing

Insert wires fitted with contact pins into the connector housing referring to the drawing below or the interconnection diagram at the back of this manual.



Note: 1. Wire differentiation



Number of dot mark(s) (1 to 4)
Dot mark color (B: Black, R: Red)
Sheath color

2. BRN and GRN show the following colors.
   BRN: Light brown
   GRN: Light green

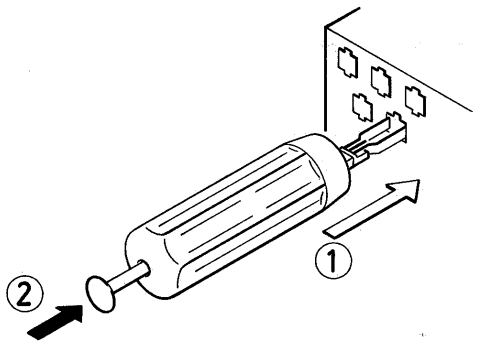
3. Cover plate is not fitted to the connector.

Inserting contact pin into connector housing

How to use pin extractor

If a contact pin is inserted into an incorrect hole on the connector body, remove it with the pin extractor.

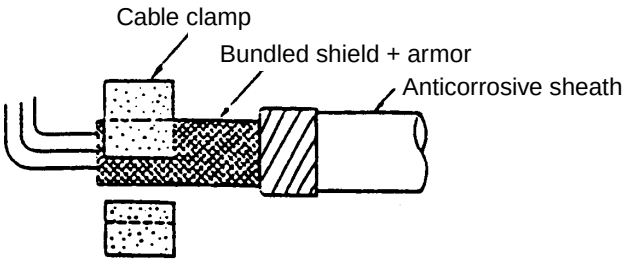
1. Push the pin extractor into the pin hole from the side opposite to the pin inserting side.
2. Push in the head of the pin extractor. The retaing spring comes free and the contact pin can be removed.



How to extract contact pin

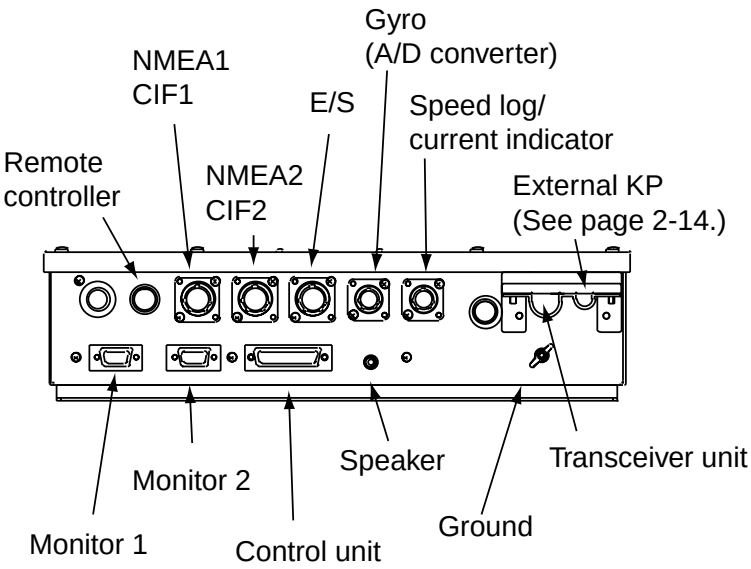
Fixing the cable

Set shield and armor section in cable clamp and tighten cable clamp.

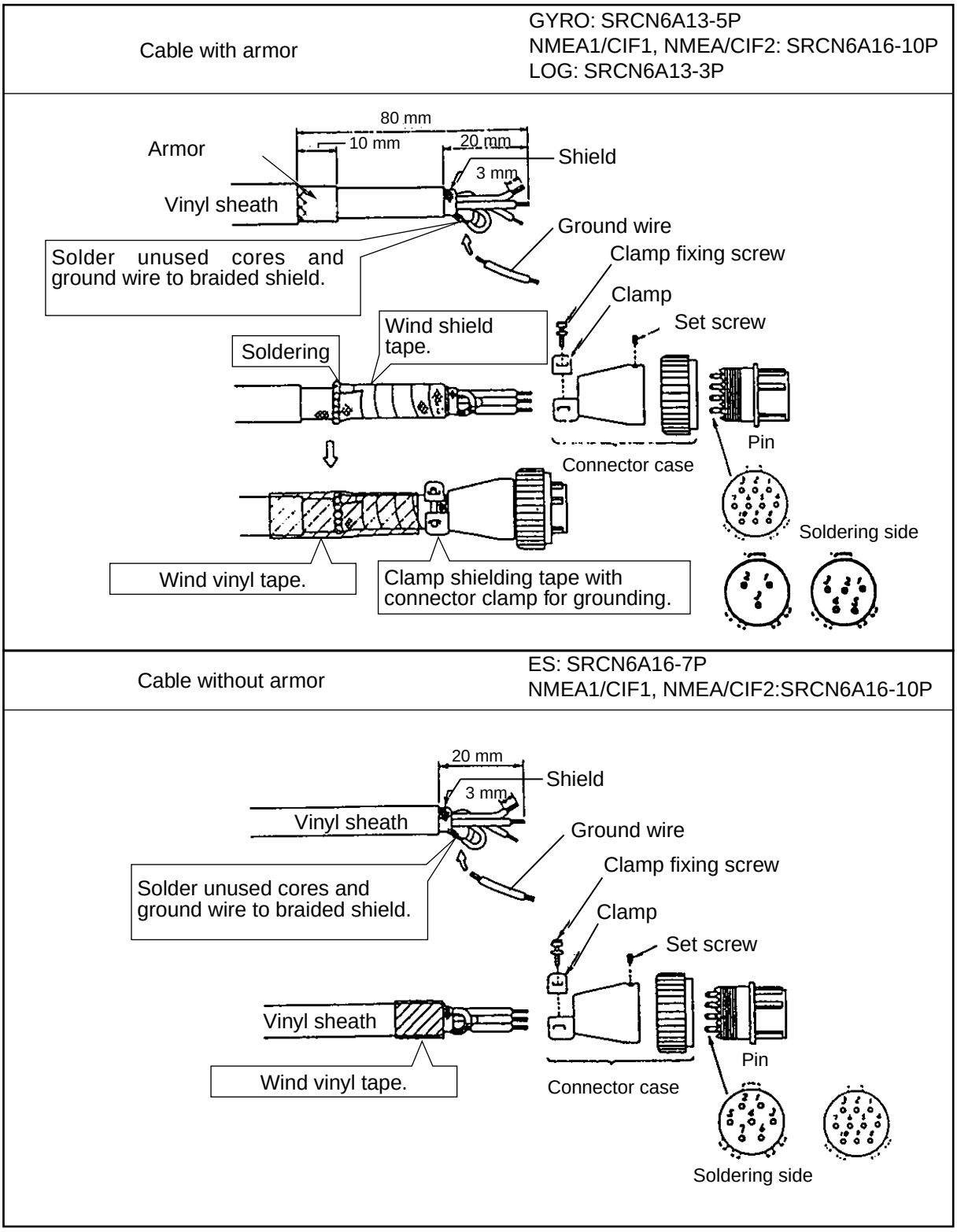


How to set cable in cable clamp

Other connections



Connection of processor unit



Fabricating of connectors for external equipment

Display unit

Prepare a XGA display locally. When using MU-150C as the display unit, refer to its operator's manual. Connect the processor unit and display with the monitor cable 3COX-2P-6C 5 m or 10 m (supplied). Use the MONITOR 1 port for a display unit.

NMEA/CIF

NMEA input sentence

Talker	Sentence	Information
*1	GGA	GPS positioning data
*1	GLL	Own ship's position
**	GTD	Own ship's position (TD, LOP)
LC	GLC	TD (Loran-C)
**	HDG	Heading (compass)
**	HDM	Heading (magnetic)
**	HDT	Heading (true)
*2	VTG	Course over ground and ground speed
VD	VHW	Water speed and heading
LC	RMA	Recommended minimum specific Loran-C data
*3	RMC	Recommended minimum specific GPS/TRANSIT data
**	DBT	Depth below transducer, Ver. 1.5
**	DBS	Depth below sea level
**	DPT	Depth below transducer plus offset value, Ver. 2.0
**	MTW	Water temperature
VD	VDR	Water current, single layer
VD	CUR	Water current, multi-layers

*1: GPS navaid, Loran-C, II (other talker), TR
*2: GPS navaid, Loran-C, II (other talker), TR, VD
*3: GPS navaid, II (other talkar), TR
**: Not specified

NMEA output sentence

Talker	Sentence	Information
SS	TLL	Target latitude and longitude

CIF input sentence

Data No.	Information
21	DR position
24	Loran-C position
28	GPS position
54	Loran-C, TD
4:	Heading (true)
41	DR speed/course
44	Loran-C speed/course
48	GPS heading/speed
57	Depth of sea bottom
58	Water temperature
66	Current indicator speed/course
56	Water current, single layer
76	Water current, multi-layers

CIF output sentence

Data No.	Information
5:	Target latitude and longitude

Gyrocompass

Heading data from a gyrocompass can be inputted in AD-10 format via AD-100. For details, see the operator's manual for AD-100.

Echo sounder

Echo sounder data can be input from an echo sounder using the E/S interface VI-1100A. For details, see the installation materials for VI-1100A.

Speed log

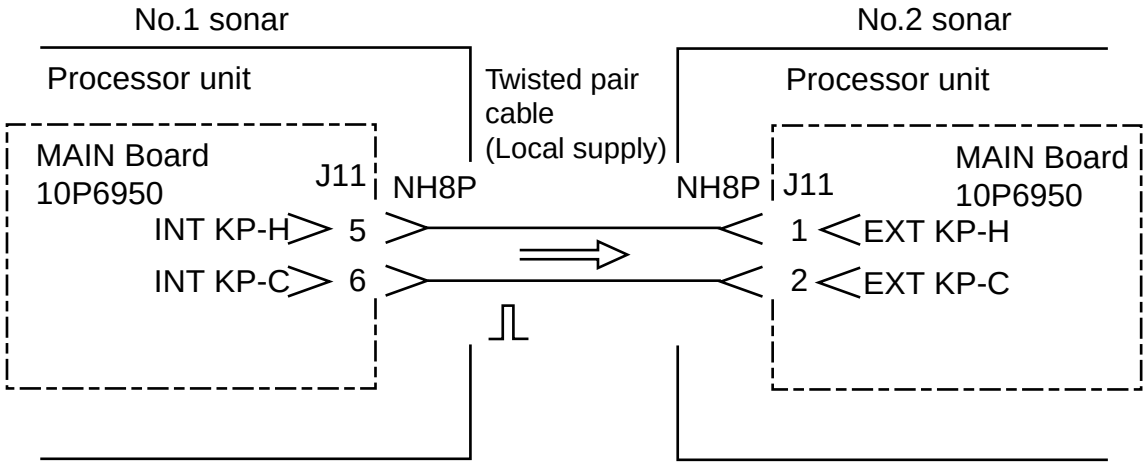
Log pulse (contact signal) can be input.

2.5 Synchronizing Transmission with Other Equipment

2.5.1 Synchronizing transmission with another CSH-8L

When two CSH-8L are installed, connect them as shown below. This will synchronize the transmission of the No. 2 sonar with that of the No.1 sonar.

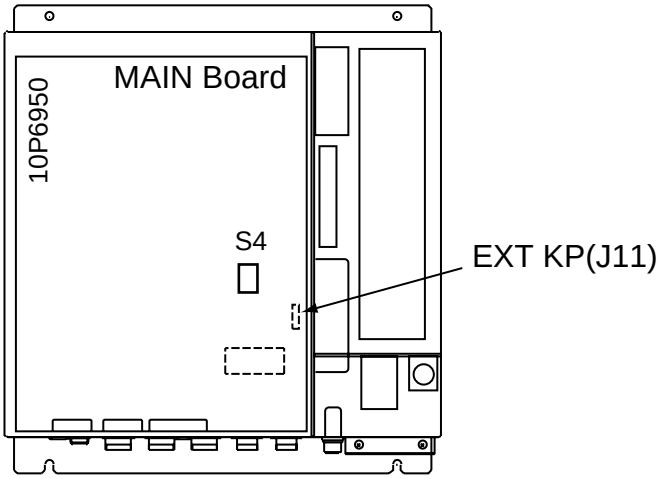
Wiring



Connecting two CSH-8L

DIP switch setting

Set DIP switch #4 on the MAIN Board as follows:



Processor unit, DIP switch S4 location

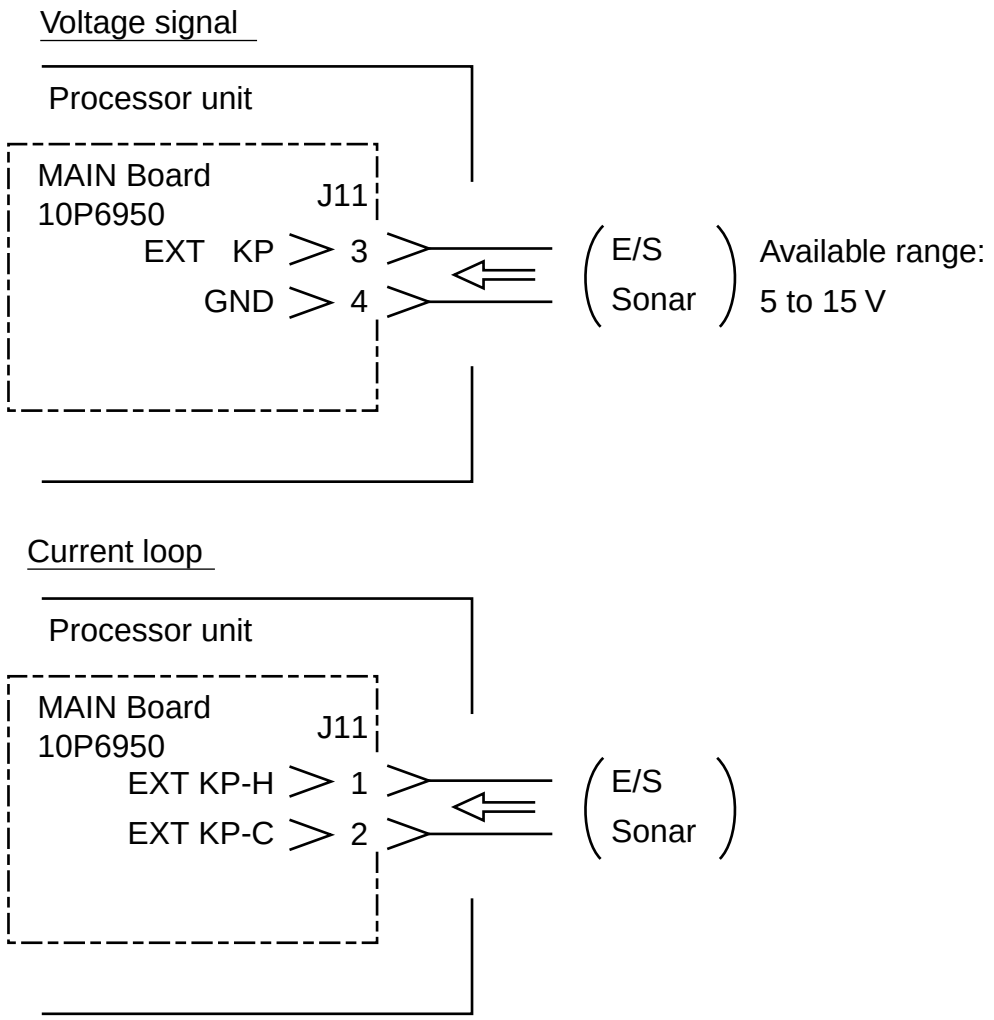
DIP switch	No.1 sonar	No.2 sonar
S4-#2	ON	-
S4-#1	-	OFF

When synchronizing No.2 sonar to No.1 sonar, set ON at [EXT KP SYNC] item on the setting menu. Refer to the operator's manual for the procedure.

2.5.2 Synchronizing with echo sounder or other sonar

To synchronize the transmission of the CSH-8L with an echo sounder or other type of sonar, make the connections shown below.

Wiring



Connect of CSH-8L with E/S or sonar

DIP switch setting

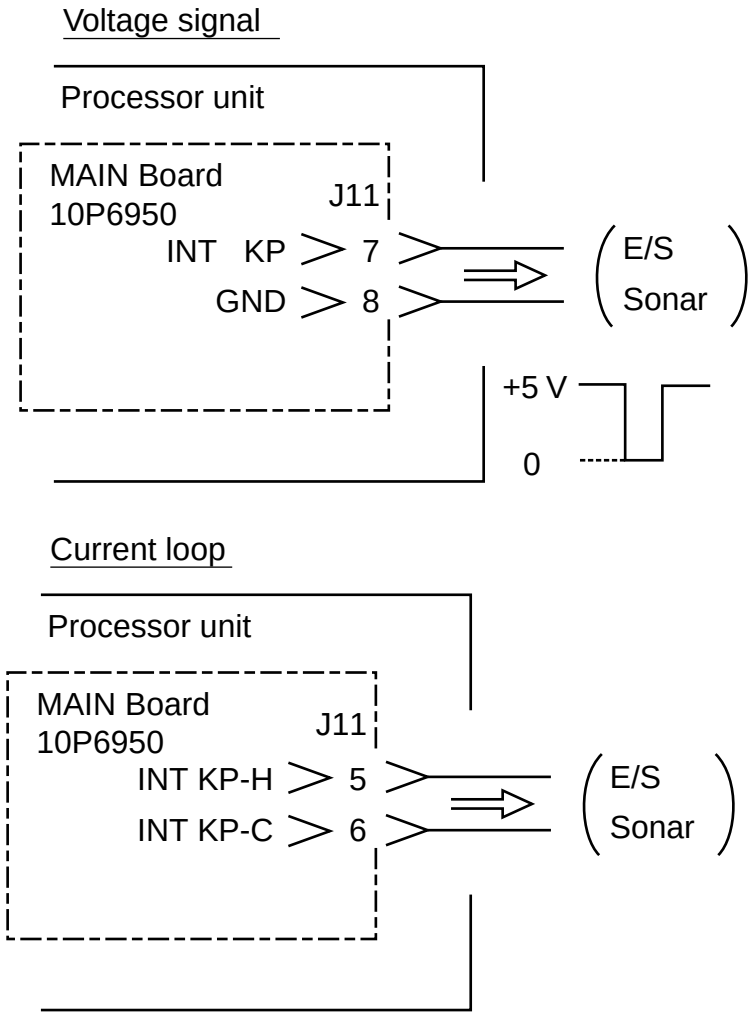
Set DIP switch S4-#1 on the MAIN Board as follows:
Positive KP: OFF
Negative KP: ON

Menu setting

Turn ON menu item [EXT KP SYNC] in the System menu. Refer to the operator's manual for the procedure.

2.5.3 Outputting KP of CSH-8L to echo sounder or other sonar

To output the transmission trigger (KP) of the CSH-8L to an echo sounder or other type of sonar, make the connections shown below.



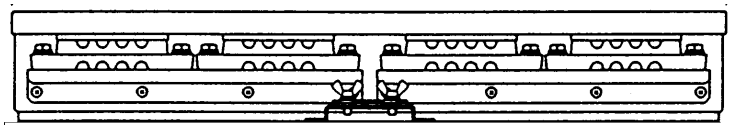
How to output CSH-8L's KP to E/S or sonar

S4-#2	Transmitting trigger
OFF	Negative
ON	Positive

2.6 Transducer Cable Extension Kit (option)

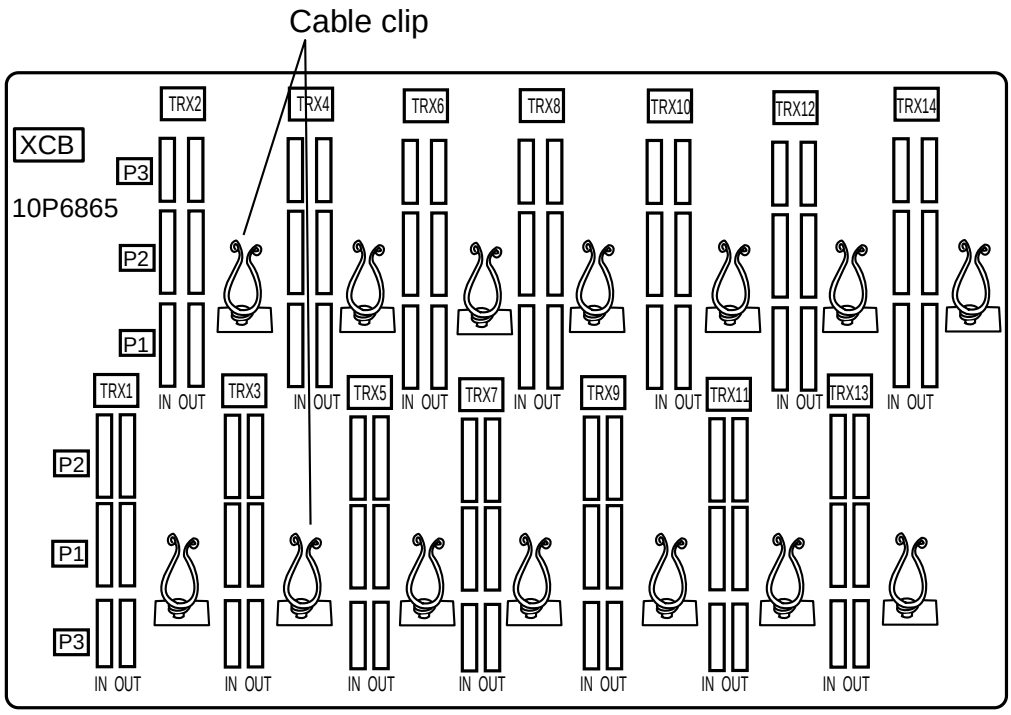
The upper side of the cable clamp holds the transducer cable; the lower side the cable connected to the transceiver unit. Terminals for the transducer are numbered from the left side from 1 to 14. On the IN side of the circuit board, connect the cables from the transducer. Connect the cable to the transceiver to the OUT side. Fix even-numbered cables with cable clips.

Fix cable (10S1950) connected to transceiver unit at upper cable clamp.



Fix transducer cable (10S1943) at lower cable clamp.

Junction box, side view



View from cable clamp

Junction box

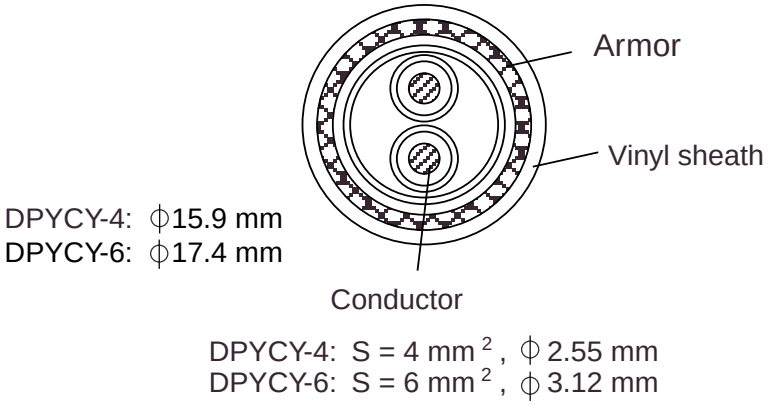
Note 1: Plug in connectors firmly and fix cables with cable clips. Connectors may become disconnected and interference may result if this is not done before replacing the cover.

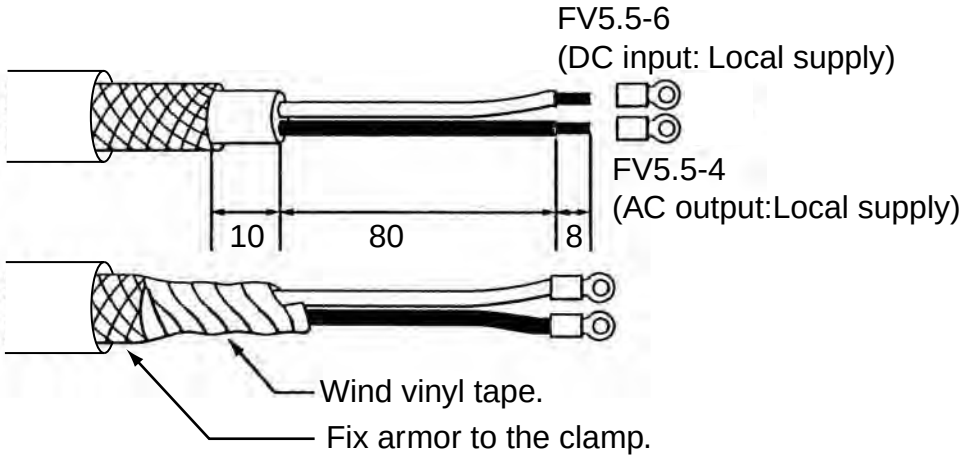
Note 2: Note that P1 and P2 connectors share the same shape and same pin number.

Note 3: If false echoes appear after installation, check connectors and the junction box.

2.7 DC-AC Inverter (option)

Use the JIS (Japan Industrial Standard) cable DPYCY-6 or equivalent (max. 5 m) between the ship's mains and the DC/AC inverter. For output (100 VAC), use JIS (Japan Industrial Standards) cable DPYCY-4 or equivalent (max. 50 m).





Fabricating JIS cable DPYCY-4, DPYCY-6

3. ADJUSTMENT

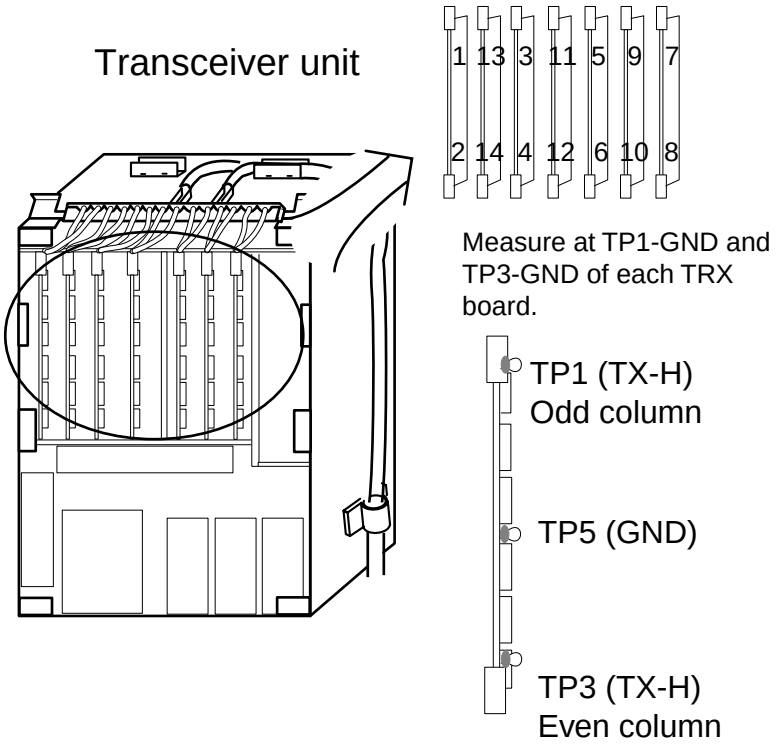
3.1 Measuring TX Output

⚠ WARNING

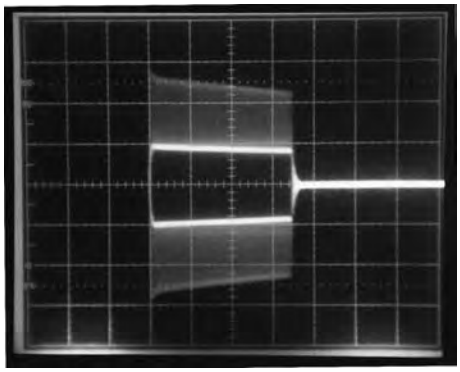
ELECTRICAL SHOCK HAZARD
Do not open the equipment unless totally familiar with electrical circuits.

Hazardous voltage which can cause electrical shock exists inside the equipment.

1. Set up the control unit as follows:
   Range: 400 m, Tx Power: 10 (max.), Vertical Scan: Narrow
   Tilt: 0°, Tx Pulselength: 10 (max.)
2. Measure voltage at test point on TRX Boards 10P6862 (14 test points total) in the transceiver unit with an oscilloscope.

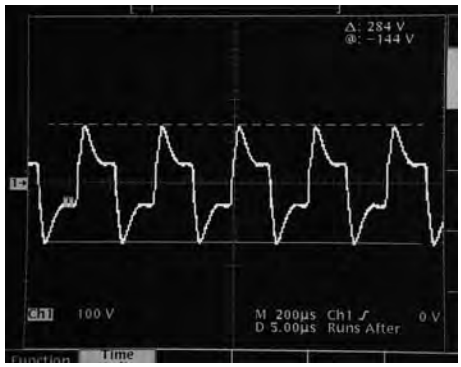


Transceiver unit, upper view



2 µs/div, 50 V/div

X axis exploded view



5µs/div, 100 V/div

Shorten time axis to 5 µS/DIV and confirm Vpp.

Typical value of TX output (107 kHz)

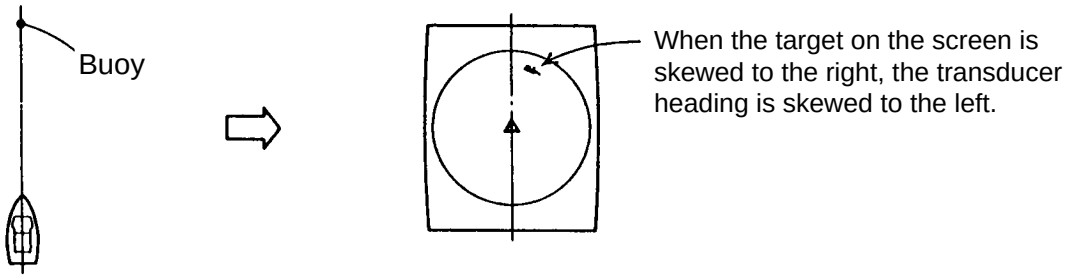
Channel	Peak Voltage (Vpp: Ref)	Channel	Peak Voltage (Vpp: Ref)
1	280	5	370
2	220	6	320
13	200	9	370
14	280	10	370
3	320	7	400
4	280	8	370
11	280		
12	320		

Typical value of TX output (85 kHz)

Channel	Peak Voltage (Vpp: Ref)	Channel	Peak Voltage (Vpp Ref)
1	290	5	290
2	290	6	280
13	270	9	260
14	270	10	300
3	310	7	280
4	322	8	290
11	290		
12	290		

3.2 Heading Alignment

1. Turn on the power. Locate a target (buoy, etc.) in the bow direction and display it on the screen at a close range. The heading alignment is correct if the target in the bow direction is displayed 12 o'clock on the screen. If it is not, go to step 2.



Locating a target to use for aligning heading

2. Read the skewed degree of the target selected at step 1.
3. Press the [MENU] key.
4. Use the [RANGE] control to choose [MENU MODE].
5. Use the [GAIN] control to choose SYSTEM to show the System menu.

** SYSTEM MENU **			(RANGE CTRL: U/D, GAIN CTRL: L/R)
[MENU MODE]	: SONAR	SOUNDER MARKS	SYSTEM
DIMMER	: 10		
DISP SELECT	: TEMP	CURRENT	
HEADING ADJ	: 0°		
AUTO RETRACT	: OFF	(OFF, 5-16kt)	

System menu

6. Rotate the [RANGE] control to select HEADING ADJ.
7. Rotate the [GAIN] control to set value so a target directly ahead in bow direction is displayed at 12 o'clock.

3.3 Setting for External Equipment

Do the following settings depending on the external equipments connected. Open the System menu referring to the previous page.

** SYSTEM MENU **					(RANGE CTRL: U/D, GAIN CTRL: L/R)
[MENU MODE]	:	SONAR	SOUNDER	MARKS	SYSTEM
DIMMER	:	10			
DISP SELECT	:	TEMP	CURRENT		
HEADING ADJ	:	0°			
AUTO RETRACT	:	OFF	(OFF, 5-16kt)		
SPEED MESSAGE	:	ON	OFF		
EXT KP SYNC	:	OFF	ON		
AUTO TRAIN SPD	:	LOW	HIGH		
AUTO TILT SPD	:	LOW	HIGH		
UNIT	:	METERS	FEET	FATHOMS	PA/BRA
SHIP'S SPD/BR	:	LOG/GYRO	CURRENT	NAV DATA	GYRO+NAV
LOG PULSE	:	200	400		
PORT1 BAUDRATE	:	19200	9600	4800	2400
PORT1 FORMAT	:	NMEA	CIF		
PORT2 BAUDRATE	:	19200	9600	4800	2400
PORT2 FORMAT	:	NMEA	CIF		
NAV DATA	:	GPS	LC	DR	ALL
COMBI SCALE	:	RIGHT	LEFT		
SUB TEXT INDI	:	OFF	ON		
LANGUAGE	:	ENGLISH	日本語	ESPAÑOL	DANSK
		NEDERLND	FRANÇAIS	ITALIANO	한국어
		NORSK	ไทย	中文	
TEST	:	SINGLE	CONTI	PANEL	COLOR
	:	PATTERN	SIO	ECHO-1	ECHO-2
		ECHO-3	ECHO-4		
SET TO DEFAULT	:	EXECUTE			

PRESS [MENU] KEY TO EXIT

= Items should be set after the installation.

EXT KP SYNC

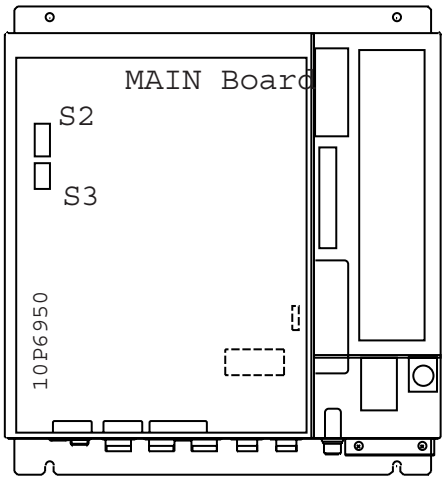
Select using or not using the external keying pulse (See “Synchronizing Transmission with Other Equipment” on page 2-15.)

1. Rotate the [RANGE] control to select EXT KP SYNC.
2. Rotate the [GAIN] control to choose OFF or ON.
   OFF: Not using the external keying pulse.
   ON: Using the external keying pulse.

SHIP'S SPD/BR

Choose the source of speed and course data with which to draw ship's track.

1. Rotate the [RANGE] control to select SHIP'S SPD/BR.
2. Rotate the [GAIN] control to choose item appropriately.
   LOG/GYRO: Use data from the speed log connected to LOG port as ship's speed, data from gyrocompass connected to GYRO port as ship's course.
   CURRENT: Use data from the current indicator connected to NMEA1/CIF1 or NMEA2/CIF2 port.
   NAV DATA: Use data from the equipment (set at [NAV DATA] described on next page) connected to NMEA1/CIF1 or NMEA2/CIF2 port.
   GYRO+NAV: Use heading data signal from the sensor connected to GYRO port for course, data from the equipment (set at [NAV DATA] described on next page) or current indicator connected to NMEA1/CIF1 or NMEA2/CIF2 port for the ship's speed. When using data from the current indicator (for positioning) for ship's speed, set DIP switch #2-2 in the transceiver unit to ON.



Location of DIP switch S3

LOG PULSE

Choose log pulse/mile specification of speed signal from the LOG port, 200 or 400 pulse/mile.

1. Rotate the [RANGE] control to select LOG PULSE.
3. Rotate the [GAIN] control to choose 200 or 400.

PORT 1 BAUDRATE, PORT 2 BAUDRATE

Set baud rate of equipment connected to NMEA1/CIF1 or NMEA2/CIF2 port, among 2400, 4800, 9600 and 19200 (bps).

1. Rotate the [RANGE] control to select PORT 1 BAUDRATE or PORT 2 BAUDRATE.
2. Rotate the [GAIN] control to choose item among 2400,4800, 9600 and 19200.

PORT 1 FORMAT, PORT 2 FORMAT

Set data format of equipment connected to NMEA/CIF 1 port or NMEA/CIF 2 port.

1. Rotate the [RANGE] control to select PORT 1 FORMAT or PORT 2 FORMAT.
2. Rotate the [GAIN] control to choose NMEA or CIF depending on the equipment connected.

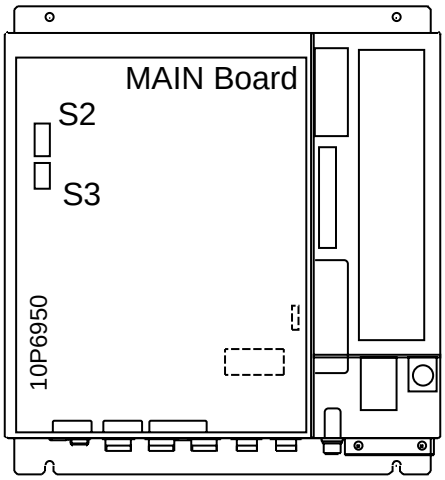
NAV DATA

Choose source of nav data among GPS, LC (Loran C), DR (Dead Reckoning) or ALL. “ALL” automatically chooses source in the order of GPS, Loran C and dead reckoning. (Priority: GPS>LC>DR)

1. Rotate the [RANGE] control to select NAV DATA.
2. Rotate the [GAIN] control to choose item among GPS, LC, DR or ALL.
   Select “DR” when using the equipment connected to GYRO port and LOG port.

3.4 Smoothing the GPS Data

If position data from the GPS navigator is not smooth, set DIP switch S2 in the processor unit as below to smooth it.



Location of DIP switch S2

#5	#6	GPS ship's speed
ON	ON	2.0 kt
ON	OFF	1.5 kt
OFF	ON	1.0 kt
OFF	OFF	0.5 kt (default setting)

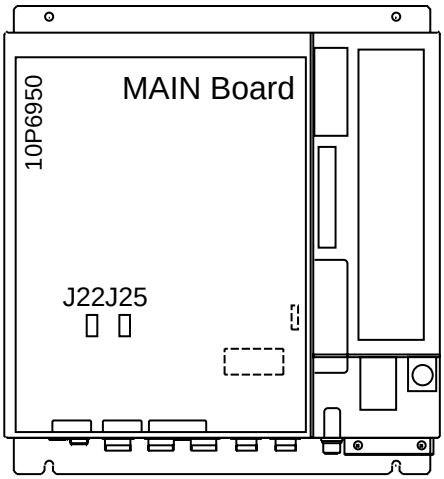
#3	#4	GPS course change
ON	ON	10°
ON	OFF	20°
OFF	ON	45°
OFF	OFF	90° (default setting)

#7	Smoothing functon
ON	Yes
OFF	No (default setting)

When all switches are ON, GPS positioning data is smoothed so that the course change is within 10° when own ship's speed is 2.0 kt or less.

3.5 NMEA Version Setting

Change the jumper block setting in the processor unit according to NMEA version to output.

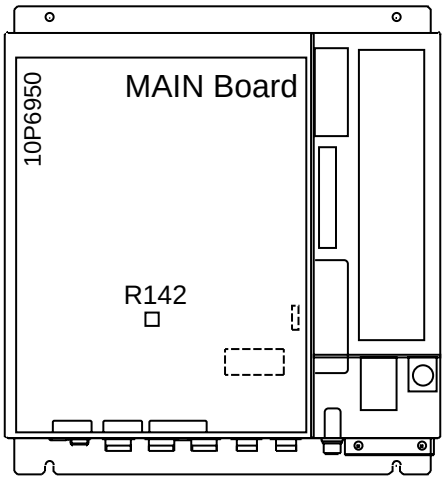


Location of jumper block J22 and J25

Jumper	*NMEA Ver1.5*	*CIF or NMEA Ver2.0*	*Port*
J22	1-2 (Default setting)	2-3	NMEA1/CIF1
J25	1-2 (Default setting)	2-3	NMEA2/CIF2

3.6 Adjusting Echo Sounder Video

When using the E/S interface to connect an echo sounder, adjust the video signal with the potentiometer R142 on the MAIN Board in the processor unit.



Location of volume register R142

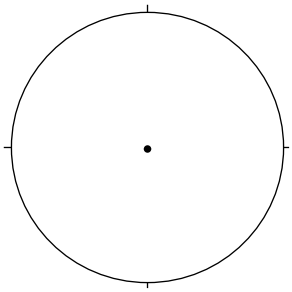
1. Rotate R142 so that the line on it locates at the center position.
2. Set the SOUNDER MENU as below to appear noises on the screen.
   GAIN: 10, CLUTTER: 0
3. On the SOUNDER MENU, set E/S INT REJECT to ON.
4. Set GAIN to 0.
5. Adjust R142 so that noises disappear.
6. Return the GAIN setting to 10.
7. After setting GAIN to 10, set CLUTTER to 10.
8. Adjust R142 so that noises disappear.

3.7 Sea Trial

Cruising noise check

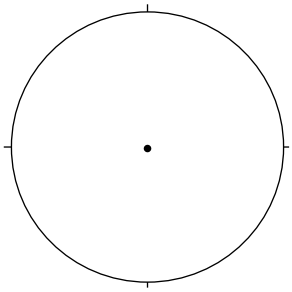
Check and record the cruising noise level displayed on the screen. Do this with the transceiver turned off and the ship anchored, and also with the ship running at the speed normally used while the sonar is in use.

Ship anchored



NL			
RANGE	800 m	ENG RPM	
GAIN	5.0	SPEED	0 KTS
TVG	N [5] F [5]	SEA CONDITION	
TILT	0˚		
DEPTH			

Ship at cruising speed



NL			
RANGE	800 m	ENG RPM	
GAIN	5.0	SPEED	
TVG	N [5] F [5]	SEA CONDITION	
TILT	0˚		
DEPTH			

Recording optimum control settings

Record the suitable settings of controls and switches, and take a photograph of the sonar picture as reference for later service.

PHOTOGRAPH

RANGE	
TILT	
TVG	N [ ] F [ ]
GAIN	
OUTPUT	
TX PULSELENGTH	
NOISE LIMITER	
AGC	
VP	
INTERFERENCE REJ	

APPENDIX
INSTALLATION OF CSH-8L ON RETRACTION TANK OF CH/FH SERIES SONAR, OR 1800/3500 MM TANK

When retrofitting the CH/FH series with the CSH-8L, it is not necessary to change the retraction tank. However, the hull unit must be chosen according to retraction tank length. Refer to the table below to choose hull unit. This must also be done with the 1800 mm or 3500 mm retraction tank.

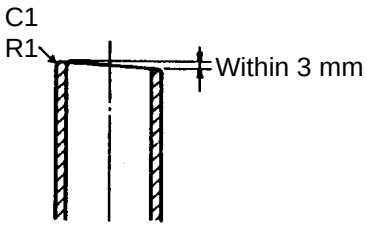
Tank length (L) mm	Hull unit type	Remarks
600 < L ≤ 750	CSH-8040-107-N-13	Transducer cable: 4200 mm, Main shaft: 1300 mm
	CSH-8040-85-N-13	
750 < L ≤ 1000	CSH-8040-107-N-15	Transducer cable: 4200 mm, Main shaft: 1550 mm
	CSH-8040-85-N-15	
1000 < L ≤ 1800	CSH-8040-107-N-23	Transducer cable: 9200 mm, Main shaft: 2350 mm
	CSH-8040-85-N-23	
1800 < L ≤ 3500	CSH-8040-107-N-40	Transducer cable: 6600 mm, Main shaft: 4065 mm
	CSH-8040-85-Nx40	

Note: The hull unit CSH-8041 (400 mm transducer travel) cannot be used.

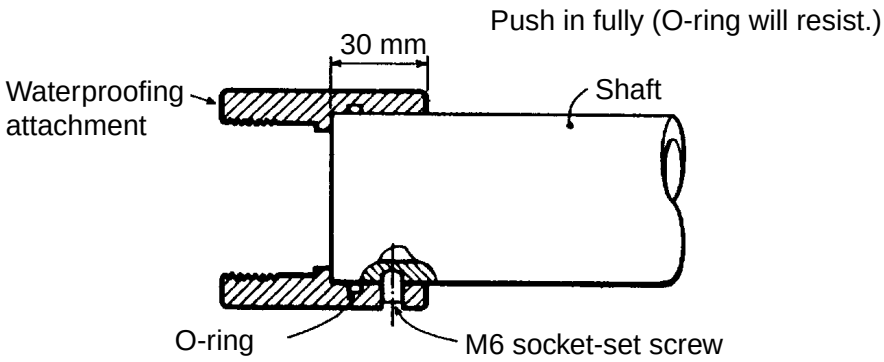
Installation when retraction tank is more than 750 mm long

1. Calculate the necessary length of the main shaft.
   - Main shaft length = Tank length + 565 mm (see page AP-5).
   - If there is a sufficient space above the hull unit, it is not necessary to cut the main shaft; the main shaft is installed with its top portion protruded beyond the top of the hull unit.
   - If the cut length of the main shaft is less than 50 mm, use it without cutting the shaft. Waterproofing attachment is not necessary. Note, however, that protrusion length of the transducer is reduced.

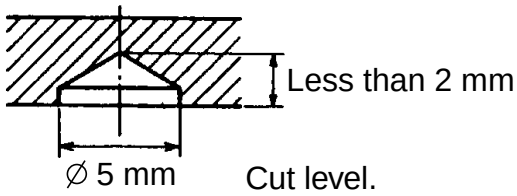
2. Cut the main shaft to the necessary length.
   - It is recommended to use a machine lathe to shorten the shaft.
   - Chamfer the top of the main shaft as shown below. (For chamfering with a file use a fine file and finish the surface as smooth as possible.)
   - When clamping the shaft with a clamp, be careful not to damage the shaft surface.
   - When a metal saw is used to shorten the shaft, finish the top of the shaft so that it is level within 3 mm.



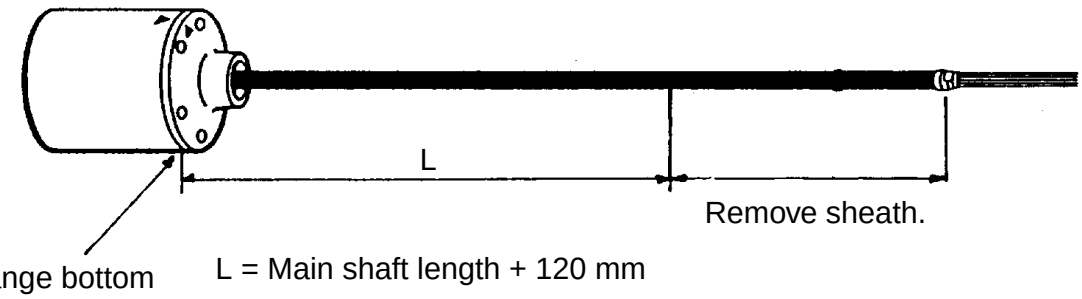
3. Temporarily install the waterproofing attachment on the top of the main shaft and drill holes for socket-set screws.



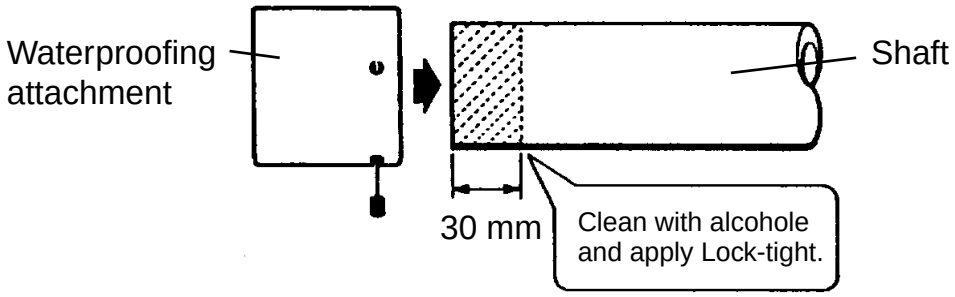
   a) Mark drilling point on the shaft surface by tightening M6 socket-set screws (2 pcs.)
   b) Remove the waterproofing attachment.
   c) Drill holes les than 2 mm in depth. Use a drill with a Ø120 tip°. Do not drill holes through the shaft. Use a stainless steel, low rpm drill with cutting oil.



4. Remove the sheath of the transducer cable and wrap the sheath end with vinyl tape.

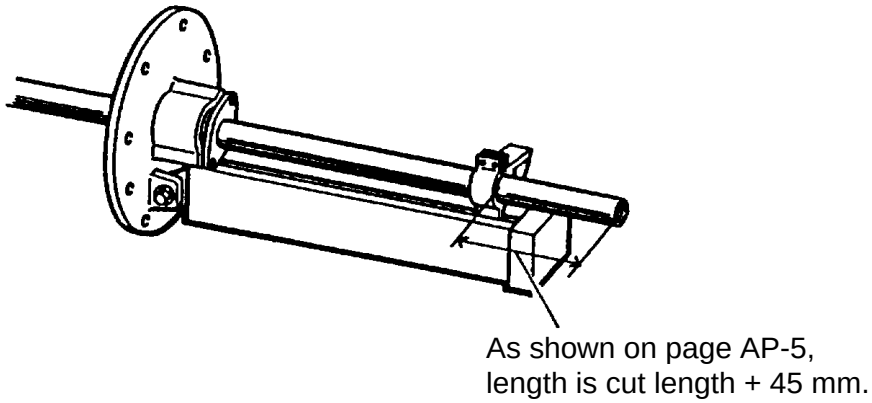


5. Pass the main shaft through the main body flange and assemble the hull unit. Refer to Chapter 1 for the assembling procedure.
6. Clean the top of the main shaft with alcohol, install the waterproofing attachment and apply Lock-tight (supplied) to the lock-screw.



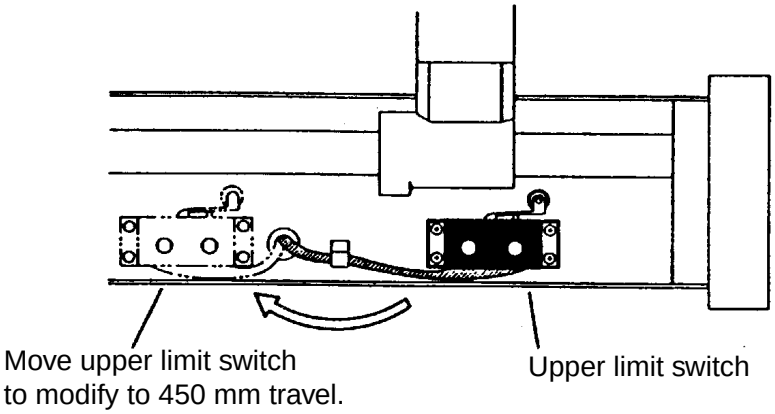
- Tighten the M6 socket-set screws with a torque of 3.92 to 4.9 N·m.
- Refer to page 1-6 for installing the waterproof attachment.

7. Assemble the hull unit, taking the following points into account:
   1) The shaft retainer should be in contact with the waterproofing attachment.
   2) The fastening band should not be used on the main shaft when it is fitted with the waterproofing attachment.
   3) When the main shaft is installed without cutting position the shaft retainer as below.



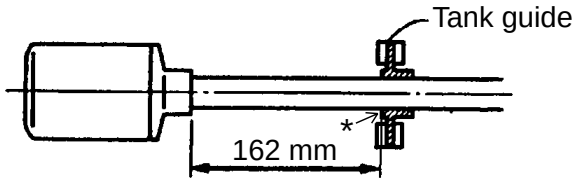
Installation when retraction tank is 600 to 750 mm long

1. Follow steps 1 through 5 in the previous procedure.
2. Set the transducer travel to 450 mm by changing the position of the upper limit switch.



3. Assemble the hull unit, taking the following points into account. Refer to Chapter 1 for assembly instruction.

Note 1: The tank guide should be installed at the position 162 mm above the top of the transducer flange.



*: Measure between the top of the transducer flange and the inner edge of the tank guide.

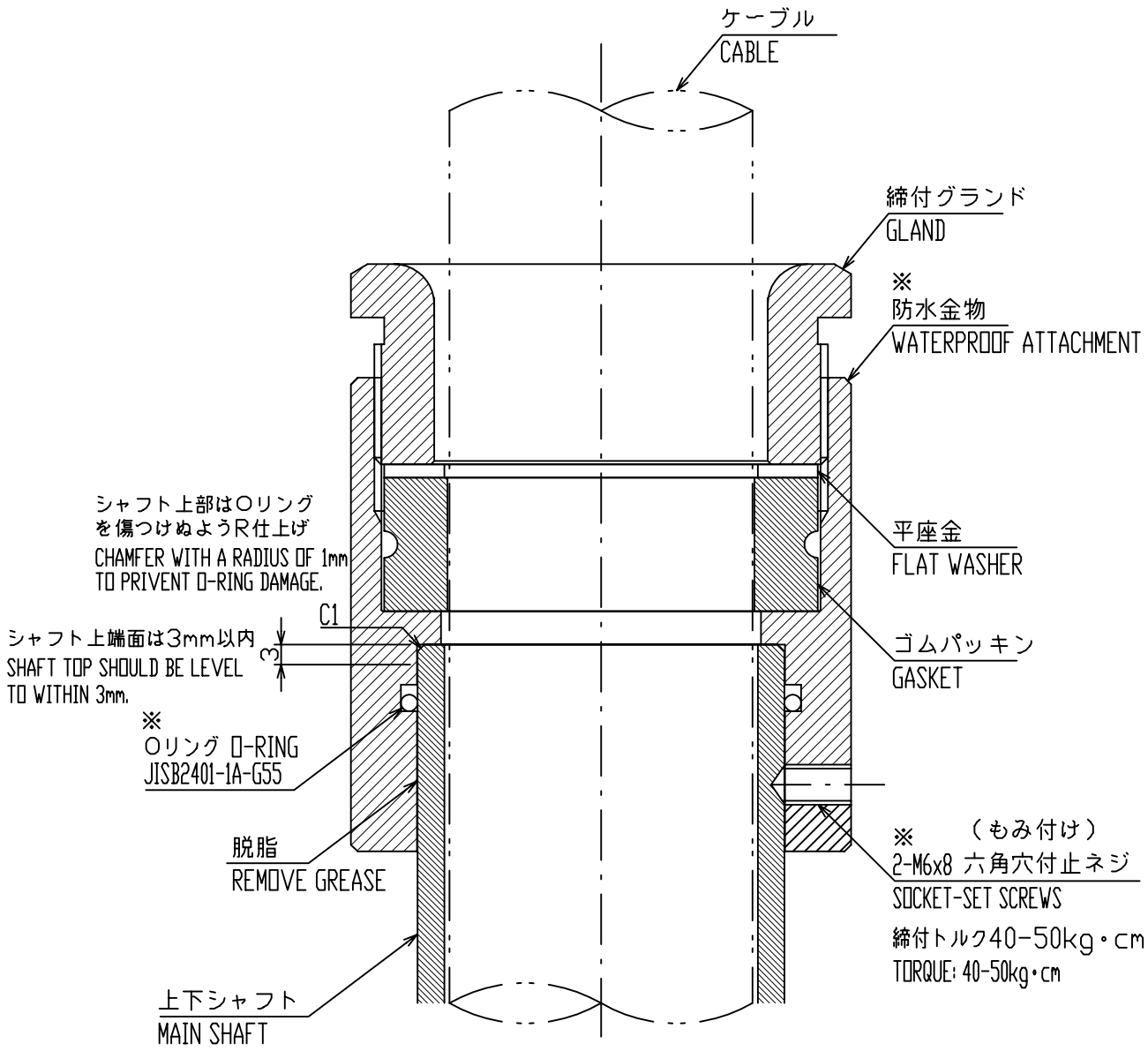
Note 2: The shaft retainer should be in contact with the waterproofing attachment.

Relation between retraction tank length and main shaft length

(Unit: mm)

Hull unit \ Main shaft / Shaft length/cut length / Tank length		945		1300		1550		2350		4065	
		Shaft length	Cut length	Shaft length	Cut length	Shaft length	Cut length	Shaft length	Cut length	Shaft length	Cut length
CSH-8041 400 stroke	550	945	0								
CSH-8040 600 stroke convereted to 450 stroke	600			1015	285						
	650			1065	235						
	700			1115	185						
CSH-8040 600 stroke	750			1300	0						
	800					1365	185				
	850					1415	135				
	900					1465	85				
	950					1515	35				
	1000					1550	0				
	1100							1665	685		
	1200							1765	585		
	1300							1865	485		
	1400							1965	385		
	1500							2065	285		
	1600							2165	185		
	1700							2265	85		
	1800							2350	0		
	1900									2465	1600
	2000									2565	1500
	2100									2665	1400
	2200									2765	1300
	2300									2865	1200
	2400									2965	1100
	2500									3065	1000
	2600									3165	900
	2700									3265	800
	2800									3365	700
	2900									3465	600
	3000									3565	500
	3100									3665	400
	3200									3765	300
	3300									3865	200
	3400									3965	100
	3500									4065	0

Note: When there is enough space above the hull unit, it is not necessary to cut the shaft. (Fasten the shaft with the shaft retainer at the position of “cut length + 45 mm” from the upper edge of the shaft.



注記

1）※：防水金物セットに含む（オプション）。

NOTE

1. ※: SUPPLIED AS WATERPROOF ATTACHMENT (OPTION).

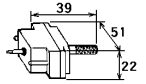
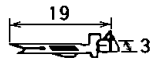
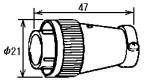
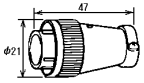
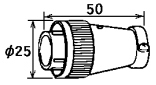
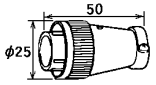
DRAWN Dec. 25 '02 T.YAMASAKI			TITLE
CHECKED Dec. 25 '02 Y.KIMURA			名称 上下シャフト上端（防水金物）
APPROVED Dec. 25, '02 Y. Kimura			装備要領
SCALE 1/1 MASS ±10% kg			NAME CONSTRUCTION OF MAIN SHAFT TOP
DWG.No. C1273-Y01- B			INSTALLATION PROCEDURE

FURUNO

CODE NO.	006-910-940-00	10CS-X-9403 -4
TYPE	CP10-05201	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｺﾈｸﾀ(8016) CONNECTOR(8016)		008016-038-313761HVF CODE NO. 000-159-017-10	1	
2	ｲﾗｯｸｽﾁｭｰﾌﾞA INSULATION TUBE		3.0X0.3 YEL *50CM* CODE NO. 000-162-841-10	2	
3	ｺﾝﾀｸﾄﾋﾟﾝ(8017) CONTACT PIN(8017)		60-8017-0313-00339F+ CODE NO. 000-159-417-10	40	
4	ﾋﾞﾆﾙ線 VINYL WIRE		KIV 2.0SQ ｸﾛ *2M* CODE NO. 000-554-516-00	1	
5	ｺﾈｸﾀ(SRCN) CONNECTOR(SRCN)		SRCN6A13-3P CODE NO. 000-160-722-10	1	
6	ｺﾈｸﾀ(SRCN) CONNECTOR(SRCN)		SRCN6A13-5P CODE NO. 000-160-726-10	1	
7	ｺﾈｸﾀ(SRCN) CONNECTOR(SRCN)		SRCN6A16-10P CODE NO. 000-160-728-10	2	
8	ｺﾈｸﾀ(SRCN) CONNECTOR(SRCN)		SRCN6A16-7P CODE NO. 000-160-730-10	1	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

FURUNO ELECTRIC CO ., LTD.

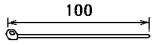
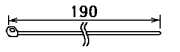
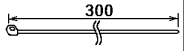
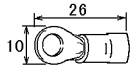
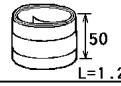
C1319-M03-E

FURUNO

CODE NO.	006-911-000-00	10CS-X-9405 -2
TYPE	CP10-05501	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-100N CODE NO. 000-162-167-10	30	
2	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-200N CODE NO. 000-162-183-10	20	
3	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-300N CODE NO. 000-162-165-10	10	
4	圧着端子 CRIMP-ON LUG		FV5.5-4 (LF) FV5.5-4 CODE NO. 000-166-744-10 000-538-123-00	2	
5	ｱｰｽ板 COPPER STRAP		WEA-1004-0 ROHS WEA-1004-0 CODE NO. 500-310-040-10 500-310-040-00	1	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

FURUNO ELECTRIC CO ., LTD.

C1319-M06-C

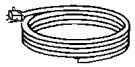
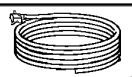
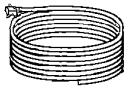
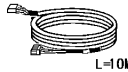
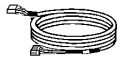
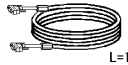
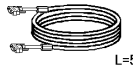
FURUNO

CODE NO.		10CS-X-9406 -1
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

CSH-8L

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	信号ｹｰﾌﾞﾙ組品 SIGNAL CABLE ASSY.	 L=15M	S10-6-15(38P) *15M* CODE NO. 006-976-580-00	1	制御/送受信装置用 FOR CONTROL/TRANSCEIVER UNIT *選択*TO BE SELECT
2	信号ｹｰﾌﾞﾙ組品 SIGNAL CABLE ASSY.	 L=30M	S10-6-30(38P) *30M* CODE NO. 006-976-590-00	1	制御/送受信装置用 FOR CONTROL/TRANSCEIVER UNIT *選択*TO BE SELECT
3	信号ｹｰﾌﾞﾙ組品 SIGNAL CABLE ASSY.	 L=50M	S10-6-50(38P) *50M* CODE NO. 006-976-600-00	1	制御/送受信装置用 FOR CONTROL/TRANSCEIVER UNIT *選択*TO BE SELECT
4	信号ｹｰﾌﾞﾙ組品 SIGNAL CABLE ASSY.	 L=10M	S10-15-10 CODE NO. 006-800-520-00	1	送受信/上下装置用 FOR TRANSCEIVER UNIT/ HULL UNIT *選択*TO BE SELECT
5	信号ｹｰﾌﾞﾙ組品 SIGNAL CABLE ASSY.	 L=5M	S10-15-5 CODE NO. 006-800-510-00	1	送受信/上下装置用 FOR TRANSCEIVER UNIT/ HULL UNIT *選択*TO BE SELECT
6	ｹｰﾌﾞﾙ組品 CABLE ASSY.	 L=10M	3COX-2P-6C *10M* CODE NO. 001-077-220-10	1	表示部/制御部 FOR MONITOR/CONTROL UNIT *選択*TO BE SELECT
7	ｹｰﾌﾞﾙ組品 CABLE ASSY.	 L=5M	3COX-2P-6C *5M* CODE NO. 001-077-230-10	1	表示部/制御部 FOR MONITOR/CONTROL UNIT *選択*TO BE SELECT

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.

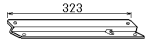
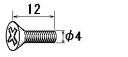
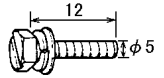
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	006-905-030-00	10CS-X-9501 -5
TYPE	FP10-02701	1/1

付属品表

ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	KB固定金具 KB MOUNTING PLATE	 323	10-078-2221-0 ROHS CODE NO. 100-302-210-10	1	
2	ﾐｶﾞｷ平座金 FLAT WASHER	 φ9	M4 C2680R CODE NO. 000-168-235-10	2	
3	六角ﾅｯﾄ 1ｼｭ HEX. NUT	 3 7	M4 C3604B CODE NO. 000-168-237-10	2	
4	バネ座金 SPRING WASHER	 8	M4 C5191W CODE NO. 000-168-238-10	2	
5	+ｻﾗﾊﾆﾈｼﾞ OVAL HEAD SCREW	 12 φ4	M4X12 C2700W MBN12 CODE NO. 000-163-309-10	2	
6	+ ｱﾌﾞｾｯﾄﾛｯｶｸｾﾑｽB HEX.BOLT	 12 φ5	M5X12 SUS304 CODE NO. 000-162-574-10	4	
7	ｺﾞﾑ足 RUBBER FEET	 φ11	SJ-5003 ｸﾛ CODE NO. 000-165-669-10	4	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

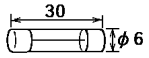
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.

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

FURUNO

CODE NO.	006-907-700-00	10CS-X-9302 -2 1/1
TYPE	SP10-02901	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE		FGBO-A 125V 2A PBF FGBO-A 2A AC125V			2	 000-155-849-10 000-549-062-00

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C1319-P03-C	1/1

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

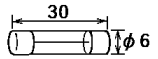
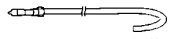
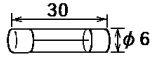
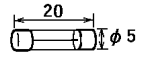
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

FURUNO

CODE NO.	006-910-950	10CS-X-9303 -4 1/1
TYPE	SP10-03001	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
1	ｺﾈｸﾀ(XH) CONNECTOR(XH)		 XHP-12			2	 000-116-944-10
2	ｺﾈｸﾀ(XH) CONNECTOR(XH)		 XHP-15			2	 000-110-946-10
3	ﾋｭｰｽﾞ FUSE		FGBO 250V 4A PBF FGBO 4A AC250V			2	 000-155-842-10 000-546-707-00
4	XHｺﾝﾀｸﾄ組品 XH CONTACT ASSY.		 80-0075			20	 006-979-310-00
5	ﾋｭｰｽﾞ FUSE		FGBO 125V 7A PBF FGBO 7A AC125V			2	 000-155-831-10 000-549-013-00
6	ﾋｭｰｽﾞ FUSE		FGMB 250V 2A PBF FGMB 2A 250V			4	 000-157-497-10 000-122-000-00

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C1319-P04-D	1/1

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

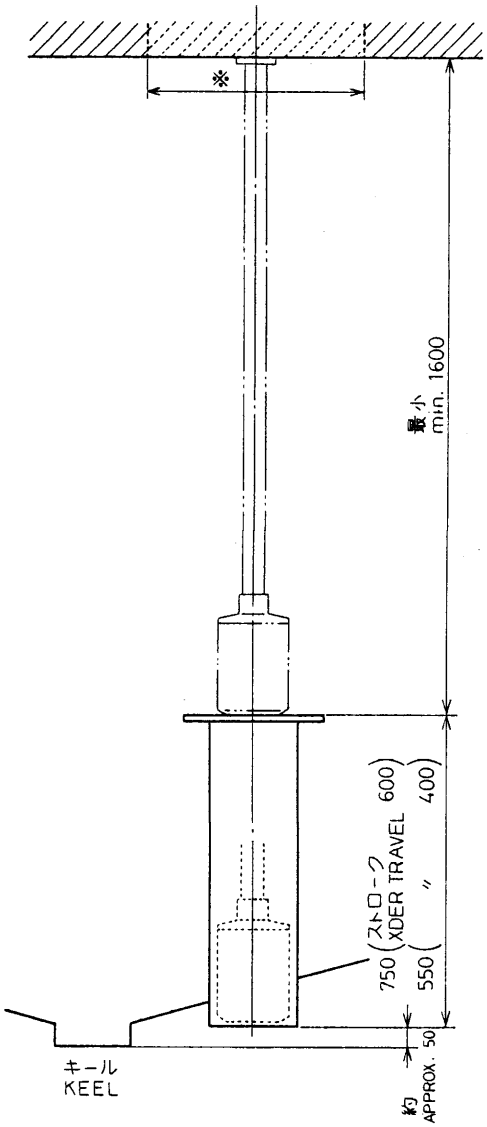
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

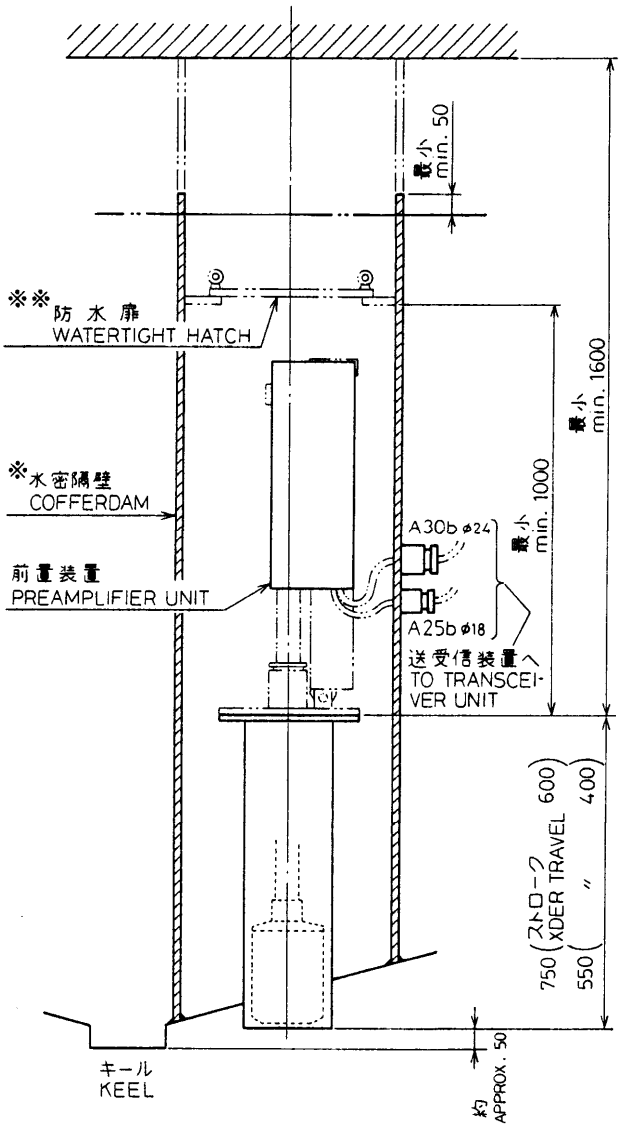
FURUNO

D－1

標準装備
STANDARD INSTALLATION



防水室内装備
WATERTIGHT ROOM INSTALLATION



※ 上下装置上部に1600mmのサービス空間を取れない場合は、天井に“300×300”の穴をあけておくこと。

※ IF OVERHEAD CLEARANCE OF 1600MM IS NOT ALLOWED, MAKE A HOLE OF 300×300MM ON CEILING FOR EASE OF INSTALLATION AND FUTURE SERVICE.

1. 水密隔壁は船級協会規則を参照し、造船所で作成下さい。その際サービススペースも考慮して下さい。
2. ※※水密隔壁の上限を吃水線の上までとれない場合には上下装置取り外しの為、防水扉を設けること。

1. CONSTRUCT THE COFFERDAM IN ACCORDANCE WITH CONCERNED REGULATION. ALSO ALLOW ENOUGH MAINTENANCE SPACE.
2. ※※ PROVIDE A WATER TIGHT HATCH FOR FUTURE MAINTENANCE IF A COFFERDAM IS NOT HIGH ABOVE WATER LEVEL.

CSH－5

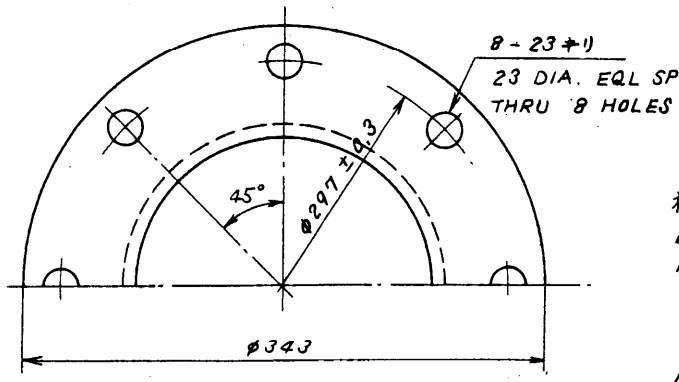
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED	・ ・	三角法 THIRD ANGLE PROJECTION		名称 TITLE	格納タンクの装備例 RETRACTION TANK INSTALLATION METHOD
検図 CHECKED	・ ・	尺度 SCALE	≈		
製図 DRAWN	八王・13・89 M.USUDA	重量 WEIGHT	kg	図番 DWG.NO.	C1273－Y02－A

FURUNO ELECTRIC CO., LTD.

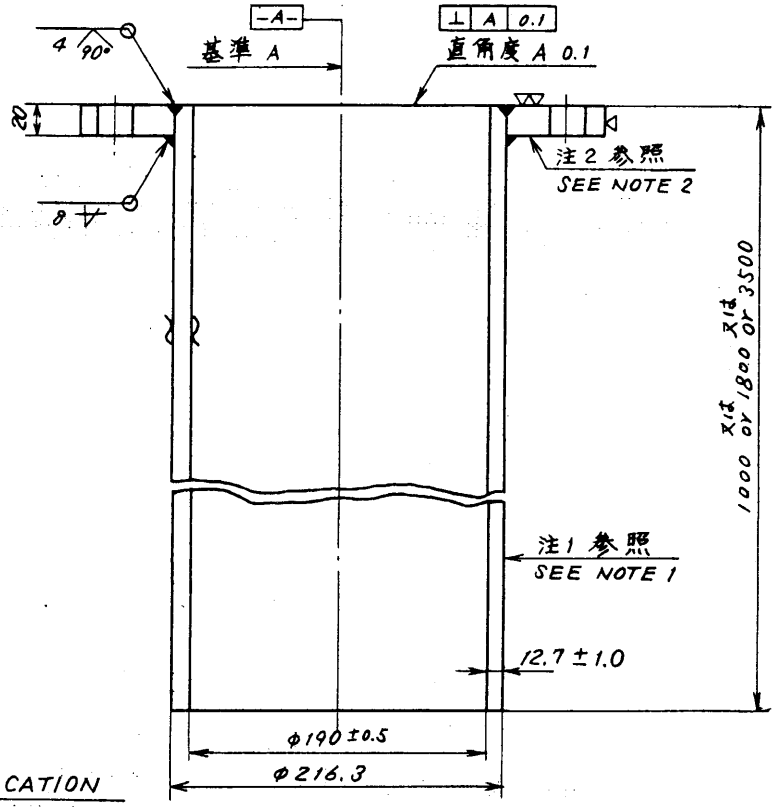
FURUNO

D - 2



格納タンクの長さ；
LENGTH OF RETRACTION TANK;

Lt = [ ] mm



製作時の注意
NOTE FOR FABRICATION

1. 材料はSTPG38-E-C(圧力配管用炭素鋼鋼管 冷間仕上電気抵抗溶接鋼管 呼び径 200A スケジュール 80)を使用のこと。
2. 材料は SS41P を使用のこと。
3. タンク側面は大日本ペイント速乾鉛丹ペイントを2回塗布のこと。
4. タンク内面はビニールAF（中国塗料）を2回塗布のこと。
5. タンク上面は塗装しないこと。

1. USE STPG-38-E-C (8"SCHEDULE 80, JIS G3454, CARBON STEEL PIPE FOR PRESSURE SERVICE).
2. USE SS41P (JIS G3101, ROLLED STEEL FOR GENERAL STRUCTURE).
3. GIVE TWO COATS OF FAST-DRYING RED LEAD PAINT ON OUTSIDE OF TANK.
4. GIVE TWO COATS OF VINYL PAINT AF OR ANTI-FOULING PAINT ON INSIDE OF TANK.
5. DO NOT PAINT ON SURFACE OF FLANGE.

単位 UNIT: mm

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED	NOV. 9 '77	三角法 THIRD ANGLE PROJECTION		名称 TITLE	鉄製格納タンク外観図 STEEL RETRACTION TANK OUTLINE DRAWING
検図 CHECKED	NOV. 8 '77	尺度 SCALE	1/5		
製図 DRAWN	'77 · 6 · 28	重量 WEIGHT	1000mm : 73 1800mm : 123 kg 3500mm : 231	図番 DWG. NO.	C1229-006-G

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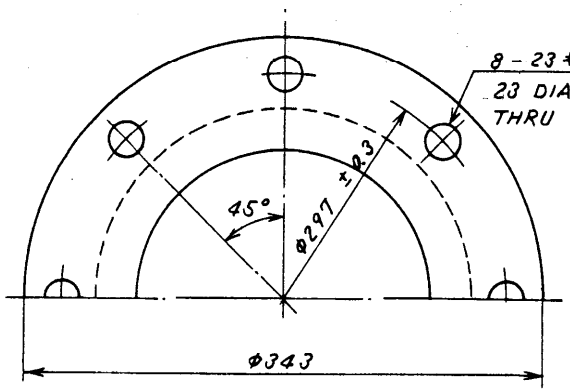
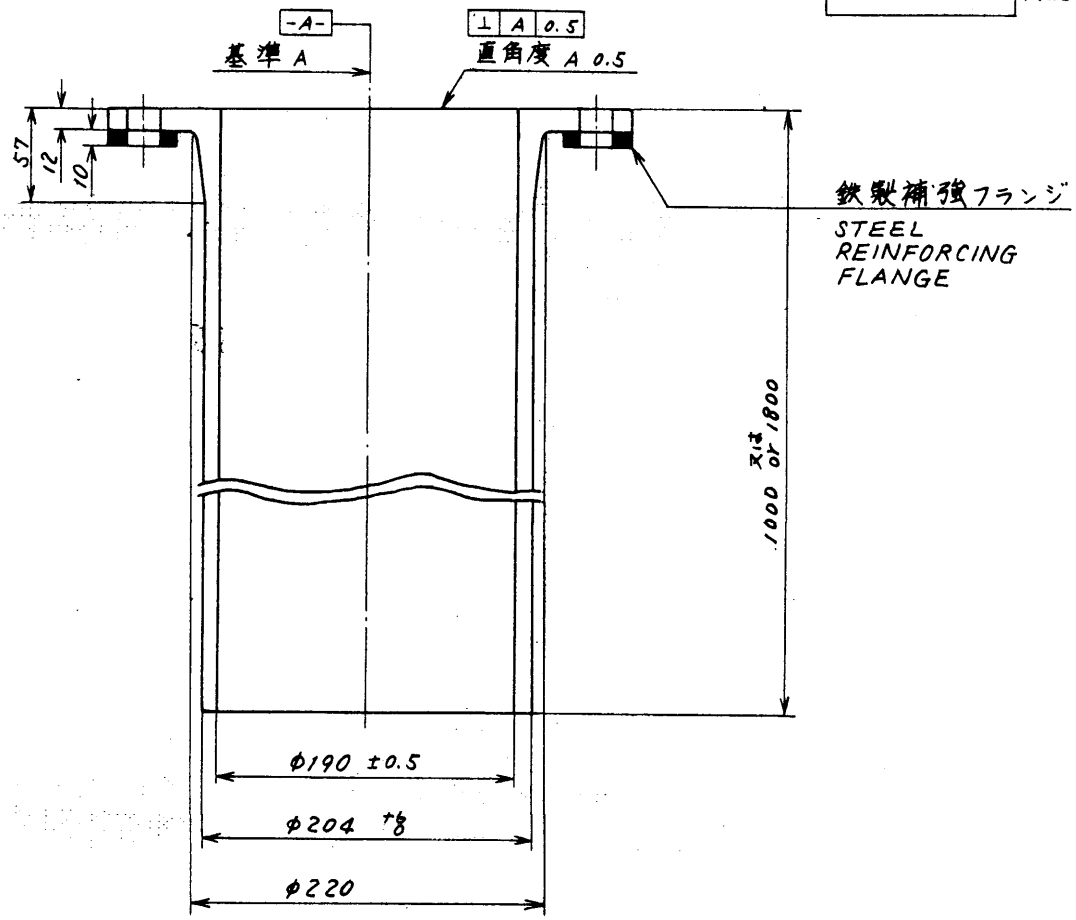
D - 3



格納タンクの長さ;
LENGTH OF
RETRACTION TANK;

Lt = [ ] mm



単位 UNIT: mm	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED		三角法 THIRD ANGLE PROJECTION		名称 TITLE	FRP製格納タンク外観図 FRP RETRACTION TANK OUTLINE DRAWING
検図 CHECKED	July·18·'78	尺度 SCALE	1/5		
製図 DRAWN	July·18·'78	重量 WEIGHT	1000mm: 20kg 1800mm: 27kg	図番 DWG. NO.	C1229-007-E

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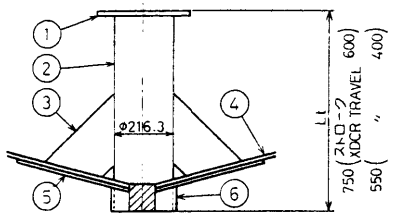
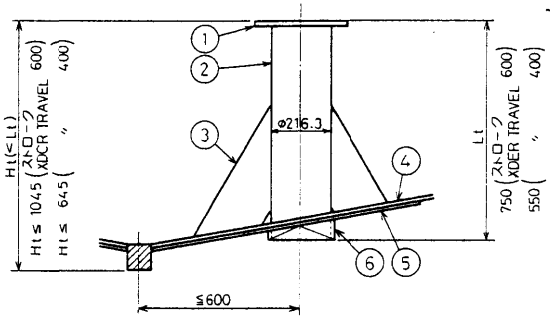
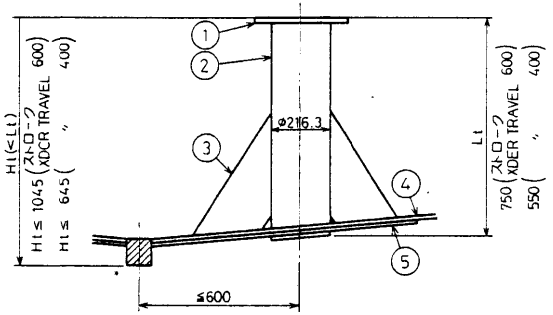
Ⓐ キール上（突出） ON KEEL （PROJECTED）



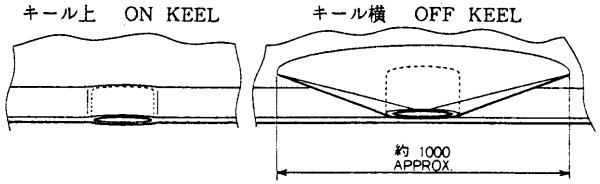
Ⓑ キール横（突出） OFF KEEL （PROJECTED）



Ⓒ キール横（非突出） OFF KEEL （NOT PROJECTED）



Ⓓ 整流覆 FAIRING PLATE



装 備 手 順

1. 船底板及び二重船底板にφ217の穴を開ける。
2. 次の点に注意して、格納タンクを船底板に連続スミ肉溶接する。
   * タンクのフランジ面が、標準走行時に水平になる事。
   * 送受波器を突出させた時に送受信ビームがキールで遮られないように、フランジ面のキールよりの高さ"Ht"を図示の範囲内にする事。
   * タンク下端がキールより下に出ないように、タンクの長さ"Lt"は"Ht"より短くする。且つ、送受波器がタンク下端より出ないように図示の範囲内にする。（標準支給長1000mm）
3. 格納タンクの周囲に外径φ1000以上のダブリング⑧を取り付ける。又、突出装備（Ⓐ,Ⓑ）の場合には、整流覆⑨（D図）を取り付ける。ダブリングと整流覆には、船底板と同じ材質、肉厚のものを使用する事。
4. タンク周囲に油槽がある場合には、隔壁⑥をめぐらせコファダム⑩を設ける事。
5. タンク周囲4ケ所以上に補強板⑤を溶接する。
6. 上下装置本体を格納タンクにボルト締めするのに必要なスペースとして、フランジ面の位置が二重船底板より100mm以上離す。二重船底が高い船には⑧図の方法で二重船底板を下げ、スペースを確保する事。

INSTALLATION METHOD OF RETRACTION TANK

1. Cut out φ217 hole on hull and inner hull plate.
2. Install tank to hull plate with fillet welding taking the following points into account.
   * Flange face is horizontal at normal Ship's trim.
   * Allow height "Ht" of flange face from keel bottom as mentioned in the drawings, otherwise transducer beam is blocked by the keel when transducer is fully lowered.
   * Tank's length "Lt" should be less than "Ht", otherwise the tank is protruded below keel level. The tank should be cut to the specified length so that the transducer can be fully protruded. (The tank is supplied with 1000 mm long as standard.)
3. Fit doubling plate ⑧ of outer dia. φ1000mm around the tank on hull plate. Fit fairing plate ⑨ referring to the drawing Ⓓ for installation method Ⓐ and Ⓑ. Use same material and thickness of doubling and fairing plate as hull plate.
4. Provide cofferdam around the tank in order to isolate the tank from the oil tank.
5. Install 4 pcs. of reinforcement plates between the tank and the hull plate.
6. Allow clearance of more than 100mm below the flange face for easy bolting. Lower the inner hull plate as shown in the drawing Ⓑ if the specified clearance is not secured.

ITEM	NAME	MATERIAL	Q'TY	DWG.NO.	REMARKS
6	整流覆 FAIRING PLATE				
5	ダブリング DOUBLING				
4	船底板 HULL PLATE				
3	補強板 REINFORCEMENT PLATE				
2	格納タンク RETRACTION TANK				
1	タンクフランジ TANK FLANGE				

DRAWN Apr. 25 '97 T. YAMASAKI		TYPE	
CHECKED Apr.25'97 K.Kusunoki	CSH-7 CSH-5 M2 CSH-5	名称	格納タンク（鋼船）
APPROVED Apr.25'97 K.Kusunoki			送受波器装備図
SCALE / MASS kg	APPLICABLE TO: (MODEL) / BLOCK NO.	NAME	RETRACTION TANK (STEEL HULL) TRANSDUCER INSTALLATION
DWG NO. C1273-T01- C			

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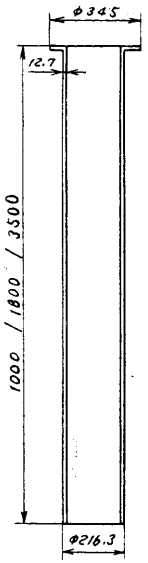
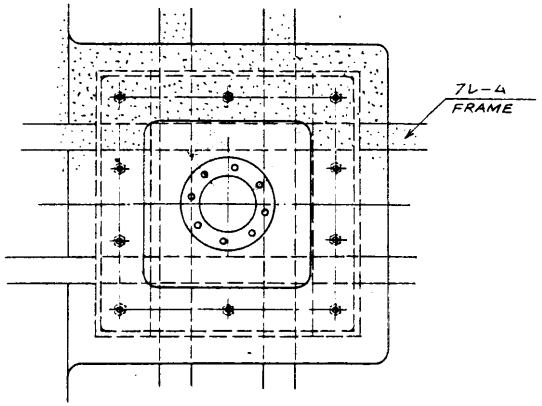
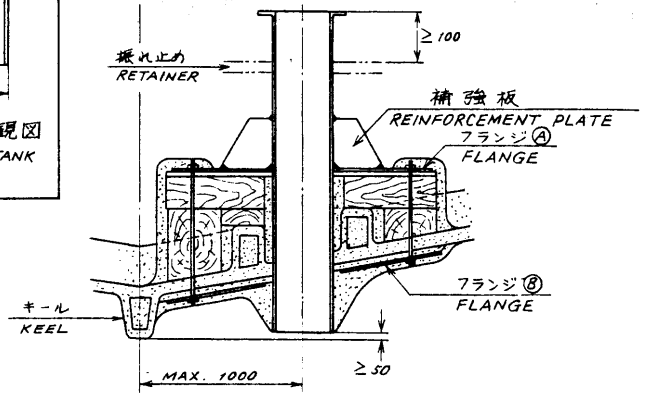
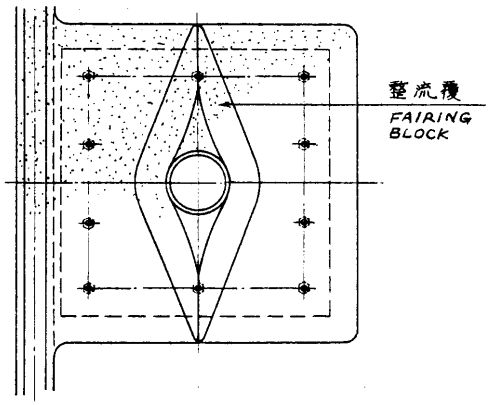


鉄製格納タンク外観図
STEEL RETRACTION TANK
OUTLINE DRAWING







1. 格納タンクの装備は次の条件を満すこと。
   1) 取付位置は船首から 1/3 (小型船の場合は 1/2) 程度。
   2) キールより 1 m 以内。
   3) フランジのボルト締めのため フランジ下面と障害物 (二重船底等) との間に 100 mm 以上のスペースがあること。
   4) タンクの先端はキールの先端より 50 mm 上であること。
   5) タンクのフランジ面は標準定航時に水平であること。

2. 格納タンクの装備は、次の要領を参考にして行うこと。
   1) フレーム間の船底にタンクが通る穴をあける。
   2) タンクあるいは タンクと同径の中子を貫通させ、その回りに フランジ(A) の乗せられる取付台を作り FRP で フレーム、船底間に固定する。
   3) フランジ (A) の取付穴に合わせて取付台にボルトを立てておく。 必要があれば フランジ (B) を作り ボルトを船底から貫通させる。
   4) FRP 硬化後 タンクあるいは中子を抜き取る。
   5) フランジ (A) を タンクに溶接する。
   6) フランジ (A) 下面及び タンク外周に FRP - 鉄接着剤を塗布した後 タンクを取りつける。
   7) 漫水を防ぐため充分に FRP で必要個所を塗り固める。 特に タンク回りは 流線型に成型し 水による抵抗及び 気泡発生を最少限におさえる様 努めること。
   8) 必要に応じて タンクのフランジ面 下部 100 mm の位置より 隔壁等に向けて 振れ止めを設けること。 また フランジ (A) 溶接時、タンクの周囲 3, 4 ヶ所で フランジ (A) に向けて 補強板を溶接する。

注: 強度及び水密性について、船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

1. SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
   1) ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW.
   2) WITHIN 1000 mm FROM KEEL LINE.
   3) ALLOW CLEARANCE OF MORE THAN 100 mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
   4) KEEP LOWEST END OF TANK 50 mm ABOVE BOTTOM OF KEEL.
   5) TANK FLANGE SHOULD BE EXACTLY HORIZONTAL WHEN SHIP IS NORMALLY TRIMMED.

2. INSTALL THE RETRACTION TANK REFERRING TO THE PROCEDURE BELOW.
   1) CUT OUT A HOLE FOR PASSING THE TANK ON THE HULL PLATE.
   2) PASS THE TANK OR A CORE HAVING THE SAME DIAMETER AS THE TANK THRU THE HULL PLATE. MAKE A MOUNTING BED WITH WOODEN BLOCK AND FRP AROUND THE TANK OR THE CORE. THIS BED IS USED TO MOUNT THE FLANGE (A).
   3) WHEN FABRICATING THE MOUNTING BED, STAND THE BOLTS ON THE BED FOR FIXING THE FLANGE (A). IF NECESSARY, MAKE THE FLANGE (B) TO ENSURE FIXING OF THE FLANGE (A).
   4) AFTER FRP IS STIFFENED, DRAW OUT THE TANK OR THE CORE FROM THE MOUNTING BED.
   5) WELD THE FLANGE (A) TO THE TANK.
   6) APPLY A STEEL-FRP ADHESIVE TO THE TANK AND THE FLANGE (A), AND INSTALL THE TANK WITH FLANGE (A) IN PLACE. SETTLE THE FLANGE (A) WITH BOLTS AND NUTS.
   7) APPLY FRP AROUND THE PARTS OF THE TANK PROTRUDING FROM THE HULL BOTTOM FOR SUFFICIENT REINFORCEMENT. MAKE A FAIRING BLOCK WITH FRP AROUND THE PROTRUDING PARTS OF THE TANK TO MINIMIZE THE EFFECT OF AERATION
   8) IF REQUIRED, INSTALL A REINFORCEMENT PLATE WHEN THE FLANGE (A) IS WELDED TO THE TANK. IT IS ADVISABLE TO PROVIDE REINFORCEMENT ANGLES BETWEEN THE TANK AND THE ADJACENT BULKHEAD OR CEILING.

CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED	NOV. 9. '77	三角法 THIRD ANGLE PROJECTION		名称 TITLE	鉄製格納タンク船底装備図(FRP船) STEEL RETRACTION TANK INSTALLATION ON FRP HULL
検図 CHECKED	NOV. 8. '77	尺度 SCALE			
製図 DRAWN	1977. 11. 7	重量 WEIGHT	kg	図番 DWG.NO.	C1243-019-F

CSH-5
CSH-5 MARK-2
CH-12/14/16/24/26

単位 UNIT: mm

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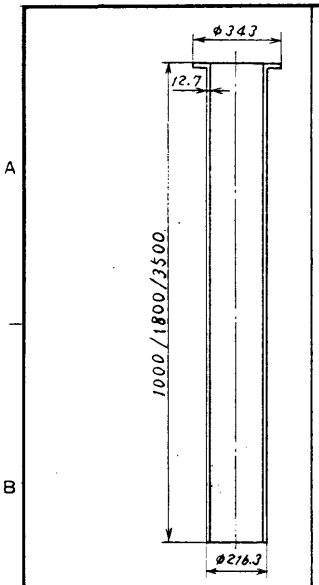
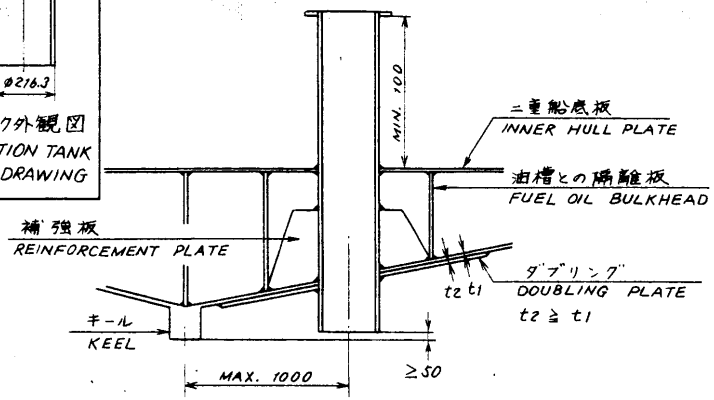
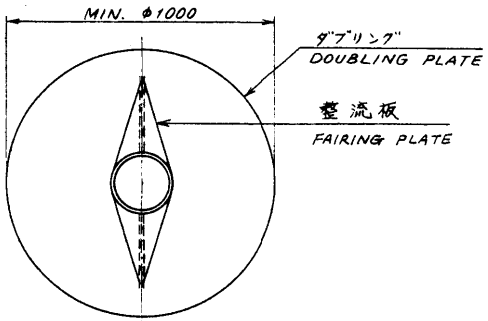
D-5

FURUNO



格納タンク外観図
RETRACTION TANK OUTLINE DRAWING





1. 格納タンクの設備は次の条件を満すこと。
   1) 取付位置は船首から1/3(小型船の場合は1/2)程度。
   2) キールより1m以内。
   3) フランジのボルト締めのためのフランジ下面と障害物(二重船底等)との間に100mm以上のスペースがあること。
   4) タンクの先端はキールの先端より50mm上であること。
   5) タンクのフランジ面は標準走航時に水平であること。

2. 格納タンクの周辺の船底板に径1000程度のダブリングを施すこと。
3. 格納タンクの突出部分に網除けを兼ねた整流板を設けること。
4. 必要に応じて格納タンク周辺に油槽との隔離板をめぐらせること。
   またタンク周囲、3、4ヶ所で船底板に向けて補強板を溶接すること。

注: 強度及び水密性について、船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

1. SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
   1) ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW ON FORE-AFT LINE.
   2) WITHIN 1000 mm FROM KEEL LINE.
   3) ALLOW CLEARANCE OF MORE THAN 100 mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
   4) KEEP LOWEST END OF TANK 50 mm ABOVE BOTTOM OF KEEL.
   5) TANK FLANGE SHOULD BE EXACTLY HORIZONTAL WHEN SHIP IS NORMALLY TRIMMED.

2. DOUBLING PLATE OF ABOUT 1000 mm IN DIA. SHOULD BE INSTALLED BY THE SHIPYARD.
3. FAIRING PLATE (NET PROTECTOR) SHOULD BE INSTALLED AROUND THE PARTS OF THE TANK PROTRUDING FROM THE HULL BOTTOM BY THE SHIPYARD.
4. IF REQUIRED, FUEL OIL BULKHEAD AND REINFORCEMENT PLATE SHOULD BE INSTALLED BY THE SHIPYARD.

CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED	NOV. 9. '77	三角法 THIRD ANGLE PROJECTION	名称 TITLE 格納タンク船底装備図(鋼船) RETRACTION TANK INSTALLATION ON STEEL HULL
検図 CHECKED	NOV. 8. '77	尺度 SCALE 1/	
製図 DRAWN	1977. 11. 7	重量 WEIGHT kg	図番 DWG.NO. C1243-017-F

単位 UNIT: mm

CSH-5
CSH-5 MARK-2
CH-12/14/16/24/26

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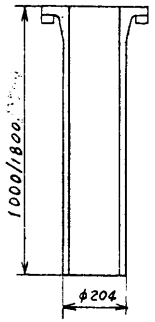
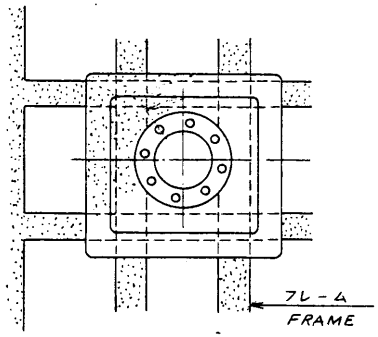
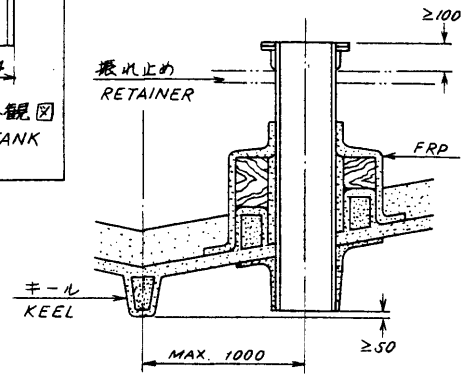
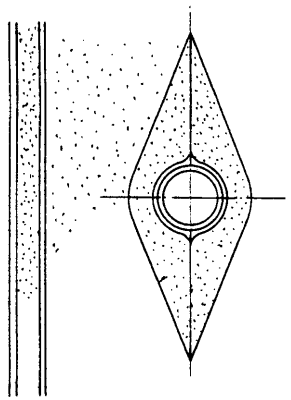
FURUNO



FRP製格納タンク外観図
FRP RETRACTION TANK
OUTLINE DRAWING







1. 格納タンクの装備は次の条件を満すこと。
   1) 取付位置は船首から1/3（小型船の場合は1/2）程度。
   2) キールより1m以内。
   3) フランジのボルト締めのためフランジ下面と障害物（二重船底等）との間に100mm以上のスペースがあること。
   4) タンクの先端はキールの先端より50mm上であること。
   5) タンクのフランジ面は標準走航時に水平であること。

2. 浸水を防ぐため充分にFRPで必要個所を塗り固める。特にタンク回りは流線型に成型し水による抵抗及び気泡発生を最少限におさえる様努めること。
3. 必要に応じてタンクのフランジ面下部100mmの位置より隔壁等に向けて振れ止めを設けること。

注：強度及び水密性について、船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

1. SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
   1) ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW.
   2) WITHIN 1000mm FROM KEEL LINE.
   3) ALLOW CLEARANCE OF MORE THAN 100mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
   4) KEEP LOWEST END OF TANK 50mm ABOVE BOTTOM OF KEEL.
   5) TANK FLANGE SHOULD BE EXACTLY HORIZONTAL WHEN SHIP IS NORMALLY TRIMMED.

2. APPLY FRP AROUND THE PARTS OF THE TANK PROTRUDING FROM THE HULL BOTTOM FOR SUFFICIENT REINFORCEMENT. MAKE A FAIRING BLOCK WITH FRP AROUND THE PROTRUDING PARTS OF THE TANK TO MINIMIZE THE EFFECT OF AERATION.
3. IT IS ADVISABLE TO PROVIDE REINFORCEMENT ANGLES BETWEEN THE TANK AND THE ADJACENT BULKHEAD OR CEILING.

CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED		三角法 THIRD ANGLE PROJECTION	名称 TITLE FRP製格納タンク船底装備図(FRP船) FRP RETRACTION TANK INSTALLATION ON FRP HULL
検図 CHECKED	May・14・1978	R度 SCALE	
製図 DRAWN	July・18・1978 M. Mori	重量 WEIGHT kg	図番 DWG.NO. C1220-038-F

CSH-5
CSH-5 MARK-2
CH-12/14/16/24/26

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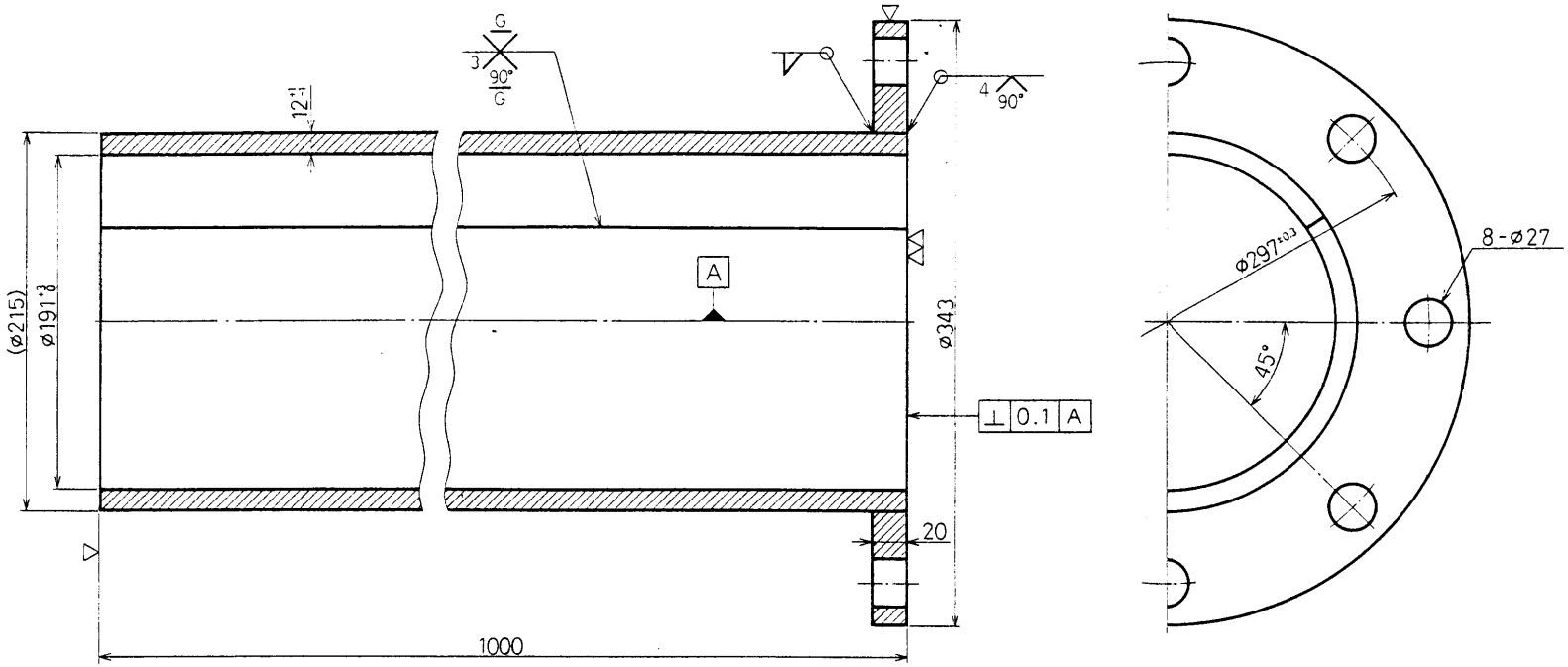
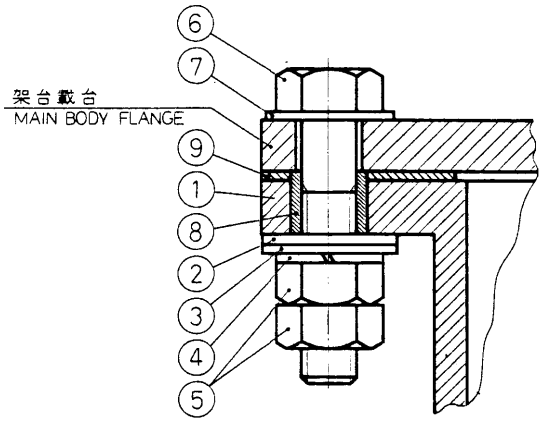
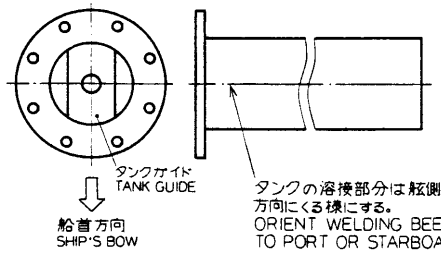




a) 格納タンク装備要領
ORIENTATION OF TANK



注) 架台, 格納タンクに他の電気機器のアースを取らないこと。
NOTE. DO NOT CONNECT GROUNDING WIRE OF OTHER EQUIPMENT TO RETRACTION TANK.

ITEM	NAME	MATERIAL	Q'TY	DWG.NO.	REMARKS
9	フランジパッキン GASKET	CR	1	SHJ-0009-1	
8	絶縁パッキン (2) INSULATION PACKING (2)	CR	8	MS-1000-68	
7	平座金 FLAT WASHER	SUS304	8	M20用	
6	六角ボルト HEX. BOLT	SUS304	8	M20 × 100	
5	六角ナット HEX. NUT	SUS304	8	M20	
4	スプリングワッシャ SPRING WASHER		8		
3	ワッシャ WASHER	SUS304	8	SHG-0002	
2	絶縁板 (2) INSULATION WASHER (2)	CR	8	SHG-0004	
1	格納タンク (アルミ) RETRACTION TANK	A5083	1	10-044-2601	

承認 APPROVED	DEC. 27.'90 T.NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	格納タンク(アルミ)外寸図 RETRACTION TANK (ALUMINUM)
検図 CHECKED	DEC. 27.'90 T. MIYOSHI	尺度 SCALE	/		
製図 DRAWN	DEC. 27.'90 M. USUDA	重量 WEIGHT	35 kg	図番 DWG.NO.	C1273-G09-A

CSH-5

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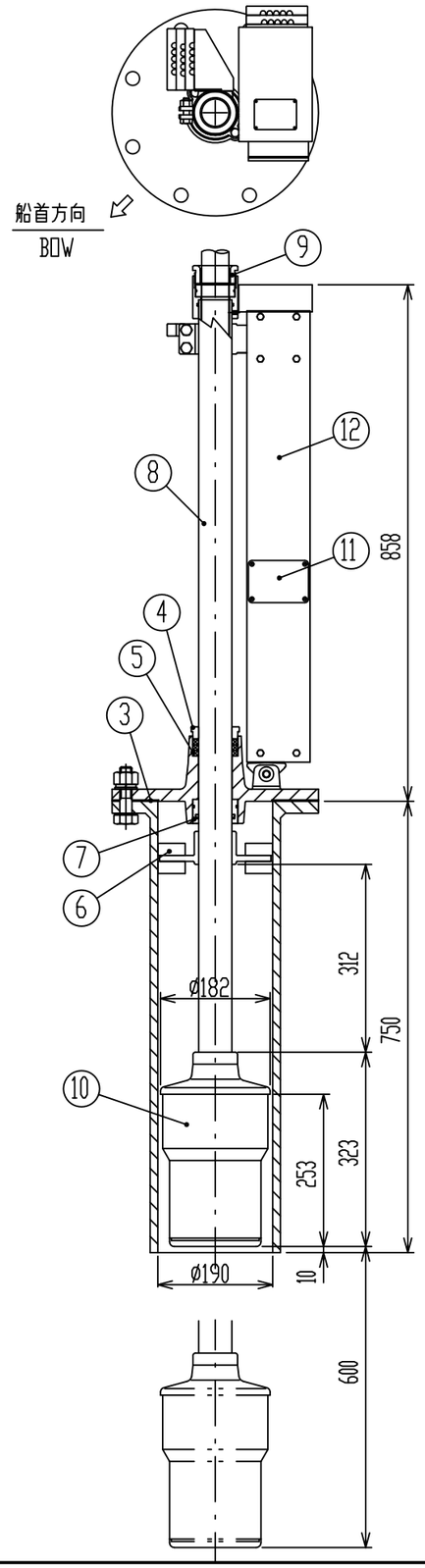
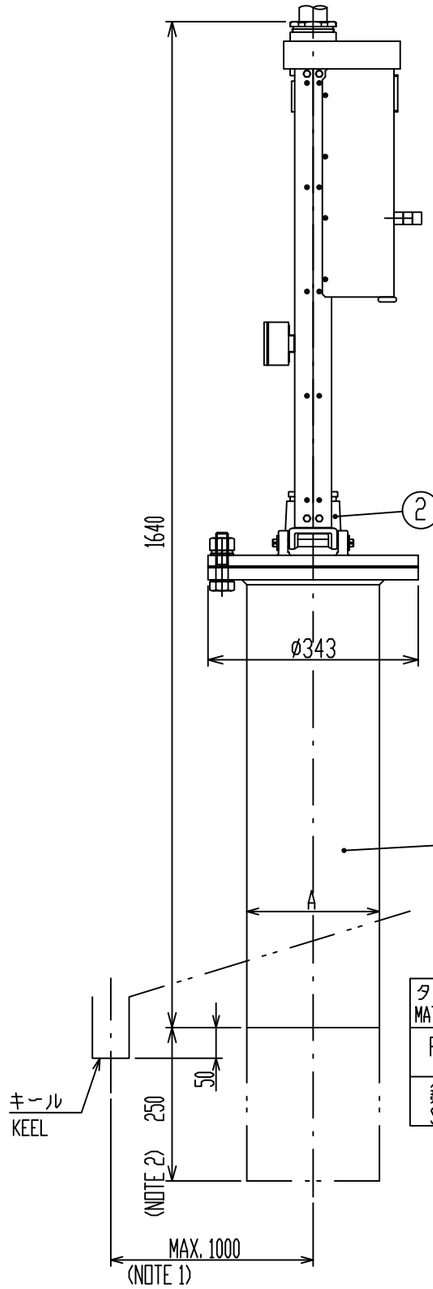
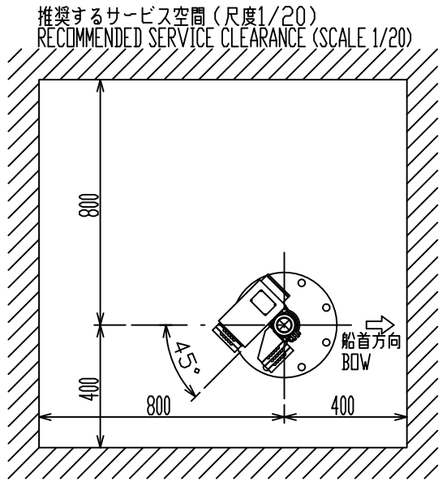
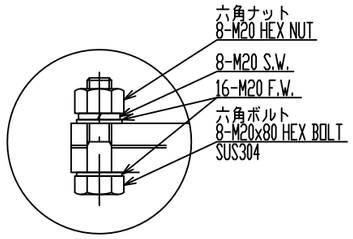




タンクの材質 MATERIAL OF TANK	外径(A) DIA.(mm)
FRP	ø204
鉄 STEEL	ø216.3

推奨するサービス空間（尺度1/20）
RECOMMENDED SERVICE CLEARANCE (SCALE 1/20)





注記
1）装備位置は船首から１／３（小型船では１／２）程度でキールから１m以内とする。
2）格納タンクは装備位置に応じて250mm以内で切断する。
3）左図のごとく船首－船尾ラインと上下動部の角度が約45°となるよう装備する。
図では上下動部は左舷船尾側に位置しているが、右舷船尾側、左舷船首側、
または、右舷船首側でもよい。
4）装備後は装備要領書を参照し船首線調整を行うこと。

NOTE
1) THE HALL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF THE SHIP'S LENGTH FROM THE BOW ON THE FORE-AFT LINE AND BESIDE THE KEEL LINE (LESS THAN 1000 mm FROM KEEL LINE).
2) CUT THE TANK WITHIN 250 mm IN LENGTH ACCORDING TO INSTALLATION METHOD.
3) THE HULL UNIT SHOULD BE ORIENTED SO THAT THE SHIP'S FORE-AFT LINE CROSSES THE RAISE LOWER DRIVE BLOCK AT AN ANGLE OF SPPROXIMATELY 45°AS SHOWN AT LEFT. NOTE THAT POSITIIONS WHITCH ARE ROTATED IN 90°STEPS FROM THE SHOWN POSITION ARE ALSO ALLOWED.
4) HEADING ADJUSTMENT SHOULD BE PERFORMED AFTER INSTALLATION. REFERING TO THE INSTALLATION MANUAL.

ITEM 品番	NAME 品名	MATERIAL 材質	Q'TY 数量	DWG.NO. 図番	REMARKS 摘要
12	上下動部 RAISE/LOWER DRIVE BLOCK		1		
11	コネクタボックス CONNECTOR BOX		1		
10	送受波器 TRANSDUCER		1		
9	抜止め金具 STOPPER		1		
8	上下シャフト(1) MAIN SHAFT(1)		1		
7	U-パッキン U-PACKING		1	ISI 55 65 6	
6	タンクガイド TANK GUIDE		1		
5	グリスコットン GREASE COTTON		1		□9.5x0.7m
4	グリスコットン押さえ台 GREASE COTTON RETAINER		1		
3	フランジパッキン GASKET	CR	1	SHJ-0009-1	
2	架台載台 MAIN BODY FLANGE		1		
1	格納タンク RETRACTION TANK		1		質量に含まず NOT INCLUDED IN MASS

DRAWN	8/Apr/09 T.YAMASAKI	TITLE	CSH-8040-107
CHECKED	8/Apr/09 T.TAKENO	名称	上下装置（600mmストローク）
APPROVED	14/Apr/09 R.Esumi		外寸図
SCALE	1/10	MASS	82 kg（質量は格納タンクを含まず MASS W/O RETRACTION TANK）
NAME	HULL UNIT (600mm TRAVEL)		
DWG. No.	C1314-G03- E	REF. No.	10-067-3000-G0
	OUTLINE DRAWING		

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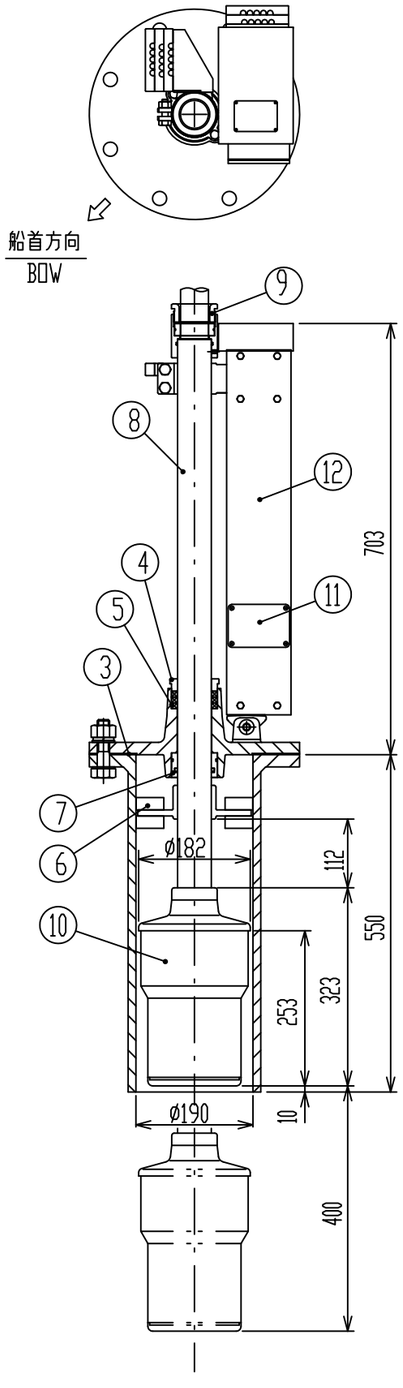
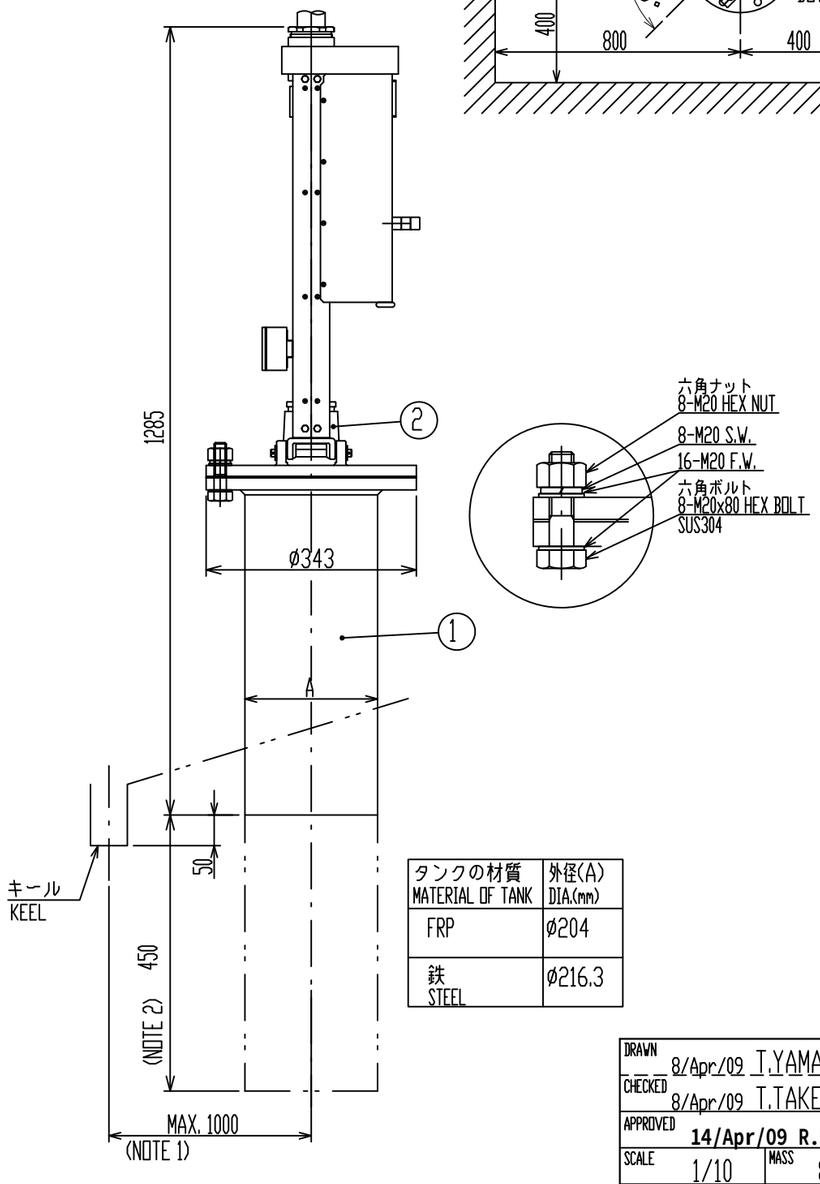
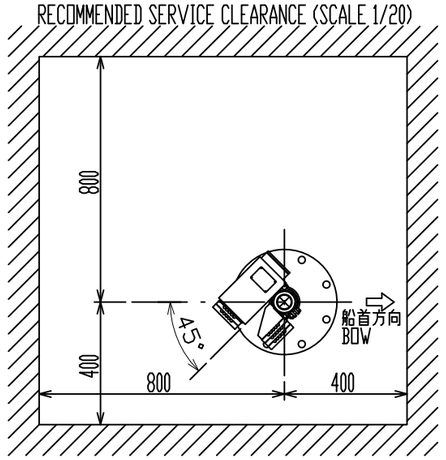




タンクの材質 MATERIAL OF TANK	外径(A) DIA.(mm)
FRP	ø204
鉄 STEEL	ø216.3

推奨するサービス空間（尺度1/20）
RECOMMENDED SERVICE CLEARANCE (SCALE 1/20)



注記
1）装備位置は船首から１／３（小型船では１／２）程度でキールから１ｍ以内とする。
2）格納タンクは装備位置に応じて450mm以内で切断する。
3）左図のごとく船首－船尾ラインと上下動部の角度が約45°となるよう装備する。
　図では上下動部は左舷船尾側に位置しているが、右舷船尾側、左舷船首側、
　または、右舷船首側でもよい。
4）装備後は装備要領書を参照し船首線調整を行うこと。

NOTE
1) THE HALL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF THE SHIP'S LENGTH FROM THE BOW ON THE FORE-AFT LINE AND BESIDE THE KEEL LINE (LESS THAN 1000 mm FROM KEEL LINE).
2) CUT THE TANK WITHIN 450 mm IN LENGTH ACCORDING TO INSTALLATION METHOD.
3) THE HULL UNIT SHOULD BE ORIENTED SO THAT THE SHIP'S FORE-AFT LINE CROSSES THE RAISE LOWER DRIVE BLOCK AT AN ANGLE OF SPPROXIMATELY 45°AS SHOWN AT LEFT. NOTE THAT POSITIONS WHITCH ARE ROTATED IN 90°STEPS FROM THE SHOWN POSITION ARE ALSO ALLOWED.
4) HEADING ADJUSTMENT SHOULD BE PERFORMED AFTER INSTALLATION. REFERING TO THE INSTALLATION MANUAL.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
12	上下動部 RAISE/LOWER DRIVE BLOCK		1		
11	コネクタボックス CONNECTOR BOX		1		
10	送受波器 TRANSDUCER		1		
9	抜止め金具 STOPPER		1		
8	上下シャフト(1) MAIN SHAFT(1)		1		
7	U-パッキン U-PACKING		1	ISI 55 65 6	
6	タンクガイド TANK GUIDE		1		
5	グリスコットン GREASE COTTON		1		□9.5x0.7m
4	グリスコットン押さえ台 GREASE COTTON RETAINER		1		
3	フランジパッキン GASKET	CR	1	SHJ-0009-1	
2	架台載台 MAIN BODY FLANGE		1		
1	格納タンク RETRACTION TANK		1		質量に含まず NOT INCLUDED IN MASS

DRAWN	8/Apr/09 T.YAMASAKI	TITLE	CSH-8041-107
CHECKED	8/Apr/09 T.TAKENO	名称	上下装置（400mmストローク）
APPROVED	14/Apr/09 R.Esumi		外寸図
SCALE	1/10	MASS	81 kg
DWG.No.	C1314-G04- E	質量は格納タンクを含まず MASS W/O RETRACTION TANK	10-067-3100-G0
NAME	HULL UNIT (400mm TRAVEL)		
	OUTLINE DRAWING		

FURUNO

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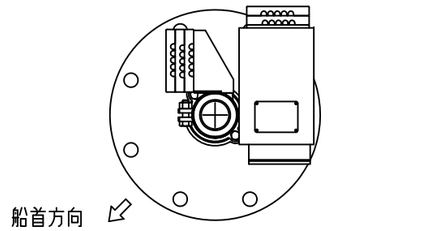
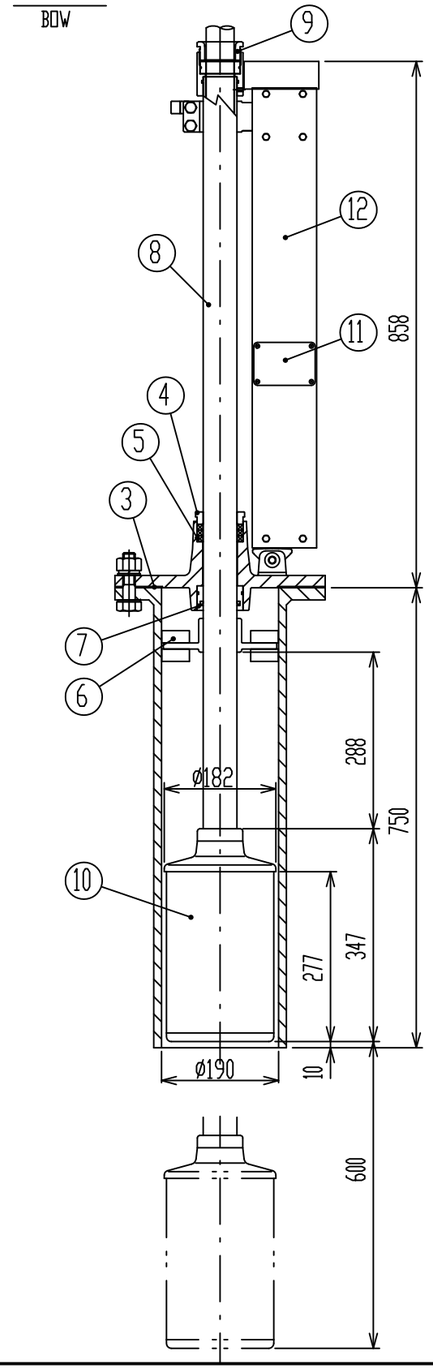
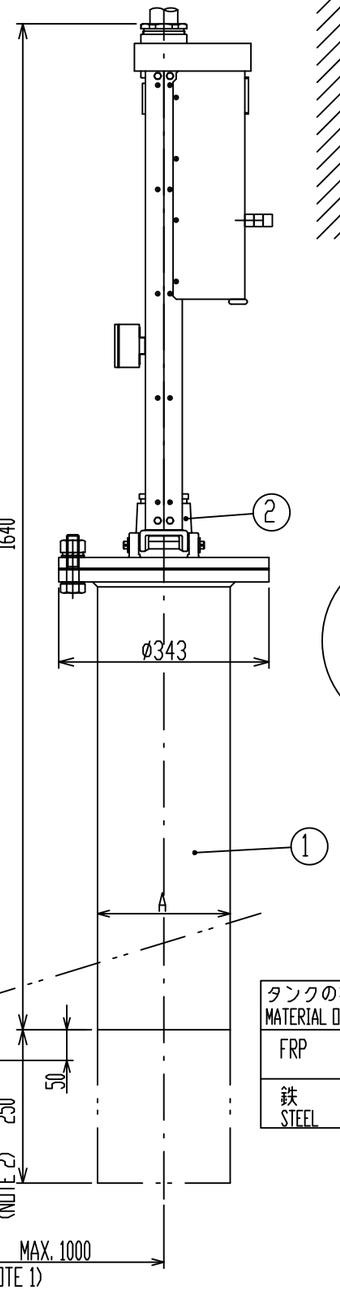
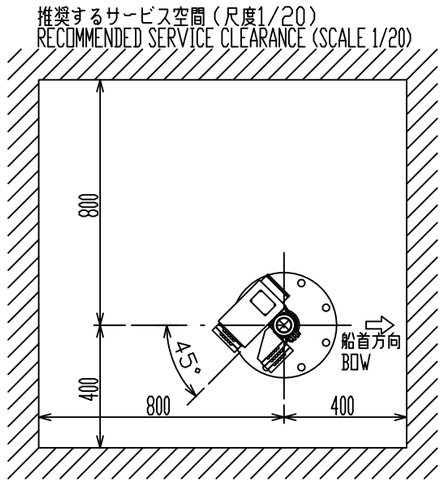


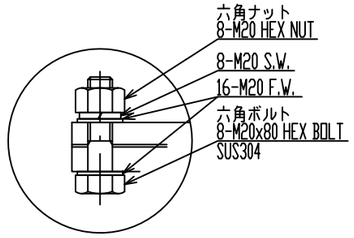




タンクの材質 MATERIAL OF TANK	外径(A) DIA.(mm)
FRP	ø204
鉄 STEEL	ø216.3

推奨するサービス空間（尺度1/20）
RECOMMENDED SERVICE CLEARANCE (SCALE 1/20)





注記
1）装備位置は船首から１／３（小型船では１／２）程度でキールから１ｍ以内とする。
2）格納タンクは装備位置に応じて250mm以内で切断する。
3）左図のごとく船首ー船尾ラインと上下動部の角度が約45°となるよう装備する。
図では上下動部は左舷船尾側に位置しているが、右舷船尾側、左舷船首側、
または、右舷船首側でもよい。
4）装備後は装備要領書を参照し船首線調整を行うこと。

NOTE
1) THE HALL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF THE SHIP'S LENGTH FROM THE BOW ON THE FORE-AFT LINE AND BESIDE THE KEEL LINE (LESS THAN 1000 mm FROM KEEL LINE).
2) CUT THE TANK WITHIN 250 mm IN LENGTH ACCORDING TO INSTALLATION METHOD.
3) THE HULL UNIT SHOULD BE ORIENTED SO THAT THE SHIP'S FORE-AFT LINE CROSSES THE RAISE LOWER DRIVE BLOCK AT AN ANGLE OF SPPROXIMATELY 45°AS SHOWN AT LEFT. NOTE THAT POSITIONS WHITCH ARE ROTATED IN 90°STEPS FROM THE SHOWN POSITION ARE ALSO ALLOWED.
4) HEADING ADJUSTMENT SHOULD BE PERFORMED AFTER INSTALLATION. REFERING TO THE INSTALLATION MANUAL.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
12	上下動部 RAISE/LOWER DRIVE BLOCK		1		
11	コネクタボックス CONNECTOR BOX		1		
10	送受波器 TRANSDUCER		1		
9	抜止め金具 STOPPER		1		
8	上下シャフト(1) MAIN SHAFT(1)		1		
7	Uーパッキン U-PACKING		1	ISI 55 65 6	
6	タンクガイド TANK GUIDE		1		
5	グリスコットン GREASE COTTON		1		□9.5x0.7m
4	グリスコットン押さえ台 GREASE COTTON RETAINER		1		
3	フランジパッキン GASKET	CR	1	SHJ-0009-1	
2	架台載台 MAIN BODY FLANGE		1		
1	格納タンク RETRACTION TANK		1		質量に含まず NOT INCLUDED IN MASS

DRAWN	8/Apr/09 T.YAMASAKI	TITLE	CSH-8040-85
CHECKED	8/Apr/09 T.TAKENO	名称	上下装置（600mmストローク）
APPROVED	14/Apr/09 R.Esumi		外寸図
SCALE	1/10 MASS 85 kg 質量は格納タンクを含まず MASS W/O RETRACTION TANK	NAME	HULL UNIT (600mm TRAVEL)
DWG. No.	C1314-G05- C	REF. No.	OUTLINE DRAWING

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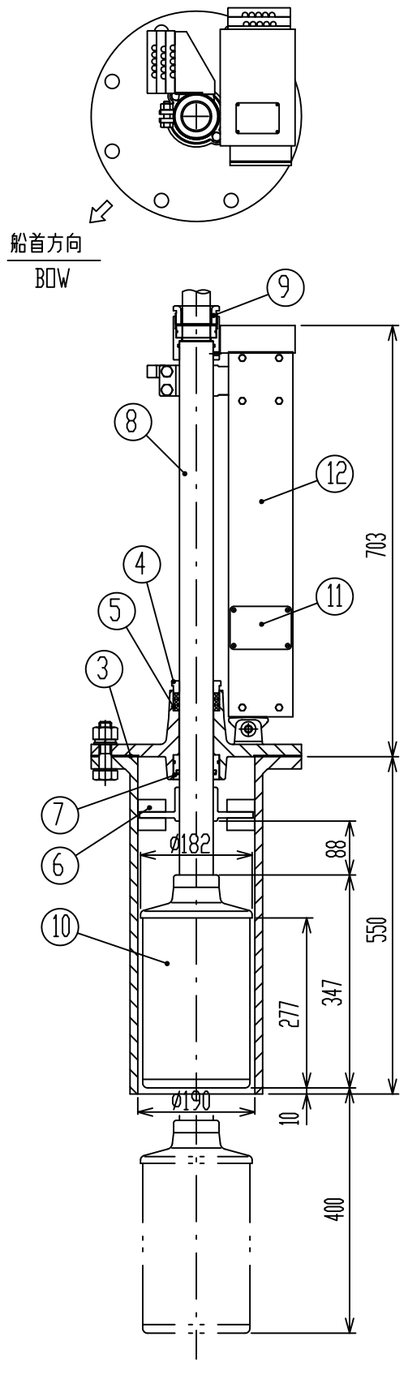
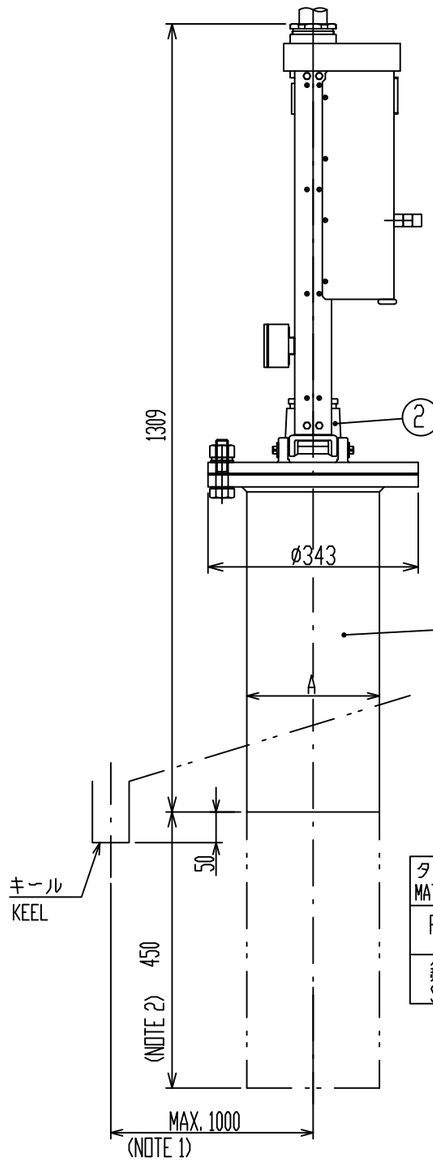
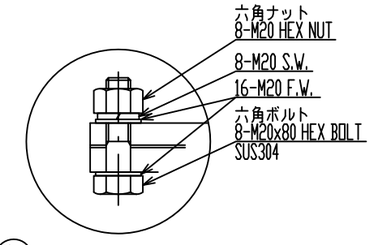
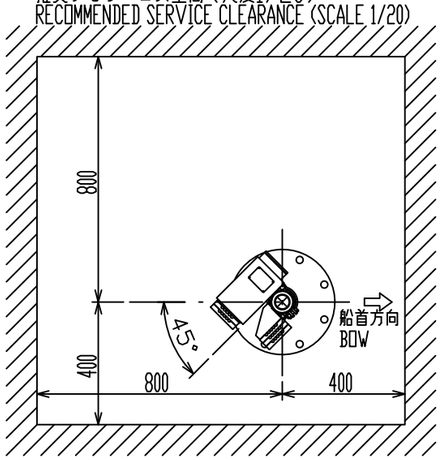






推奨するサービス空間（尺度1/20）
RECOMMENDED SERVICE CLEARANCE (SCALE 1/20)



注記
1）装備位置は船首から１／３（小型船では１／２）程度でキールから１ｍ以内とする。
2）格納タンクは装備位置に応じて450mm以内で切断する。
3）左図のごとく船首－船尾ラインと上下動部の角度が約45°となるよう装備する。
　図では上下動部は左舷船尾側に位置しているが、右舷船尾側、左舷船首側、
　または、右舷船首側でもよい。
4）装備後は装備要領書を参照し船首線調整を行うこと。

NOTE
1) THE HALL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF THE SHIP'S LENGTH FROM THE BOW ON THE FORE-AFT LINE AND BESIDE THE KEEL LINE (LESS THAN 1000 mm FROM KEEL LINE).
2) CUT THE TANK WITHIN 450 mm IN LENGTH ACCORDING TO INSTALLATION METHOD.
3) THE HULL UNIT SHOULD BE ORIENTED SO THAT THE SHIP'S FORE-AFT LINE CROSSES THE RAISE LOWER DRIVE BLOCK AT AN ANGLE OF SPPROXIMATELY 45°AS SHOWN AT LEFT. NOTE THAT POSITIONS WHITCH ARE ROTATED IN 90°STEPS FROM THE SHOWN POSITION ARE ALSO ALLOWED.
4) HEADING ADJUSTMENT SHOULD BE PERFORMED AFTER INSTALLATION. REFERING TO THE INSTALLATION MANUAL.

タンクの材質 MATERIAL OF TANK	外径(A) DIA.(mm)
FRP	ø204
鉄 STEEL	ø216.3

ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
12	上下動部 RAISE/LOWER DRIVE BLOCK		1		
11	コネクタボックス CONNECTOR BOX		1		
10	送受波器 TRANSDUCER		1		
9	抜止め金具 STOPPER		1		
8	上下シャフト(1) MAIN SHAFT(1)		1		
7	Uーパッキン U-PACKING		1	ISI 55 65 6	
6	タンクガイド TANK GUIDE		1		
5	グリスコットン GREASE COTTON		1		□9.5x0.7m
4	グリスコットン押さえ台 GREASE COTTON RETAINER		1		
3	フランジパッキン GASKET	CR	1	SHJ-0009-1	
2	架台載台 MAIN BODY FLANGE		1		
1	格納タンク RETRACTION TANK		1		質量に含まず NOT INCLUDED IN MASS

DRAWN	8/Apr/09 T.YAMASAKI	TITLE	CSH-8041-85
CHECKED	8/Apr/09 T.TAKENO	名称	上下装置（400mmストローク）
APPROVED	14/Apr/09 R.Esumi		外寸図
SCALE	1/10	MASS	84 kg
		質量は格納タンクを含まず MASS W/O RETRACTION TANK	
DWG. No.	C1314-G06- C	REF. No.	
NAME	HULL UNIT (400mm TRAVEL)		
	OUTLINE DRAWING		

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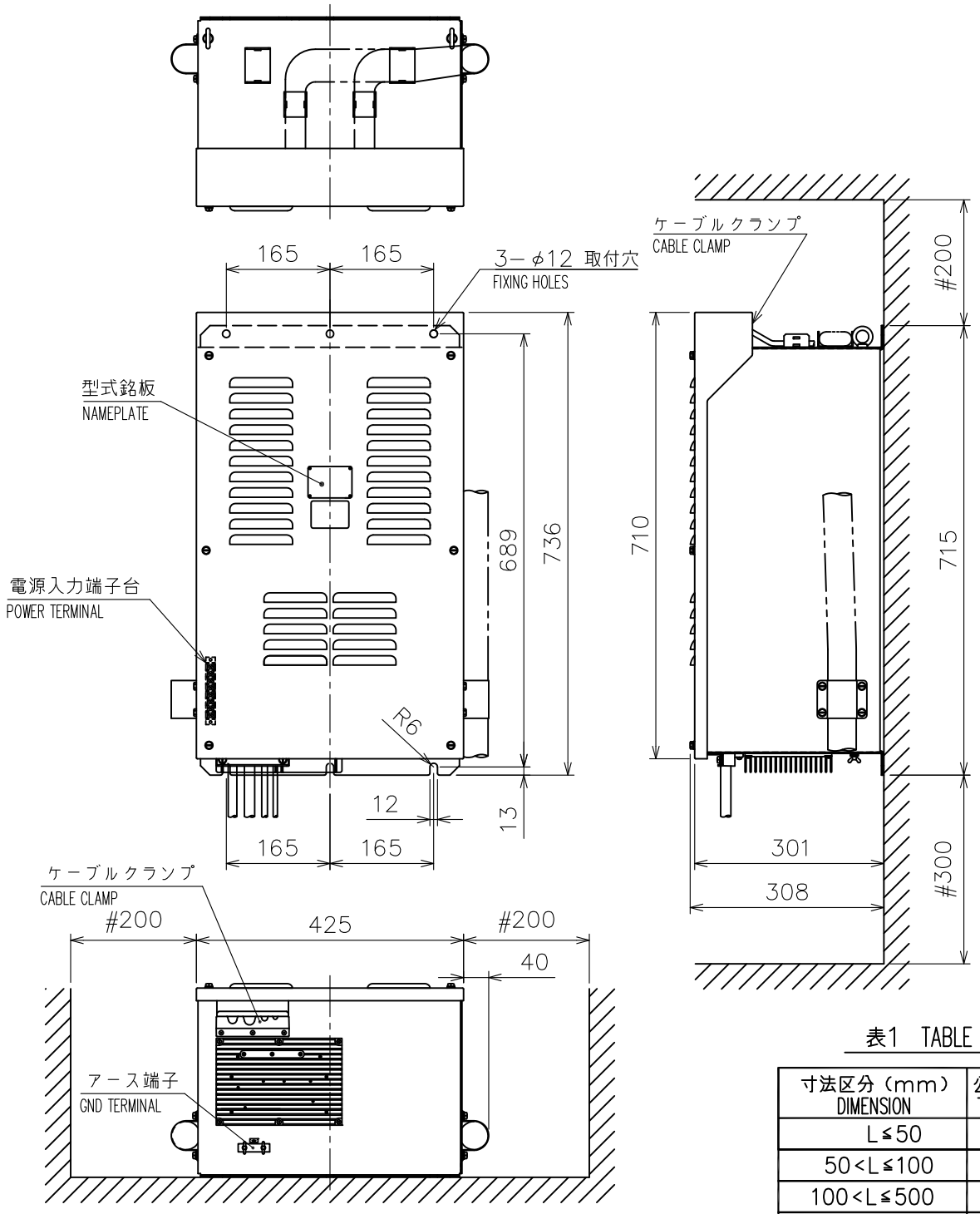

表1 TABLE 1

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

注 記 1） ＃印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表1による。
3） 取付用ネジはM10ボルトを使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE M10 BOLTS FOR FIXING THE UNIT.

DRAWN 27/Jan/10 T.YAMASAKI		TITLE	CSH-8030
CHECKED 27/Jan/10 T.TAKENO		名称	送受信装置
APPROVED 16/Feb/10 R.Esumi	CSH-8/8L		外寸図
SCALE 1/10 MASS 37 ±10% kg		NAME	TRANSCEIVER UNIT
DWG. No. C1314-G01- C	REF. No. 10-067-200G- 4		OUTLINE DRAWING

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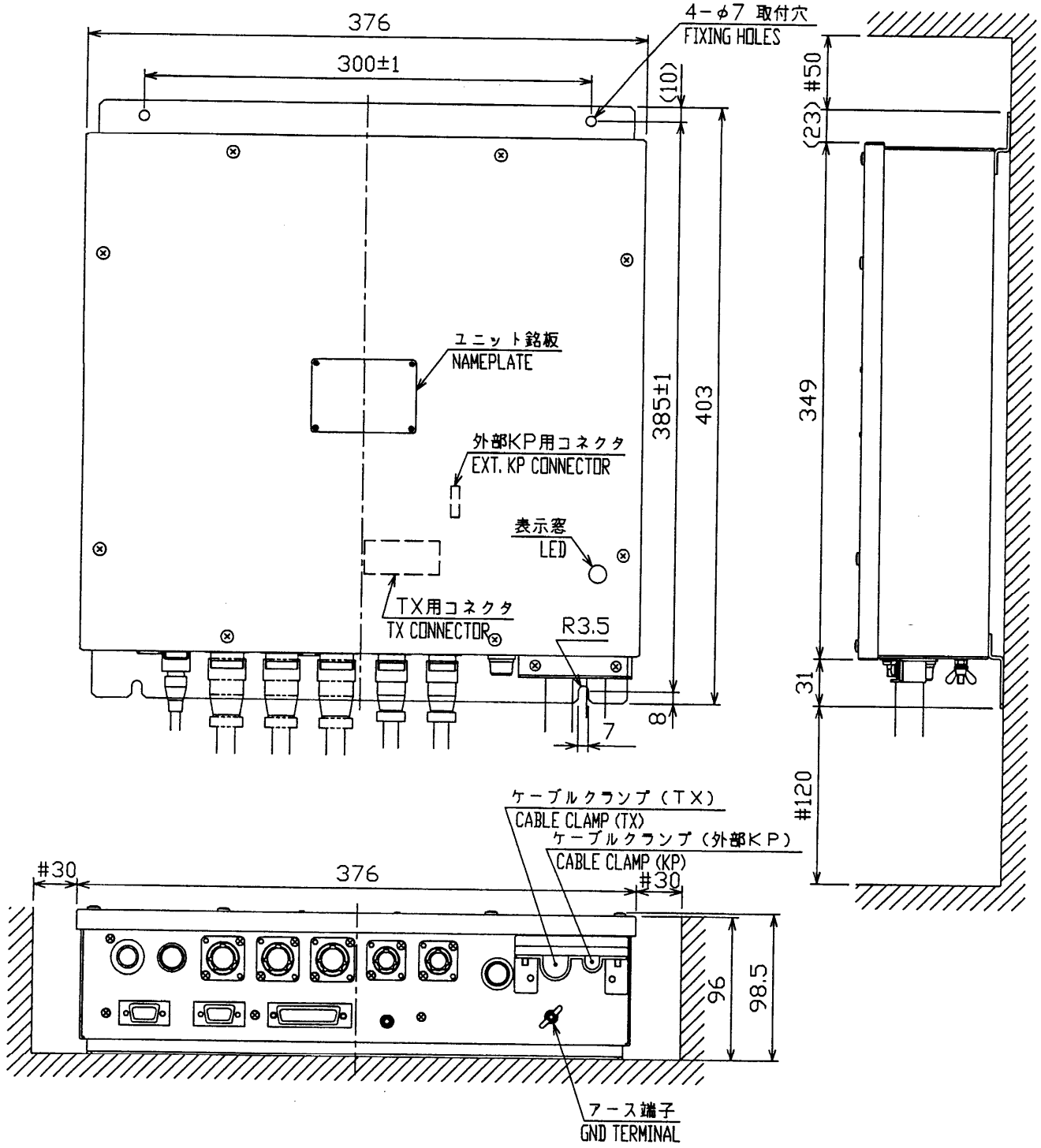

注　記　1）＃印寸法は最小サービス空間寸法とする。
　　2）指定外の寸法公差は表１による。
　　3）取付用ネジはＭ６ボルト、またはコーチボルト呼び径６を使用

NOTE　1.　#: RECOMMENDED SERVICE CLEARANCE.
　　2.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
　　3.　USE M6 BOLTS OR COACH SCREWS φ6 FOR FIXING THE UNIT.

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

表１ TABLE 1

DRAWN Dec. 5 '02 T.YAMASAKI			TITLE CSH-5210
CHECKED Dec. 5 '02 Y.KIMURA			名称 制御部
APPROVED Dec. 5, '02 Y. Kimura	CSH-5L/8L		外寸図
SCALE 1/4	MASS 3.4 ±10% kg		NAME PROCESSOR UNIT
DWG.No. C1319-G01- B	10-078-300G-1		OUTLINE DRAWING

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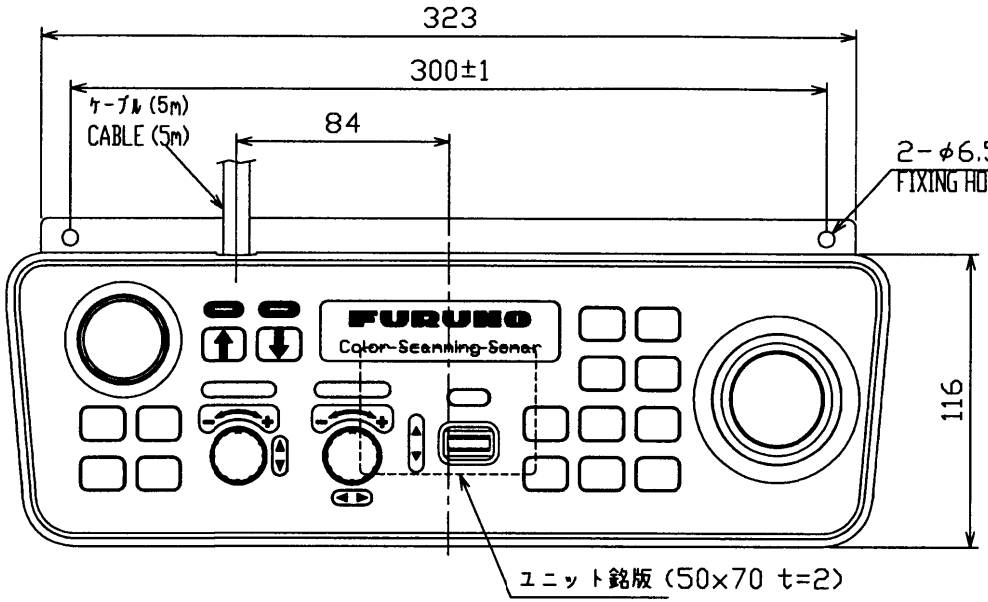
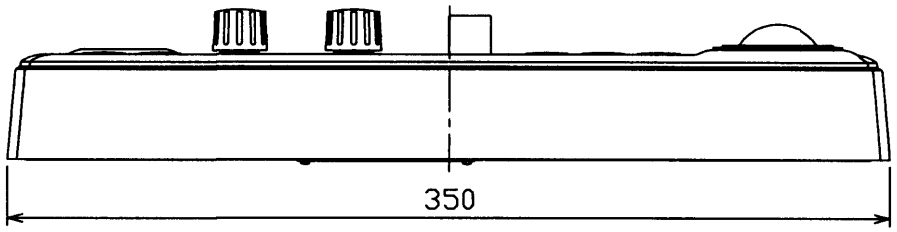


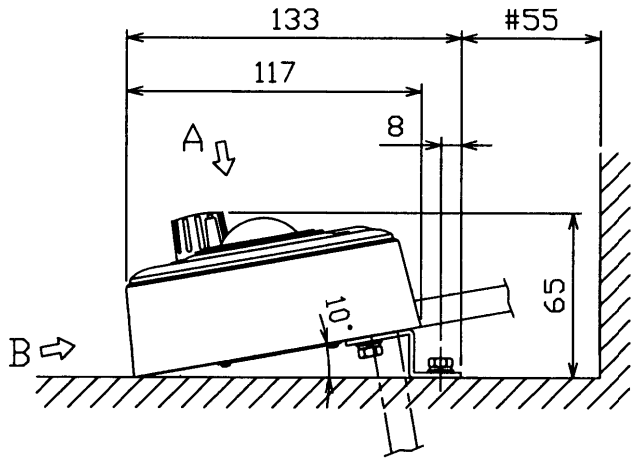
矢視 A　VIEW A



矢視 B　VIEW B

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

表1 TABLE 1



注　記　1）＃印寸法は最小サービス空間寸法とする。
　　2）指定外の寸法公差は表1による。
　　3）取付用ネジはトラスタッピンネジ呼び径5、
　　またはM5ボルトを使用のこと。

NOTE　1. #: RECOMMENDED SERVICE CLEARANCE.
　　2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
　　3. USE M5 BOLTS OR TAPPING SCREWS φ5 FOR FIXING THE UNIT.

DRAWN Dec. 13 '02 T.YAMASAKI		TITLE	CSH-5211
CHECKED Dec. 16 '02 Y.KIMURA		名称	操作部 (卓上装備、金具付)
APPROVED Dec. 16, '02 Y. Kimura	CSH-5L/8L		外寸図
SCALE 1/3 MASS 3.5 ±10% kg	質量はケーブル重さを含む。MASS W/ CABLE.	NAME	CONTROL UNIT (TABLETOP MOUNT W/ FIXTURE)
DWG No. C1319-G02- B	10-078-200G-1		OUTLINE DRAWING

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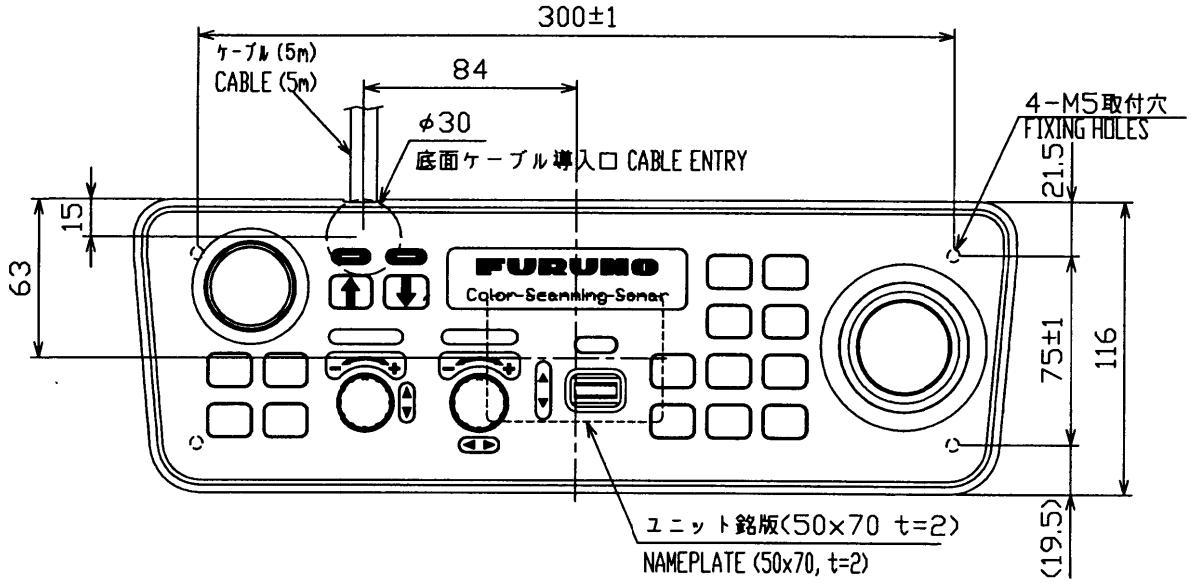
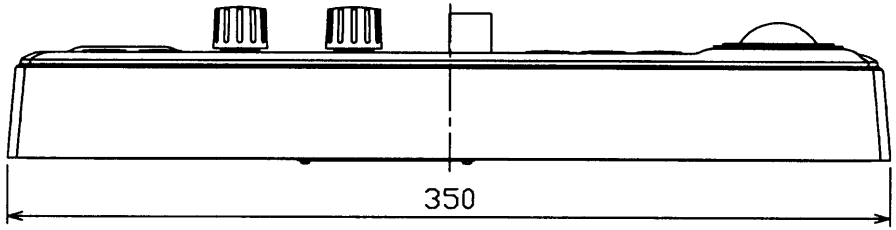
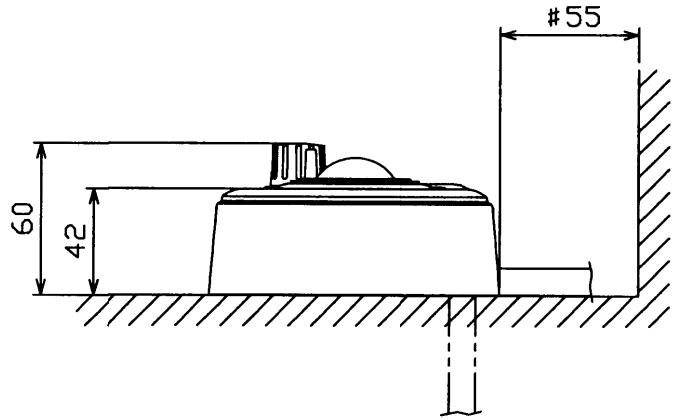


寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

表1 TABLE 1





注　記　1）＃印寸法は最小サービス空間寸法とする。
　　2）指定外の寸法公差は表1による。
　　3）取付用ネジはM5ボルトを使用のこと。
　　ボルトが内部に12mm以上入り込まないこと。

NOTE　1. #: RECOMMENDED SERVICE CLEARANCE.
　　2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
　　3. USE M5 BOLTS FOR FIXING THE UNIT.
　　DO NOT FASTEN BOLTS INTO UNIT 12 mm OR MORE.

DRAWN Dec. 13 '02 T.YAMASAKI		TITLE CSH-5211
CHECKED Dec. 16 '02 Y.KIMURA		名称 操作部（卓上装備）
APPROVED Dec. 16, '02 Y. Kimura	CSH-5L/8L	外寸図
SCALE 1/3 MASS 3.2 ±10% kg	質量はケーブル重さを含む。MASS W/ CABLE.	NAME CONTROL UNIT (TABLETOP MOUNT)
DWG No. C1319-G03- B	10-078-201G-1	OUTLINE DRAWING

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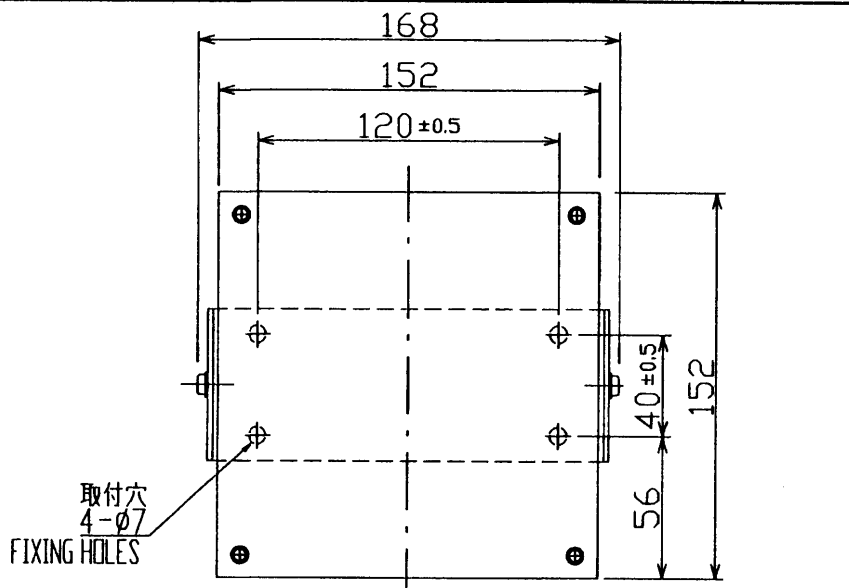
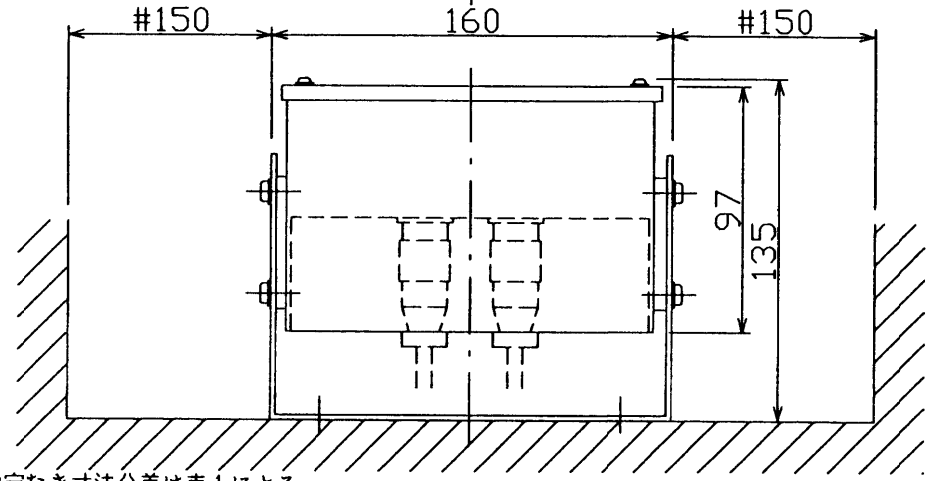
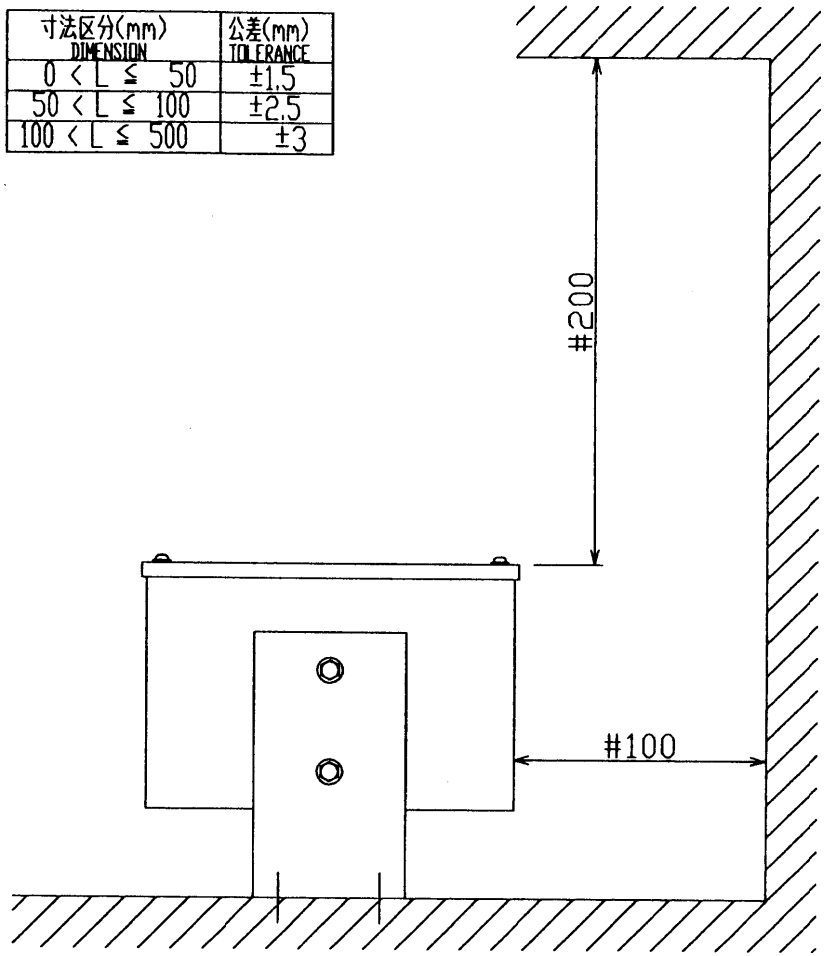


表1 TABLE 1

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





注記
1）指定なき寸法公差は表1による。
2）#：推奨する最小サービス空間寸法。
3）船首マーク(FORE)を船首方向に向けて、きょう体を水平に取り付けること。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: RECOMMENDED SERVICE CLEARANCE.
3. ORIENT THE 'FORE' MARK ON THE UNIT TOWORD SHIP'S BOW AND MOUNT THE UNIT LEVEL IN PARALLEL WITH SURFACE.

DRAWN	Nov. 6 '01 I.YAMASAKI
CHECKED	Nov 6 '01
APPROVED	Nov 6 '01
SCALE	1/3
MASS	1.1 kg ±10%
DWG.No.	C1278-G01- B
TITLE	MS-100
名称	動揺検出器 外寸図
NAME	MOTION SENSOR OUTLINE DRAWING

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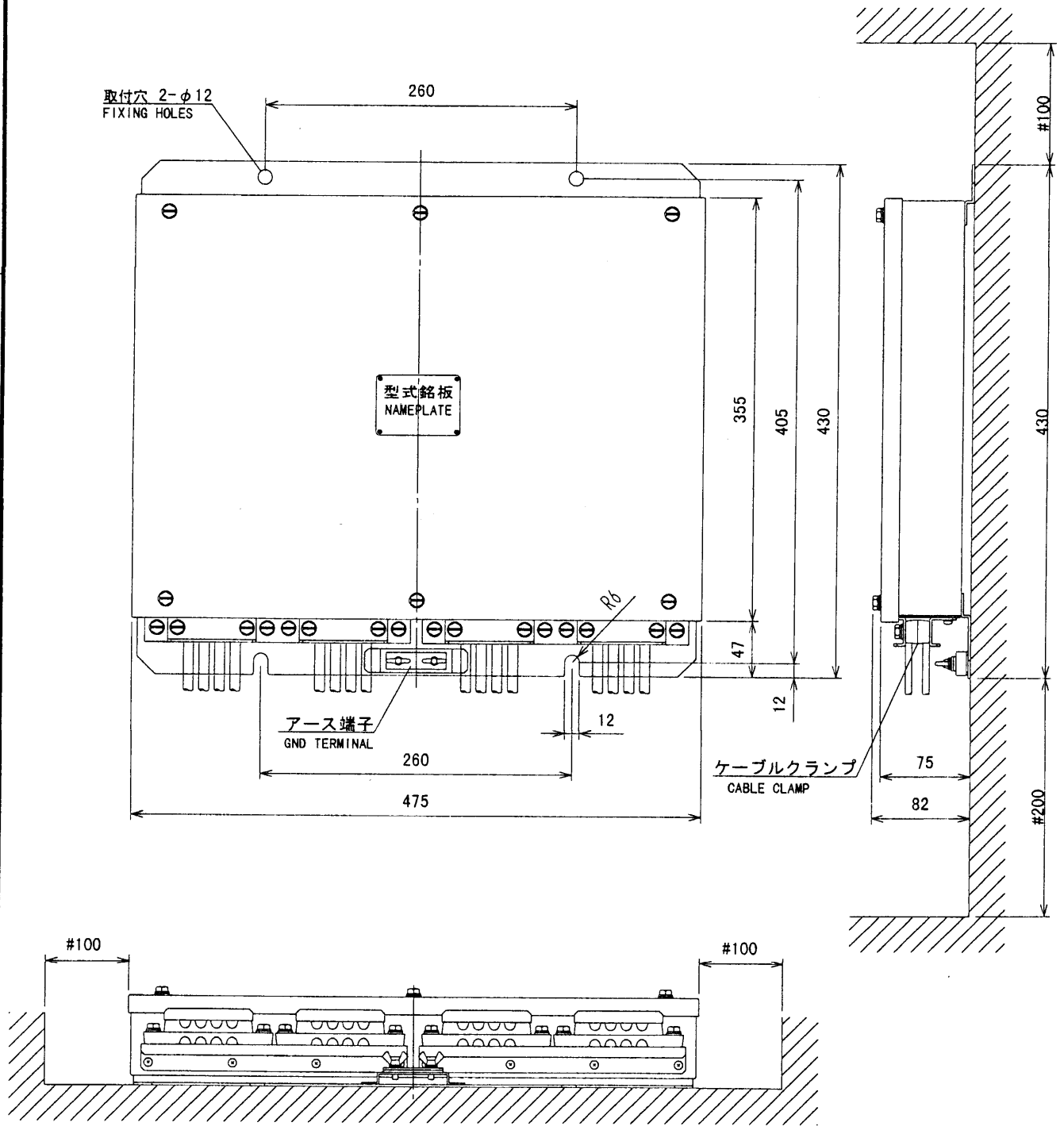

注 記

1） 指定外寸法公差は 表1 による。

2） #印寸法は最小サービス空間寸法とする.

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

2. #: RECOMMENDED SERVICE CLEARANCE.

範 囲 DIMENSION	公差 TOL.
L≦50	±1.5 mm
50<L≦100	±2.5 mm
100<L≦500	±3 mm

表 1 TABLE 1

DRAWN July 13'99 T.YAMASAKI			TITLE CSH-1700
CHECKED July 14'99 K.Kusunoki			名称 振動子ケーブル延長キット
APPROVED July 14'99 K.Kusunoki	CSH-5 MARK-2 CSH-8		外寸図
SCALE 1/5	MASS 8.0 kg		NAME TRANSDUCER CABLE EXTENTION KIT
DWG. No. C1314-G02- B	10-067-5000-G1		OUTLINE DRAWING

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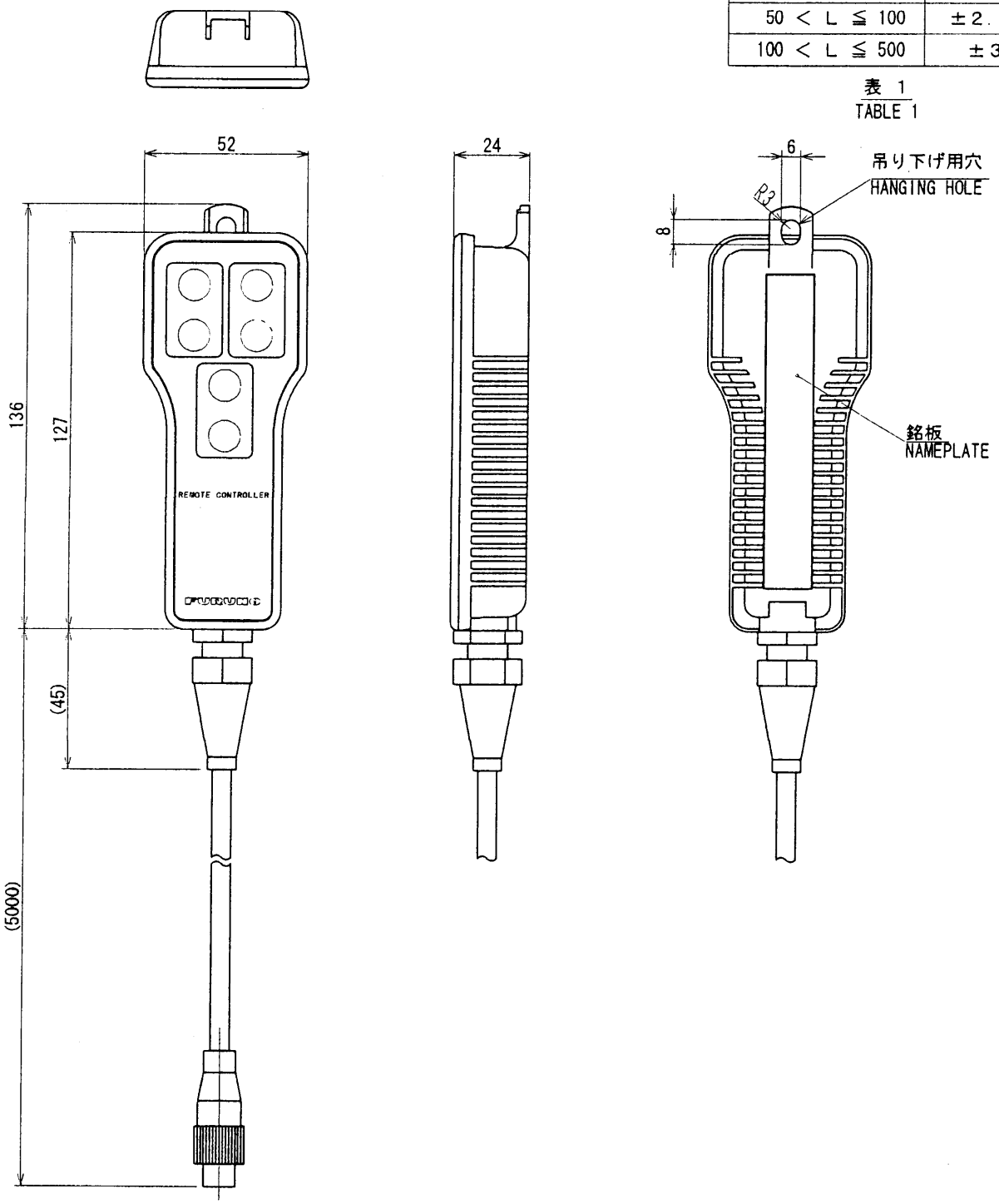
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

表 1
TABLE 1



注記　1）　指定なき寸法公差は表1による。

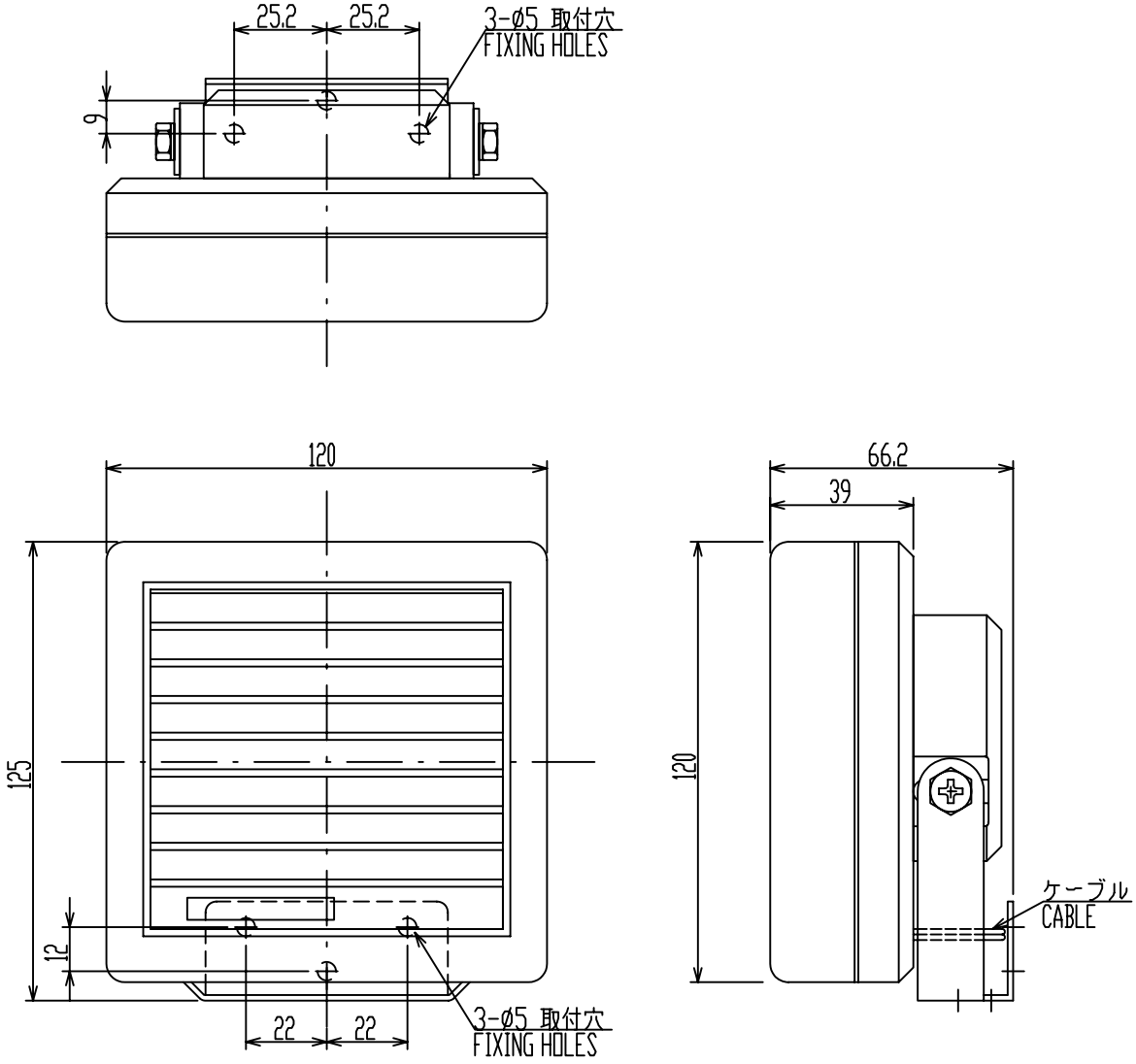
NOTE　1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN Sep21'00 T.YAMASAKI		TITLE	CSH-7040
CHECKED Sep21'00 T.K		名称	リモートコントローラ
APPROVED Sep21'00 T.K	CSH-7		外寸図
SCALE 1/2	MASS 0.25 kg ±10% 質量はケーブル重さを含む MASS W/ CABLE	NAME	REMOTE CONTROLLER
DWG. No. C1302-G05- B	10-061-5000- G1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

表1 TABLE 1

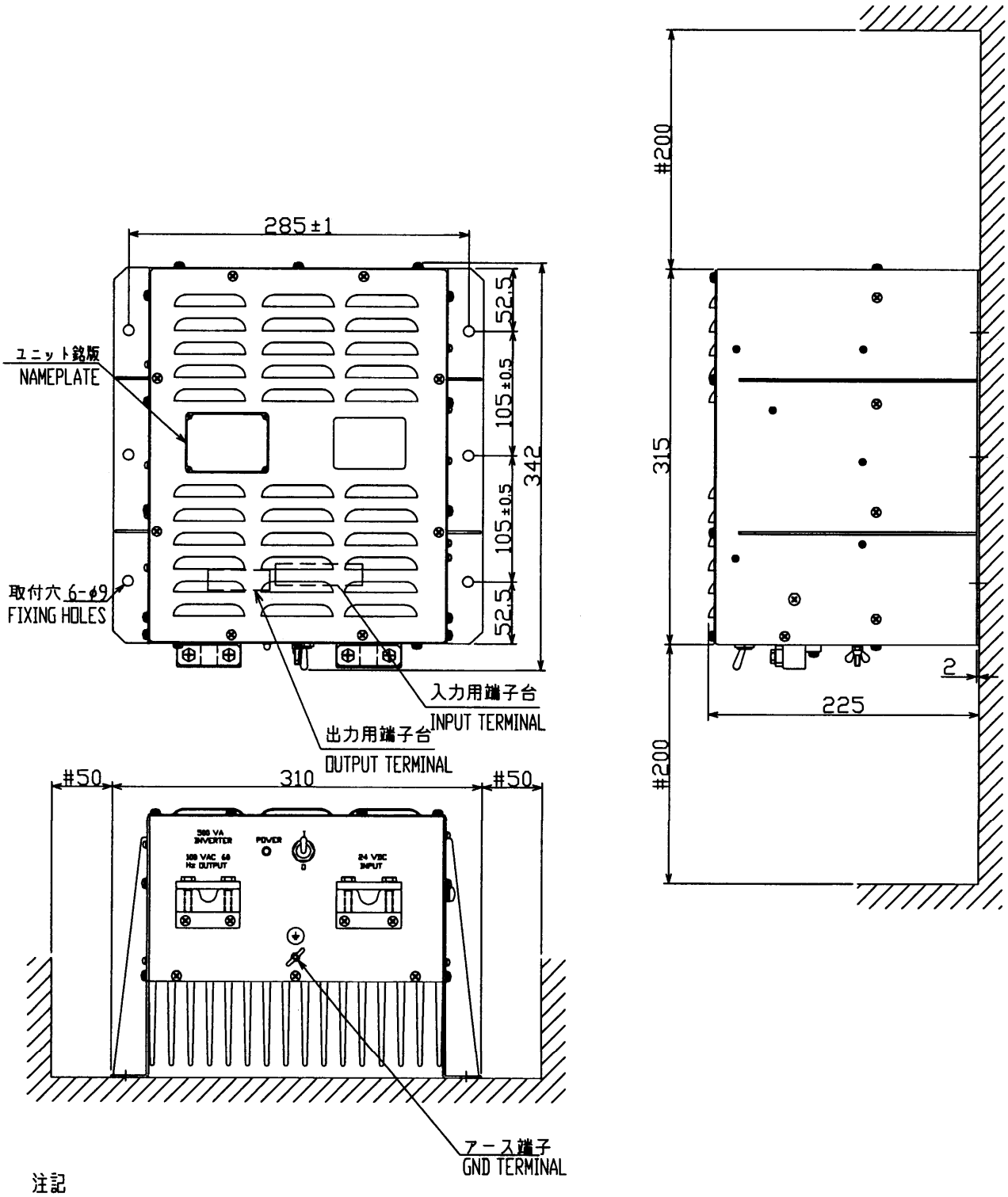
寸法区分(mm) DIMENSIONS	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3



注記 1 ）指定外寸法公差は表1による。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN Nov. 25, '06 E. MIYOSHI		TITLE	SEM-21Q
CHECKED TAKAHASHI. T		名称	スピーカ
APPROVED Y. Hatai			外寸図
SCALE 1/2	MASS 0.54 ±10% kg 質量は2.8mケーブルを含む MASS W/ 2.8m CABLE	NAME	LOUDSPEAKER
DWG.No. C5016-G07- C	REF.No.		OUTLINE DRAWING



注記
1）指定なき寸法公差は表1による。
2）#：推奨するサービス空間寸法。
3）取付けにはM8ボルトまたはコーチボルト呼び径8を使用のこと。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: RECOMMENDED SERVICE CLEARANCE.
3. USE M8 BOLTS OR COARCH SCREWS φ8 FOR FIXING THE UNIT.

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

表1 TABLE 1

DRAWN Dec. 13 '02 T.YAMASAKI			TITLE TR-2451
CHECKED Dec. 16 '02 Y.KIMURA			名称 DC/ACインバータ
APPROVED Dec. 16, '02 Y. Kimura	CSH-5L/8L		外寸図
SCALE 1/5	MASS 15 ±10% kg		NAME DC/AC INVERTER
DWG.No. C1319-G04- B			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

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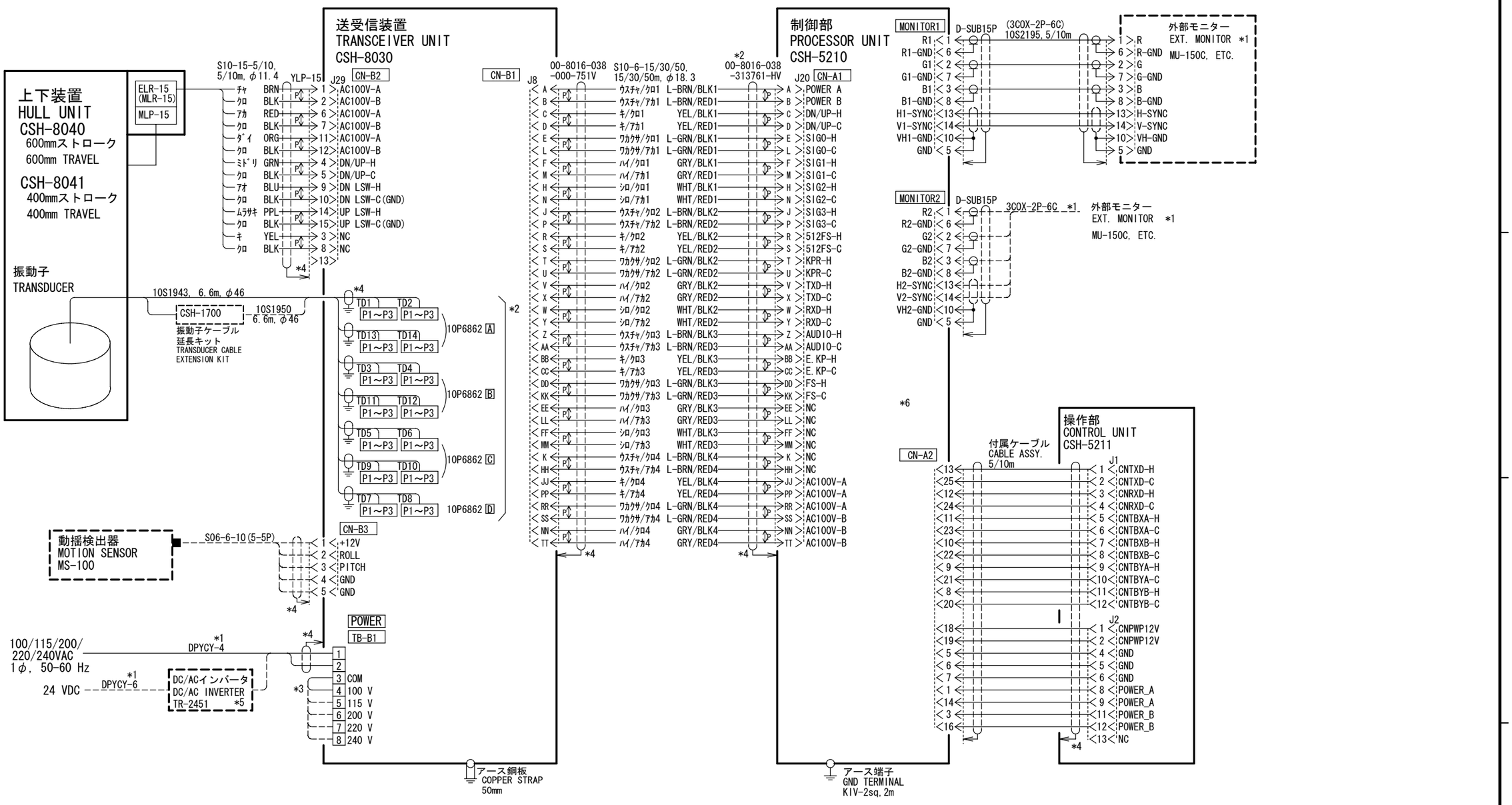
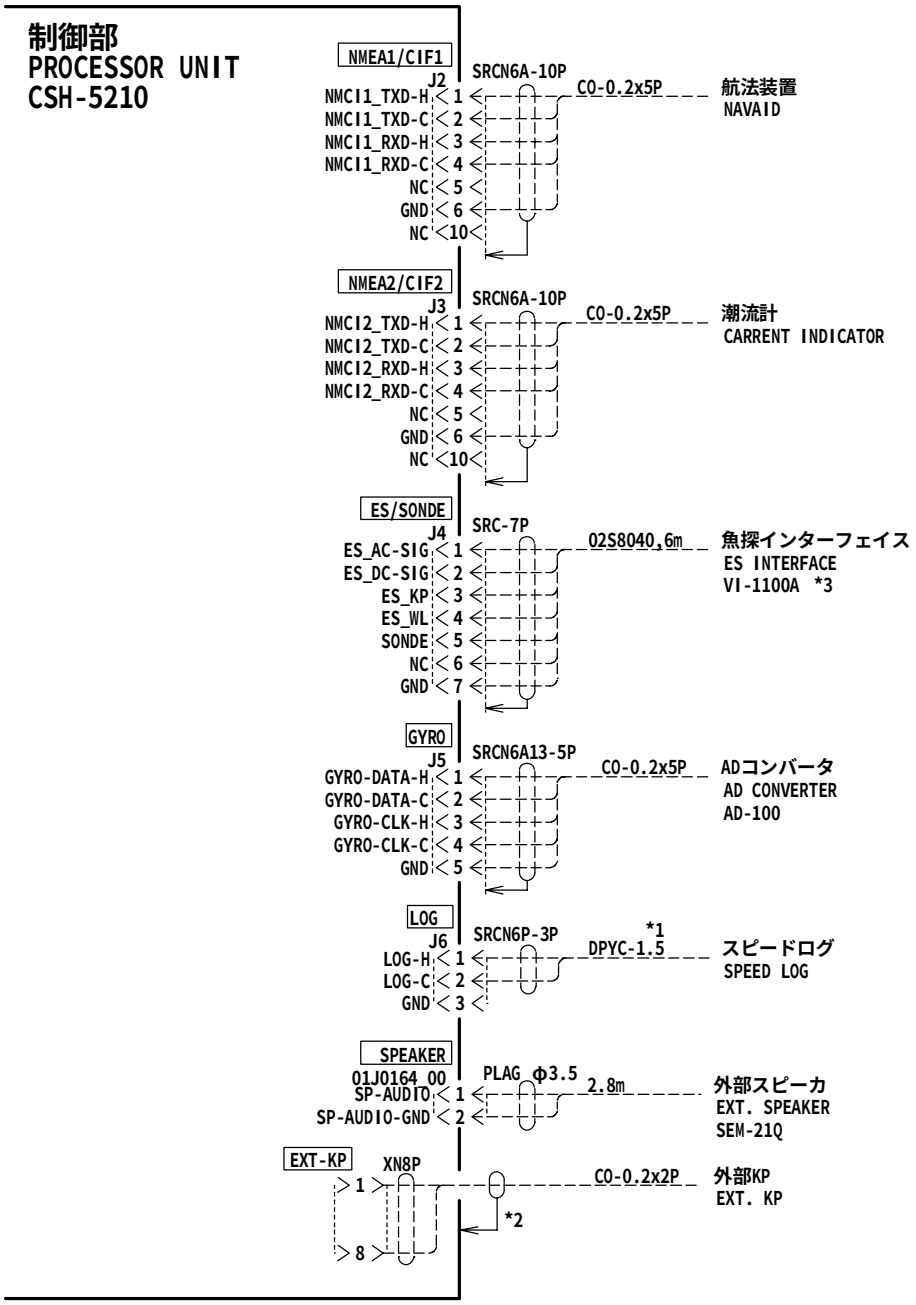


注記
1）造船所手配。
2）現地取付。
3）船内電源に応じて接続を変更。
4）ケーブルクランプにて接地する。
5）オプション。
6）外部機器との接続は別紙を参照。

NOTE
*1: SHIPYARD SUPPLY.
*2: FITTED LOCALLY.
*3: CHANGE WIRE CONNECTION AS POWER SOURCE.
*4: GROUND THRU CABLE CLAMP.
*5: OPTION.
*6: REFER TO ANOTHER DIAGRAM FOR EXTERNAL CONNECTIONS.

DRAWN MAY 18,'06 E.MIYOSHI			TITLE CSH-8L
CHECKED TAKAHASHI.T			名 称 カラースキャニングソナー
APPROVED Y. Hatai			相互結線図
SCALE	MASS kg		NAME COLOR SCANNING SONAR
DWG. No. C1320-C01- C		10-078-0101-0	INTERCONNECTION DIAGRAM

FURUNO



注記
1）造船所手配。
2）ケーブルクランプにて接地する。
3）魚探接続はリニアアンプ信号のみ可。

NOTE
*1: SHIPYARD SUPPLY.
*2: GROUND THRU CABLE CLAMP.
*3: E/S CONNECTABLE BY LINEAR AMP SIGNAL ONLY.

CO-0.2x2P: CO-SPEVV-SB-C 0.2x2P,φ10.5
CO-0.2x5P: CO-SPEVV-SB-C 0.2x5P,φ13.5

DRAWN Dec. 5 '02 T.YAMASAKI			TITLE CSH-5210
CHECKED Dec. 5 '02 Y.KIMURA			名称 制御部
APPROVED Dec. 5, 02 Y. Kimura		CSH-5L/8L	相互結線図
SCALE	MASS kg		NAME PROCESSOR UNIT
DWG.No. C1319-C02- B			INTERCONNECTION DIAGRAM

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