

FURUNO

INSTALLATION MANUAL

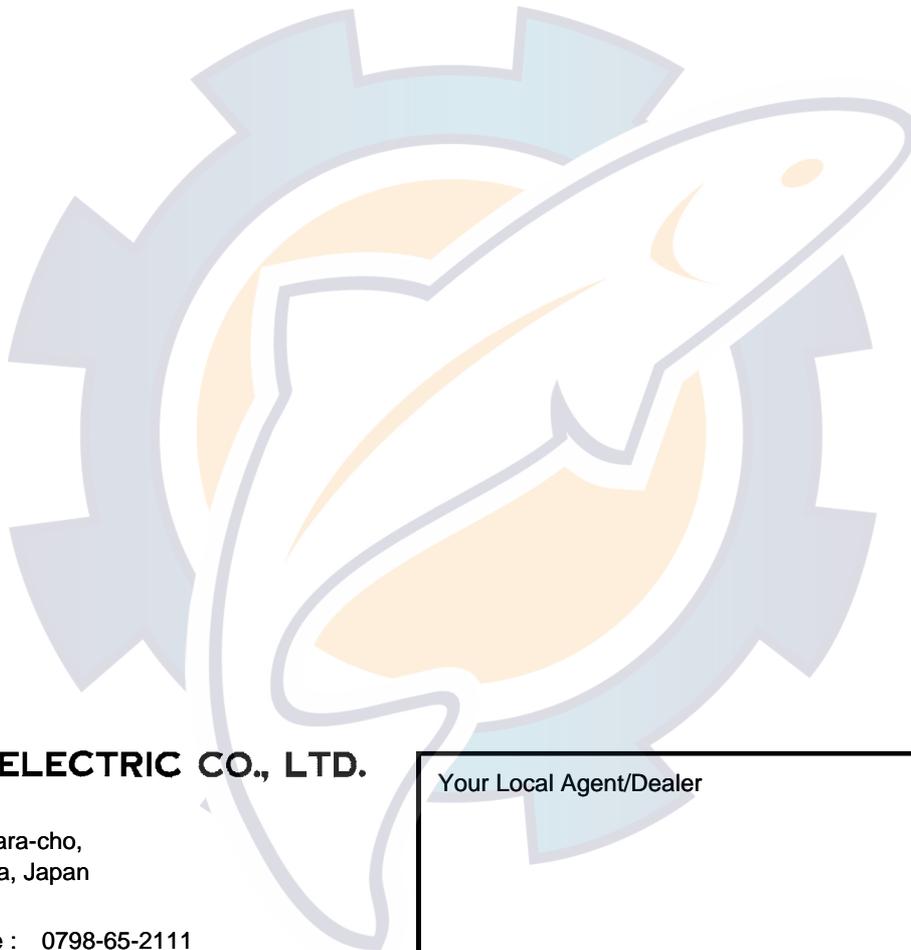
COLOR SCANNING SONAR

MODEL CSH-5 MARK-2

The chapter 1 describes installation using the 1000mm long tank. For installation with 1800mm or 3500mm tank, refer to APPENDIX.



FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN



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Your Local Agent/Dealer

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(TENI) CSH-5 MARK-2



00080739501



IME12990G00



SAFETY INFORMATION

"WARNING", "CAUTION" and "NOTICE" signs appear throughout this manual. It is the responsibility of the installer of the equipment to read, understand and follow these notices. If you have any questions regarding these safety instructions, please contact a FURUNO agent or dealer.

Safety information for both the installer and operator begins on the next page.



WARNING

This notice indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

This notice indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or property damage.

NOTICE

This notice indicates an unsafe practice which, if not avoided, could result in property damage or equipment malfunction.

WARNING



Only qualified personnel should work inside the equipment.

This equipment uses high voltage electricity which can shock, burn, or cause death.

Turn off the power at the ship's mains switchboard before beginning the installation. Post a warning sign near the switchboard to ensure that the power will not be applied while the equipment is being installed.

Serious injury or death can result if the power is not turned off, or is applied while the equipment is being installed.

CAUTION



Ground the equipment.

Ungrounded equipment can give off or receive electromagnetic interference or cause electrical shock.

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

Connection to the wrong power supply can cause fire or equipment damage. The voltage rating appears on the label at the rear of the equipment.

The zinc block attached near the transducer 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.

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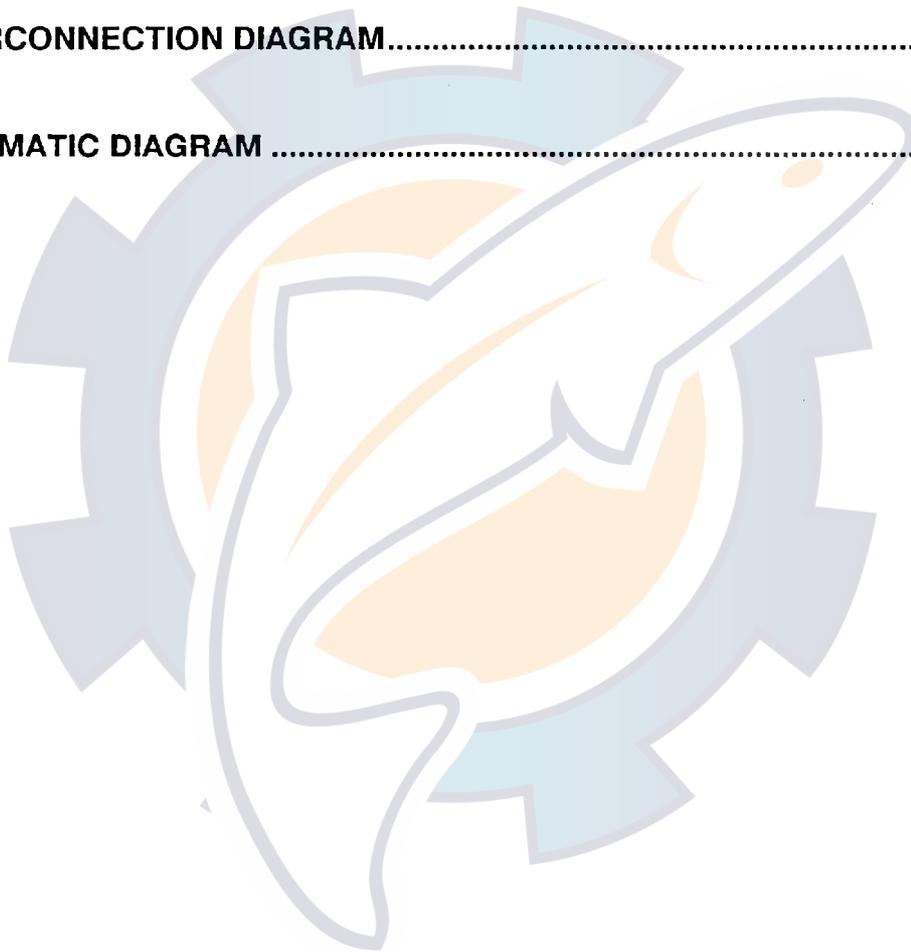
- I. Installation on More Than 750mm Long Retraction Tank..... AP1-1
- II. Installation on 600mm to 750mm Long Retraction Tank AP1-4

APPENDIX 2. INSTALLATION AND INTERCONNECTION OF INTERFACE MODULE CSH-5060 AP2-1

OUTLINE DRAWINGS D-1

INTERCONNECTION DIAGRAM..... S-1

SCHEMATIC DIAGRAM S-2



EQUIPMENT LIST

Standard Supply

No.	Name	Type	Dimensions(mm) W×H×D	Q'ty	Mass (kg)	Remarks
1	Display Unit	CSH-5110	350×430×450	1	20	
2	Control Box	CSH-5111	280×50×90	1	1.5	
3	Preamplifier Unit	CSH-5020	210×250×85	1	7	
4	Transceiver Unit	CSH-5130	325×530×280	1	20	
5	Hull Unit	CSH-5040* CSH-5041*	ø343×1605 ø343×1250	1	75 70	600mm travel 400mm travel
6	Installation Materials			1 set		
7	Accessories	FP10-01600		1 set		
8	Spare Parts	SP10-01200		1 set		

* Specify main shaft length.

Optional Supply

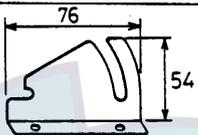
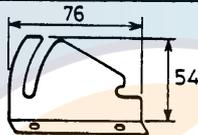
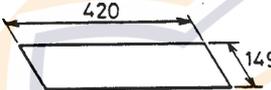
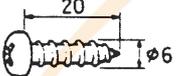
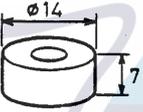
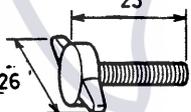
No.	Name	Type	Q'ty	Mass (kg)	Remarks
1	Interface Module	CSH-5060	1		incorporated in display unit
2	Interface Unit	VI-1100A	1	2	interface module CSH-5060 required
3	DC/AC Inverter	CSH-5050	1		24/32VDC
4	Retraction Tank	OP10-5	1		
5	Motion Sensor	MS-100	1		
6	Switch Box	CSH-5070	1		
7	Waterproofing Cover	OP10-8	1		for Control Box
8	Handle	FP10-00210	1		
9	Vinyl Cover	10-044-3402-1	1		for Control Box
10	Hood	FP02-02610	1		for Display Unit
11	Vinyl Cover	10-044-0031-1	1		for Display Unit
12	Copper Strap	CP10-00900	1		for grounding of Display Unit

Special Tools (Optional Supply)

No.	Name	Type	Outline
1	Crimping Tool	06-1011-016	
2	Pin Extractor	06-1877-04	

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CODE NO.	000-069-023	10CG-X-9501
TYPE	FP10-01600	

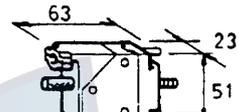
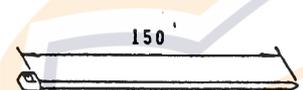
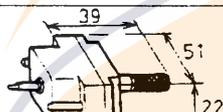
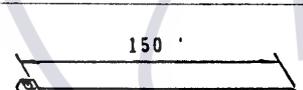
付 属 品 表 ACCESSORIES		CSH-5MARK-2 カラースキャニングソナー COLOR SCANNING SONAR			
番号 No	名 称 N A M E	略 号 図 OUTLINE	型 名 / 規 格 DESCRIPTIONS	数 量 Q'TY	用 途 / 備 考 REMARKS
1	フィルター組品 FILTER ASSEMBLY		FP02-02620	1	
			CODE NO. 002-007-290		
2	ハンカ― HANGER		10-044-3301-1	1	
			CODE NO. 100-112-031		
3	ハンカ― HANGER		10-044-3303-1	1	
			CODE NO. 100-114-671		
4	テンプレート TEMPLATE		10-044-3401	1	
			CODE NO. 100-112-050		
5	+ナハ"タツピ"ンク"UIネジ" +TAPPING SCREW		6X20 1シ SUS304	4	
			CODE NO. 000-800-414		
6	ミカ"キ平座金 FLAT WASHER		M6 SUS304	4	
			CODE NO. 000-864-129		
7	ワッシャー WASHER		10-044-3302-1	2	
			CODE NO. 100-112-041		
8	サムスクリュー-T型 T-TYPE		M5X16 2口 SUS304 BLK	2	
			CODE NO. 000-801-885		
			CODE NO.		
			CODE NO.		

006-976-630
FP10-00410

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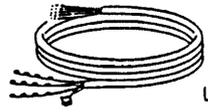
CODE NO.	006-976-570	10B0-X-9401-2
TYPE	CP10-02001	

工事材料表 INSTALLATION MATERIALS		CSH-5 CSH-5MARK-2	カラースキニングソナー COLOR SCANNING SONAR		
番号 No	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	アース銅板 COPPER STRAP		WEA-1004-0	1	指示装置用 FOR DISPLAY UNIT
			CODE NO. 500-310-040		
2	コネクタ CONNECTOR		00-8016-038-000-751HV	1	指示装置用 FOR DISPLAY UNIT
			CODE NO. 000-118-308		
3	コネクタコンタクト CONNECTOR CONTACT PIN		60-8017-0313-00-339	38	指示装置用 FOR DISPLAY UNIT
			CODE NO. 000-519-542		
4	コンパックス PLASTIC BAND		CV-150	30	前置装置用 FOR PRE-AMPLIFIER UNIT
			CODE NO. 000-570-325		
5	アース銅板 COPPER STRAP		WEA-1004-0	1	前置装置用 FOR PRE-AMPLIFIER UNIT
			CODE NO. 500-310-040		
6	コネクタ CONNECTOR		00-8016-038-000761HV	1	送受信装置用 FOR TRANSCEIVER UNIT
			CODE NO. 000-118-309		
7	アース銅板 COPPER STRAP		WEA-1004-0	1	送受信装置用 FOR TRANSCEIVER UNIT
			CODE NO. 500-310-040		
8	コンパックス PLASTIC BAND		CV-150	20	送受信装置用 FOR TRANSCEIVER UNIT
			CODE NO. 000-570-325		
			CODE NO.		
			CODE NO.		

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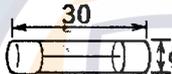
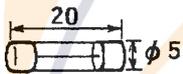
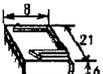
CODE NO.		10B0-X-9402-2
TYPE		

工事材料表 INSTALLATION MATERIALS		CSH-5 CSH-5MARK-2		カラーキャノンソナー COLOR SCANNING SONAR		
番号 No.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS	
1	信号ケーブル組品 SIGNAL CABLE ASSEMBLY	 L=5m	S10-7-5 CODE NO. 006-976-610	1	送受信装置用 (選択) FOR TRANSCIVER UNIT (SELECTONE.)	
	信号ケーブル組品 SIGNAL CABLE ASSEMBLY	 L=10m	S10-7-10 CODE NO. 006-976-460			
	信号ケーブル組品 SIGNAL CABLE ASSEMBLY	 L=15m	S10-7-15 CODE NO. 006-976-470			
2	RX168芯ケーブル組品 168C CABLE ASSEMBLY	 L=5m	10S1562 *5M* CODE NO. 006-976-620	1	送受信装置用 (選択) FOR TRANSCIVER UNIT (SELECTONE.)	
	RX168芯ケーブル組品 168C CABLE ASSEMBLY	 L=10m	10S1583 *10M* CODE NO. 006-976-440			
	RX168芯ケーブル組品 168C CABLE ASSEMBLY	 L=15m	10S1584 *15M* CODE NO. 006-976-450			
3	信号ケーブル組品 SIGNAL CABLE ASSEMBLY	 L=15m	S10-6-15 (38P) *15M* CODE NO. 006-976-580	1	指示装置用 (選択) FOR DISPLAY UNIT (SELECTONE.)	
	信号ケーブル組品 SIGNAL CABLE ASSEMBLY	 L=30m	S10-6-30 (38P) *30M* CODE NO. 006-976-590			
	信号ケーブル組品 SIGNAL CABLE ASSEMBLY	 L=50m	S10-6-50 (38P) *50M* CODE NO. 006-976-600			
			CODE NO.			

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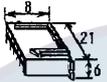
CODE NO.	006-976-560	10B0-X-9301 -2
TYPE	SP10-01200	BOX NO. P

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		SPARE	
				PER SET	PER VES		
1	MLソケットコンタクト組品 NK SOCKET CONTACT ASSY.		80-0074	24		6	006-979-300
2	XHコンタクト組品 XH CONTACT ASSY.		80-0075	700		20	006-979-310
3	ヒューズ FUSE		FGBO 7A AC125V	2		10	000-549-013
4	ヒューズ FUSE		FGMB 2A 250V	4		2	000-122-000
5	コネクタ(ML) CONNECTOR(ML)		MLP-02	12		2	000-505-750
6	コネクタ(XH) CONNECTOR(XH)		XHP-10	12		2	000-110-947
7	コネクタ(XH) CONNECTOR(XH)		XHP-12	14		2	000-116-944
8	コネクタ(XH) CONNECTOR(XH)		XHP-13	12		2	000-102-045
9	コネクタ(XH) CONNECTOR(XH)		XHP-14	2		2	000-112-430
10	コネクタ(XH) CONNECTOR(XH)		XHP-15	12		2	000-110-946
MFR'S NAME		FURUNO ELECTRIC CO.,LTD.		DWG NO.	C1273-P01- C		1/2

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

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CODE NO.	006-976-560	10B0-X-9301 -2
TYPE	SP10-01200	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	PER VES	SPARE
11	コネクタ(XH) CONNECTOR(XH)		XHP-7	12		2
						000-105-683
MFR'S NAME	FURUNO ELECTRIC CO.,LTD.		DWG NO.	C1273-P03- A		2/2

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

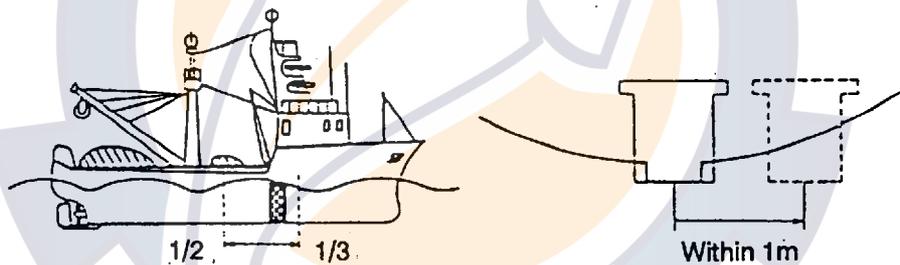
CHAPTER 1. MOUNTING

1.1 Hull Unit

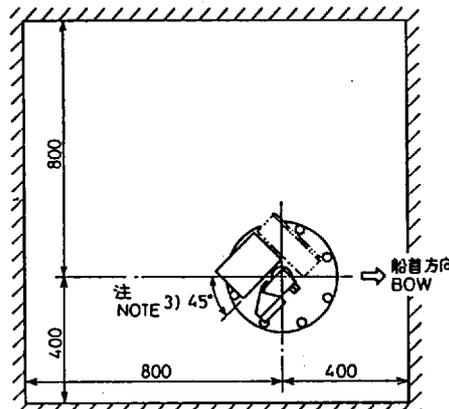
1.1.1 Installation Position of Hull Unit

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 can not be installed on the keel, the center of the retraction tank should be within 1m of the keel so as to prevent a rolling effect.



- 2) Select a place where interference from other equipment is minimal. The hull unit should be at least 2.5m 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 .

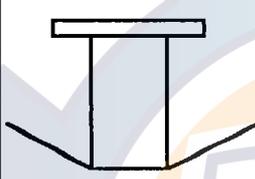
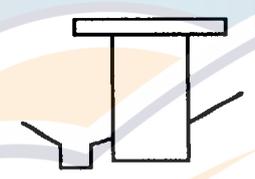
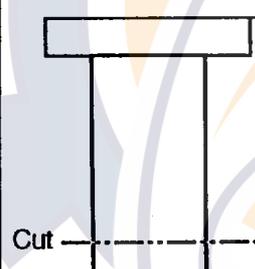
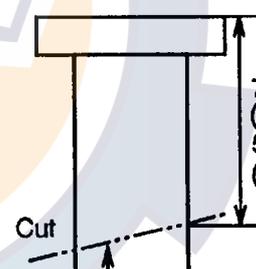


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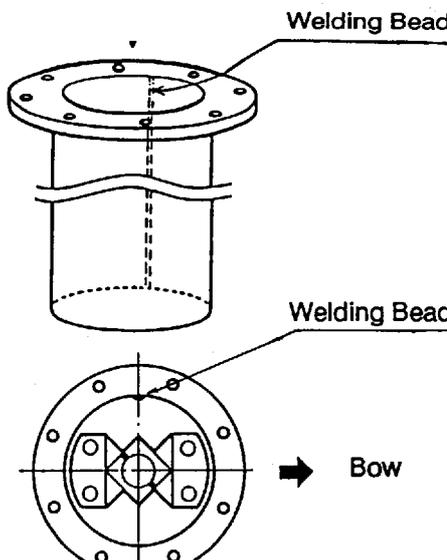
1.1.2 Installation of Retraction Tank

The retraction tank is 1000mm 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 pages D-1 thru D-8 for detailed tank installation method.

Cutting the End of Retraction Tank

Tank Installation Method		
		
Tank Cutting	 <p>750mm (600 XDCR TRAVEL) 550mm (400 XDCR TRAVEL)</p> <p>Cut</p>	 <p>750mm (600 XDCR TRAVEL) 550mm (400 XDCR TRAVEL)</p> <p>Cut</p> <p>Cut along the hull bottom.</p>

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



Welding Bead

Welding Bead

Bow

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1.1.3 Assembling and Installation of Hull Unit

You will receive the hull unit disassembled to parts shown on page 1-7 and 1-8. To reassemble them follow the procedure shown below.

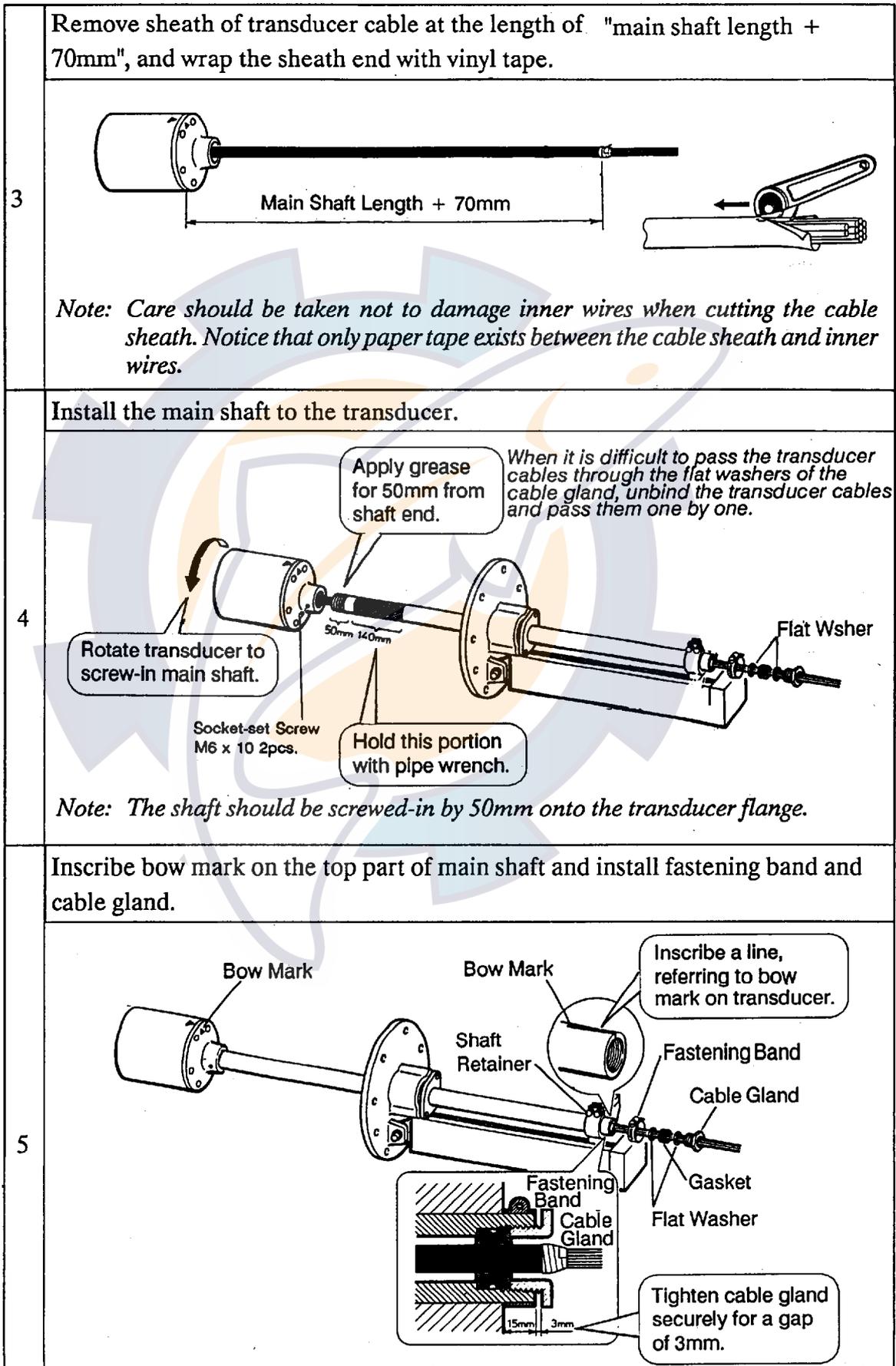
Necessary Tools

1	Spanner	Double-ended spanner is recommended.
	For M10 (Hex. Size 17mm) For M20 (Hex. Size 30mm)	
2	Pipe Wrench ϕ 55mm	Used for fastening cable gland
3	Socket-set Screw Wrench For M6 (Hex. Size 3mm)	Used for main body flange fixing

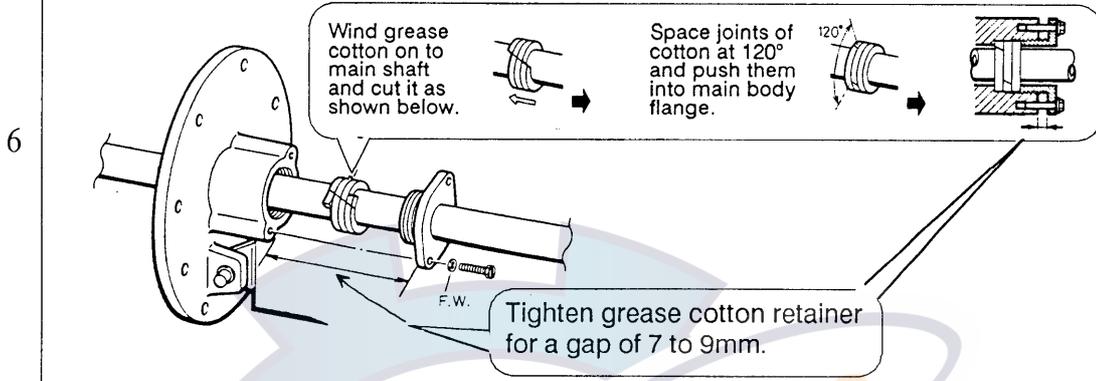
Procedure

1 Install raise/lower drive assembly onto main body flange using trunnion shaft.

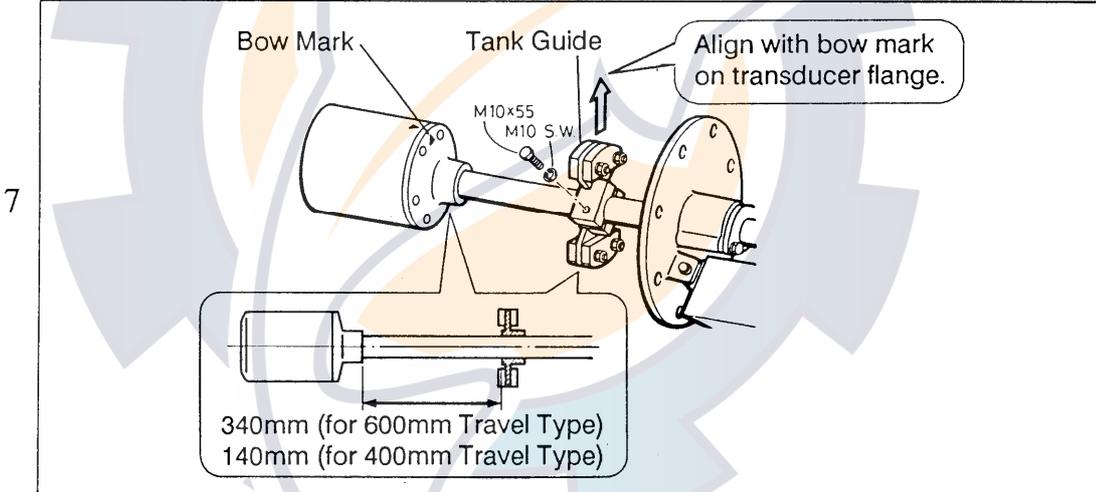
2 Apply a slight amount of grease to the top of main shaft, pass the main shaft through the main body flange and fix it temporarily with the shaft retainer. (The shaft retainer should be secure enough to prevent shaft rotation.)



Install grease cotton to the main body flange and tighten the grease cotton retainer.



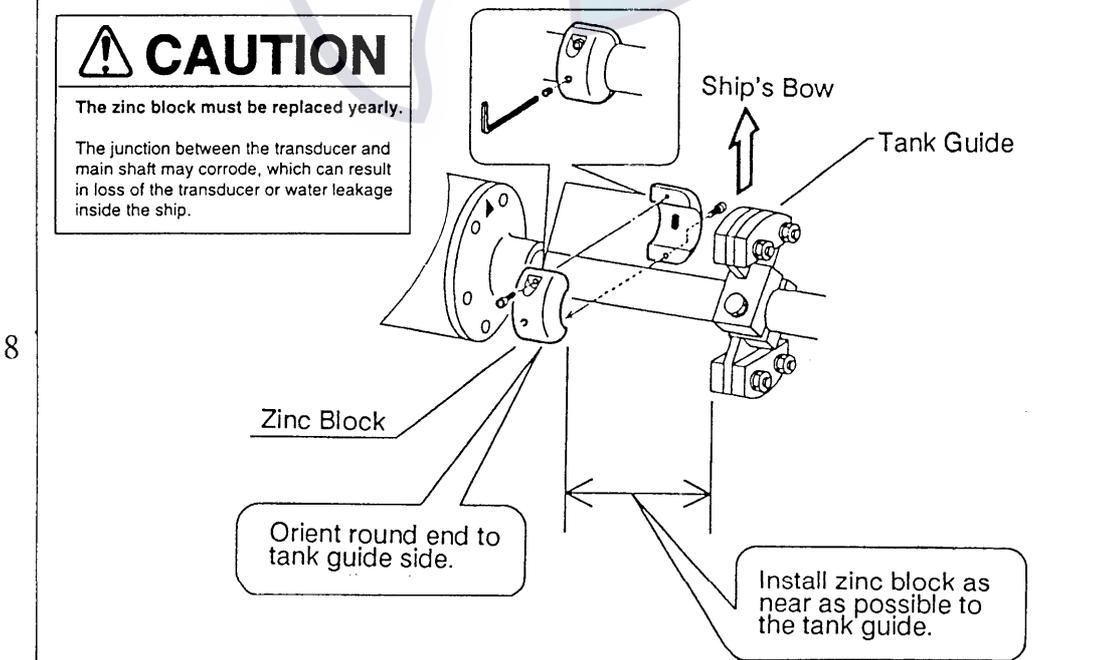
Install the tank guide. The distance between the top of the transducer flange and the bottom of the tank guide body should be 340mm for 600mm travel type and 140mm for 400mm travel type.

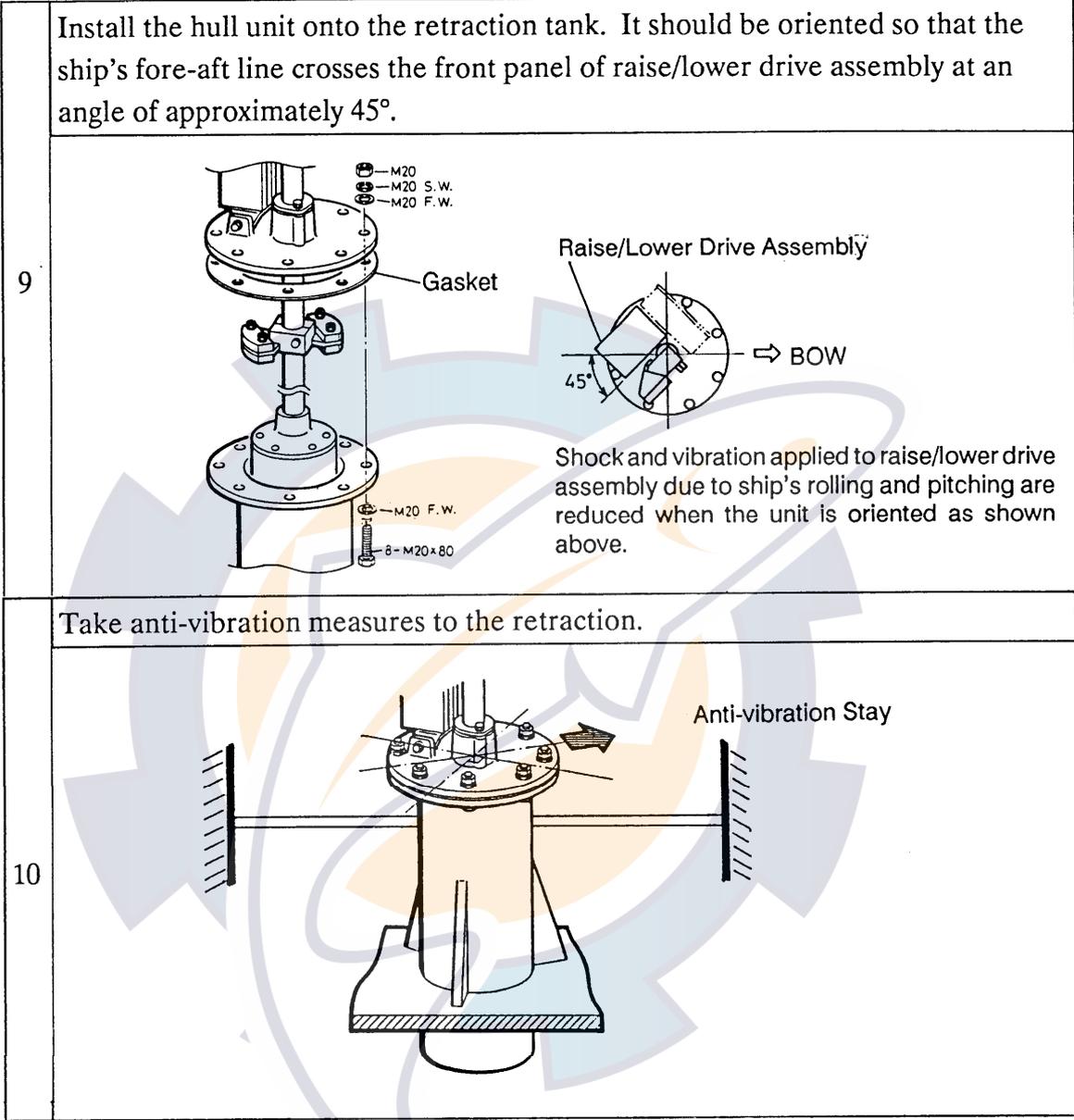


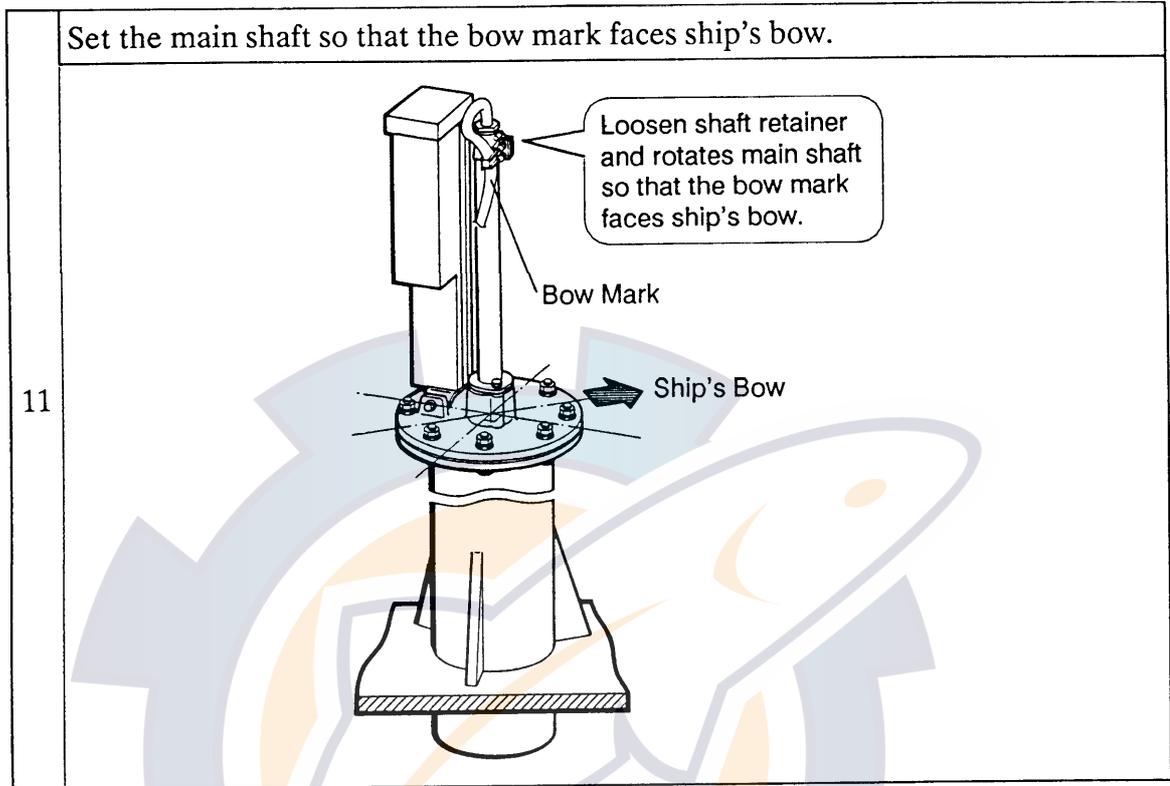
CAUTION

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.

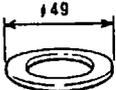
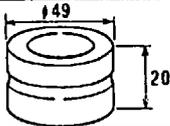
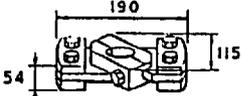
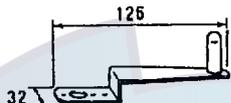
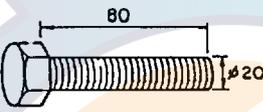
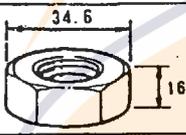
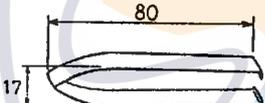
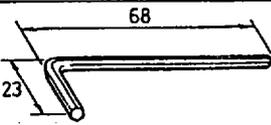
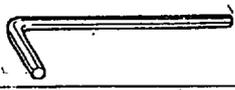






上下装置 解体出荷リスト HULL UNIT KIT

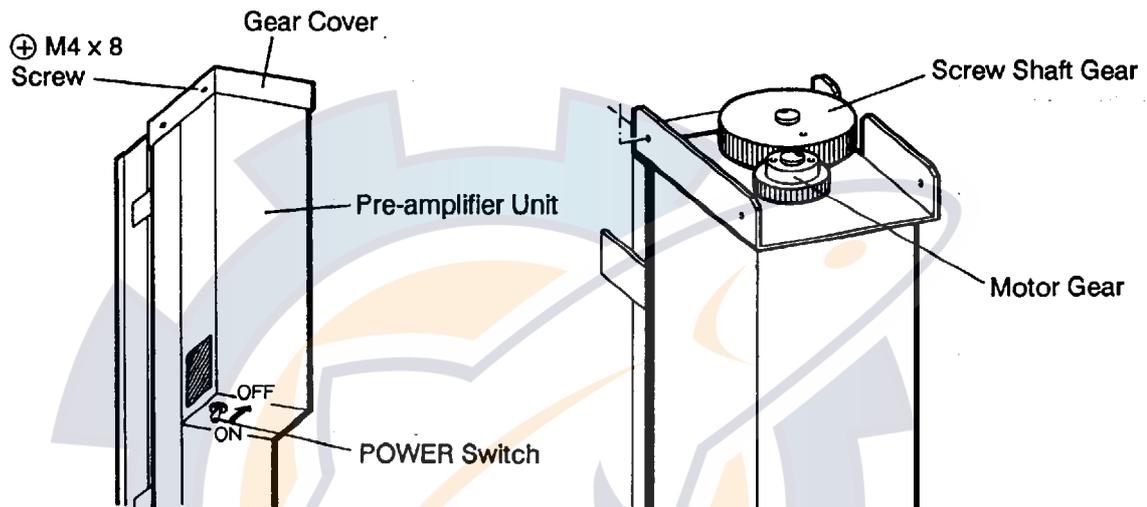
番号 No.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	上下動部 RAISE/LOWER DRIVE ASSEMBLY		CODE No.	1	
2	送受波器 TRANSDUCER ASSEMBLY		CODE No.	1	
3	フランジ圧入品 MAIN BODY FLANGE		10-044-2201 CODE No. 100-112-540	1	
4	グリスコットン GREASE COTTON		□9.5 *0.7M* CODE No.	1	
5	グリスコットン押え GREASE COTTON RETAINER		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 N A M E	略 図 OUTLINE	型 名 / 規 格 DESCRIPTIONS	数 量 Q'TY	用 途 / 備 考 R E M A R K S
14	ケーブル座金 FLAT WASHER		10-044-2303	2	同上 Ditto
			CODE No. 100-112-611		
15	ケーブルガスケット GASKET		10-044-2304	1	同上 Ditto
			CODE No. 100-112-621		
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	1	
			CODE No. 006-979-150		
18	六角ボルト HEX. BOLT		M20×80 SUS304	8	
			CODE No. 000-801-893		
19	ミガキ平座金 FLAT WASHER		M20 SUS304	16	
			CODE No. 000-864-136		
20	バネ座金 SPRING WASHER		M20 SUS304	8	
			CODE No. 000-864-270		
21	六角ナット HEX. NUT		M20 SUS304	8	
			CODE No. 000-863-116		
22	XH抜き工具 CONNECTOR PULLER		10-044-2431	1	
			CODE No. 100-122-480		
23	配線バンド CABLE FIXING BAND		HP-18N	5	
			CODE No. 000-113-838		
24	配線バンド CABLE-FIXING BAND		HP-5N	2	
			CODE No. 000-570-003		
25	六角レンチ SOCKET SCREW WRENCH		対辺 3mm HEX. SIZE 3mm	1	
			CODE No. 000-830-131		
26	保護アエン ZINC BLOCK		ジクケイ55 AXIS DIA55	1	
			CODE No. 000-802-966		
27	六角レンチ SOCKET SCREW WRENCH		AL0500	1	
			CODE No. 000-802-418		

FURUNO

1.1.4 How to use Hand Crank

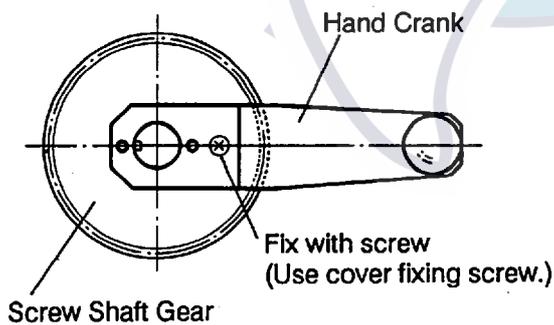
1. Turn off the POWER switch on the hull unit.
2. Remove the gear cover.



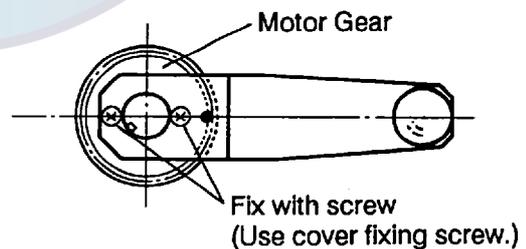
3. Mount the hand crank onto the screw shaft gear or motor gear.

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

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



120 turns to move main shaft by 600mm.



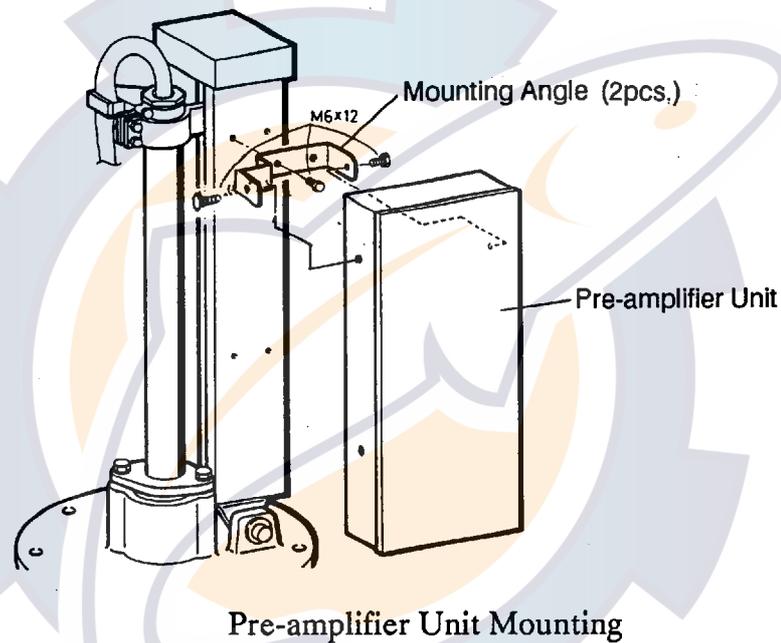
210 turns to move main shaft by 600mm.

FURUNO

1.2 Pre-amplifier Unit

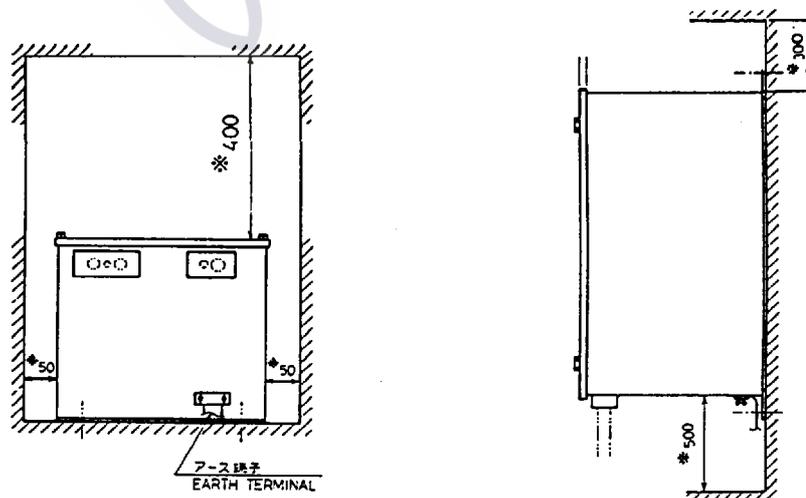
The pre-amplifier unit is installed on the hull unit with the following procedure.

1. Detach the mounting angles (2pcs.) from the pre-amplifier unit.
2. Fix the mounting angles onto the hull unit with M6 × 12 hex. bolts.
3. Utilizing M6 × 12 bolts, fix the pre-amplifier unit to the mounting angles.



1.3 Transceiver Unit

Since the transceiver unit generates heat, install it on a dry, well ventilated location.

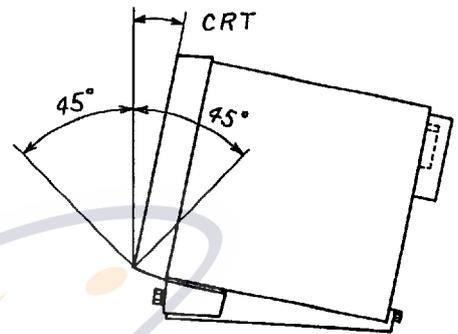


FURUNO

1.4 Display Unit

To install the display unit, the following conditions should be considered.

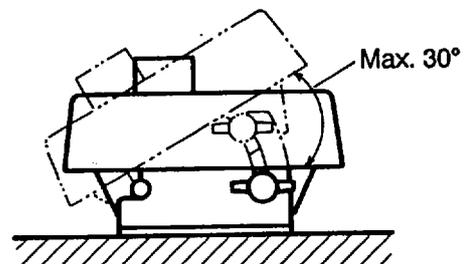
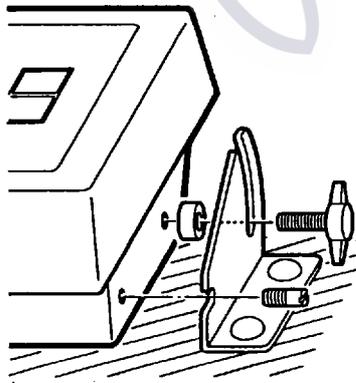
- 1) Place where operating personnel are able to control the unit easily while observing the fishing ground or area surrounding the vessel.
- 2) Place at least 1m away from magnetic components (radar magnetron, loudspeaker, high power transformer, etc.) and magnetic compass.
- 3) Place where the unit is not exposed to direct sunlight, water splashes or hot air.
- 4) Place where maintenance and ventilation clearance shown in the outline drawings is ensured.
- 5) Place where the CRT face is within $\pm 45^\circ$ from the vertical.



1.5 Control Box

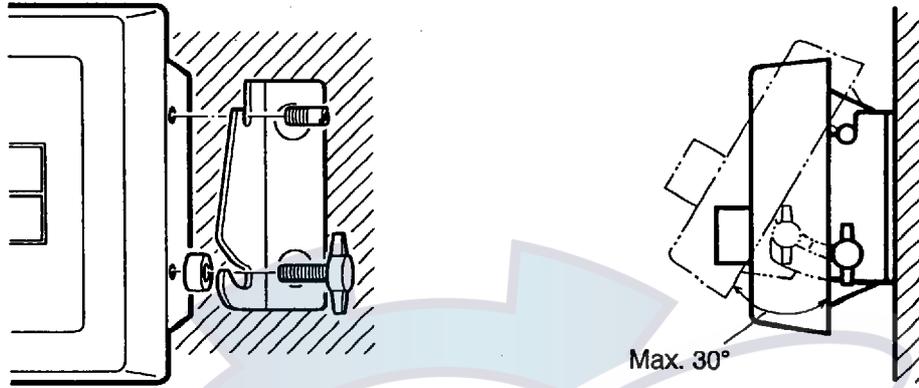
The control box can be installed not only on the table-top but also on the bulkhead if the mounting direction of the hanger is changed as shown below. Use the supplied template to determine the fixing position of the hanger.

Table-top Mounting



FURUNO

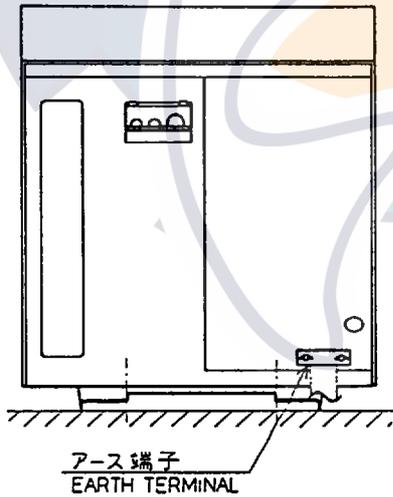
Bulkhead Mounting



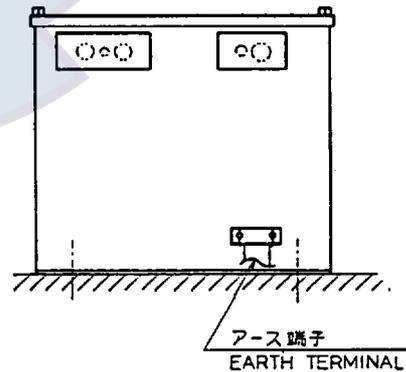
Note: When a sufficient mounting space can not be secured, exchange the right and left hangers. Necessary space can be reduced by 3cm.

1.6 Unit Grounding

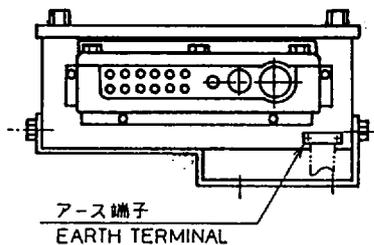
Since all units are very sensitive to noise, they should be grounded with specified copper strap or grounding wire (all units should be grounded to ship's hull).



Display Unit



Transceiver Unit



Pre-amplifier Unit

CHAPTER 2 WIRING

2.1 General Descriptions for Cabling

1) DISPLAY Cable between display and transceiver units (19 pair cable)

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

2) TX Cable between transceiver and pre-amplifier units

5m, 10m or 15m long cable is available. Both ends of the cable are fabricated at the factory. However, the connector housing is not factory-fitted at one end (pre-amplifier unit side), considering the easiness of running the cable through conduit pipe. It should be fitted 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.

3) RX Cable between transceiver and pre-amplifier units

5m, 10m or 15m long cable is available. The RX cable has factory-fitted connectors at both ends and does not require any field fabrication.

4) HULL Cable between hull and pre-amplifier units

The HULL cable is factory-connected to the hull unit, the other end being fitted with connectors at the factory.

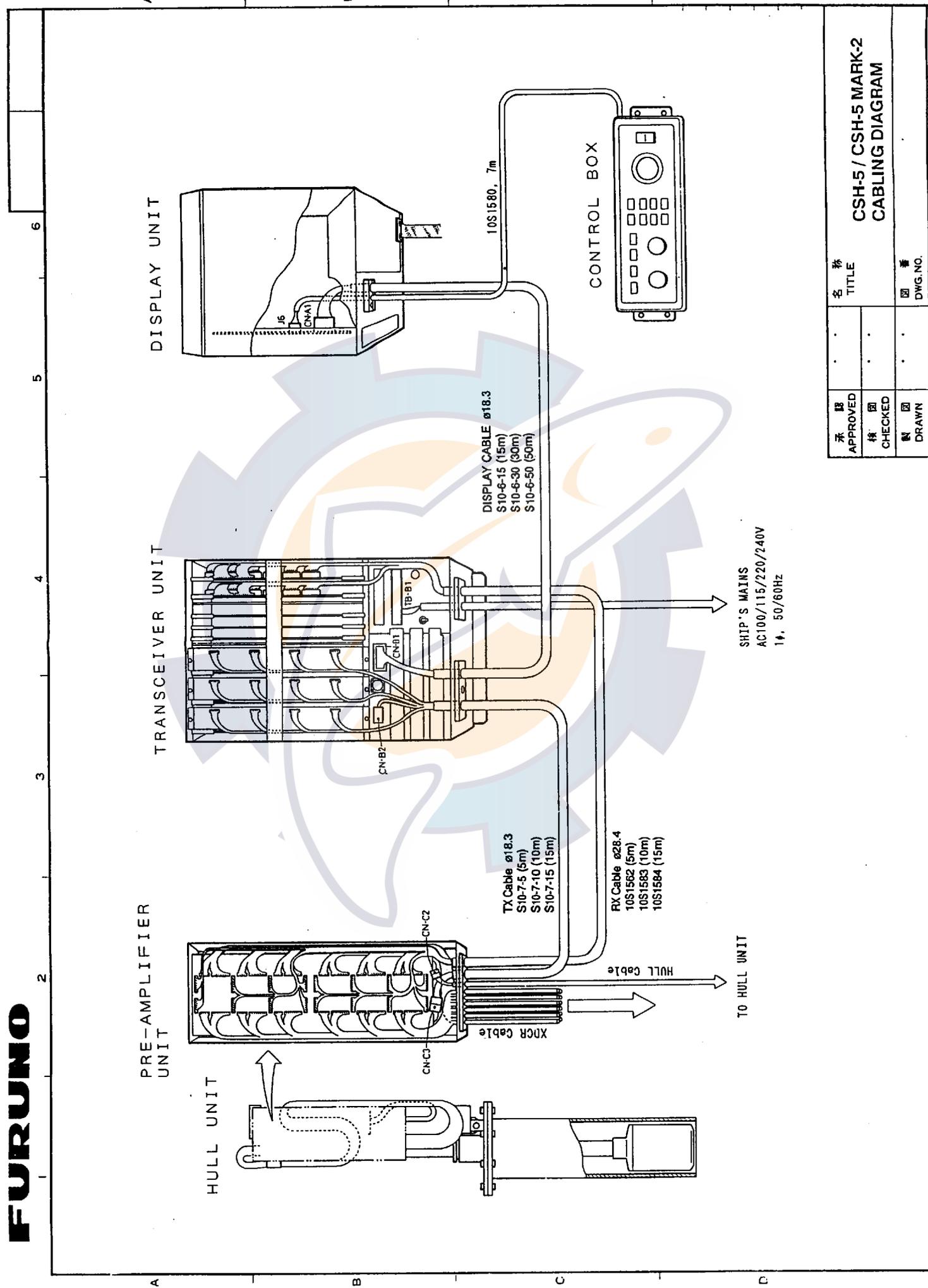


CAUTION



Ground the equipment.

Ungrounded equipment can give off or receive electromagnetic interference or cause electrical shock.



承認 APPROVED	名称 TITLE
検閲 CHECKED	
製図 DRAWN	団番 DWG.NO.

**CSH-5 / CSH-5 MARK-2
CABLING DIAGRAM**

FURUNO

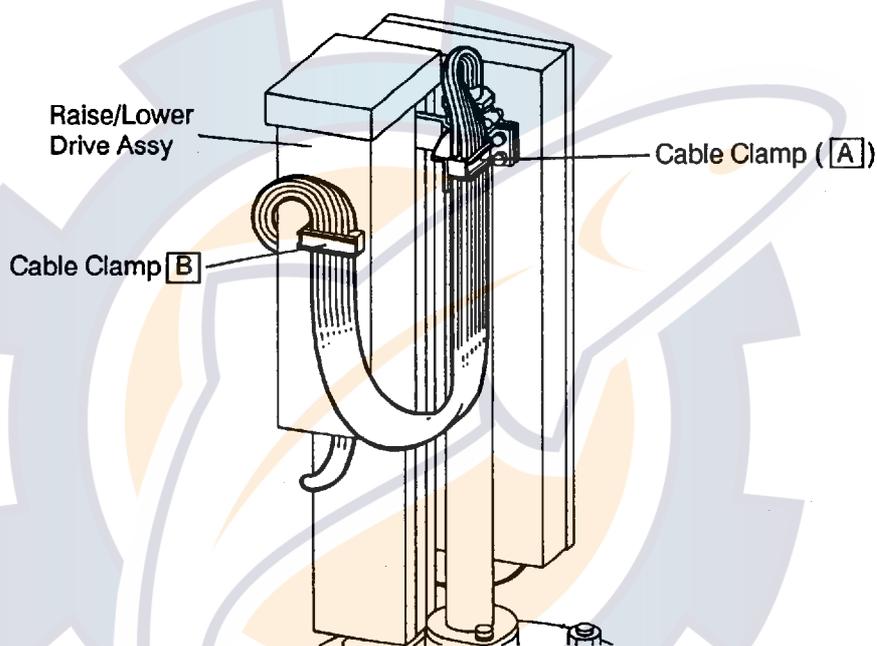
FURUNO

2.2 Hull Unit/Pre-amplifier Unit

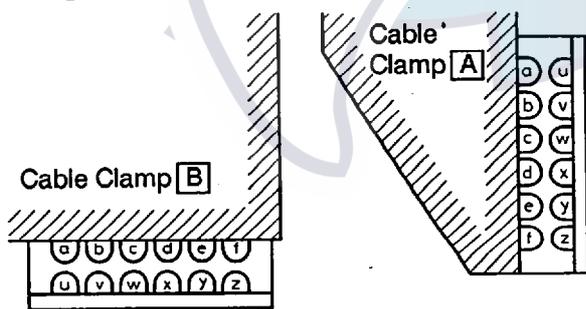
2.2.1 Transducer Cable Wiring

Excessive stretching force should not be applied to the transducer cables (12pcs.) during raise/lower operation. Follow the procedure below to run the cables.

1 Fix the 12 transducer cables with the cable clamp **A**



2 Run the cables to the cable clamp **B** and position them as shown below. Temporarily tighten the cable clamp **B**



Ex.) The cable which is fixed at **a** of the clamp **A** should pass **a** of the clamp **B**.

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

	600mm Travel Type	400mm Travel Type
Length of cable between A a and B a	660mm	580mm
Length of cable between A l and B l	690mm	610mm

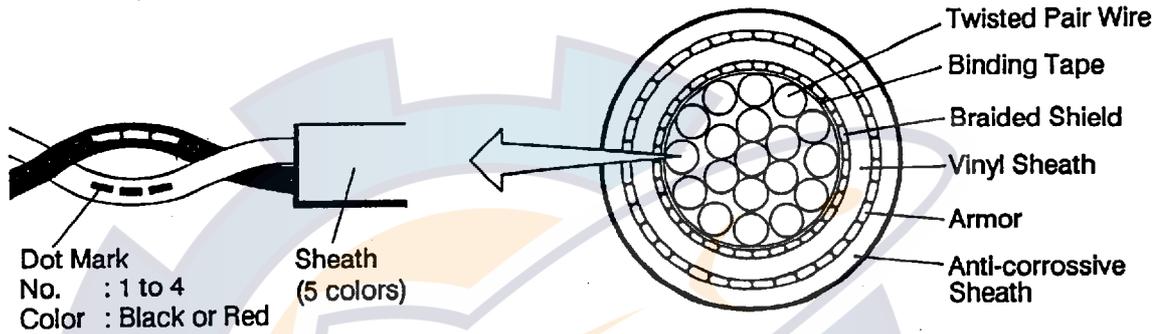
4 Adjust slack of the other ten cables so that it becomes the same as the ones adjusted at step **3**. Tighten the cable clamp **B**.

FURUNO

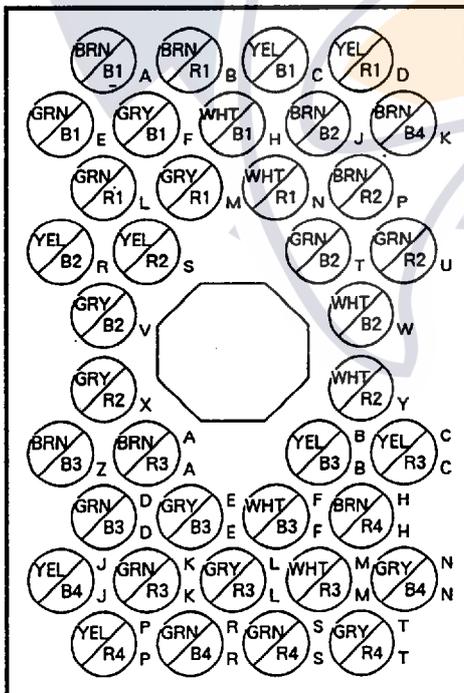
2.2.2 Fabricating TX cable (from transceiver unit)

Each wire of the TX cable has factory-fitted contact pin. Insert it into the connector housing.

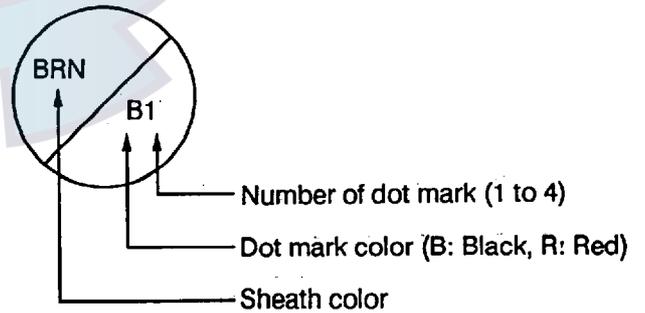
Cable Construction



Connector Pin No.-Wire Color



Note: 1. Wire discrimination



2. BRN and GRN show the following colors.

BRN ... Light brown

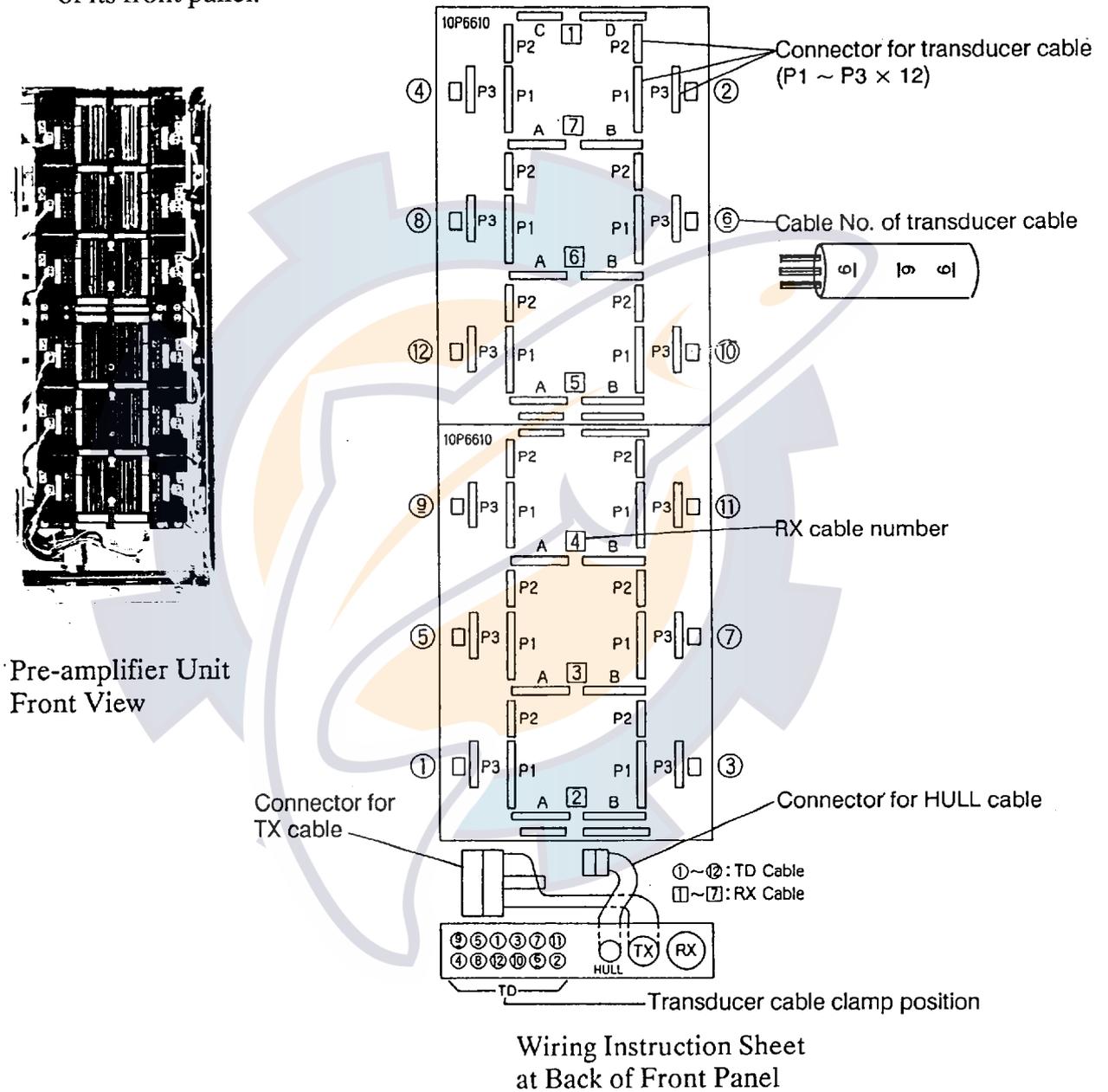
GRN ... Light green

3. Cover plate is not fitted to the connector.

FURUNO

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

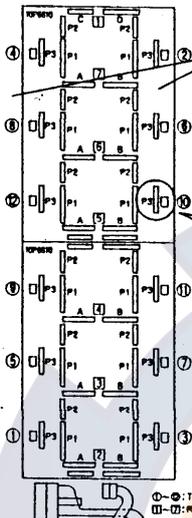
Wiring Instruction Sheet at Back of Front Panel

Procedure

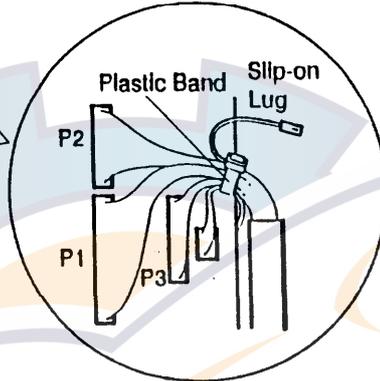
- 1 Plug in the 38P connector of the TX cable (19 pair cable).

2 Connect the transducer cables in the following order and bind the wires with plastic band. Do not connect the slip-on lugs of cables 2 to 3 at this stage.

Cable connecting order ② → ⑥ → ⑩ → ⑪ → ⑦ → ③
 ④ → ⑧ → ⑫ → ⑨ → ⑤ → ①



Run cables through this space.

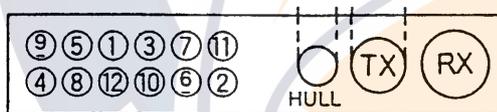


Note: Cable and connection numbers are marked on the side of each connector as shown below.



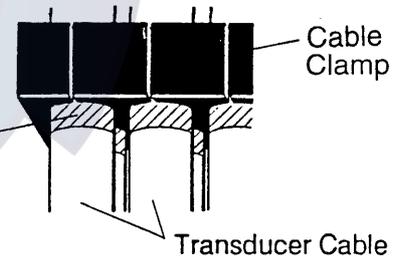
Connector No.
 Cable No.

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



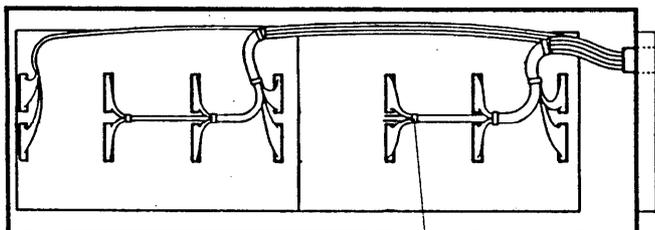
Transducer cable clamp position (Numeral shows cable number.)

Clamp Point Marking



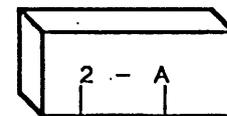
4 Pass the HULL and RX cables through the cable clamp, and assemble/tighten the cable clamp.

5 Run the RX cable as shown below and plug-in the connectors.



Fix the wires to the board with plastic band.

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



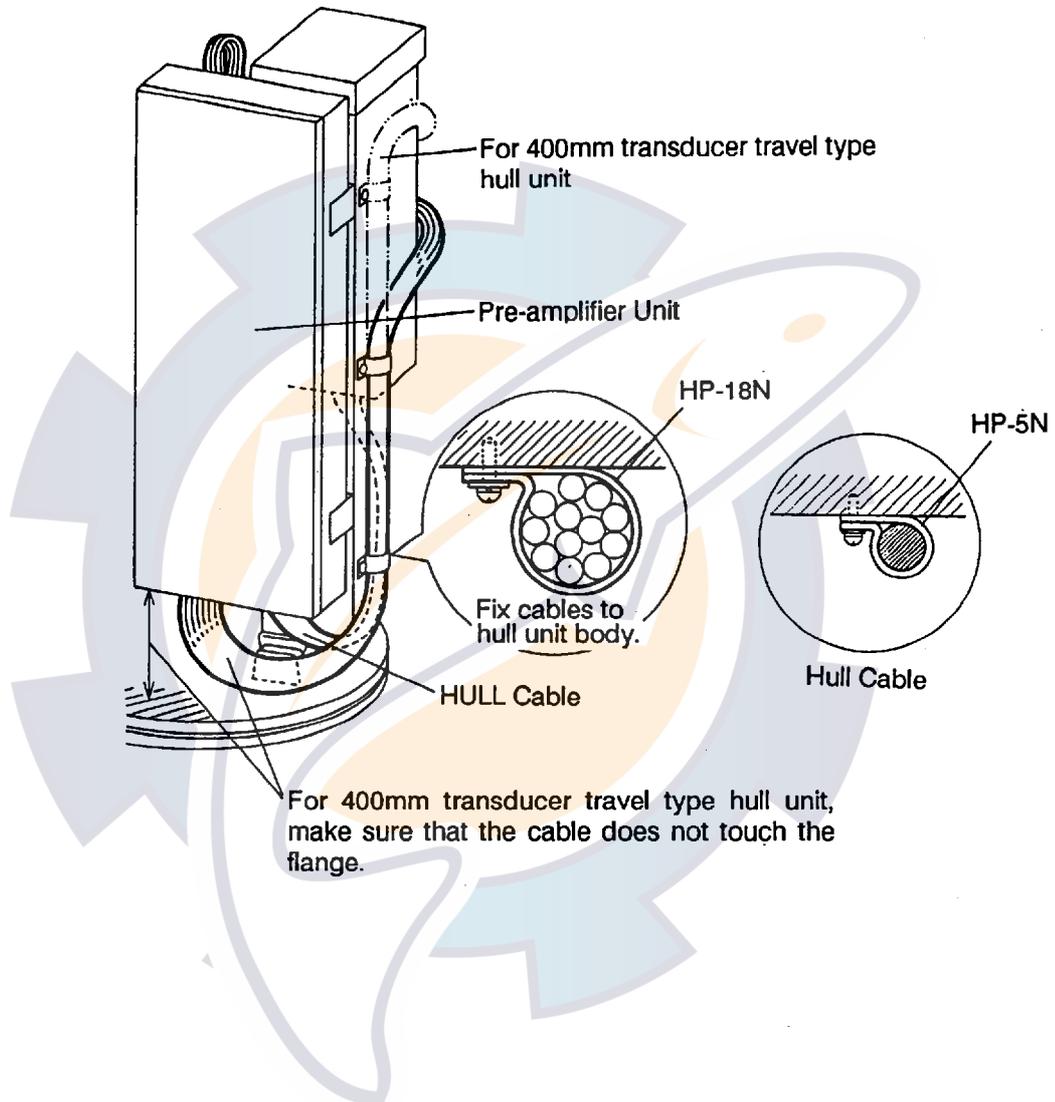
Connector No.
 Cable No.

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

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2.2.4 Fixing Transducer and HULL Cables

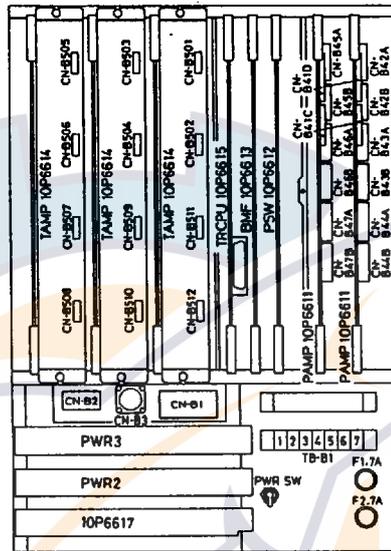
Fix the transducer and HULL cables to the hull unit body with cable bands.



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2.3 Transceiver Unit

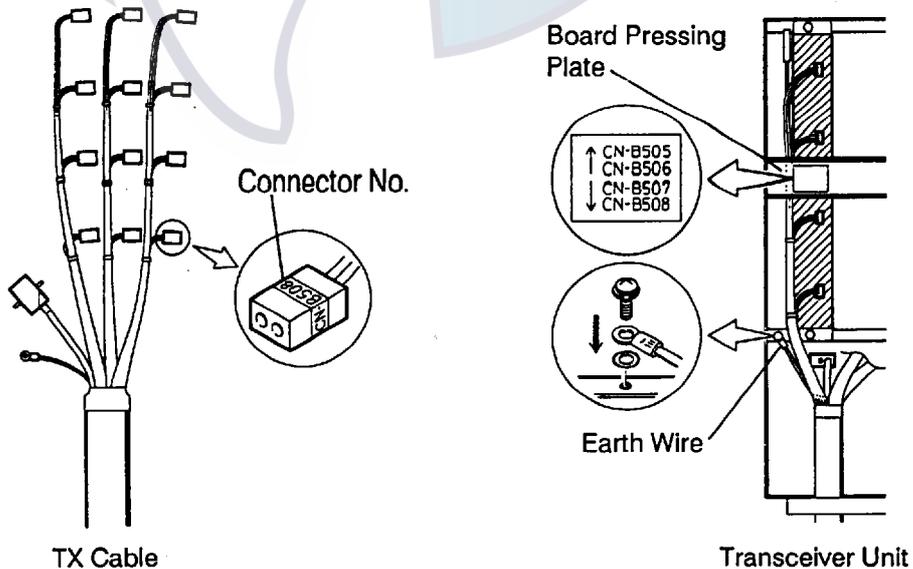
All cables, except for power cable, connected to the transceiver unit have factory-fitted connectors and lugs.



Connector/Terminal Board Location in Transceiver Unit

2.3.1 Connecting TX Cable

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

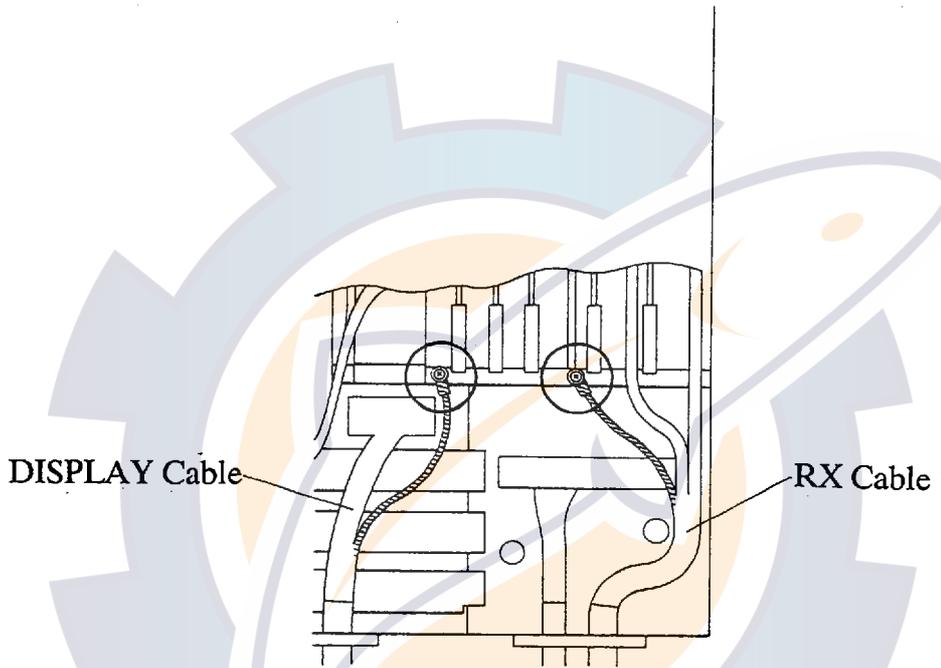


FURUNO

2.3.2 Connecting RX Cable

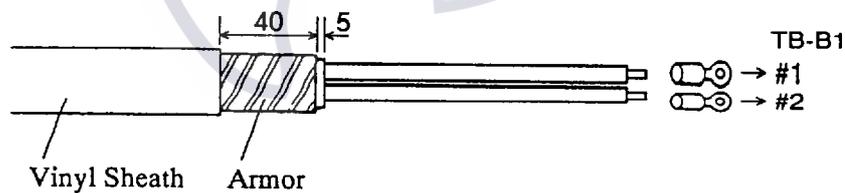
The connector numbers are marked on respective plugs. Connect them, referring to the instruction at the back of the front panel of the transceiver unit.

NOTE: CN-B41C/41D are provided on the both PAMP boards and you may use either side.

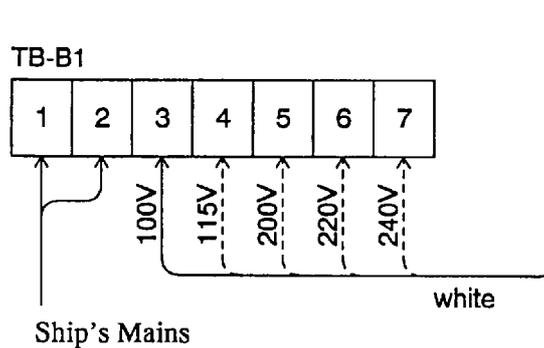


Grounding Wire Connections of DISPLAY and RX Cables

2.3.3 Connecting Power Cable



Note: Change connection of white wire at the TB-B1 according to be ship's mains.



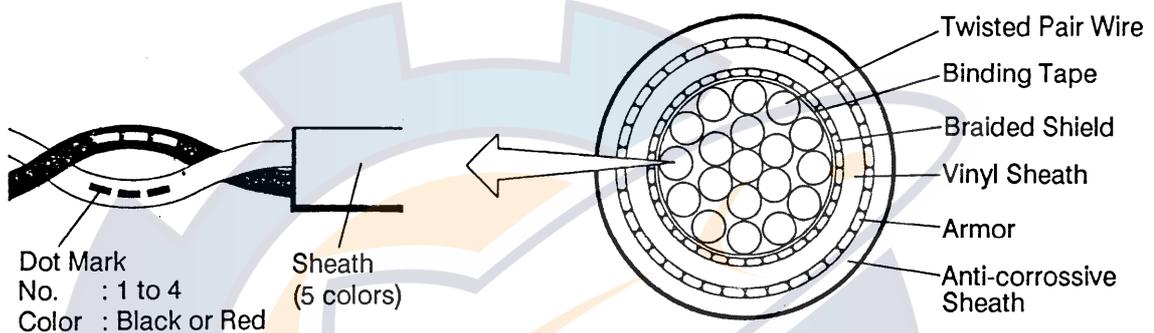
FURUNO

2.4 Display Unit

2.4.1 Cable Fabrication

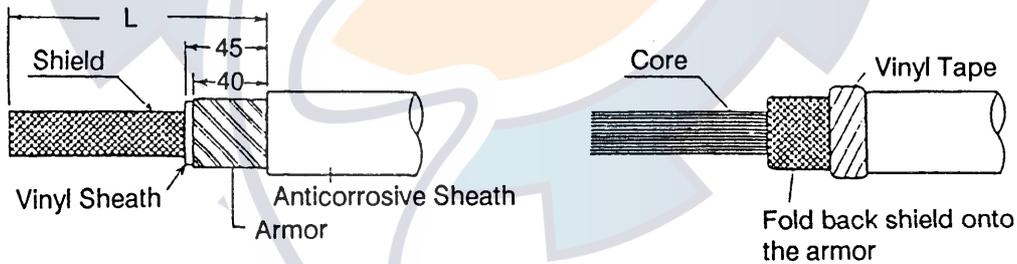
The display unit side of the DISPLAY cable (interconnection cable between display and transceiver units) is not fabricated at the factory. Install the 38P connector locally.

Cable Construction



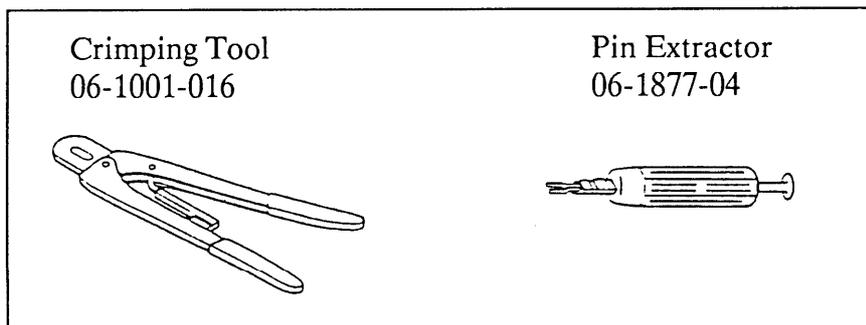
Cable Fabrication

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



Connecting Contact Pins

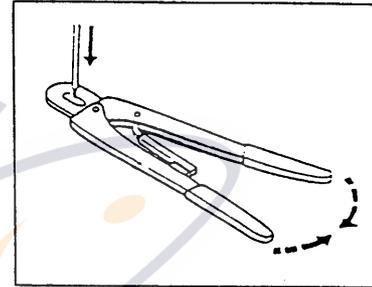
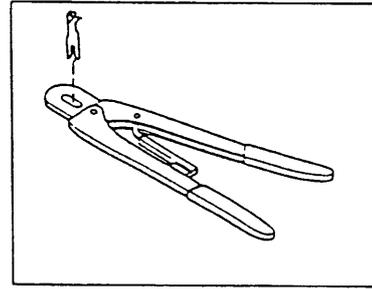
A special crimping tool is necessary for connection of wires to the contact pins of 38P connector. In addition, a pin extractor should be used to remove the contact pin from the connector housing. The following describes how to crimp and extract the contact pin.



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1. Wire Crimping Procedure

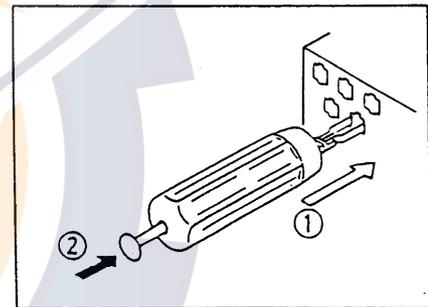
- 1) Strip the vinyl sheath of the wire to expose the core by 3.2mm - 4mm.
- 2) Hold the crimping tool horizontally and insert the contact pin, with its slit faced downward, into the crimp hole of the crimping tool.
- 3) From the same side, place the wire onto the contact pin and squeeze the handle until the ratchet is released. Pull the wire to make sure that it is securely crimped.



2. Procedure to Extract Contact Pin

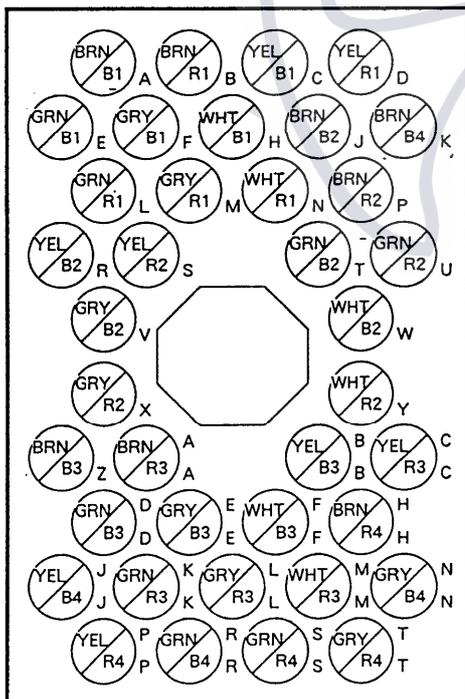
When a contact pin has been inserted into an incorrect hole on the connector housing, remove it by using the pin extractor.

- 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.

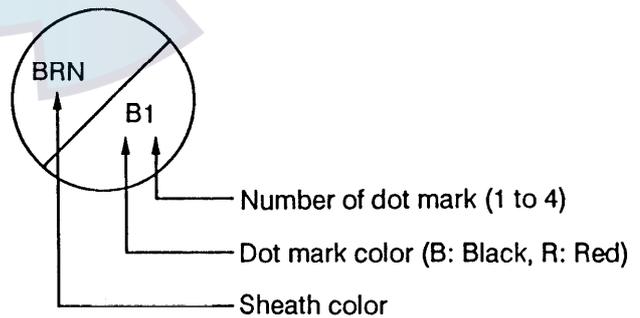


Inserting Contact Pin Into Connector Housing

The wires fitted with contact pins should be inserted into the connector housing referring to the drawing below or interconnection diagram on page S-1.



Note: 1. Wire discrimination



2. BRN and GRN show the following colors.

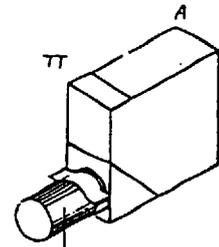
BRN ... Light brown
GRN ... Light green

3. Cover plate is not fitted to the connector.

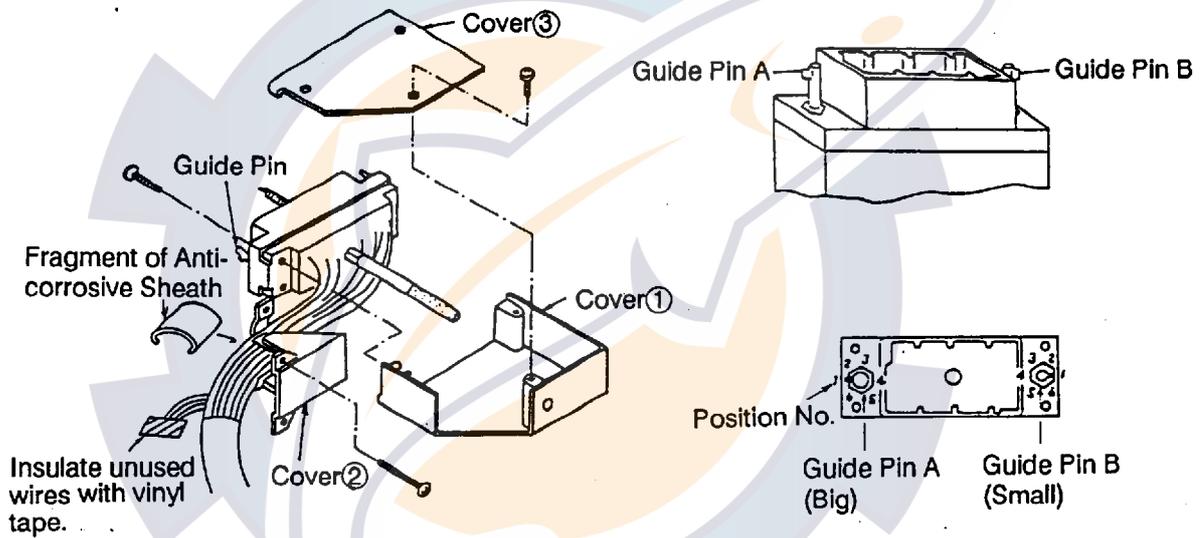
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Assembling Connector Housing

1. Fix the cover ①, paying attention to the cable outgoing direction.
2. Dress the wires and fix covers ② and ③.
3. Use a fragment of cable sheath to secure the wires at the connector clamp.
4. Cut the unused wires to proper lengths and wrap their ends with vinyl tape.

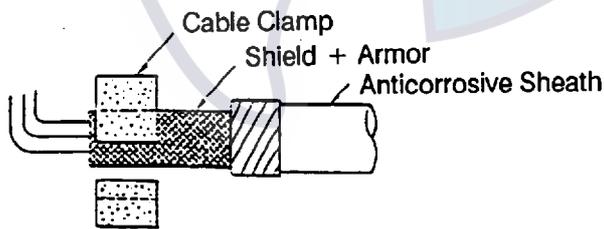


Cable Outgoing Direction



Clamping Cable

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



Plugging-in Connector

Plug-in the connector to CN-A1 in the display unit.

2.5 Control Box

Connect the interconnection cable of the control box to J6 on MAIN board in the display unit.

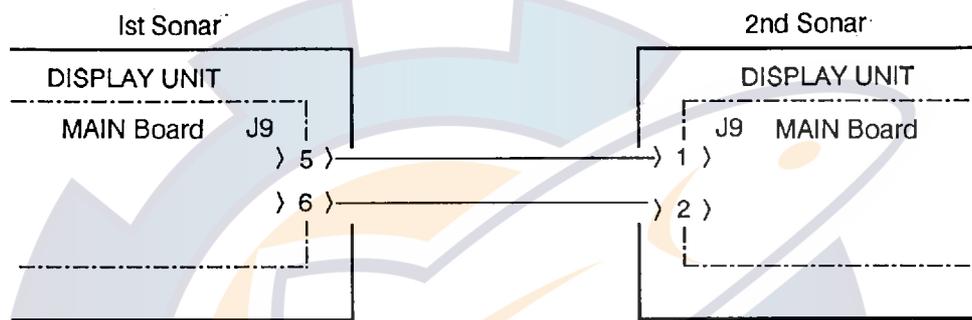
FURUNO

2.6 Synchronizing Transmission with Other Equipment

2.6.1 Synchronizing with another CSH-5/CSH-5 MARK-2

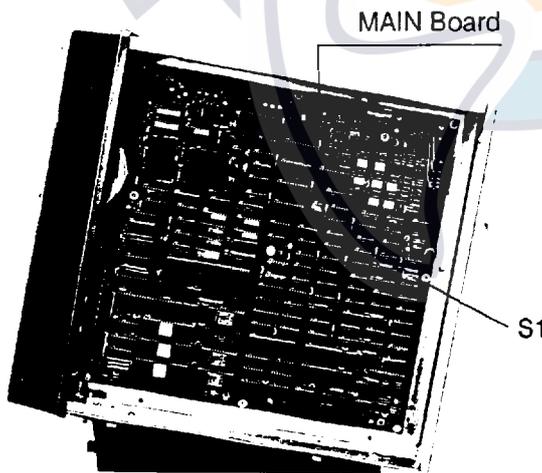
When two CSH-5 MARK-2's are installed, make connections as shown below, and the transmission of the 2nd sonar is synchronized with that of the first sonar.

1) Wiring



2) DIP Switch Setting

Set DIP switch S1 on the MAIN board as follows.



DIP SW	1st Sonar	2nd Sonar
S1-#2	/	OFF
S1-#1	ON	/

3) Menu Setting

Set the external KP item of MENE-2 to "ON" for the 2nd Sonar.

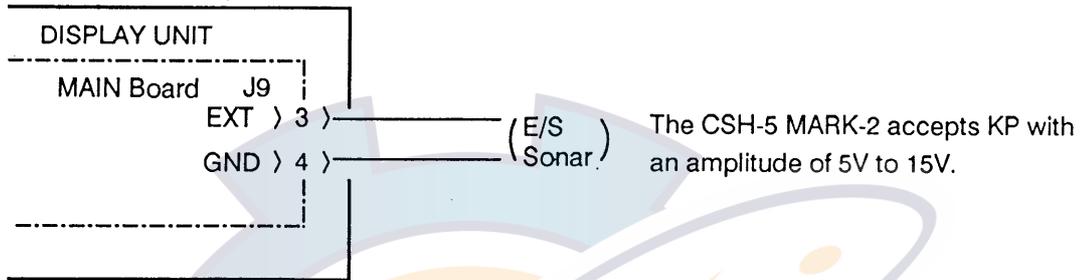
Refer to the operator's manual for the menu setting procedure.

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2.6.2 Synchronizing with echo sounder or other sonar

To synchronize the transmission of the CSH-5 MARK-2 with an echo sounder or other type of sonar, make connections as shown below.

1) Wiring



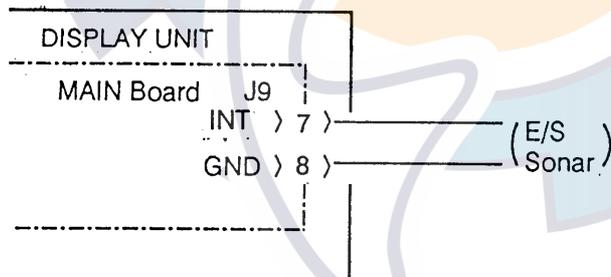
2) DIP Switch Setting

Set DIP switch S1-#2 on the MAIN board to “OFF” when the positive KP is fed and “ON” when negative.

3) Menu Setting

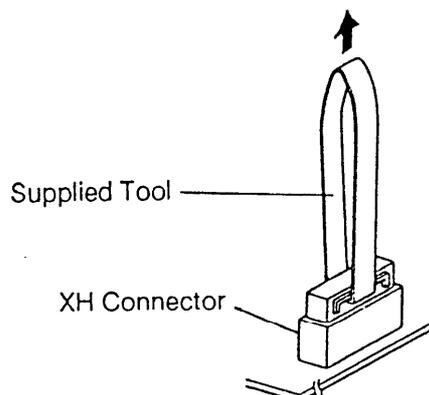
Set the external KP item of MENU-2 to “ON”.

Note: To output the KP of the CSH-5 MARK-2 to other sonar or echo sounder, make connections as shown below.



2.7 Unplugging XH Connector

When unplugging the XH connector in the pre-amplifier and transceiver units, use the supplied tool as shown at right.

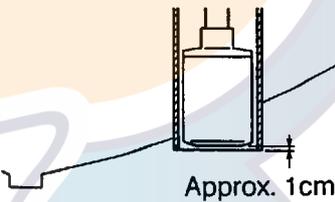
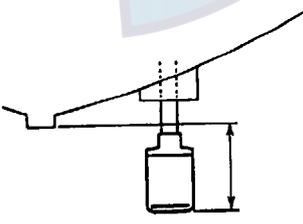
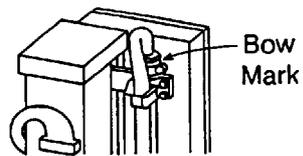


CHAPTER 3. AFTER-INSTALLATION CHECK AND ADJUSTMENT

3.1 General Check

3.1.1. Check on Slipway or in Drydock

Before the ship is launched, check the following points.

No.	Check Item	Ratings	Refer to page	Result
1	Retraction Tank Level	<p>On-keel Installation</p>  <p>Flush with keel</p> <p>Off-keel Installation</p>  <p>within 1m</p>	1-1 1-2	
2	Clearance between transducer and bottom of retraction tank when transducer is completely retracted by hand crank.	 <p>Approx. 1cm</p>	D-9 D-10	
3	<p>Transducer Travel (lowered by hand crank)</p> <p>CAUTION:When checking, a clearance of approximately 1m is required under the bottom of the transducer.</p>	 <p>Minimum Value is 300mm</p>		
4	Transducer Heading	 <p>Bow Mark</p> <p>Bow mark inscribed on main shaft should face ship's bow.</p>	1-6	

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3.1.2 Overall Check

WARNING

Only qualified personnel should work inside the equipment.

This equipment uses high voltage electricity which can shock, burn, or cause death.

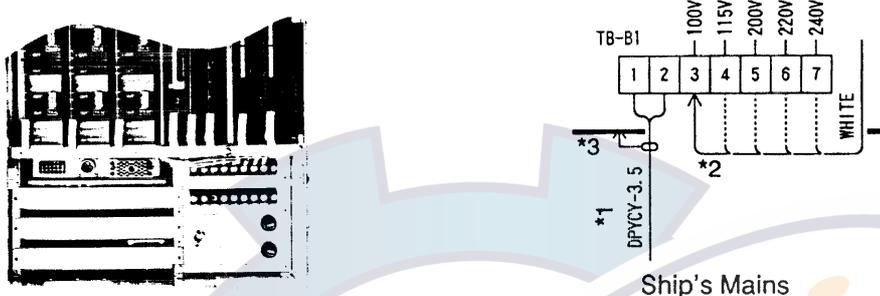
No.	Check Item	Ratings	Refer to page	Result
1	Wiring Check	1) All cables are correctly connected. 2) All lead wires are tightly fixed with contact pins or crimp-on lugs. 3) All screws are securely tightened. 4) Cables are firmly bound. 5) Cable shields are properly grounded.		
2	Rejecting Source of Noise and Interference	1) Noise generating machines are not placed nearby, e.g., motor, radiotelephone, transmitter unit, TV set, etc. 2) Magnetic devices are not placed in the vicinity of display unit.	1-11	
3	Grounding	Each unit is grounded with a copper strap.	1-12	
4	Ship's Mains Voltage	Ship's mains voltage is stable at 100/115/200/220/240VAC.	3-3	
5	Watertightness	Water should not leak from the main body flange or along the main shaft.		
6	Heading Alignment	A target is displayed in the correct bearing.	3-8	

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3.2 Line Voltage and LED Status Check

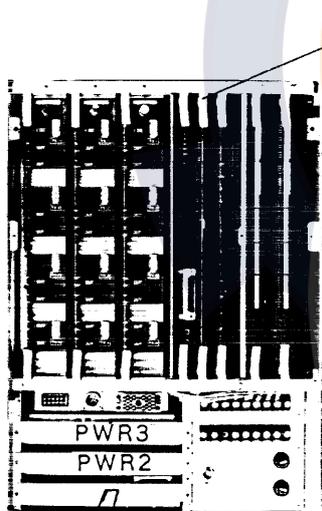
3.2.1 Transceiver Unit

1) Check that ship's mains lines are connected to the specified terminals.-----

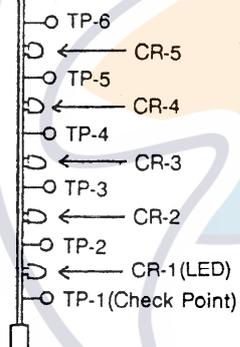


Confirm that the ship's mains voltage is stable and within $\pm 15\%$ of the rated value.-----

2) Line voltage check



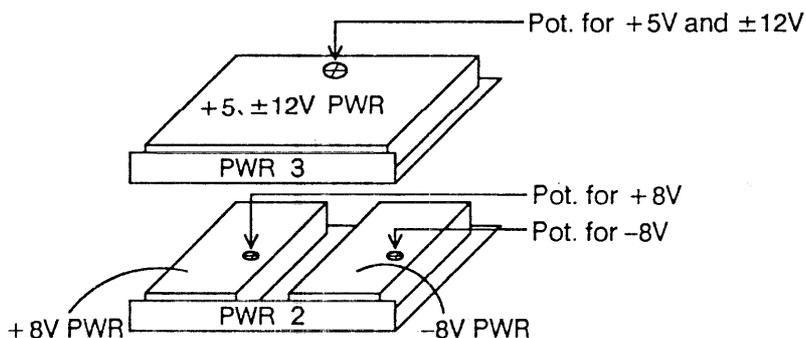
Check voltages at test points and LEDs on PSW (10P6612) board-----



Line	LED	TP	Measured Value (Allowance)
+5V	CR5	TP-6	V ($\pm 5\%$)
-12V	CR4	TP-5	V ($\pm 10\%$)
+12V	CR3	TP-4	V ($\pm 10\%$)
-8V	CR2	TP-3	V ($\pm 5\%$)
+8V	CR1	TP-2	V ($\pm 5\%$)
GND		TP-1	

When the voltage is out of allowance, adjust as follows.

Slide out RWR 2 and RWR 3. (Take care of wires connected.)

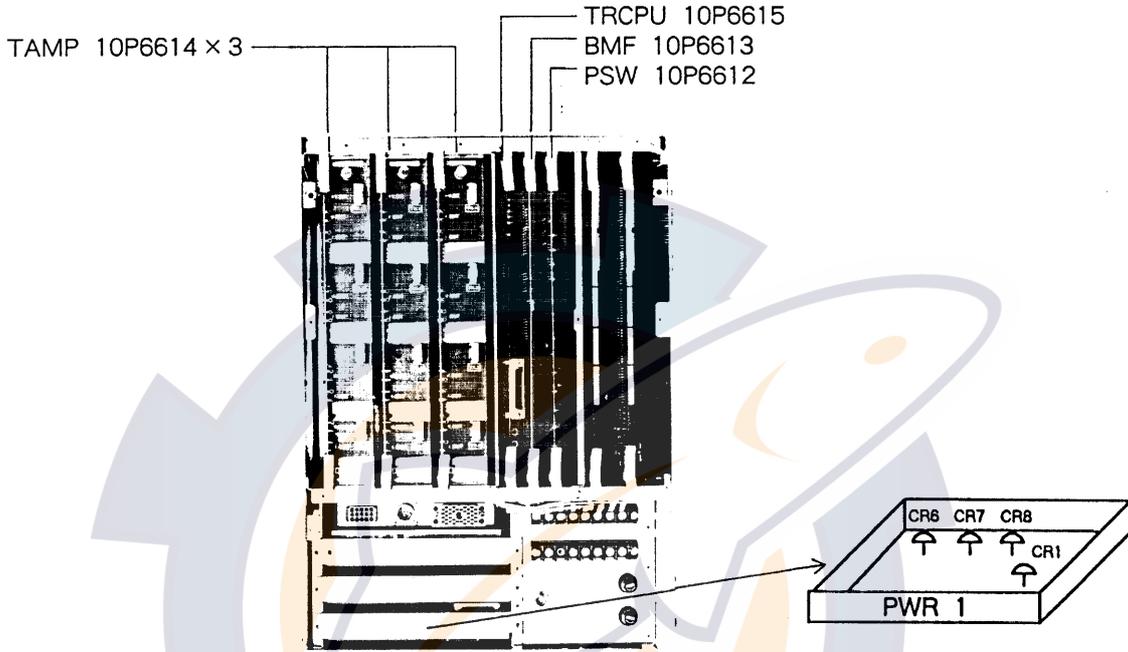


Connect the multimeter to the test points on the PSW board (10P6612) and adjust the potentiometer for a rated voltage.

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3) LED Status Check

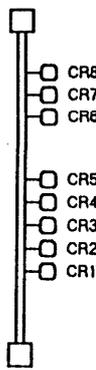
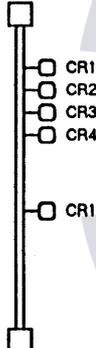
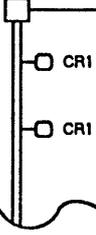
Check the LED status on the PC boards -----



○; Light ●; Flicker ●; Off

PCB	LED			Remarks																												
	No.	Signal	Status																													
TRCPU 10P6615 	CR3	KPR	●	Flickers all the time.																												
	CR6	RXD	●	Lights with serial data input from display unit.																												
	CR7	TXD	●	Lights with serial data output to display unit.																												
	CR9	KP	●	Flickers during transmission (TX SW:ON, XDCR:Lowered).																												
	CR12			Change status with tilt angle. <table border="1" style="margin: 5px auto;"> <thead> <tr> <th>TLT</th> <th>CR12</th> <th>CR13</th> <th>CR14</th> <th>CR15</th> <th>CR16</th> <th>CR17</th> </tr> </thead> <tbody> <tr> <td>0°</td> <td>●</td> <td>●</td> <td>●</td> <td>●</td> <td>●</td> <td>●</td> </tr> <tr> <td>10°</td> <td>●</td> <td>○</td> <td>●</td> <td>○</td> <td>●</td> <td>●</td> </tr> <tr> <td>55°</td> <td>○</td> <td>○</td> <td>○</td> <td>●</td> <td>○</td> <td>○</td> </tr> </tbody> </table>	TLT	CR12	CR13	CR14	CR15	CR16	CR17	0°	●	●	●	●	●	●	10°	●	○	●	○	●	●	55°	○	○	○	●	○	○
	TLT	CR12	CR13		CR14	CR15	CR16	CR17																								
	0°	●	●		●	●	●	●																								
	10°	●	○		●	○	●	●																								
	55°	○	○		○	●	○	○																								
	CR13																															
	CR14																															
CR15																																
CR16																																
CR17																																
CR22	-12V		○																													
CR23	+12V																															

FURUNO

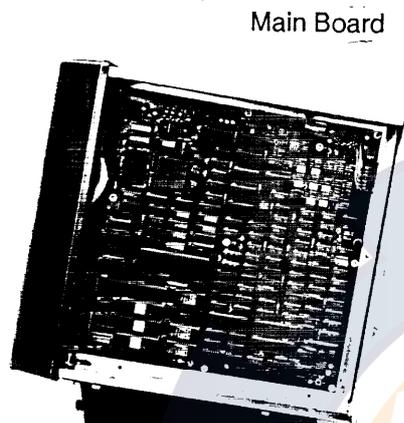
PCB	LED			Remarks	
	No.	Signal	Status		
PSW 10P6612 	CR1	+8V	○		
	CR2	- 8V	○		
	CR3	+12V	○		
	CR4	- 12V	○		
	CR5	+5V	○		
	CR6	O.SIG	●	Lights with received echoes.	
	CR7	E.SIG	●	Ditto	
	CR8	AUDIO	●	Ditto	
	BMF 10P6613 	CR1	SIG 0	●	Lights with received echoes.
CR2		SIG 1	●	Ditto	
CR3		SIG 2	●	Ditto	
CR4		SIG 3	●	Ditto	
CR14		FS	○*	Flikers with FS signal.(Looks as if it is lighting.)	
TAMP 10P6614 	CR1	TX	●	Lights every transmission.	
PWR 10P6617	CR1	U/D	○/●	XDCR rising:Lights, XDCR lowering:off	
	CR6	TX PWR1	○	Voltage for TAMP1	CR8 is brightest and CR6 darkest.
	CR7	TX PWR2	○	Voltage for TAMP2	
	CR8	TX PWR3	○	Voltage for TAMP3	

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3.2.2 Display Unit

1) Line Voltage Check

Check line voltages at test points on MAIN board 10P6601 -----

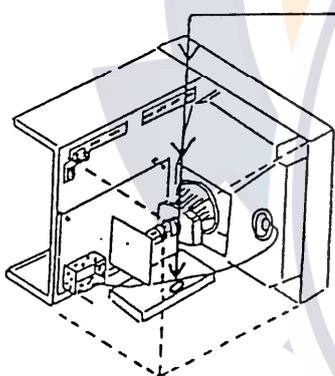


Main Board

- MAIN
(10P6601)
- TP - 11
 - TP - 12
 - TP - 13
 - ⊖ CR - 36
 - ⊖ CR - 38
 - ⊖ CR - 40
 - TP - 15

Line	LED	TP	Measured Value (Allowance)
+5V	CR36	TP11	V (±5%)
+12V	CR38	TP12	V (±10%)
-12V	CR40	TP13	V (±10%)
GND		TP14	

When the voltage is out of the allowance, adjust it as follows.



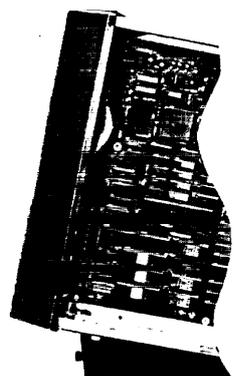
Potentiometer for +5V and ±12V adjustment

Since the power pack is located on the bottom of the unit, a long screwdriver is required. Be aware of high voltage.

Connect the multimeter to the test points on the MAIN board and adjust the potentiometer for a rated voltage.

2) Check of LED Status

Check the LED status on the MAIN (10P6601) board. -----



- MAIN
(10P6601)
- ⊖ CR12
 - ⊖ CR13
 - ⊖ CR15

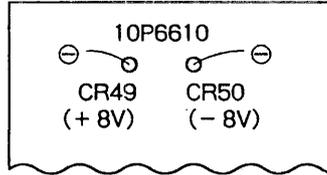
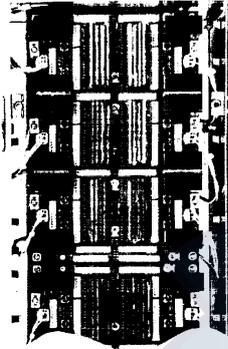
No.	LED		Remarks
	Signal	Status	
CR12	TXD	●	Serial data to transceiver unit
CR13	RXD	●	Serial data from transceiver unit
CR15	KPR	●	Lights during KPR period

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3.2.3 Preampifier Unit

1) Line Voltage Check

Check the LED on the PBUF (10P6610) board. -----



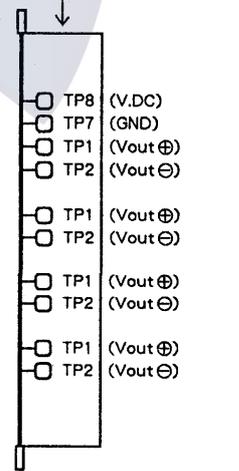
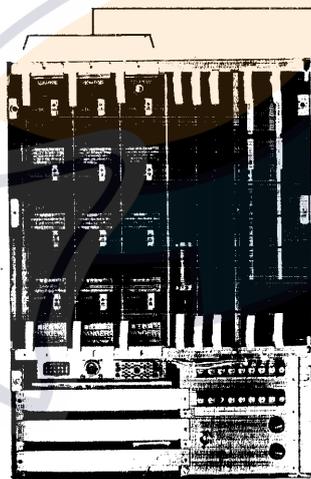
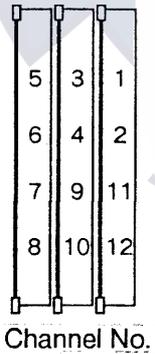
Since the test points for +8V and -8V lines are not provided, check the voltages with LEDs.
+8V and -8V are supplied from the transceiver unit.

3.3 Measurement TX Output Signal

1. Set the controls of the display unit as follows

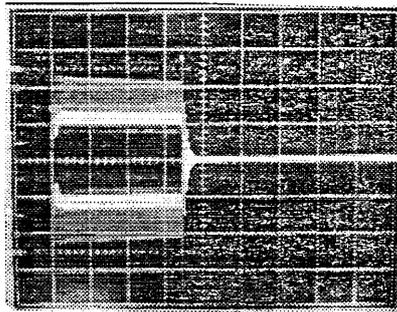
Range: 400m Output: 10 (Max.) Ver. Beam: Wide
Tilt: 0° Pulselength: 10 (Max.)

2. Connect the oscilloscope across Vout + and Vout - jacks on the TAMP board (10P6614) and measure the peak-to-peak voltage of the TX signal at the center point of its pulselength.



Test Point Location

Waveform measured across Vout ⊕ and Vout ⊖



2ms/div. 50V/div.

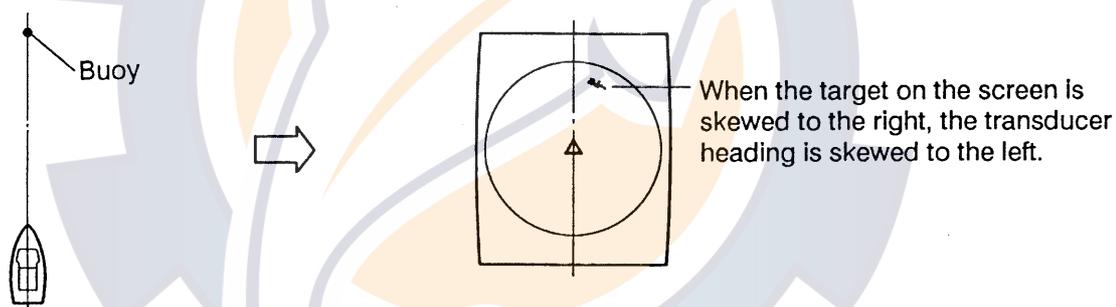
To measure the peak-to-peak voltage (Vpp), expand the waveform to 5ms/div. In the example shown on the previous page, the amplitude is 220Vpp.

Typical Value of TX Output

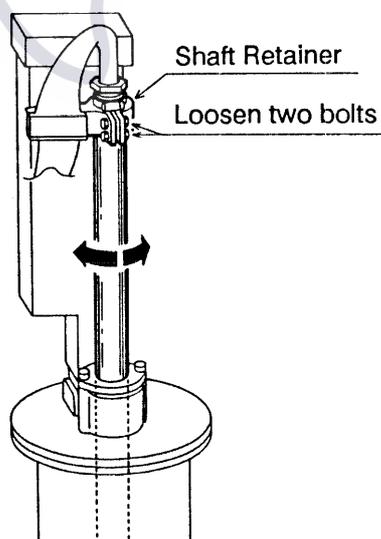
CH	Vout (+) - (-)	CH	Vout (+) - (-)	CH	Vout (+) - (-)
1	100Vpp	5	250Vpp	9	190Vpp
2	100Vpp	6	250Vpp	10	190Vpp
3	190Vpp	7	250Vpp	11	100Vpp
4	190Vpp	8	250Vpp	12	100Vpp

3.4 Heading Alignment

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



2. When the heading alignment is incorrect, rotate the main shaft after loosening two bolts.



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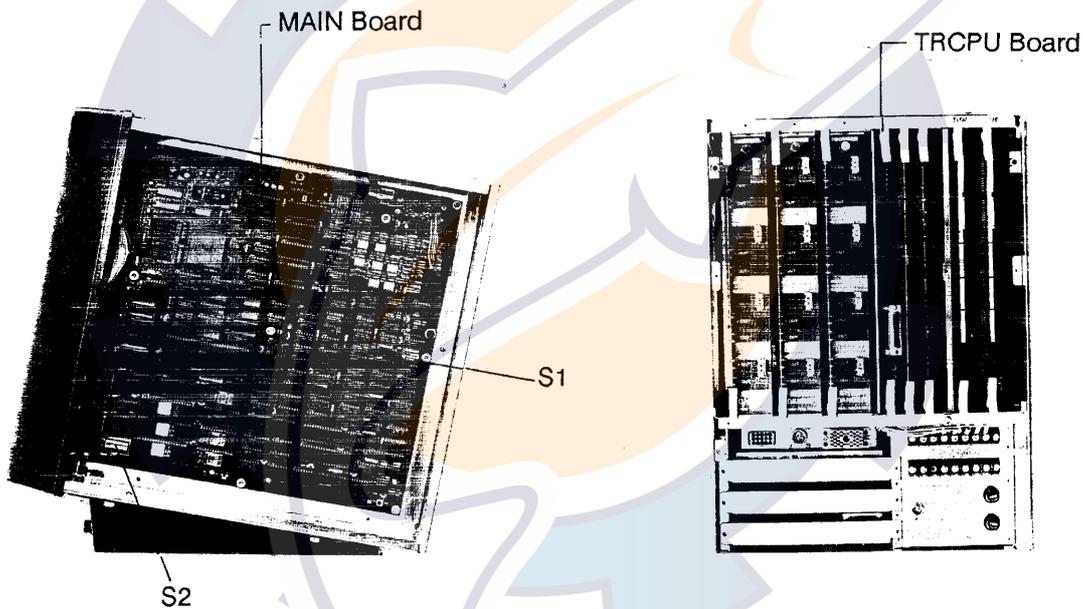
3. After the adjustment, do not fail to fasten the loosened bolts.

NOTE: 1. The heading alignment can be performed on the menu screen of the display unit if the heading error is small. When the error is large, the shaft should be rotated; the tank guide should be oriented to ship's fore-aft direction to reduce shock applied to the main shaft due to ship's pitching.

2. Refer to the operator's manual for the heading alignment on the menu screen.

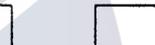
3.5 DIP Switch Setting

Check the DIP switch settings on the MAIN board in the display unit and TRCPU board in the transceiver unit.



PCB	DIP Switch				Function								
	Symbol	No.	ON	OFF									
TRCPU 10P6615	S1	1	<input type="checkbox"/>	<input type="radio"/>	PTVG curve saturation point								
		2	<input type="radio"/>	<input type="checkbox"/>	1	ON	200m	OFF	400m	ON	600m	OFF	800m
		3	<input type="radio"/>	<input type="checkbox"/>	Gain at R=100m point								
		4	<input type="checkbox"/>	<input type="radio"/>	3	ON	109dB	OFF	114dB	ON	119dB	OFF	124dB
		5	<input type="checkbox"/>	<input type="radio"/>	TVG curve for R ≥ 100m								
		6	<input type="radio"/>	<input type="checkbox"/>	5	ON	25log	OFF	30log	ON	35log	OFF	40log
		7	<input type="checkbox"/>	<input type="radio"/>	TVG NEAR curve terminating point								
		8	<input type="radio"/>	<input type="checkbox"/>	7	ON	300m	OFF	400m	ON	500m	OFF	600m

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PCB	DIP Switch				Function
	Symbol	No.	ON	OFF	
TRCPU 10P6615	S2	1	<input type="radio"/>		} Do not change settings
		2	<input type="radio"/>		
		3	<input type="radio"/>		
		4		<input type="radio"/>	
		5	<input type="radio"/>		
		6	<input type="radio"/>		
		7	<input type="radio"/>		
		8	<input type="radio"/>		
MAIN 10P6601	S1	1	<input type="radio"/>		Polarity of KP output ON:  OFF: 
		2	<input type="radio"/>		Polarity of external KP input ON:  OFF: 
		3	<input type="radio"/>		} Do not change settings
		4	<input type="radio"/>		
	S2	1	<input type="radio"/>		} Do not change setting.
		2	<input type="radio"/>		
		3	<input type="radio"/>		
		4	<input type="radio"/>		
		5	<input type="radio"/>		
		6	<input type="radio"/>		
		7	<input type="radio"/>		
		8	<input type="radio"/>		

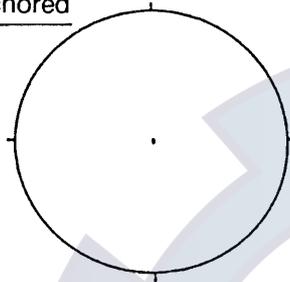
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3.6 Check at Sea Trial

3.6.1 Cruising Noise Check

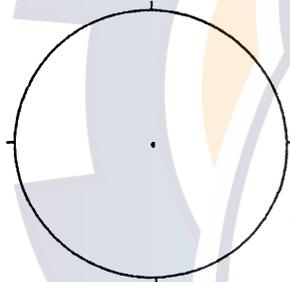
Check and record the cruising noise displayed on the screen with the transmitter turned off while the ship is anchored and also while the ship runs at a normal speed in which the sonar is used.

Ship Anchored



NL		
RANGE	1000 m	ENG RPM
GAIN	5.0	SPEED
TVG	N <input type="checkbox"/> F <input type="checkbox"/>	SEA CONDITION
TILT	0°	
DEPTH		

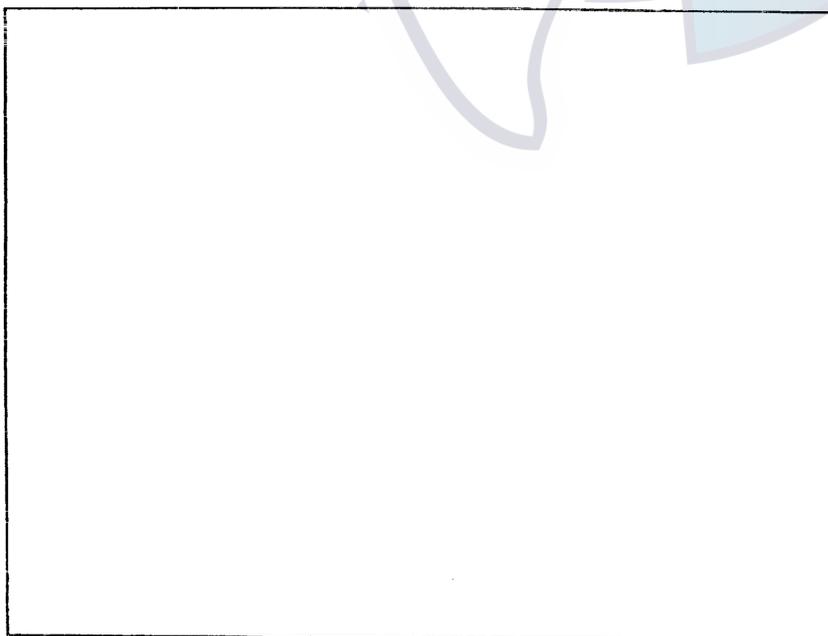
Ship at Normal Speed



NL		
RANGE	1000 m	ENG RPM
GAIN	5.0	SPEED
TVG	N <input type="checkbox"/> F <input type="checkbox"/>	SEA CONDITION
TILT	0°	
DEPTH		

3.6.2 Recording Proper Settings at Sea Trial

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



RANGE	<input type="text"/>
TILT	<input type="text"/>
TVG	N <input type="checkbox"/> F <input type="checkbox"/>
GAIN	<input type="text"/>
OUTPUT	<input type="text"/>
PL	<input type="text"/>
NOISE LIM	<input type="text"/>
AGC	<input type="text"/>
VP	<input type="text"/>
IR	<input type="text"/>

APPENDIX 1. INSTALLING CSH-5 MARK-2 ON THE RETRACTION TANK OF CH/FH SERIES SONARS OR BY USING 1800/3500MM TANK

When the CSH-5 sonar is installed by using the retraction tank of the CH or FH series sonar already fitted on board, the following type of the hull unit should be used depending on the length of the retraction tank. When 1800mm or 3500mm tank is used, proper type of hull unit should also be selected.

Tank length (L) mm	Hull Unit Type	Remarks
$600 \leq L \leq 750$	CSH-5040-FFx13	XDCR Cable: 4200mm, Main Shaft: 1300mm
$750 < L \leq 1000$	CSH-5040-FFx15	XDCR Cable: 4200mm, Main Shaft: 1550mm
$1000 < L \leq 1800$	CSH-5040-FFx23	XDCR Cable: 4900mm, Main Shaft: 2350mm
$1800 < L \leq 3500$	CSH-5040-FFx40	XDCR Cable: 6600mm, Main Shaft: 4065mm

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

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

The watertight attachment is standard supply in the CSH-5040-FFx40.

- 3. FF; Frequency, x; Retraction tank type*

I. Installation on More Than 750mm Long Retraction Tank

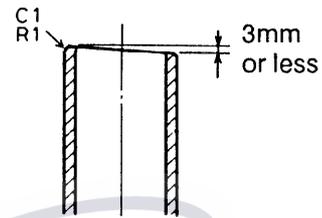
1 Calculate the necessary length of the main shaft.

- Main Shaft Length = Tank Length + 565mm (See page AP1-5.)
- When a sufficient space can be secured above the hull unit, it is unnecessary to cut the main shaft; the main shaft is installed with its top portion protruded beyond the top of the hull unit.
- When the excessive length of the main shaft is less than 50mm, use it without cutting it. Fitting job of the waterproof attachment becomes unnecessary. Note, however, that protrusion length of the transducer is reduced.

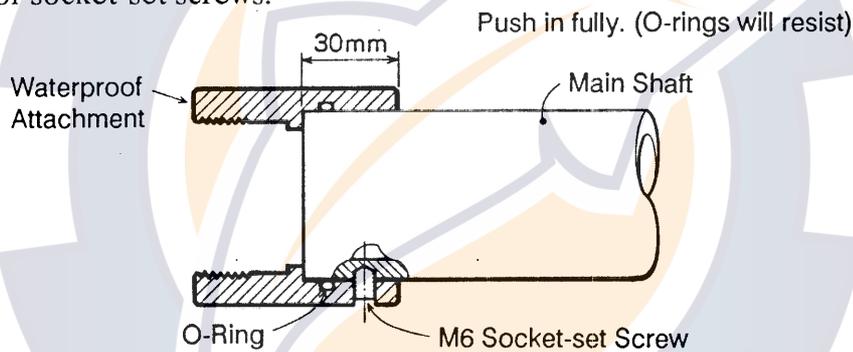
FURUNO

2 Cut the main shaft to the necessary length.

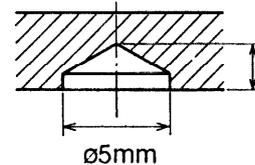
- It is desired to use an engine lathe to cut the main shaft.
- When clamping the main shaft with a tool, take care not to hurt the shaft surface.
- Chamfer the top of the main shaft as shown at right.
(When chamfered with a file, use a fine file and finish the surface as smooth as possible.)
- When a metal saw is used to cut the main shaft, finish the shaft top so that it is level within 3mm.



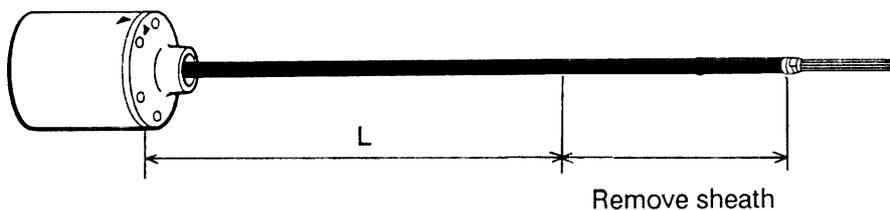
3 Temporarily install the waterproof attachment on the top of the main shaft and make holes for socket-set screws.



- 1) Mark a drilling point on the shaft surface by tightening M6 socket-set screws (2pcs.)
- 2) Remove the waterproof attachment.
- 3) Drill less than 2mm deep holes by using a drill with a $\phi 5\text{mm}$ and 120° tip. Do not drill holes through the shaft. Use a low r.p.m. drill for stainless steel use.



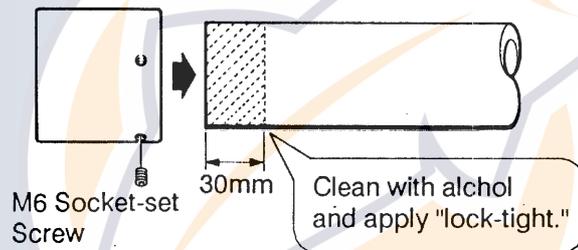
4 Remove the sheath of the transducer cable and wrap the sheath end by vinyl tape.



$L = \text{Main Shaft Length} + 100\text{mm}$

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.

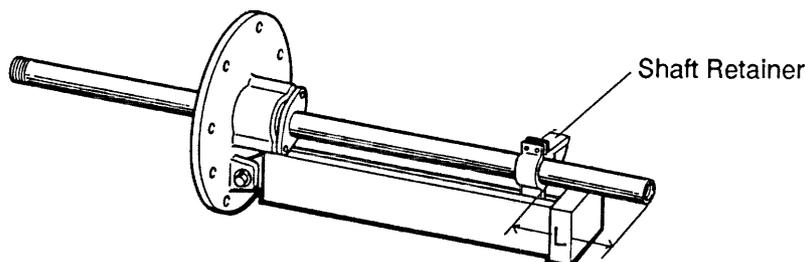


- Tighten the M6 socket-set screws with a torque of 40kg.cm to 50kg.cm.
- Refer to "Construction of Main Shaft Top" on page AP1-6.

7 Assemble the hull unit completely, taking the following points into account.

- 1) The shaft retainer should be in contact with the waterproof attachment.
- 2) The fastening band is unused on the main shaft fitted with the waterproof attachment. See page 1-0 for the fastening band.

NOTE: When the main shaft is installed without cutting off unnecessary portion, the shaft retainer position should be as follows.



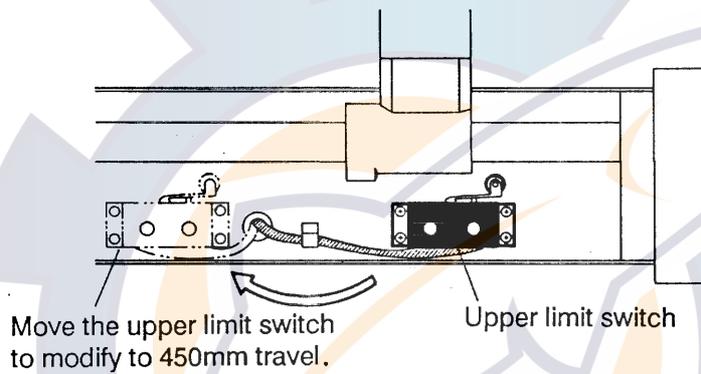
L = Cut length shown on page AP1-5 + 30mm

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II. Installation on 600mm to 750mm long Retraction Tank

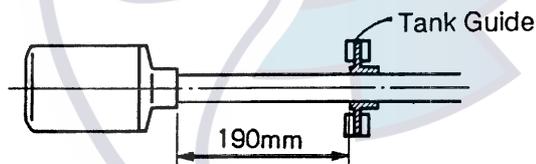
1 }
 } Same procedure as for more than 750mm long tank
 6 }

7 Modify the transducer travel to 450mm by changing the upper limit switch position.



8 Assemble the hull unit completely, taking the following points into account. Refer to chapter 1 for details of assembling and installation.

- 1) The tank guide should be installed at a position 190mm above the top of the transducer flange.



- 2) The shaft retainer should be in contact with the waterproof attachment.
- 3) The fastening band is unused.

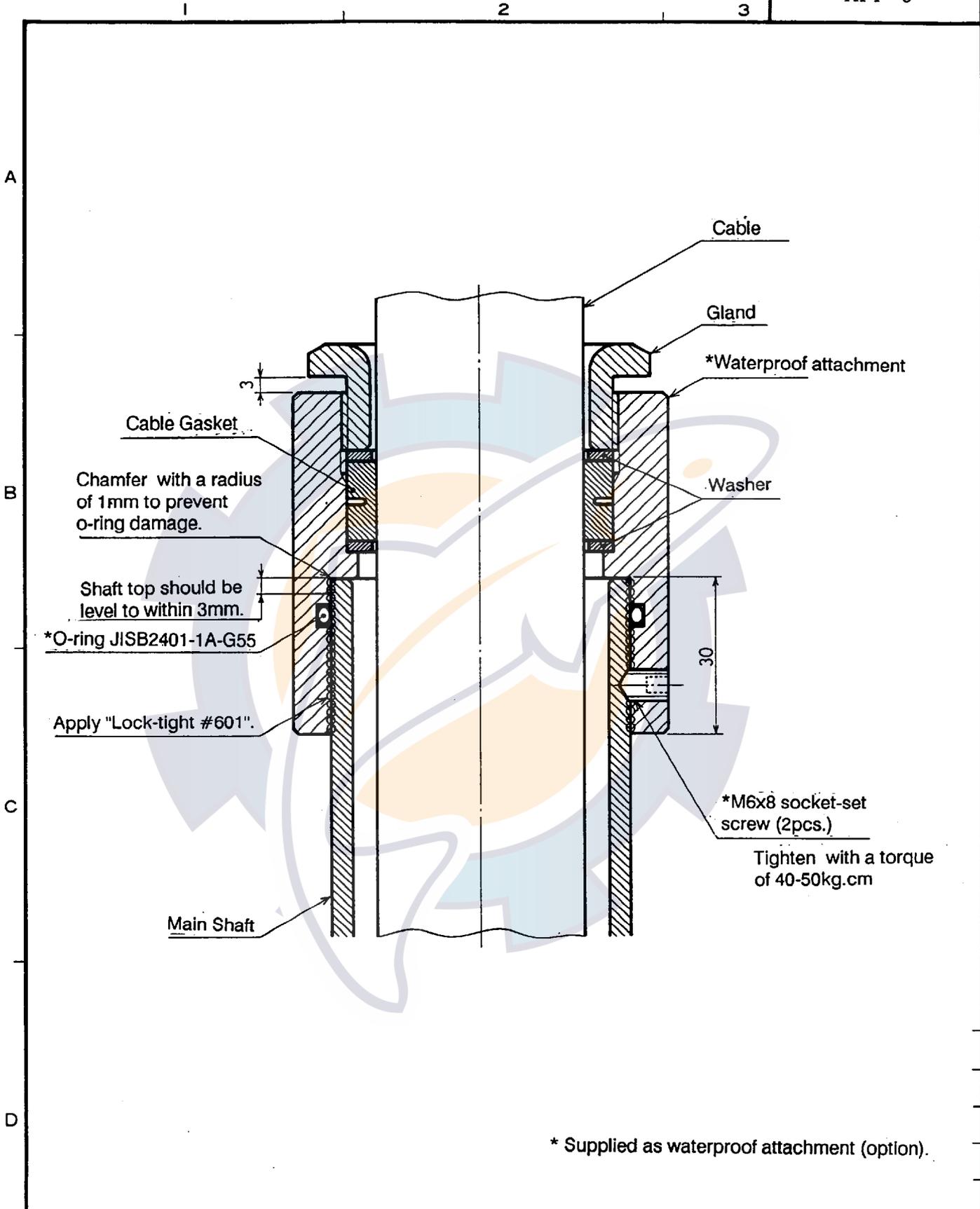
FURUNO

Relation between Retraction Tank Length and Main Shaft Length

Unit: mm

Hull Unit	Main Shaft Tank Length	945		1300		1550		2350		4065	
		Shaft Length	Cut-off Length								
CSH - 5041 400mm Travel	550	945	0								
CSH - 5040 Converted to 450mm Travel	600			1015	285						
	650			1065	235						
	700			1115	185						
CSH - 5040 600mm Travel	750			1300	0						
	800					1365	185				
	850					1415	135				
	900					1465	85				
	950					1515	35				
	1000					1550	0				
	1100							1685	685		
	1200							1765	585		
	1300							1865	485		
	1400							1965	385		
	1500							2065	285		
	1600							2165	185		
	1700							2285	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	

When a sufficient space can be secured above the hull unit, it is unnecessary to cut off the main shaft; the main shaft should be clamped at the portion of "cut-off length + 30mm" from the top of the shaft.



* Supplied as waterproof attachment (option).

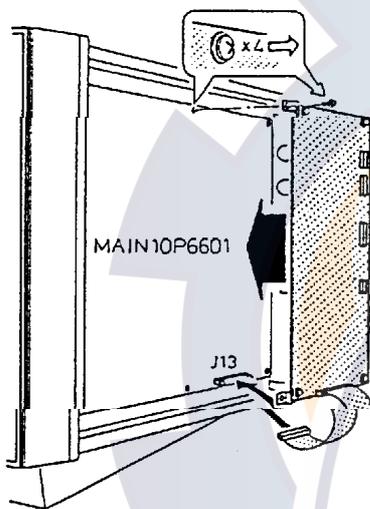
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	三角法 THIRD ANGLE PROJECTION	名称 TITLE Construction of Main Shaft Top			
検図 CHECKED	尺度 SCALE 1/1				
製図 DRAWN	重量 WEIGHT kg	図番 DWG.NO.			

APPENDIX 2.

INSTALLATION AND INTERCONNECTION OF INTER-FACE MODULE CSH-5060

The interface module CSH-5060 (option) is required to connect the CSH-5 to navigation equipment, echo sounder, etc. and it is usually installed in the display unit at the factory. When it is separately supplied, install it as follows. As for the interconnection to other equipment, refer to the interconnection diagram on the following page.

INSTALLATION

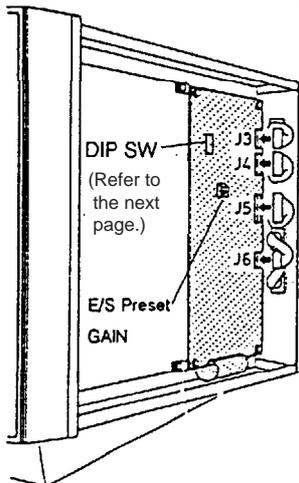


- (1) Remove the display unit cover.
- (2) Loosen the four fixing screws for the MAIN board 10P6601.
- (3) Mate the flat cable connector of the Interface Module to J13 on the MAIN board. Fix the Interface Board SUB-1 with the four loosened fixing screws.
- (4) Mate the cables of the connectors on the rear panel to the corresponding jacks as follows:

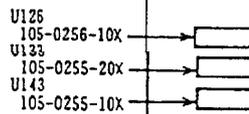
- CN-A3 --- J3 (Nav)
- CN-A4 --- J4 (Current Indicator)
- CN-A5 --- J5 (Echo Sounder, Sonde)
- CN-A6 --- J6 (Gyrocompass)
- CN-A7 --- J6 (Log)

Memo:

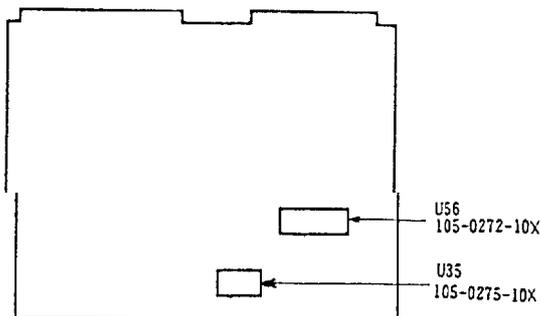
For the CSH-5 produced before September 1990, replace the PROM's with new ones referring to the figure below



Display Unit
Main Board
10P6601



Transceiver Unit
TRCPU Board
10P6615



DIP Switch

#5	GPS Smoothing
ON	OFF
OFF	ON

#6	Soruce of own track
ON	Latitude/Longitude
OFF	Speed/Course

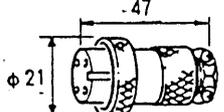
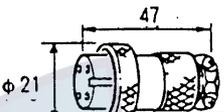
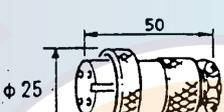
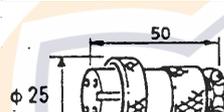
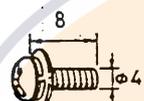
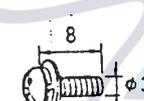
#1	#2	GPS Average speed	#3	#4	The amount of GPS Bearing
ON	ON	0.5 kt	ON	ON	90°
OFF	ON	1.0 kt	OFF	ON	45°
ON	OFF	1.5 kt	ON	OFF	20°
OFF	OFF	2.0 kt	OFF	OFF	10°

Ex) Turnig off #1 to #5 of S1 reduces the amount of GPS bearing fluctuation within 10° when own GPS average speed is within 2 kt.

FURUNO

CODE No.	006-984-870
TYPE	CP10-02610

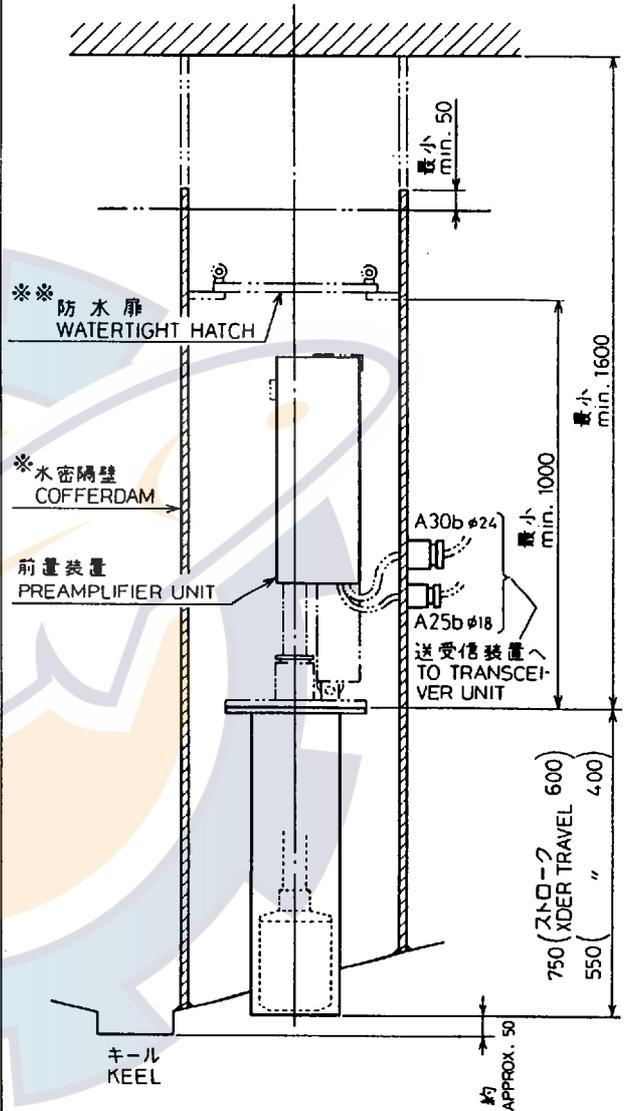
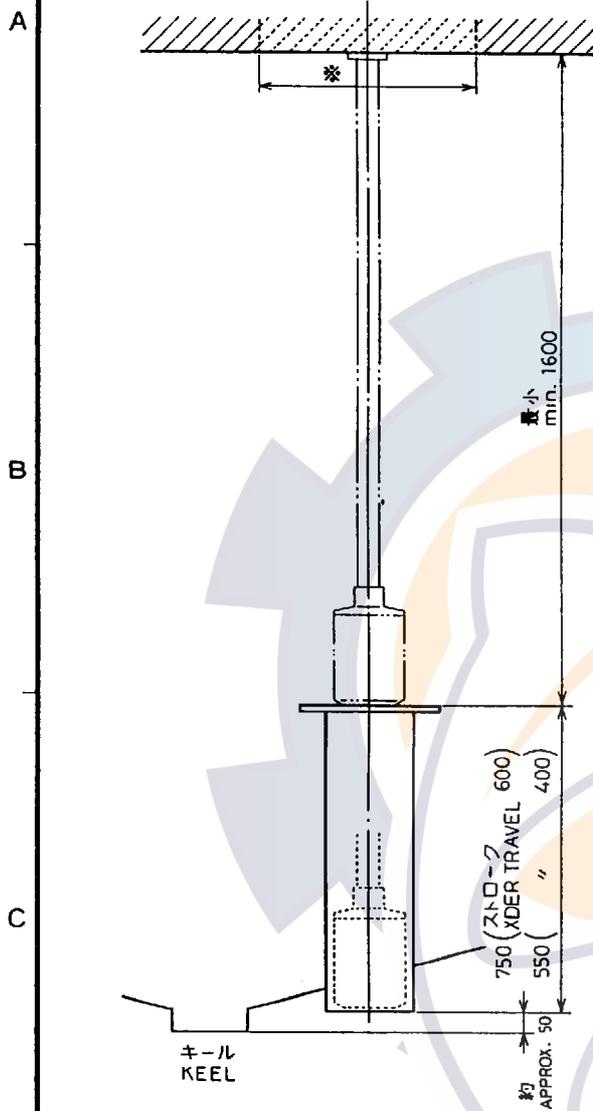
工事材料表 INSTALLATION MATERIALS	CSH-5060-2	外部インターフェース INTERFACE MODULE
---------------------------------	------------	--------------------------------

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 CONNECTOR		SRCN6A13-3P	1	
			CODE No. 000-508-660		
2	コネクタ CONNECTOR		SRCN6A13-5P	1	
			CODE No. 000-508-661		
3	コネクタ CONNECTOR		SRCN6A16-7P	1	
			CODE No. 000-508-662		
4	コネクタ CONNECTOR		SRCN6A16-10P	2	
			CODE No. 000-508-663		
5	イラックスチューブ INSULATION TUBE		φ3 *50cm*	2	
			CODE No. 000-568-226		
6	⊕ナベセムスネジA WASHERHEAD SWREW A		M4×8 C2700W MBNI2	6	
			CODE No. 000-881-144		
7	⊕ナベセムスネジB WASHERHEAD SWREW B		M3×8 C2700W MBNI2	4	
			CODE No. 000-881-404		
			CODE No.		
			CODE No.		
			CODE No.		

図番 DWG. No.	C1273-M03-A	1/1
検図 CHECKED		

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。

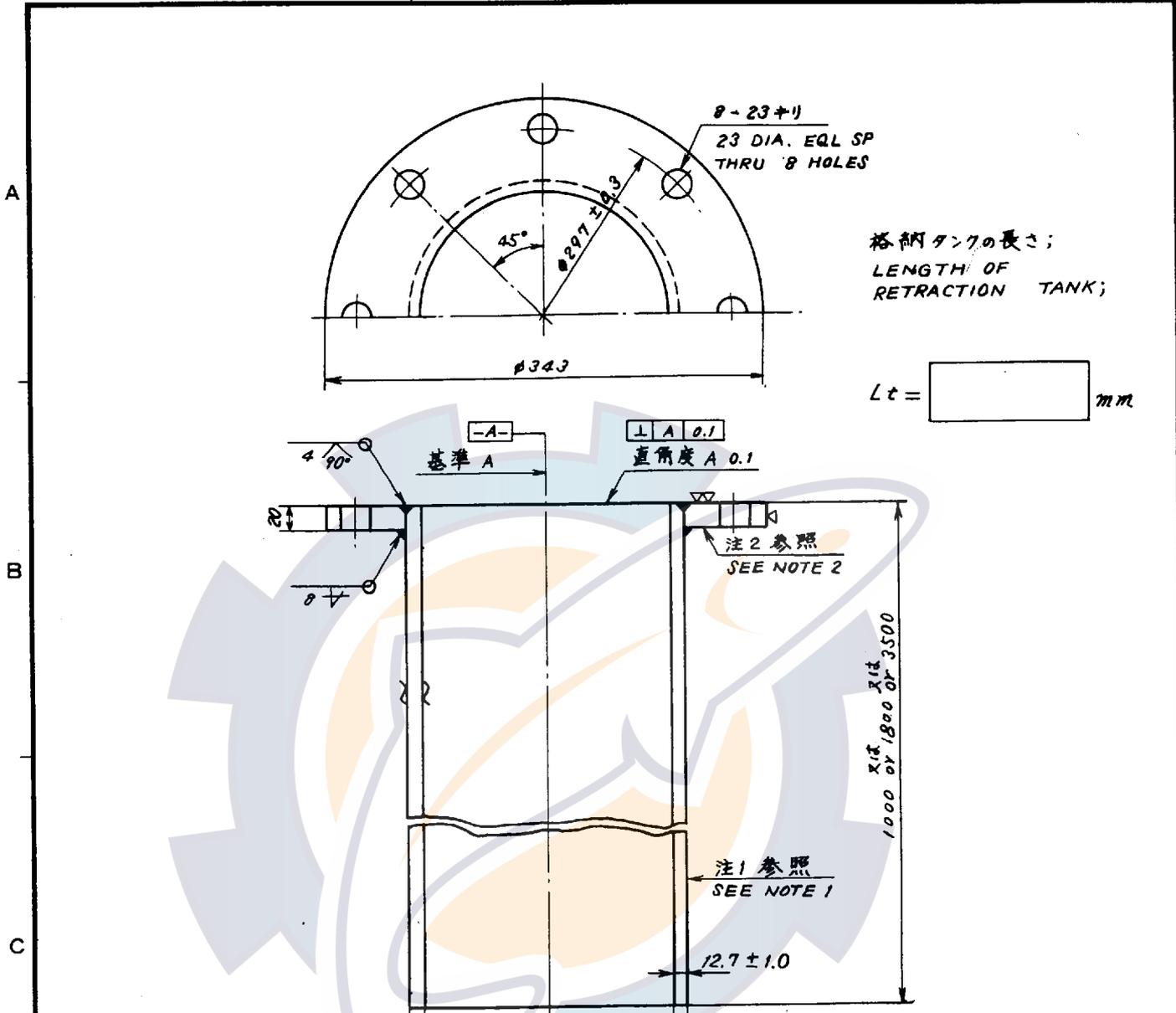
1. CONSTRUCT THE COFFERDAM IN ACCORDANCE WITH CONCERNED REGULATION. ALSO ALLOW ENOUGH MAINTENANCE SPACE.

2. ※※ PROVIDE A WATER TIGHT HATCH FOR FUTURE MAINTENANCE IF A COFFERDAM IS NOT HIGH ABOVE WATER LEVEL.

CSH-5
CSH-5 MARK-2

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	∞	図番 DWG.NO.	C 1 2 7 3 - Y 0 2 - A
製図 DRAWN	11.13.59 11.13.11.24	重量 WEIGHT	kg		

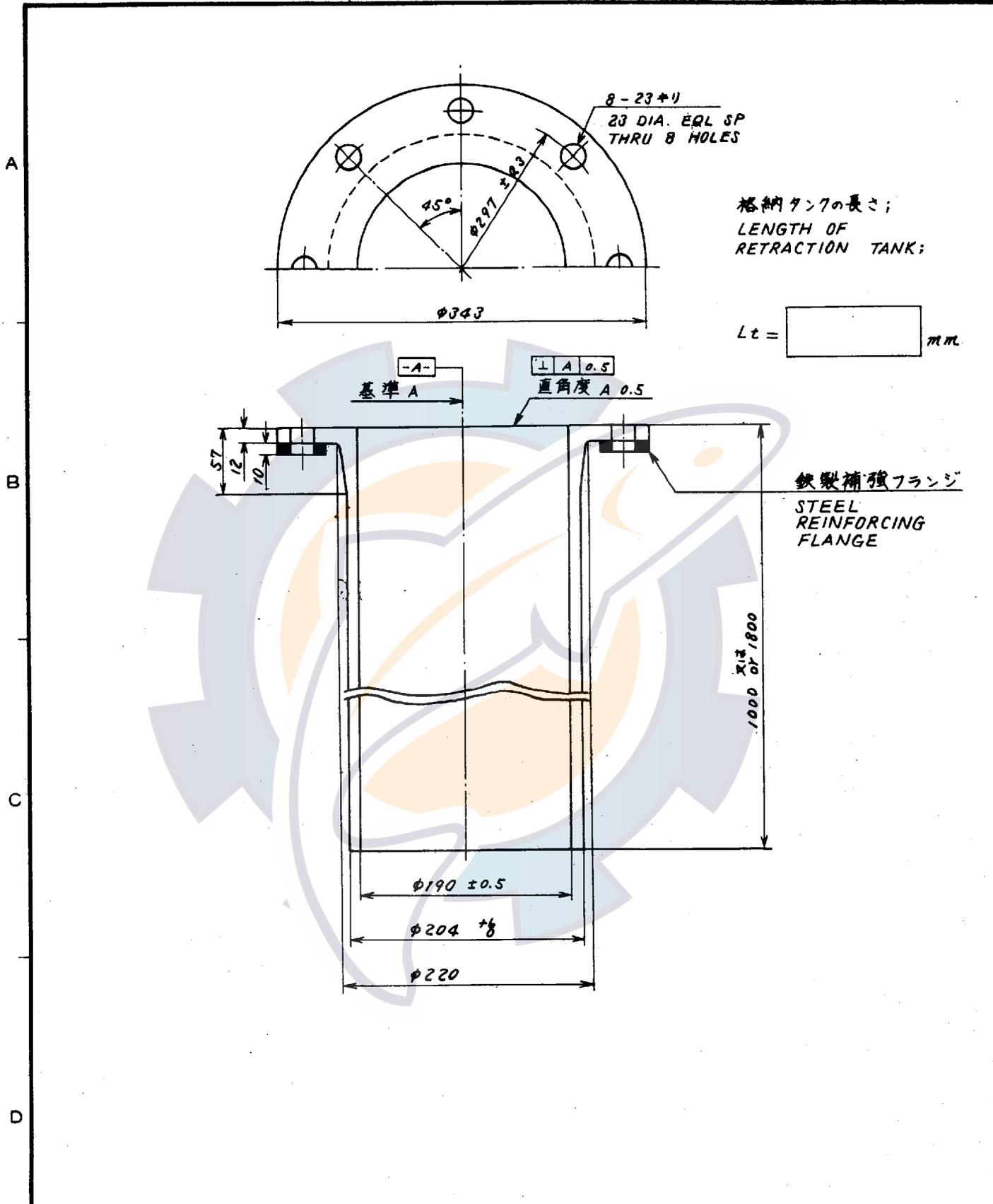


格納タンクの長さ;
 LENGTH OF
 RETRACTION TANK;
 Lt = mm

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.

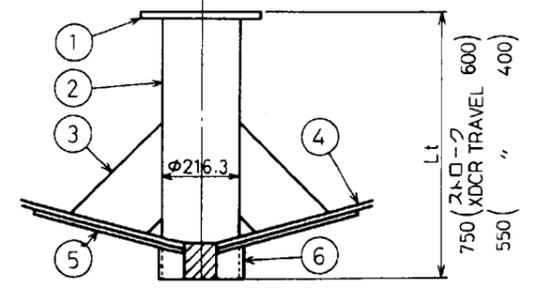
単位 UNIT: mm		品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	NOV. 9 '77		三角法 THIRD ANGLE PROJECTION	名称 TITLE		鉄製格納タンク外觀図 STEEL RETRACTION TANK OUTLINE DRAWING	
検図 CHECKED	NOV. 8 '77		尺度 SCALE	1/5			
製図 DRAWN	'77.6.28 N. Neda		重量 WEIGHT	1000mm : 73 1800mm : 123 kg 3500mm : 231		図番 DWG.NO. C1229-006-G	



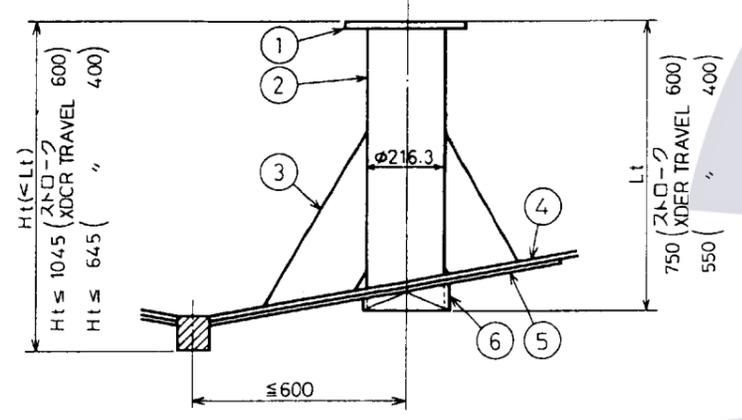
単位 UNIT: mm

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製格納タンク外觀図 FRP RETRACTION TANK OUTLINE DRAWING			
検図 CHECKED	尺度 SCALE	1/5			
製図 DRAWN	重量 WEIGHT	1000mm: 20kg 1800mm: 27kg			
		図番 DWG. NO. C1229-007-E			

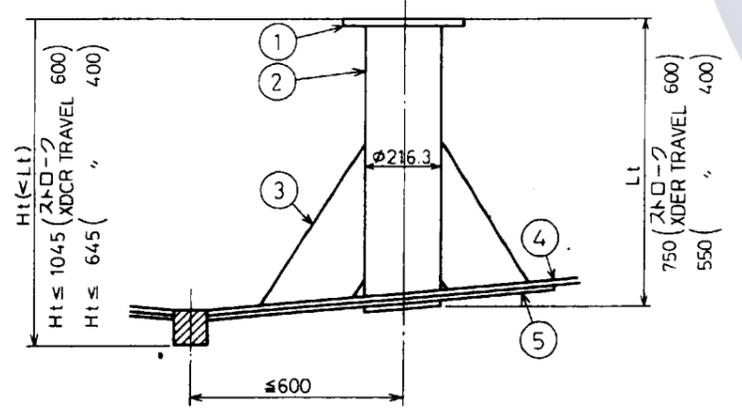
(A) キール上 (突出) ON KEEL (PROJECTED)



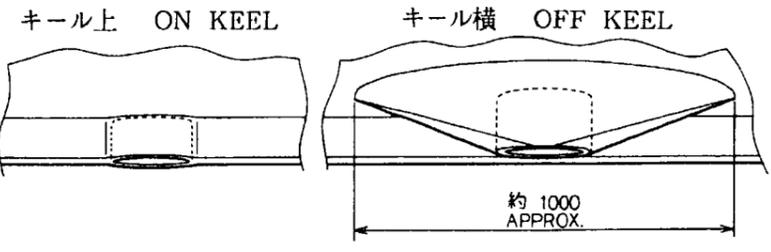
(B) キール横 (突出) OFF KEEL (PROJECTED)



(C) キール横 (非突出) OFF KEEL (NOT PROJECTED)



(D) 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(A, B)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ヶ所以上に補強板③を溶接する。
6. 上下装置本体を格納タンクにボルト締めするのに必要なスペースとして、フランジ面の位置が二重船底板より100mm以上離す。二重船底が高い船には⑧図の方法で二重船底板を下げ、スペースを確保する事。

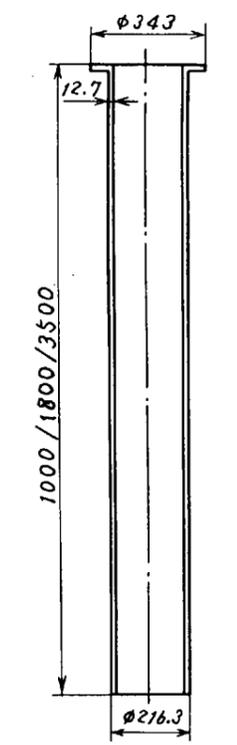
INSTALLATION METHOD OF RETRACTION TANK

1. Cut out φ217 hole on hull and inner hull plate.
2. Install tank to hull plate with fillet welding taking the following points into account.
 - * Flange face is horizontal at normal Ship's trim.
 - * Allow height "Ht" of flange face from keel bottom as mentioned in the drawings, otherwise transducer beam is blocked by the keel when transducer is fully lowered.
 - * Tank's length "Lt" should be less than "Ht", otherwise the tank is protruded below keel level. The tank should be cut to the specified length so that the transducer can be fully protruded. (The tank is supplied with 1000 mm long as standard.)
3. Fit doubling plate ⑧ of outer dia. φ1000mm around the tank on hull plate. Fit fairing plate ⑨ referring to the drawing ⑩ for installation method (A) and (B). 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 ⑩ if the specified clearance is not secured.

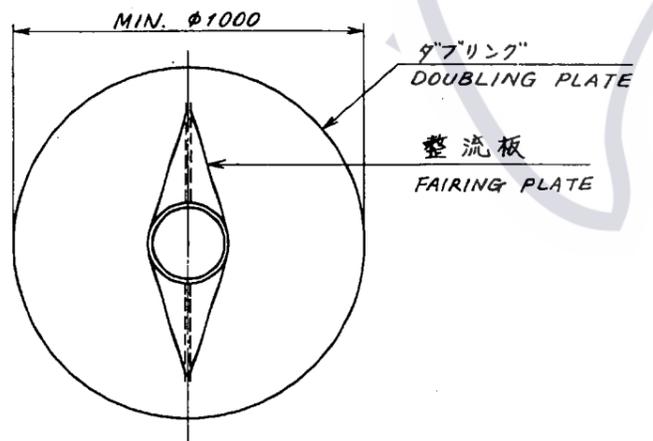
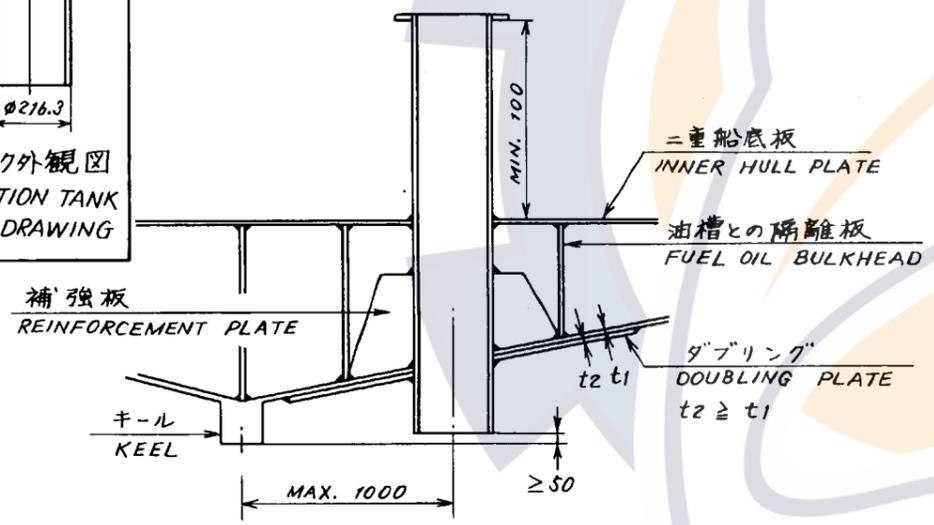
6	整流覆 FAIRING PLATE					
5	ダブリング DOUBLING					
4	船底板 HULL PLATE					
3	補強板 REINFORCEMENT PLATE					
2	格納タンク RETRACTION TANK					
1	タンクフランジ TANK FLANGE					
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS	

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

FURUNO



格納タンク外観図
RETRACTION TANK
OUTLINE DRAWING



- 格納タンクの装備は次の条件を満たすこと。
 - 取付位置は船首から1/3 (小型船の場合は1/2) 程度。
 - キールより1m以内。
 - 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。
 - タンクの先端はキールの先端より50mm上であること。
 - 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程度のダブリングを施すこと。
 - 格納タンクの突出部分に網除けを兼ねた整流板を設けること。
 - 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。

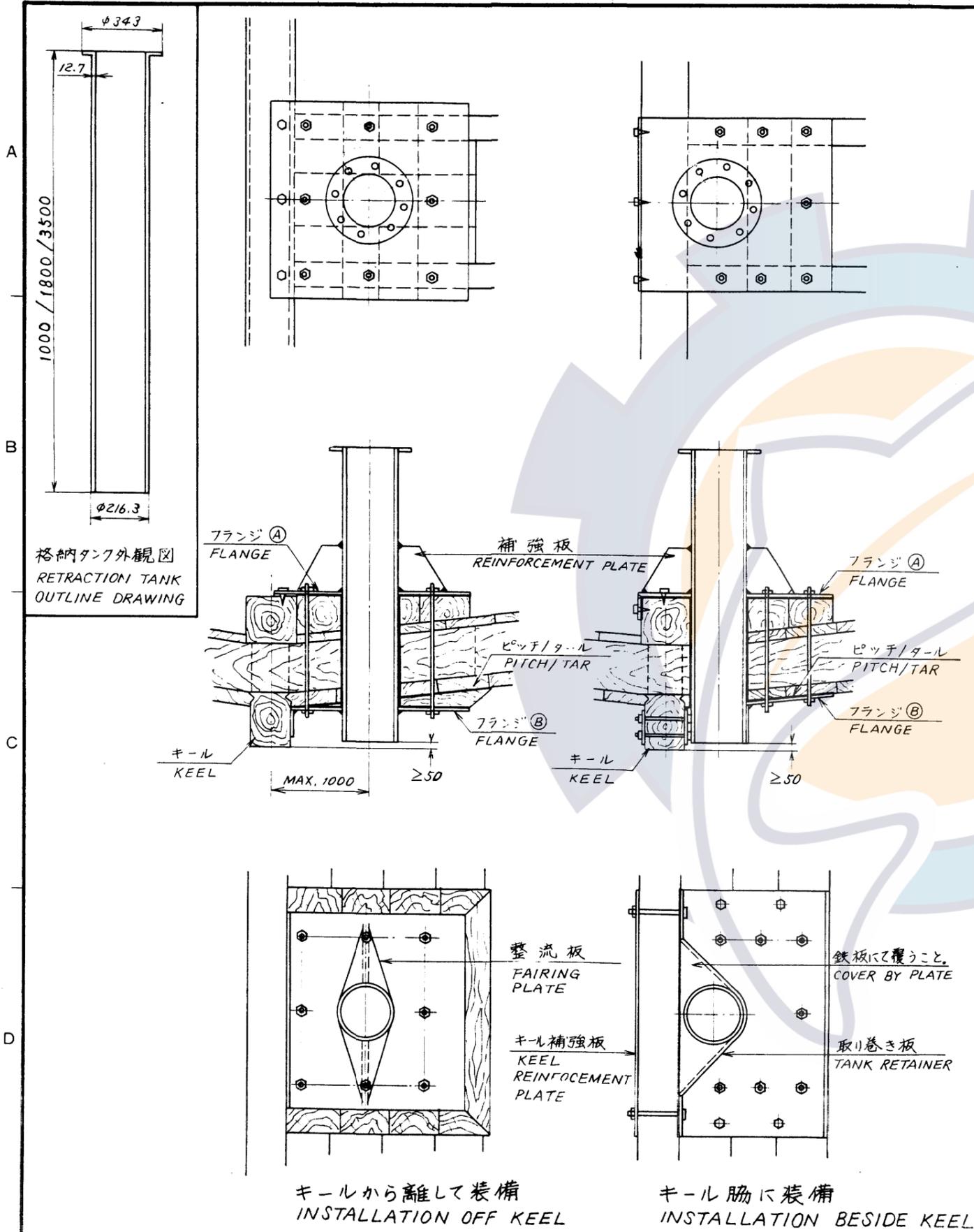
- SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
 - ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW ON FORE-AFT LINE.
 - WITHIN 1000 mm FROM KEEL LINE.
 - ALLOW CLEARANCE OF MORE THAN 100 mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
 - KEEP LOWEST END 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.

単位 UNIT: mm

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

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 格納タンク船底装備図 (鋼船) TITLE RETRACTION TANK INSTALLATION ON STEEL HULL
検図 CHECKED	Nov. 8 '77	尺度 SCALE	1/20		
製図 DRAWN	1977.11.7 N. Medy.	重量 WEIGHT	kg	図番 DWG.NO.	C1243-017-F



1. 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行うこと。
 - 1) 木のブロック等を使用して肋骨間の船底を充分補強する。補強された面は標準走航時水平になる様にする。
 - 2) タンクが通る穴を開ける。
 - 3) 必要箇所には水密のためのピッチ等を充てん塗布した後、フランジ(A)及び(B)をボルトナットで締めつけて固定する。
 - 4) タンクを貫通させ、タンクの底部がキール下端より50mm上になる様にフランジ(A)及び(B)に溶接し、固定する。キール肋装備の場合は取り巻き板もタンクに溶接し、キールに固定する。
 - 5) 格納タンクの突出部分に網除けを兼ねた整流板を設ける。
 - 6) 必要に応じてタンクの周囲3,4ヶ所でフランジ(A)に向けて補強板を溶接する。
- 注: 強度及び水密性について 船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

1. SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
 - 1) ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW 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. 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 PALTE 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.

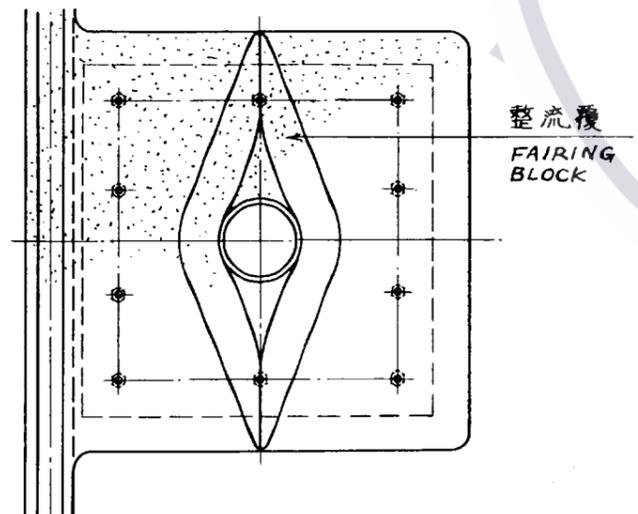
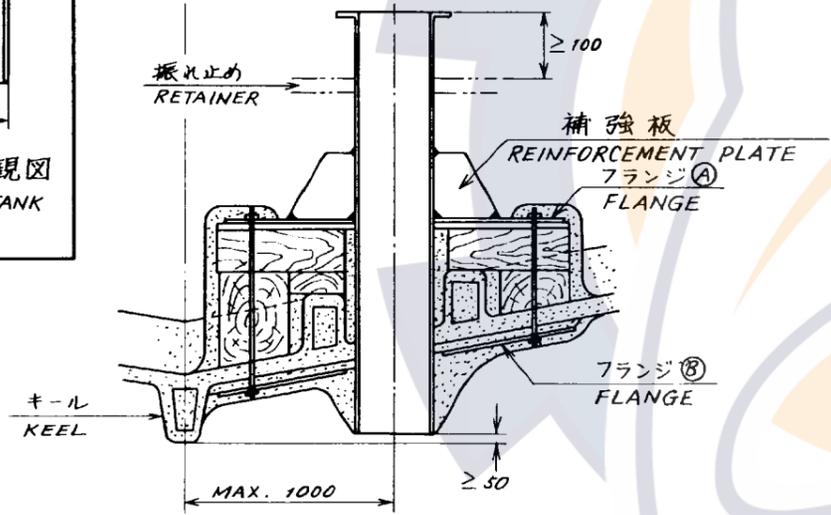
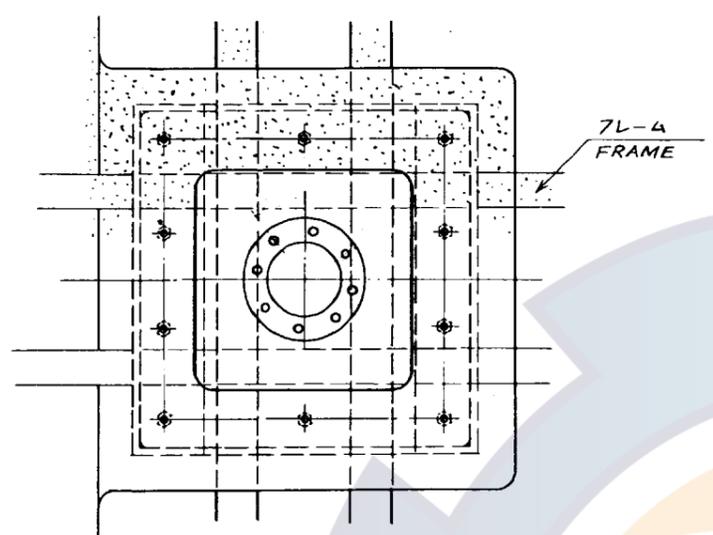
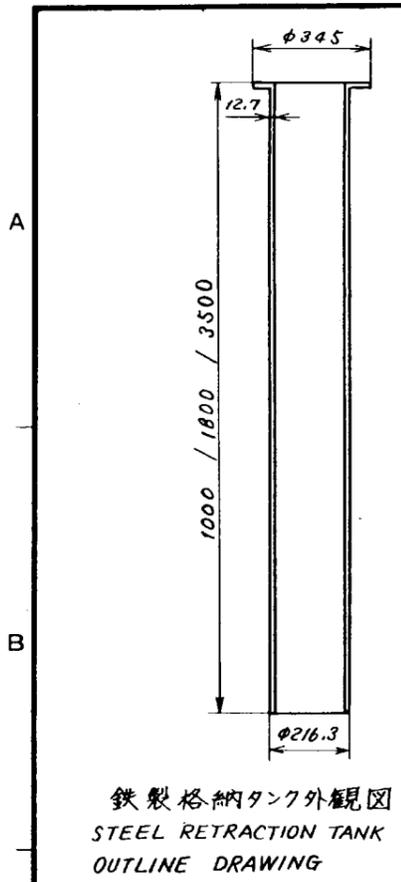
CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.

承認 APPROVED	NOV. 9 '77	品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. NO.	摘要 REMARKS
検図 CHECKED	NOV. 8 '77		三角法 THIRD ANGLE PROJECTION				名称 TITLE 格納タンク船底装備図 (木船) RETRACTION TANK INSTALLATION ON WOODEN HULL
製図 DRAWN	1977.11.7 D. Nede		尺 度 SCALE 1/20	重 量 WEIGHT	kg	図 番 DWG. NO. C1243-018-F	

キールから離して装備
INSTALLATION OFF KEEL

キール脇に装備
INSTALLATION BESIDE KEEL

単位 UNIT: mm



- 格納タンクの装備は次の条件を満たすこと。
 - 取付位置は船首から1/3 (小型船の場合は1/2) 程度。
 - キールより1m以内。
 - 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。
 - タンクの先端はキールの先端より50mm上であること。
 - タンクのフランジ面は標準走航時に水平であること。
 - 格納タンクの装備は、次の要領を参考にして行うこと。
 - フレーム間の船底にタンクが通る穴をあける。
 - タンクあるいはタンクと同径の中子を貫通させ、その回りにフランジ(A)の乗せられる取付台を作りFRPでフレーム、船底間に固定する。
 - フランジ(A)の取付穴に合わせて取付台にボルトを立てておく。必要があればフランジ(B)を作りボルトを船底から貫通させる。
 - FRP硬化後タンクあるいは中子を抜き取る。
 - フランジ(A)をタンクに溶接する。
 - フランジ(A)下面及びタンク外周にFRP-鉄接着剤を塗布した後タンクを取りつける。
 - 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。またフランジ(A)溶接時、タンクの周囲3,4ヶ所でフランジ(A)に向けて、補強板を溶接する。
- 注: 強度及び水密性について、船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

- 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 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.
- INSTALL THE RETRACTION TANK REFERRING TO THE PROCEDURE BELOW.
 - CUT OUT A HOLE FOR PASSING THE TANK ON THE HULL PLATE.
 - 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).
 - 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).
 - AFTER FRP IS STIFFENED, DRAW OUT THE TANK OR THE CORE FROM THE MOUNTING BED.
 - WELD THE FLANGE (A) TO THE TANK.
 - 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.
 - 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.
 - 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.

単位 UNIT: mm

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

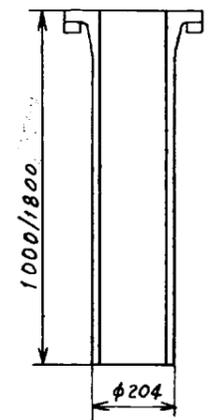
承認 APPROVED	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
NOV. 9 '77 <i>[Signature]</i>		三角法 THIRD ANGLE PROJECTION				名称 TITLE 鉄製格納タンク船底装備図 (FRP船) STEEL RETRACTION TANK INSTALLATION ON FRP HULL
NOV. 8 '77 <i>[Signature]</i>		尺度 SCALE		1/20		
1977.11.7 <i>[Signature]</i>		重量 WEIGHT		kg	図番 DWG.NO.	C1243-019-F

1. 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. 浸水を防ぐため十分に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。
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。

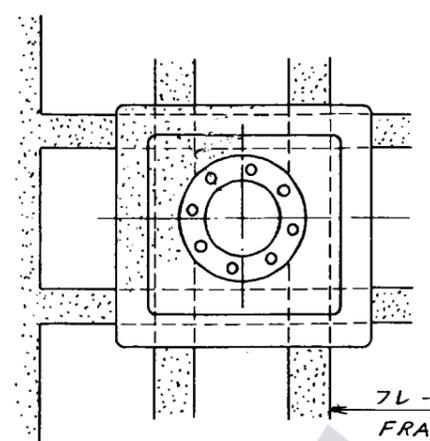
注: 強度及び水密性について、船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

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.

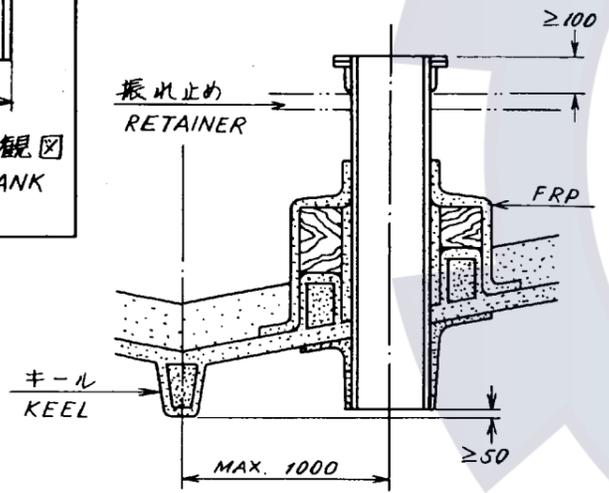
CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.



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



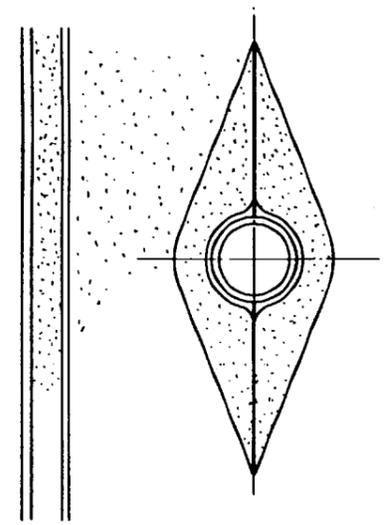
フレーム
 FRAME



キール
 KEEL

振れ止め
 RETAINER

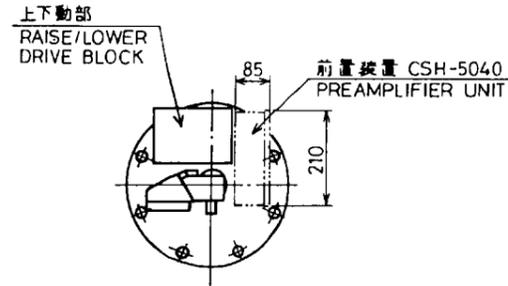
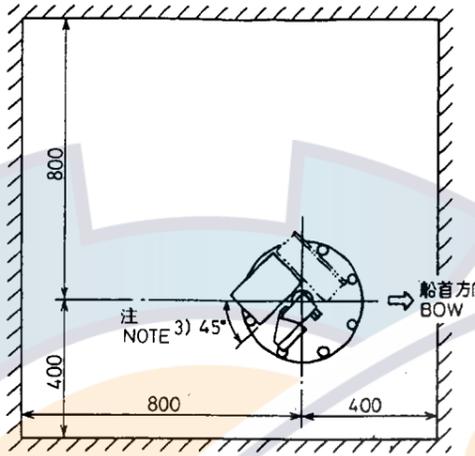
FRP



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

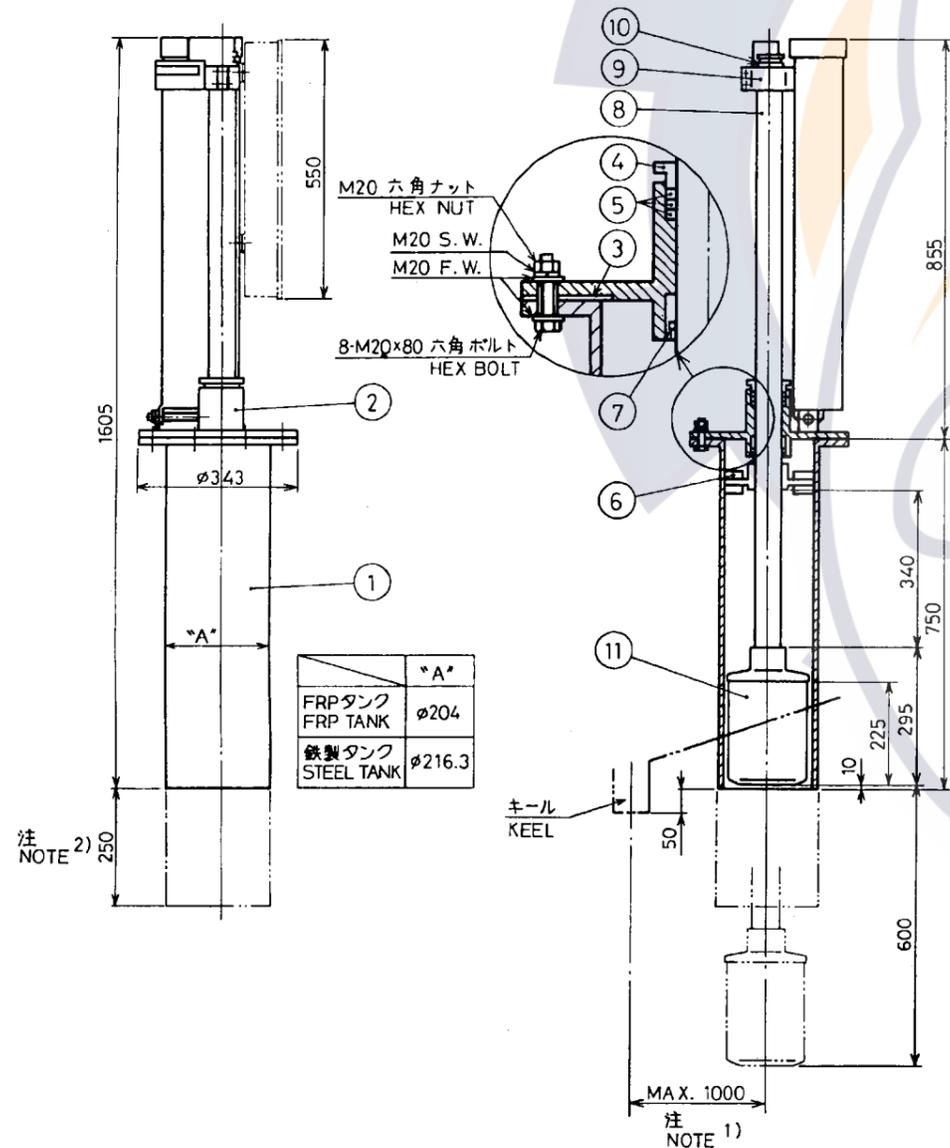
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	三角法 THIRD ANGLE PROJECTION	名称 TITLE FRP製格納タンク船底装備図(FRP船) FRP RETRACTION TANK INSTALLATION ON FRP HULL			
検 CHECKED	尺度 SCALE 1/20				
製 DRAWN	重量 WEIGHT kg	図番 DWG.NO. C1220-038-F			

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



- 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-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。

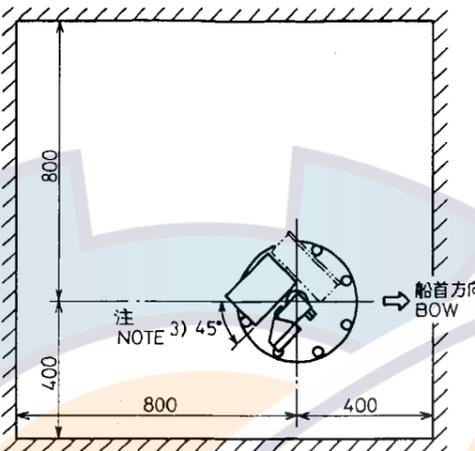
- NOTE 1) THE HULL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF THE SHIP'S LENGTH FROM THE BOW ON THE FORE-AFT LINE AND BESIDE THE KEEL LINE (LESS THAN 1000mm FROM KEEL LINE).
2) CUT THE TANK WITHIN 250MM IN LENGTH ACCORDING TO INSTALLATION METHOD.
3) THE HULL UNIT SHOULD BE ORIENTED 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.



11	送受波器 TRANSDUCER		1		
10	戻止め金具 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		
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

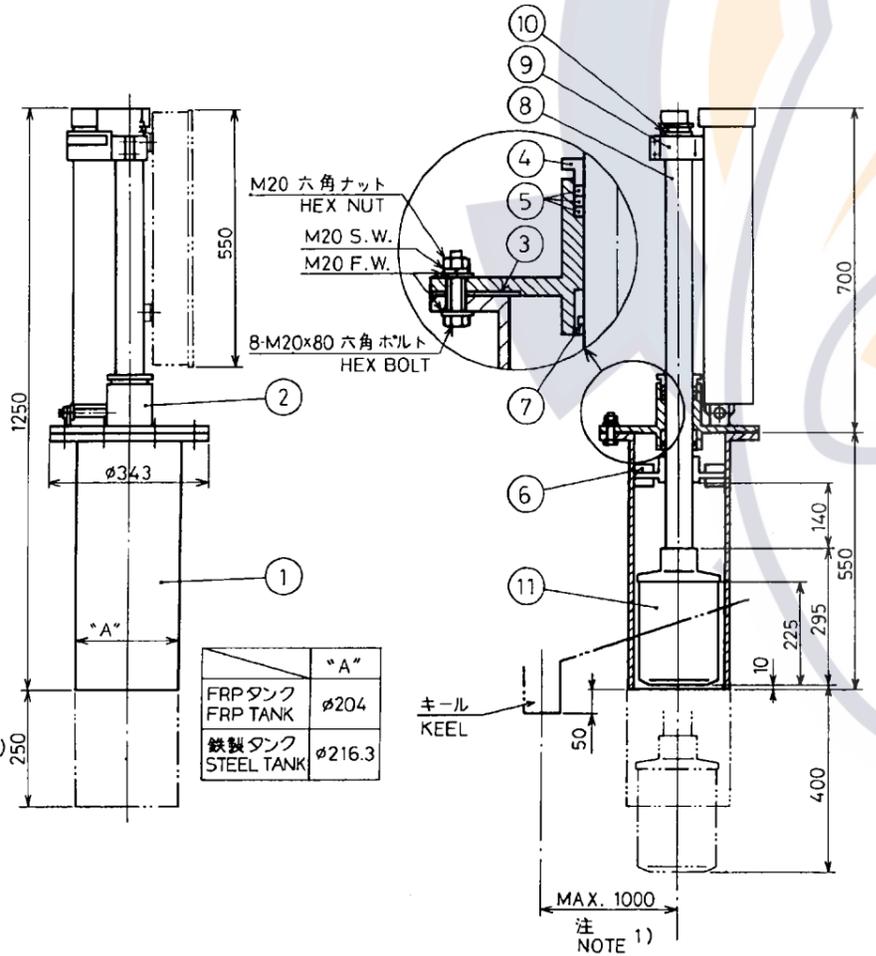
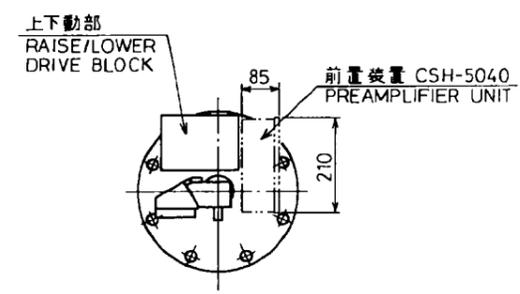
承認 APPROVED	OCT. 4 '89 T. NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	上下装置外寸図 HULL UNIT (ストローク XDCR TRAVEL 600mm)
検図 CHECKED	OCT. 4 '89 T. Koda	尺度 SCALE	1/15	品名 DWG.NO.	C1273-G05-B
製図 DRAWN	OCT. 4 '89 M. USUDA	重量 WEIGHT	75 kg		

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



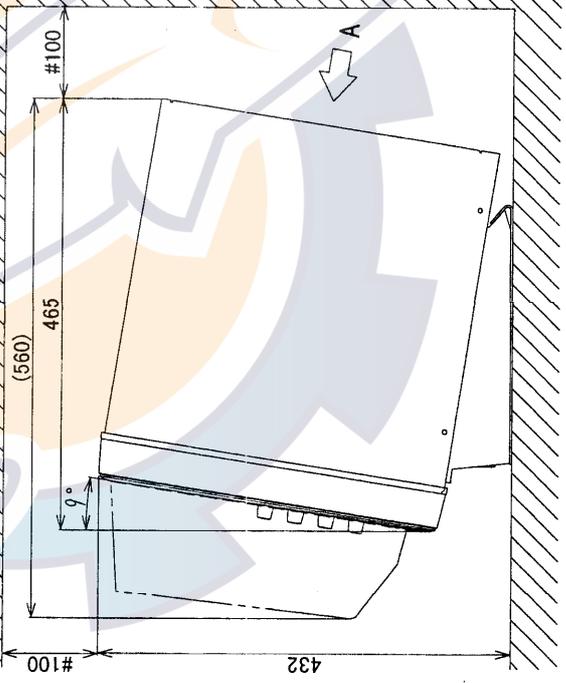
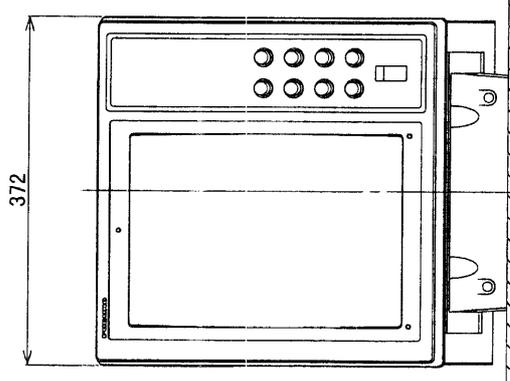
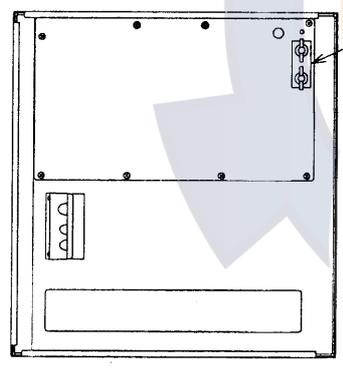
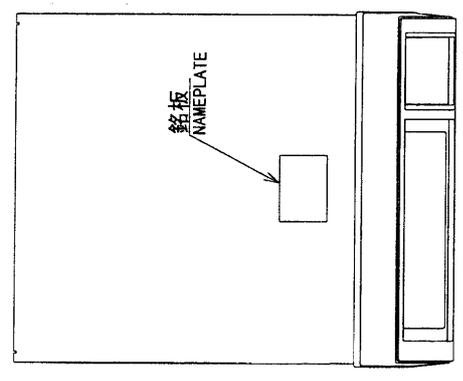
- 注 1) 装備位置は船首から1/3 (小型船では1/2) 程度でキールから1m以内とする。
 注 2) 格納タンクは装備位置に応じて250mm以内で切断する。
 注 3) 左図の如く船首-船尾ラインと上下動部の角度が約45°となるよう装備する。
 図では上下動部は左舷船尾側に位置しているが、右舷船尾側、左舷船首側
 又は、右舷船首側でもよい。
 注 4) 装備後は装備要領書を参照し船首線調整を行うこと。

- 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.



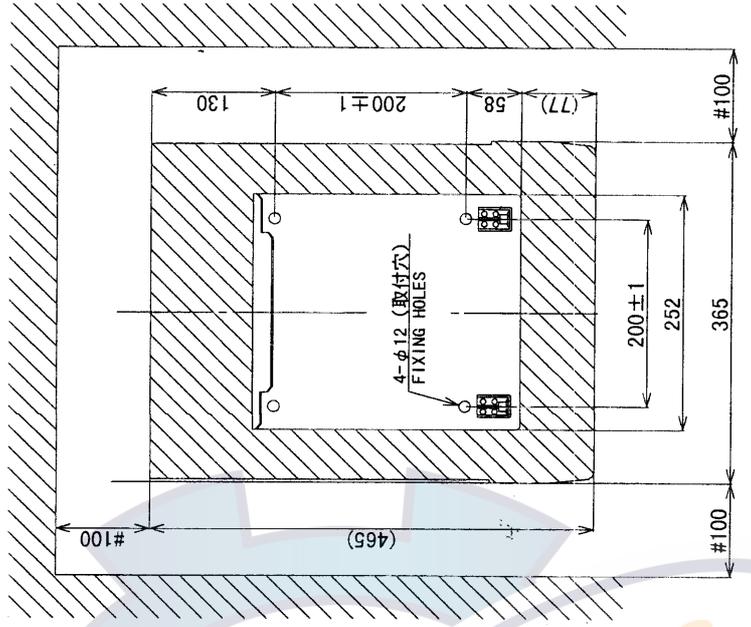
11	送受波器 TRANSDUCER		1		
10	戻止め金具 STOPPER		1		
9	パイプ取付金具 SHAFT RETAINER		1		
8	上下シャフト(1) MAIN SHAFT (1)		1		
7	O-リング O-RING	JISB2401 CLASS 1A	1		
6	タンクガイド TANK GUIDE		1		
5	グリスコットン GREASE COTTON		3		
4	グリスコットン押え台 GREASE COTTON RETAINER		1		
3	フランジパッキン GASKET		1		
2	架台載台 MAIN BODY FLANGE		1		
1	格納タンク RETRACTION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

承認 APPROVED	OCT. 4. 89 T. NAKAUO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	上下装置外寸図 HULL UNIT
検図 CHECKED	OCT. 6. 89 T. Koda	尺度 SCALE	1/15	格納タンク RETRACTION TANK	(ストローク XDCR TRAVEL 400mm)
製図 DRAWN	OCT. 4. 89 M. USUDA	重量 WEIGHT	70 kg	図番 DWG.NO.	C1273-G06-B



範囲 DIMENSION	公差 TOL.
$L \leq 50$	$\pm 1.5 \text{ mm}$
$50 < L \leq 100$	$\pm 2.5 \text{ mm}$
$100 < L \leq 500$	$\pm 3 \text{ mm}$

表 1
TABLE 1

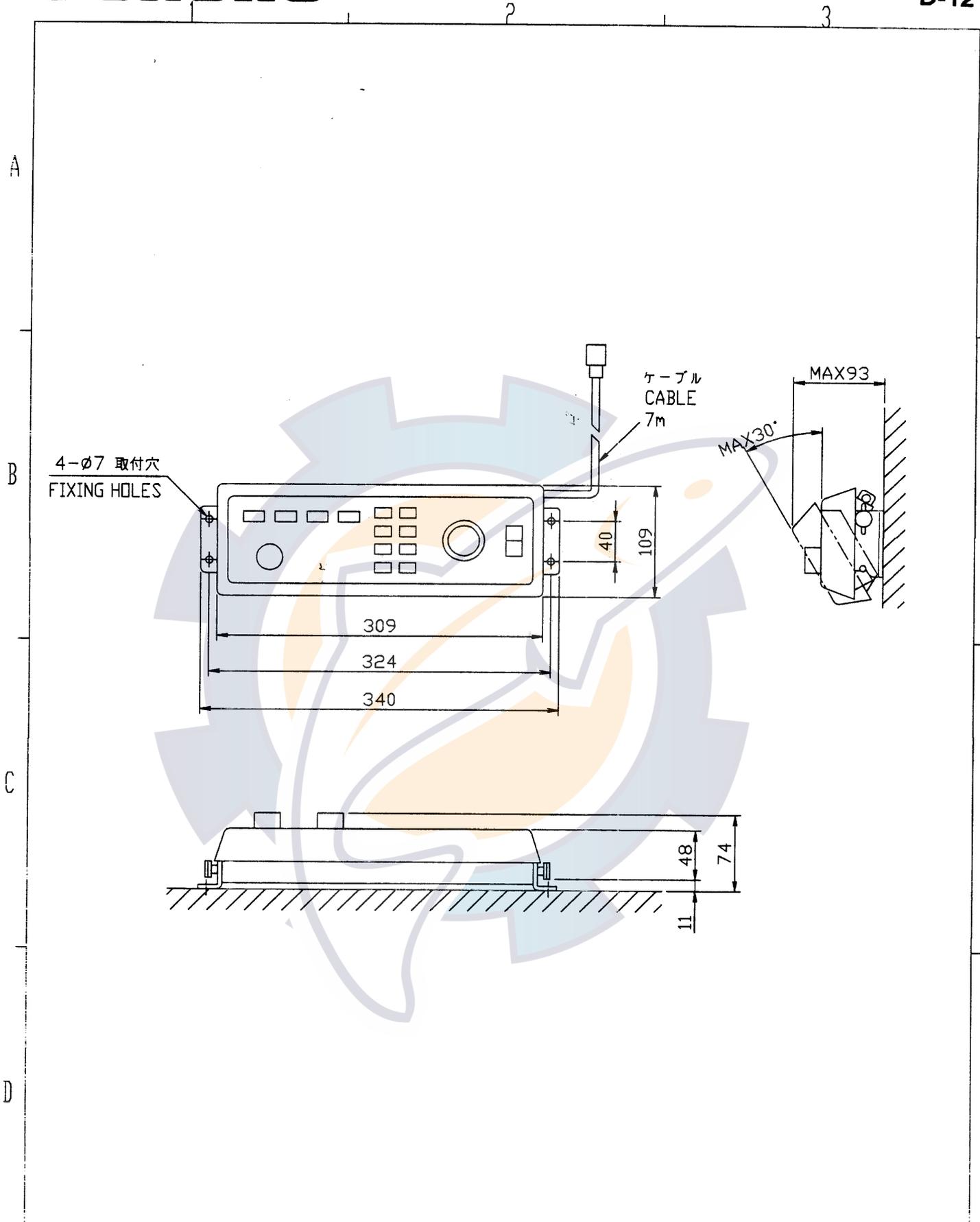


取付寸法
MOUNTING DIMENSIONS

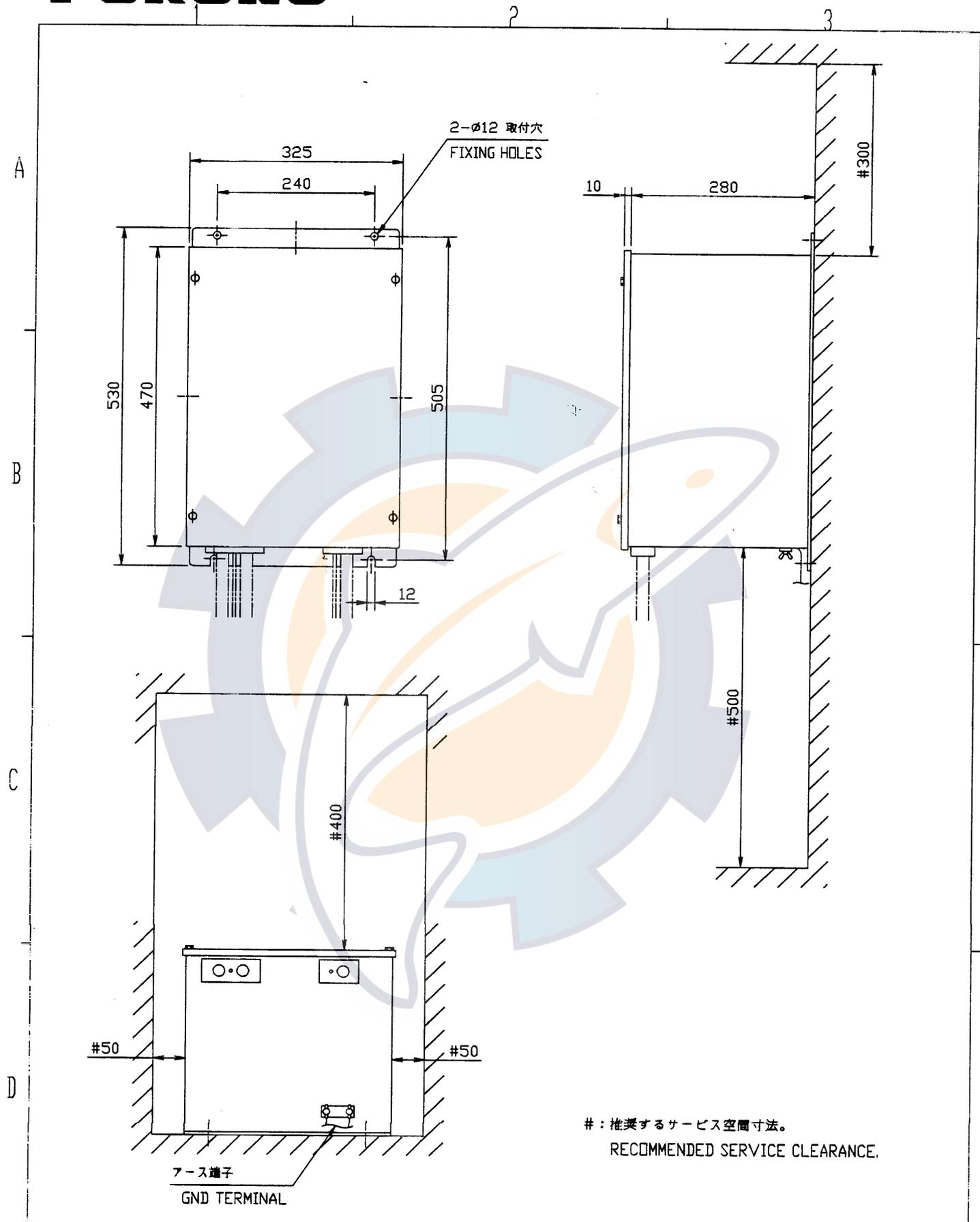
注記 1) #印寸法は最小サービスマージン寸法とする
 2) 指定外寸法公差は表 1 による

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

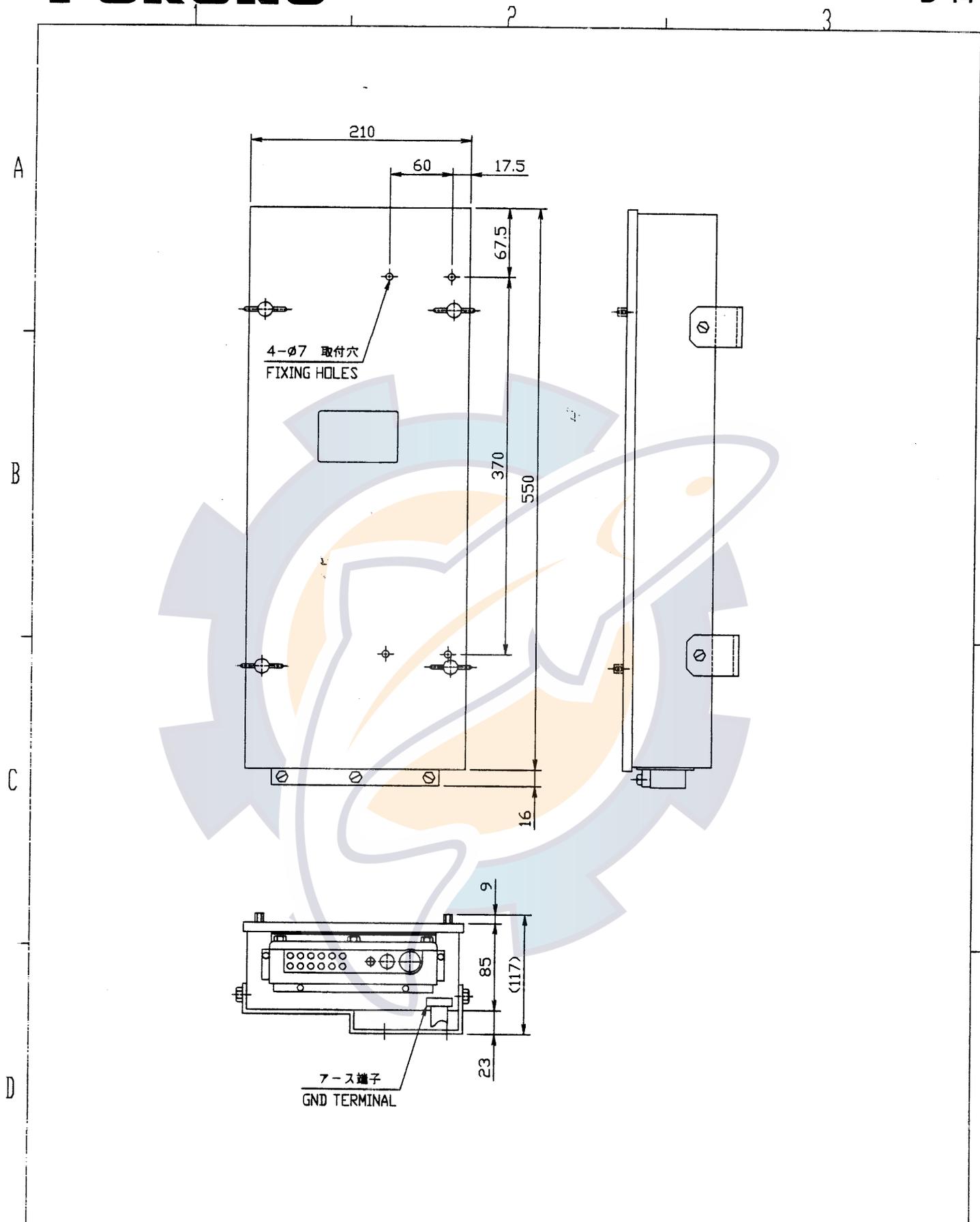
DRAWN Aoy 10 99 Taka Asaka	TITLE CSH-5110
CHECKED Aoy 10 99 K. Kawamura	名称 指示装置
APPROVED Aoy 10 99 K. Kawamura	外寸図
SCALE 1/8 MASS 23 kg	NAME DISPLAY UNIT
DWG No. C1299-601-B	OUTLINE DRAWING



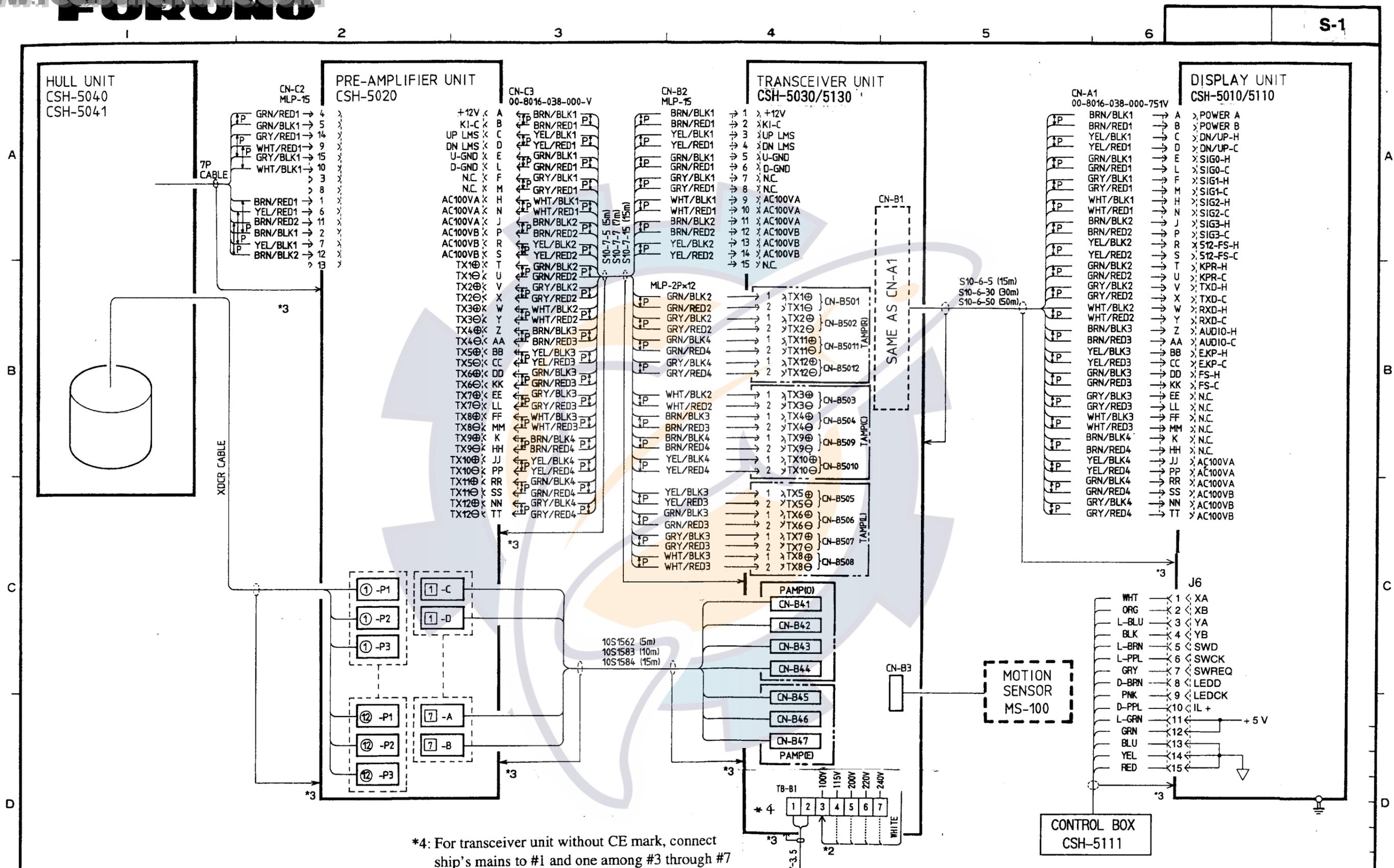
DRAWN	Apr. 16 '01 T.YAMASAKI	TITLE	CSH-5011/CSH-5111
CHECKED	Apr. 16 '01 Y.KIMURA	名称	リモート箱
APPROVED	Apr. 16 '01 Y.KIMURA		外寸図
SCALE	1/5 MASS $\pm 10\%$ 1.5 kg	NAME	CONTROL BOX
DWG.No.	C1273-G02-C		OUTLINE DRAWING



DRAWN Apr. 16 '01	T.YAMASAKI		TITLE CSH-5030/CSH-5130
CHECKED Apr. 16 '01	Y.KIMURA		名称 送受信装置
APPROVED Apr. 16 '01	Y.KIMURA		外寸図
SCALE 1/8	MASS 20 ±10% kg		NAME TRANSCEIVER UNIT
DWG.No. C1273-G07-C			OUTLINE DRAWING

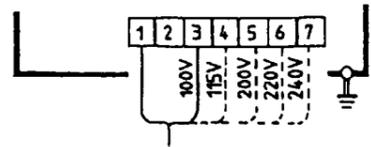


DRAWN Apr. 16 '01 T.YAMASAKI		TITLE CSH-5020
CHECKED Apr. 16 '01 Y.KIMURA		名称 前置装置
APPROVED Apr. 16 '01 Y.KIMURA		外寸図
SCALE 1/5	MASS 7 ±10% kg	NAME PREAMPLIFIER UNIT
DWG.No. C1273-G04-C		OUTLINE DRAWING



- *1: SHIPYARD SUPPLY
- *2: Change connection of white wire according to the ship's mains.
- *3: Ground through cable clamp.

*4: For transceiver unit without CE mark, connect ship's mains to #1 and one among #3 through #7 on terminal TB-B1, according to the ship's mains.

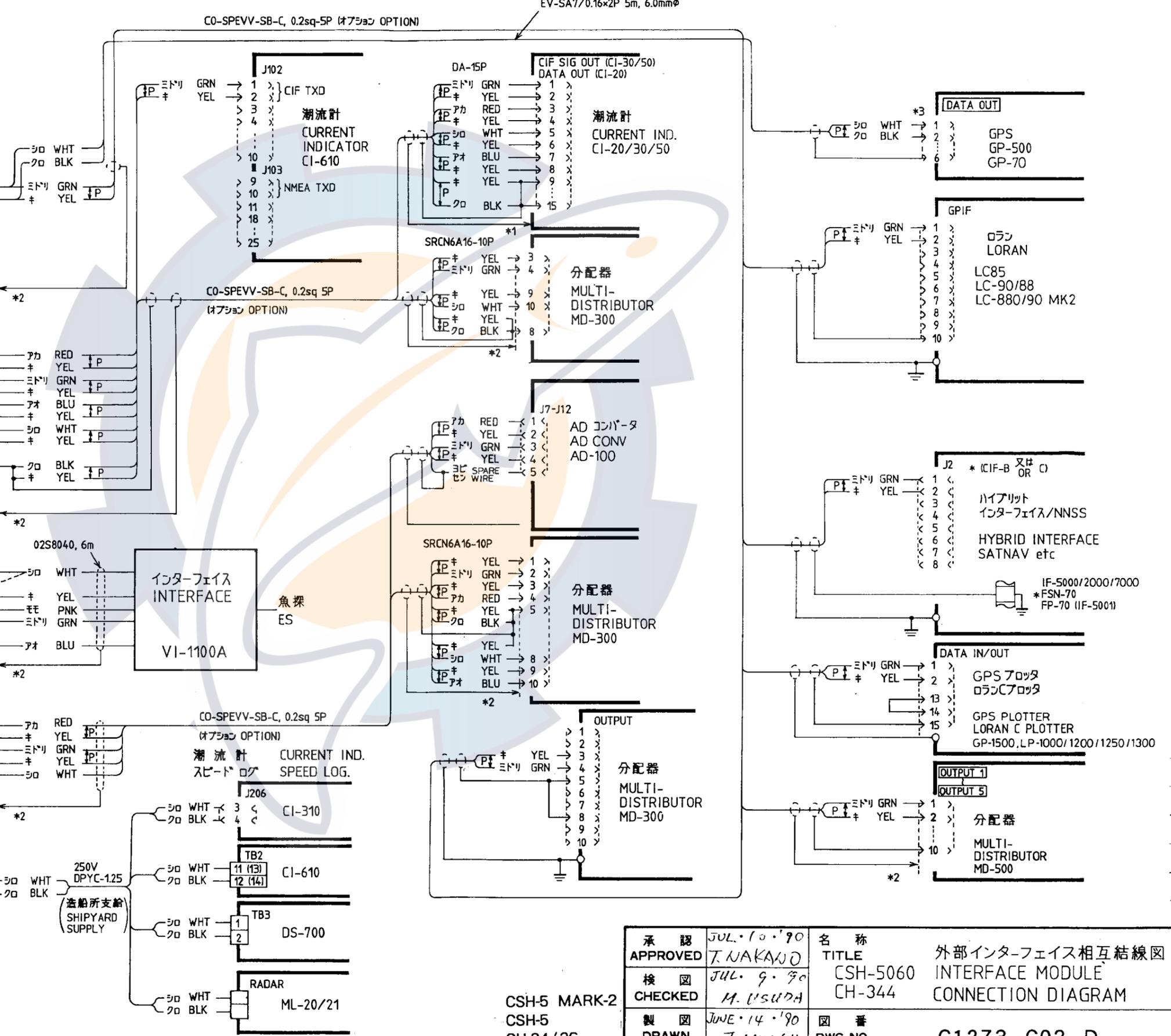
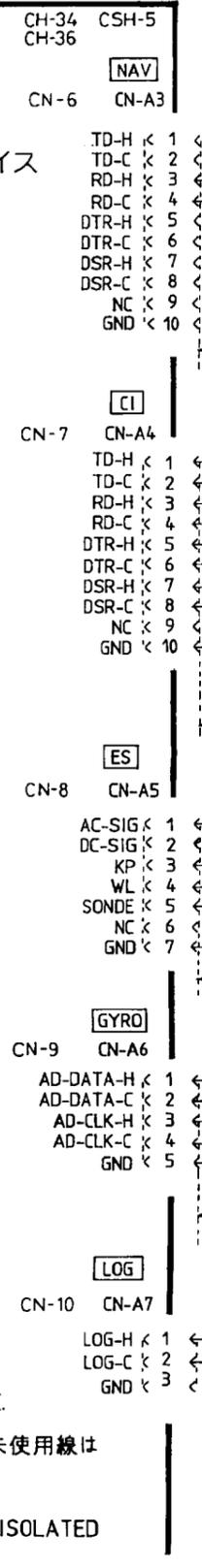


SHIP'S MAINS
 AC100, 115, 200, 220, 240V
 50/60Hz

承認 APPROVED	NOV. 8 '89 T. NAKANO	名称 TITLE	CSH-5 / CSH-5 MARK-2 INTERCONNECTION DIAGRAM
検図 CHECKED	NOV. 8 '89 T. ITO	図番 DWG. NO.	E1273-C01-F
製図 DRAWN	NOV. 8 '89 H. USUDA		

CSH-5 MARK-2
CSH-5 指示器
CH-34/36 DISPLAY UNIT

CSH-5060
 CH-344
 外部インターフェイス
 INTERFACE
 MODULE



- *1 ケーブルクランプでアースにおとす。
GROUND THRU CABLE CLAMP.
- *2 コネクタケースでアースにおとす。
GROUND THRU CONNECTOR CASE.
- *3 出荷時プラグ接続済。ケーブルの未使用線は個別にテピング。
PLUG IS FACTORY-SOLDERED. UNUSED CORE LEADS MUST BE ISOLATED INDIVIDUALLY. DO NOT GROUND THEM.

承認 APPROVED	JUL. 10. '90 T. NAKAJI	名称 TITLE	外部インターフェイス相互結線図
検図 CHECKED	JUL. 9. '90 M. USUDA	CSH-5060 CH-344	INTERFACE MODULE CONNECTION DIAGRAM
製図 DRAWN	JUNE. 14. '90 T. MIYOSHI	図番 DWG. NO.	C1273-C02-D

CSH-5 MARK-2
 CSH-5
 CH-34/36