

Installation Manual

COLOR SECTOR SCANNING SONAR

CH-37

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(Elemental Chlorine Free)

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Printed in Japan

A : JUL. 1998

J1 : OCT. 09, 2018

Pub. No. IME-13030-J1

(ETMI) CH-37





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SAFETY INSTRUCTIONS

Read these safety instructions before you operate the equipment.

 WARNING	Indicates a condition that can cause death or serious injury if not avoided.
 CAUTION	Indicates a condition that can cause minor or moderate injury if not avoided.

 Warning, Caution	 Prohibitive Action	 Mandatory Action
--	--	--

 **WARNING**

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

Only qualified personnel should work inside the equipment.

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


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

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

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

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

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

 **WARNING**

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

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

If a steel tank is installed on a wooden or FRP vessel, take appropriate measures to prevent electrolytic corrosion.

Electrolytic corrosion can damage the hull.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or equipment damage. The voltage rating of the equipment appears on the label above the power connector.



CAUTION



Ground the equipment to prevent electrical shock and mutual interference.

Observe the following compass safe distances to prevent deviation of a magnetic compass:

	Standard compass	Steering compass
Display unit	2.2 m	1.6 m

WORKING WITH THE SONAR OIL

Precautions

- Keep oil away from eyes. Wear protective gloves when working with the oil. The oil can cause inflammation of the eyes.
- Do not touch the oil. Wear protective gloves when working with the oil. The oil can cause inflammation of the skin.
- Do not ingest the oil. Diarrhea or vomiting can result.
- Keep the oil out of reach of children.

Emergency

- If the oil enters eyes, flush with clean water about 15 min. Consult a physician.
- If the oil contacts skin, wash with soap and water.
- If the oil is ingested, see a physician immediately.

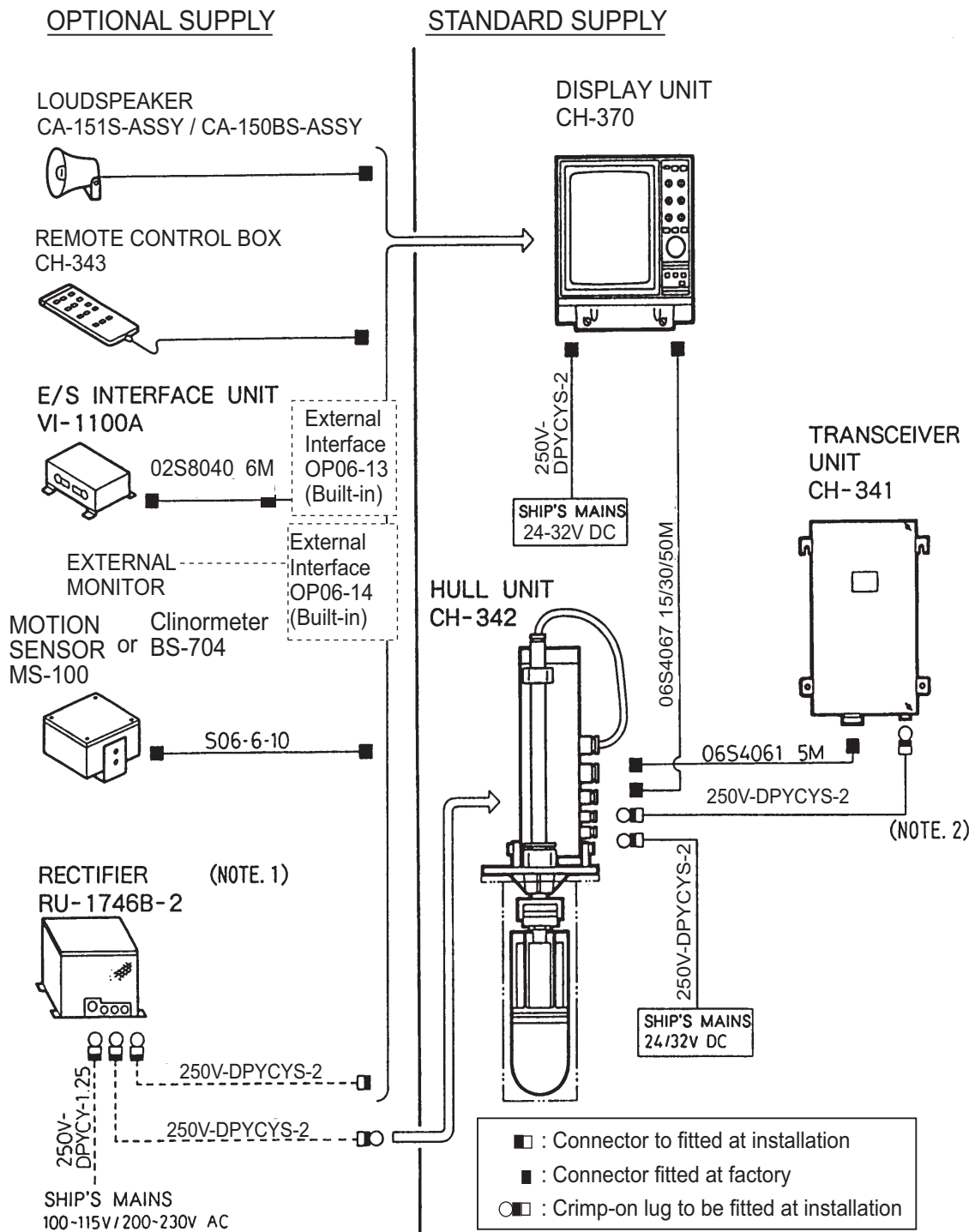
Disposal of oil and its container

Dispose of oil and its container in accordance with local regulations. For further details, contact place of purchase.

Storage

Seal container to keep out foreign material. Store in dark place.

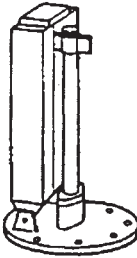


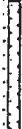



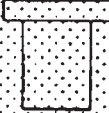
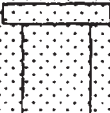
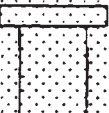
SYSTEM CONFIGURATION



NOTE 1: Two sets of rectifiers are necessary for AC mains.

NOTE 2: DC ship's mains only. For AC ship's mains, the power is supplied directly from the rectifier unit to the transceiver unit.

Hull unit assembly combination

R / L D R I V E U N I T			<table border="1"> <thead> <tr> <th>Power</th> <th>Freq.</th> <th>Type</th> <th colspan="2">Code No.</th> </tr> </thead> <tbody> <tr> <td rowspan="4">DC24V</td> <td>60kHz</td> <td>CH-3421-60-2</td> <td colspan="2">006-547-010</td> </tr> <tr> <td>81kHz</td> <td>CH-3421-81-2</td> <td colspan="2">006-547-030</td> </tr> <tr> <td>113kHz</td> <td>CH-3421-115-2</td> <td colspan="2">006-547-050</td> </tr> <tr> <td>162kHz</td> <td>CH-3421-162-2</td> <td colspan="2">006-547-070</td> </tr> <tr> <td rowspan="4">DC32V</td> <td>60kHz</td> <td>CH-3421-60-3</td> <td colspan="2">006-547-020</td> </tr> <tr> <td>81kHz</td> <td>CH-3421-81-3</td> <td colspan="2">006-547-040</td> </tr> <tr> <td>113kHz</td> <td>CH-3421-115-3</td> <td colspan="2">006-547-060</td> </tr> <tr> <td>162kHz</td> <td>CH-3421-162-3</td> <td colspan="2">006-547-080</td> </tr> </tbody> </table>				Power	Freq.	Type	Code No.		DC24V	60kHz	CH-3421-60-2	006-547-010		81kHz	CH-3421-81-2	006-547-030		113kHz	CH-3421-115-2	006-547-050		162kHz	CH-3421-162-2	006-547-070		DC32V	60kHz	CH-3421-60-3	006-547-020		81kHz	CH-3421-81-3	006-547-040		113kHz	CH-3421-115-3	006-547-060		162kHz	CH-3421-162-3	006-547-080	
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	162kHz	CH-3421-162-3	006-547-080																																										
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06-008-1021	100-028-500	SHJ-0006-1	661-000-061	06-007-1572	600-715-720																																								
S O U N D O M E	 2.7 m cable		 3.7 m cable		 5.3m cable																																								
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	DC24V	60	CH-3422-60-11	006-547-090	60	CH-3422-60-22	006-547-100	60	CH-3422-60-38	006-547-110																																			
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DC32V	113	CH-3422-115-11	006-547-150	113	CH-3422-115-22	006-547-160	113	CH-3422-115-38	006-547-170																																				
	162	CH-3422-162-11	006-547-180	162	CH-3422-162-22	006-547-190	162	CH-3422-162-38	006-547-200																																				
T A N K	 1m		 1.8m		 3.5m																																								
	Mat.	Type	Code No.		Mat.	Type	Code No.		Mat.	Type	Code No.																																		
	Steel	06-007-1570	600-715-700		Steel	SBJ-0001-0	661-000-010		Steel	06-007-1571	600-715-710																																		
FRP	SHJ-0027	661-000-220		FRP	06-007-1573	600-715-730		Alum.	10-044-2501	100-127-500																																			

EQUIPMENT LISTS

Standard Supply

Name	Type	Code No.	Qty	Remarks
Display Unit	CH-370	-	1	
Transceiver Unit	CH-341	-	1	60/81/113/162 kHz, select one
Hull Unit	CH-342	-	1	60/81/113/162 kHz, 24/32 VDC, Shaft length 1.17/2.2/3.8 m
Installation Materials	CP06-01100	000-068-457	Select one	Cable length: 15 m (standard supply)
	CP06-01110	000-068-458		Cable length: 30m
	CP06-01120	000-068-459		Cable length: 50m
	CP06-01102	006-563-250	1 set	For display unit
	CP06-01103	006-563-300	1 set	For transceiver unit
	CP06-01104	006-563-340	1 set	For hull unit
Spare Parts	SP06-01001	006-563-170	1 set	For display unit
	SP06-01002	006-563-260	1 set	For transceiver unit
	SP06-01003	006-563-320	1 set	For hull unit
Accessories	FP06-01000	000-068-460	1 set	Hood, vinyl cover

Optional Supply

Name	Type	Code No.	Remarks
Motion Sensor	MS-100	-	
Clinometer	BS-704	-	
Remote Control Box	CH-343	-	
Steel Retraction Tank	06-007-1570	000-065-066	1.0 m
	SHJ-0001	000-066-643	1.8 m
	06-007-1571	000-065-070	3.5 m
FRP Retraction Tank	SHJ-0022	000-066-644	1 m
	06-007-1573	000-065-067	1.8 m
Aluminum Retraction Tank	OP10-5	000-069-763	1 m, with inst. materials
Rectifier	RU-1746B-2	000-030-439	110/220 VAC, 2 sets required
E/S Interface	VI-1100A	000-021-805	
Handle	OP03-70	008-423-420	
Loudspeaker	CA-151S-ASSY	001-466-200	8Ω
	CA-150BS-ASSY	000-190-183	
Cable assembly	MJ-A6SPF0012-050C	000-154-053	64S4071-2, 5 m, 6 pin-6 pin
	MJ-A6SPF0012-100C	000-154-037	64S4071-2, 10 m, 6 pin-6 pin
	MJ-A6SPF0011-050C	000-159-690	03S9202-2, 5 m, 6 pin-4 pin
	MJ-A6SPF0011-100C	000-159-691	03S9202-2, 10 m, 6 pin-4 pin
5-pair Twisted Cable	CO-SPEVV-SB-C 0.2 x 5P	000-560-451	5 m
		000-560-452	10m
		000-560-417	15 m
		000-103-868	20 m
48-core Cable	06S4056	000-126-160	For extension of cable between hull unit and transceiver unit, specify length

EQUIPMENT LISTS

Name	Type	Code No.	Remarks
Filter	FP02-02620	002-007-290	
External E/S Interface	OP06-13	000-068-455	
External Monitor Interface	OP06-14	000-068-456	
Fairing	06-021-4502	001-159-790-10	For an FRP ship
Soundome shaft	06-007-1591	001-261-030	3 m

1. MOUNTING

NOTICE

Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

1.1 Hull Unit

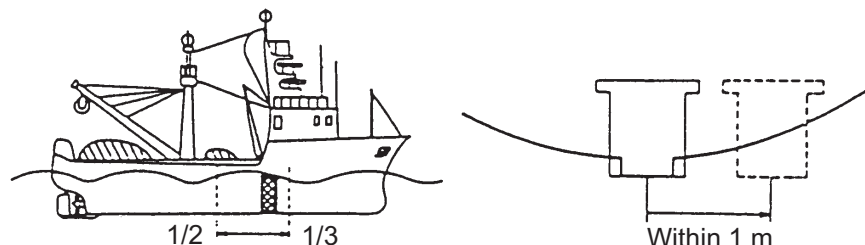
General mounting considerations

- Noise and air bubbles will affect performance.
- Keep the transducer 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.

Installation position considerations

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

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



- Select a place where interference from the transducers of other sounding equipment is minimal. The hull unit should be at least 2.5 meters away from the transducers of other sounding equipment.
- An obstacle in the fore direction not only causes a shadow zone but also aerated water, resulting in poor sonar performance. Be sure to locate the transducer well away from any obstacle in the fore direction.

Mounting method

A typical mounting method is shown in the outline drawing at the back of this manual. Consult ship's owner, dockyard and user to determine appropriate mounting method. Pay attention to safety (strength, watertightness) first, followed by ease of maintenance and inspection.

Tank length

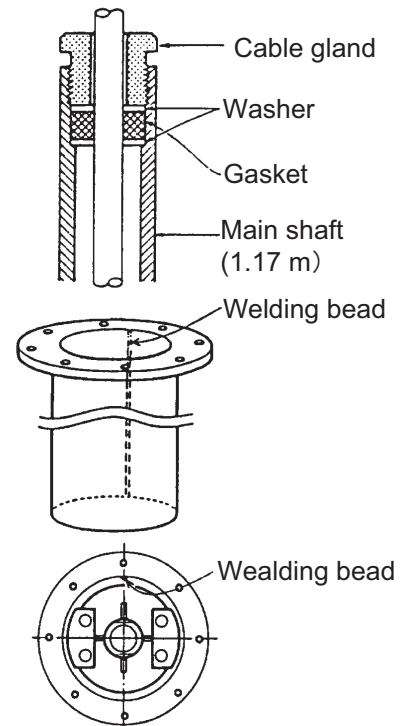
Shorten the transducer tank so the transducer is lowered into water as deep as possible.

Pay particular attention to the tank length L_t . Determine the length of the main shaft as described in the paragraph "Assembling and mounting of hull unit" on page 1-3.

Note 1: Do not shorten the 1 meter retraction tank. Shortening it may also necessitate shortening of the top part of the main shaft, thereby destroying the watertight construction of the 1.17 meter shaft.

Note 2: When the retraction tank is constructed locally, finish it so that welding beads do not protrude on the inner surface of the tank. The tank guide will hit the bead, burning out the raise/lower motor. Also, do not position the welding bead in the ship's fore-aft line.

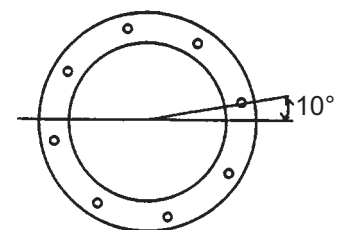
Note 3: Use of other manufacturer's tank is permitted. However, the dimensions should be the same as those in the transducer tank outline drawing.



Mounting of transducer tank

Install the transducer tank referring to the hull unit outline drawings at the back of this manual.

Note: Locate one of the bolt holes 10° to port to minimize mechanical shock at the raise/lower block during pitching and rolling.



Assembling and mounting of hull unit

The hull unit is shipped disassembled as the parts shown in the hull unit kit on pages 1-10 and 1-11. Assemble the hull unit as shown in the procedure below.


Necessary tools

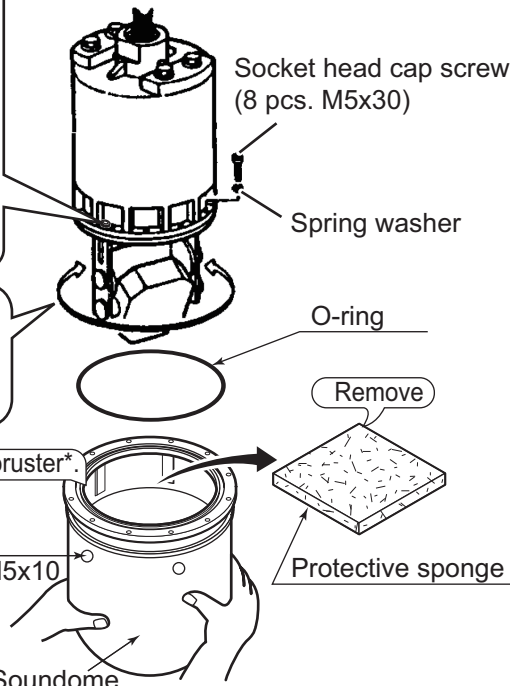
Name	Specification	Remarks
Wrench	For M10 (Hex. size 17 mm)	
Wrench	For M20 (Hex. size 20 mm)	
Pipe Wrench	55 mm	
Ball Wrench	Hex size 4 mm	Supplied with hull unit kit

1. Unscrew eight pieces of socket head cap screws with the ball wrench (supplied) to detach the soundome.

NOTE

Do not unfasten two nuts painted in red.
Unfastening the nuts may allow water to leak inside, which can damage the soundome.





Kinoruster*: Anti-crevice corrosion sealant (supplied)

NOTE

Do not fasten the M5x10 screws. Oil may leak into the soundome.

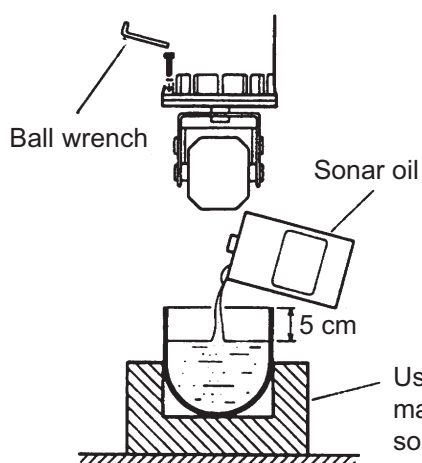
Rotate 3 or 4 turns by hand to make sure that turning mechanisms are functioning properly.

Apply Kinoruster* →

Screw 6 pcs. M5x10



Protective sponge

2. Fill the soundome with sonar oil 6 cm below the top of the dome. (Use only the specified sonar oil. Use of other sonar oils may affect performance.) Reattach the soundome.

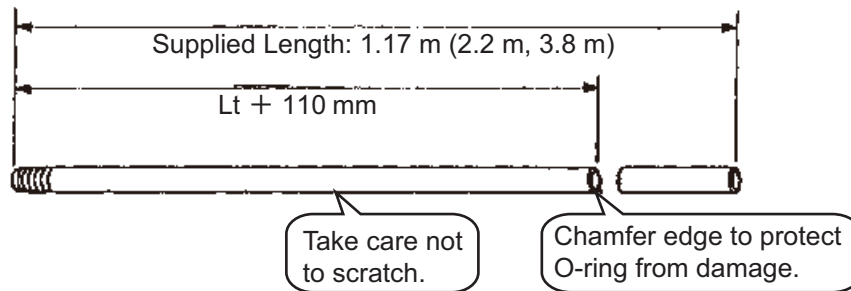


Use packing material to support soundome.

	Frequency (kHz)			
	60	81	113	162
Sonar oil 4L (000-824-033)	No	Yes	Yes	Yes
Super sonar oil 4L (000-177-561-10)	Yes	No	No	No

 CAUTION	
 WORKING WITH THE SONAR OIL <u>Precautions</u> <ul style="list-style-type: none">· Keep oil away from eyes. Wear protective gloves when working with the oil. The oil can cause inflammation of the eyes.· Do not touch the oil. Wear protective gloves when working with the oil. The oil can cause inflammation of the skin.· Do not ingest the oil. Diarrhea or vomiting can result.· Keep the oil out of reach of children.	<u>Emergency</u> <ul style="list-style-type: none">· If the oil enters eyes, flush with clean water about 15 minutes. Consult a physician.· If the oil contacts skin, wash with soap and water.· If the oil is ingested, see a physician immediately. <u>Disposal of oil and its container</u> <ul style="list-style-type: none">· Dispose of oil and its container in accordance with local regulations. For further details, contact place of purchase. <u>Storage</u> <ul style="list-style-type: none">· Seal container to keep out foreign material. Store in dark place.

3. Shorten the main shaft by the length of $L_t + 110$ mm, where L_t is the length of the retraction tank. When the retraction tank length is 1 meter do not shorten the 1.17 meter main shaft.



4. Fasten the main shaft to the soundome assembly as follows;
 - a) Screw the lock nut onto the main shaft.
 - b) Pass the transducer cable through the main shaft.
 - c) After fully screwing the main shaft into the soundome neck, unscrew it by four turns and apply the supplied sealant (LOCTITE NO.575) to the threads.
 - d) Screw in the main shaft completely, then tighten the lock nut with a wrench.
 - e) Remove any excess sealant with a waste cloth. The sealant does not harden when exposed to air.
 - f) Tighten the socket-set screw on the lock nut.

- g) Fasten two reinforce metal fittings to connect the main shaft and the soundome assembly securely (not using the stopper washer).

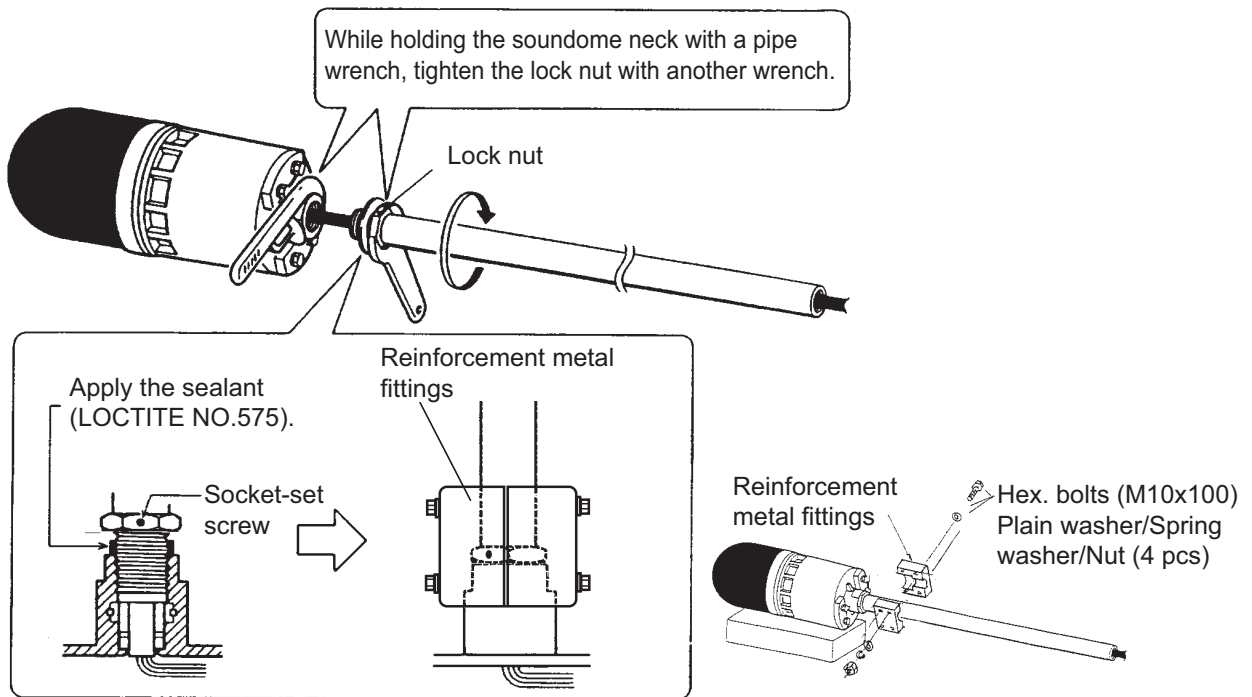


Figure 1-6 How to fasten main shaft to soundome assembly

5. Clean the main shaft and pass it through the main body flange.

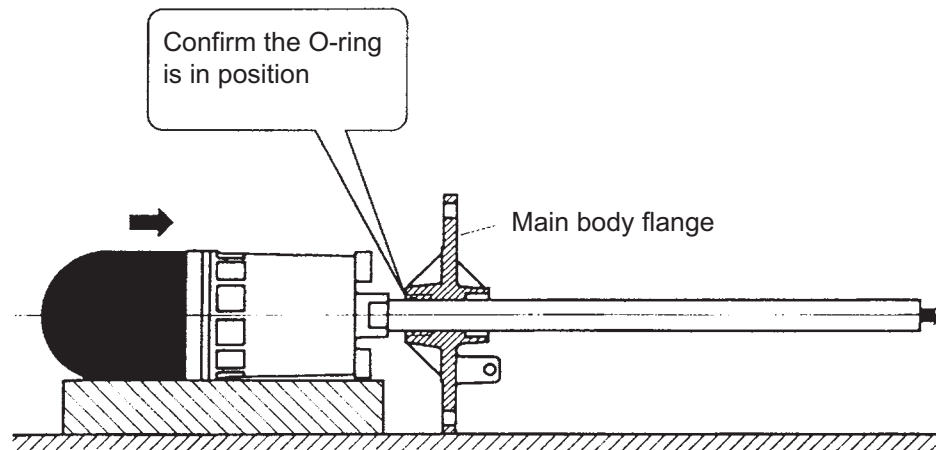


Figure 1-7 Passing main shaft through the main body flange

1. MOUNTING

- Set the grease cotton to the main body flange and tighten the grease cotton re-tainer temporarily.

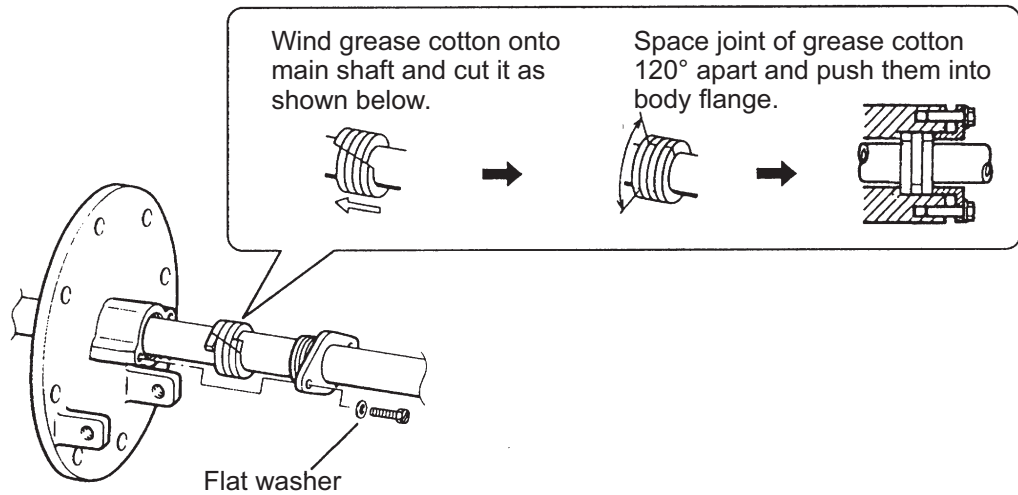


Figure 1-8 Installing grease cotton on the main shaft

- Temporarily fasten the fastening band onto the main shaft at the location shown below.

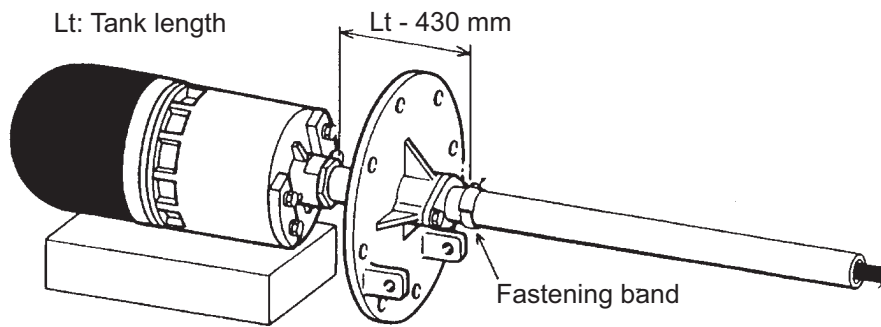


Figure 1-9 Fastening the fastening band on the main shaft

- Inscribe bow mark at the top of the main shaft. Pass pipe clamp through the main shaft and install washer, gasket and cable gland.

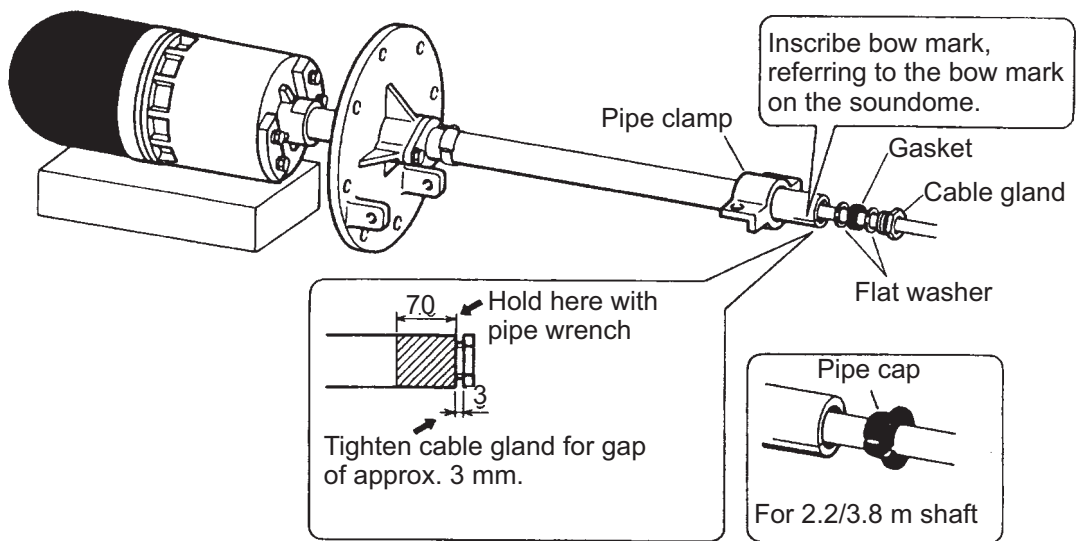
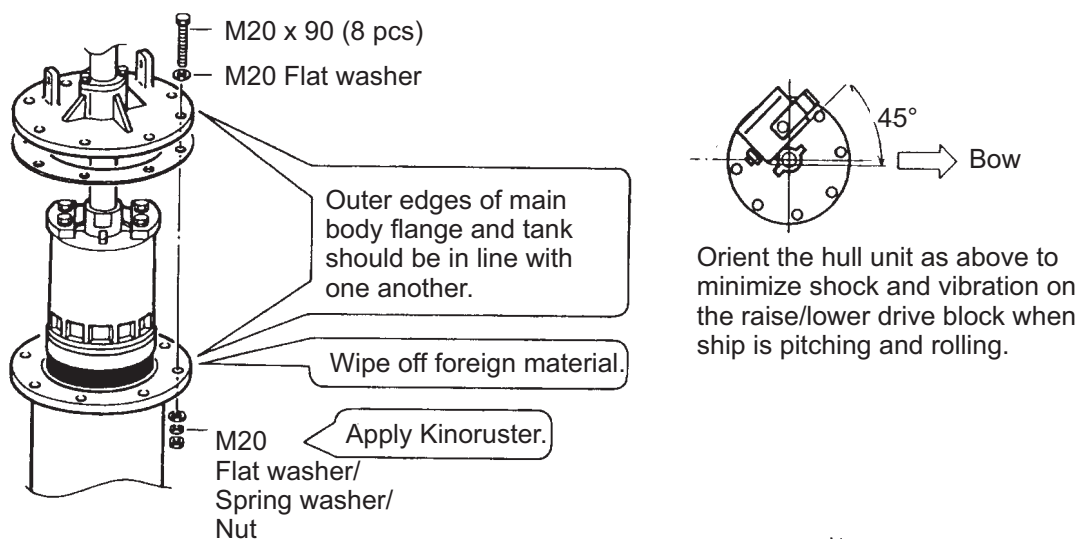


Figure 1-10 Passing pipe clamp, gasket, flat washer and cable gland on main shaft

9. Fasten the hull unit to the transducer tank, orienting it so the ship's fore-aft line crosses the front panel of the raise/lower drive block at an angle of approximately 45 degrees.



CAUTION:

1. Do not drag hull unit on floor.
2. Do not rest hull unit against wall.

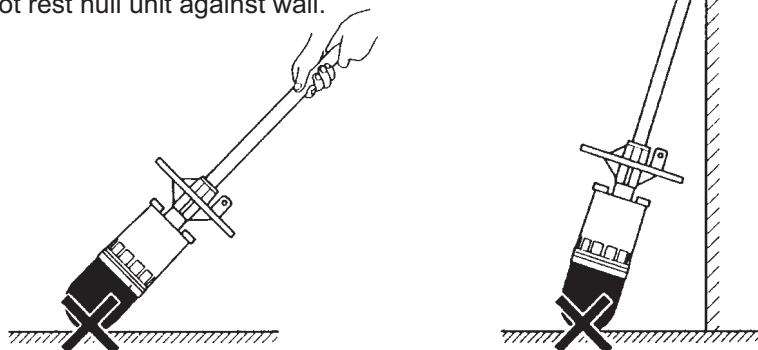


Figure 1-11 Fastening the hull unit to the transducer tank

10. Install the raise/lower drive block as follows;
- a) Rotate the main shaft so the bow mark faces ship's bow.
 - b) Install the raise/lower drive block onto the main body flange.
 - c) Fix the main shaft with the shaft retainer.
 - d) Loosen the fastening band, slide it up to the shaft retainer and fasten it.
 - e) Check that the distance from the top of the main shaft to the top of the shaft retainer is as follows:
 - 1.17 m main shaft: 75 mm
 - Main shaft cut at Lt + 110 mm: 15 mm

1. MOUNTING

If not as shown above, loosen shaft retainer and fastening band to adjust the distance. This will place the bottom of the soundome 10 mm above the bottom of the retraction tank when the soundome is retracted.

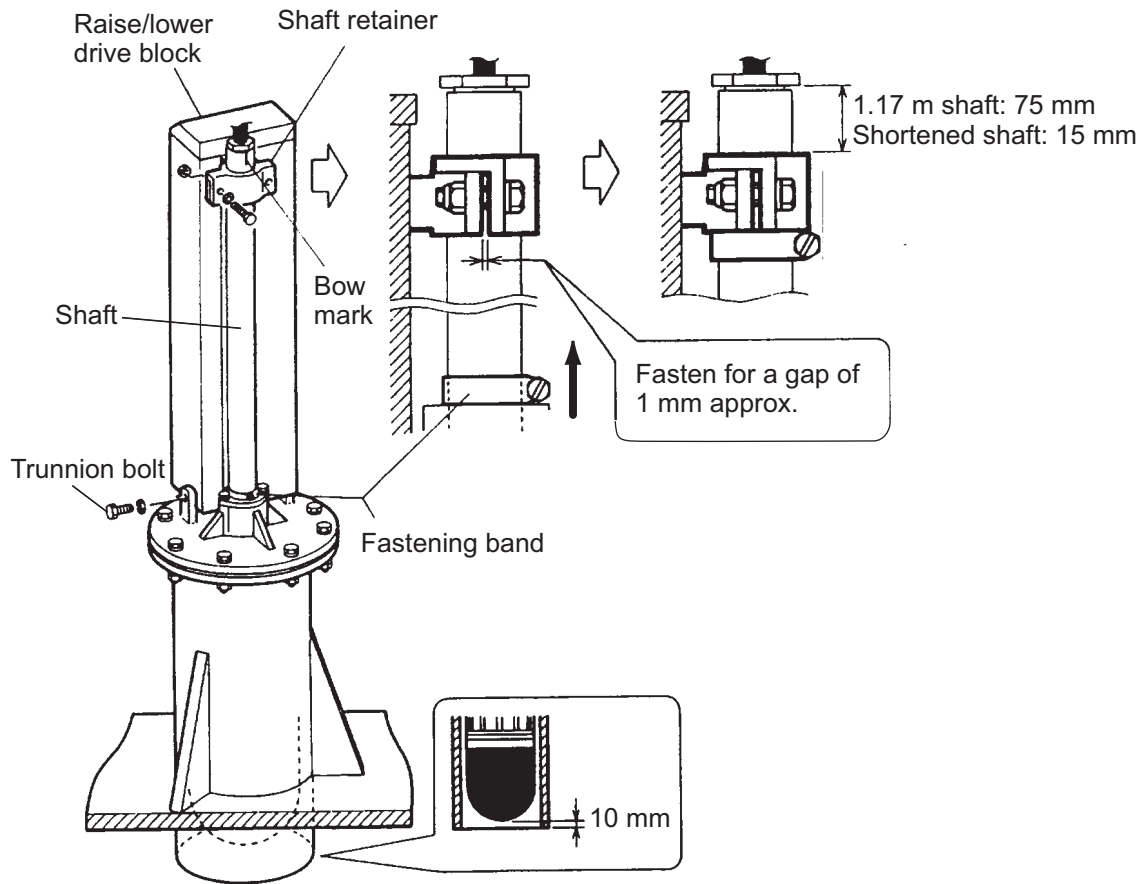


Figure 1-12 Installing the raise/lower drive block

11. Tighten the grease cotton retainer for a gap of 7 to 9 mm.

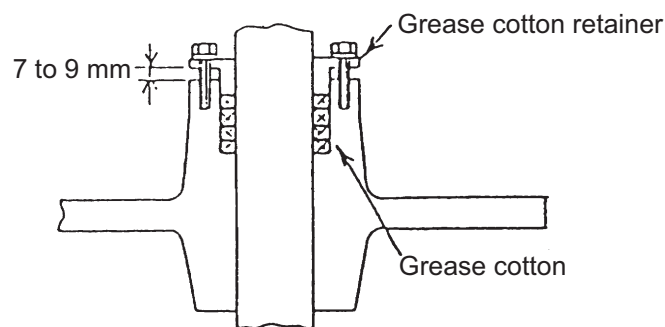


Figure 1-13 Tightening the grease cotton retainer

Checking manual raise/lower of transducer with handcrank

Perform this check after all wiring has been completed. Ship's mains power must be applied to the hull unit, otherwise the magnetic brake of the raise/lower motor activates, disabling the manual raise/lower gears.

1. Turn off the breaker on the hull unit.
2. Detach the brake-off switch cover.

3. Set hand crank to the screw shaft gear and turn it while pressing the brake-off switch.
4. The transducer should rise/lower smoothly with even force in upper to lower limits. If not, the centers of the main body flange and the retraction tank are not aligned. Adjust the hull mounting position if necessary.

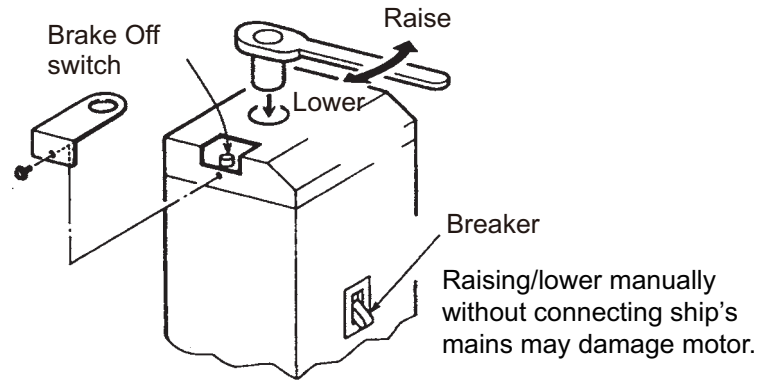
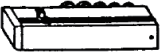



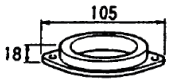
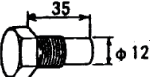


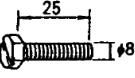
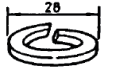
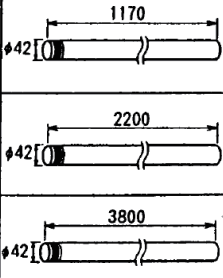

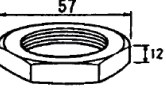




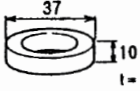
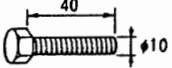

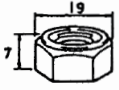
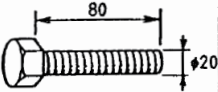


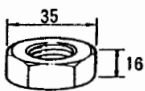
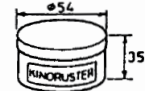
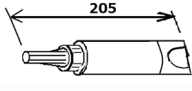

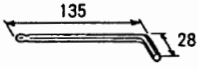


Figure 1-14 How to use the hand crank

Hull unit 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	上下動部 RAISE/LOWER DRIVE ASSEMBLY		CODE NO.		
2	旋回部 SOUNDOME ASSEMBLY		CODE NO.		
3	フランジ MAIN BODY FLANGE		06 - 018 - 3202 CODE NO. 100 - 162 - 031	1	
4	グリスコットン GREASE COTTON		□ 9.5 * 0.6M * CODE NO. 000 - 859 - 013	(1)	
5	グリスコットン押え台 GREASE COTTON RETAINER		SHJ - 0003 - 1 CODE NO. 661 - 000 - 031	(1)	
6	トラニオンボルト TRUNNION BOLT		06 - 013 - 3203 - 2 CODE NO. 100 - 143 - 912	(2)	
7	フランジバックキ GASKET		SHJ - 0009 - 1 CODE NO. 661 - 000 - 091	(1)	
8	Oリング O RING		JISB2401 - 1A - P42 CODE NO. 000 - 851 - 142	(1)	
9	スリ割付六角ボルト SLOTTED HEX. BOLT		M8 x 25 SUS304 CODE NO. 000 - 801 - 701	(2)	
10	バネ座金 SPRING WASHER		M16 CODE NO. 000 - 864 - 265	(2)	
12	上下シャフト MAIN SHAFT		06 - 008 - 1021 - 0 CODE NO. 100 - 028 - 500 SHJ - 0006 - 1 CODE NO. 661 - 000 - 061 06 - 007 - 1572 CODE NO. 600 - 715 - 720	1	
13	ジュビリークリップ FASTENING BAND		1X SUS304 CODE NO. 000 - 801 - 857	1	
14	止めナット LOCK NUT		06 - 013 - 2401 - 0 CODE NO. 100 - 098 - 730	1	
15	六角穴付止めネジ SOCKET SET SCREW		M4 x 5 SUS CODE NO. 000 - 801 - 527	1	

番号 No.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
16			CODE NO.		
17	パイプキャップ PIPE CAP		06-007-1307-0 CODE NO. 600-713-070	1	
18	締め付けグランド CABLE GLAND		06-008-1031-0 CODE NO. 100-028-520	1	
19	座金 WASHER		06-018-3302-0 CODE NO. 100-162-051	2	
20	ガスケット GASKET		06-018-3303-1 CODE NO. 100-162-061	1	
21	六角ボルト HEX. BOLT		M10 x 40 CODE NO. 000-862-184	2	
22	バネ座金 SPRING WASHER		M10 SUS304 CODE NO. 000-864-261	2	
23	Uナット U-NUT		M10 SUS304 CODE NO. 000-863-930	2	
24	六角ボルト HEX. BOLT		M20 x 80 CODE NO. 000-801-893	8	
25	ミガキ平座金 FLAT WASHER		M20 SUS304 CODE NO. 000-864-136	16	
26	バネ座金 SPRING WASHER		M20 SUS304 CODE NO. 000-864-270	8	
27	六角ナット HEX. NUT		M20 SUS304 CODE NO. 000-863-116	16	
28	金属すきま腐触防止剤 ANTI-CREVICE CORROSION SEALANT		KINORUSTER 855 CODE NO. 000-801-025	1	
29	シール剤 SEALANT		LOCTITE NO.575 CODE NO. 000-194-894-10	1	
30	ソナーオイル SONAR OIL		4 L CODE NO. 000-824-033	1	60 kHz SUPER SONAR OIL 4L (000-804-568)
31	ボールレンチ BALL WRENCH		HEX. SIZE 4mm CODE NO. 000-804-123	1	
			CODE NO.		

1. MOUNTING

番号 No.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
32	シャフト保護金具 REINFORCEMENT METAL FITTING		06-018-3305-0	2	
			CODE NO.		
33	六角ボルト HEX. BOLT		M10X100 SUS	4	
			CODE NO.		
34	ミガキ平座金 FLAT WASHER		M10 SUS304	8	
			CODE NO.		
35	バネ座金 SPRING WASHER		M10 SUS304	4	
			CODE NO.		
36	六角ナット HEX. NUT		M10 SUS304	4	
			CODE NO.		

1.2 Transceiver Unit

Mounting considerations

- The mounting location should be well ventilated and dry.
- The unit can be mounted on a bulkhead or the deck. The unit weighs 8.5 kg so reinforce the mounting location if necessary.
- Secure the maintenance space shown in drawing below for ease of maintenance and service.

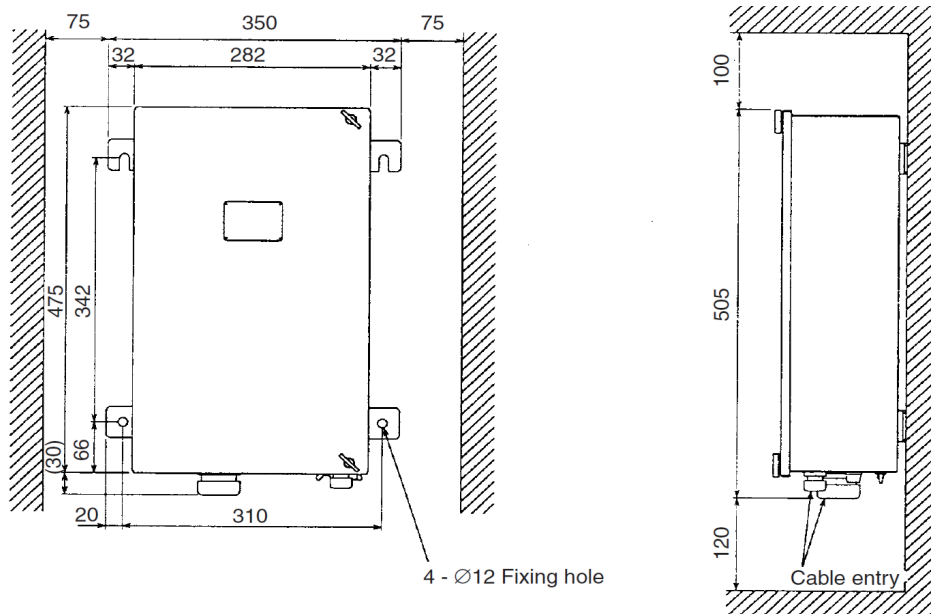


Figure 1-15 Mounting dimensions for the transceiver unit

1.3 Display Unit

Mounting considerations

Select the mounting location considering the following conditions:

- Select a location where the display unit can easily be operated while observing the fishing ground or area surrounding the vessel.
- Locate the unit at least 1 meter away from equipment which contains magnets (radar magnetron, loud-speaker).
- A magnetic compass will be affected if placed too close to the display unit. Observe the following compass safe distances to prevent deviation to a magnetic compass: Standard compass, 2.2 m, Steering compass, 1.6 m.
- Select a location not exposed to direct sunlight, water splash or hot air.
- Select a location which accommodates the viewing angle shown at right.

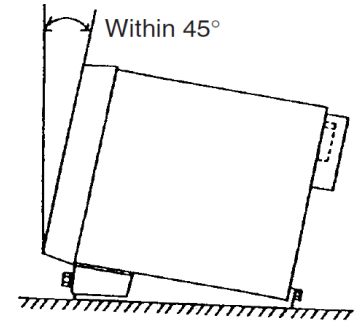
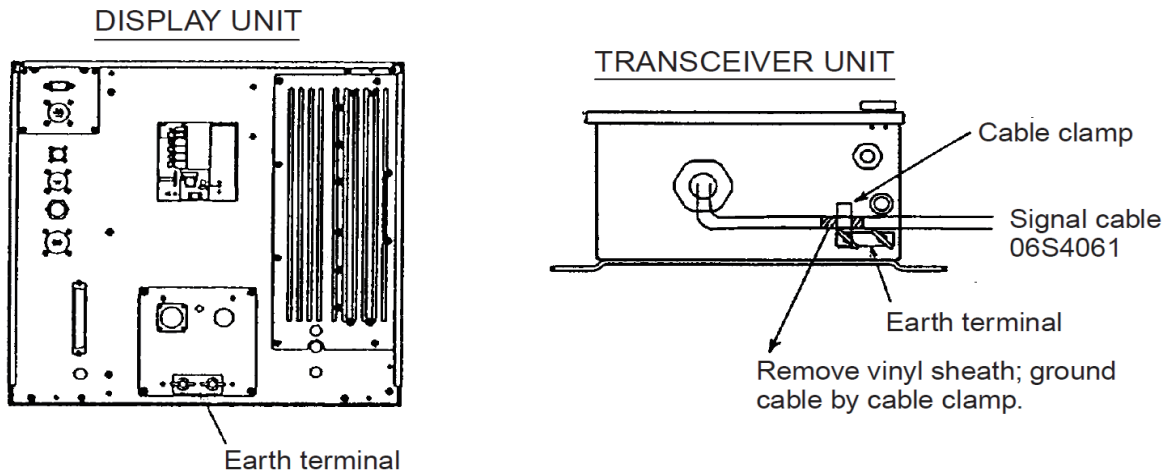


Figure 1-16 Display unit

1.4 Grounding the Display Unit and Transceiver Unit

Ground the equipment with a copper strap or ground wire to prevent interference.



CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

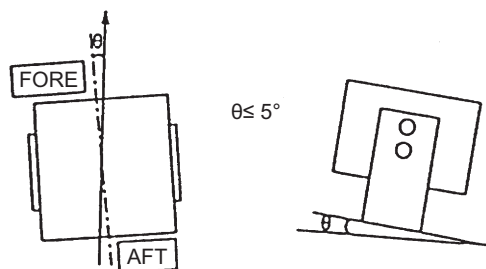
Figure 1-17 Location of earth terminals on display unit and transceiver unit

1.5 Motion Sensor MS-100 (Option)

The MS-100 measures ship's pitching and rolling angles with sensors using the principles of the gyroscope. The MS-100 is free from error caused by ship's vertical and horizontal motion. Therefore, 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.

Mounting considerations

- 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.



Mounting procedure

Orient the FORE mark on the unit toward the ship's bow and mount the unit level to within 5° in all directions.

1.6 External Interface (Option)

This section shows how to install External E/S Interface (type OP06-13) and/or the External Monitor Interface (type OP06-14).

For connecting external monitor, prepare mini D-SUB 15 pin cable (male-male).

Recommended cable : EVNPSO5-50ft, manufactured by Black Box Japan Co.,Ltd.

External monitor interface installation kit

Part	Type, Q'ty	Code No.	Q'ty
External Monitor Interface Assy.	—	—	1
XH Connector Assy.	06-313 (13-13P)	006-550-840	1
Screw	M3x6	000-881-103	4
Screw	M3x8	000-881-404	1
Cable Ties	No.249	000-515-871	1

External E/S interface installation kit

Part	Type, Q'ty	Code No.	Q'ty
External E/S Interface Assy.	—	—	1
XH Connector Assy.	06-312 (6-6P)	006-550-830	1
Screw	M3x6	000-881-103	4
Screw	M3x8	000-881-404	1
Cable Ties	No.249	000-515-871	1

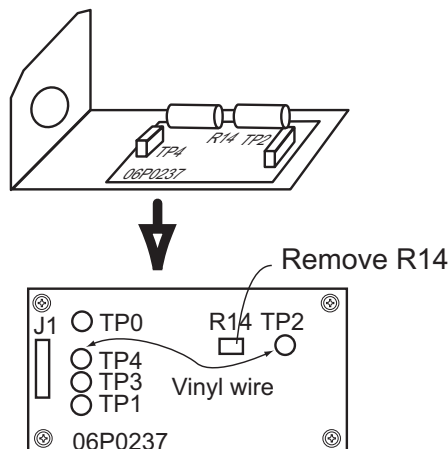
1. Remove the display unit cover.
2. Remove the dummy plate at the rear of the display unit.
3. Connect XH connector assy. to the Interface Module.
4. Fasten the Interface Module to the display unit with M3 x 6 screws and one M3 x 8 screw.
For connecting External Monitor Interface (OP06-14) and External E/S interface (OP06-13), remove ESIF Board from OP06-13, and fix ESIF Board on OP06-14.
For connecting logarithm amplifier video sounder, refer to next page.
5. Connect between J2 on the ESIF Board (06P0237) and J3 on the MAIN Board; connect between J1 on the RGB-BUFF Board (03P9229) and J4 on the MAIN-Board.
6. Bind cables with the cable tie (supplied).
7. Close the cover.

1.7 Logarithm Amplifier Video Sounder

For connecting external video sounder (logarithm amplifier: FCV-291,292,1000), modify ESIF board of OP06-13 (as below) and the INTERFACE UNIT VI-1100A. For INTERFACE UNIT VI-1100A modification, refer to installation manual of INTERFACE UNIT VI-1100A.

Modification of E/S interface

1. Remove chip resistor R14 from ESIF board (06P0237).
2. Solder vinyl wire between TP2 and TP4.



Note 1: Set “RES.COLOR” field in the E/S menu to “LOG”.

Note 2: Adjust “GAIN” and “N.L.” of E/S menu.

1.8 Clinometer BS-704 (Option)

The clinometer detects ship's inclination caused by ship's rolling and pitching and its output is used to stabilize the sonar beam against rolling and pitching.

The clinometer is, in principle, a pendulum. It measures the inclination of the ship by sensing the direction of gravity acted on it and therefore when installed on a ship, it should be placed on or near the rotation axes of the ship's rolling and pitching. If it is placed away, upward from the axes, the measured value becomes larger than the correct value. On the contrary, if it is placed below the axes, the measured value becomes smaller. The same can be said when it is placed far to the left or right from the axes.

The rotation axes of pitching and rolling are theoretically considered to be located on the level of the ship's draft and in the center of ship. In other words, it can be said as follows.

1. Vertical position of the pitching and rolling axes is on the draft level of the ship.
2. Horizontal position of the rolling axis is in the center of ship's port-starboard line.
3. Horizontal position of the pitching axis is in the center of ship's fore-aft line.

From 1), 2) and 3) above, the crossing point of the two axes is indicated by the black dots in Figure 1-21. The clinometer should be mounted as close as possible to this point.

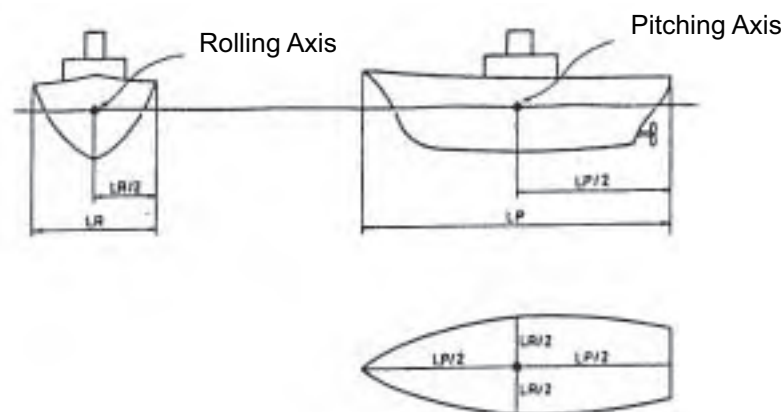


Figure 1-21 Installation Position of Clinometer

Cautions:

- 1) The vicinity of the hull unit (on the ship's bottom) is too low and should be avoided, since the polarity of the measured value is reversed.
- 2) When it is impossible to install the clinometer on the intersecting point of both rolling and pitching rotational axes, a special effort should be made to install it at place where the vertical distance to the intersecting point is minimum.
- 3) The clinometer should be installed on the horizontal plane.
- 4) Install the clinometer with the bow mark pointing in toward the ship's bow.

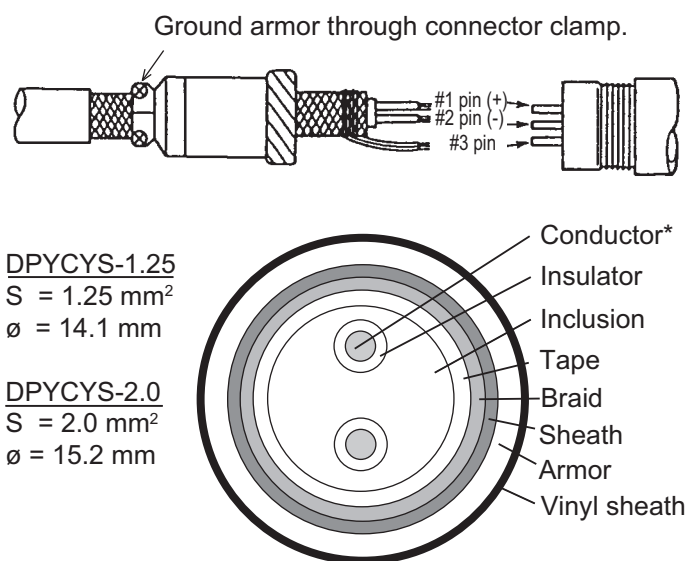
1. MOUNTING

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2. WIRING

2.1 Wiring Among Units

- The figure on the next page shows wiring among units.
- The signal cables are fitted with connectors. Connect the cables to the display, transceiver and hull units referring to the interconnection diagram and the drawing on page S-1.
- The power cable should be arranged locally. Use power cable type DPYCYS-2 and DPYCYS-1.25 (both Japan Industrial Standard cables) or equivalent cables. Attach supplied power connector as shown below.



DPYCYS-1.25, DPYCYS-2

- Install the main switch for the sonar where it can be easily accessed. Turn off this switch when the sonar is not being used, to reduce power consumption and to prevent the transducer from slipping by vibration.
- For AC mains, use two rectifiers RU-1746B, one for the display and transceiver units and the other for the hull unit.

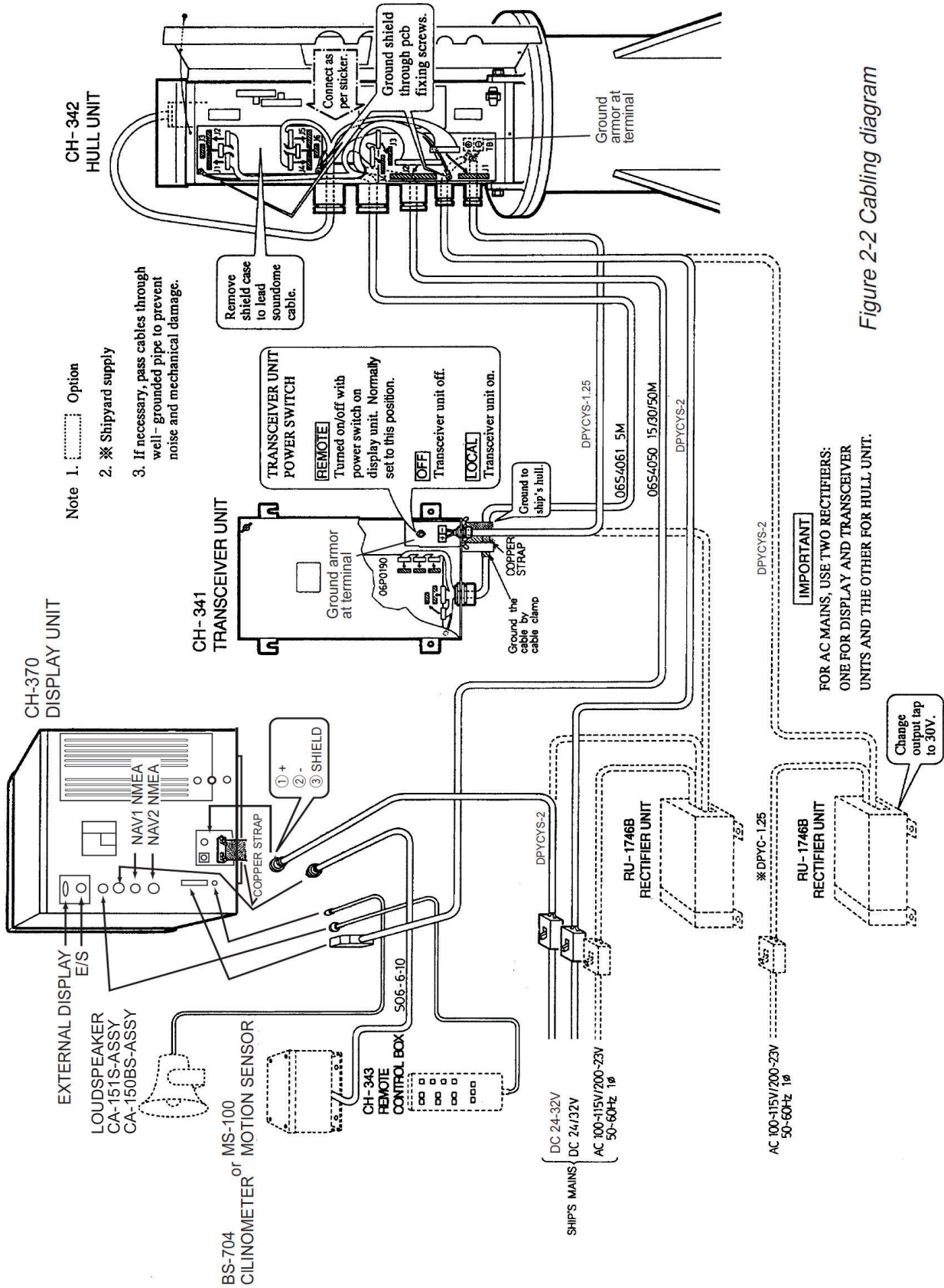
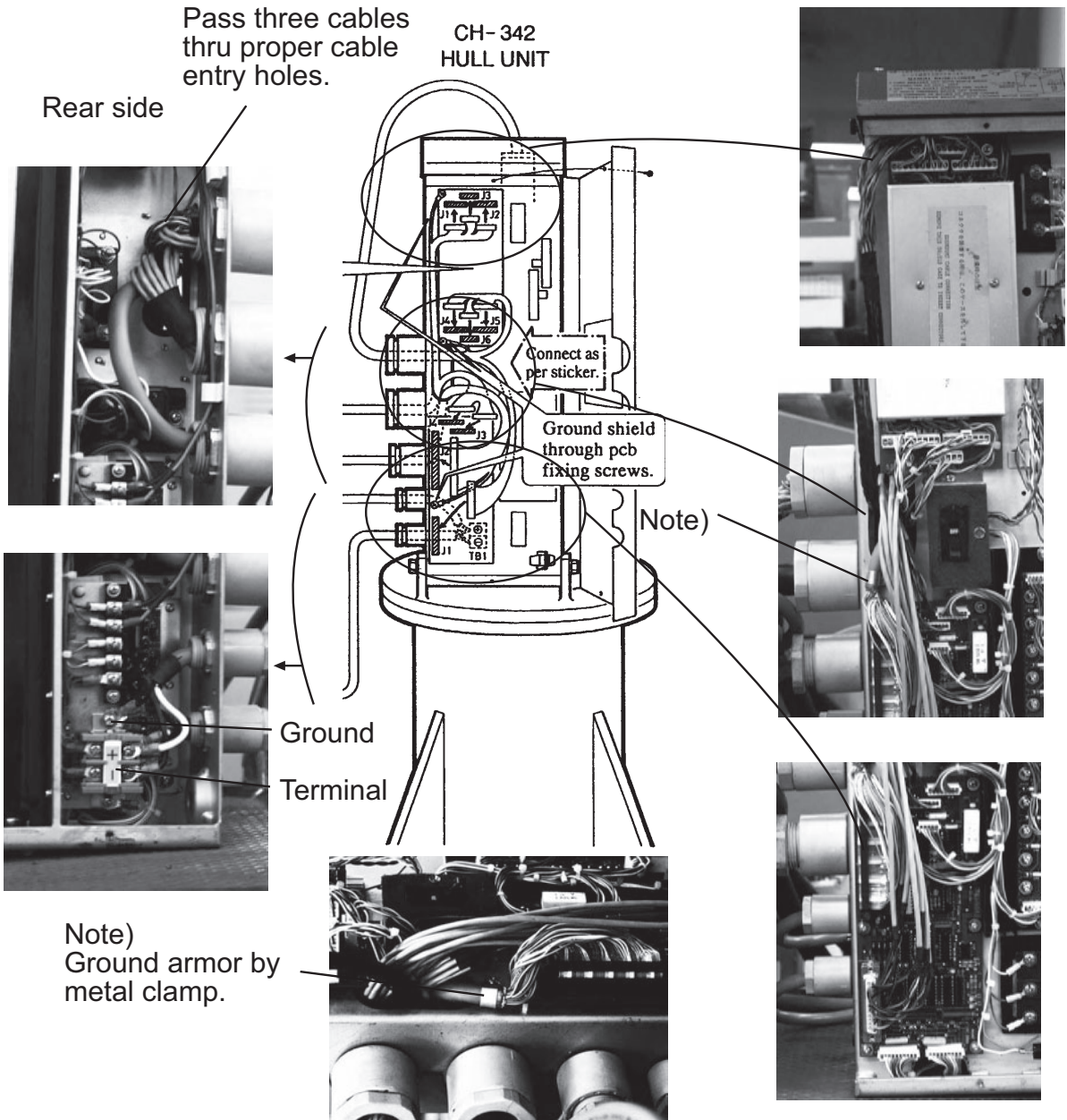


Figure 2-2 Cabling diagram

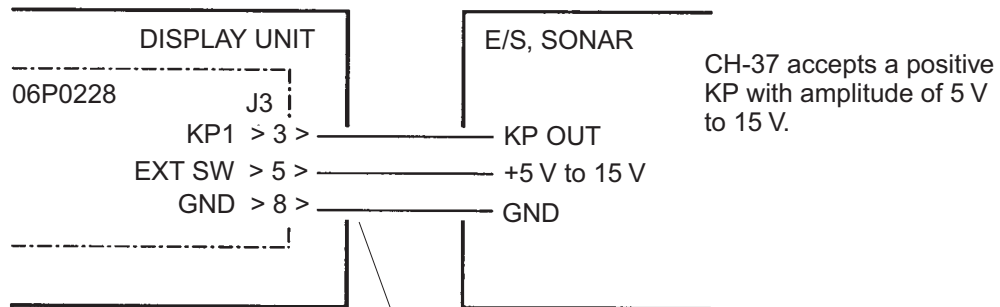
Front side



2.2 Synchronizing Transmission with Echo Sounder or Other Sonar

To synchronize transmission of the CH-37 with an echo sounder or other type of sonar, connect it as shown below.

Connections for synchronizing Tx with other E/S, sonar



Make a hole for cable entry at the left side of the rear panel.

Figure 2-3 Connection of display unit to other sonar

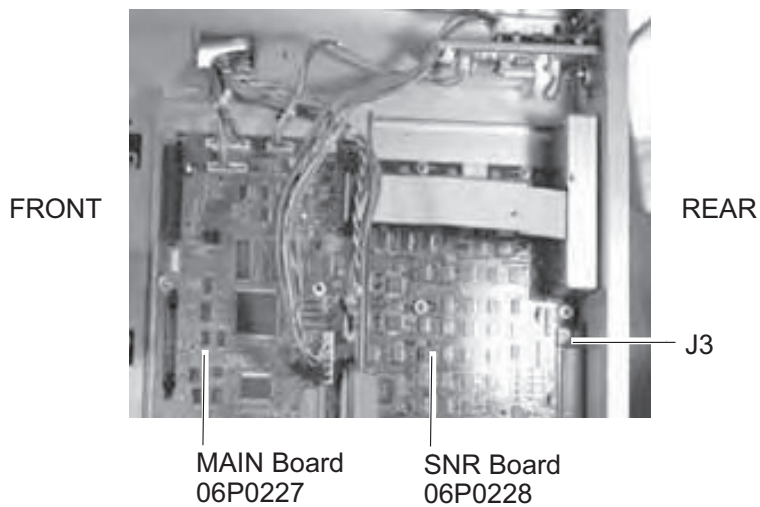


Figure 2-4 Display unit, cover removed, right side view

Menu setting

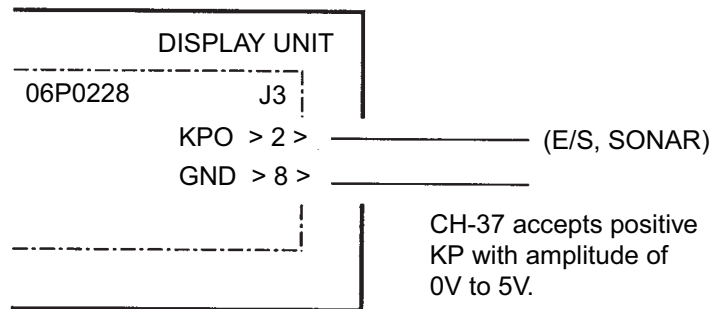
- 1) Press the MENU key
- 2) Select SONAR at the top of the menu.

MENU :	SONAR	BOTTOM/3D	DUAL	E/S
TX RATE (MAX 10) :	<input type="text" value="10"/>			
TX PULSE LENGTH :	<input type="text" value="LONG"/>	SHORT		
TX OUTPUT POWER :	A	B	<input type="text" value="C (MAX)"/>	
TX EXT SYNC :	<input type="text" value="OFF"/>	ON		
IR :	<input type="text" value="OFF"/>	ON		
STABILIZER :	OFF	<input type="text" value="ON"/>		
COLOR :	<input type="text" value="16"/>	8		
RES. COLOR :	<input type="text" value="LOG"/>	LINEAR	SQUARE	
EXIT :	PRESS MENU KEY			

Figure 2-5 SONAR menu

- 3) Set TX EXT SYNC to ON.
- 4) Press the MENU key.

Note: Outputting KP of CH-37 to other sonar, echo sounder



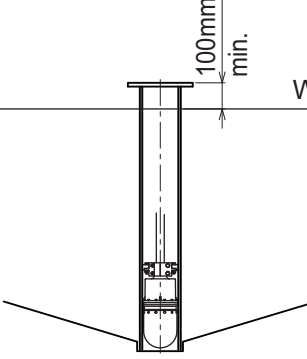
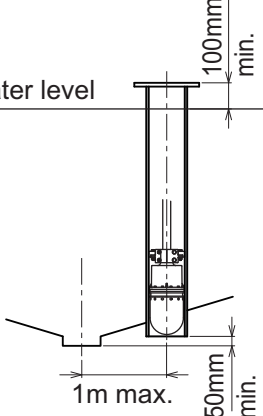
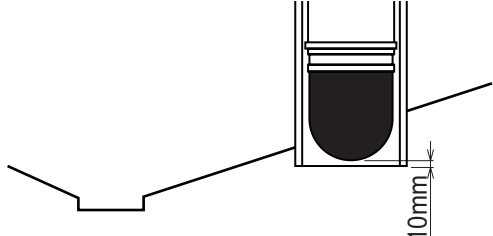
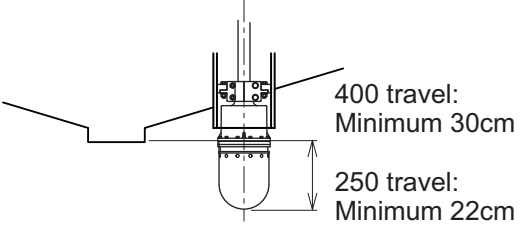
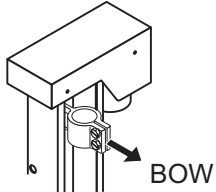
Outputting KP of CH-37 to other sonar, echo sounder

2. WIRING

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3. ADJUSTMENTS

3.1 General Checks

Check Item	Check point, Rating
Retraction tank level	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>On-keel Installation</p>  <p>100mm min.</p> </div> <div style="text-align: center;"> <p>Off-keel Installation</p>  <p>100mm min.</p> <p>Water level</p> <p>1m max.</p> <p>50mm min.</p> </div> </div> <p>Note: Do not cut the keel.</p>
Clearance between transducer and bottom of retraction tank when transducer is completely retracted by hand crank.	 <p>10mm</p>
Transducer travel (lowered by hand clank) Note: When checking, a clearance of approximately 1 meter is required under the bottom of the transducer.	 <p>400 travel: Minimum 30cm</p> <p>250 travel: Minimum 22cm</p>
Transducer heading	 <p>BOW</p> <p>Bow mark on the shaft sleeve should face ship's bow.</p>

(Continued on next page)

Table 3-1 General checks (con't)

Check Item	Check point, Rating
Wiring check	<ul style="list-style-type: none"> • All cables are correctly connected. • All lead wires are tightly fixed with contact pins or crimp-on lugs. • All screws are firmly fastened. • Cables are firmly secured. • Cable shields are property grounded.
Rejecting source of noise and interference	<ul style="list-style-type: none"> • Noise generating machinery (motor, radiotelephone, TV set, etc.) are not placed nearby. • Magnetic devices are not placed in the vicinity of display unit.
Ground	Each unit is grounded with a copper strap.
Ship's mains voltage	Ship's mains voltage is stable 24 or 32 VDC.
Watertightness	Water should not leak from the main body flange or along the main shaft.
Heading alignment	A target is displayed on the correct bearing.

3.2 Adjustment of Transceiver Unit

Selecting audio frequency

Select audio frequency of 1000 Hz or 900 Hz by jumper connector JP2 on PCB 06P0192 in the transceiver unit. The default setting is 1000 Hz. Refer to Figure3-1 for the location of JP2.

Signal offset adjustment

When noise appears on the screen, adjust R61 (offset) on PCB 06P0192. Turning R61 clockwise slices off low level signals in a similar way to the CLUTTER control on the display unit. (While the CLUTTER control on the display unit eliminates low level signals without changing signal level of strong signals, R61 shifts signal level of all signals.) When the offset adjustment is necessary, set R61 fully counterclockwise. Refer to Figure 3-1 for the location of R61.

Horizontal beamwidth

When the user wishes echoes to be displayed in high resolution, turn R40 on PCB 06P0192 clockwise to sharpen horizontal beamwidth. Do not turn it excessively clockwise, or an echo which should be displayed as a single solid mass may become hollow or split into smaller, fewer masses. Normally, set R40 at the mid-point of its travel.

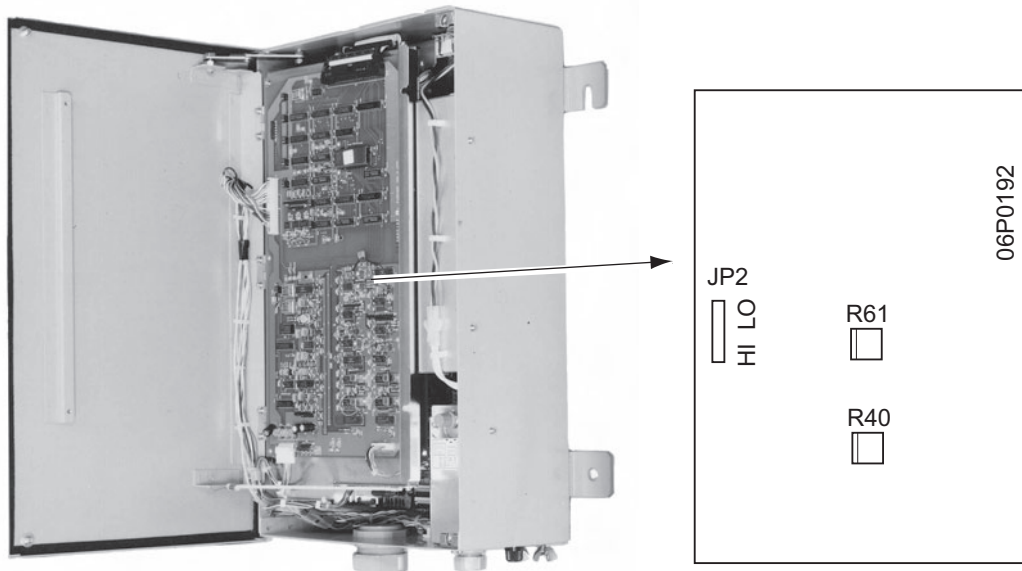


Photo No. 2058

3.3 Heading Alignment

1. Locate a target (buoy, etc.) in the bow direction and display it on the screen at close range. The heading alignment is correct when the target is displayed at 12 o'clock on the screen.

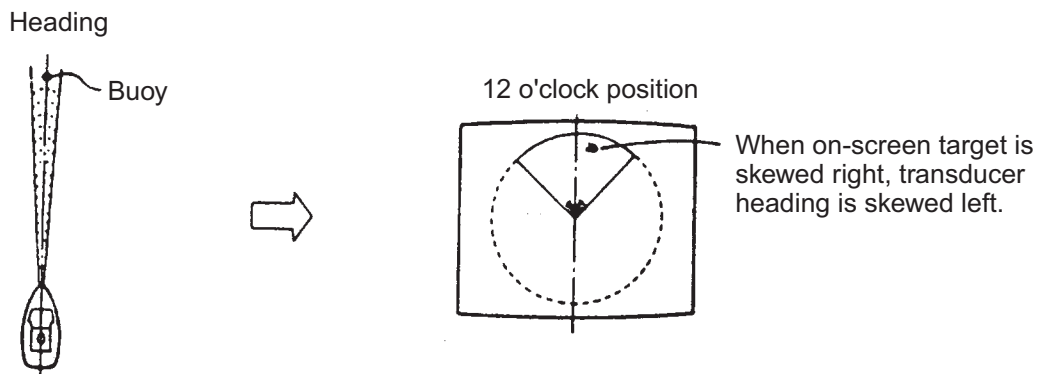
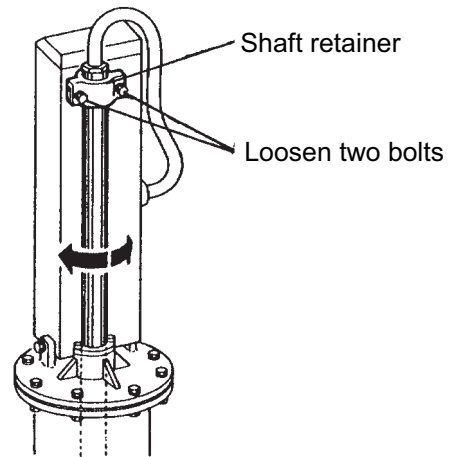


Figure 3-2 Checking heading alignment

3. ADJUSTMENTS

2. When the heading alignment is incorrect, loosen four bolts on the shaft retainer and then rotate the main shaft to align heading.
3. Tighten bolts.



3.4 Adjustment of Motion Sensor, Clinometer

When the ship has a semi-permanent inclination, offset it as follows. Inclination of up to 10° can be corrected.

1. Turn on the power while pressing the **MENU** key. Release the **MENU** key when you hear a beep.
2. Select DISPLAY TEST.

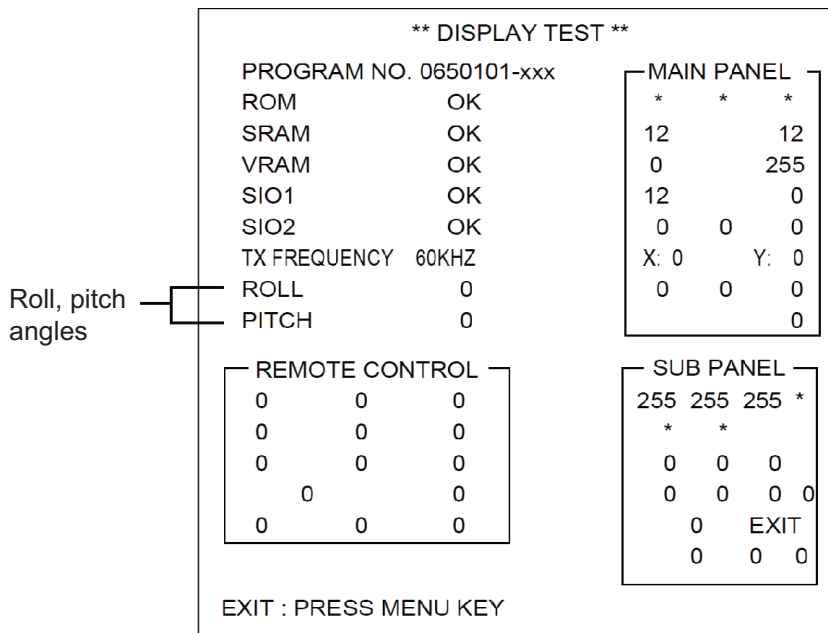
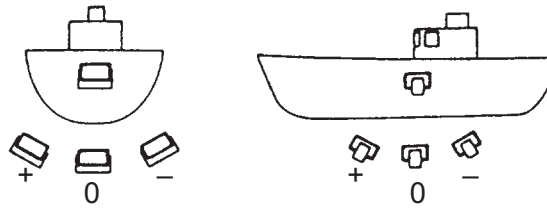


Figure 3-4 Display test results

3. Read ROLL/PITCH angles from the display.

4. By using a clinometer or other means, measure ship's semi-permanent inclination angle. Take the polarity of the angle as follows:



ROLL: Starboard up: +, Starboard down: -
 PITCH: Stern up: +, Stern down: -

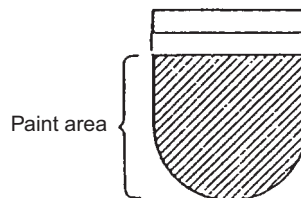
Figure 3-5 Measuring ship's semi-permanent inclination angle

5. Adjust the potentiometers R35 (ROLL) and R36 (PITCH) on the MAIN Board (06P0227) in the display unit so angle readouts on the screen agree with the angles measured at step 4.

3.5 Soundome Painting

When the soundome is painted to keep marine life off the transducer, observe the following precautions:

- Use only anti-fouling paint type SEATENDAR 20 (Manufacturer: Chugoku Marine Paint Co., Ltd., Japan).
- Paint only the plastic portion of the dome. Painting the metal parts causes corrosion.



3.6 LED Status

Display unit

Settings

Range: 400 m Tx output power: C (max) Tilt: 0Tx Rate: 10°

3. ADJUSTMENTS

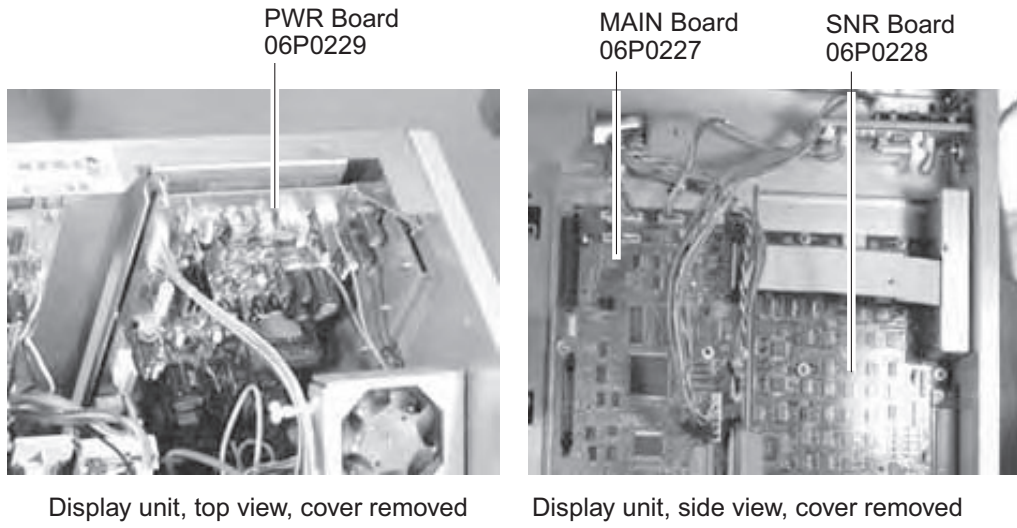


Figure 3-6 Location of printed circuit boards in the display unit

Table 3-2 LEDs in the display unit

Off: ● Flickering: ◎ Lighting: ○

PCB	LED			Remarks
	No.	Signal	Status	
MAIN 06P0227	CR2	+5V	○	
	CR4	+12V	○	
	CR5	-12V	○	

Transceiver unit

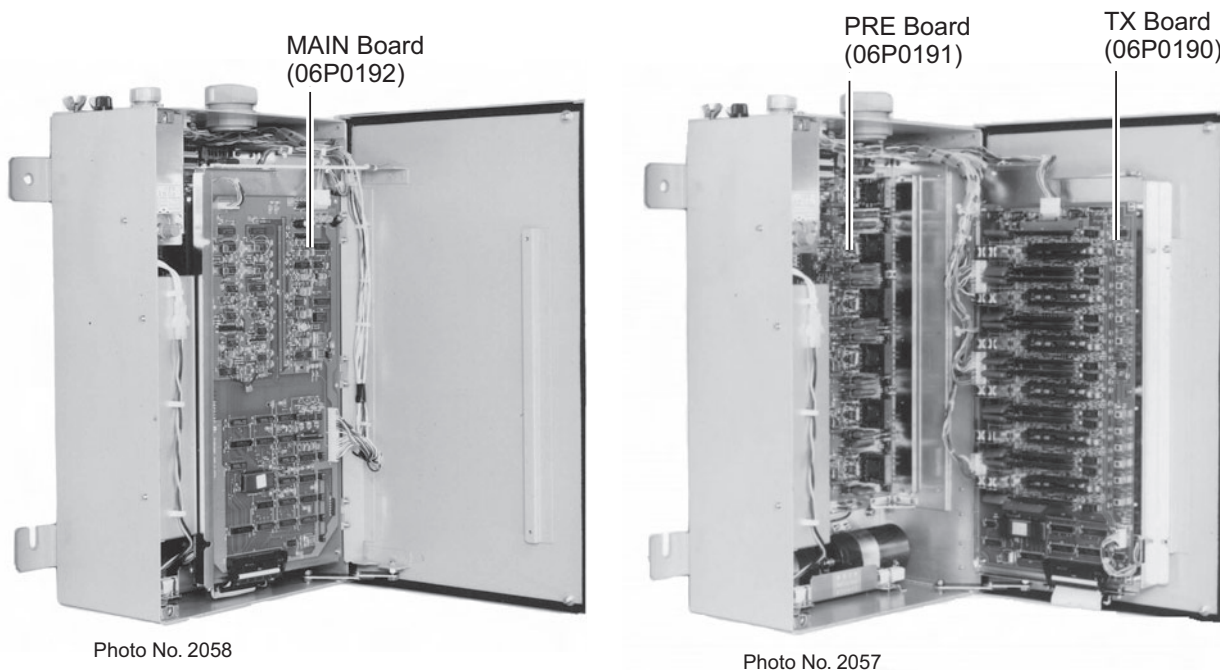


Figure 3-7 Transceiver unit

Table 3-3 LEDs in the transceiver unit

Off: ● Flickering: ◎ Lighting: ○

PCB	LED			Remarks
	No.	Signal	Status	
TX Board 06P0190	CR11	+5V	○	
	CR12	+12V	○	
	CR13	+130V	○	
	CR39	TX1	◎	Flickers during transmission.
	CR40	TX2	◎	" " "
	CR41	TX11	◎	" " "
	CR42	TX2	◎	" " "
	CR43	TX3	◎	" " "
	CR44	TX10	◎	" " "
	CR45	TX9	◎	" " "
	CR46	TX4	◎	" " "
	CR47	TX5	◎	" " "
	CR48	TX8	◎	" " "
	CR49	TX7	◎	" " "
	CR50	TX6	◎	" " "

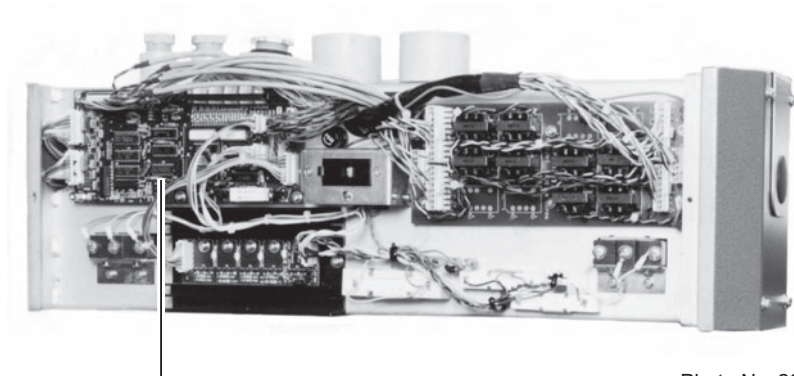
3. ADJUSTMENTS

Table 3-3 LEDs in the transceiver unit (con't)

Off: ● Flickering: ◎ Lighting: ○

PCB	LED			Remarks
	No.	Signal	Status	
PRE Board 06P0191	CR1	+5V	○	
	CR2	+12V	○	
	CR3	-12V	○	
MAIN Board 06P0192	CR1	+5V	○	
	CR2	+12V	○	
	CR3	-12V	○	
	CR4	AUD	◎	Flickers by audio signal.
	CR16	FS	○	FS signal
	CR17	TVG	◎	Digital TVG signal
	CR18	LCLK	○	TVG signal latch clock
PWR Board 06P0172	CR9	-12V	○	
	CR10	+12V	○	
	CR11	+5V	○	
	CR12	+130V	○	

Hull unit



DRIVE Board
(06P0193)

Photo No. 2056

Figure 3-8 Hull unit

Table 3-4 LEDs in the hull unit

Off: ● Flickering: ◎ Lighting: ○

PCB	LED			Remarks
	No.	Signal	Status	
DRIVE Board 06P0193	CR12	TR0°	◎	Lights momentarily when transducer is trained in 0° direction.
	CR13	TR180°	◎	Lights momentarily when transducer is trained in 180° direction.
	CR14	TI +10°	●	Lights momentarily when transducer is tilted to +10° or 90°.
	CR15	TI 90°	●	Lights momentarily when transducer is tilted to 90°.
	CR16	+13V	○	
	CR18	TR CLK	○	Lights when transducer is being trained.
	CR19	TI CLK	●	Lights while TILT level is pressed; goes off when TILT lever is released.
	CR20	+13V	○	

3. ADJUSTMENTS

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4. CHANGING SPECIFICATIONS

4.1 System Menu

1. Turn on the power while pressing the MENU key. Release the key when you hear a beep.
2. Select SYSTEM SETTING.

** SYSTEM SETTING **			
3D DISPLAY	:	<input type="checkbox"/> OFF	ON
SHIP'S POSITION	:	<input type="checkbox"/> OFF	L/L LOP
CURRENT DATA	:	<input type="checkbox"/> OFF	ON
DEPTH DATA	:	<input type="checkbox"/> OFF	ON
HEADING INDICATION	:	<input type="checkbox"/> OFF	TRUE AZ
NORTH MARK	:	<input type="checkbox"/> OFF	ON
TRACK	:	<input type="checkbox"/> 10R	20R
HDG/SPD DATA	:	<input type="checkbox"/> NAV	CI
NAV DATA	:	<input type="checkbox"/> GPS	LORAN C LORAN A
		<input type="checkbox"/> DR	DECCA OTHERS
DATA FORMAT FOR NAV2	:	<input type="checkbox"/> NMEA	CIF
CIF BAUD RATE	:	1200	2400 <input type="checkbox"/> 4800
TVG CORRECTION	:	<input type="checkbox"/> OFF	1/2 1
UNIT	:	<input type="checkbox"/> m	ft fa HIRO
V-MODE MANUAL TRAIN	:	<input type="checkbox"/> HALF	FULL
DEGAUSSING INTERVAL	:	<input type="checkbox"/> 30	SEC
FACTORY SETTING	:	<input type="checkbox"/> NO	YES
EXIT : PRESS MENU KEY			

3. Select items and options with the arrow keys.
4. To return to normal operation, reset the power.

See the next page for system setting menu description.

4. CHANGING SPECIFICATIONS

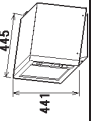

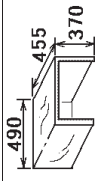




Table 4-1 System setting menu description

Item	Description
3D DISPALY	Turns 3D mode on/off.
SHIP'S POSITION	Turns position indication on/off and selects position format, latitude and longitude or Loram LOP.
CURRENT DATA	Turns current (tide) data on/off.
DEPTH DATA	Turns depth indication on/off.
HEADING DISPLAY	Turns heading indication on/off and selects its format; true bearing or azimuth (16 azimuth bearing).
NORTH MARK	Turns north maker on/off.
TRACK	Selects length of courseline plotting; 10R (ten times the range in use) or 20R (twenty times the range in use).
HDG/SPD DATA	Selects source of data to be used to plot courseline; NAV (Navigator), CI (Current Indicator).
NAV DATA	Selects source of position data; GPS, LORAN C LORAN A, DR, DECCA, OTHERS.
DATA FORMAT FOR NAV2	Selects data format for nav data; CIF (FURUNO) or NMEA.
CIF BAND RATE	Select band rate of CIF data; 1200, 2400, 4800 bps.
TVG CORRECTION	Change TVG curve to compensate for absorption attenuation of ultrasonic wave in water. OFF, Standard TVG curve, 1/2, 1/2 of theoretical absorption value added to TVG curse, 1 Full theoretical absorption value added to TVG curve.
UNIT	Select unit of depth mesurement. m, meters; ft feet; fa fathoms, HIRO.
V-MODE MANUAL TRAIN	Selects manual training sector width for the vertical fan mode. Half, half circle, Full , full circle.
DEGAUSSING INTERVAL	Enter interval at which to have the screen degaussed. OFF dehausses the screen at the maximum interval.
FACTORY SETTING	Yes restores default system menu settings.

PACKING LIST

06AR-X-9851 -2 1/1
A-1

CH-370

NAME	UNIT	OUTLINE	DESCRIPTION/CODE No.	QTY
ユニット				
指示器 DISPLAY UNIT			CH-370-J/E 000-068-708-00 ***	1
予備品				
予備品			SP06-01001	1
予備品			006-563-170-00	
付属品				
ビニルカバー VINYL COVER			10-026-0601-4 ROHS 10-026-0601-4 000-800-199-14 000-800-199-04	1
フード HOOD ASSY.			FP02-02610 002-007-280-00	1
工事材料				
工事材料			CP06-01102	1
工事材料			006-563-250-00	
図書				
取扱説明書 OPERATOR'S MANUAL			011*-13030-* 000-808-210-1*	1
整備要領書 INSTALLATION MANUAL			111*-13030-* 000-808-212-1*	1

コード番号末尾の[**]は、選択品の代表コードを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

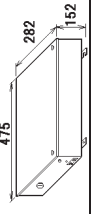


型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

C1303-Z01-C

PACKING LIST

06AR-X-9852 -0 1/1
A-2

CH-341-60/81/113/162

NAME	UNIT	OUTLINE	DESCRIPTION/CODE	QTY
ユニット				
送受信装置 TRANSCIVER UNIT			CH-341-60/81/113/162 000-068-717-00 ***	1
予備品				
予備品			SP06-01002	1
予備品			006-563-260-00	
工事材料				
工事材料			CP06-01103	1
工事材料			006-563-300-00	

コード番号末尾の[**]は、選択品の代表コードを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

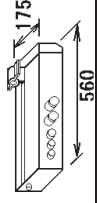


型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

C1303-Z02-A

PACKING LIST

CH-3421-37*

06AR-X-9853 -0 1/1
A-3

NAME	OUTLINE	DESCRIPTION/CODE	Q'TY
ユニット			
上下動部 RAISE/LOWER DRIVE UNIT		CH-3421-37* 006-565-640-00**	1
予備品			
予備品 SPARE PARTS		SP06-01003 006-563-320-00	1
工事材料			
工事材料 INSTALLATION MATERIALS		CP06-01104 006-563-340-00	1

コード番号末尾の「*」は、選択品の代表コードを表します。
CODE NUMBER ENDING WITH "*" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

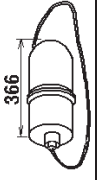
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

C1303-Z03-A

PACKING LIST

CH-3422-113*/115*

06AR-X-9854 -0 1/1
A-4

NAME	OUTLINE	DESCRIPTION/CODE	Q'TY
ユニット			
旋回俯仰部 COMPLETE SOUNDOME ASSEMBLY		CH-3422-113*/115* 006-547-150-00**	1

コード番号末尾の「*」は、選択品の代表コードを表します。
CODE NUMBER ENDING WITH "*" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

C1303-Z04-A

PACKING LIST
CH-3424-11-60/CH-3424-22-60

06AR-X-9855 -2 1/1

A-5

NAME	UNIT	OUTLINE	DESCRIPTION/CODE No.	QTY
ユニット フラッグ				
MAIN BODY FLANGE ASSEMBLY			CH-3423 006-547-210-00	1
現地組立キット			CH-3424-11/22 006-546-130-00 **	1
HULL UNIT ASSEMBLY PARTS				
スーパ-ソナ-オイル			4リットル缶 001-247-260-00	1
SUPER SONAR OIL				

ユニット番号末尾の「**」は、選択品の代表ユニットを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

型式/ユニット番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

C1303-Z05-C

PACKING LIST
CH-3424-11-81/CH-3424-22-81

06AR-X-9856 -2 1/1

A-6

NAME	UNIT	OUTLINE	DESCRIPTION/CODE	QTY
ユニット フラッグ				
MAIN BODY FLANGE ASSEMBLY			CH-3423 006-547-210-00	1
現地組立キット			CH-3424-11/22 006-546-130-00 **	1
HULL UNIT ASSEMBLY PARTS				
ソナ-オイル			4リットル缶 000-824-033-10	1
SONAR OIL				

ユニット番号末尾の「**」は、選択品の代表ユニットを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

型式/ユニット番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

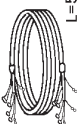
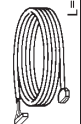
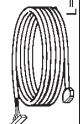
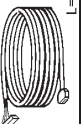
C1303-Z06-C

COLOR SECTOR SCANNING SOMAR

CH-37, CH-37BB

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	ケーブル(組品) CABLE ASSEMBLY	 L=5M	06S4061-O *5M* CODE NO. 0001126-189-10	1	
2	ケーブル(組品) CABLE ASSEMBLY	 L=15M	81-545-0089-001*15M* CODE NO. 0011109-990-10	1	
3	ケーブル(組品) CABLE ASSEMBLY	 L=30M	81-545-0089-002 CODE NO. 0011110-000-10	1	
4	ケーブル(組品) CABLE ASSEMBLY	 L=50M	81-545-0089-003*50M* CODE NO. 0011110-010-10	1	

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



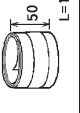
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME. (略図の寸法は、参考値です。)

FURUNO ELECTRIC CO., LTD.

C1303-M02-C

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	圧着端子 OR IMP-ON LUG		FVZ-4 BLU CODE NO. 000157-247-10	4	
2	コネクタ(N/C) CONNECTOR(N/C)		NUC-203-PF #R0HS* CODE NO. 000160-185-11	1	
3	銅板 COPPER STRAP		MEA-1004-O R0HS CODE NO. 500310-040-10	2	

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

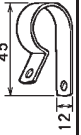
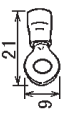

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME. (略図の寸法は、参考値です。)

FURUNO ELECTRIC CO., LTD.

C1303-M04-D

CODE NO.	006-563-300-00	06AR-X-9406 -1
TYPE	CP06-01103	1/1

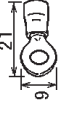
工事材料表

INSTALLATION MATERIALS		略 図 OUTLINE	型名 / 規格 DESCRIPTIONS	数 量 Q'TY	用途 / 備考 REMARKS
番 号 NO.	名 称 NAME				
1	メタルケーブルクリップ METAL CABLE CLAMP		AL-12 AL-12 CODE NO. 000-165-801-10 000-137-934-00	1	
2	圧着端子 CRIMP-ON LUG		FVZ-4 FVZ-4 71 CODE NO. 000-157-247-10 000-538-116-00	2	
3	7-ス板 COPPER STRAP		WEA-1004-0 R0HS WEA-1004-0 CODE NO. 500-310-040-10 500-310-040-00	1	

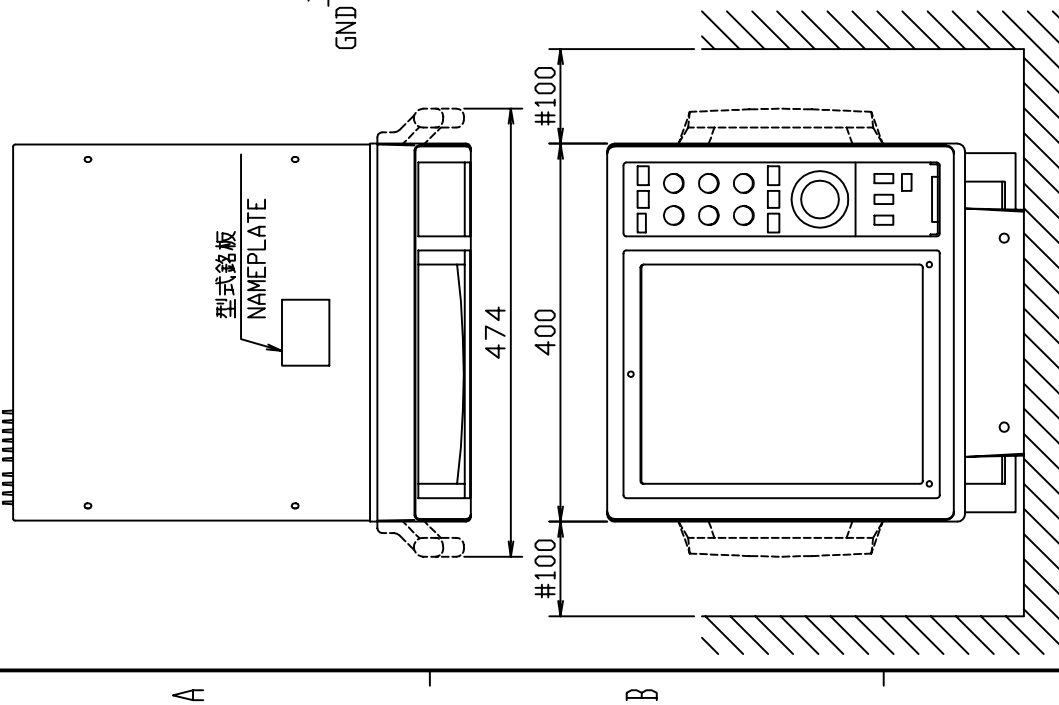
型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
 TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
 (断面の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

CODE NO.	006-563-340-00	06AR-X-9403 -1
TYPE	CP06-01104	1/1

工事材料表

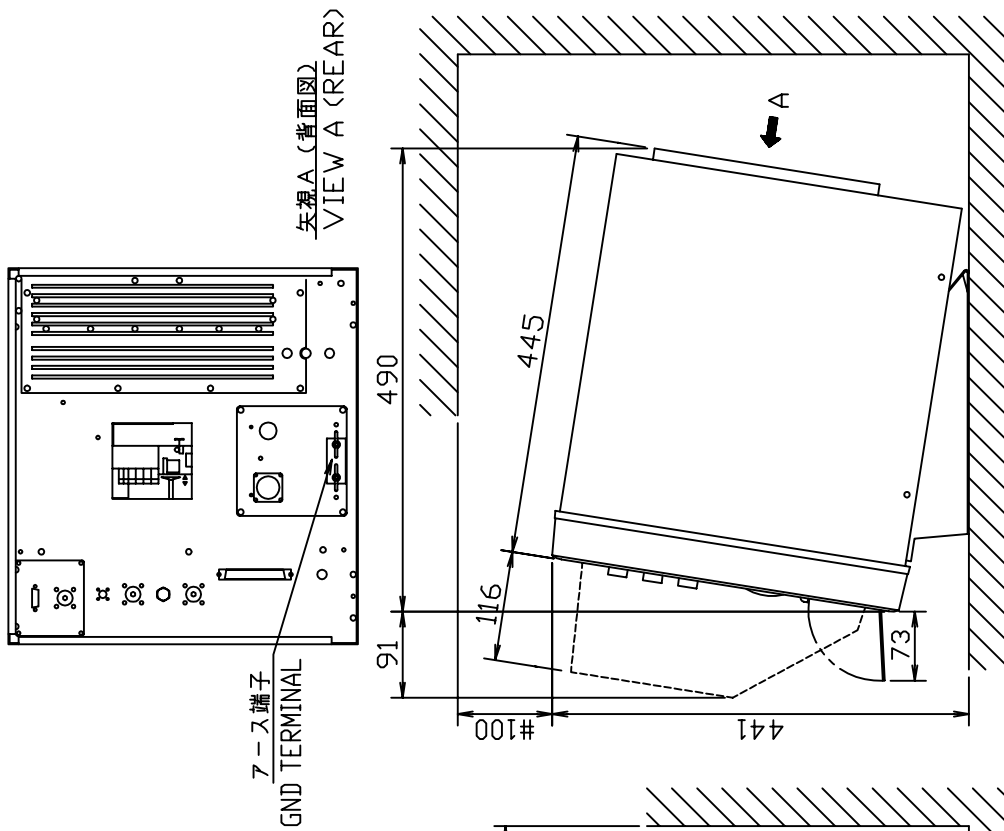
INSTALLATION MATERIALS		略 図 OUTLINE	型名 / 規格 DESCRIPTIONS	数 量 Q'TY	用途 / 備考 REMARKS
番 号 NO.	名 称 NAME				
1	圧着端子 CRIMP-ON LUG		FVZ-4 CODE NO. 000-157-247-10	6	

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
 TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
 (断面の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)



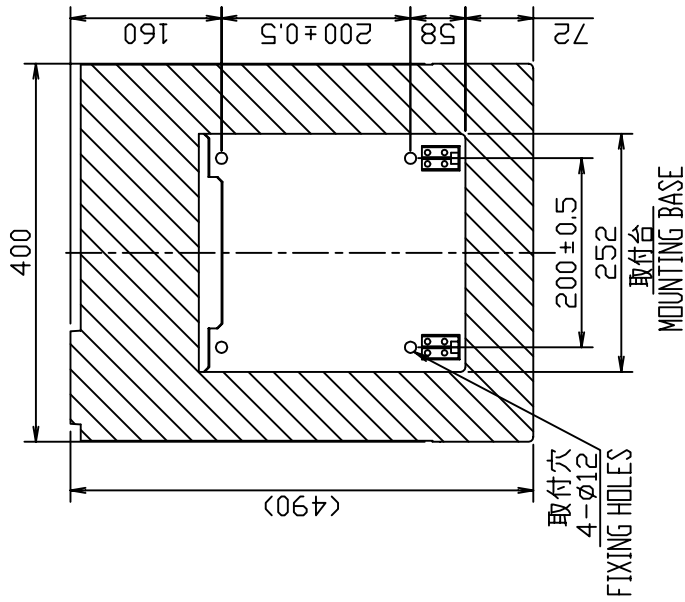
寸法範囲 (mm) DIMENSION	公差 (mm) TOLERANCE
$L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 3

表 1 TABLE 1



矢視A (背面図)
VIEW A (REAR)

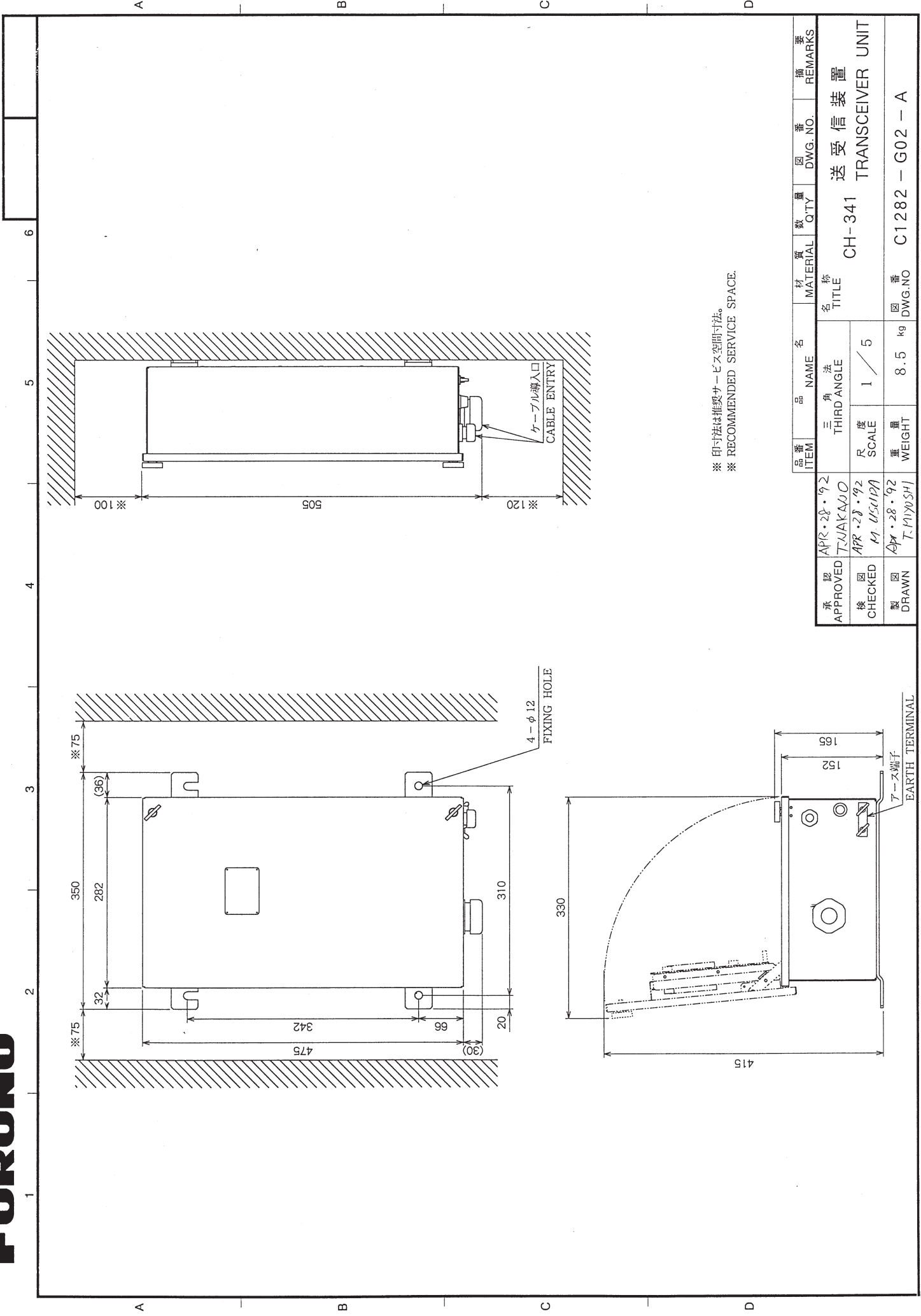
7-ス端子
GND TERMINAL



注記
1) 指定寸法公差は表 1 による。
2) #印寸法は最小サービスイ間寸法とする

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: RECOMMENDED SERVICE CLEARANCE.

DRAWN Jan. 15 '03 T. YAMASAKI	TITLE CH-370
CHECKED Jan. 15 '03 Y. KIMURA	名称 指示器
APPROVED Jan. 15 '03 Y. Kimura	外寸図 CH-37
SCALE 1/8 MASS 30 kg	NAME DISPLAY UNIT
DWG.No. C1303-G01-B	OUTLINE DRAWING



※ 印寸法は推奨サービス空間寸法。
 ※ RECOMMENDED SERVICE SPACE.

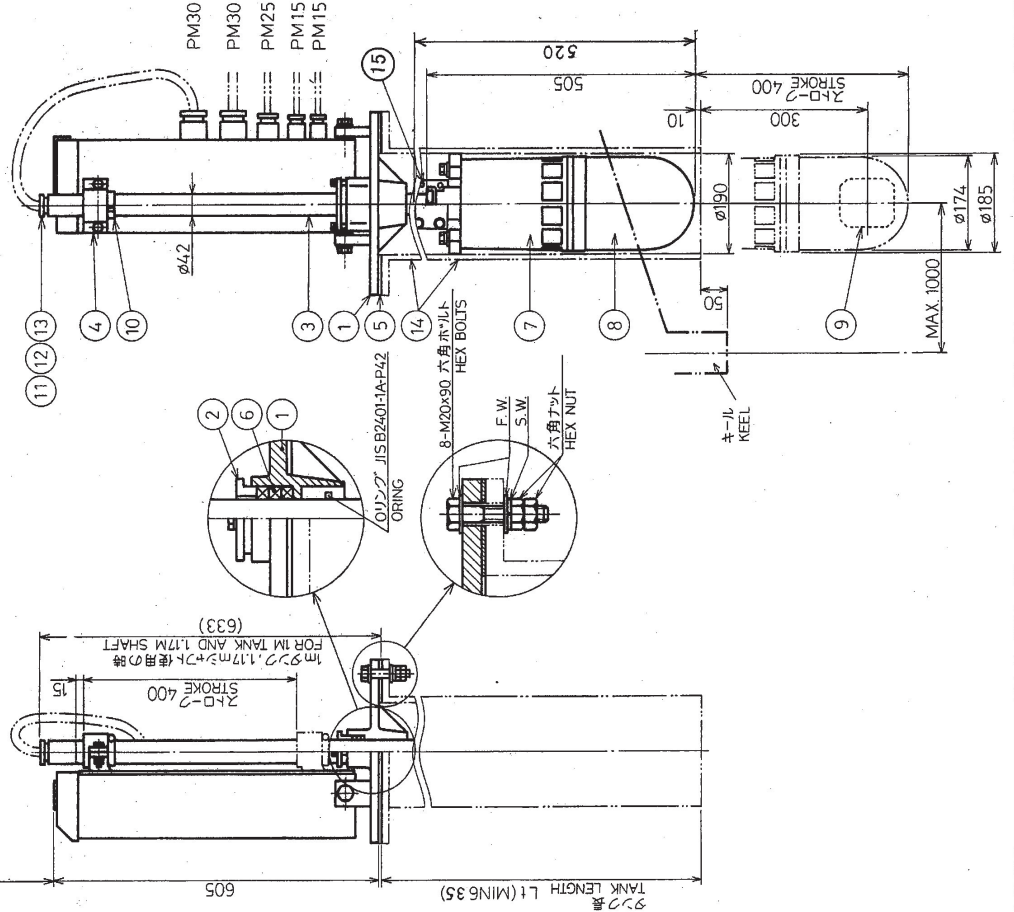
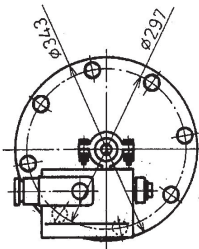
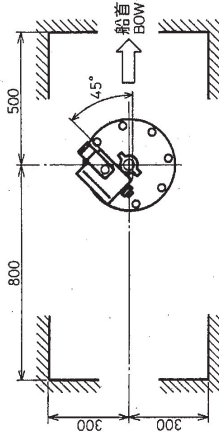
承認 換	品名	材料	数量	図番	換	備
APPROVED	NAME	MATERIAL	Q.TY	DWG.NO.	REMARKS	REMARKS
APR・28・92 T.NAKANO	品名 TITLE					
APR・28・92 M.USUDA	角法 THIRD ANGLE					
APR・28・92 T.MIYOSHI	R度 SCALE					
	重量 WEIGHT					
	重量 8.5 kg					
	重量 C1282 - G02 - A					
	重量 CH-341					
	重量 送受信装置					
	重量 TRANSCEIVER UNIT					

注 NOTES:

- 1) 表機位置は船首から1/3 (小型船では1/2) 程度でキールから1m以内とする。
- 2) 上下シャフトの長さ (Ls) は、次の式の値で切断すること。
(Lt: 格納タンクの長さ)
 $Ls = Lt + 110$ (mm)
- 3) 上下装置の船首方向は左図の矢印 (⇒) で示す。
- 4) ドーム内部保守点検のため、上下装置上部には図示のススペースを設けるか、障害となる天井等に300mm × 300mm程度程度の角穴を開ける。

- 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) THE MAIN SHAFT SHOULD BE CUT TO A LENGTH (Ls) GIVEN BY THE FOLLOWING EQUATION.
 $Ls = Lt + 110$ (mm) Lt: TANK LENGTH
- 3) ⇒ (ARROW) SHOWS FORE FOR HULL UNIT AND TANK.
- 4) IF THE OVERHEAD CLEARANCE SHOWN IN THE DRAWING IS NOT OBTAINED, MAKE A HOLE OF 300mm × 300mm ON THE CEILING FOR FACILITATING INSTALLATION AND FUTURE SOUNDOME SERVICE.

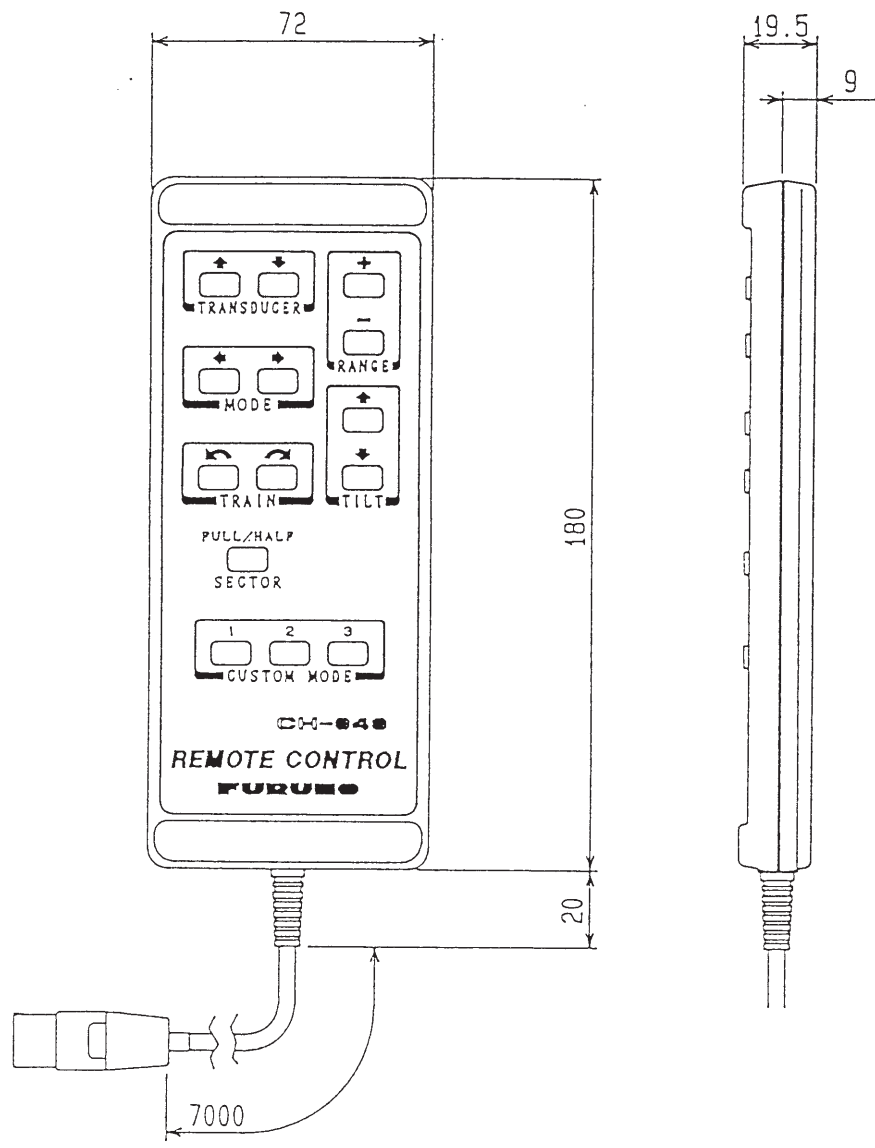
推奨保守点検用スペース (尺原 1/20)
RECOMMENDED SERVICE SPACE SCALE(1/20)



品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q.TY	図番 DWG. NO.	備考 REMARKS
15	シャフト保護金具 SHAFT RETAINER		1		
14	格納タンク RETRACTION TANK				
13	ガスケット GASKET		1		
12	座金 WASHER		2		
11	締付フランジ CABLE GLAND		1		
10	ジュビリークリップ FASTENING BAND		1		
9	送受波器 TRANSUDUCER		1		
8	ドーム (D) SOUNDOME (D)		1		
7	ドーム (U) SOUNDOME (U)		1		
6	グリスコットン GREASE COTTON		1		
5	フランジパッキン GASKET		1		
4	パイプクランプ PIPE CLAMP		1		
3	上シャフト MAIN SHAFT		1		
2	グリスコットン脚立 GREASE COTTON RETAINER		1		
1	ランジ MAIN BODY FLANGE		1		

DRAWN	T. YAMASAKI
CHECKED	
APPROVED	
SCALE	1/20
Dwg No.	C1282-G03-D
TYPE	CH-342
名称	上下装置
MODEL	CH-34/37
BLOCK No.	外寸図
NAME	HULL UNIT
OUTLINE DRAWING	

A
B
C
D

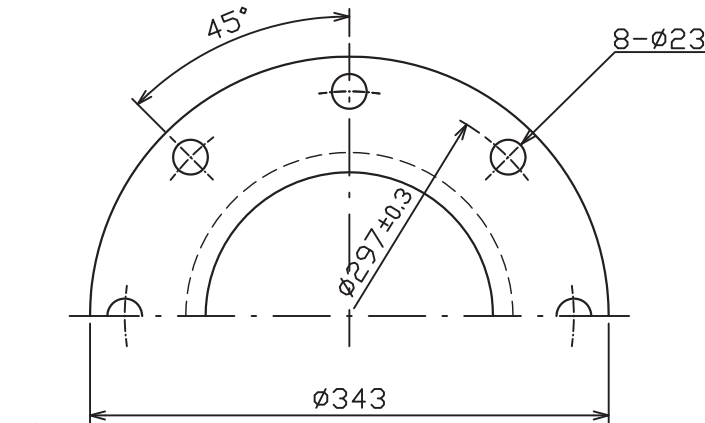


品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS
承認 APPROVED	三角法 THIRD ANGLE	名称 TITLE		CH-343	リモートコントロール REMOTE CONTROL
検図 CHECKED	尺度 SCALE	1 / 2			
製図 DRAWN	重量 WEIGHT	0.38 kg	図番 DWG.NO	C1282 - G04 - A	

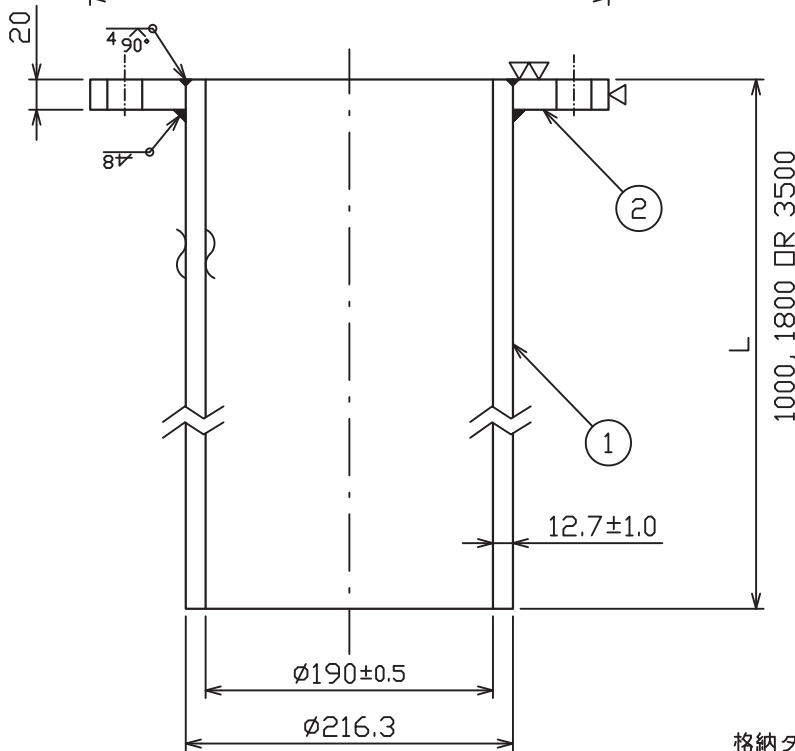
表1 TABLE 1

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3
500 < L ≤ 1000	±4
1000 < L ≤ 2000	±5
2000 < L ≤ 4000	±7

A



B



C

注記

- 1) 指定なき寸法公差は表1による。
- 2) フランジ面は塗装しないこと。
- 3) タンク側面はエピコンジクリッチプライマ(中国塗料製)を塗布すること。
- 4) タンク内面はビニル防汚塗料を二重に塗布すること。

格納タンクの長さ : Lt
 LENGTH OF RETRACTION TANK: Lt
 Lt = mm

NOTE

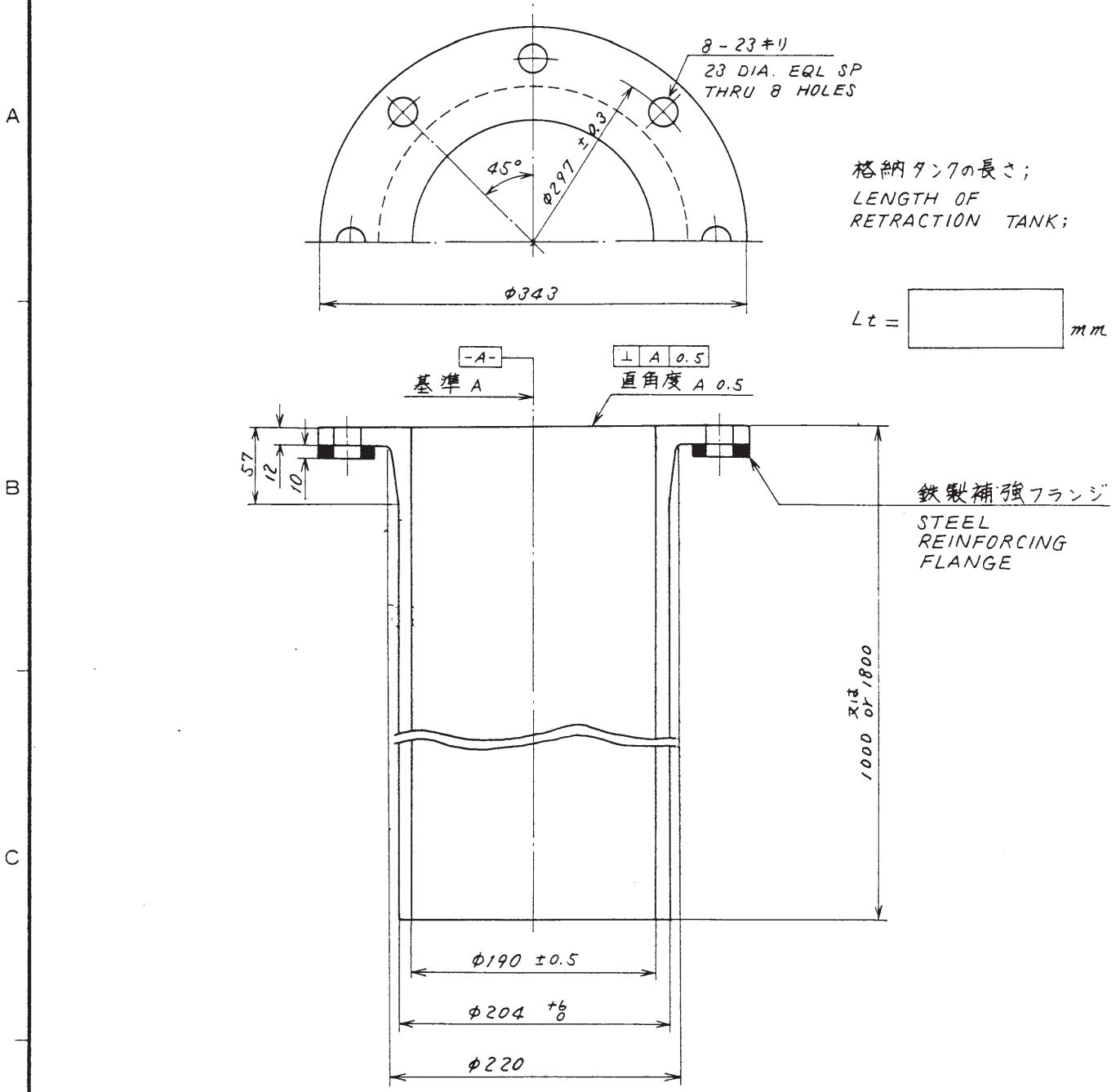
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. DO NOT PAINT ON SURFACE OF FLANGE.
3. APPLY ZINC RICH PRIMER ON OUTSIDE OF TANK.
4. APPLY VINYL ANTI-FOULING PAINT TWICE ON INSIDE OF TANK.

長さ L (mm) LENGTH (mm)	質量(kg±10%) MASS
1000	73
1800	123
3500	231

D

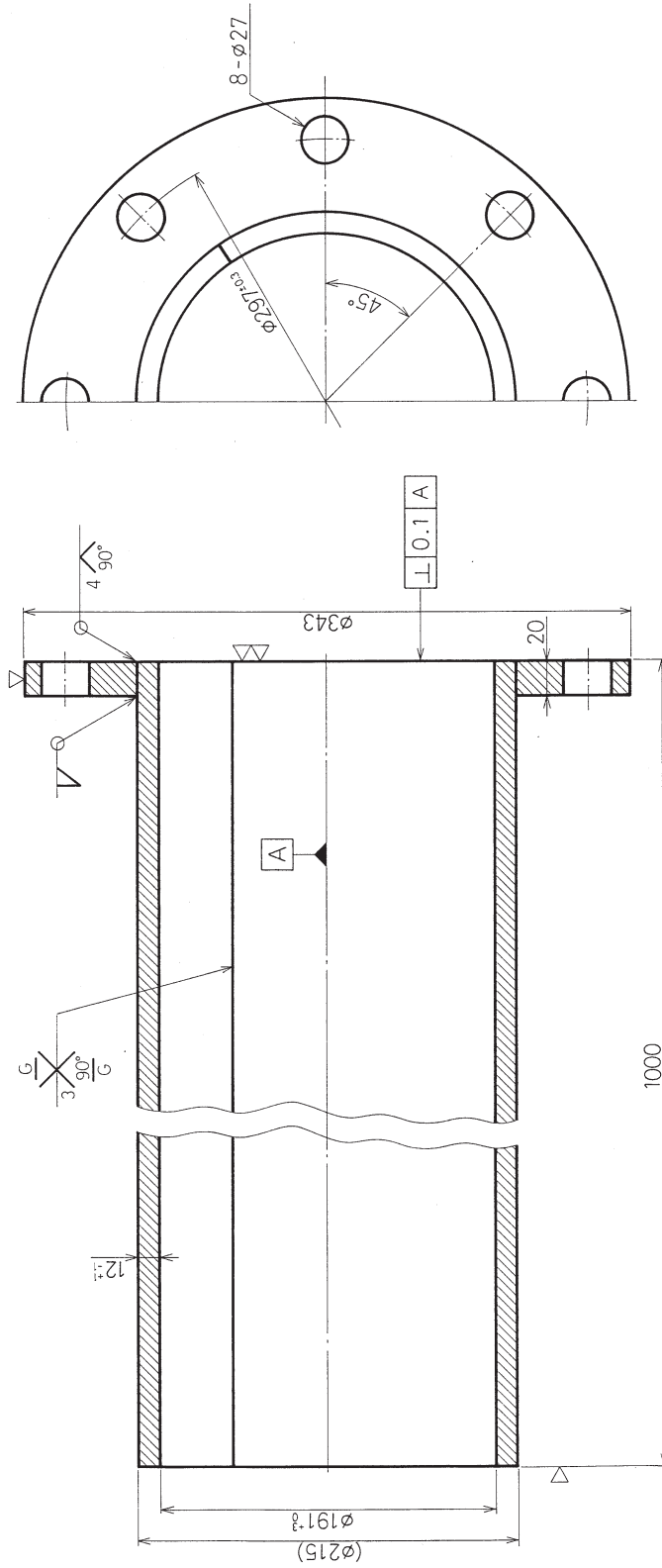
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. No.	摘要 REMARKS
2	フランジ FLANGE	SS41P	1	JIS G3101	ROLLED STEEL FOR GENERAL STRUCTURE
1	本体 BODY	STPG-38-E-C	1	200A, 8" SCHEDULE 80	

DRAWN 7/May/2013 T.YAMASAKI	TITLE 06-007-1570
CHECKED 7/May/2013 H.MAKI	名称 格納タンク(鋼製)
APPROVED 8/May/2013 H.MAKI	外寸図
SCALE 1/5 MASS 表2参照 SEE TABLE 2	NAME RETRACTION TANK (STEEL HULL)
DWG. No. C1229-006-H	REF. No. 06-007-1570-2
OUTLINE DRAWING	

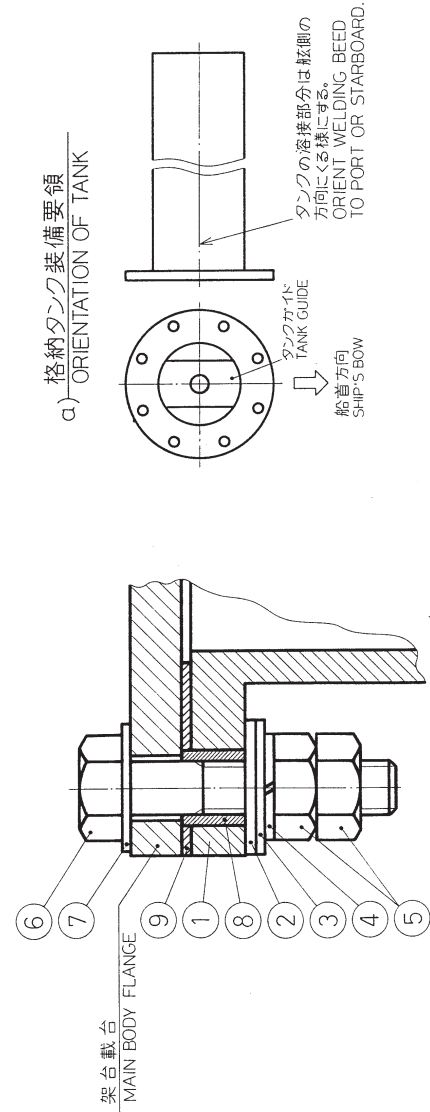


単位 UNIT: mm

承認 APPROVED	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS
		三角法 THIRD ANGLE PROJECTION				名称 TITLE FRP製格納タンク外觀 <input checked="" type="checkbox"/> FRP RETRACTION TANK OUTLINE DRAWING
検 <input checked="" type="checkbox"/> CHECKED	July 18 '78 <i>N. Meda</i>	尺度 SCALE	1/5			
製 <input checked="" type="checkbox"/> DRAWN	July 18 '78 <i>N. Meda</i>	重量 WEIGHT	1000mm: 20kg 1800mm: 27kg		図番 DWG. NO.	C1229-007-E



格納タンク装備要領
a) ORIENTATION OF TANK

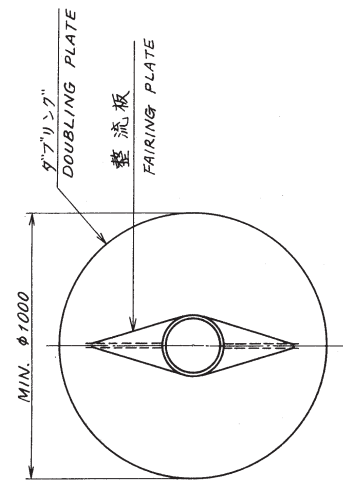
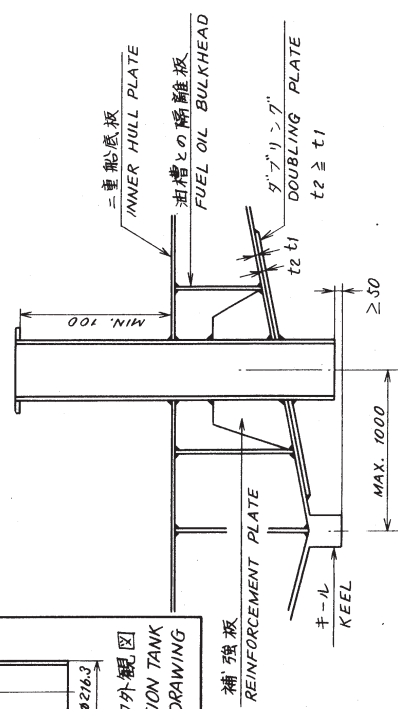
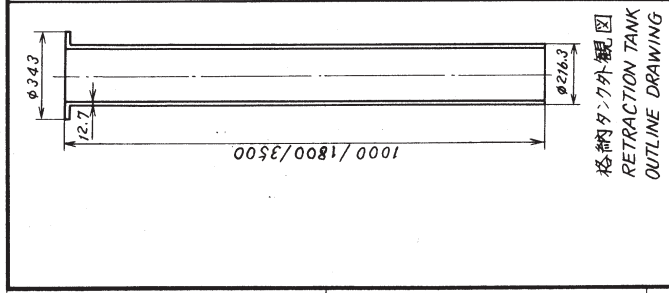


注) 架台, 格納タンクに他の電気機器のアースを取らないこと。
NOTE: DO NOT CONNECT GROUNDING WIRE OF OTHER EQUIPMENT TO RETRACTION TANK.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG.NO.	摘要 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 x 100	
5	六角ナット HEX. NUT	SUS304	8	M20	
4	スプリングワッシャー SPRING WASHER		8		
3	ワッシャー 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
検図 CHECKED	DEC. 27. '90 T. Miyoshi	R 1/3 SCALE	格納タンク(アルミ)外寸図 RETRACTION TANK (ALUMINUM)
製図 DRAWN	DEC. 27. '90 H. Usuda	重量 WEIGHT	図番 DWG.NO.
		3.5 kg	C1273-G09-A

CSH-5



- 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) フランジのボルト間隔のためのフランジ下面と隣接物 (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以上であること。
 5) タンクのフランジ面は標準走航時に水平であること。
 - 格納タンクの周辺の船底板に径1000程度のダブルリングを施すこと。
 - 格納タンクの突出部外に網除けを兼ねた整流板を設けること。
 - 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ヶ所を船底板に向けて補強板を添接すること。
- 注: 強度及び水密性に付いて、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。

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

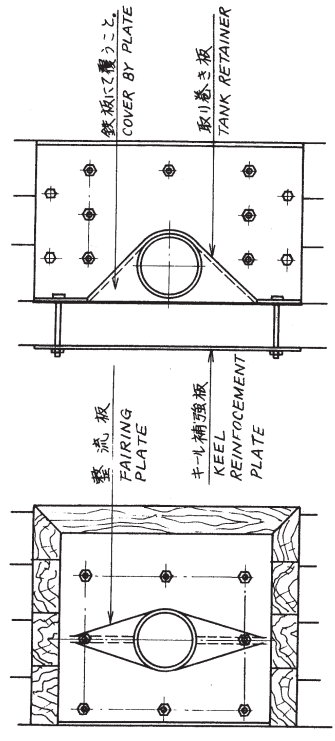
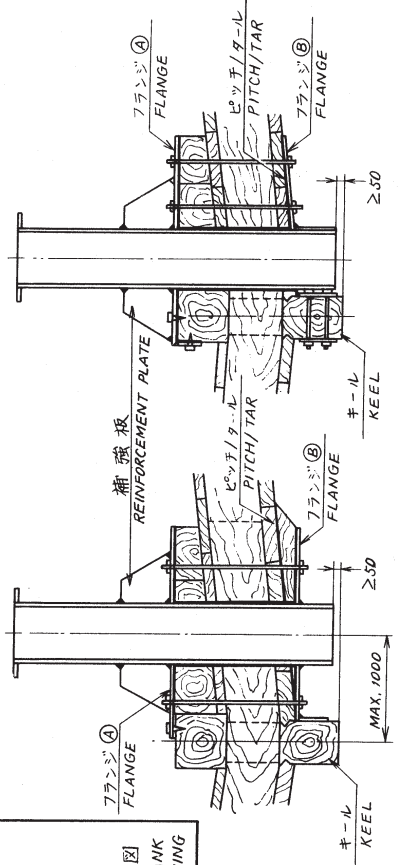
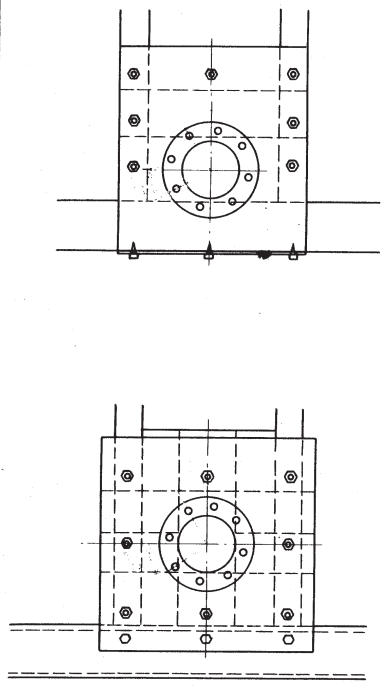
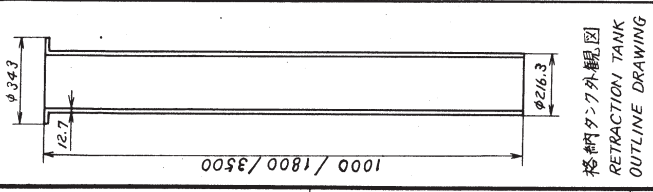
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	備考 REMARKS
承認 APPROVED	Nov. 9. '77				
検図 CHECKED	Nov. 8. '77				
製図 DRAWN	1977. 11. 7				
承認 APPROVED		品名 NAME		材質 MATERIAL	数量 Q'TY
検図 CHECKED		品名 NAME		材質 MATERIAL	数量 Q'TY
製図 DRAWN		品名 NAME		材質 MATERIAL	数量 Q'TY
承認 APPROVED		品名 NAME		材質 MATERIAL	数量 Q'TY
検図 CHECKED		品名 NAME		材質 MATERIAL	数量 Q'TY
製図 DRAWN		品名 NAME		材質 MATERIAL	数量 Q'TY
承認 APPROVED		品名 NAME		材質 MATERIAL	数量 Q'TY
検図 CHECKED		品名 NAME		材質 MATERIAL	数量 Q'TY
製図 DRAWN		品名 NAME		材質 MATERIAL	数量 Q'TY
承認 APPROVED		品名 NAME		材質 MATERIAL	数量 Q'TY
検図 CHECKED		品名 NAME		材質 MATERIAL	数量 Q'TY
製図 DRAWN		品名 NAME		材質 MATERIAL	数量 Q'TY

CSH5
CSH5 MARK-2
CH-12/14/16/24/26

単位 UNIT: mm

図番 DWG. NO. C1243-017-F

FURUNO ELECTRIC CO., LTD.



7. 格納タンクの装備は次の条件を満たすこと。
 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) フランジの中心は船首の中心、フランジ下面と隔壁物 (二重船底等) の間に100mm以上のスペースがあること。
 4) タンクの底部はキールの下端より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. 格納タンクの装備は次の要領を参考にしておくこと。
 1) タンクの開口部は船首の中心、フランジ下面と隔壁物 (二重船底等) の間に100mm以上のスペースがあること。
 2) タンクの開口部は船首の中心、フランジ下面と隔壁物 (二重船底等) の間に100mm以上のスペースがあること。
 3) 必要箇所に水密の取付は、タンクの底部より50mm上になる様にフランジ (A) 及び (B) に密着し、タールを塗布すること。
 4) キール脇の場合には、取り巻き板をタンクに密着させ、キールに固定する。
 5) 格納タンクの突出部分に鋼板を密着させ、キールに固定する。
 6) 必要に応じてタンクの周囲に、4ヶ所、フランジ (A) に向けて補強板を密着させる。

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、骨子決定すること。

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-AST 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.

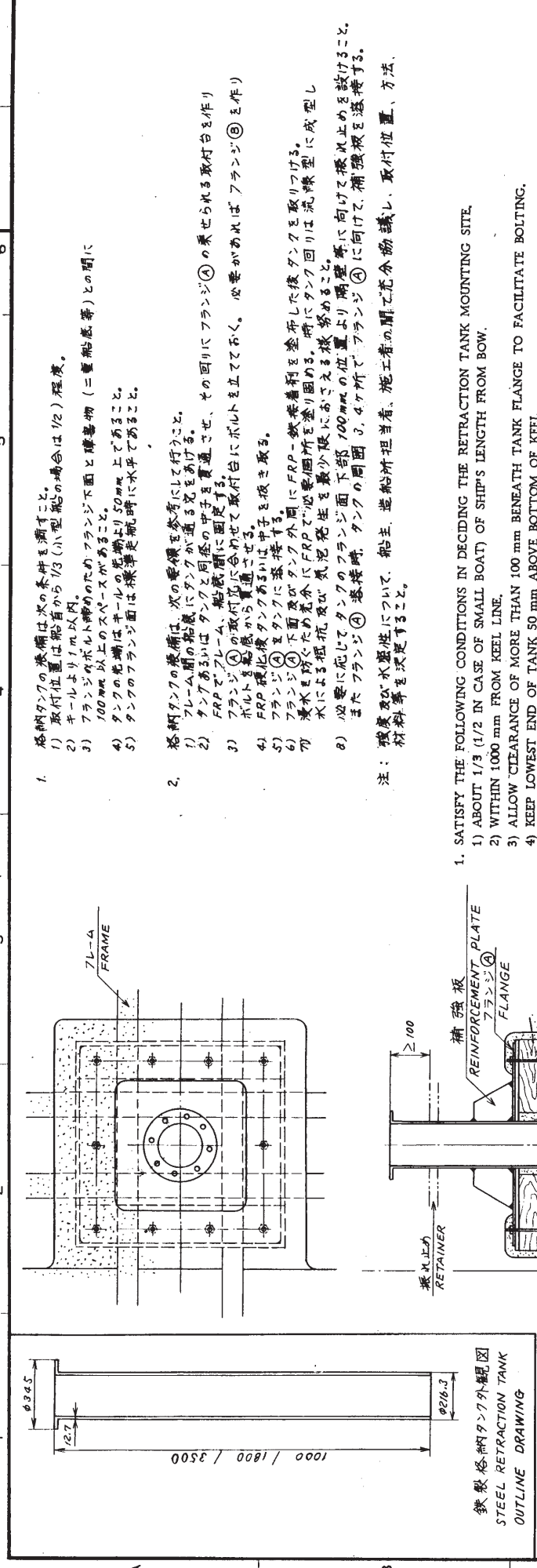
2. INSTALL THE RETRACTION TANK REFERRING TO THE PROCEDURE BELOW.
 1) REINFORCE THE HULL PLATE BETWEEN FRAMES WITH WOODEN BLOCKS OR SO. THE WOODEN BLOCKS SHOULD BE INSTALLED SO THAT THE FLANGE (A) IS LEVELED WHEN THE SHIP IS NORMALLY TRIMMED AS IN THE DRAWING.
 2) CUT OUT A HOLE FOR PASSING THE TANK ON THE HULL BOTTOM, WOODEN BLOCKS AND FLANGES (A) & (B).
 3) APPLY PITCH, TAR, ETC BETWEEN FLANGES (A) & (B) AND WOODEN BLOCKS OR HULL PLATE FOR SUFFICIENT WATERTIGHTNESS. THEN SETTLE THE FLANGES (A) AND (B) IN POSITION WITH BOLTS AND NUTS.
 4) WELD THE TANK TO THE FLANGES (A) AND (B). WHEN THE TANK IS INSTALLED BESIDE THE KEEL, WELD THE TANK RETAINER TO THE FLANGE (B) AND THE TANK. THEN FIX THE RETAINER TO THE KEEL WITH BOLTS AND NUTS.
 5) FAIRING PLATE (NET PROTECTOR) SHOULD BE INSTALLED AROUND THE PARTS OF THE TANK PROTRUDING FROM THE BOTTOM BY THE SHIPYARD.
 6) IF REQUIRED, 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.

CSH5 MARK-2
 CH-12/14/16/24/26

承認 APPROVED	検査 CHECKED	製図 DRAWN	品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG.NO.	摘要 REMARKS
NOV. 9. 77	NOV. 8. 77	1977. 11. 7		第三角法 THIRD ANGLE PROJECTION				格納タンク船底装備図 (本船) RETRACTION TANK INSTALLATION ON WOODEN HULL
				R SCALE				
				重量 WEIGHT				
				kg				図番 DWG. NO. C1243-018-F

単位 UNIT: mm



格納タンクの準備は次の条件を満すこと。
 1) 取付位置は船首から1/3 (小型船の場合は1/2) 程度。
 2) キールより1m以内。
 3) フランジのボルト締めのためのフランジ下面と構造物 (三重船底等) との間は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以上であること。
 5) タンクのフランジ面は標準走航時に水平であること。

格納タンクの整備は、次の要領を参考にすること。
 1) フレーム間の船底にタンクと同様の寸法を充てる。
 2) タンクがあるのは、タンクと同様の寸法を充てる。
 3) FRPでフレーム、船底間に固定する。
 4) フランジ(A)の取付面に合わせて取付台にボルトを立てておく。必要があればフランジ(B)を作り
 5) ボルトは船底から貫通させる。
 6) FRP補強板は、フランジ(A)とフランジ(B)の間にボルトを抜き取る。
 7) フランジ(A)の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付ける。
 8) 浸水を防ぐため充分にFRPで必要箇所を塗り固める。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。
 9) 必要に応じてタンクのフランジ下面下部100mmの位置より隔壁等に向けて横止めを設けること。
 またフランジ(A)接続時、タンクの間隙を、4ヶ所フランジ(B)に向けて、補強板を接続する。
 またフランジ(A)接続時、タンクの間隙を、施工者の間を充分協議し、取付位置、方法、材料等を決定すること。

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

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

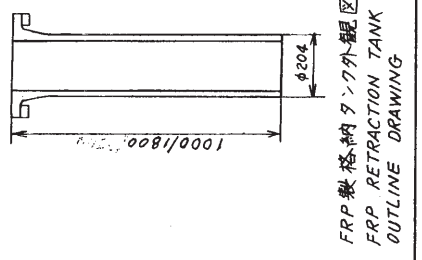
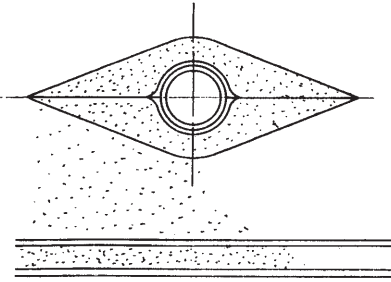
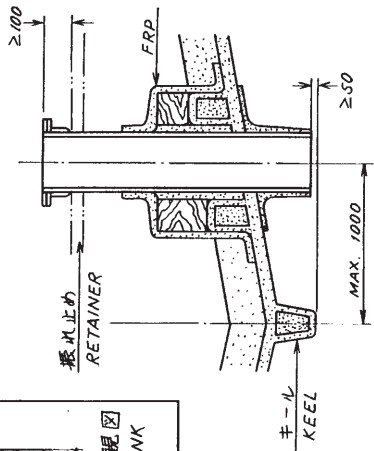
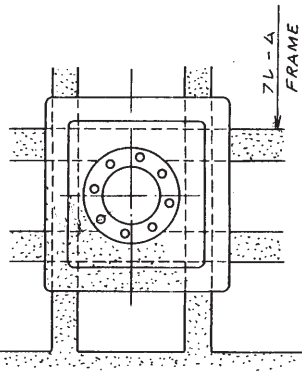
2. INSTALL THE RETRACTION TANK REFERRING TO THE PROCEDURE BELOW.
 1) CUT OUT A HOLE FOR PASSING THE TANK ON THE HULL PLATE.
 2) PASS THE TANK OR A CORE HAVING THE SAME DIAMETER AS THE TANK THRU THE HULL PLATE. MAKE A MOUNTING BED WITH WOODEN BLOCK AND FRP AROUND THE TANK OR THE CORE. THIS BED IS USED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

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

承認 APPROVED	NOV. 9. 1977	品名 NAME	鋼製格納タンク船底整備用 (FRP船)	材質 MATERIAL	数量 QTY	図番 DWG. NO.	摘要 REMARKS
検閲 CHECKED	NOV. 8. 1977	品名 NAME	鋼製格納タンク船底整備用 (FRP船)	材質 MATERIAL	数量 QTY	図番 DWG. NO.	摘要 REMARKS
製図 DRAWN	1977. 11. 7	品名 NAME	鋼製格納タンク船底整備用 (FRP船)	材質 MATERIAL	数量 QTY	図番 DWG. NO.	摘要 REMARKS
THIRD ANGLE PROJECTION		TITLE					
R 度 SCALE		STEEL RETRACTION TANK					
重量 WEIGHT		INSTALLATION ON FRP HULL					
製図人 DRAWN		図番 DWG. NO. C1243-019-F					

CSH-5
 CSH-5 MARK-2
 CH12/14/16/24/26

単位 UNIT: mm



FRP製格納タンク外觀図
FRP RETRACTION TANK
OUTLINE DRAWING

- 格納タンクの整備は次の条件を満たすこと。
 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は、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定航時に水平であること。
- 浸水を防ぐため充分にFRPで必要箇所を塗り固める。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。
- 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。

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

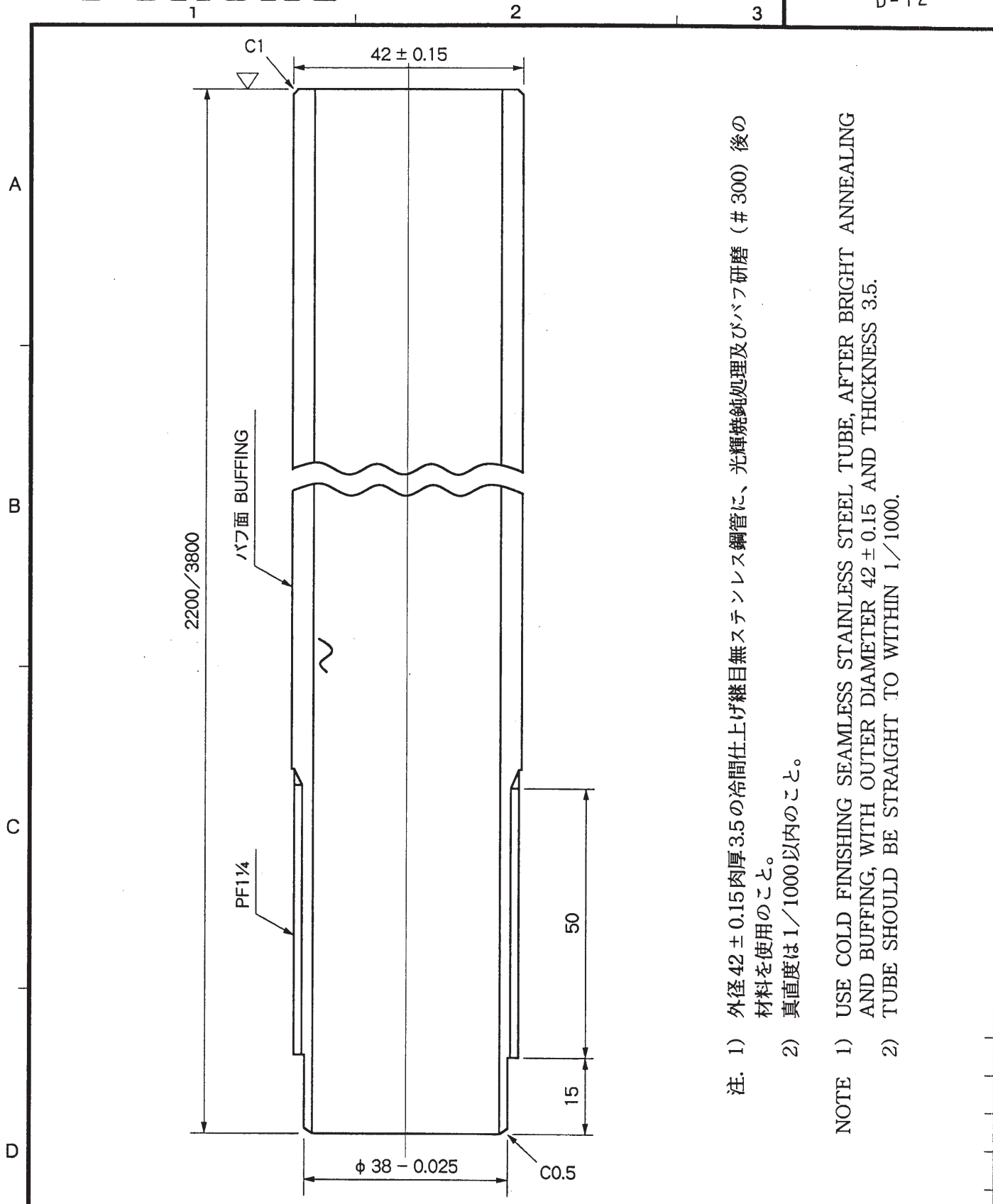
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q.TY	図番 DWG.NO.	備考 REMARKS
承認 APPROVED	三角法 THIRD ANGLE PROJECTION	名称 TITLE			
検図 CHECKED	尺度 SCALE	名称 FRP製格納タンク船底装備図 (FRP船)			
製図 DRAWN	重量 WEIGHT	名称 FRP RETRACTION TANK			
	kg	名称 INSTALLATION ON FRP HULL			
		図番 DWG.NO.			
		C1220-038-F			

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

<p>条件 CONDITION</p>	<p>A 満載時喫水線の上までタンク長が取れる場合。 WHEN THE LONGER TANK IS USED SO THAT ITS FLANGE POSITIONS ABOVE WATER LINE.</p>	<p>B 1. オフシーズンに上下装置を取りはずしておく場合。 WHEN THE OUT OF SEASON, HULL UNIT IS REMOUNTED FROM THE TANK. 2. 満載時喫水線の上までタンク長が取れない場合。 WHEN THE LONGER TANK IS NOT USED DUE TO LIMITED CLEARANCE.</p>	<p>C タンク長を喫水線まで取れない場合で、仕切弁を使用しないとき。 WHEN THE LONGER TANK OR A GATE VALVE CANNOT BE USED.</p>
<p>装備法 METHOD</p>	<p>満載時の喫水線 WATER LINE AT FULL LOAD</p> <p>以上 MIN. 100</p> <p>300</p> <p>NOTE 2</p> <p>以上 MIN.</p> <p>NOTE 2 Lt + 805</p> <p>以上 MIN.</p> <p>100</p> <p>以上 MIN.</p> <p>※ NOTE 3 BULKHEAD</p> <p>タンク長 TANK LENGTH Lt</p> <p>以上 MIN. 475</p> <p>以上 MIN. 50</p> <p>※: 造船所手配 キール SHIPYARD SUPPLY. KEEL</p>	<p>以上 MIN.</p> <p>以上 MIN.</p> <p>100</p> <p>以上 MIN.</p> <p>※ NOTE 2 BULKHEAD</p> <p>※ GASKET</p> <p>仕切弁 ※ GATE VALVE 船用鑄鉄, 口径200 CAST IRON, 8" DIAMETER 11.2kgf/cm²(1.1MPa)</p> <p>以上 MIN. 475</p> <p>以上 MIN.</p> <p>以上 MIN.</p> <p>タンク長 TANK LENGTH Lt</p> <p>以上 MIN. 475</p> <p>以上 MIN. 50</p> <p>※: 造船所手配 キール SHIPYARD SUPPLY. KEEL</p>	<p>以上 MIN.</p> <p>通気孔 AIR VENT</p> <p>以上 MIN.</p> <p>NOTE 2 防水扉 ※ WATERTIGHT HATCH</p> <p>水密隔壁 ※ COFFERDAM</p> <p>※ A20f ※ A25a グランド GLAND ※</p> <p>タンク長 TANK LENGTH Lt</p> <p>以上 MIN. 475</p> <p>以上 MIN. 50</p> <p>※: 造船所手配 キール SHIPYARD SUPPLY. KEEL</p>
<p>注記 NOTE</p>	<p>1. この装備法を標準として推奨する。 THIS METHOD IS RECOMMENDED AS STANDARD INSTALLATION. 2. 上下装置の上部に十分なサービス空間が取れない場合は、天井に300×300の穴をあけておくこと。 WHEN OVERHEAD CLEARANCE IS NOT ALLOWED, MAKE A HOLE OF 300x300 mm ON CEILING FOR FACILITATING INSTALLATION AND FUTURE SOUNDOME SERVICE. 3. 隔壁の強度は船底外板と同等以上とする。 BULKHEAD SHOULD BE STRONG AS WELL AS HULL PLATE OR MORE.</p>	<p>1. 上記(1)の目的でこの装備を行う場合は、左図(A)と同様に喫水線の上までタンク長を取る方が望ましい。 THE TANK FLANGE POSITION IS DESIRED TO BE ABOVE WATER LINE, AS LIKE THE INSTALLATION METHODE 'A'. 2. 隔壁の強度は船底外板と同等以上とする。 BULKHEAD SHOULD BE STRONG AS WELL AS HULL PLATE OR MORE.</p>	<p>1. 水密隔壁は、船級協会規則を参照し、造船所で製作してください。その際、サービス空間も考慮してください。 FABRICATE THE COFFERDAM BY SHIPYARD IN ACCORDANCE WITH CONCERNED REGULATIONS, ALSO PROVIDE ENOUGH SERVICE CLEARANCE. 2. 水密隔壁の上限を喫水線の上までとれない場合にも、上下装置取り外しのための防水扉を設けること。 PROVIDE A WATERTIGHT HATCH FOR FUTURE MAINTENANCE IF A COFFERDAM IS NOT HIGH ABOVE WATER LEVEL.</p>

注記
船底から甲板まで他の船室と区切られたソナールーム以外に船底タンクを装備するとき、上記基準を遵守すること。
装備法の決定に際しては、安全性(強度、水密性等)を重視し、保守・点検の容易さにも配慮すること。
NOTE
FOLLOW THE ABOVE INSTALLATION METHODS OTHERWISE INSTALLATION IN A SONAR ROOM PARTED FROM OTHER ROOMS WITH BULKHEAD BETWEEN HULL AND DECK.
DECIDE THE METHOD CONSIDERING SUFFICIENT REINFORCEMENT, WATERTIGHT OF THE SHIP'S HULL AND MAINTENANCE CLEARANCE AROUND THE UNIT ALSO.

DRAWN	17/Nov/2016 T.YAMASAKI	TITLE	TANK FOR CH SERIES
CHECKED	17/Nov/2016 H.MAKI	名称	格納タンク
APPROVED	18/Nov/2016 H.MAKI		送受波器装備図
SCALE	1/15 MASS - kg	NAME	RETRACTION TANK
DWG No.	C1316-T01- B		TRANSDUCER INSTALLATION



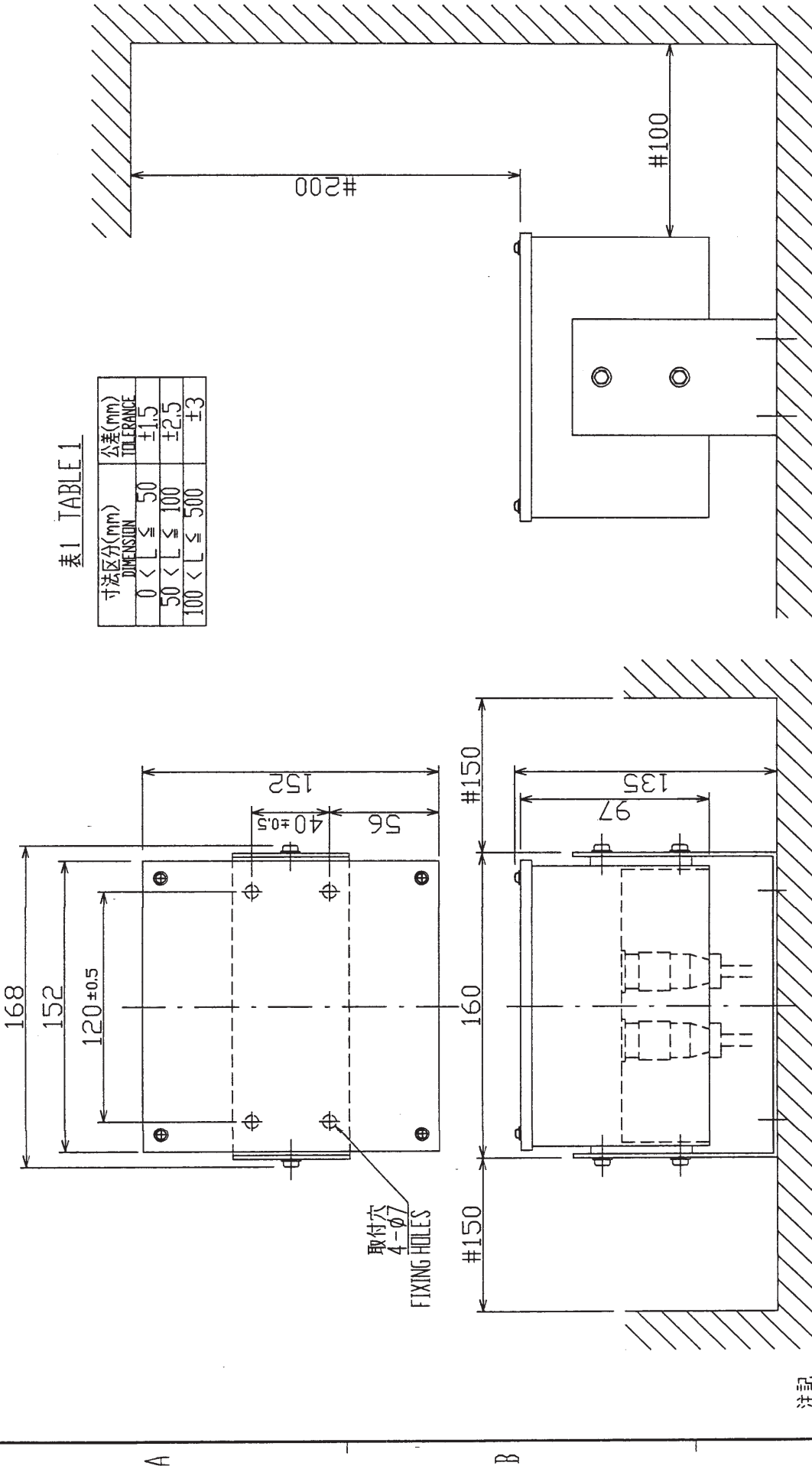
注. 1) 外径 42 ± 0.15 肉厚 3.5 の冷間仕上げ継目無ステンレス鋼管に、光輝焼鈍処理及びバフ研磨 (# 300) 後の材料を使用のこと。
 2) 真直度は $1/1000$ 以内のこと。

NOTE 1) USE COLD FINISHING SEAMLESS STAINLESS STEEL TUBE, AFTER BRIGHT ANNEALING AND BUFFING, WITH OUTER DIAMETER 42 ± 0.15 AND THICKNESS 3.5.
 2) TUBE SHOULD BE STRAIGHT TO WITHIN $1/1000$.

CH-24/26/34/36		品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS
承認 APPROVED	APR. 28. '92 T. YAKAWO	三角法 THIRD ANGLE		名称 TITLE 上下シャフト MAIN SHAFT			
検図 CHECKED	APR. 28. '92 M. USUDA	尺度 SCALE	/				
製図 DRAWN	Apr. 28. '92 T. MIYOSH	重量 WEIGHT	kg	図番 DWG. NO.	C1269 - G01 - A		

3

4



注記

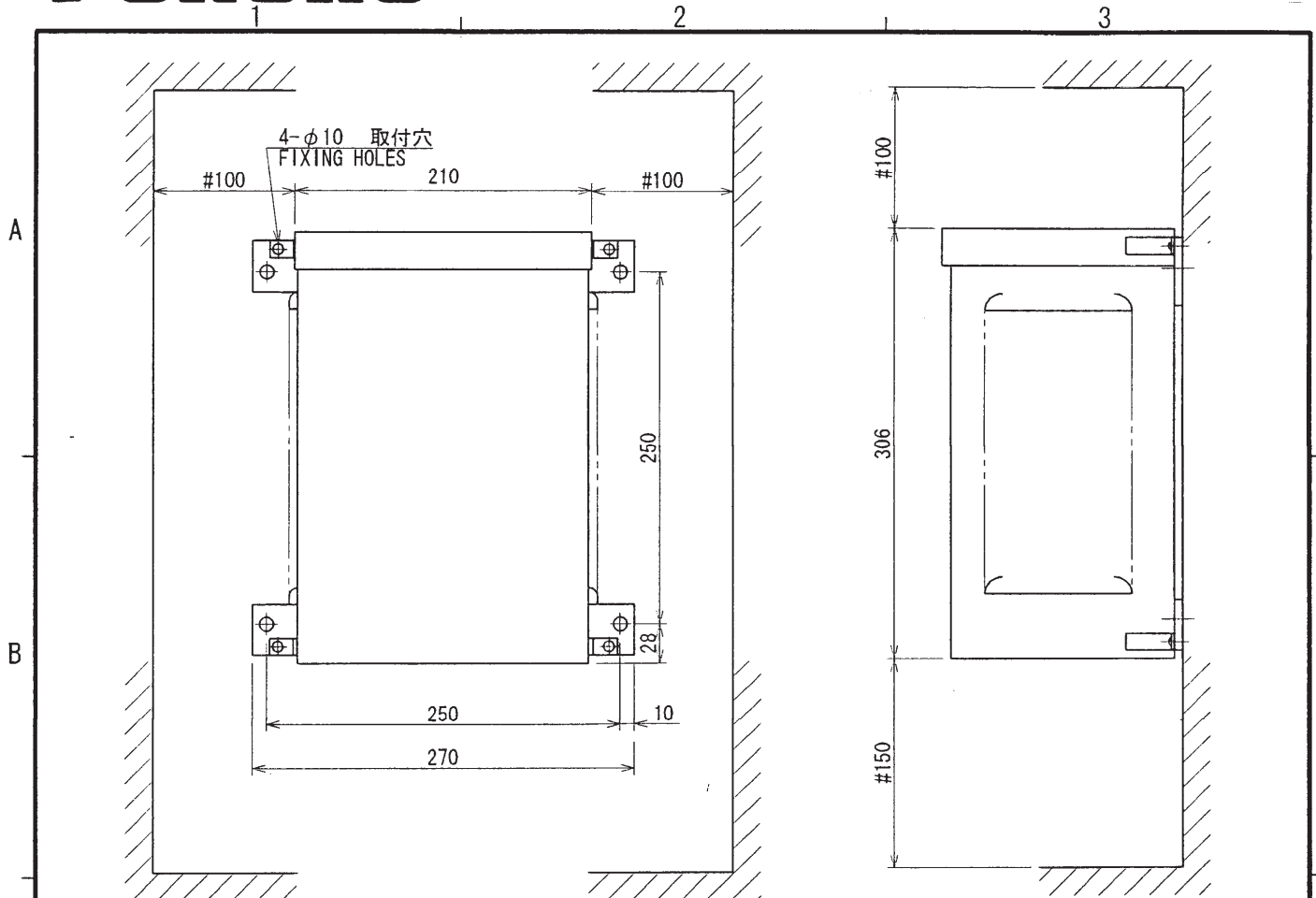
- 1) 指定なき寸法公差は表1による。
- 2) # : 推奨する最小サービス空間寸法。
- 3) 船首マーク(FORE)を船首方向に向けて、きょう体を水平に取り付けること。

NOTE

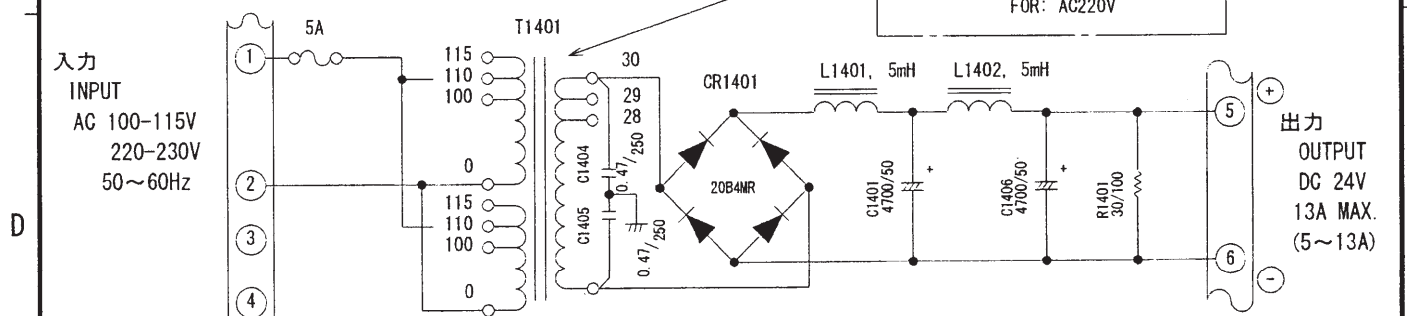
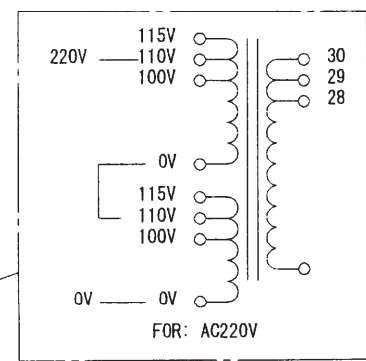
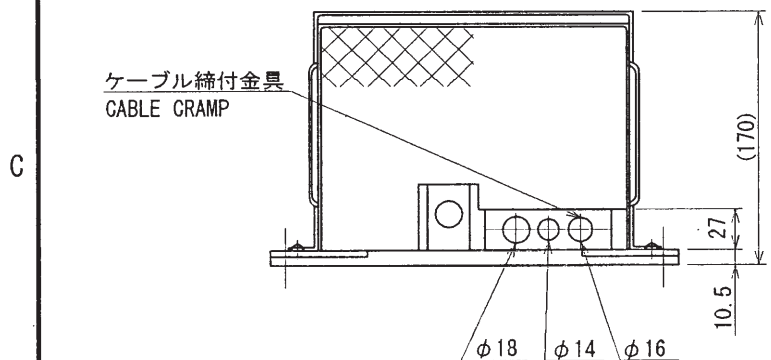
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. # RECOMMENDED SERVICE CLEARANCE.
3. ORIENT THE 'FORE' MARK ON THE UNIT TOWARD SHIP'S BOW AND MOUNT THE UNIT LEVEL IN PARALLEL WITH SURFACE.

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

OUTLINE DRAWING



NOTE 1. # : 推奨サービス空間
RECOMMENDED SERVICE CLEARANCE.



注記 AC220V入力に対しては T1401の一次巻線を直列に接続する。
NOTE FOR 220V AC INPUT, CONNECT T1401 PRIMARY WINDINGS IN SERIES.

DRAWN Aug 16 '00 T. TAMASAKI	TITLE RU-1746B-2
CHECKED Aug 17 '00 Y. K.	名称 整流器
APPROVED Aug 17 '00 Y. K.	外寸図
SCALE 1/5 MASS ±10% 17 kg	NAME RECTIFIER UNIT
DWG. No. C3002-002-N	OUTLINE DRAWING

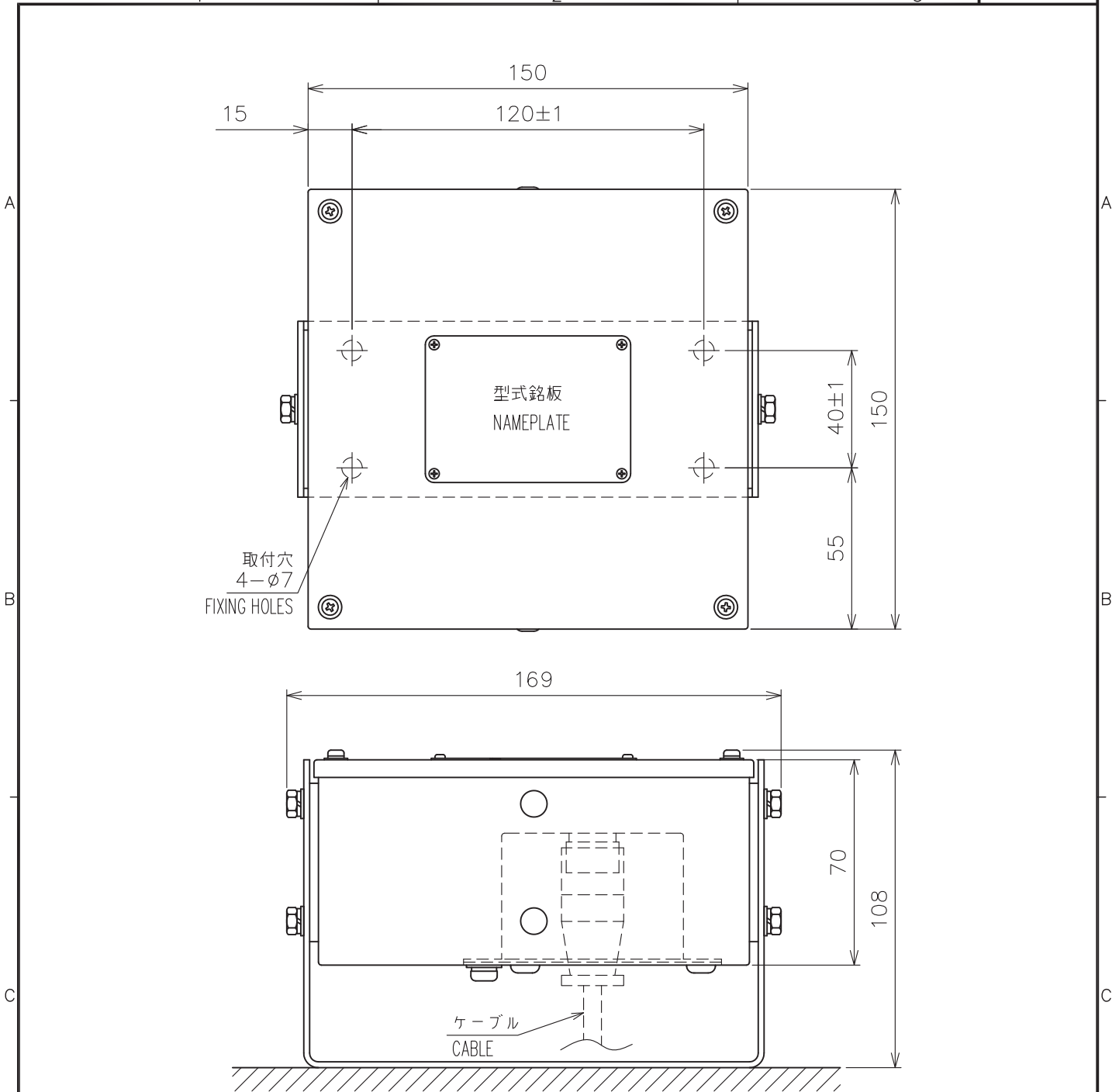


表1 TABLE 1

- 注 記 1) 指定外の寸法公差は表 1 による。
 2) 取付用ネジは、M5 ボルトを使用のこと。
 3) 船体の回転軸と水平に取り付けること。

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

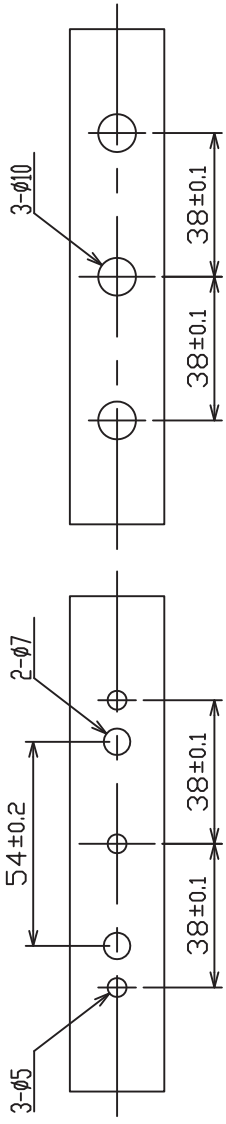
- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 2. USE M5 BOLTS FOR FIXING THE UNIT.
 3. INSTALL THE UNIT HORIZONTALLY ON THE ROTATION AXIS OF SHIP'S ROLLING AND PITCHING.

DRAWN 16/Sep/2014 T.YAMASAKI	TITLE BS-704
CHECKED 16/Sep/2014 H.MAKI	名称 傾斜角検出器 (卓上装備)
APPROVED 17/Sep/2014 H.MAKI	外寸図
SCALE 1/2	MASS 1.3 ±10% kg 質量はケーブルを含まず。 MASS DOES NOT INCLUDE CABLE.
DWG. No. C1259-009-D	REF. No. 06-008-201G-0
NAME CLINOMETER (TABLETOP MOUNT)	
OUTLINE DRAWING	

4

3

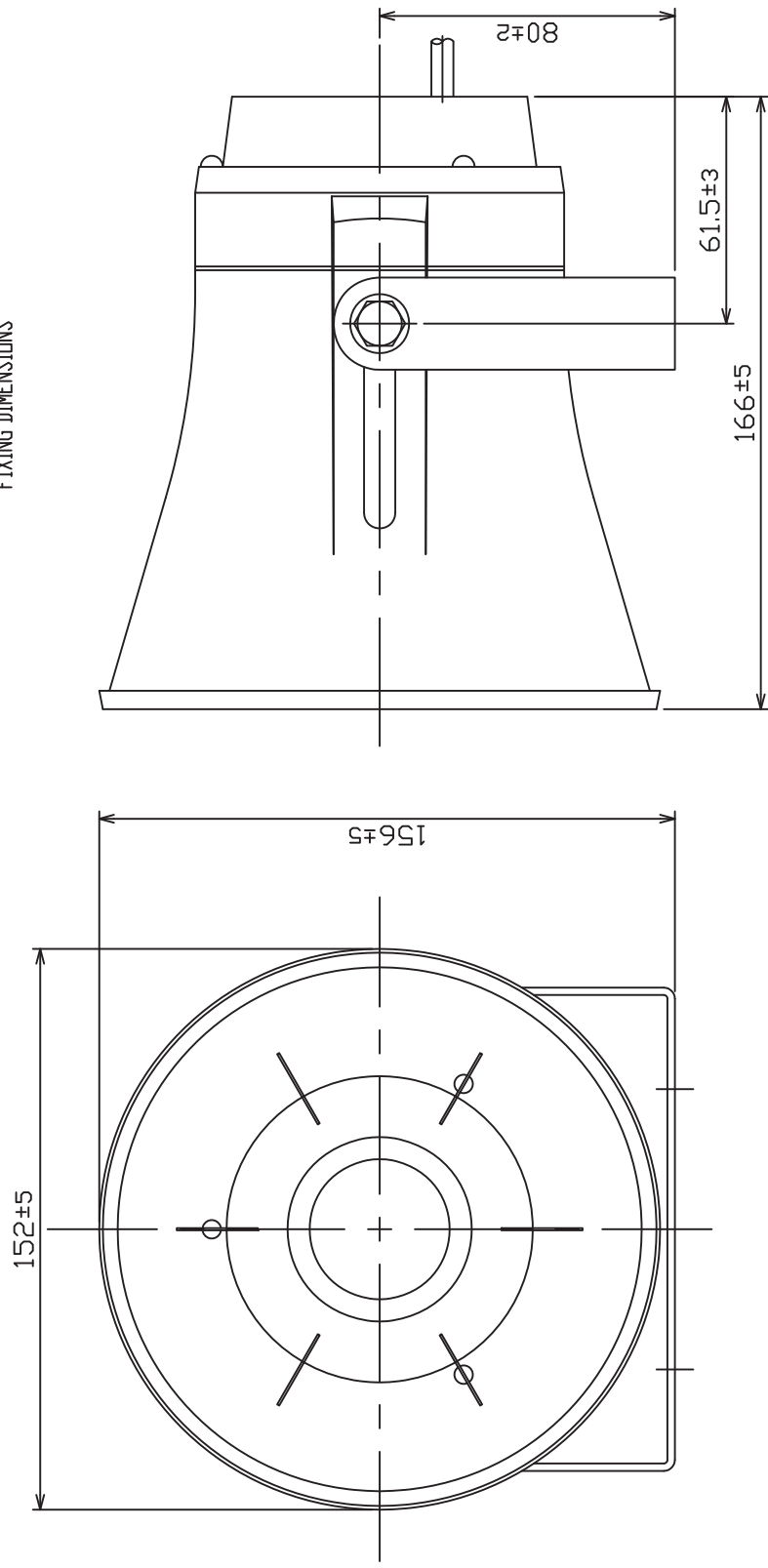
2



取付寸法
FIXING DIMENSIONS

CA-150

SC-05WR



φ6.3 プラグ
PLUG

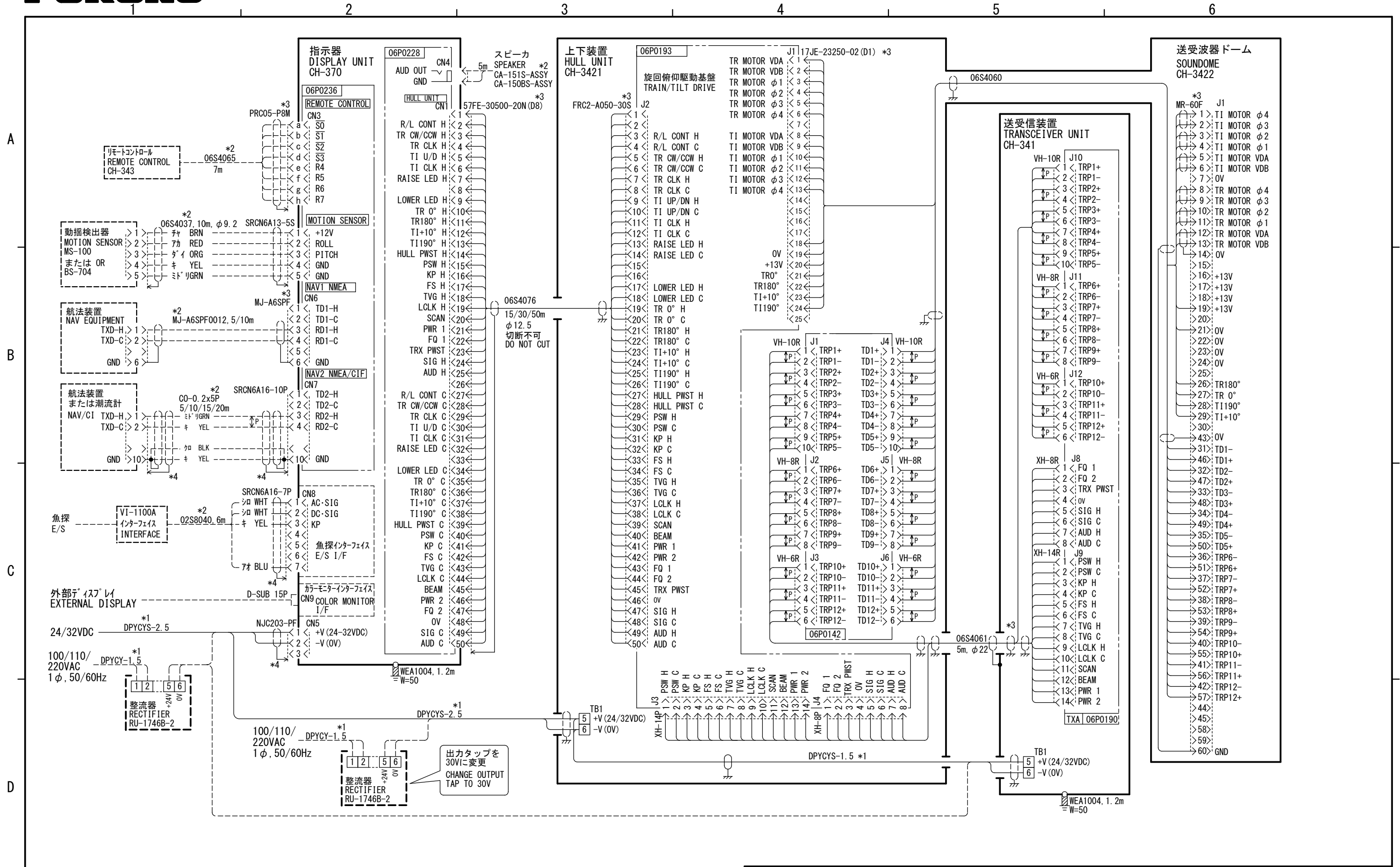
5m ケーブル
CABLE

DRAWN	9/Oct/08	I. YAMASAKI	TITLE	SC-05WR, CA-150
CHECKED	9/Oct/08	T. TAKENO	名称	5Wトランペットスピーカ
APPROVED	23/Oct/08	R. Esumi	外寸図	
SCALE	1/2	MASS 1.2 kg ±10% 質量はケーブルを含みず。 MASS. W/O CABLE.	NAME	TRUMPET SPEAKER
DWG.No.	C5016-101-E	REF.No.	OUTLINE DRAWING	

A

B

C



注記
 * 1) 造船所手配
 * 2) オプション
 * 3) 工場にて取付済み。
 * 4) コネクタのクランプを通し接地する。

NOTE
 *1. SHIPYARD SUPPLY.
 *2. OPTION.
 *3. FITTED AT FACTORY.
 *4. GROUNDING THRU CONNECTOR CLAMP.
 CO-0. 2x5P: CO-SPEVV-SB-C 0. 2x5P, φ 13.5

DRAWN 31/Mar/2017 T. YAMASAKI	TYPE CH-37
CHECKED 31/Mar/2017 H. MAKI	名称 カラーセクタースキャニングソナー
APPROVED 3/Apr/2017 H. MAKI	相互結線図
DWG. No. C1303-C01-G	NAME COLOR SECTOR SCANNING SONAR
REF. No. 06-020-0001-0	INTERCONNECTION DIAGRAM