FURUNO

INSTALLATION MANUAL

COLOR SCANNING SONAR

MODEL CSH-5L

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

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(HIMA) CSH-5L

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⚠ SAFETY INSTRUCTIONS

⚠ 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
Fastening band: 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
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.

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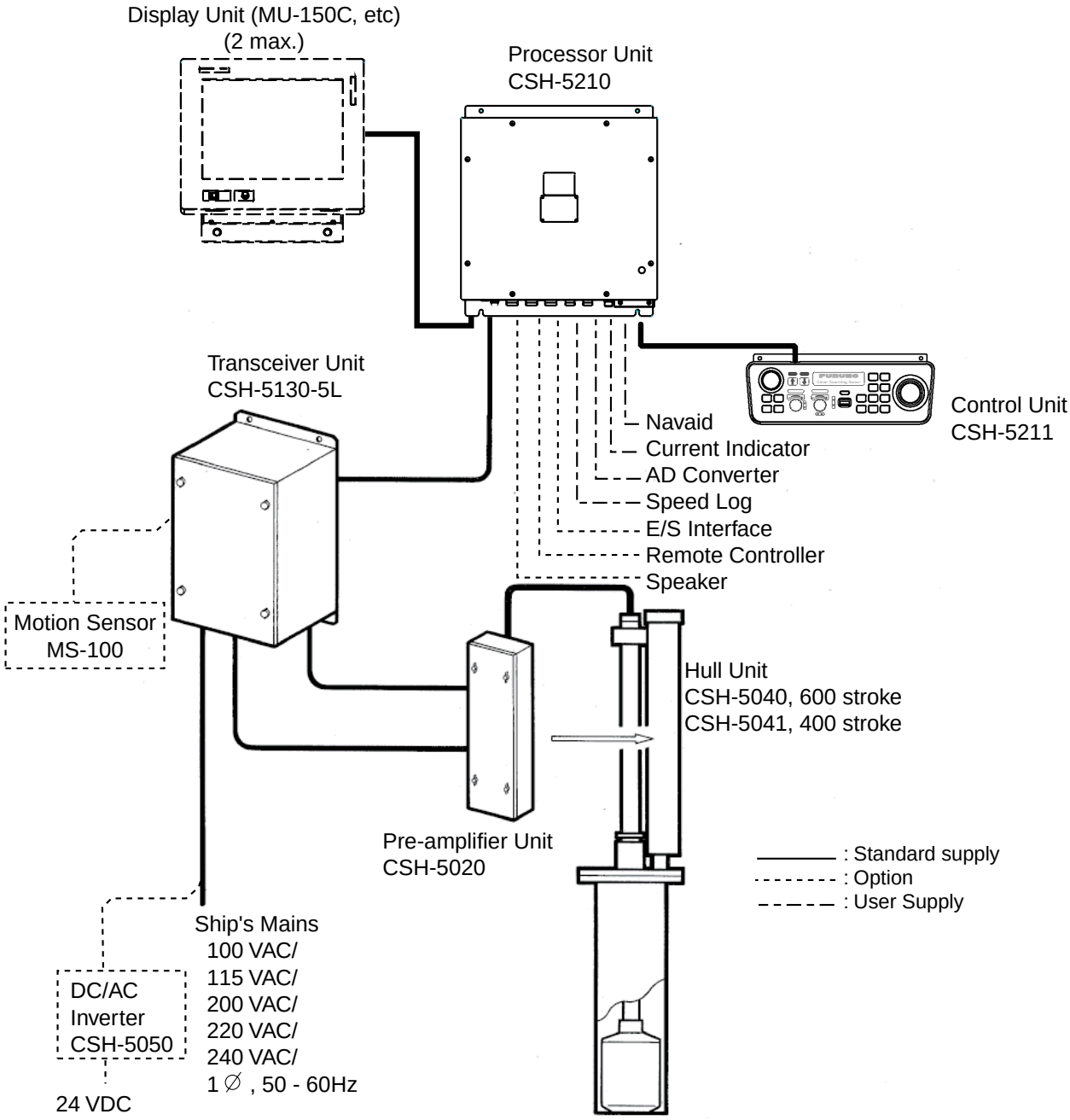
SYSTEM CONFIGURATION



EQUIPMENT LISTS

Standard Supply

Name	Type	Code No.	Qty	Remarks
Processor Unit	CSH-5210	-	1	
Control Unit	CSH-5211	-	1	
Transceiver Unit	CSH-5130-5L	-	1	
Pre-amplifier Unit	CSH-5020		1	
Hull Unit	CSH-5040	-	1	600 stroke
	CSH-5041	-		400 stroke
Installation Materials	CP10-05201	006-910-940	1	For processor unit
	CP10-05202	006-904-860	1	For transceiver unit
	CP10-05203	006-904-880	1	For pre-amplifier unit
	For cables, see the table below.			
Accessories	FP10-02701	006-905-030	1	For control unit
Spare Parts	SP10-02901	006-907-700	1	For processor unit
	SP10-02902	006-904-850	1	For transceiver unit

Installation Materials (Cables)

Type	Code No.	Transceiver unit/ Pre-amplifier unit		Processor unit/ Transceiver unit	Display unit/ Processor unit
		TX cable	RX cable	Processor cable	Display cable
CP10-05300	000-069-059	S10-7-5	10S1562 5m	S10-6-15(38P)	3COX-2P-6C 5m
CP10-05310	000-069-067		10S1562 5m	S10-6-30(38P)	
CP10-05320	000-069-068		10S1562 5m	S10-6-50(38P)	
CP10-05330	000-069-069	S10-7-10	10S1563 10m	S10-6-15(38P)	
CP10-05340	000-069-070		10S1563 10m	S10-6-30(38P)	
CP10-05350	000-069-072		10S1563 10m	S10-6-50(38P)	
CP10-05360	000-069-073	S10-7-5	10S1564 15m	S10-6-15(38P)	
CP10-05370	000-069-074		10S1564 15m	S10-6-30(38P)	
CP10-05380	000-069-075		10S1564 15m	S10-6-50(38P)	
CP10-05400	000-069-076	S10-7-10	10S1562 5m	S10-6-15(38P)	3COX-2P-6C 10m
CP10-05410	000-069-077		10S1562 5m	S10-6-30(38P)	
CP10-05420	000-069-096		10S1562 5m	S10-6-50(38P)	
CP10-05430	000-069-184	S10-7-5	10S1563 10m	S10-6-15(38P)	
CP10-05440	000-069-186		10S1563 10m	S10-6-30(38P)	
CP10-05450	000-069-229		10S1563 10m	S10-6-50(38P)	
CP10-05460	000-069-230	S10-7-10	10S1564 15m	S10-6-15(38P)	
CP10-05470	000-069-244		10S1564 15m	S10-6-30(38P)	
CP10-05480	000-069-245		10S1564 15m	S10-6-50(38P)	

Name	Type	Code No.	Qty	Remarks	
Processor cable	S10-6-15 (38P)	006-976-580	1	15 m	Processor/ Transceiver units
	S10-6-30 (38P)	006-976-590		30 m	
	S10-6-50 (38P)	006-976-600		50 m	
TX cable	S10-7-5	006-976-610	1	5 m	Transceiver/ Pre-amplifier units
	S10-7-10	006-976-460		10 m	
	S10-7-15	006-976-470		15 m	
RX cable	10S1562	006-976-620	1	5 m	Transceiver/ Pre-amplifier units
	10S1583	006-976-440		10 m	
	10S1584	006-976-450		15 m	
Display unit cable	3COX-2P-6C 5M	000-146-500	1	5 m	Display/ Processor units
	3COM-2P-6C 10M	000-146-501		10 m	

Hull unit can be arranged as below.

CSH - 5130 – 5L - [(1)] - [(2)]
(1): Input voltage: 60 (100VAC), 72 (220VAC)
(2): Frequency: 55 kHz, 68 kHz

Hull unit can be arranged as below.

CSH- [(1)] - [(2)] - [(3)] - [(4)]
(1): Stroke: 5040 (600 stroke) or 5041 (400 stroke)
(2): Frequency: 55 kHz or 68 kHz
(3): Tank: N (None), S (Steel), F (FRP)
(4): Shaft length:13 (1300 mm), 15 (1550 mm), 23 (2350 mm), 40 (4065 mm), 94 (945 mm)

Ex) Stroke: 600 mm; Frequency; 55 kHz; Steel tank, Shaft length, 2350 mm, type is CSH-5040-55-S-23.

Optional Supply

Name	Type	Code No.	Qty	Remarks
DC-AC Inverter	TR-2451	-	1 set	
E/S Interface	VI-1100A	-	1 set	
Retraction Tank	OP10-5	-	1 set	Made of aluminum
Speaker	SEM-21Q	-	1 set	
Motion Sensor	MS-100	-	1 set	
Remote Controller	CSH-7040	-	1 set	

1. MOUNTING

NOTICE

Be sure the power supply matches equipment voltage rating.

Improper power supply will damage the equipment.

Locate the transducer where the affects 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.
- The useable temperature range of the display unit is 0°- 50°C.
- Provide sufficient ventilation.
- Select location 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 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.

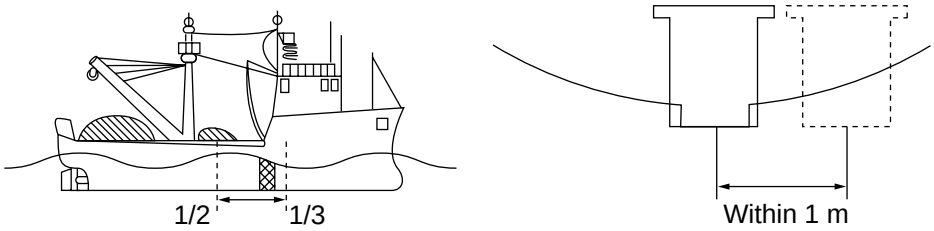
Exposing the transducer to air may damage it.

1.1 Hull Unit

1.1.1 Installation position of hull unit

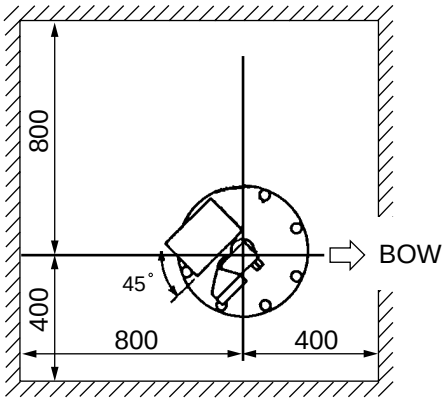
Discussion and agreement are required with the dockyard and the ship owner in deciding the installation position of the hull unit. When deciding the installation position, the following points should be taken into account.

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



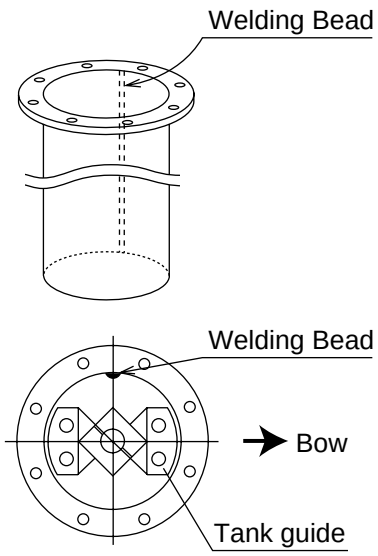
Installation position of hull unit

2) Select a place where interference from other equipment is minimal. The hull unit should be at least 2.5 m away from the transducers of other equipment.
3) An obstacle in the fore direction not only causes shadow zone but also aerated water, resulting in poor sonar performance.
4) The following space is required around the hull unit for wiring and maintenance. If the ambient temperature of the unit is below 0°C, the sonar compartment must be provided with a heater so as to keep the temperature above 0°C.



Sonar room

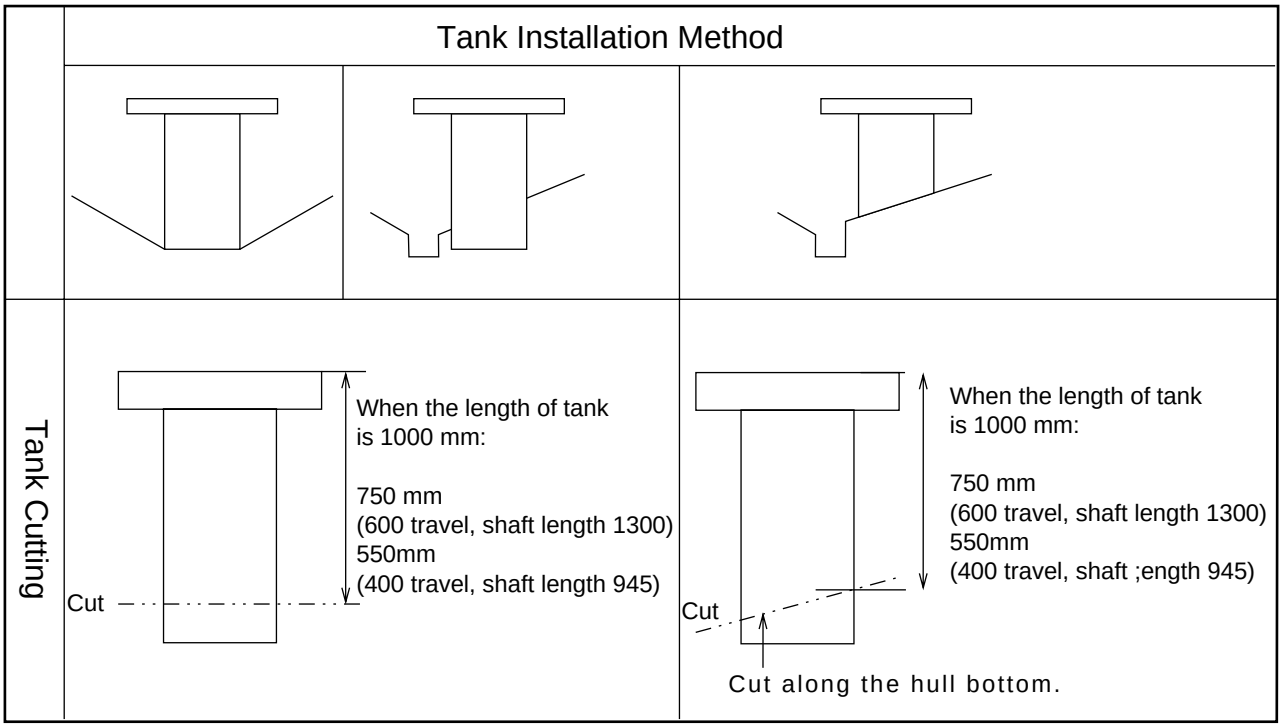
Note: When the retraction tank is made locally, finish it so that the welding bead does not protrude on the inner surface of the tank. The tank guide will hit the bead, causing motor burn-out. The gap between the tank and tank guide is 1 mm.
Also when installing the tank, orient the welding bead so it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



1.1.2 Installation of retraction tank

The retraction tank is 1000 mm in length when supplied. Cut the end of the tank referring to the table below so that the transducer is fully protruded beyond the keel when it is lowered. Refer to the tank installation method at the end of this manual.

Cutting the end of retraction tank



Note: It is not necessary to cut the shaft when there is enough space above the raise/lower drive assembly.

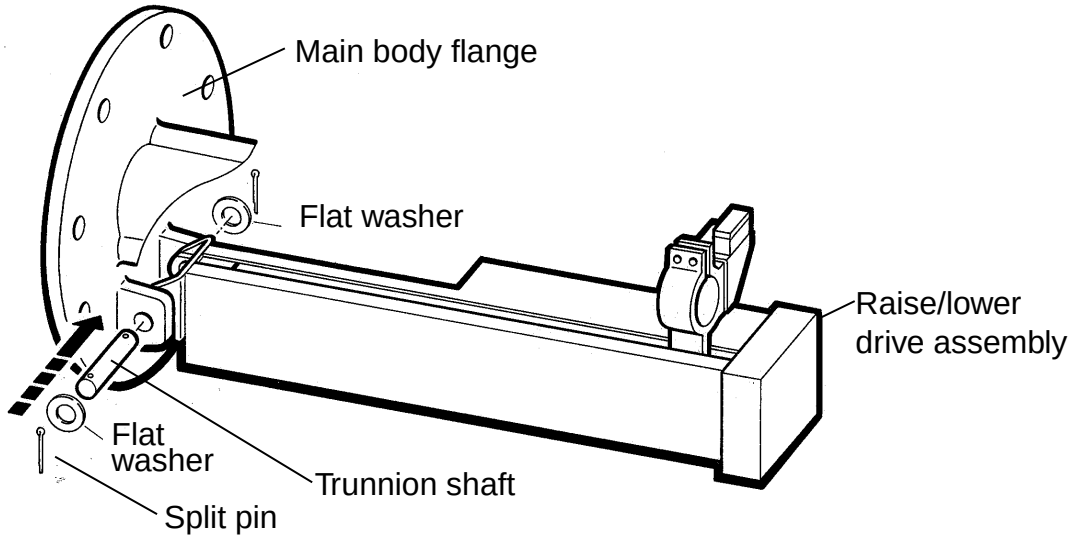
1.1.3 Assembling and installation of hull unit

The hull unit comes unassembled, with the parts shown on pages 1-10 and 1-11. Assemble the unit as shown below.

Necessary Tools

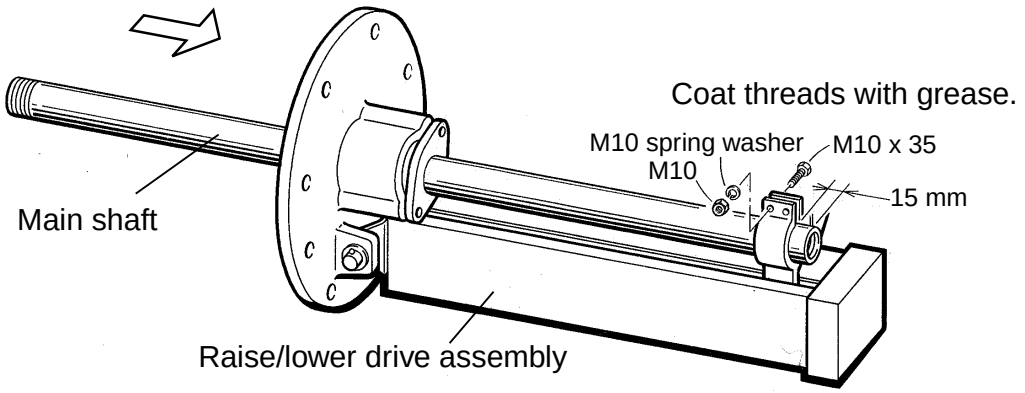
Name	Diameter	Remarks
Wrench	M10 (Hex. size: 17 mm)	Double-ended wrench is recommended.
	M20 (Hex. size: 30 mm)	
Pipe wrench	Ø55 mm	Used for fastening cable gland
Socket-set screw wrench	M6 (Hex. size: 3 mm)	Used for fixing main body flange

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



Fastening main body flange to raise/lower drive assembly

2. Apply a slight amount of grease to the top of main shaft. 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.)



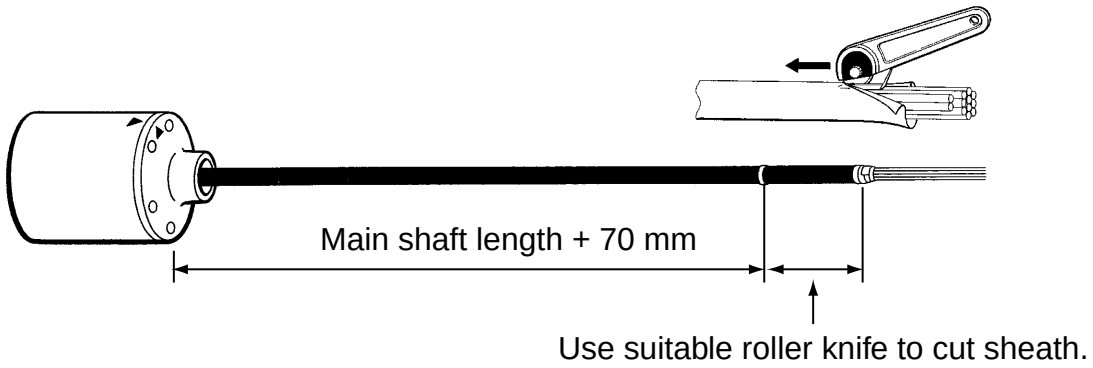
Wipe-off grease before tightening shaft retainer.

Main shaft should protrud by 15 mm from top of the shaft retainer.

Installing main shaft

3. Wrap the sheath end with vinyl tape to pass the cable through the main shaft, and then remove sheath of transducer cable at the length of “main shaft length + 70 mm.”

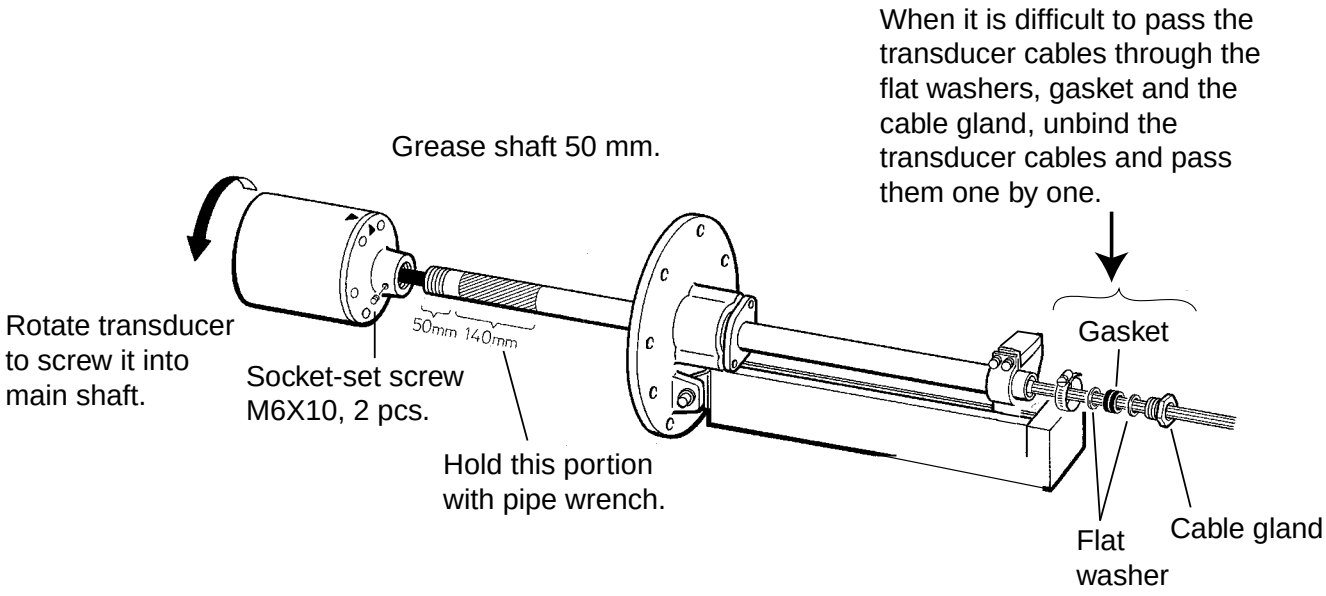
   Note: Care should be taken not to damage inner wires when cutting the cable sheath, only paper tape exists between the cable sheath and inner wires.



Transducer cable

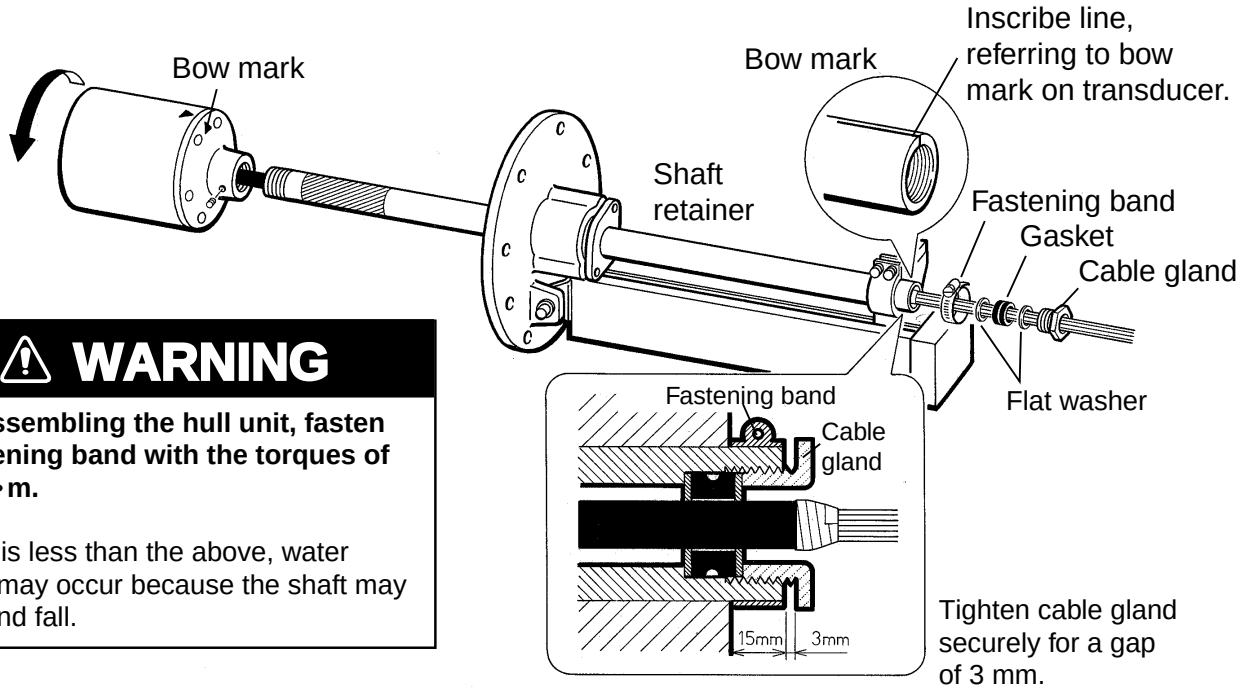
4. After screwing the transducer into main shaft, fasten two socket-set screws (M6x10, supplied) to fasten the main shaft to the transducer.

   Note: The transducer should be screwed into the main shaft by 50 mm.



Installing transducer

5. Inscribe bow mark on the top part of main shaft. Install fastening band, flat washers, gasket and cable gland as shown below.



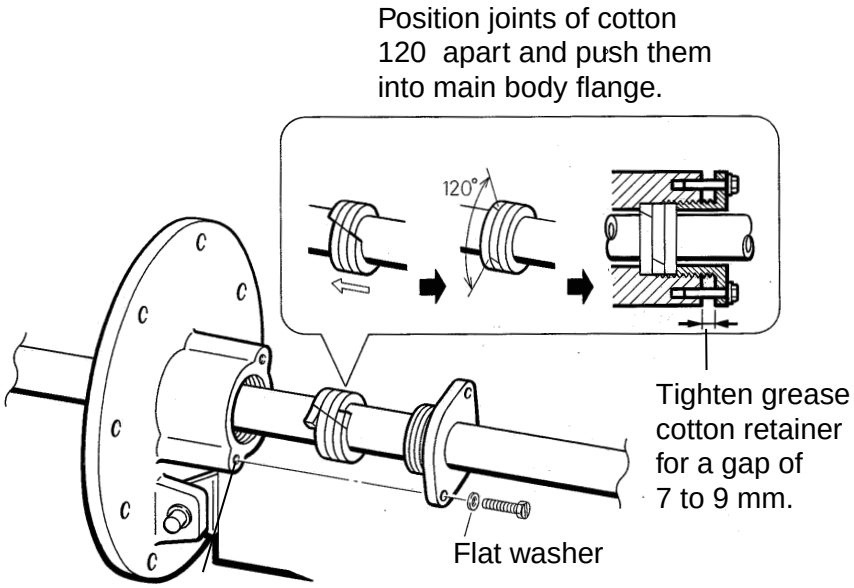
⚠ WARNING

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.

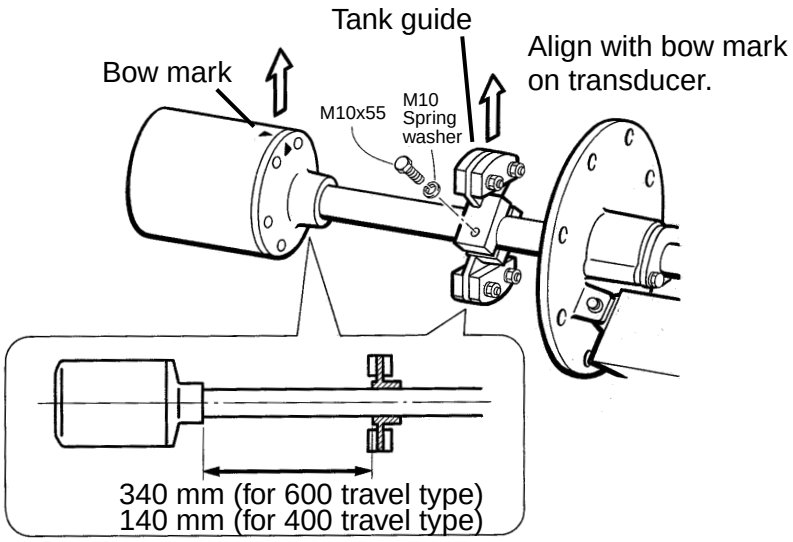
Installing fastening band and cable gland

6. 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.



Installing grease cotton

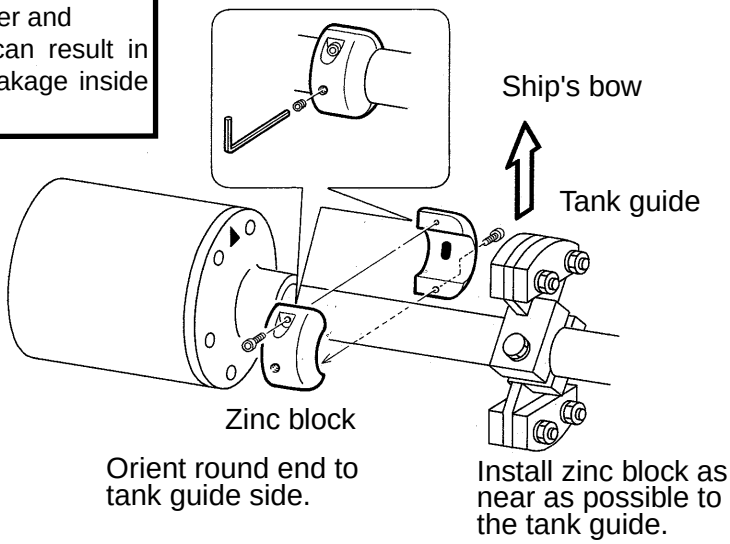
7. Install the tank guide as shown below.



Installing tank guide

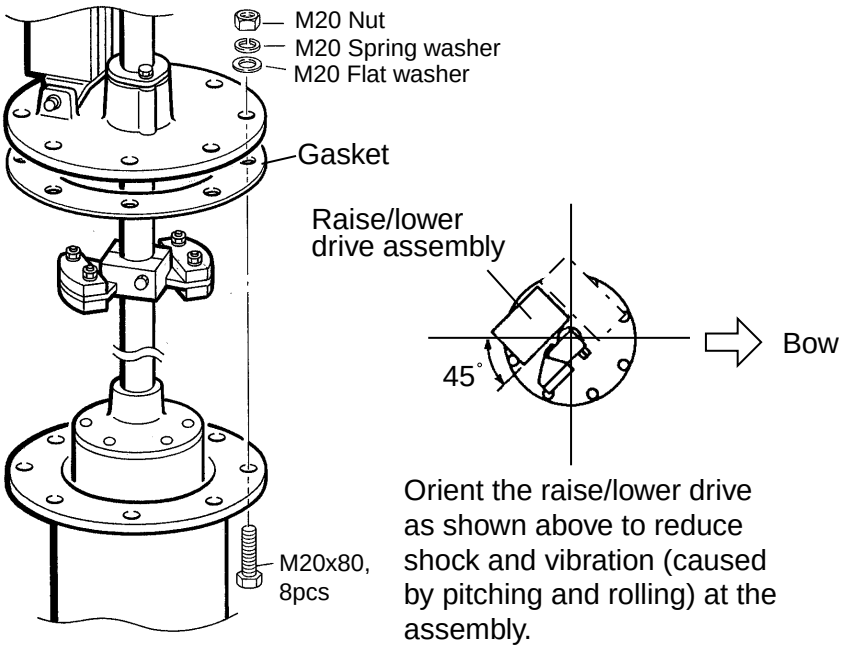
8. Attach the zinc block to the main shaft as shown below.

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



Attaching zinc block

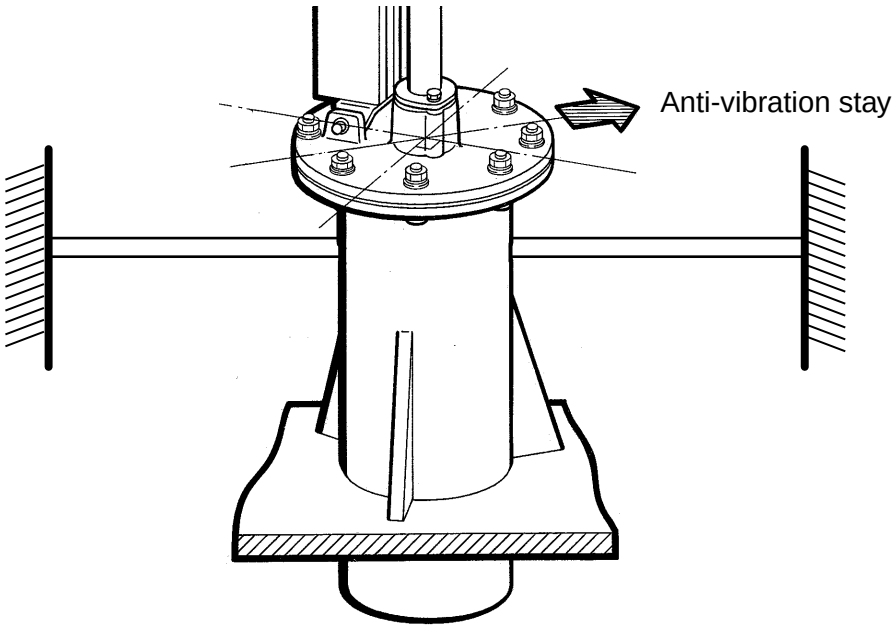
9. Fasten the hull unit to the retraction tank as shown below.



Fastening hull unit to retraction tank

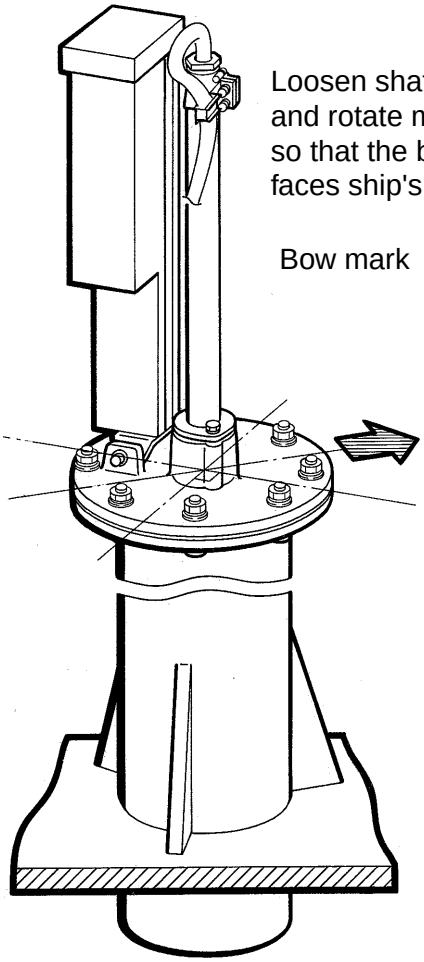
10. Fix anti-vibration stays to the retraction tank.

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



Anti-vibration stay

11. Set the main shaft so that the bow mark faces ship’s bow, and then tighten the shaft retainer.



⚠ WARNING

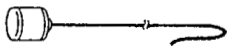
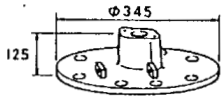
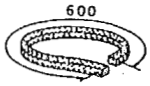
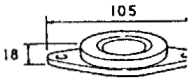
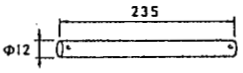
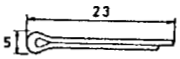
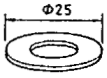
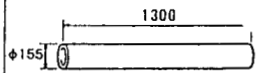
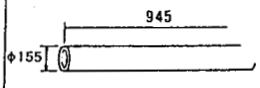
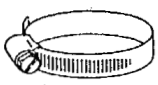
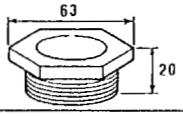
Tighten bolts fixing shaft retainer for torque of 20 - 25 N·m.

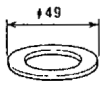
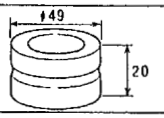
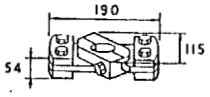
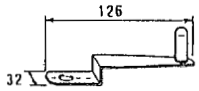
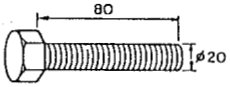
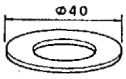
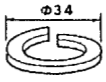
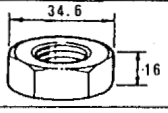
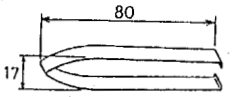
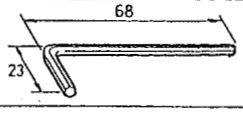
If torque is less than the above, water leakage may occur because the shaft may loosen and fall.

Hull unit, orienting bow mark

上下装置 解体出荷リスト HULL UNIT KIT

* *

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.		
2	送受波器 TRANSDUCER ASSEMBLY		CODE No. 190-112-540		
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.	1	
5	グリスコットン押え GREASE COTTON RETAINER		10-044-2204 CODE No. 100-112-571	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. 100-112-581	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	
13	締付グランド CABLE GLAND		10-044-2302-1 CODE No. 100-112-601	1	上下シャフト防水用 For waterproofing main shaft

番号 No.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
14	ケーブル座金 FLAT WASHER		10-044-2303-2 CODE No. 100-112-612	2	同上 Ditto
15	ケーブルガスケット GASKET		10-044-2304 CODE No. 100-112-621	1	同上 Ditto
16	タンクガイド組品 TANK GUIDE		CODE No. 006-979-160	1	
17	手動ハンドル HAND CRANK		10-044-2411 CODE No. 006-979-150	1	
18	六角ボルト HEX. BOLT		M20×80 SUS304 CODE No. 000-801-893	8	
19	ミガキ平座金 FLAT WASHER		M20 SUS304 CODE No. 000-864-136	16	
20	バネ座金 SPRING WASHER		M20 SUS304 CODE No. 000-864-270	8	
21	六角ナット HEX. NUT		M20 SUS304 CODE No. 000-863-116	8	
22	X H 抜き工具 CONNECTOR PULLER		10-044-2431 CODE No. 100-122-480	1	
23	配線バンド CABLE FIXING BAND		HP-18N CODE No. 000-113-838	5	
24	配線バンド CABLE FIXING BAND		HP-5N CODE No. 000-570-003	2	
25	六角レンチ SOCKET SCREW WRENCH		対辺 3mm HEX.SIZE 3mm CODE No. 000-830-131	1	

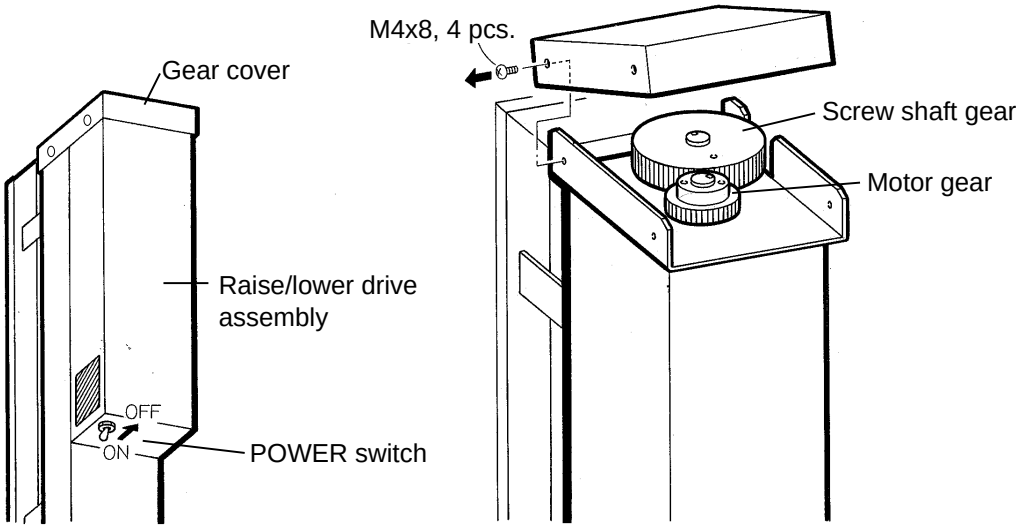
1.1.4 Confirmation of transducer movement

Confirm that the hull unit moves upward/downward smoothly by using the hand crank, which is supplied attached to the hull unit.

Note: When lowering the transducer, confirm 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.

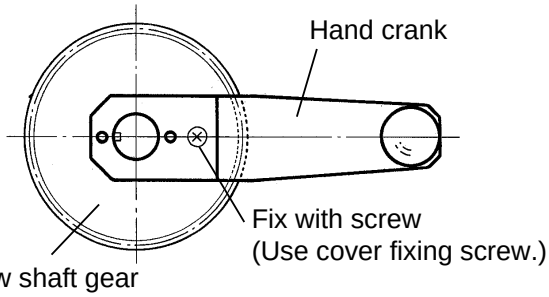
1. Open the gear cover.



Hull unit, upper view

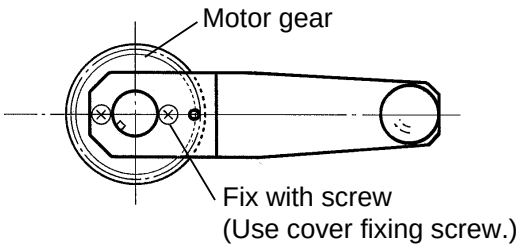
2. Attach the hand crank onto the screw shaft gear or motor gear.

a) Mounting hand crank on screw shaft gear (Requires greater force but smaller number-or-turns.)



120 turns to move main shaft by 600 mm.

b) Mounting hand crank on motor gear (Requires smaller force but greater number-of-turns.)



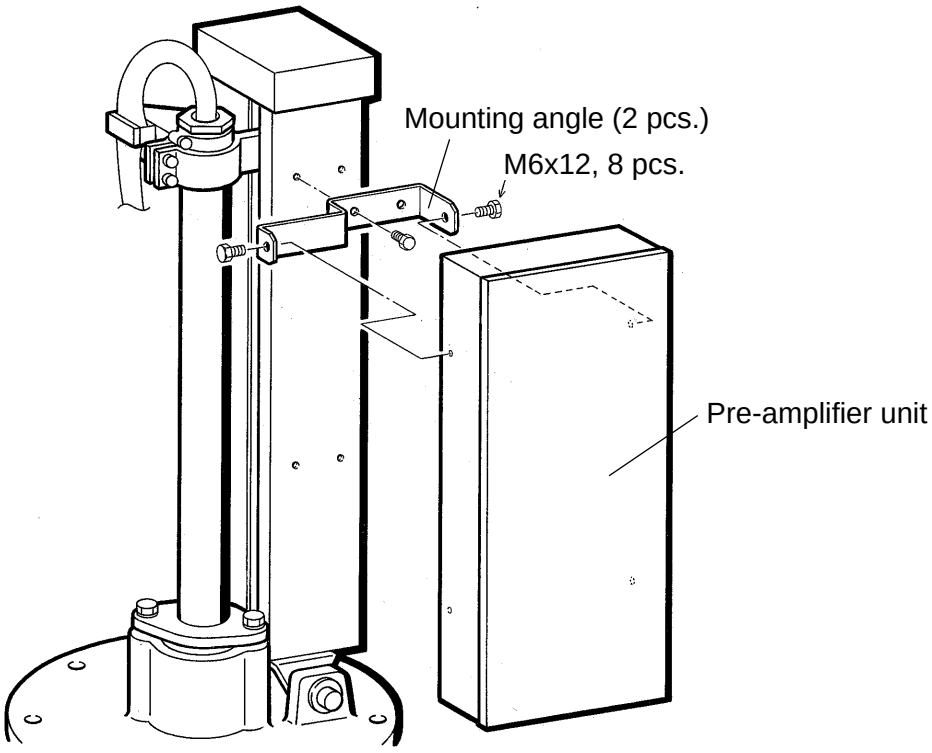
210 turns to move main shaft by 600 mm.

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

1.2 Pre-amplifier Unit

Fix the pre-amplifier unit to the hull unit as follows:

1. Unfasten four hex. bolts (M6x12) to detach the mounting angles (2 pcs.) from the pre-amplifier unit.
2. Fix the mounting angles onto the hull unit with M6x12 hex. bolts.
   Hex. bolts are supplied with the hull unit.
3. Using the M6x12 bolts removed at step 1, fix the pre-amplifier unit to the mounting angles.

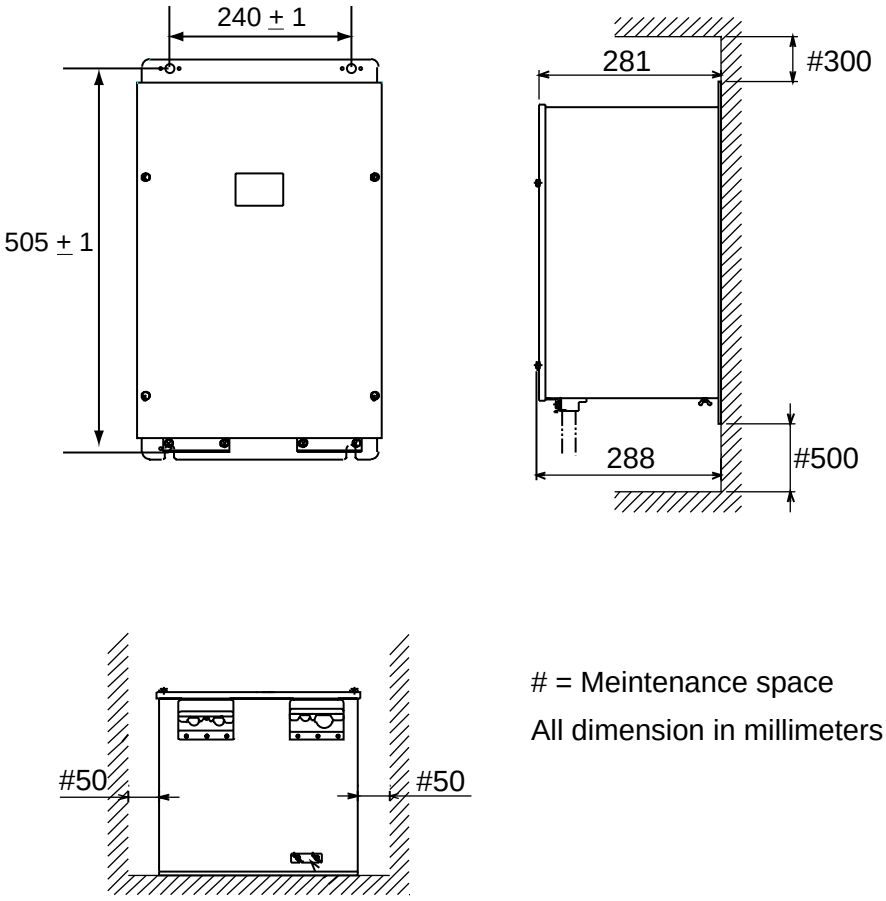


Mounting pre-amplifier unit

1.3 Transceiver Unit

When selecting a mounting location for the transceiver unit, keep the following points in mind.

- Since the transceiver unit generates heat, install it on a dry, well ventilated location.
- The unit weights 20 kg. For that reason reinforce the mounting area if necessary, especially for mounting on a bulkhead.
- Secure the maintenance space shown in drawing at the back of this manual for ease of maintenance and service.
- The maximum cable length between transceiver unit and pre-amplifier unit is 5, 10 or 15 m.

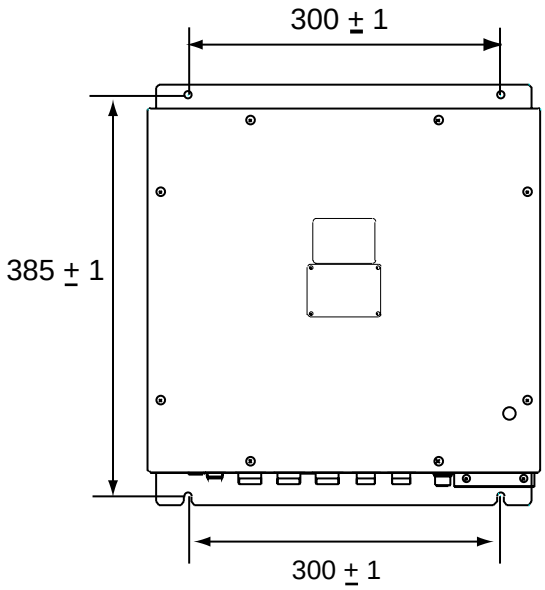


Transceiver unit, mounting dimensions

1.4 Processor Unit

Use four bolts or tapping screws (M6, local supplied) to install the processor unit. Consider the length of cables shown below when choosing a mounting location.

- Between processor and display units: Max. 10 m
- Between processor and transceiver units: Max. 50 m



Processor unit

1.5 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 10° degree. Also, the rubber feet can be used when the unit is not permanently fixed.

1.5.1 Non-permanent mounting

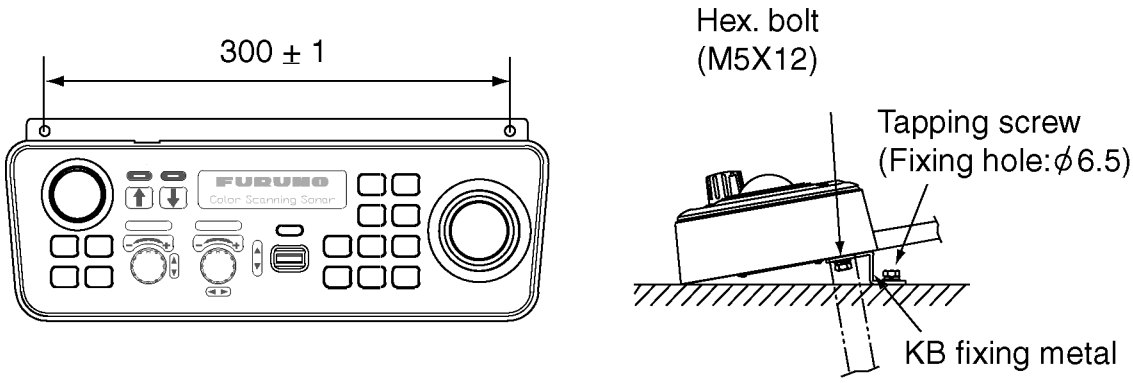
Attach four rubber feet (supplied) at the bottom of the control unit, and then place the unit on the selected location.

1.5.2 Permanent mounting

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

Installation with the KB fixing plate

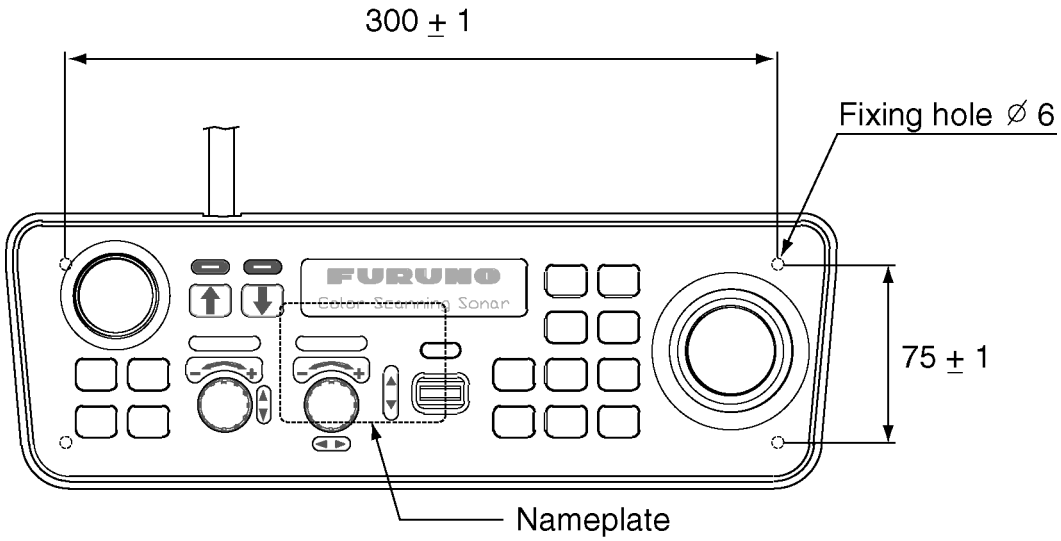
1. Fix the KB fixing plate (supplied as accessories) to the bottom of the control unit with two hex. bolts (supplied).
2. If necessary, make a hole of diameter 30 mm through the desktop to pass the control cable from the bottom of the control unit.
3. Fasten the KB fixing plate with two tapping screws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



How to attach KB fixing plate

Installation without KB fixing plate

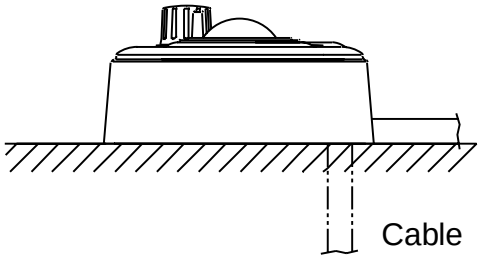
1. Make four holes of 6 mm in diameter referring to the figure below.



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 of 30 mm in diameter in the desktop to pass the control cable from the bottom of the control unit. To run the cable 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..

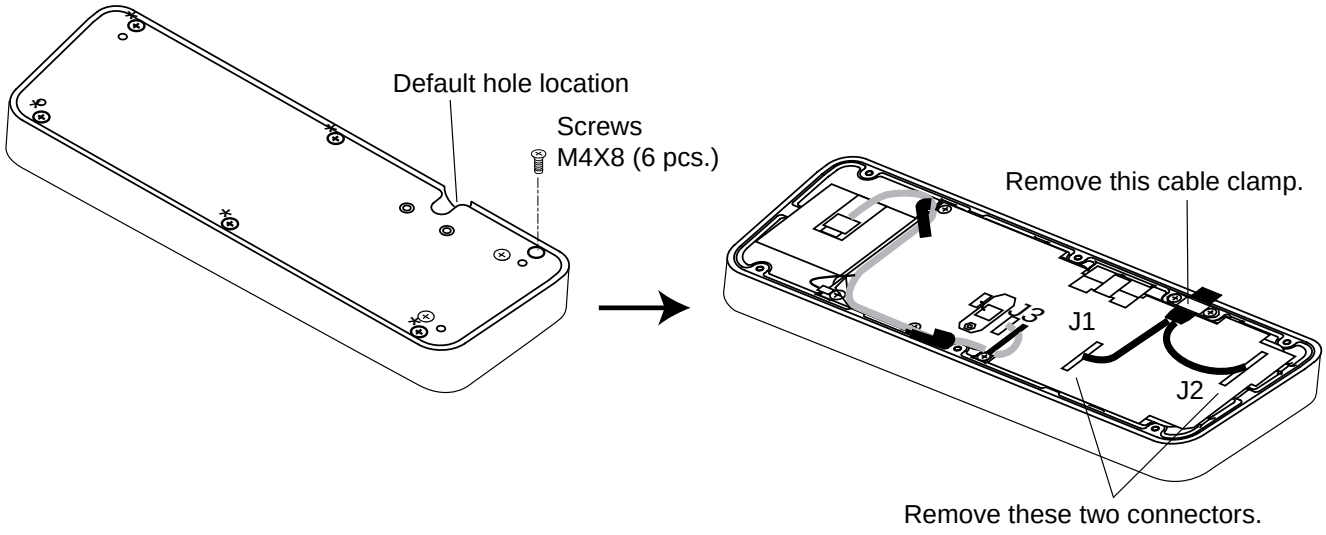
   When the supplied bolts are not long enough, use the locally supplied bolts, with their length the thickness of the desktop plus 5 to 8 mm.



Mounting control unit directly

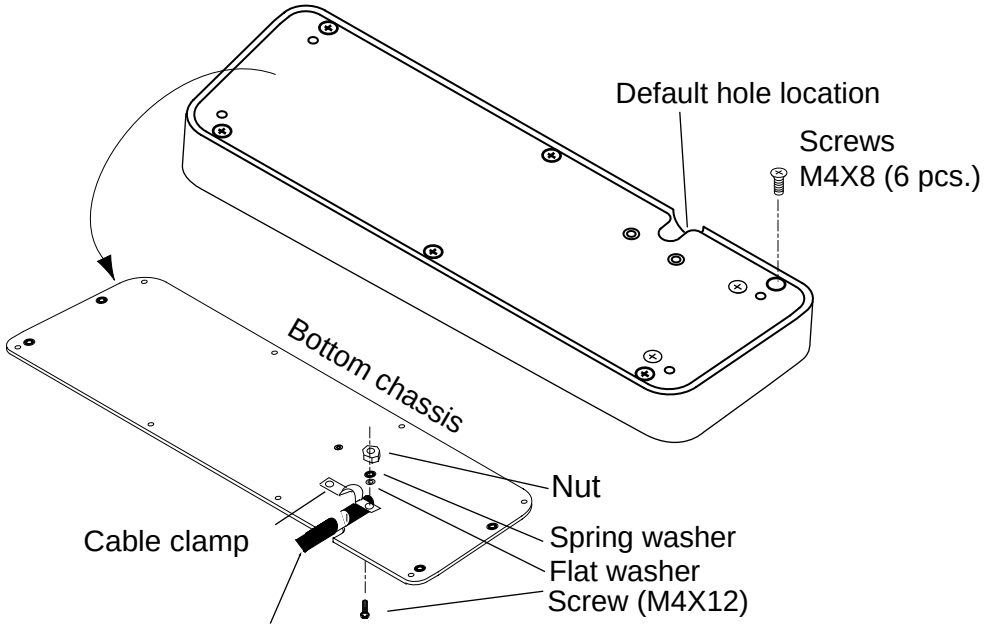
Changing the cable entrance location

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 and 3 with two screws, spring washers, flat washers and nuts (supplied with accessories) to fix the control cable as shown in the illustration below.



Fix the cable with cable clamp here.

Changing the cable location

5. Reattach connectors J1 and J2 removed at step 3.
6. Fasten six screws to assemble the control unit.

1.6 Ground

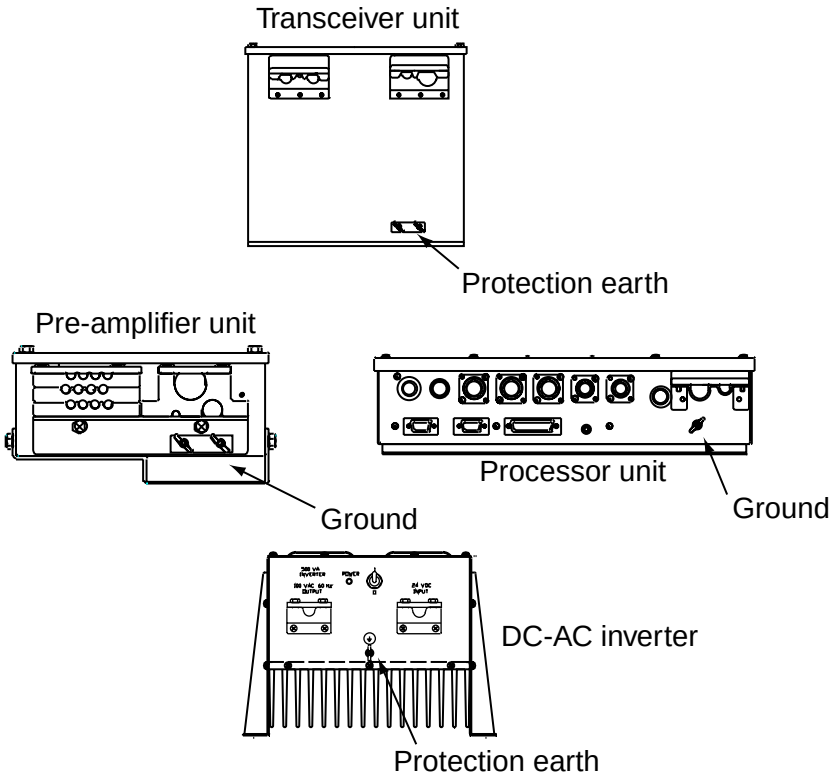
All units (excluding the control unit) should be grounded to ship's hull, with copper strap or earth wire depending on the unit.

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

⚠ CAUTION

Attach protection earth (ground) 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.



Locations of earth

1.7 Motion Sensor (option)

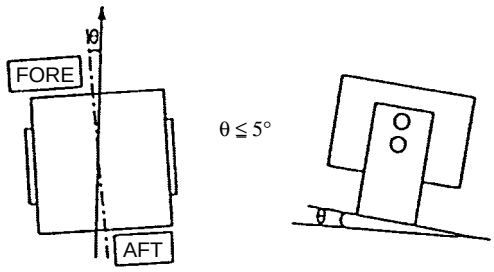
The motion sensor measures ship's pitching and rolling angles with a sensor, using the principles of the gyroscope. Because it is free from error caused by ship's vertical and horizontal motion, it can be installed at any convenient location. However, ship's semi-permanent inclination due to loading imbalance cannot be detected. Compensate for this as described in Chapter 3.

1.7.1 Mounting consideration

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

1.7.2 Mounting procedure

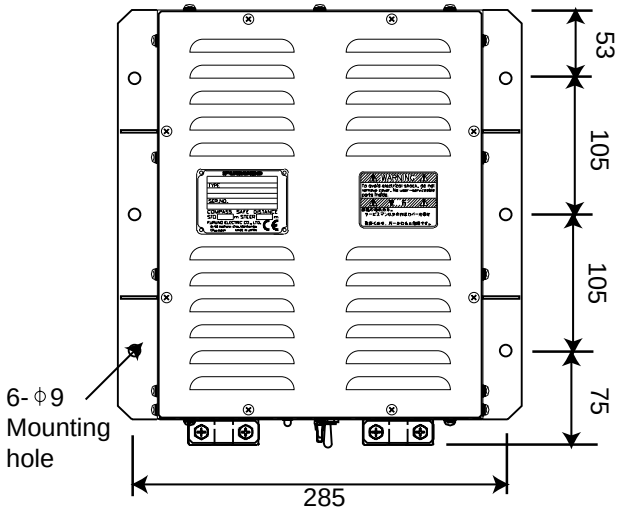
Orient the FORE mark on the unit toward the ship's bow and mount the unit within 5° of horizontal in all directions. For the offset, see Chapter 3.



Mounting of motion sensor

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). Install the unit so that the cable entrances are facing downward. Note that providing sufficient ventilation.



DC-AC inverter

2. WIRING

2.1 General Description for Cabling

2.1.1 Processor cable between processor and transceiver units

The processor cable is 15 m, 30 m or 50 m long as specified when ordering. A connector has been fitted for the transceiver unit end. The processor unit end of the cable should be fabricated at installation, after cutting it to an appropriate length.

2.1.2 TX cable between transceiver and pre-amplifier units

TX cable (19 pair cable)

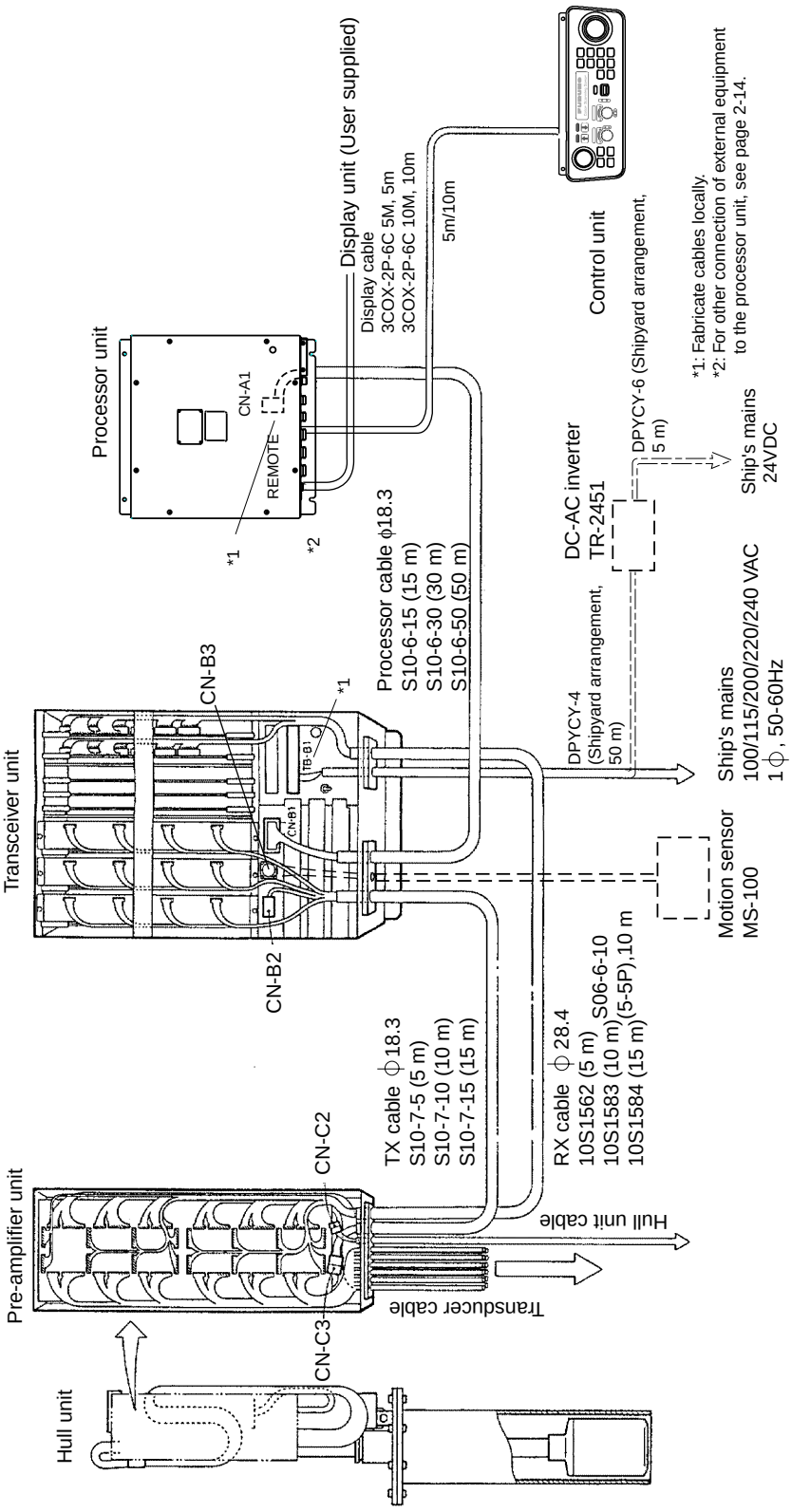
The length of the TX cable is 5 m, 10 m or 15 m long cable is available. Both ends of the cable are fabricated at the factory. However, the connector housing is not attached to the pre-amplifier unit end, so that the cable can easily be run through conduit pipe if necessary. Insert contact pins of the TX cable to the connector housing at installation referring to the interconnection diagram. Note that the cover plate should not be fitted to the connector of the pre-amplifier unit side.

RX cable (RX168 core cable assy)

The RX cable is available in length of 5 m, 10 m or 15 m. The cable is fitted with connectors at both ends so fabrication in the field is not required.

2.1.3 Hull cable between hull and pre-amplifier units

The hull cable is pre-connected to the hull unit. The other end is fitted with connector.

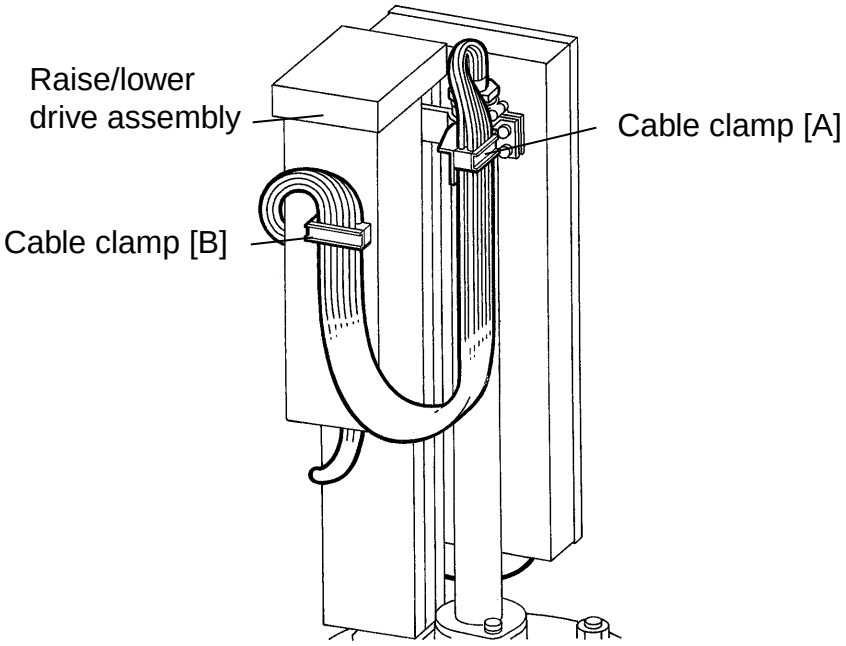

Processor unit
CN-A1
REMOTE
*1
*2
Display unit (User supplied)
Display cable
3COX-2P-6C 5M, 5m
3COX-2P-6C 10M, 10m
5m/10m
Control unit
DPYCY-6 (Shipyard arrangement, 5 m)
*1: Fabricate cables locally.
*2: For other connection of external equipment to the processor unit, see page 2-14.
DC-AC inverter
TR-2451
DPYCY-4
(Shipyard arrangement, 50 m)
Ship's mains
24VDC
Ship's mains
100/115/200/220/240 VAC
1 ϕ, 50-60Hz
Processor cable ϕ18.3
S10-6-15 (15 m)
S10-6-30 (30 m)
S10-6-50 (50 m)
CN-B3
Transceiver unit
TB-B1
CN-B1
CN-B2
Motion sensor
MS-100
RX cable ϕ 28.4
10S1562 (5 m)
10S1583 (10 m)
10S1584 (15 m)
S06-6-10
(5-5P),10 m
TX cable ϕ18.3
S10-7-5 (5 m)
S10-7-10 (10 m)
S10-7-15 (15 m)
CN-C2
CN-C3
Pre-amplifier unit
Hull unit cable
Transducer cable
Hull unit

2.2 Hull unit/Pre-amplifier Unit

2.2.1 Running transducer cable

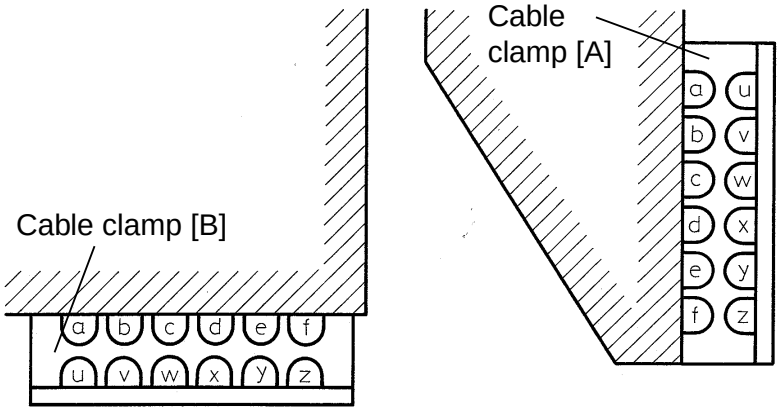
Excessive stress should not be placed on the transducer cables (12 pcs.) during raise/lower operation. Follow the procedure below to run the cables.

1. Fix the 12 transducer cables with the cable clamp [A].



Cable clamp (1)

2. Temporarily fix cable clamp [B]. Note the positions of cable in clamps [A] and [B] as shown below.



Ex) The cable which is fixed at (a) of the clamp [A] should be wired to (a) of the clamp [B].

Cable clamp (2)

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

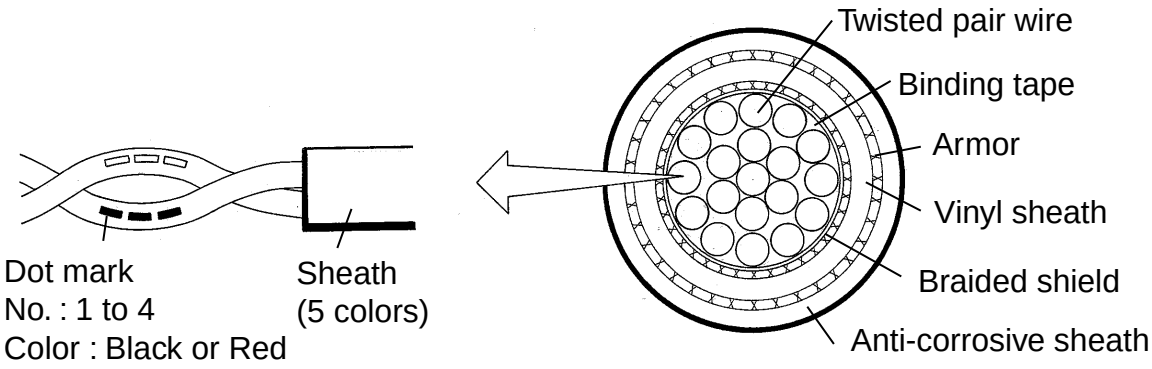
	600 mm Travel type	400 mm Travel type
Length of cable between [A] (a) and [B] (a)	660 mm	580 mm
Length of cable between [A] (u) and [B] (u)	690 mm	610 mm

4. Adjust slack of the other ten cables so that it becomes the same as the ones adjusted at step 3. Tighten the cable clamps [A] and [B].

2.2.2 Fabricating TX cable (from transceiver unit)

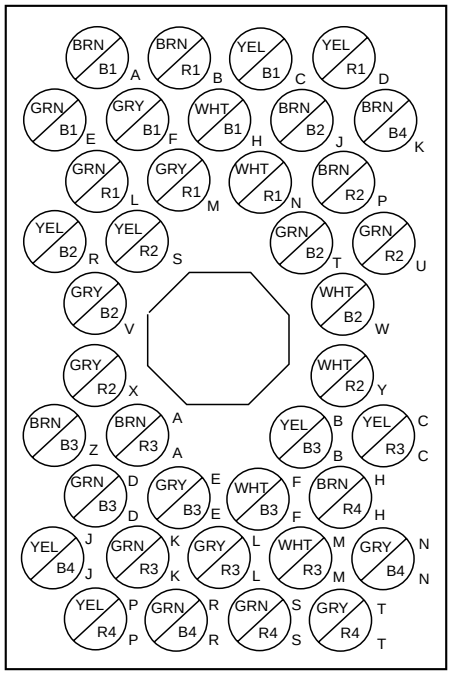
Each wire of the TX cable is pre-fitted with a contact pin. Insert it into the connector housing.

Cable construction

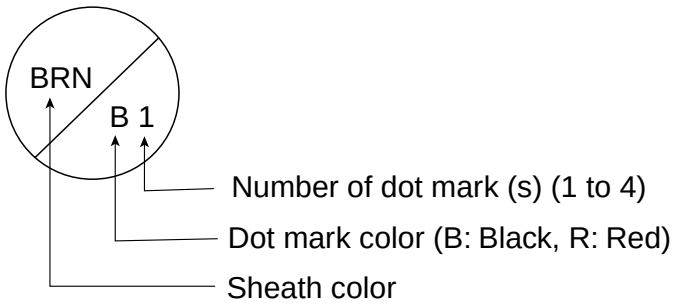


TX cable, sectional view

Connector pin No. – wire color



Note: 1. Wire differentiation



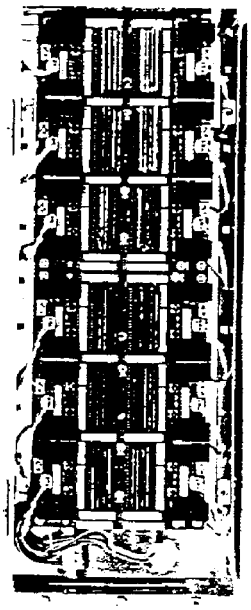
2. BRN and GRN show the following colors.
   BRN: Light brown
   GRN: Light green

3. Cover plate is not fitted to the connector.

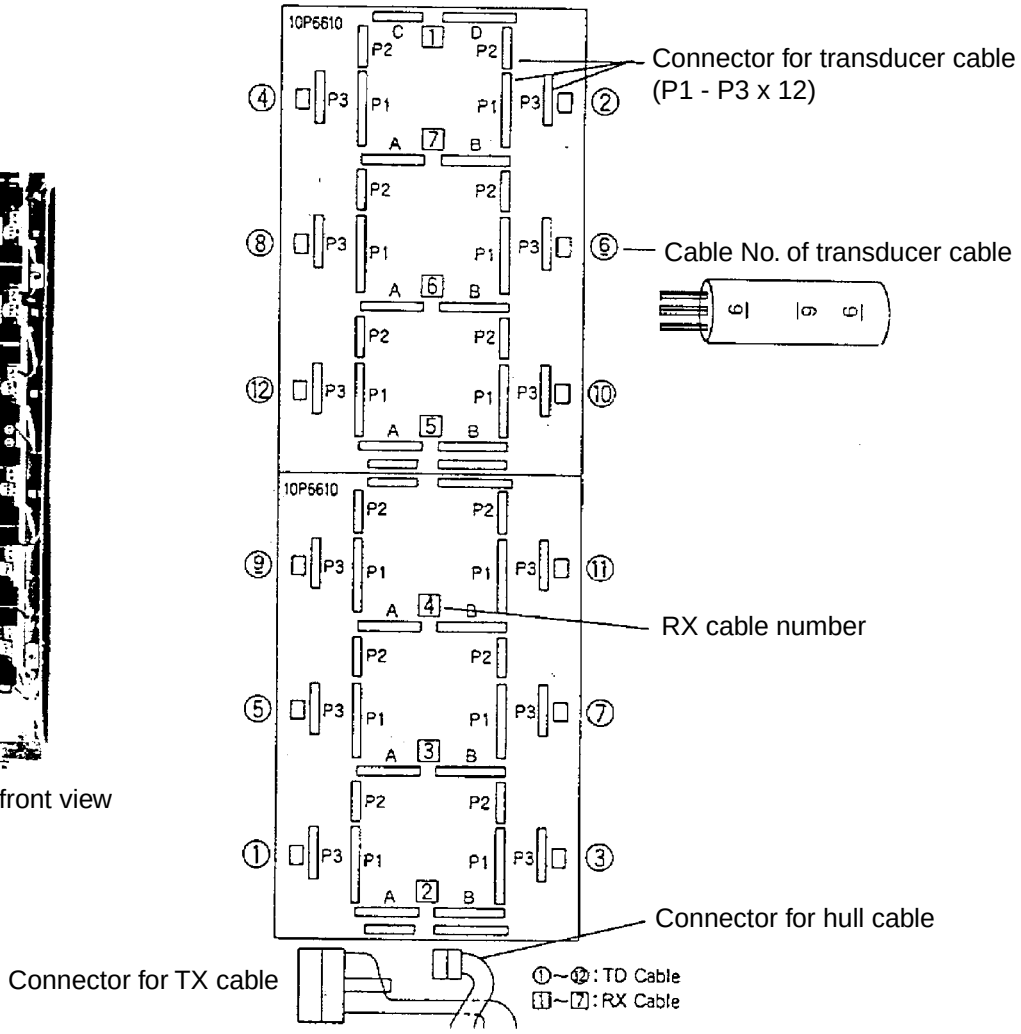
Connector pins

2.2.3 Pre-amplifier unit wiring

For wiring in the pre-amplifier unit, refer to the instruction sheet provided at the back of its front panel.



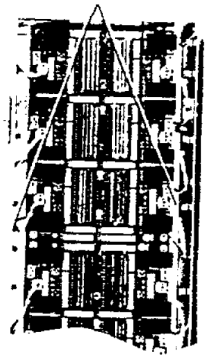
Pre-amplifier unit, front view

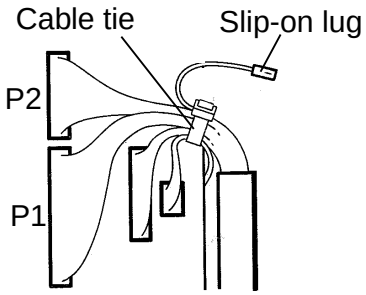


Wiring of pre-amplifier unit

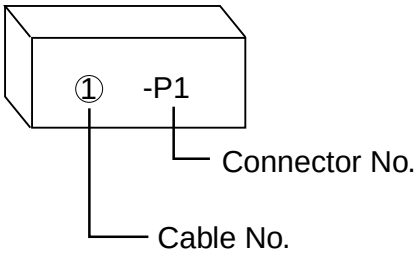
1. Plug in the 38P connector of the TX cable (19 pair cable).
2. Connect the transducer cables in the following order and bind the wires with cable ties. Do not connect the slip-on lugs of cables 2 to 3 at this stage.
   Pass the transducer cable under the board.
   Cable connection order:
   (upper) ② → ⑥ → ⑧ → ④ (mid) ⑩ → ⑪ → ⑨ → ⑫ (lower) ⑦ → ③ → ⑤ → ①

Run cables through this space.



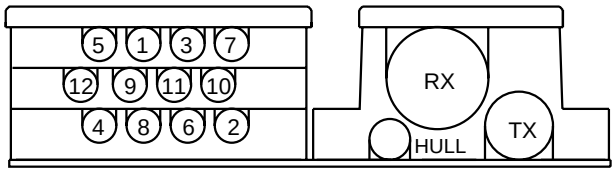


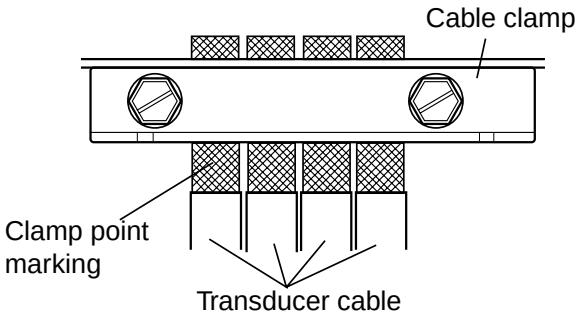
Note: Cable and connection numbers are marked on the side of each connector as shown below.



Transducer cable connection

3. Pass the transducer cable (12 cores) and TX cable through the cable clamp. Note that the transducer cables should be arranged as shown below and clamped at the point of marking.



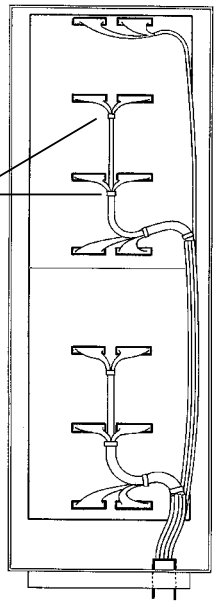


Preamplifier unit, cable clamp

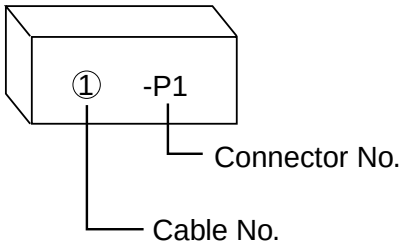
4. Pass the hull and RX (168 cores) cables through the cable clamp, and tighten the cable clamp.
5. Run the RX cable as shown below and plug in the connectors.

   Pass the RX cable under the board.

Fix the wires to the board with cable ties.



Note: Cable and connector numbers are marked on the side of each connector as shown below.

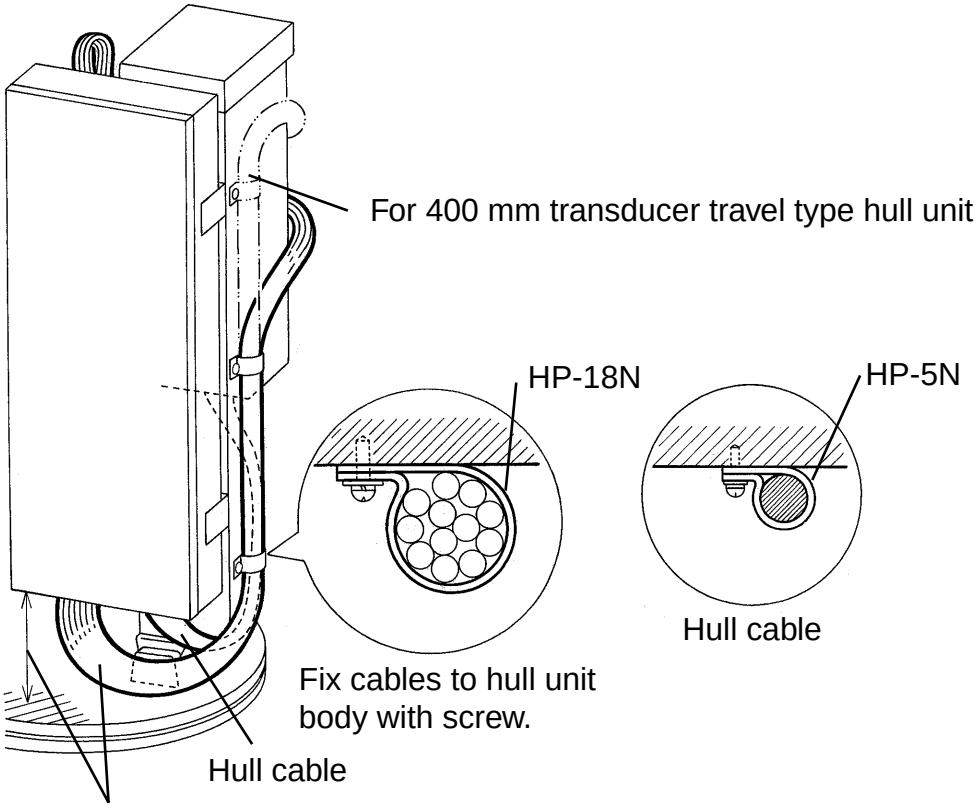


RX cable connection

6. Plug in the slip-on lugs of transducer cables ② to ③.

2.2.4 Fixing transducer and hull cables

Fix the transducer and hull cables to the hull unit body with cable clamps.

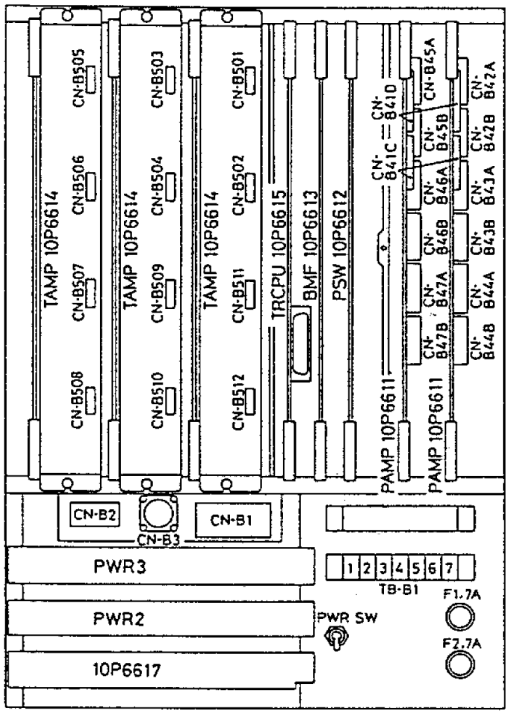


For 400 mm transducer travel type hull unit, make sure that the cable does not touch the flange.

Fixing the hull cable

2.3 Transceiver Unit

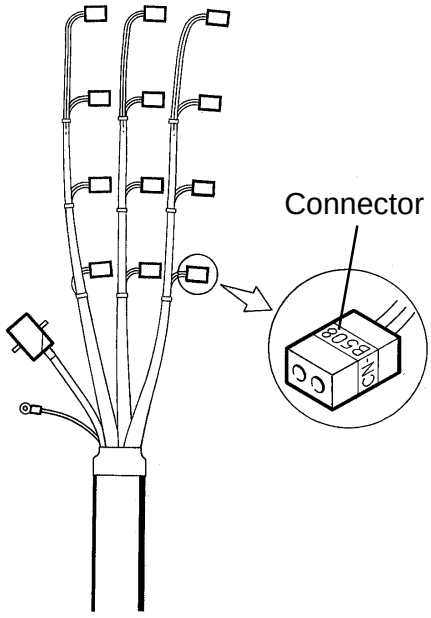
All cables, except for the power cable, connected to the transceiver unit are fitted with connectors and lugs.



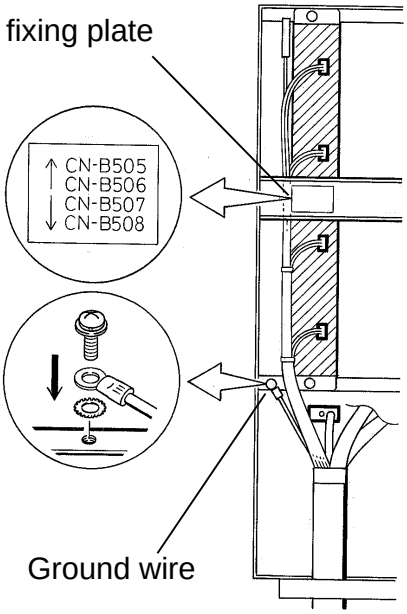
Connector and terminal board location in transceiver unit

2.3.1 Connecting TX cable

The connector numbers are marked on respective 2P plugs (12 pcs.) of the TX cable. Connect them to the transceiver unit, referring to the sticker on the PCB fixing plate. The ground wire should be connected to the chassis as shown below.



TX cable

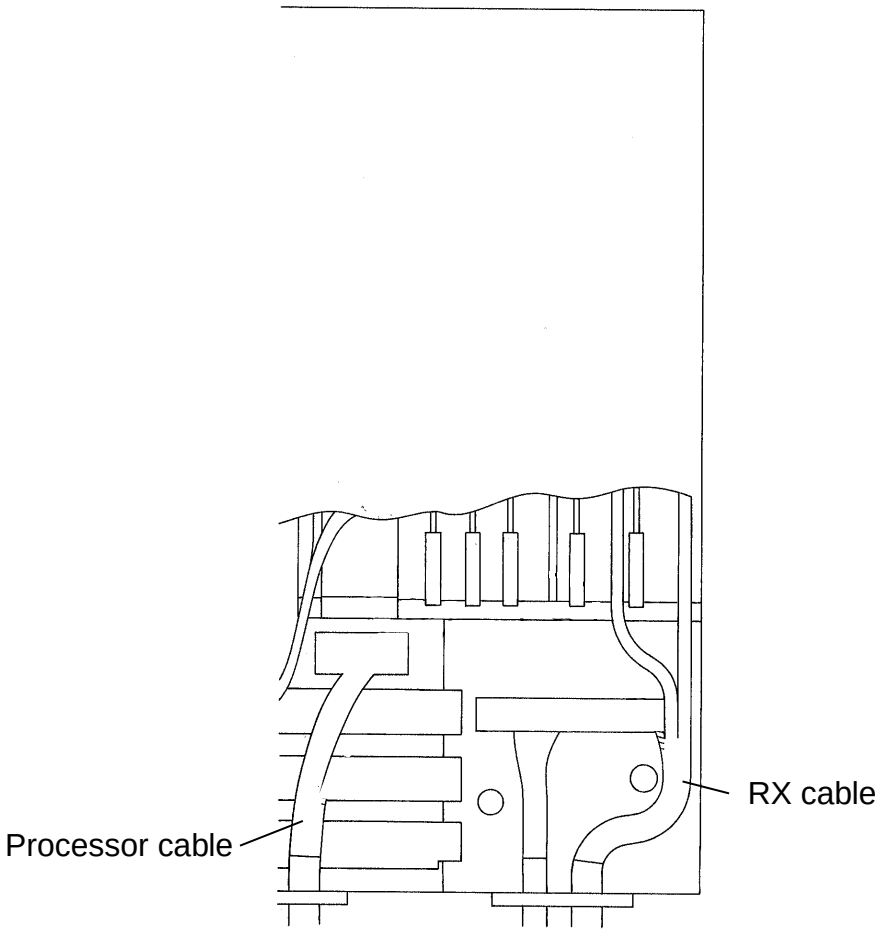


Transceiver unit

2.3.2 Connecting RX Cable

The connector numbers are marked on respective plugs. Connect them referring to the instruction at the back of the front panel of the transceiver unit.

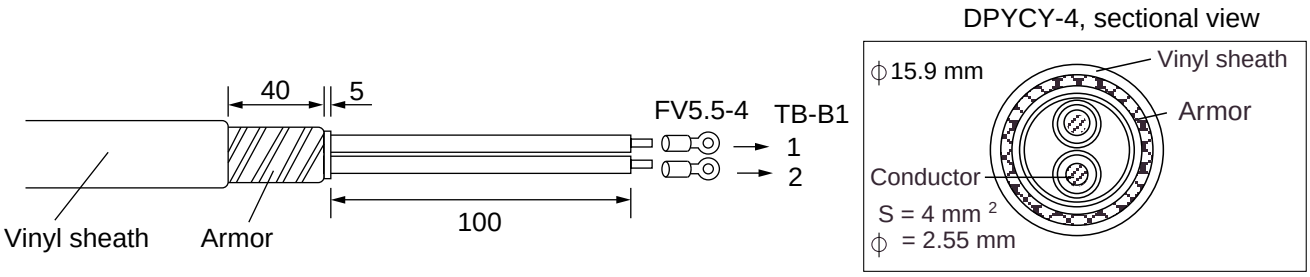
Note: CN-B41C/CN-B41D are provided on the both PAMP Boards and you may use either side.



Connecting of Processor and RX cables

2.3.3 Connecting power cable

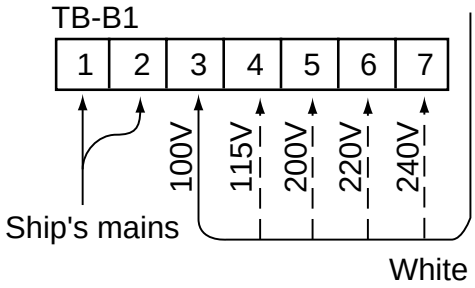
Fabricate the power cable DPYCY-4 (Japan Industrial Standard (JIS)) or equivalent (local supply.)



Fabricating of power cable

Note: Change connection of white wire at the TB-B1 according to ship's mains. And then, replace the 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.

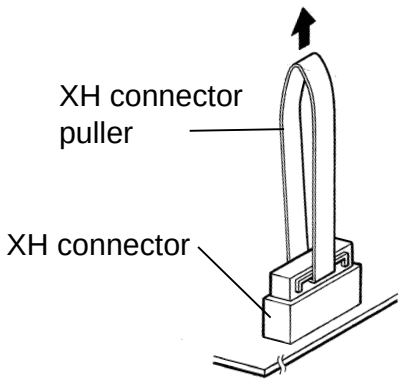
Ship's mains	Fuse
100/110/115 VAC	7 A 125 V
200/220/240 VAC	4 A 250 V



Connections at TB-B1

2.3.4 How to unplug the XH connector

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



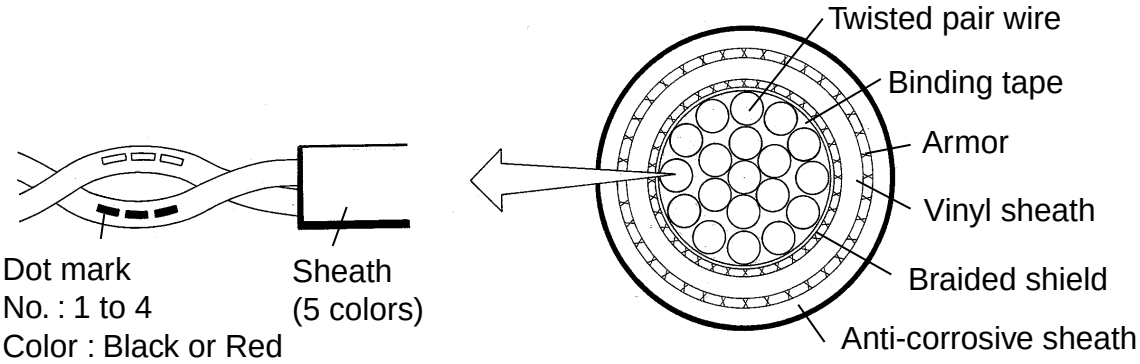
XH connector puller

2.4 Processor Unit

2.4.1 Cable fabrication

Cable construction

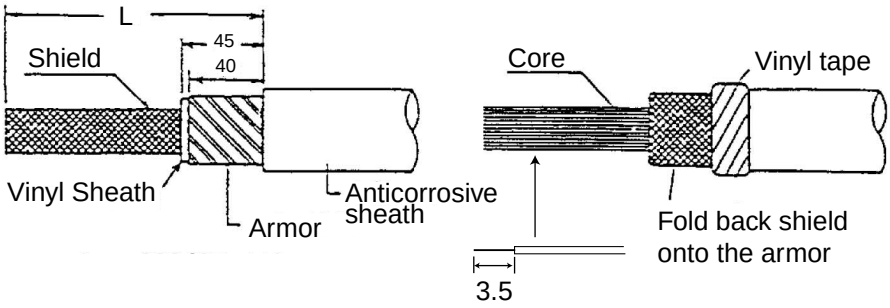
The processor unit end of the processor cable (interconnection cable between processor and transceiver units) is not fabricated at the factory. Attach the 38P connector locally. This cable is attached to CN-A1 on the MAIN Board.



Processor cable, sectional view

Cable fabrication

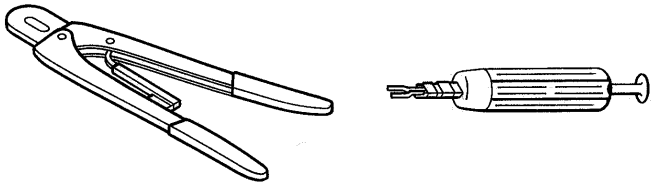
Remove the anticorrosive sheath, armor and vinyl sheath as shown below.



Fabrication of processor cable

Connecting contact pins

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

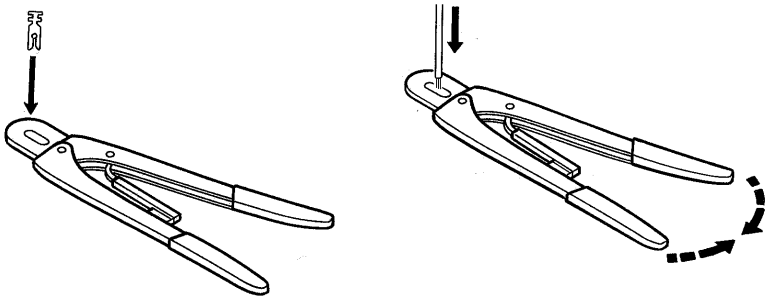


Crimping tool Pin extractor

Tools for crimping, extracting contact pins

Wire crimping procedure

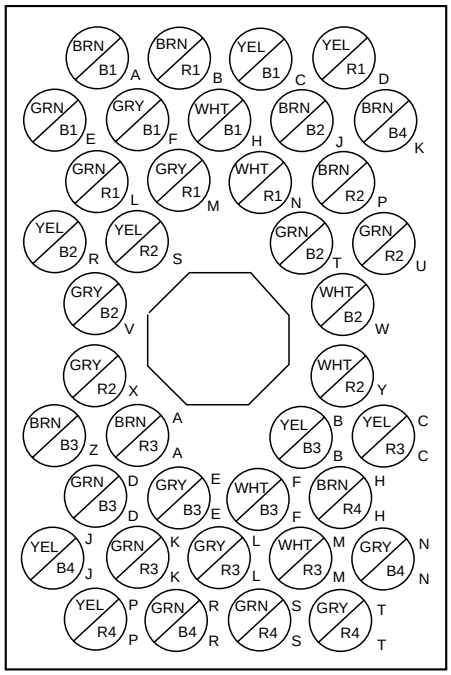
1. Strip the vinyl sheath of the wire to expose the core by 3.5 mm.
2. Hold the crimping tool horizontally and insert the contact pin, with its slit faced downward, into the crimp hole of the crimping tool.
3. From the same side, place the wire onto the contact pin and squeeze the handle until the ratchet is released. Pull the wire to make sure that it is securely crimped.



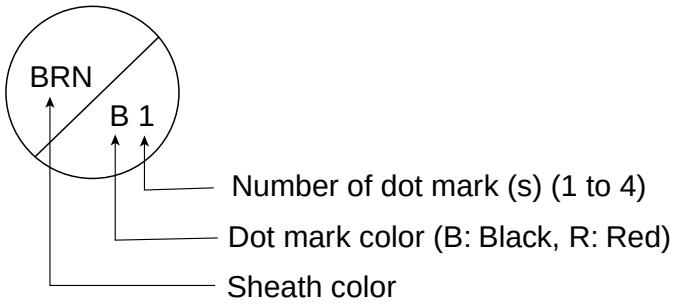
How to use the crimping tool

Inserting contact pin into connector housing

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



Note: 1. Wire differentiation



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

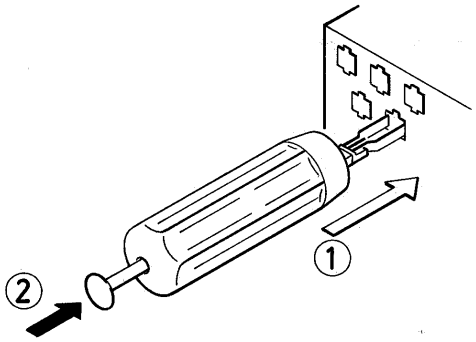
3. Cover plate is not fitted to the connector.

Inserting pins contact

Procedure to extract contact pin

When a contact pin has been inserted into an incorrect hole on the connector housing, remove it by using the pin extractor.

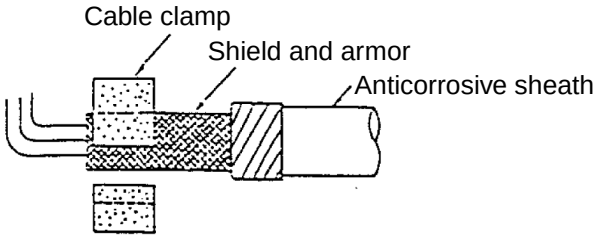
1. Push the pin extractor into the pin hole from the side opposite to the pin inserting side.
2. Firmly push in the head of the pin extractor. The retaining spring will come free and contact pin can be removed.



Pin extractor

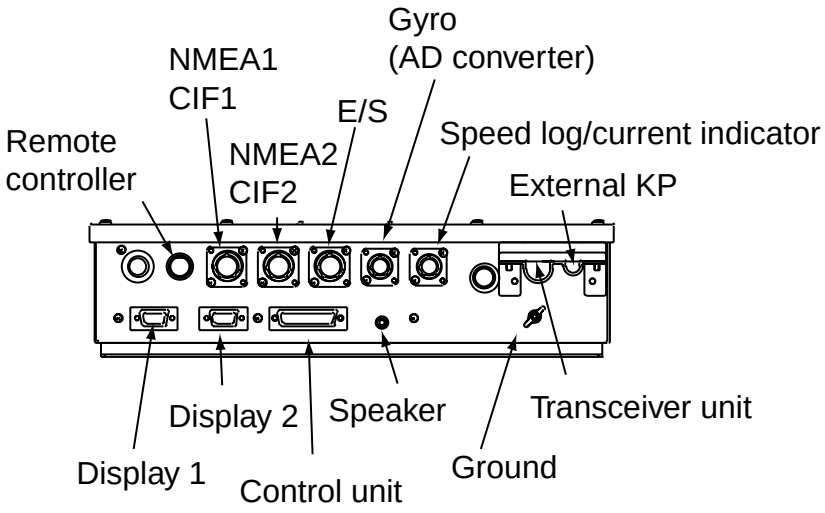
Clamping cable

Secure the cable with cable clamp at the shield and armor.



Clamping cable

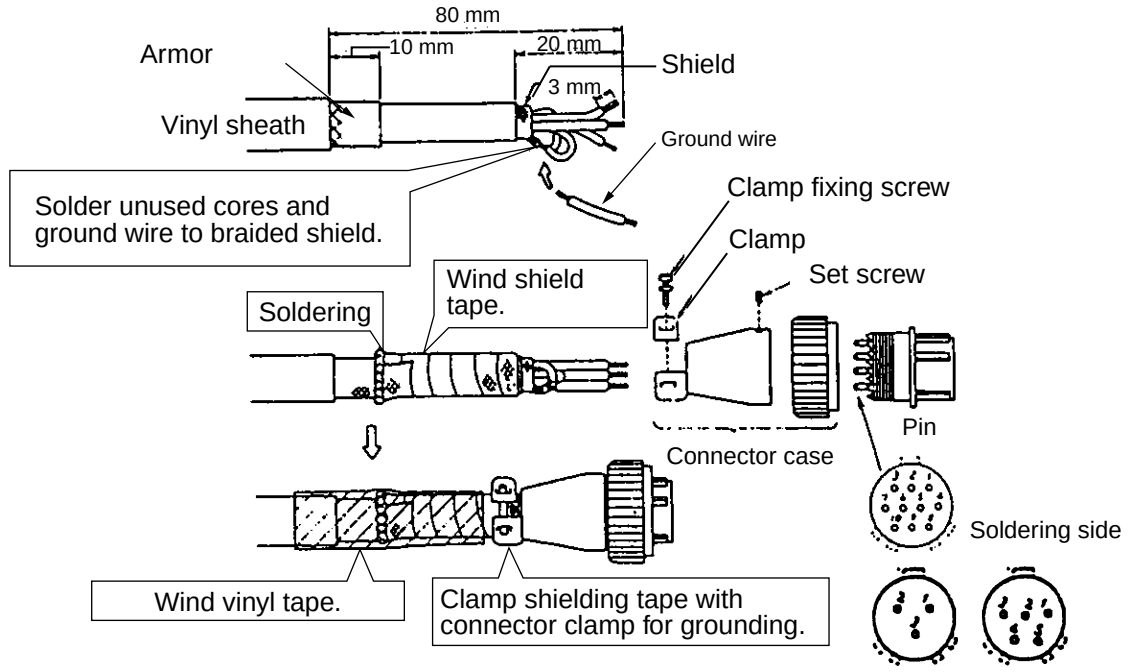
2.4.2 Other connections



Connection of processor unit

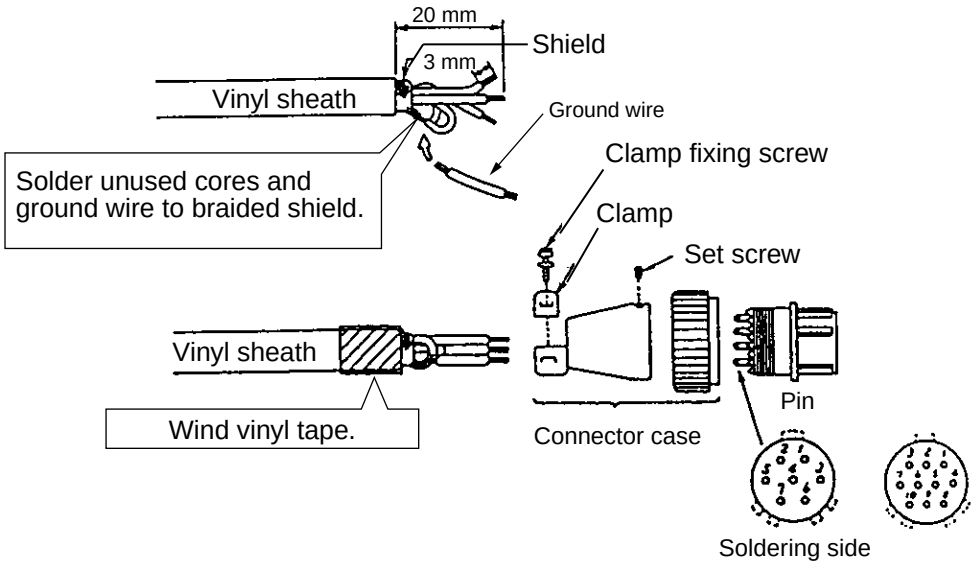
Cable with armor

GYRO: SRCN6A13-5P
NMEA1/CIF1, NMEA2/CIF2: SRCN6A16-10P
LOG: SRCN6A13-3P



Cable without armor

ES: SRCN6A16-7P
NMEA1/CIF1, NMEA2/CIF2: SRCN6A16-10P



Fabricating other cables

Display unit

Prepare XGA monitor locally. When using MU-150C as the display unit, see 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 input sentences

Talker	Sentence	Information
*1	GGA	GPS position data
*1	GLL	Own ship position
**	GTD	Own ship position (TD, LOP)
LC	GLC	TD (Loran-C)
**	HDG	Heading (compass)
**	HDM	Heading (magnetic bearing)
**	HDT	Heading (true)
*1	VTG	Course over ground speed
VD	VHW	Water speed, heading
LC	RMA	Recommended minimum specific Loran-C data
*2	RMC	Recommended minimum specific GPS 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, II (other talker), TR
**: Not specified

NMEA output sentence

Talker	Sentence	Information
SS	TLL	Target position (L/L)

CIF input sentences

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

CIF output sentence

Data No.	Information
5:	Target position (L/L)

Gyrocompass

Heading data from a gyrocompass can be input via A-D converter AD-100. For details, see the operator's manual for AD-100.

Echo sounder

Echo sounder video can be input using the echo sounder interface VI-1100A. For details, see the installation manual for VI-1100A.

Speed log

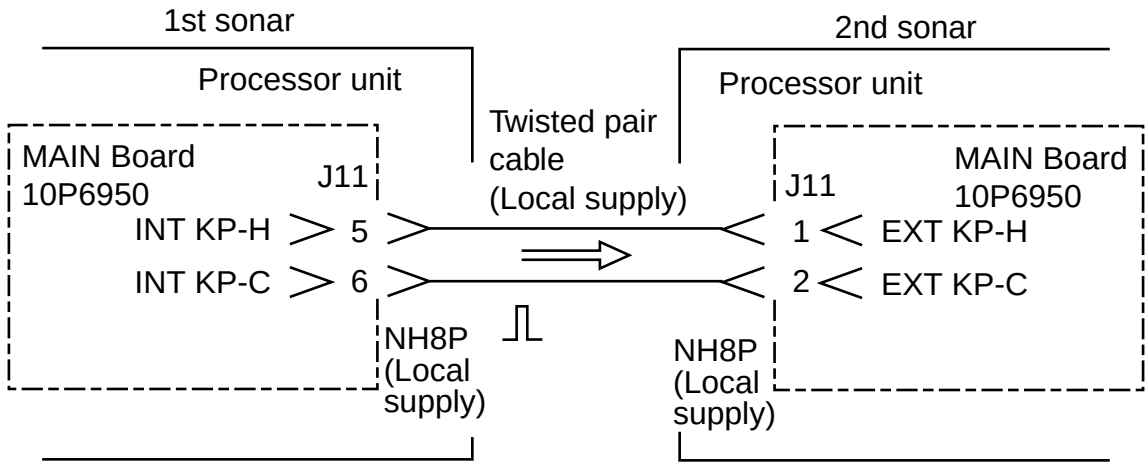
Log pulse (contact signal) can be input.

2.5 Synchronizing Transmission with Other Equipment

2.5.1 Synchronizing transmission with another CSH-5L

When two CSH-5Ls are installed, connect them as shown below, so that the transmission of the second sonar is synchronized with that of the first.

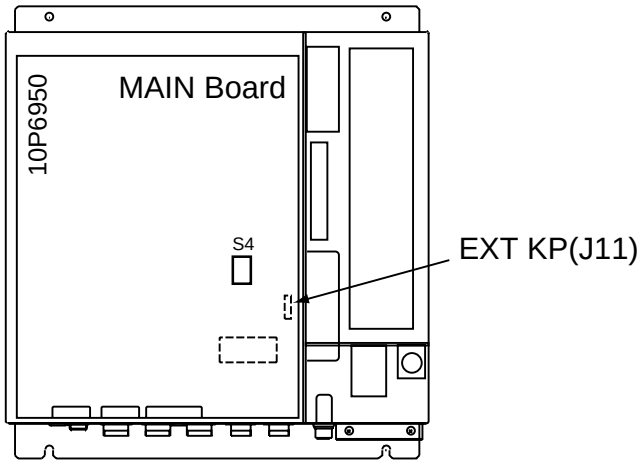
Wiring



Connecting two CSH-5Ls

DIP switch setting

Set DIP switch S4 on the MAIN Board in the processor unit as follows:



Location of DIP switch S4

DIP switch	1st sonar	2nd sonar
S4-#2	ON	-
S4-#1	-	OFF

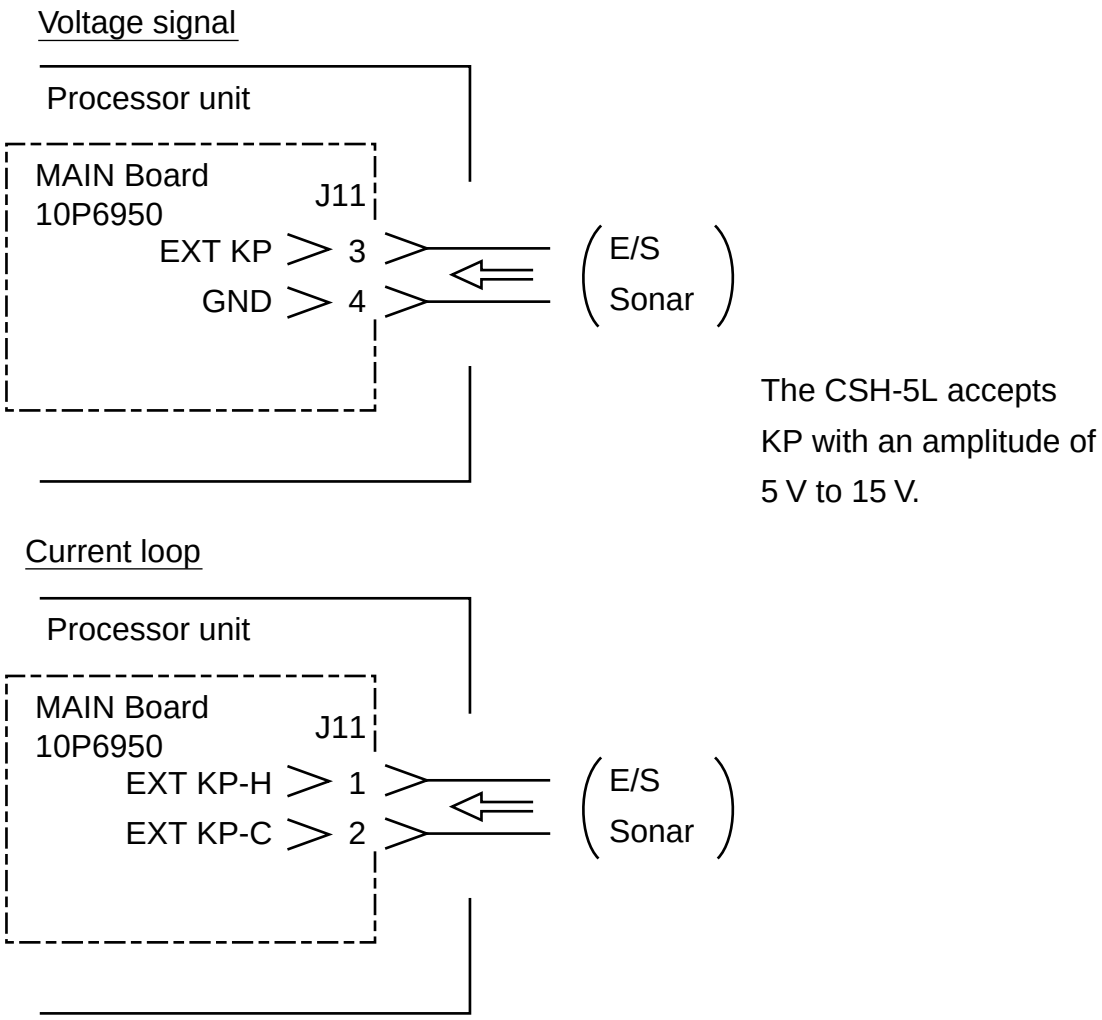
Menu setting

On 2nd sonar, set EXT KP SYNC to ON at the System 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-5L with an echo sounder or other sonar, make the connections shown below.

Wiring



Connecting CSH-5L with echo sounder or sonar

DIP switch setting

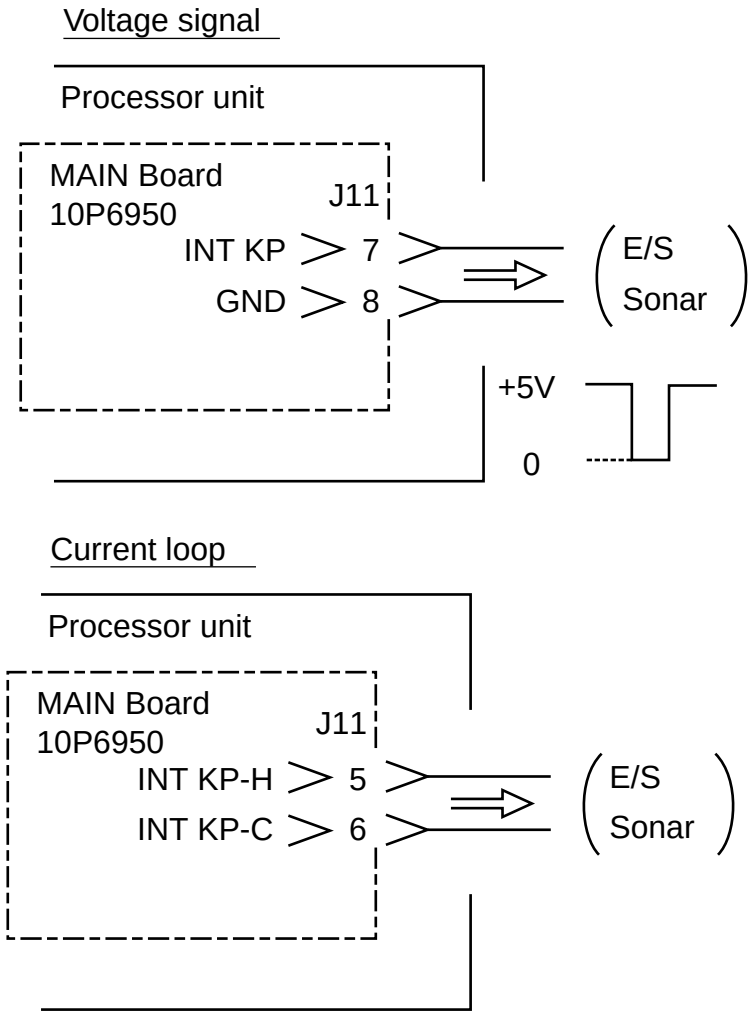
Set DIP switch S4-#1 on MAIN Board as below.
Positive KP: OFF
Negative KP: ON

Menu setting

Set EXT KP SYNC to ON at the System menu. Refer to the operator's manual for the procedure.

2.5.3 Outputting KP of CSH-5L to external equipment

To output KP of CSH-5L to an echo sounder or other type of sonar, make the connections shown below.



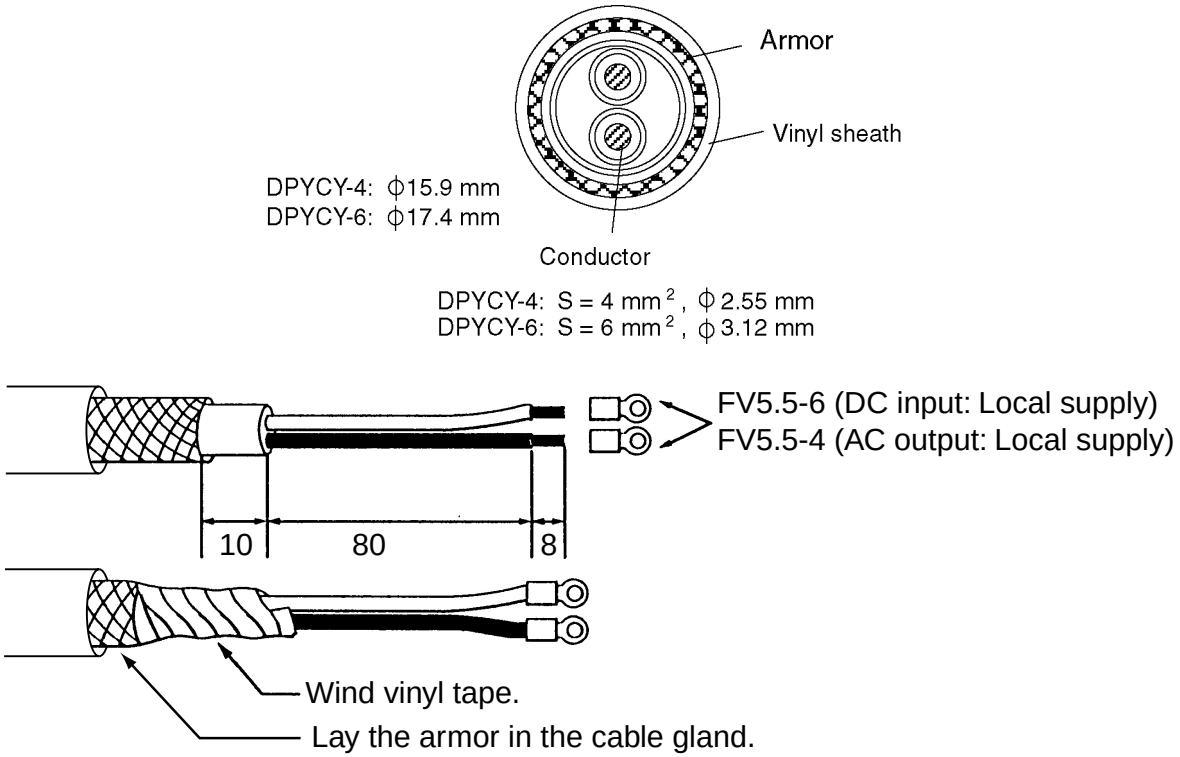
How to output CSH-5L's KP to external equipment

DIP switch setting

S4-#2	Transmission trigger
OFF	Negative
ON	Positive

2.6 DC-AC Inverter

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. ADJUSTMENTS

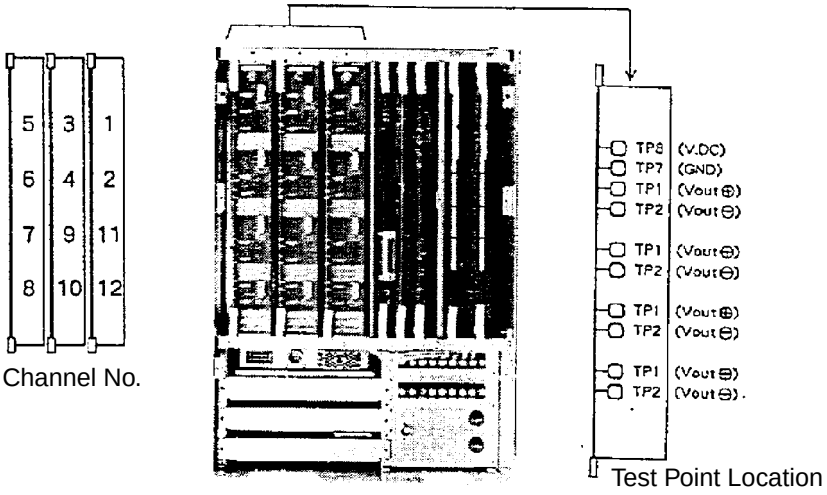
⚠ WARNING

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

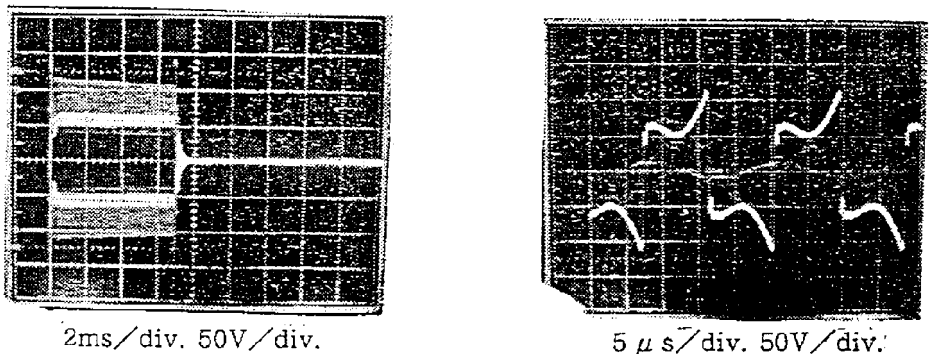
Only qualified personnel should work inside the equipment.

3.1 Measuring TX Output

1. Set the controls of the control unit as follows.
   Range: 400 m Output: 10 (Max.) Vertical Beam width: Wide
   Tilt: 0° Pulselength: 10 (Max.)
2. Connect the oscilloscope across Vout + and Vout – jacks on the TAMP boards (10P6614) and measure the peak-to-peak voltage of the TX signal at the center point of its pulselength.



Waveform measured across Vout ⊕ and Vout ⊖



Measuring TX output signal

To measure the peak-to-peak voltage (Vpp), expand the waveform to 5 µs/div. In the example shown on the previous page, the amplitude is 220 Vpp.

Typical value of TX output (68 kHz)

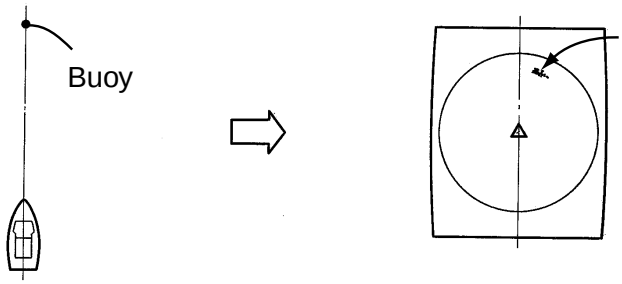
CH	Vout +, -	CH	Vout +, -	CH	Vout +, -
1	100 Vpp	5	240 Vpp	9	175 Vpp
2	100 Vpp	6	240 Vpp	10	175 Vpp
3	175 Vpp	7	240 Vpp	11	100 Vpp
4	175 Vpp	8	240 Vpp	12	100 Vpp

Typical value of TX output (55 kHz)

CH	Vout +, -	CH	Vout +, -	CH	Vout +, -
1	140 Vpp	5	310 Vpp	9	240 Vpp
2	140 Vpp	6	310 Vpp	10	240 Vpp
3	240 Vpp	7	310 Vpp	11	140 Vpp
4	240 Vpp	8	310 Vpp	12	140 Vpp

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.



When the target on the screen is skewed to the right, the transducer heading is skewed to the left.

Displaying a buoy on the screen

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	(JAPANESE)	ESPAÑOL	DANSK
		NEDERLND	FRANCAIS	ITALIANO	(KOREAN)
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

System menu

EXT KP SYNC

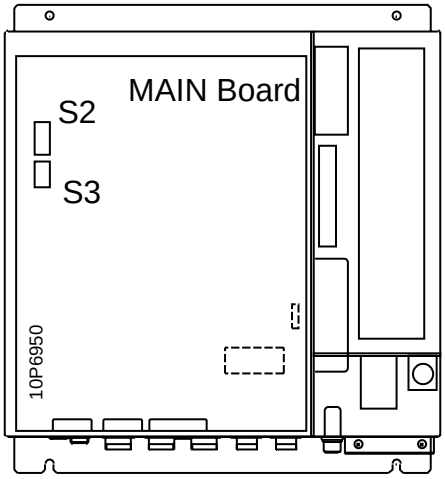
Select using or not using the external keying pulse (See "2.5 Synchronizing Transmission with Other Equipment" on page 2-16.)

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 GPS navaid connected to NMEA/CIF 1 or NMEA/CIF 2 port.
   - GYRO+NAV: Use heading data signal from the sensor connected to the GYRO port for course, data from the GPS navaid or current indicator connected to NMEA/CIF 1 or NMEA/CIF 2 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 S2

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.
2. 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 appropliately.
2. Rotate the [GAIN] control to choose item among 2400, 4800, 9600 and 19200.

PORT 1 FORMAT, PORT 2 FORMAT

Set format of equipment connected to NMEA1/CIF1 port or NMEA2/CIF2 port.

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

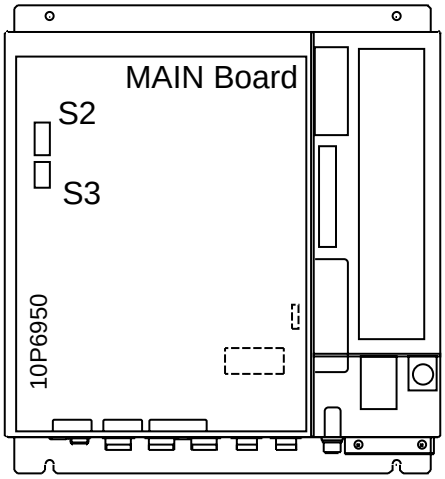
NAV DATA

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 appropriately.
   Select “DR” when using the equipment connected to GYRO port and LOG port.

3.4 Setting GPS Navaid Smoothing

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 and S3

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

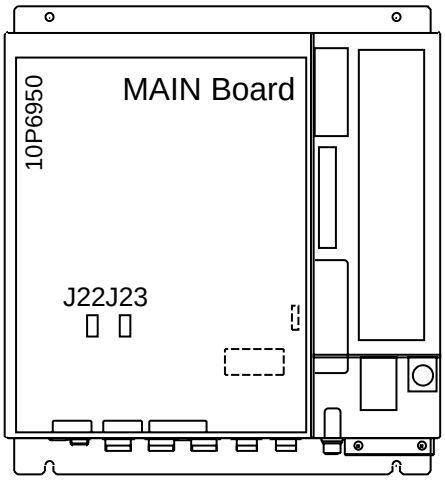
#3	#4	GPS course change
ON	ON	10°
ON	OFF	20°
OFF	ON	45°
OFF	OFF	90° (default setting)

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

When all switches are ON, GPS positioning data 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.

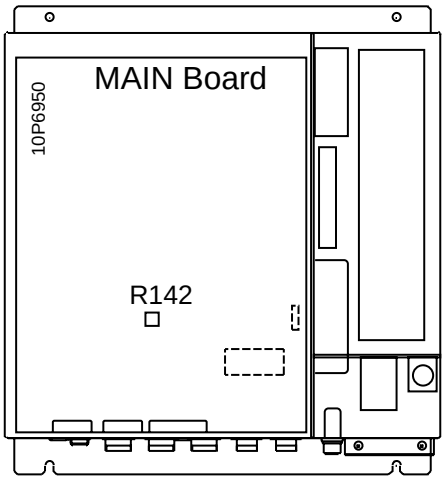


Location of jumper block J22 and J23

Jumper	*NMEA Ver1.5*	*CIF or NMEA Ver2.0*	*Port*
J22	*1-2 (Default setting)*	*2-3*	*NMEA1/CIF1*
J23	*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 R142

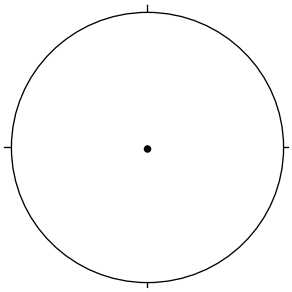
1. Rotate R142 so that the line on it locates at the center position.
2. Set the SOUNDER MENU as below.
   GAIN: 10, CLUTTER: 0
3. On the SOUNDER MENU, set E/S INT REJECT to ON.
3. Set GAIN to 0 on the SOUNDER MENU.
4. Adjust R142 so that noises disappear on the echo sounder display.
5. On the SOUNDER MENU, set the GAIN to 10, and then set the CLUTTER to 10.
6. Adjust R142 so that noises disappear on the echo sounder display.

3.7 Sea Trial

3.7.1 Cruising noise check

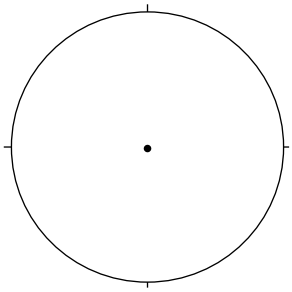
Check and record the cruising noise displayed on the screen. Do this with the transmitter turned off and the ship anchored, and also with the ship running at the speed normally used while the sonar is in use.

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			

3.7.2 Recording proper setting at sea trial

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
INSTALLING CSH-5L ON THE RETRACTION TANK OF CH/FH SERIES SONARS OR BY USING 1800/3500 MM TANK

When retrofitting the CH/FH series with the CSH-5L 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 bellow 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-5040-FFx13	XDCR cable: 4200 mm, Main shaft: 1300 mm
750 < L ≤ 1000	CSH-5040-FFx15	XDCR cable: 4200 mm, Main shaft: 1550 mm
1000 < L ≤ 1800	CSH-5040-FFx23	XDCR cable: 4900 mm, Main shaft: 2350 mm
1800 < L ≤ 3500	CSH-5040-FFx40	XDCR cable: 6600 mm, Main shaft: 4065 mm

Note 1: The hull unit CSH-5041 (400 mm transducer travel) can not be used.
Note 2: When some portion of the main shaft is cut off, the parts listed below should be additionally ordered.

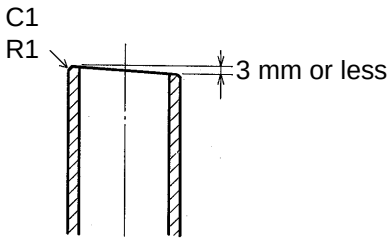
Name	Type	Code No.
Waterproofing attachment	10-044-2320-0	006-970-810
Lock-tight	#601	000-856-120

The waterproofing attachment is supplied with the CSH-5040-FFx40.
Note 3: FF: Frequency, x: Retraction tank type

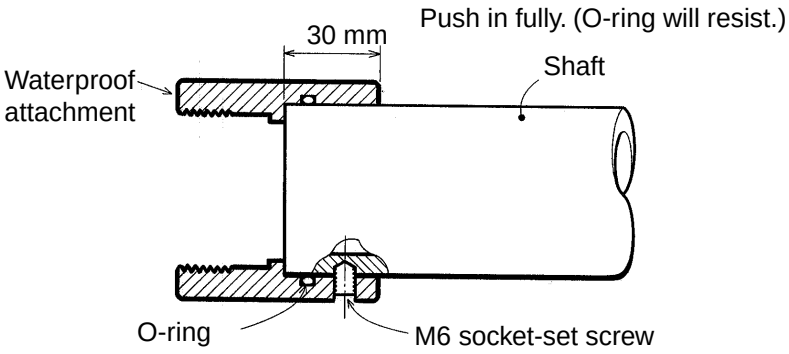
Installation when retraction tank is more than 750 mm long

1. Calculate the necessary length of the main shaft.
   - Main shaft length = Tank length + 565 mm (See page AP-5.)
   - If there is 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 it. The 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 cut the main shaft.

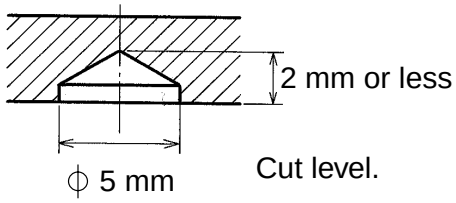
- Chamfer the top of the main shaft as shown below. (When chamfering with a file, use a fine file and finish the surface as smooth as possible.)
- When clamping the main shaft with a clamp, take care not to hurt the shaft surface.
- When a metal saw is used to cut the main shaft, finish the shaft top so that it is level within 3 mm.



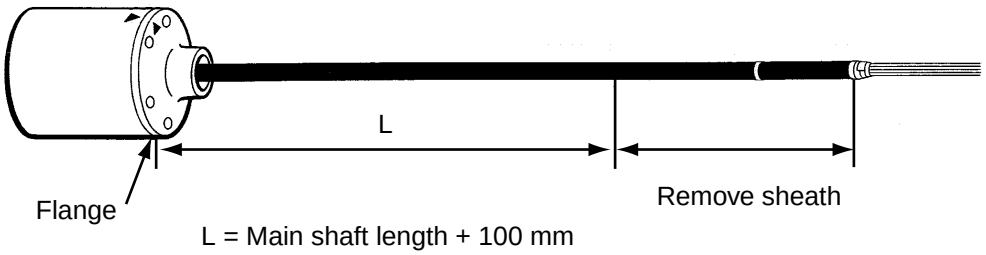
3. Temporarily install the waterproofing attachment on the top of the main shaft and make holes for socket-set screws.



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



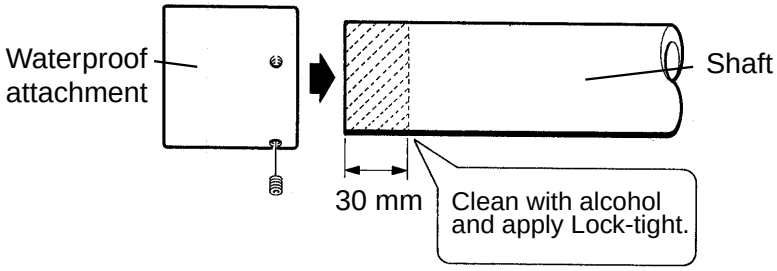
4. Remove the sheath of the transducer cable and wrap the sheath end vinyl tape.



L = Main shaft length + 100 mm

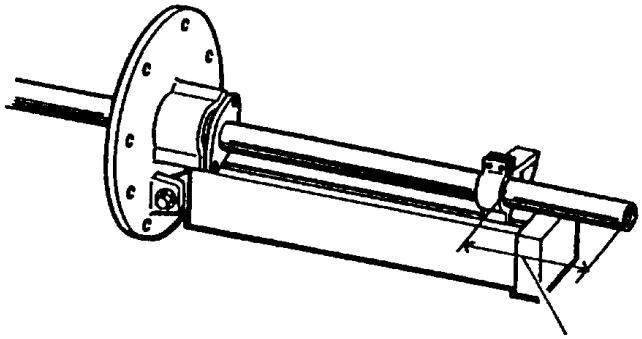
5. Pass the main shaft through the main body flange and assemble the hull unit. Refer to chapter 1 for the assembling procedure.

6. Clean the top of the main shaft with alcohol, apply bond “Lock-tight 601” and install the waterproof attachment.



- Tighten the M6 socket-set screws with a torque of 3.92 N·m to 4.9 N·m.

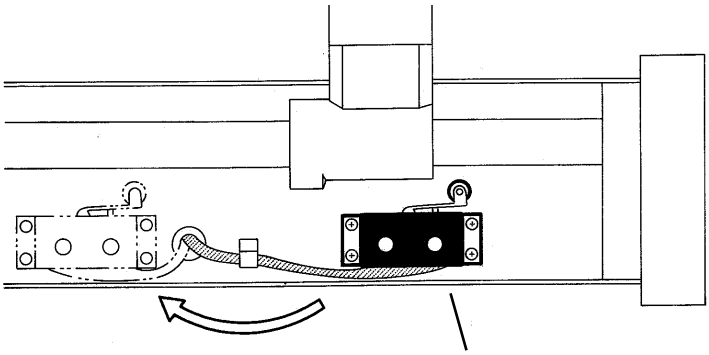
7. Assemble the hull unit completely, taking the following points into account.
   1) The shaft retainer should be in contact with the waterproofing attachment.
   2) The fastening band should not be used on the main shaft fitted with the waterproofing attachment is used.
   3) When the main shaft is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



L = Cut length shown on page AP-5 + 30 mm.

Installation when retraction tank is 600 mm to 750 mm long

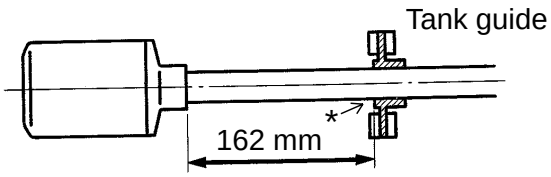
1. Follow the steps 1 to 5 in the previous procedure.
2. Modify the transducer travel to 450 mm by changing the upper limit switch position.



Move the upper limit switch to modify to 450 mm travel.

Upper limit switch.

3. Assemble the hull unit completely, taking the following points into account. Refer to chapter 1 for details of assembling and installation.
   a) The tank guide should be installed at a position 162 mm above the top of the transducer flange.



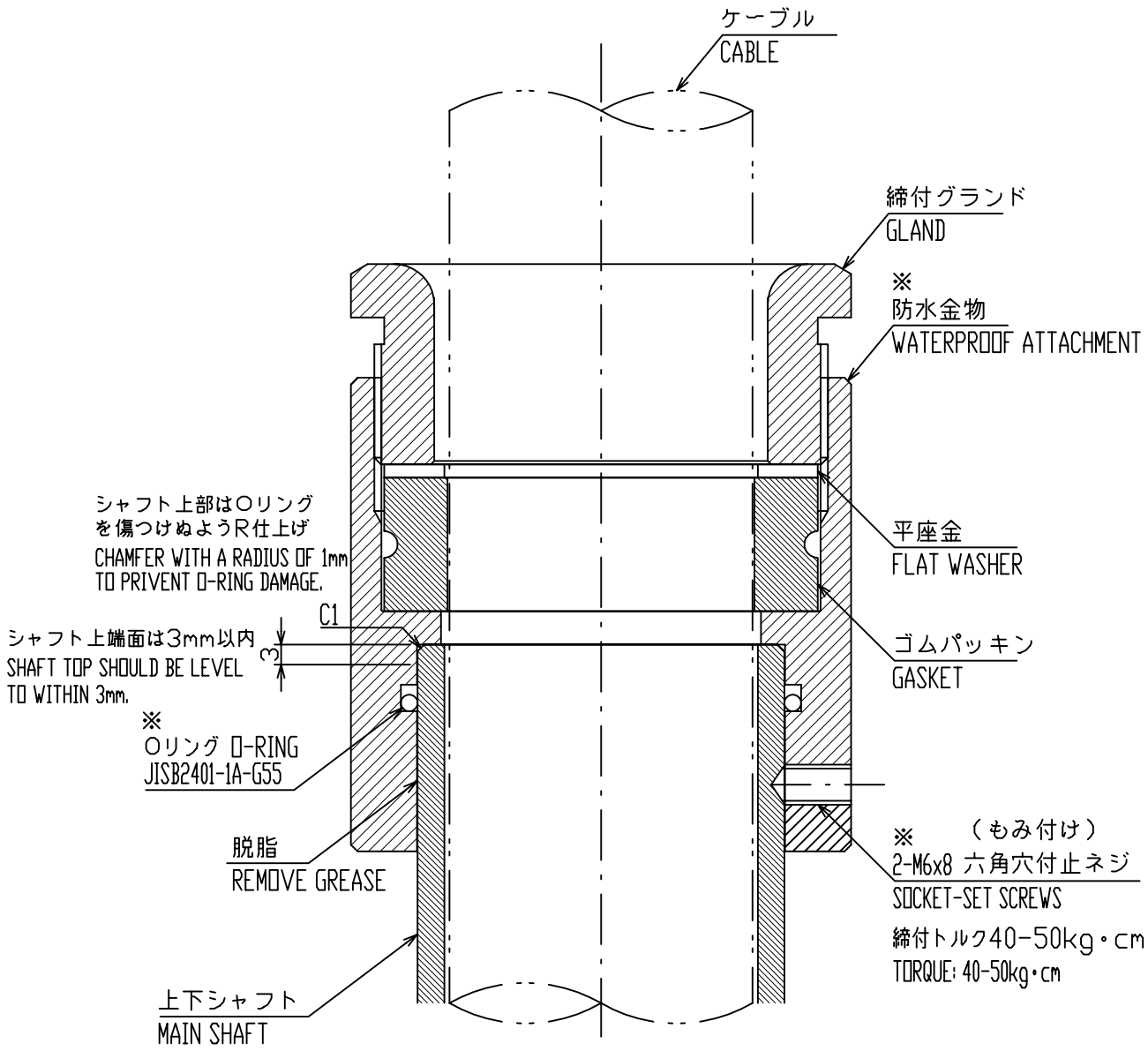
*Measure from the inside of the tank guide.

   b) The shaft retainer should be in contact with the waterproofing attachment.

Relation between retraction tank length and main shaft length

Hull unit	Tank length	945		1300		1550		2350		4065	
	Main shaft / Shaft length/cut length	Shaft length	Cut length	Shaft length	Cut length	Shaft length	Cut length	Shaft length	Cut length	Shaft length	Cut length
CSH-5041 400 stroke	550	945	0								
CSH-5040 600 stroke convereted to 450 stroke	600			1015	285						
	650			1065	235						
	700			1115	185						
CSH-5040 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 + 30 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).

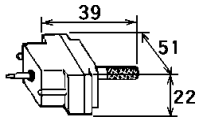
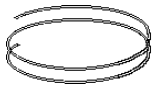
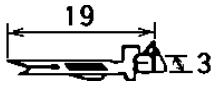
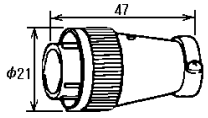
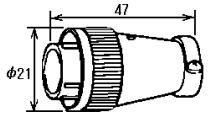
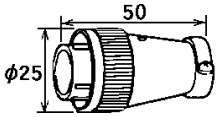
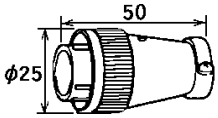
DRAWN Dec. 25 '02 T.YAMASAKI			TITLE
CHECKED Dec. 25 '02 Y.KIMURA			名称 上下シャフト上端（防水金物）
APPROVED Dec. 25, '02 Y. Kimura			装備要領
SCALE 1/1	MASS ±10% kg		NAME CONSTRUCTION OF MAIN SHAFT TOP
DWG.No. C1273-Y01- B			INSTALLATION PROCEDURE

FURUNO

CODE NO.	006-910-940	10CS-X-9403 -0
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)		00-8016-038-313761HV CODE NO. 000-127-234	1	
2	ｲﾗｯｸｽﾁｭｰﾌﾞA INSULATION TUBE		3.0X0.3 ｷｲﾛ *50CM* CODE NO. 000-568-226	2	
3	ｺﾝﾀｸﾄ ﾋﾟﾝ (8017) CONTACT PIN (8017)		60-8017-0313-00-339 CODE NO. 000-519-542	40	
4	ﾋﾞﾆｰﾙ線 VINYL WIRE		KIV 2.0SQ ｸﾛ *2M* CODE NO. 000-554-516	1	
5	ｺﾈｸﾀ(SRCN) CONNECTOR(SRCN)		SRCN6A13-3P CODE NO. 000-508-660	1	
6	ｺﾈｸﾀ(SRCN) CONNECTOR(SRCN)		SRCN6A13-5P CODE NO. 000-508-661	1	
7	ｺﾈｸﾀ(SRCN) CONNECTOR(SRCN)		SRCN6A16-10P CODE NO. 000-508-663	2	
8	ｺﾈｸﾀ(SRCN) CONNECTOR(SRCN)		SRCN6A16-7P CODE NO. 000-508-662	1	

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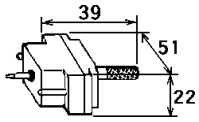
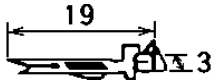
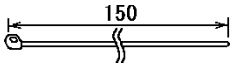
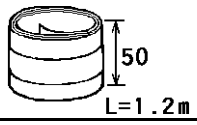
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	006-904-860	10CS-X-9401 -0
TYPE	CP10-05202	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		00-8016-038-000761HV		1	
			CODE NO.	000-118-309		
2	ｺﾝﾀｸﾄ ﾋﾟﾝ (8017) CONTACT PIN (8017)		60-8017-0313-00-339		38	
			CODE NO.	000-519-542		
3	ｺﾝﾍﾞｯｸｽ PLASTIC BAND		CV-150		20	
			CODE NO.	000-570-325		
4	ｱｰｽ板 COPPER STRAP		WEA-1004-0		1	
			CODE NO.	500-310-040		

FURUNO ELECTRIC CO ., LTD.

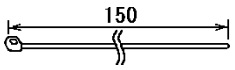
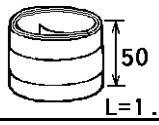
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	006-904-880	10CS-X-9402 -0
TYPE	CP10-05203	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 PLASTIC BAND		CV-150		30	
			CODE NO.	000-570-325		
2	ｱｰｽ板 COPPER STRAP		WEA-1004-0		1	
			CODE NO.	500-310-040		

FURUNO ELECTRIC CO ., LTD.

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

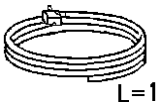
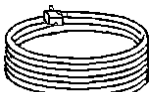
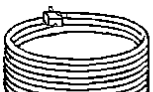
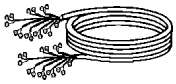
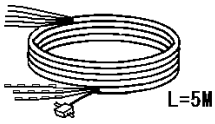
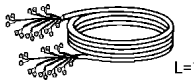
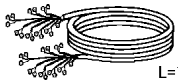
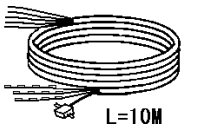
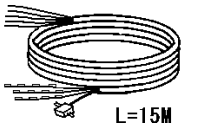
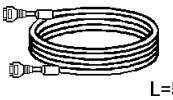
FURUNO

CODE NO.		10CS-X-9404 -0
TYPE		1/2

工事材料表

INSTALLATION MATERIALS

CSH-5L

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	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	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	1	制御/送受信装置用 FOR CONTROL/TRANSCEIVER UNIT *選択*TO BE SELECT
4	RX168　芯ｹｰﾌﾞﾙ組品 168C CABLE ASSY.	 L=5M	10S1562 *5M* CODE NO.	006-976-620	1	送受信/前置装置用 FOR TRANSCEIVER/PRE-AMPLIFIER UNIT *選択*TO BE SELECT
5	信号ｹｰﾌﾞﾙ組品 SIGNAL CABLE ASSY.	 L=5M	S10-7-5 CODE NO.	006-976-610	1	送受信/前置装置用 FOR TRANSCEIVER/PRE-AMPLIFIER UNIT *選択*TO BE SELECT
6	RX168　芯ｹｰﾌﾞﾙ組品 168C CABLE ASSY.	 L=10M	10S1583 *10M* CODE NO.	006-976-440	1	送受信/前置装置用 FOR TRANSCEVER/PRE-AMPLIFIER UNIT *選択*TO BE SELECT
7	RX168　芯ｹｰﾌﾞﾙ組品 168C CABLE ASSY.	 L=15M	10S1584 *15M* CODE NO.	006-976-450	1	送受信/前置装置用 FOR TRANSCEVER/PRE-AMPLIFIER UNIT *選択*TO BE SELECT
8	信号ｹｰﾌﾞﾙ組品 SIGNAL CABLE ASSY.	 L=10M	S10-7-10 CODE NO.	006-976-460	1	送受信/前置装置用 FOR TRANSCEVER/PRE-AMPLIFIER UNIT *選択*TO BE SELECT
9	信号ｹｰﾌﾞﾙ組品 SIGNAL CABLE ASSY.	 L=15M	S10-7-15 CODE NO.	006-976-470	1	送受信/前置装置用 FOR TRANSCEVER/PRE-AMPLIFIER UNIT *選択*TO BE SELECT
10	ｹｰﾌﾞﾙ組品 CABLE ASSY.	 L=5M	3COX-2P-6C *5M* CODE NO.	000-146-500	1	表示部/制御部 FOR MONITOR/CONTROL UNIT *選択*TO BE SELECT

FURUNO ELECTRIC CO ., LTD.

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

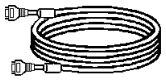
FURUNO

CODE NO.		10CS-X-9404 -0
TYPE		2/2

工事材料表

INSTALLATION MATERIALS

CSH-5L

番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
11	ｹｰﾌﾞﾙ組品 CABLE ASSY.	 L=10M	3COX-2P-6C *10M*		1	表示部/制御部 FOR MONITOR/CONTROL UNIT *選択*TO BE SELECT
			CODE NO.	000-146-501		

FURUNO ELECTRIC CO ., LTD.

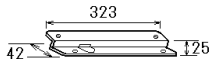
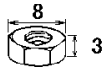
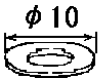
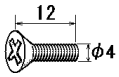
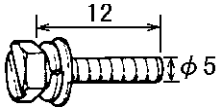
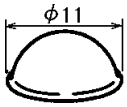
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	006-905-030	10CS-X-9501 -0
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		10-078-2221-0 CODE NO. 100-302-210	1	
2	六角ﾅｯﾄ １種 HEX. NUT		M4 C2700W MBNI2 CODE NO. 000-863-206	2	
3	バネ座金 SPRING WASHER		M4 C5191W MBNI2 CODE NO. 000-864-206	2	
4	ﾐｶﾞｷ平座金 FLAT WASHER		M4 C2600P MBNI2 CODE NO. 000-864-106	2	
5	＋ｻﾗ小ﾈｼﾞ OVAL HEAD SCREW		M4X12 C2700W MBNI2 CODE NO. 000-861-224	2	
6	+ ｱﾌﾟｾｯﾄﾛｯｶｸｾﾑｽB HEX.BOLT		M5X12 SUS304 CODE NO. 000-803-147	4	
7	ゴム足 RUBBER FEET		SJ-5003 ｸﾛ CODE NO. 000-801-787	4	

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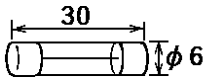
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	006-907-700	10CS-X-9302 -1 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			REMARKS/CODE NO.
				WORKING PER SET	WORKING PER VES	SPARE	
1	ﾋｭｰｽﾞ FUSE		FGB0-A 2A AC125V			2	000-549-062

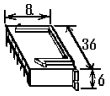
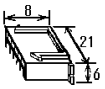
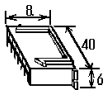
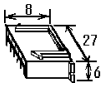
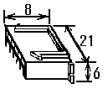
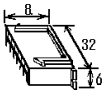
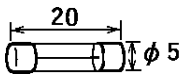
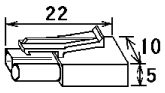
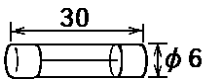
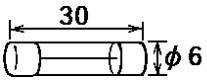
MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C1319-P03-B	1/1

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

FURUNO

CODE NO.	006-904-850	10CS-X-9301 -1 1/2
TYPE	SP10-02902	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-13			2	000-102-045
2	ｺﾈｸﾀ(XH) CONNECTOR(XH)		XHP-7			2	000-105-683
3	ｺﾈｸﾀ(XH) CONNECTOR(XH)		XHP-15			2	000-110-946
4	ｺﾈｸﾀ(XH) CONNECTOR(XH)		XHP-10			2	000-110-947
5	ｺﾈｸﾀ(XH) CONNECTOR(XH)		XHP-14			2	000-112-430
6	ｺﾈｸﾀ(XH) CONNECTOR(XH)		XHP-12			2	000-116-944
7	ﾋｭｰｽﾞ FUSE		FGMB 2A 250V			4	000-122-000
8	ｺﾈｸﾀ(ML) CONNECTOR(ML)		MLP-02			2	000-505-750
9	ﾋｭｰｽﾞ FUSE		FGBO 4A AC250V			2	000-546-707
10	ﾋｭｰｽﾞ FUSE		FGBO 7A AC125V			2	000-549-013

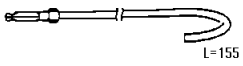
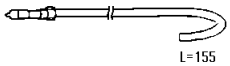
MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C1319-P01-B	1/2

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

FURUNO

CODE NO.	006-904-850	10CS-X-9301 -1 2/2
TYPE	SP10-02902	BOX NO. P

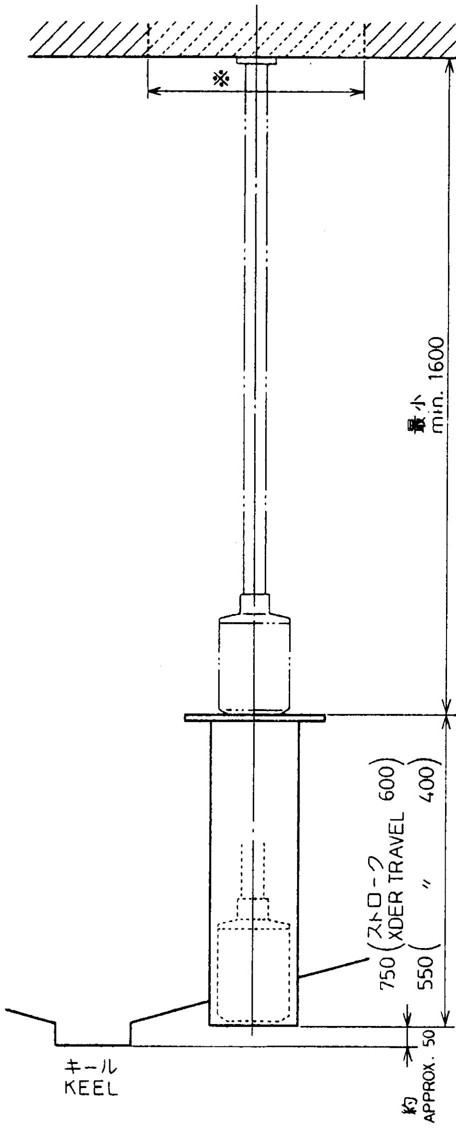
SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

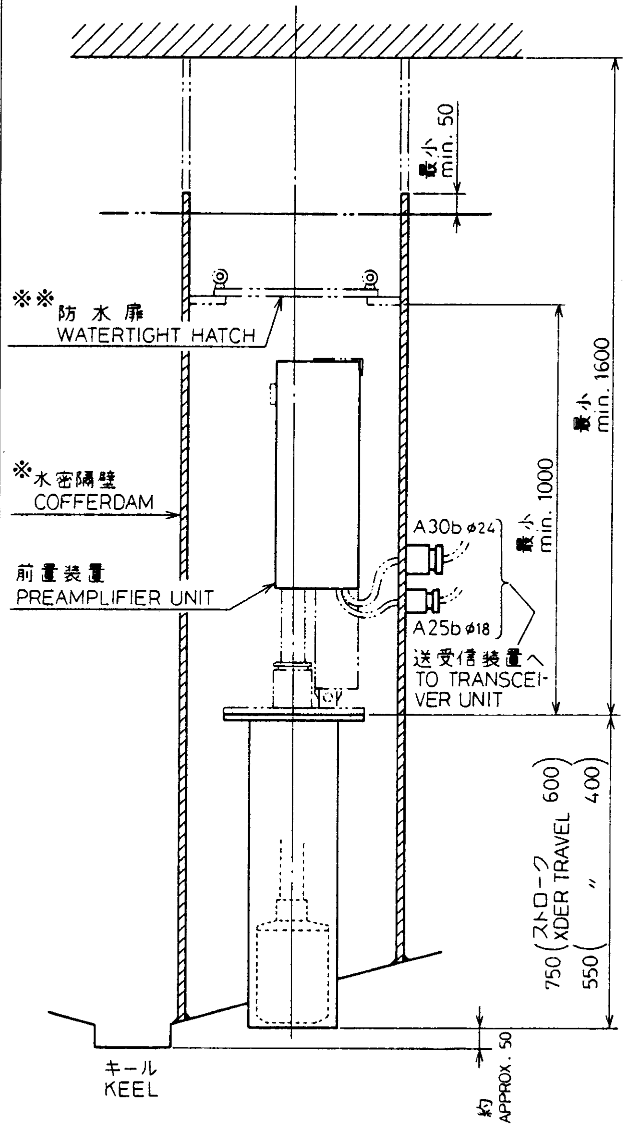
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
11	MLソケットコンタクト組品 NK SOCKET CUNTACT ASSY.		80-0074			6	006-979-300
12	XHコンタクト組品 XH CONTACT ASSY.		80-0075			20	006-979-310

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C1319-P02-B	2/2

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

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	NOV·13·89 M. USUDA	重量 WEIGHT kg	図番 DWG. NO. C1273－Y02－A

FURUNO

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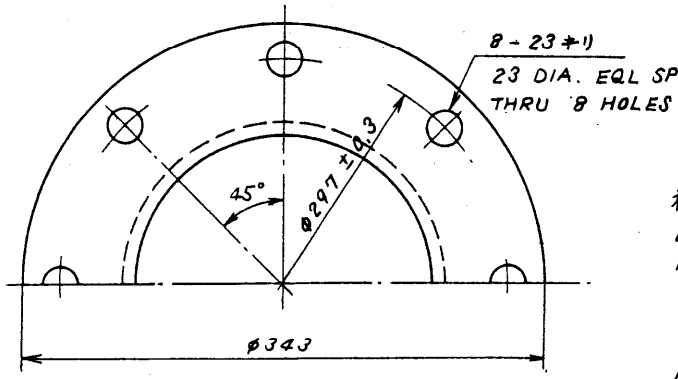
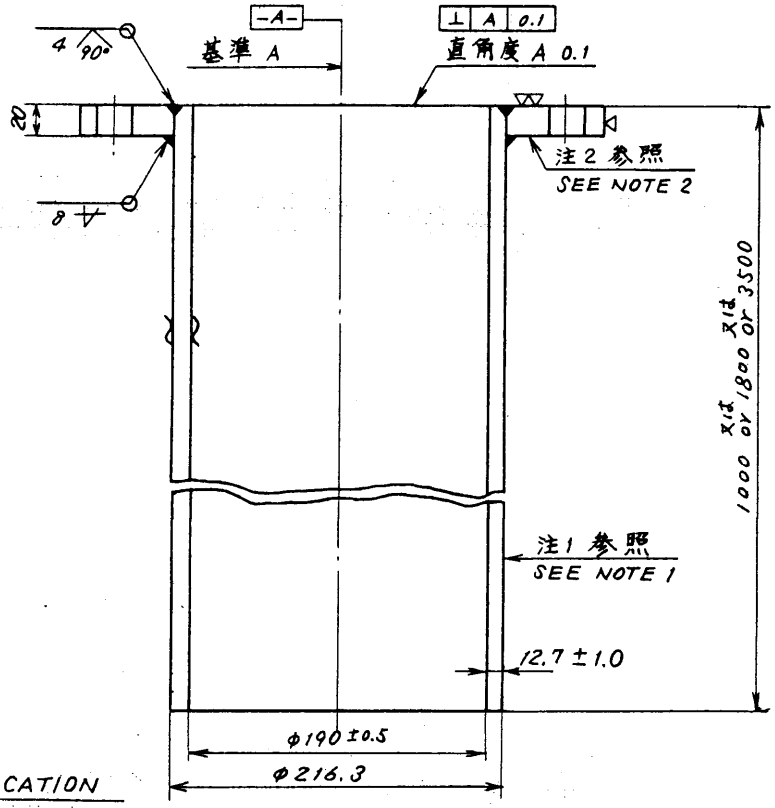


格納タンクの長さ；
LENGTH OF RETRACTION TANK;

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.

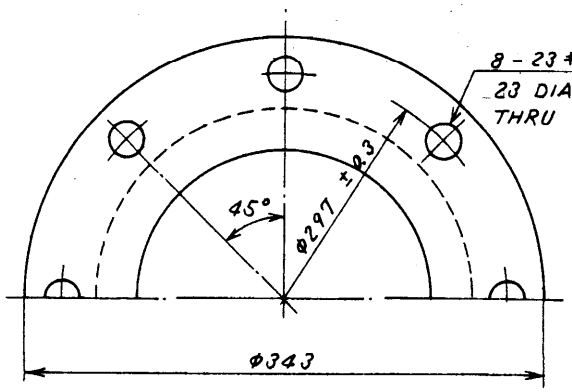
単位 UNIT: mm	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

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

FURUNO ELECTRIC CO., LTD.

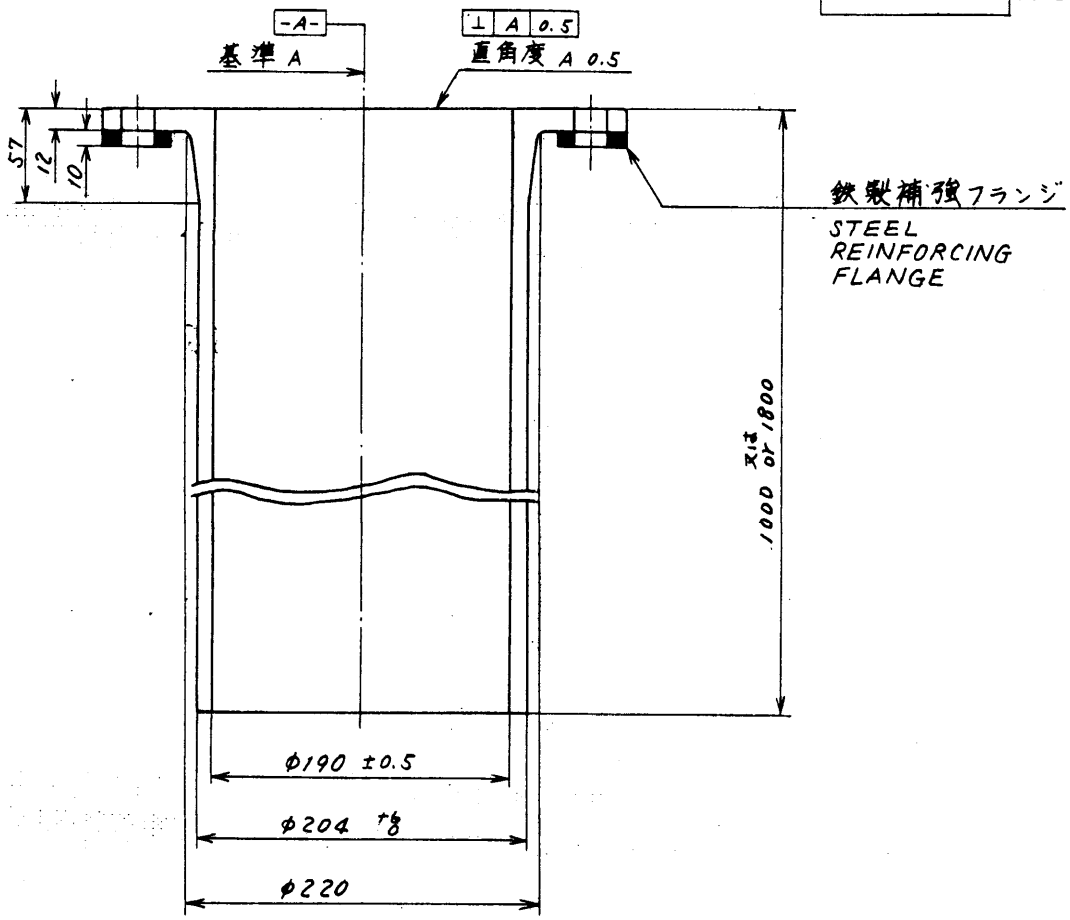
FURUNO

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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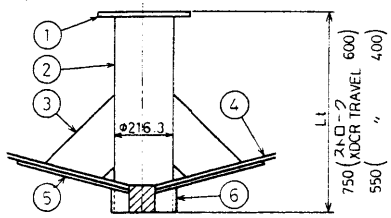
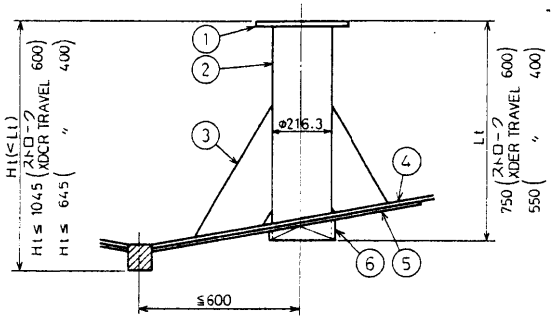
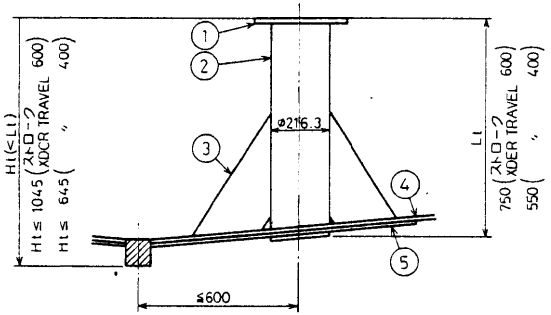
Ⓐ キール上（突出） ON KEEL (PROJECTED)



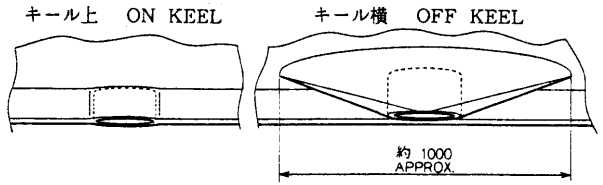
Ⓑ キール横（突出） OFF KEEL (PROJECTED)



Ⓒ 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Ⓑ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 H.Kusunoki	CSH-7 CSH-5 M2 CSH-5	名称	格納タンク（鋼船） 送受波器装備図
APPROVED Apr.25'97 H.Kusunoki			
SCALE / MASS kg	APPLICABLE TO: (MODEL) / BLOCK NO.	NAME	RETRACTION TANK (STEEL HULL) TRANSDUCER INSTALLATION
DWG NO. C1273-T01- C			

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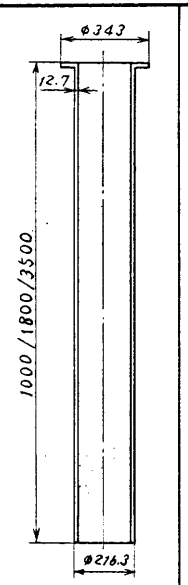
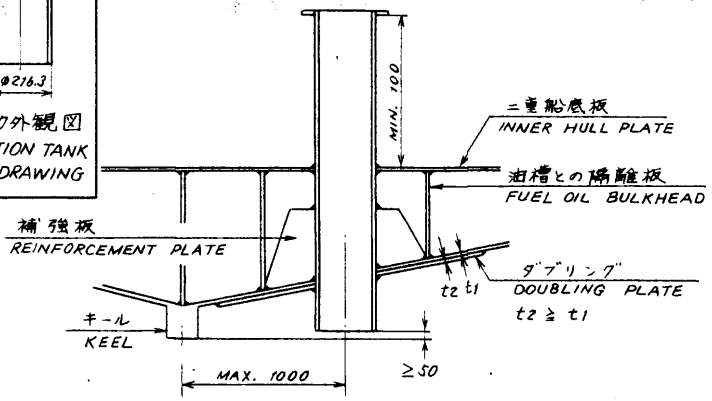
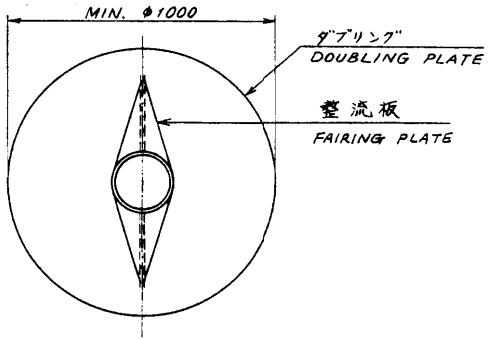
D-14

FURUNO



格納タンク外観図
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. 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調節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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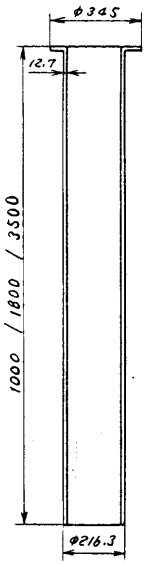
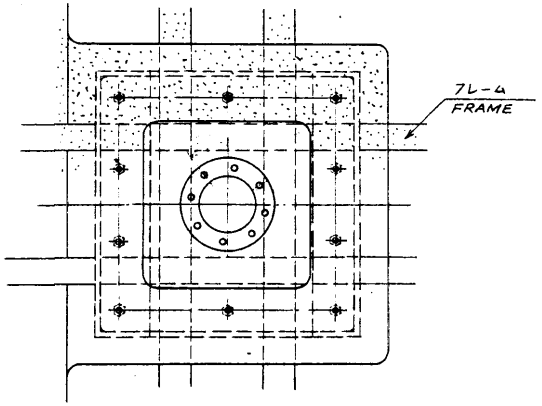
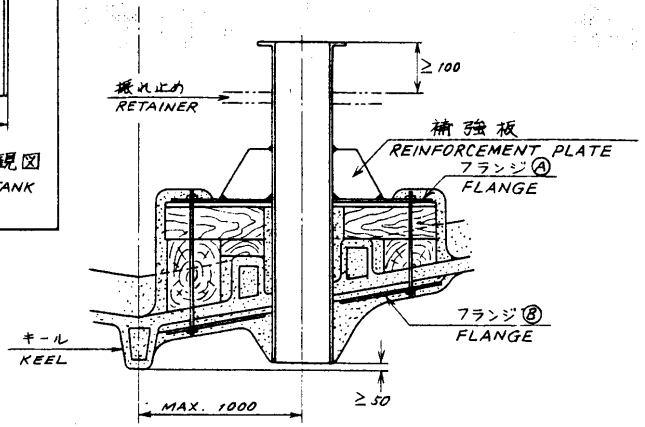
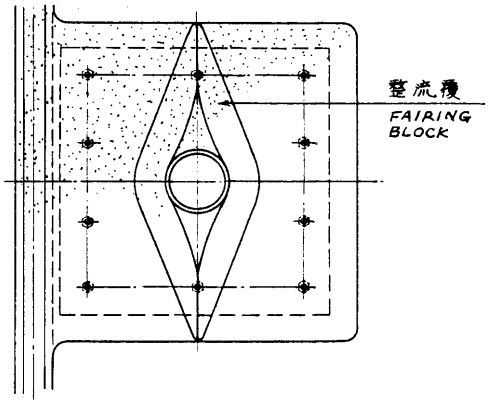


鉄製格納タンク外観図
STEEL RETRACTION TANK
OUTLINE DRAWING







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 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. 格納タンクの設備は、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Ⓐ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Ⓐ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Ⓑ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Ⓐをタンクに溶接する。
   6) フランジⒶ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) 漫水を防ぐため差分に FRP で必要個所を塗り固める。時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 100mm 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Ⓐ溶接時、タンクの周囲 3, 4ヶ所で フランジⒶ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 Ⓐ.
   3) WHEN FABRICATING THE MOUNTING BED, STAND THE BOLTS ON THE BED FOR FIXING THE FLANGE Ⓐ. IF NECESSARY, MAKE THE FLANGE Ⓑ TO ENSURE FIXING OF THE FLANGE Ⓐ.
   4) AFTER FRP IS STIFFENED, DRAW OUT THE TANK OR THE CORE FROM THE MOUNTING BED.
   5) WELD THE FLANGE Ⓐ TO THE TANK.
   6) APPLY A STEEL-FRP ADHESIVE TO THE TANK AND THE FLANGE Ⓐ, AND INSTALL THE TANK WITH FLANGE Ⓐ IN PLACE. SETTLE THE FLANGE Ⓐ 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 Ⓐ 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. 4. '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-6

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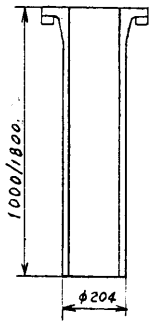
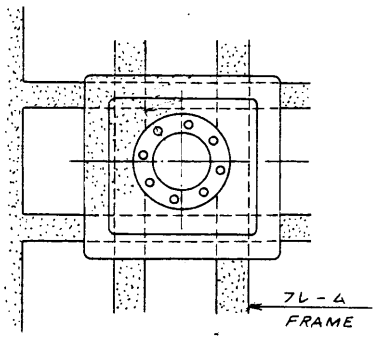
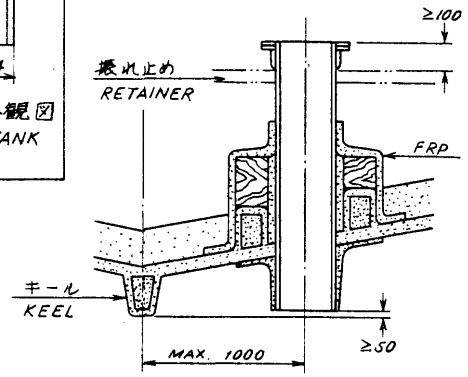
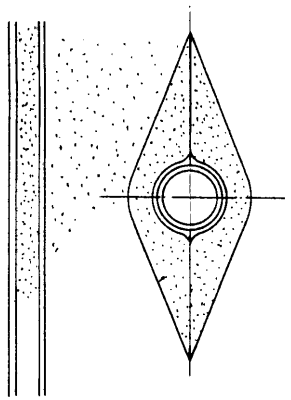


FRP製格納タンク外観図
FRP RETRACTION TANK
OUTLINE DRAWING







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.

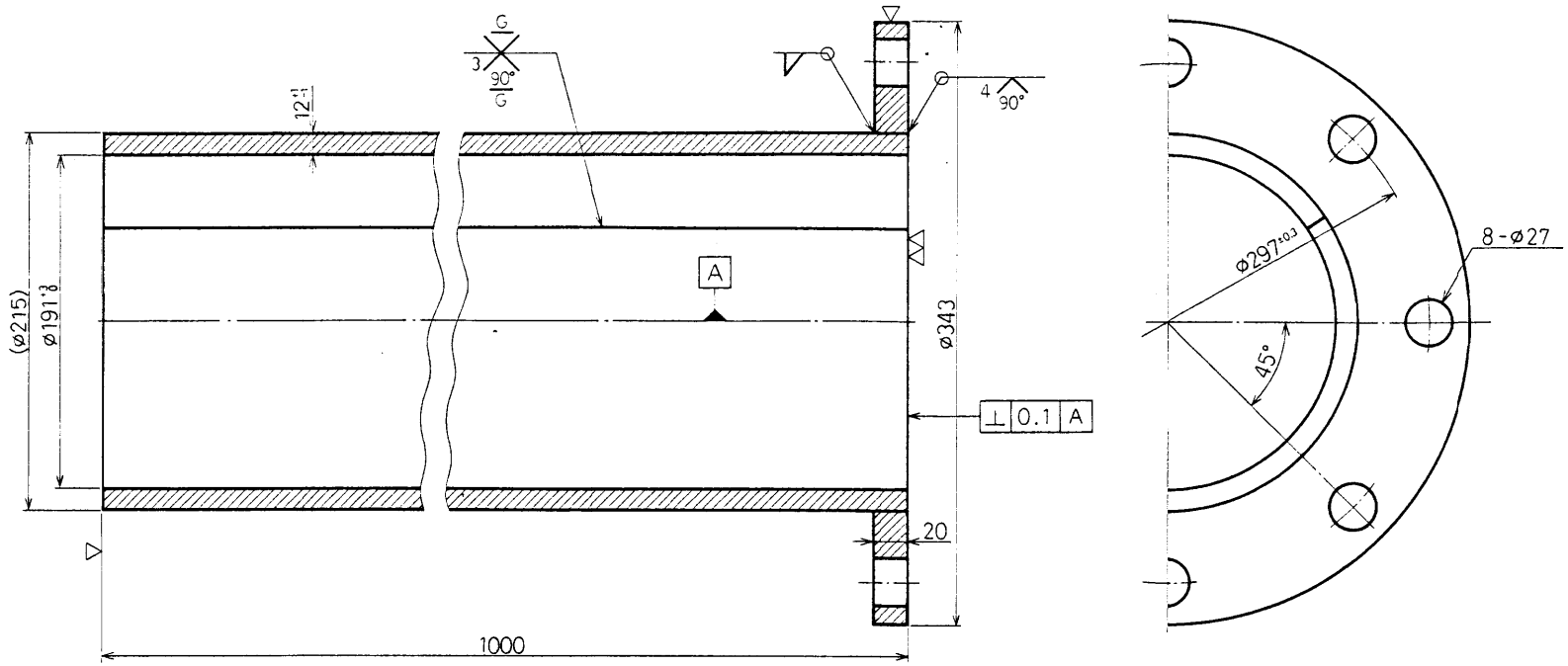
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

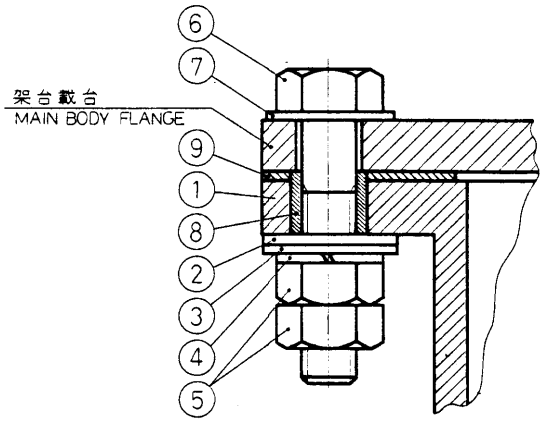
承認 APPROVED		三角法 THIRD ANGLE PROJECTION	名称 TITLE FRP製格納タンク船底装備図(FRP船) FRP RETRACTION TANK INSTALLATION ON FRP HULL
検図 CHECKED	May. 14. 1979	尺度 SCALE	
製図 DRAWN	July. 18. 1978 M. Mori	重量 WEIGHT kg	図番 DWG.NO. C1220-038-F

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

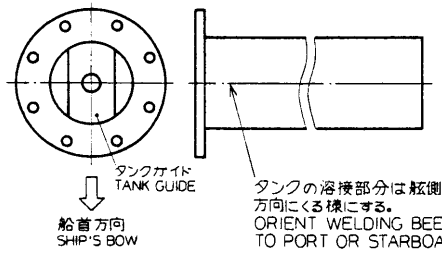
FURUNO ELECTRIC CO., LTD.

FURUNO





a) 格納タンク装備要領
ORIENTATION OF TANK



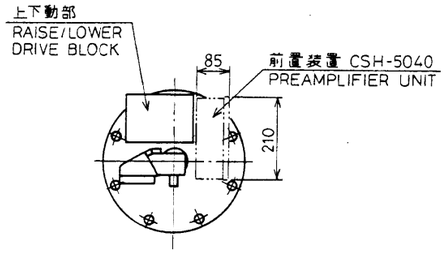
注) 架台，格納タンクに他の電気機器のアースを取らないこと。
NOTE. DO NOT CONNECT GROUNDING WIRE OF OTHER EQUIPMENT TO RETRACTION TANK.

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	

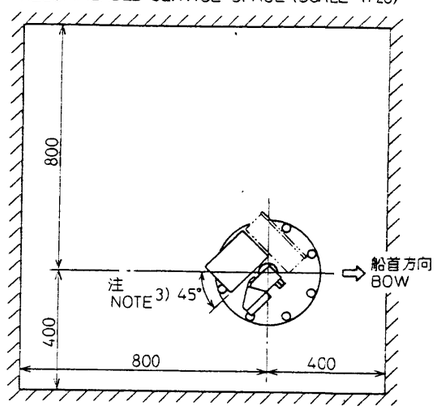
承認 APPROVED	DEC. 27.'90 T. NAKANO	三角法 THIRD ANGLE PROJECTION	名称 TITLE: 格納タンク(アルミ)外寸図 RETRACTION TANK (ALUMINUM)
検図 CHECKED	DEC. 27.'90 T. MIYOSHI	尺度 SCALE: /	
製図 DRAWN	DEC. 27.'90 M. USUDA	重量 WEIGHT: 35 kg	図番 DWG. NO.: C1273-G09-A

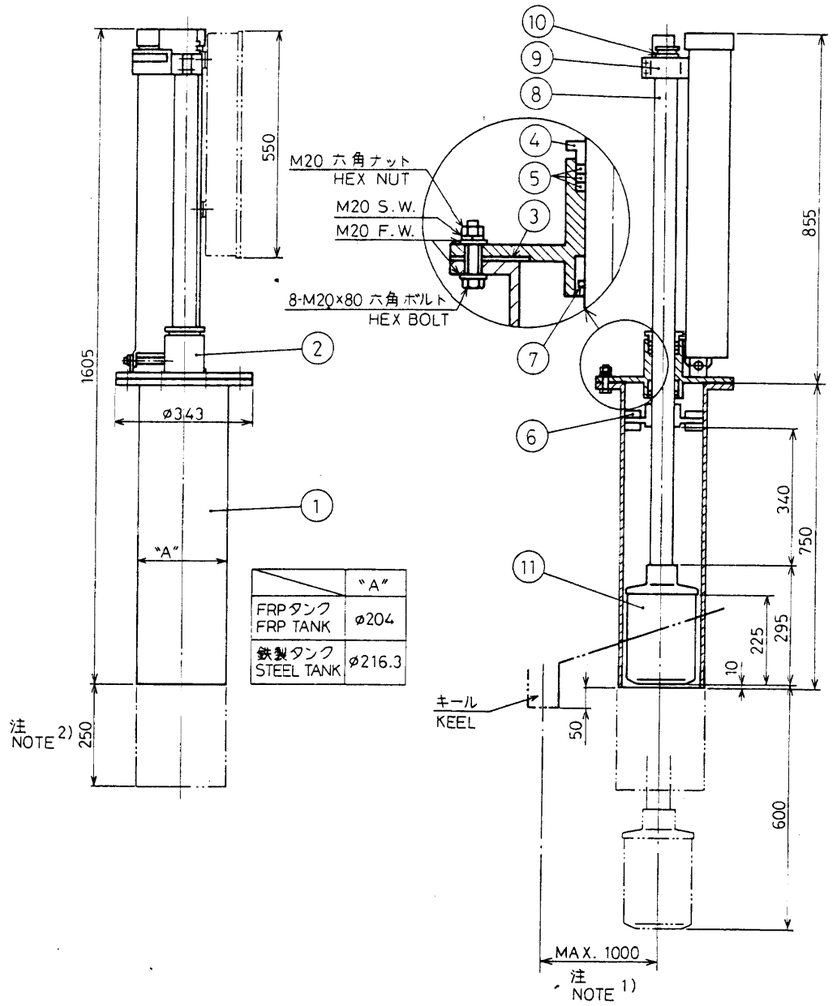
CSH-5

FURUNO ELECTRIC CO., LTD.



推奨保守点検用スペース (尺度 1/20)
RECOMMENDED SERVICE SPACE (SCALE 1/20)





	"A"
FRPタンク FRP TANK	ø204
鉄製タンク STEEL TANK	ø216.3

注 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) 左図の如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
又は、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 HULL 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 1000mm FROM KEEL LINE).
2) CUT THE TANK WITHIN 250MM 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 APPROXIMATELY 45° AS SHOWN AT LEFT. NOTE THAT POSITIONS WHICH ARE ROTATED IN 90° STEPS FROM THE SHOWN POSITION ARE ALSO ALLOWED.
4) HEADING ADJUSTMENT SHOULD BE PERFORMED AFTER INSTALLATION, REFERRING TO THE INSTALLATION MANUAL.

ITEM 品番	NAME 品名	MATERIAL 材質	Q'TY 数量	DWG.NO. 図番	REMARKS 摘要
11	送受波器 TRANSDUCER		1		
10	抜止め金具 STOPPER		1		
9	パイプ取付金具 SHAFT RETAINER		1		
8	上下シャフト(1) MAIN SHAFT (1)		1		
7	O-リング O-RING	JISB2401 CLSS 1A	1		
6	タンクガイド TANK GUIDE		1		
5	グリスコットン GREASE COTTON		3		
4	グリスコットン押え台 GREASE COTTON RETAINER		1		
3	フランジパッキン GASKET		1		
2	架台載台 MAIN BODY FLANGE		1		
1	格納タンク RETRACTION TANK	STPG38 SS41P	1		

承認 APPROVED	OCT・4・89 T.AKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	上下装置外寸図 HULL UNIT (ストロークXDCR TRAVEL 600mm)
検図 CHECKED	Oct・4・89 T.Ueda	尺度 SCALE	1/15	CSH-5040	
製図 DRAWN	OCT・4・89 M.USUDA	重量 WEIGHT	75 kg	図番 DWG.NO.	C1273-G05-B

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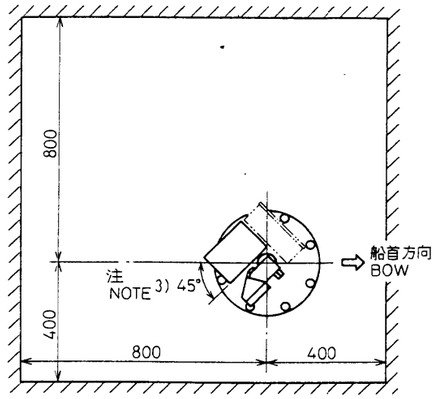
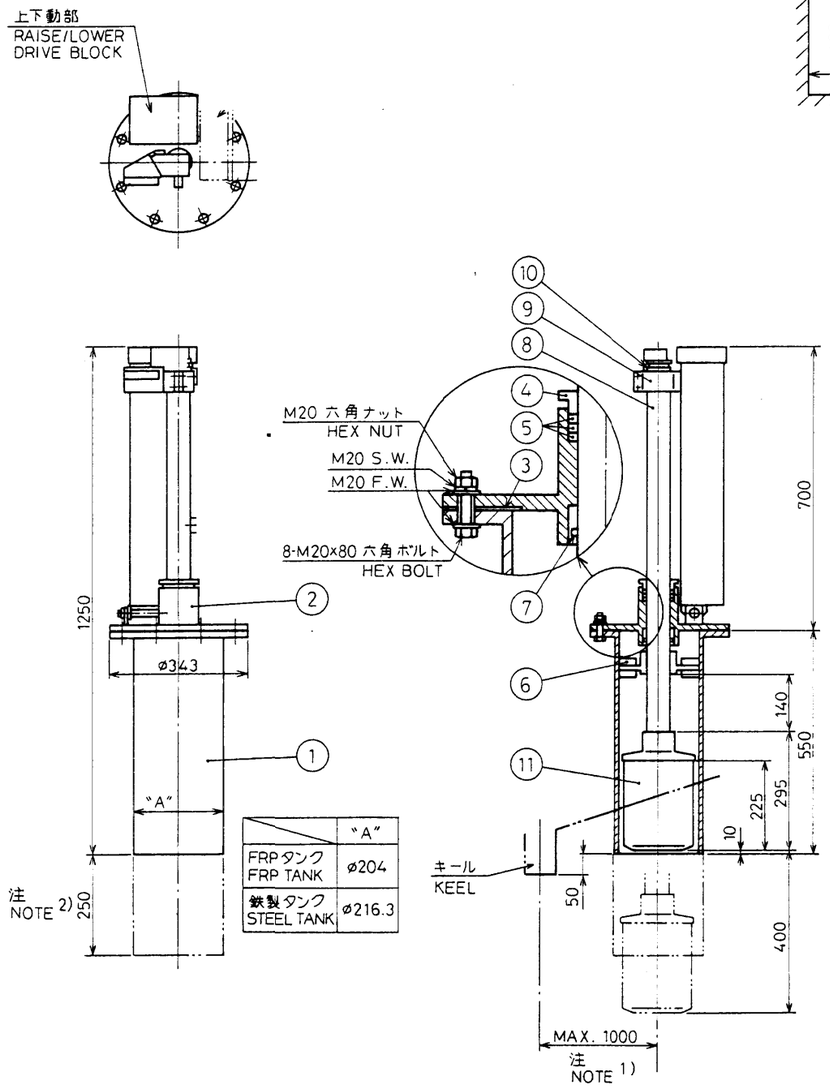
推奨保守点検用スペース (尺度 1/20)
RECOMMENDED SERVICE SPACE (SCALE 1/20)





	"A"
FRPタンク FRP TANK	ø204
鉄製タンク STEEL TANK	ø216.3

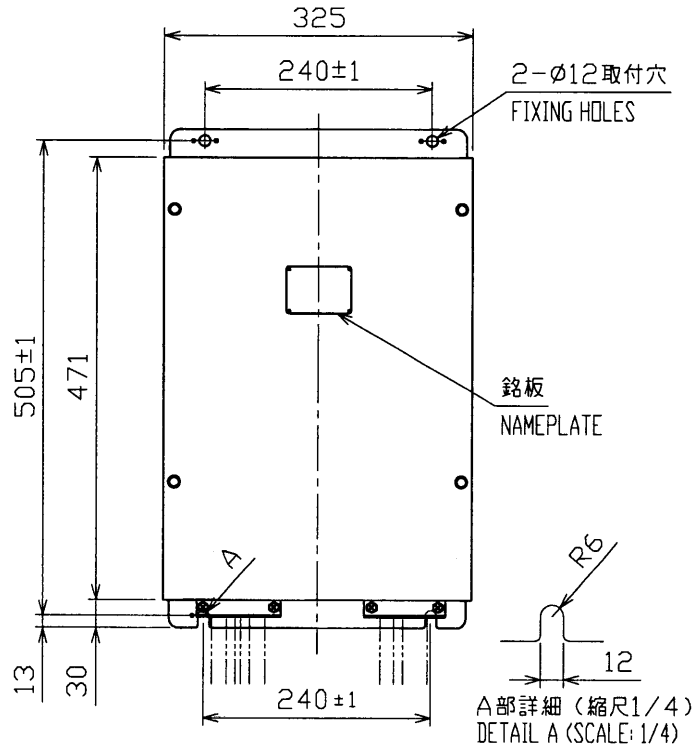
注 1) 装備位置は船首から1／3 (小型船では1／2) 程度でキールから1m以内とする。
2) 格納タンクは装備位置に応じて250mm以内で切断する。
3) 左図の如く船首ー船尾ラインと上下動部の角度が約45°となるよう装備する。
図では上下動部は左舷船尾側に位置しているが、右舷船尾側、左舷船首側
又は、右舷船首側でもよい。
4) 装備後は装備要領書を参照し船首線調整を行うこと。

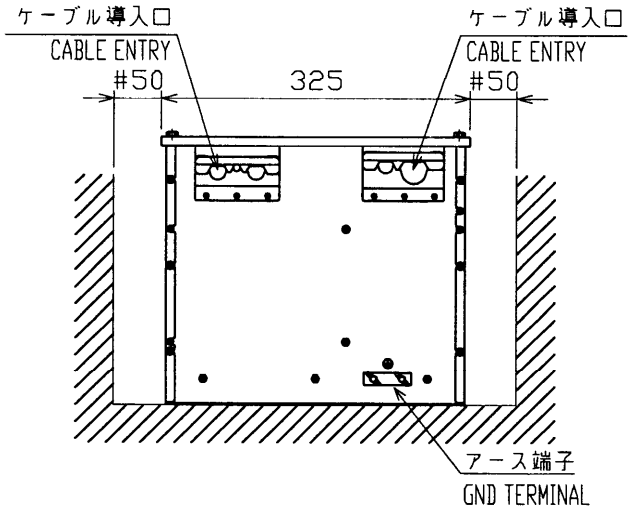
NOTE 1) THE HULL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF THE SHIP'S LENGTH FROM THE BOW ON THE FORE-AFT LINE AND BESIDE THE KEEL LINE (LESS THAN 1000mm FROM KEEL LINE).
2) CUT THE TANK WITHIN 250MM IN LENGTH ACCORDING TO INSTALLATION METHOD.
3) THE HULL UNIT SHOULD BE ORIENTED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

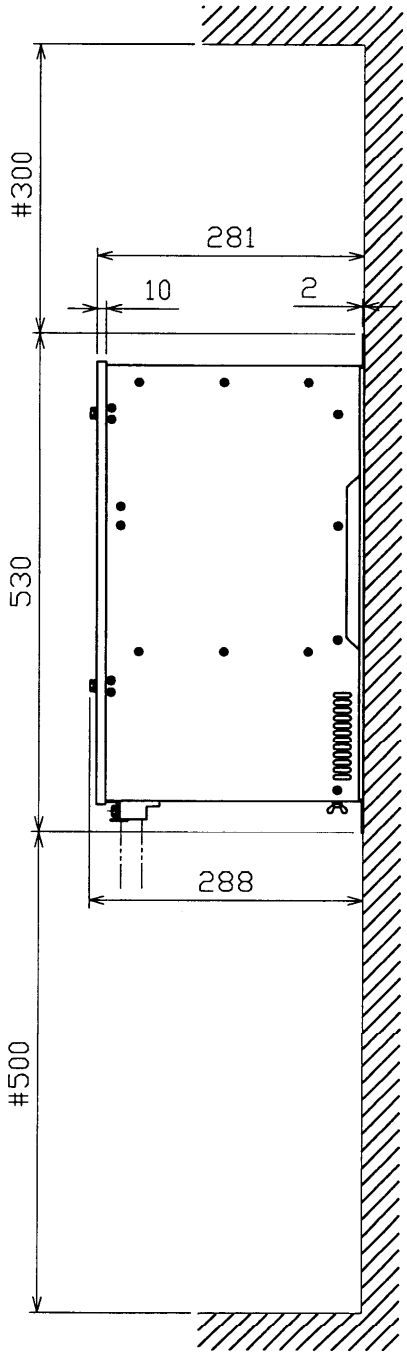
ITEM	NAME	MATERIAL	Q'TY	DWG.NO.	REMARKS
11	送受波器 TRANSDUCER		1		
10	抜止め金具 STOPPER		1		
9	パイプ取付金具 SHAFT RETAINER		1		
8	上下シャフト(1) MAIN SHAFT (1)		1		
7	O-リング O-RING	JISB2401 CLSS IA	1		
6	タンクガイド TANK GUIDE		1		
5	グリスコットン GREASE COTTON		3		
4	グリスコットン押え台 GREASE COTTON RETAINER		1		
3	フランジパッキン GASKET		1		
2	架台鍛台 MAIN BODY FLANGE		1		
1	格納タンク RETRACTION TANK	STPG38 SS41P	1		

承認 APPROVED	OCT.4.'89 T.NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	上下装置外寸図 HULL UNIT (ストローク XDCR TRAVEL 400mm)
検図 CHECKED	Oct.6.'89 T Koda	尺度 SCALE	1/15	CSH-5041	
製図 DRAWN	OCT.4.'89 M.USUDA	重量 WEIGHT	70 kg	図番 DWG.NO.	C1273-G06-B

FURUNO ELECTRIC CO., LTD.







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、またはコーチボルト呼び径９を使用のこと。

NOTE

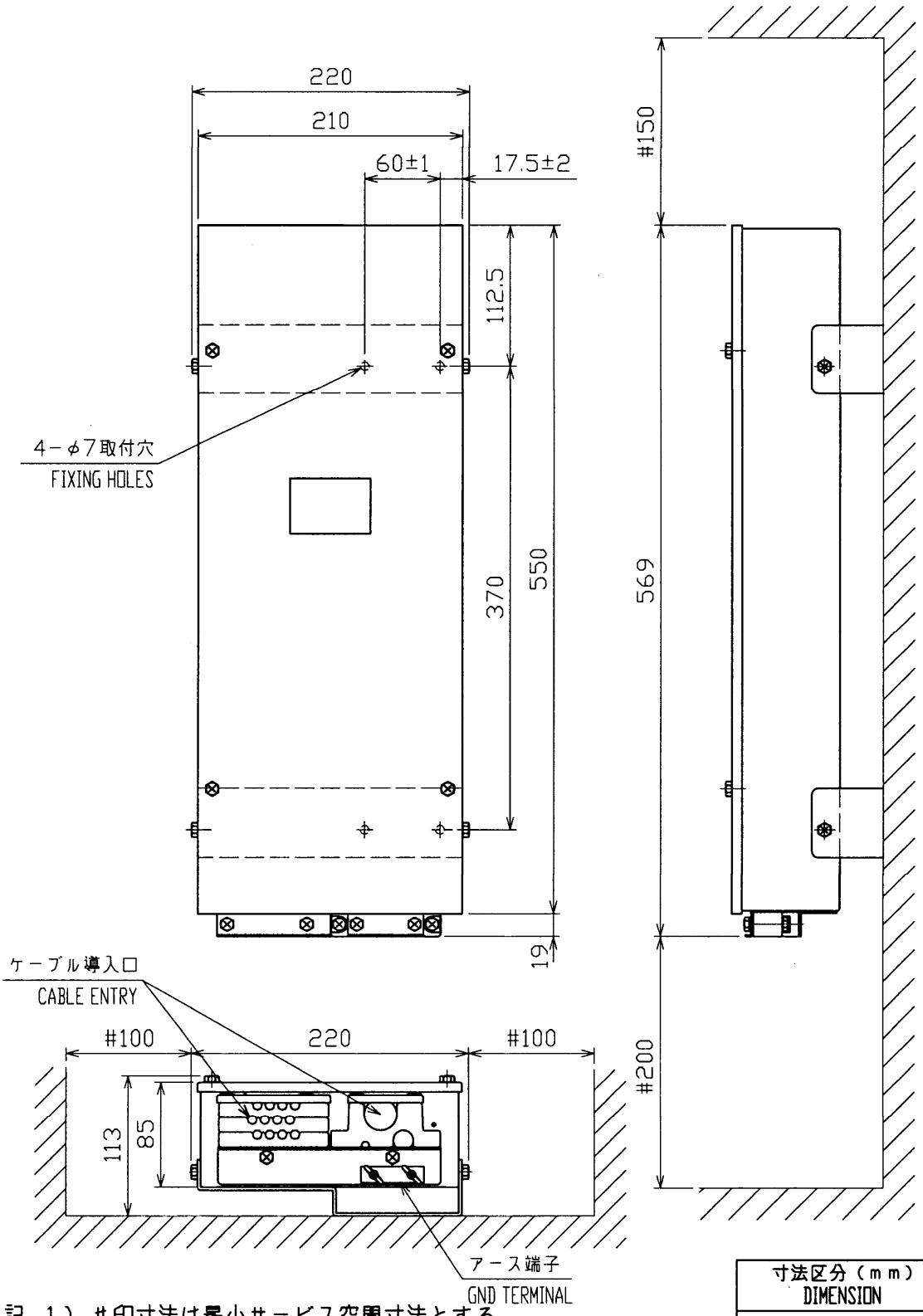
1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE M10 BOLTS OR COACH SCREWS ø9 FOR FIXING THE UNIT.

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

表１ TABLE 1

DRAWN Dec. 13 '02 T.YAMASAKI			TITLE CSH-5030/5130
CHECKED Dec. 13 '02 Y.KIMURA			名称 送受信装置
APPROVED Dec. 16, '02 Y. Kimura	CSH-5L CSH-5/5MARK-2		外寸図
SCALE 1/8	MASS 20 ±10% kg		NAME TRANSCEIVER UNIT
DWG.No. C1273-G07- D	10-044-4106-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.



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

表1 TABLE 1

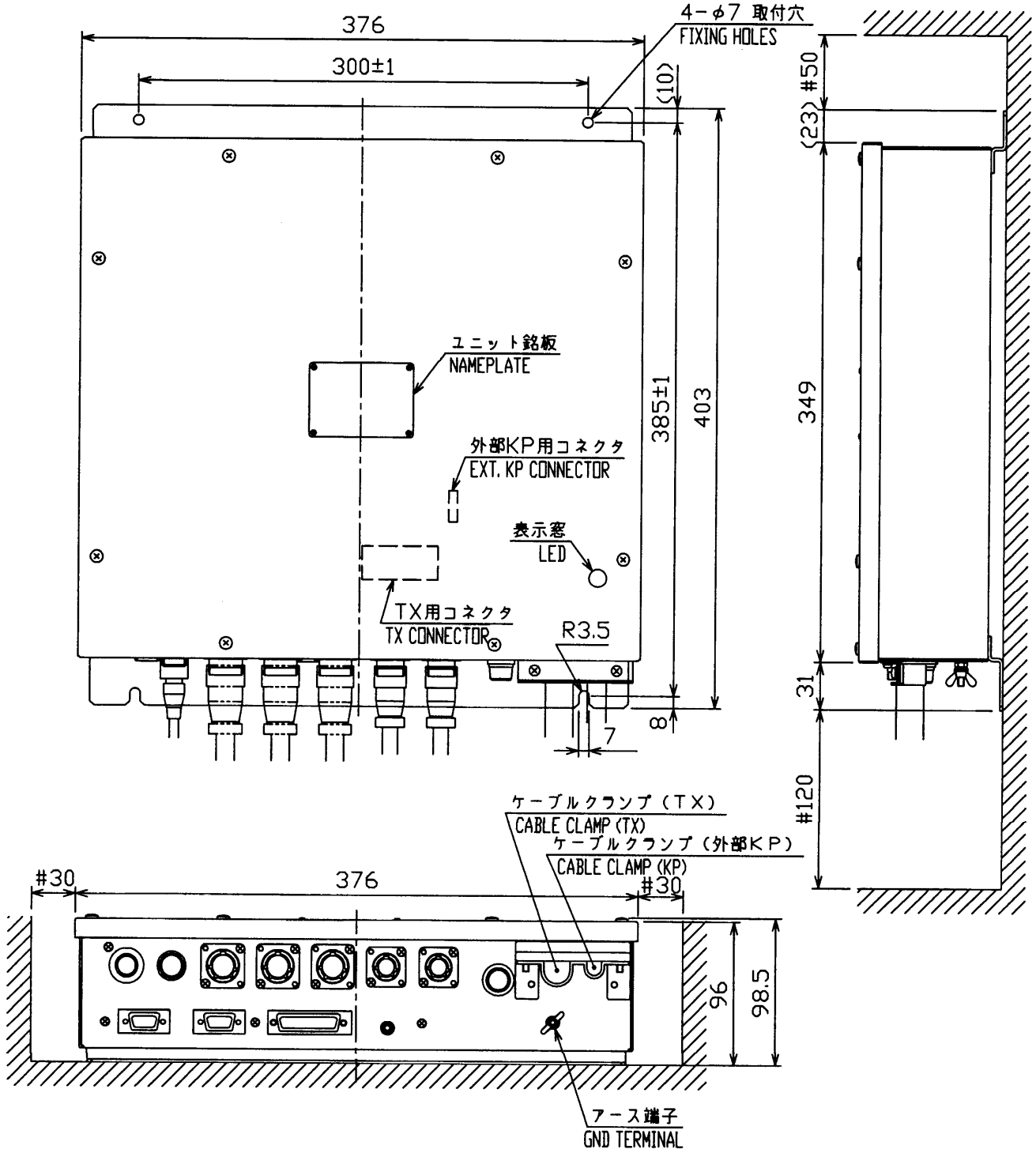
注　記　1）＃印寸法は最小サービス空間寸法とする。
　　2）指定外の寸法公差は表1による。
　　3）取付用ネジはM6ボルトを使用のこと。

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

DRAWN Dec. 13 '02 T.YAMASAKI			TITLE CSH-5020
CHECKED Dec. 13 '02 Y.KIMURA			名称 前置装置
APPROVED Dec. 16, '02 Y. Kimura	CSH-5L CSH-5/ 5MARK-2		外寸図
SCALE 1/5	MASS 6.5 ±10% kg		NAME PREAMPLIFIER UNIT
DWG.No. C1273-G04- D	10-044-200G-2		OUTLINE DRAWING

FURUNO

D-13



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

FURUNO ELECTRIC CO., LTD.

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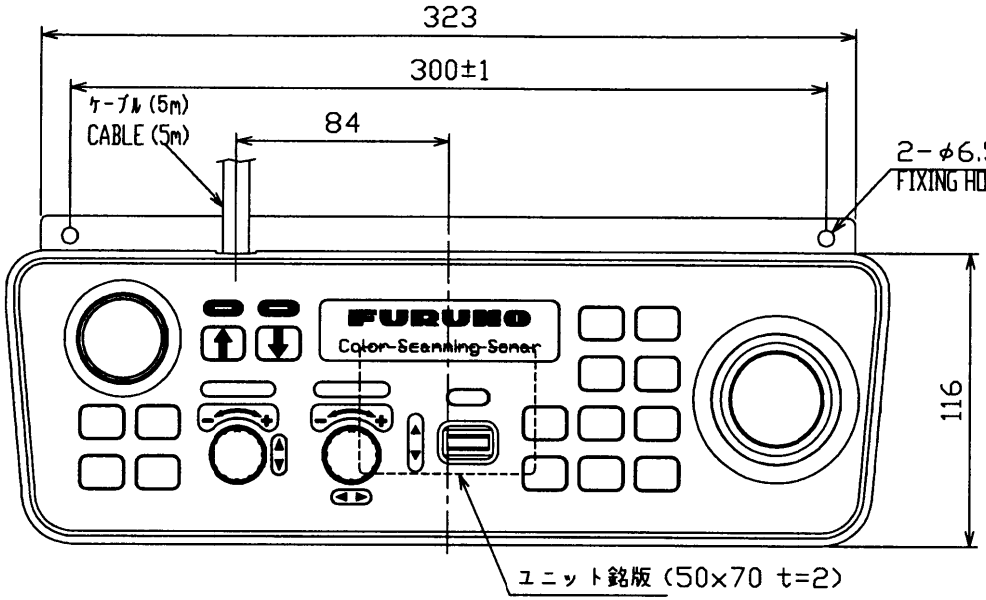
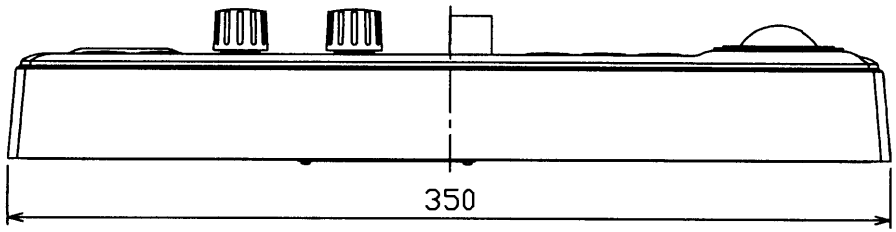
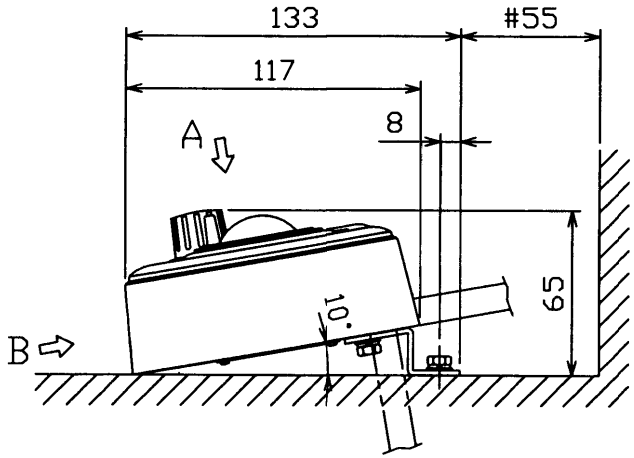


矢視 A　VIEW A



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

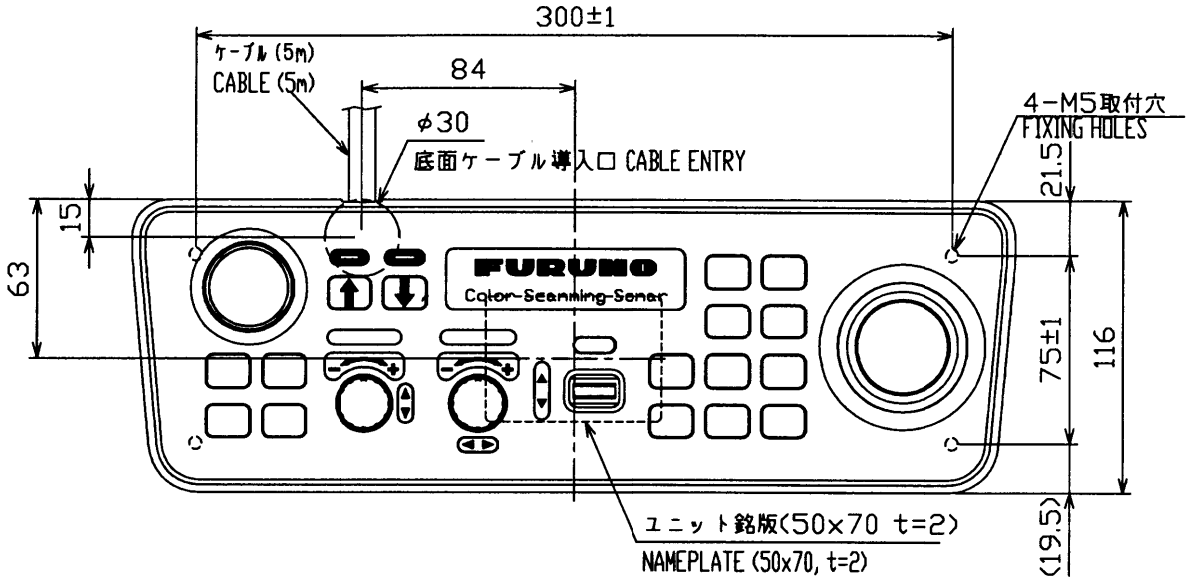
注　記　1）＃印寸法は最小サービス空間寸法とする。
　　2）指定外の寸法公差は表１による。
　　3）取付用ネジはトラスタッピンネジ呼び径５、
　　またはＭ５ボルトを使用のこと。

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 I.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

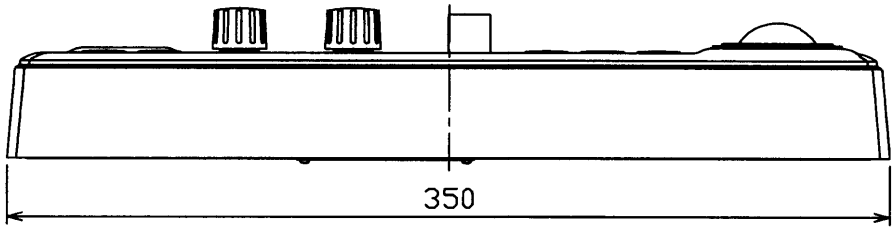
FURUNO ELECTRIC CO., LTD.

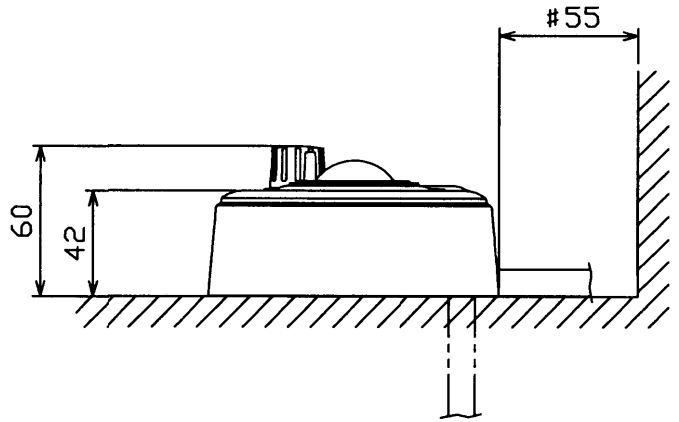
FURUNO



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

FURUNO ELECTRIC CO., LTD.

D-15

FURUNO

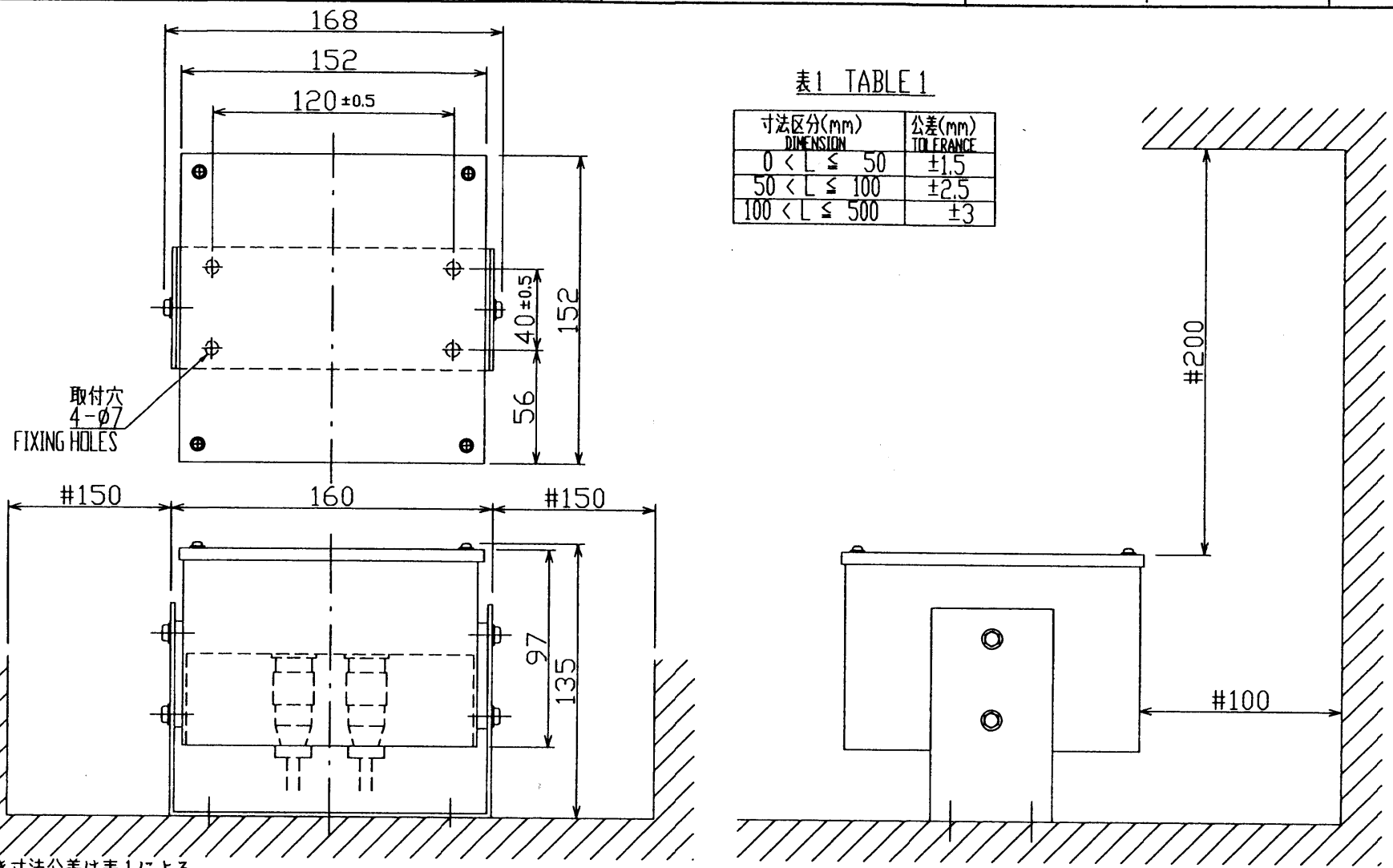


表1 TABLE 1

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

FURUNO ELECTRIC CO., LTD.

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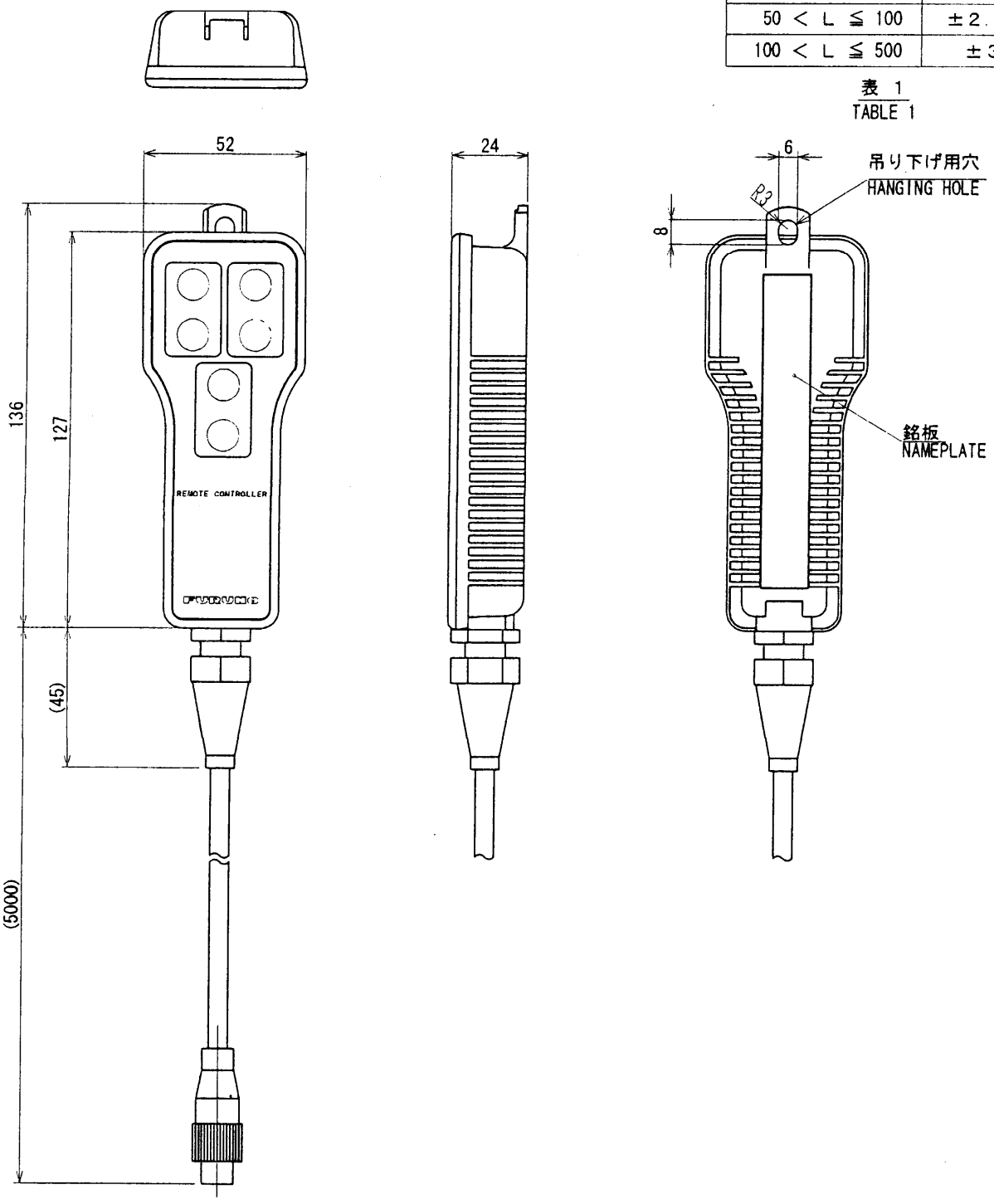
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

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.

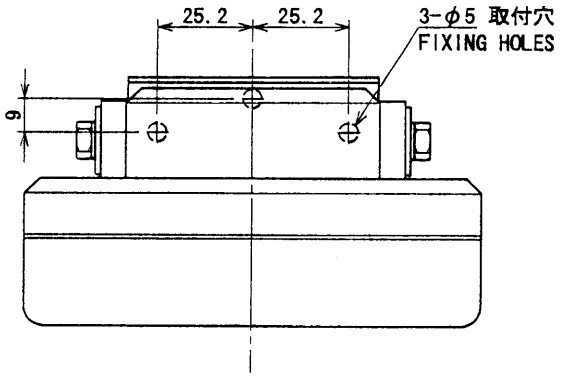
DRAWN Sep21'00 T.YAMASAKI		TITLE	CSH-7040
CHECKED Sep21'00 T.K		名称	リモートコントローラ
APPROVED Sep21'00 T.K	CSH-7		外寸図
SCALE 1/2	MASS 0.25 kg ±10% 質量はケーブル重さを含む MASS W/ CABLE	NAME	REMOTE CONTROLLER
DWG. No. C1302-G05- B	10-061-5000- G1		OUTLINE DRAWING

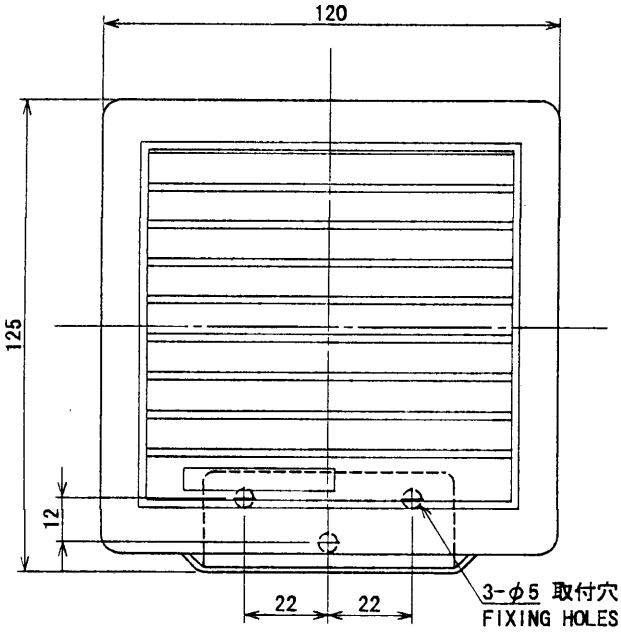
FURUNO ELECTRIC CO., LTD.

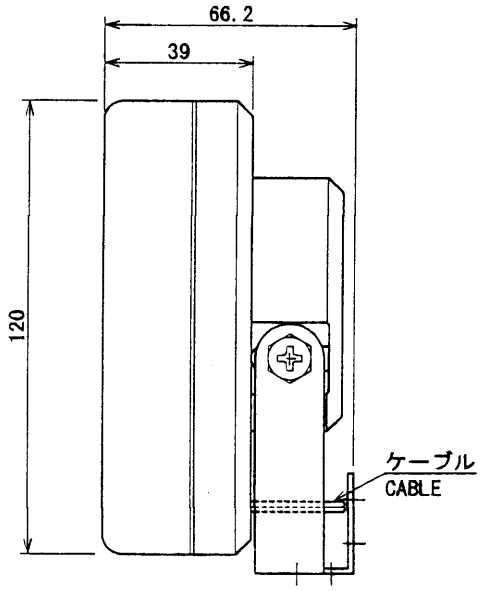
FURUNO

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

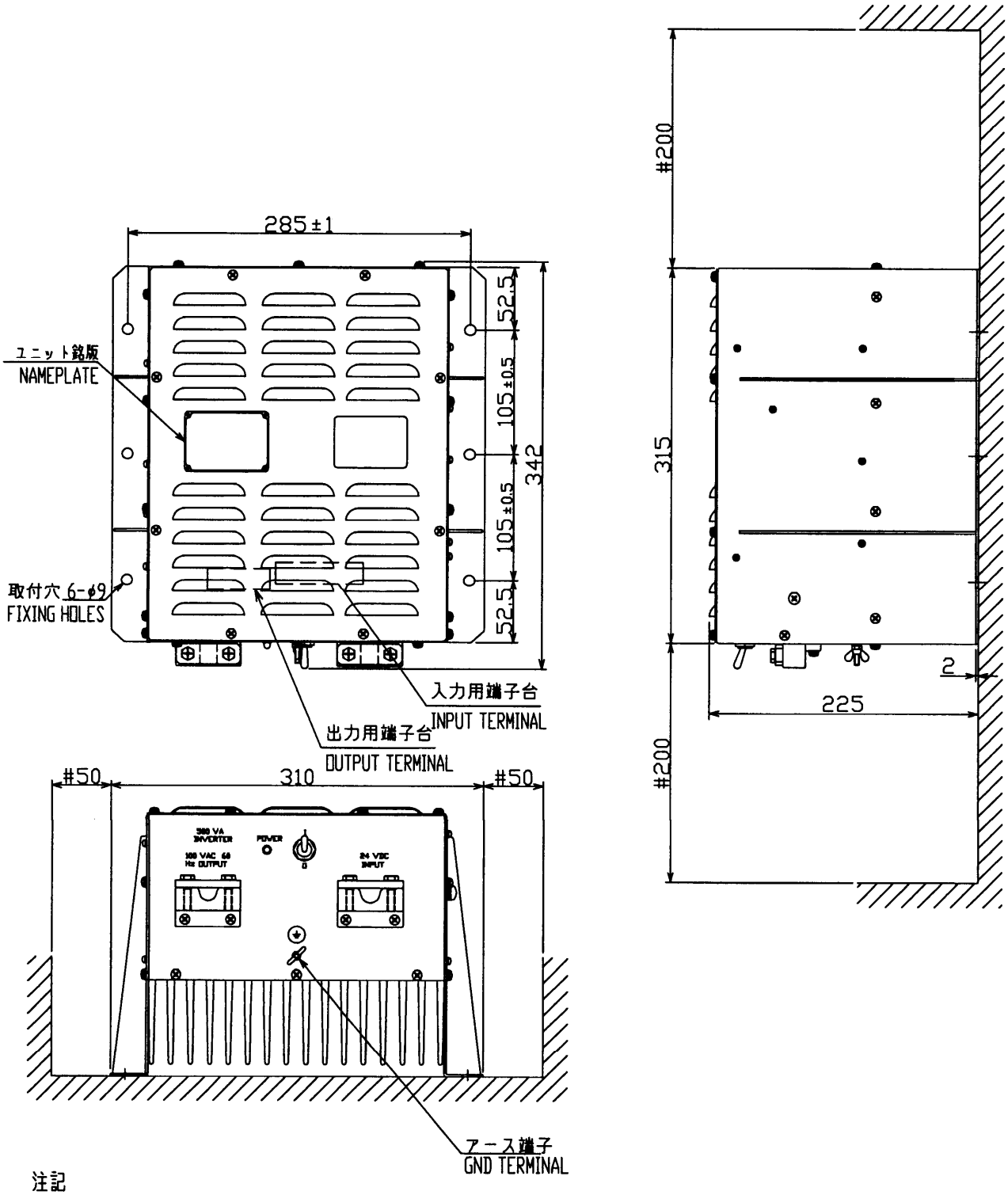
1）指定なき寸法公差は表1による。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN May 23 '01 T. YAMASAKI			TITLE SEM-21Q
CHECKED			名称 スピーカ
APPROVED			外寸図
SCALE 1/2	MASS 0.54 kg ±10%	質量は2.8mケーブルを含む MASS W/ 2.8m CABLE	NAME LOUDSPEAKER
DWG. No. C5016-G07- A			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.



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

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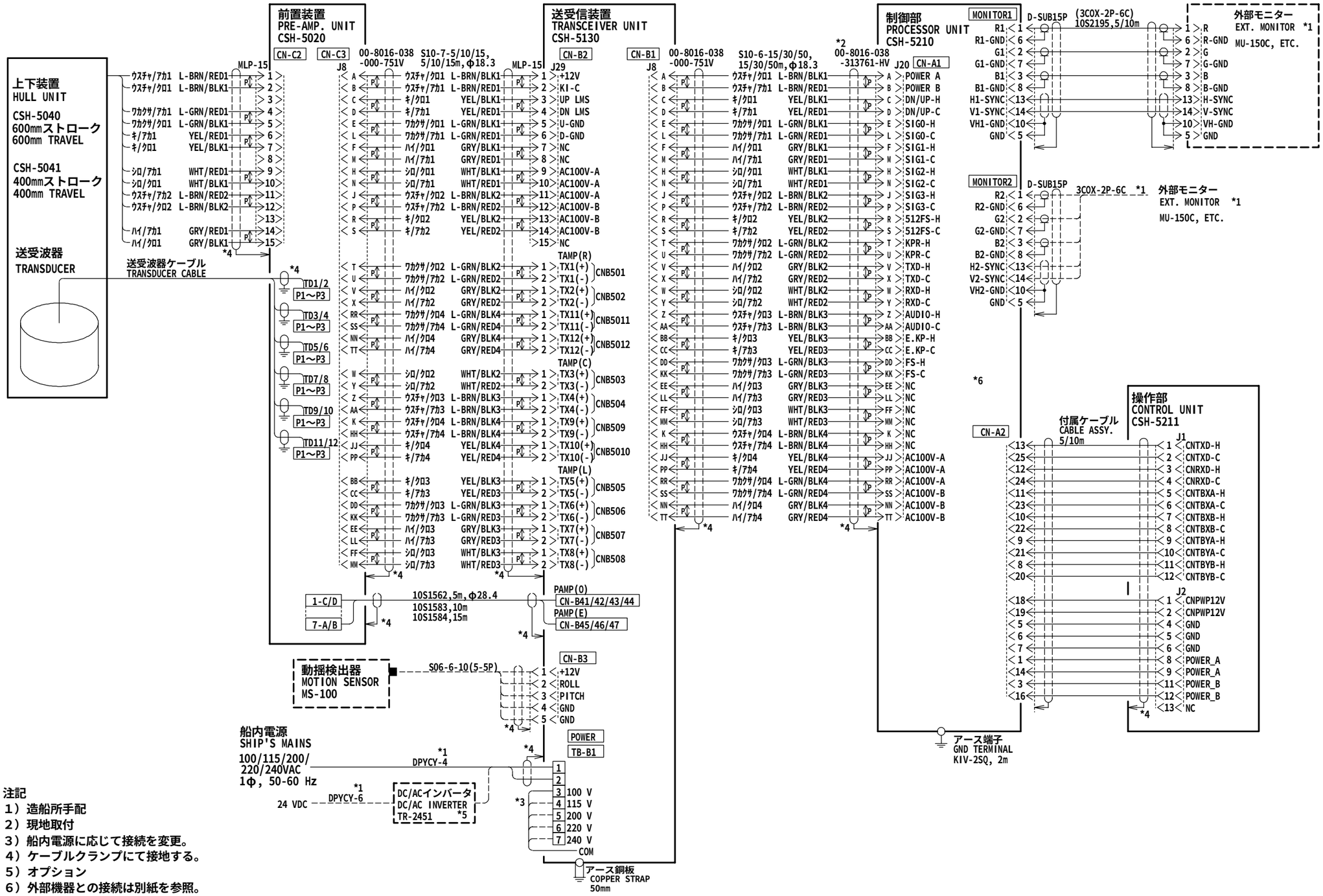

注記
1）造船所手配
2）現地取付
3）船内電源に応じて接続を変更。
4）ケーブルクランプにて接地する。
5）オプション
6）外部機器との接続は別紙を参照。

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 Dec. 5 '02 T.YAMASAKI			TITLE CSH-5L
CHECKED Dec. 5 '02 Y.KIMURA			名 称 カラースキャニングソナー
APPROVED Dec. 5, '02 Y. Kimura			相互結線図
SCALE	MASS kg		NAME COLOR SCANNING SONAR
DWG.No. C1319-C01- B			INTERCONNECTION DIAGRAM

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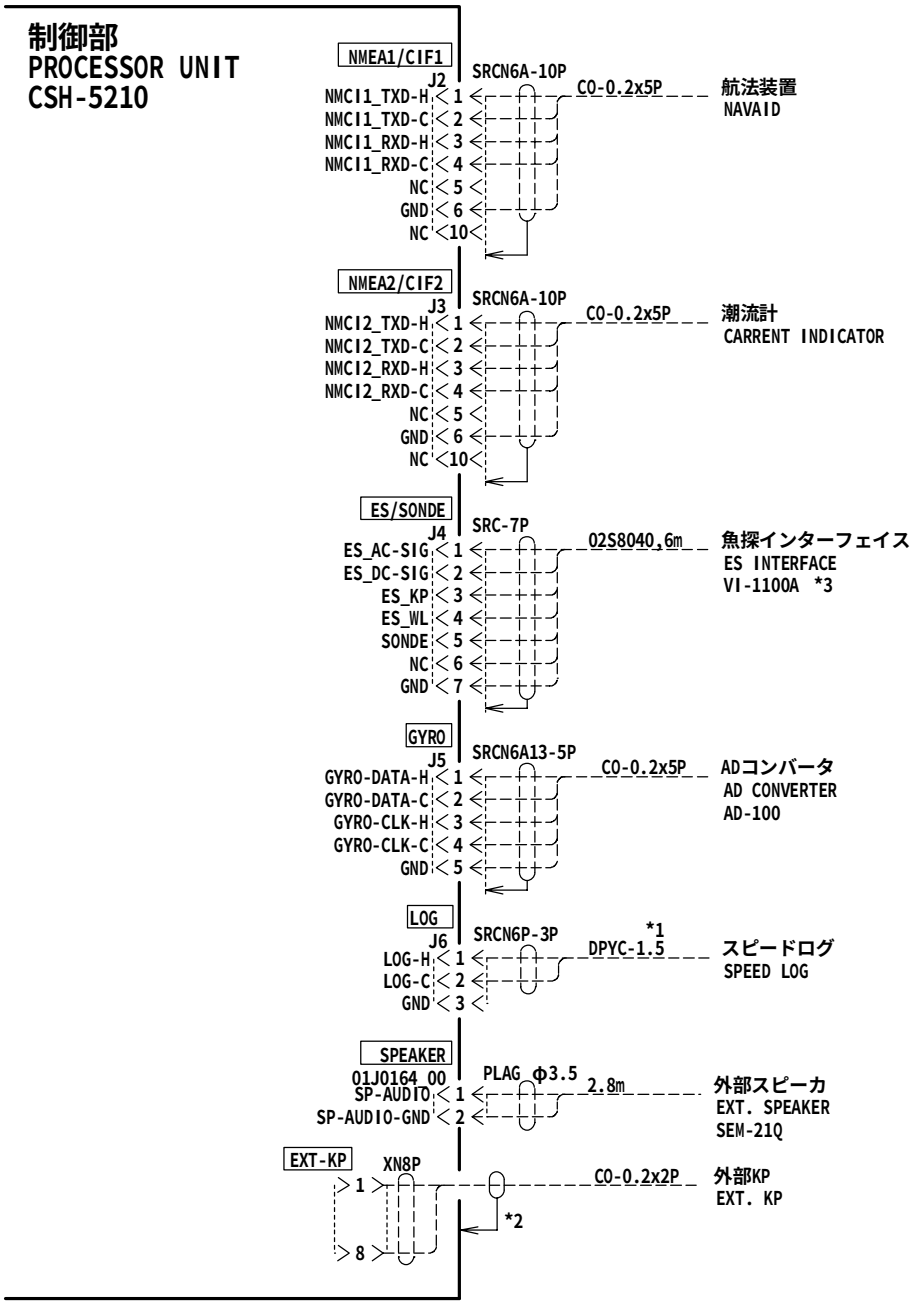


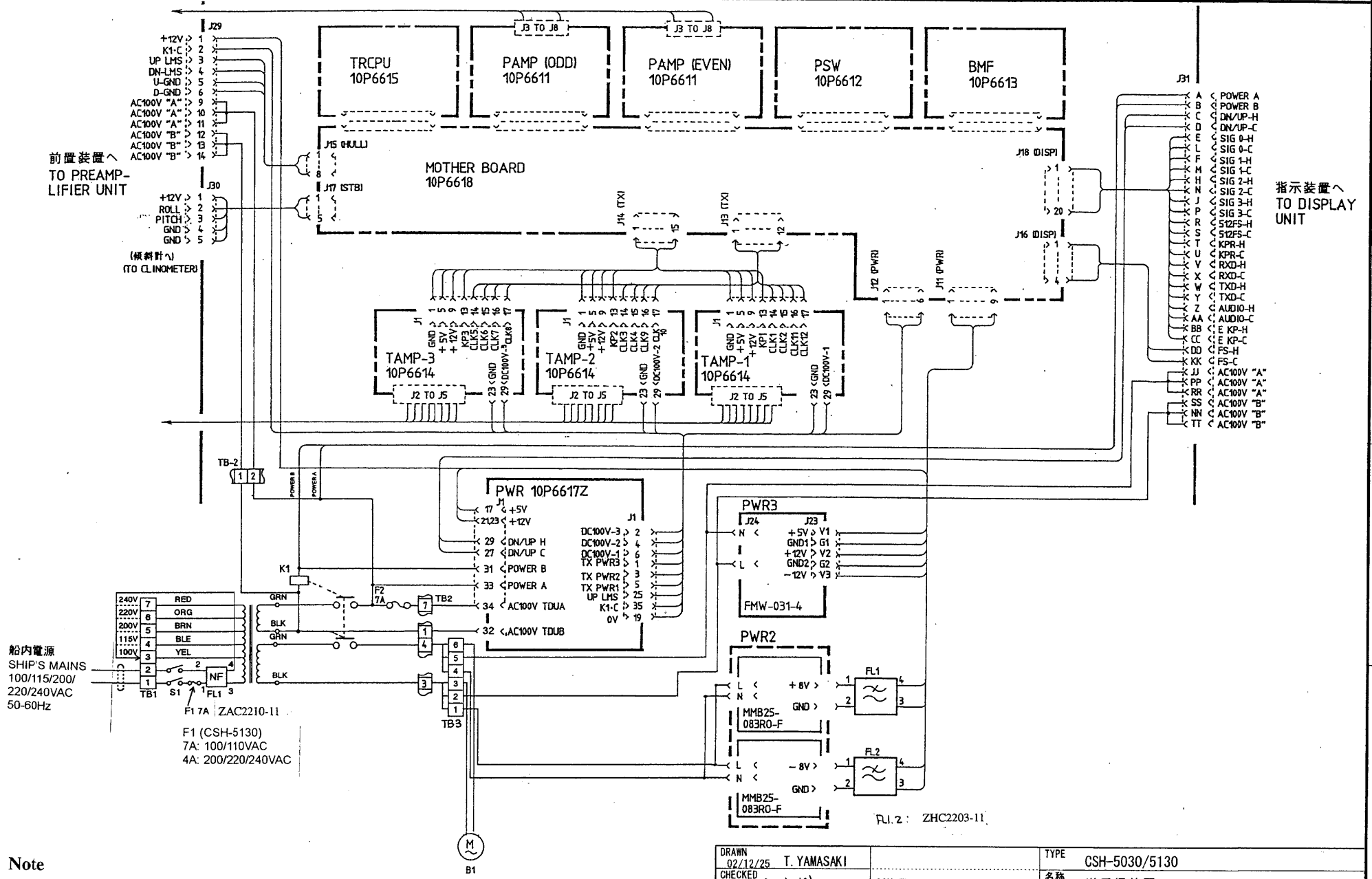
注記
1）造船所手配。
2）ケーブルクランプにて接地する。
3）魚探接続はリニアアンプ信号のみ可。

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

FURUNO



Note

This schematic diagram is for the transceiver unit with CE mark.
The PC board 10P66017**Z** is applicable to CE-marked equipment and is not compatible with 10P6617.

DRAWN 02/12/25 T. YAMASAKI		TYPE	CSH-5030/5130
CHECKED 02/12/25	CSH-5L	名称	送受信装置
APPROVED 02/12/25	CSH-5/ 5 MARK-2		回路図
SCALE / MASS	MODEL / BLOCK No.	NAME	TRANSCEIVER UNIT
Dwg No. C1273-K09- C			SCHEMATIC DIAGRAM

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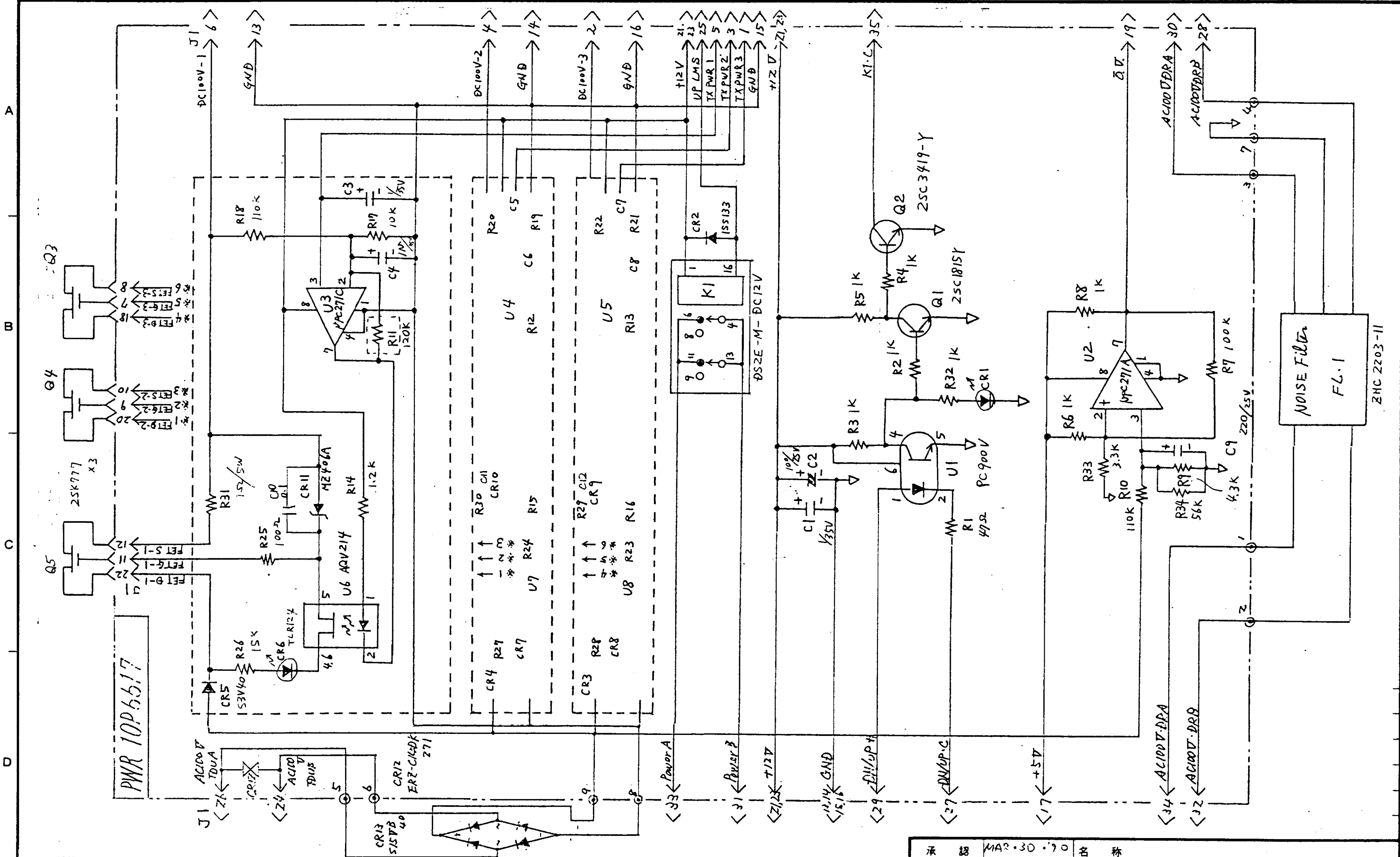

承認 APPROVED	MAR·30·'90 T. NAKANO	名称 TITLE	10P6617	PWR1 基板 PWR1 BOARD
検図 CHECKED	MAR·30·'90 T. MIYOSHI			
製図 DRAWN	MAR·30·'90 H. USUDA	図番 DWG. NO.	C1273−K19−B	

CSH-5 MARK-2
CSH-5

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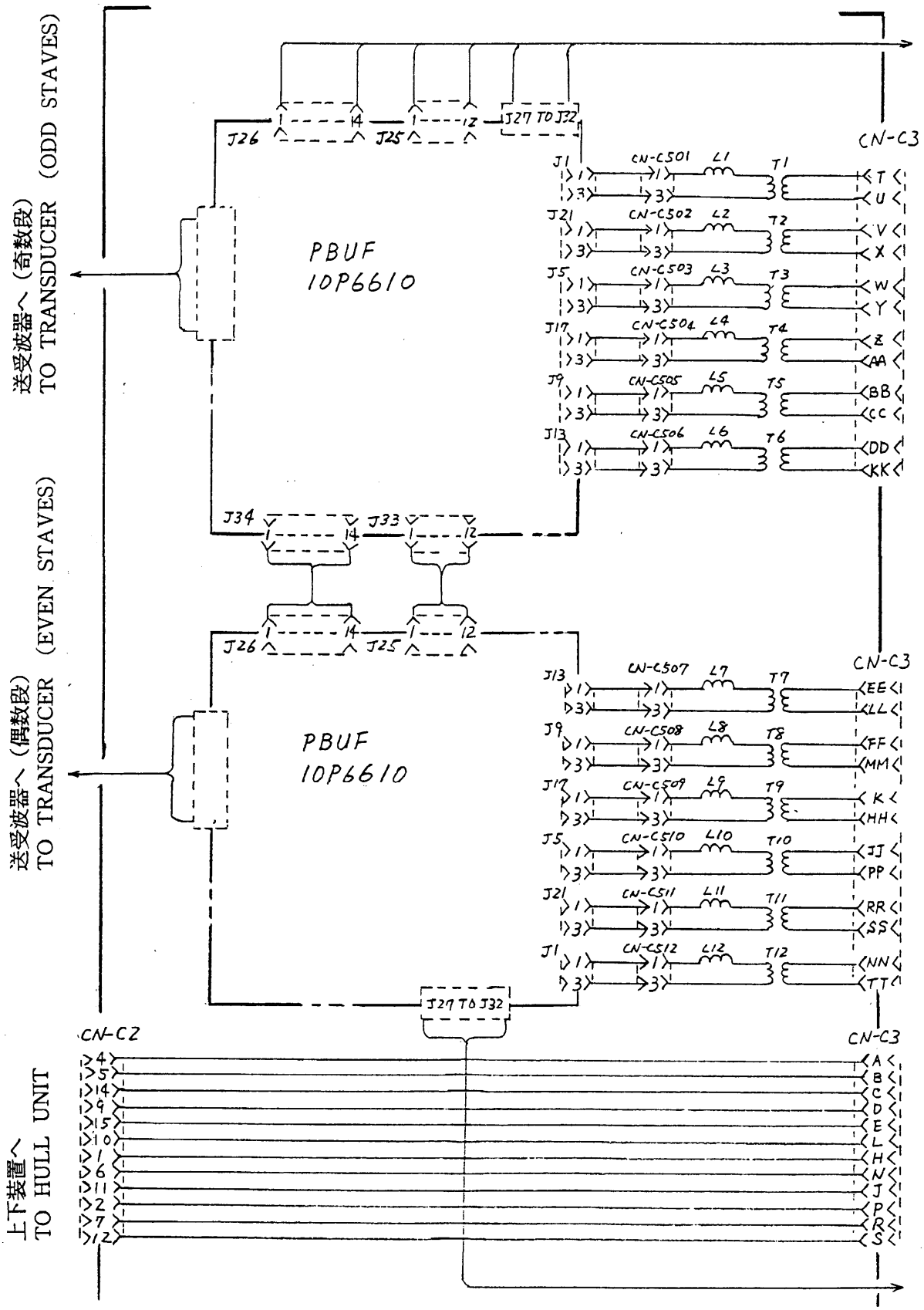
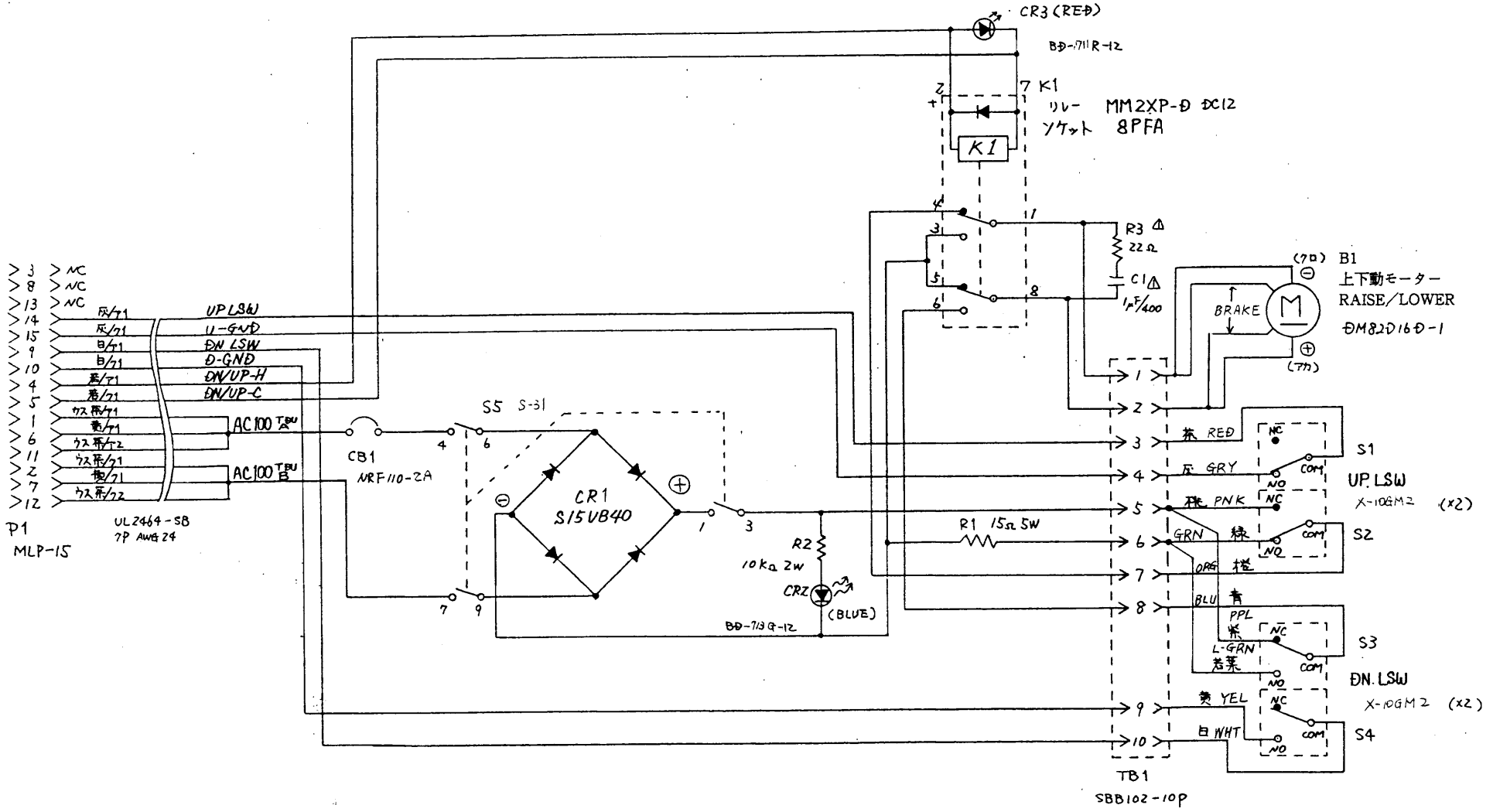


CSH-5	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED	MAR.30.'90 T.NAKAUC	三角法 THIRD ANGLE PROJECTION		名称 TITLE	前置装置 CSH-5020 PRE-AMPLIFIER UNIT
検図 CHECKED	MAR.30.'90 T.MIYOSHI	尺度 SCALE	/		
製図 DRAWN	MAR.30.'90 M.USUDA	重量 WEIGHT	kg	図番 DWG.NO.	C1273-K21-A

FURUNO ELECTRIC CO., LTD.

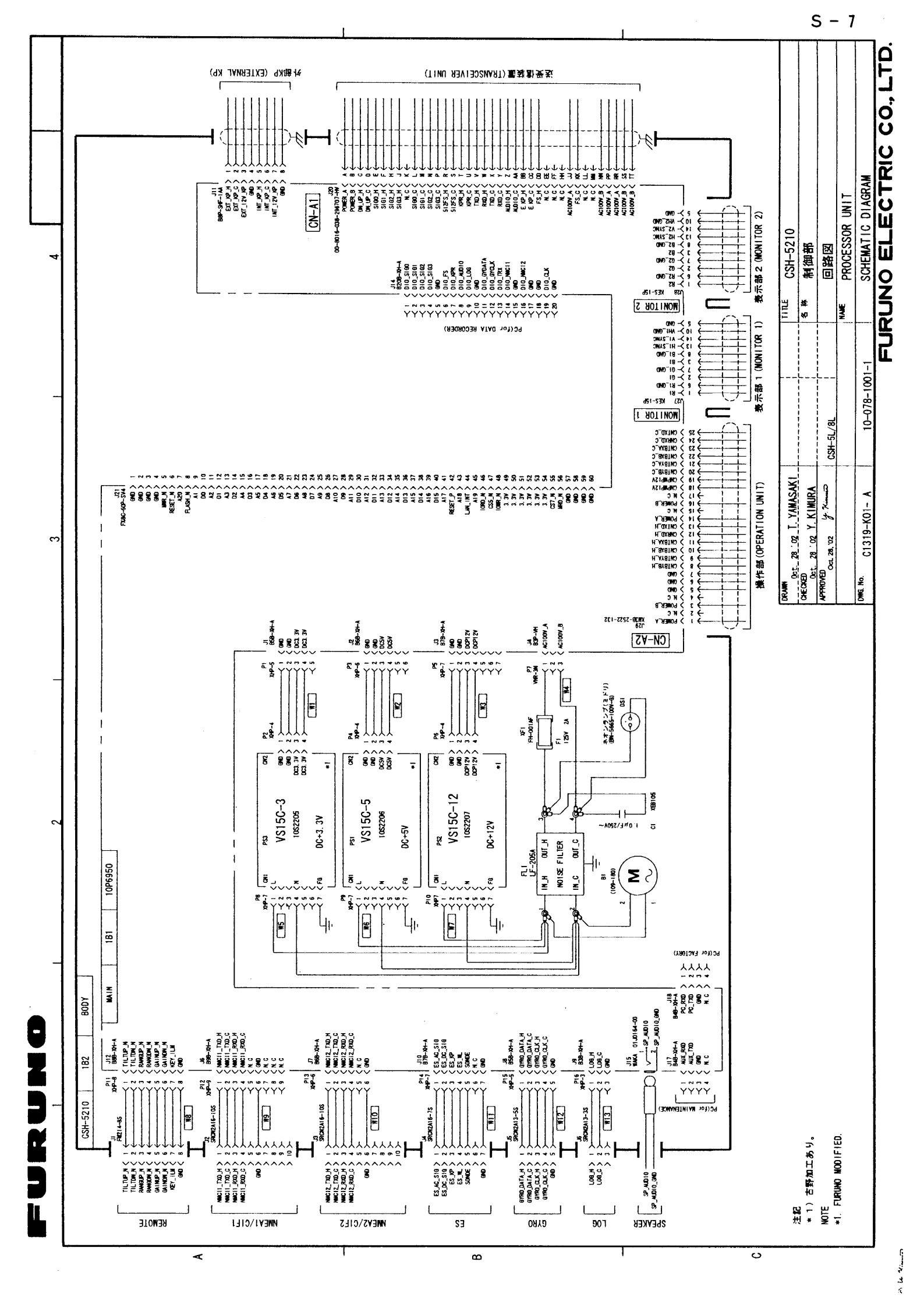
FURUNO



承認 APPROVED	MAR・30・90 T.NAKANO	名称 TITLE	CSH−5040 上下装置 CSH−5042 HULL UNIT
検図 CHECKED	MAR・30・90 T. MIYOSHI		
製図 DRAWN	MAR・30・90 M. USUDA	図番 DWG. NO.	C1273−K23−B

CSH-5 MARK-2
CSH-5

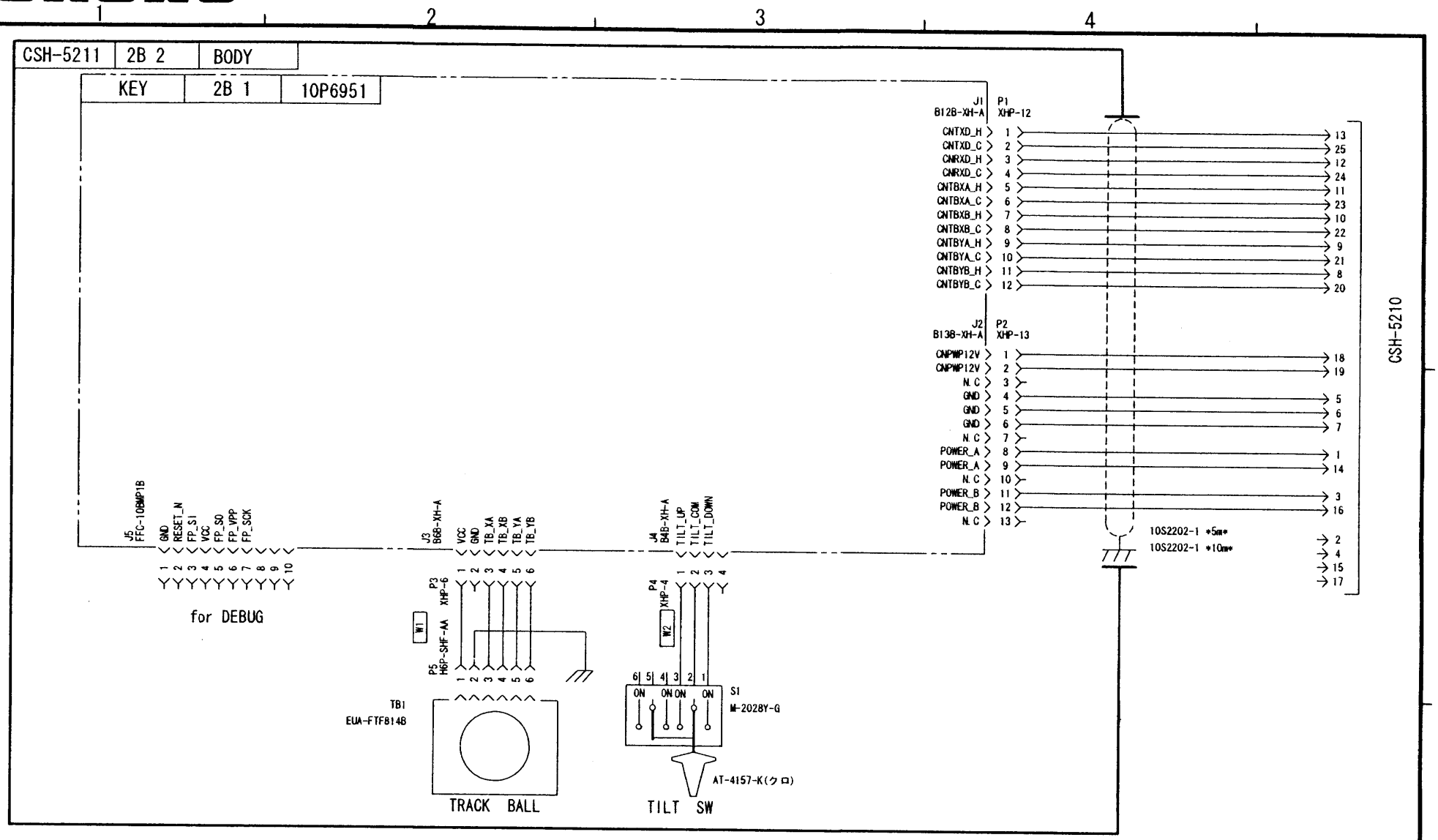
FURUNO ELECTRIC CO., LTD.



注記
＊1）古野加工あり。

NOTE
*1. FURUNO MODIFIED.

FURUNO



DRAWN Oct. 28 '02 T. YAMASAKI			TITLE CSH-5211
CHECKED Oct. 28 '02 Y. KIMURA			名 称 操作部
APPROVED Oct. 28, '02 Y. Kimura		CSH-5L/8L	回路図
			NAME CONTROL UNIT
DWG. No. C1319-K02- A		10-078-1101-1	SCHEMATIC DIAGRAM

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