FURUNO®

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Installation Manual

SEARCHLIGHT SONAR CH-250

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

9-52 Ashihara-cho,
Nishinomiya, Japan

Telephone : 0798-65-2111
fax : 0798-65-4200

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(HIMA) CH-250

Your Local Agent/Dealer

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IME13160K00

⚠ SAFETY INSTRUCTIONS

⚠ WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment.

Only qualified personnel should work inside the equipment.

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

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

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

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

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

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

⚠ WARNING

Installe the specified transducer tank in accordance with the installation instructions. If a different tank is to be installed the shipyard is solely responsible for its installation, and it should be installed so the tank doesn't strike an object.

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

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

Electrolytic corrosion can damage the hull.

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

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

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

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

	Standard	Steering
Monitor unit/ Control unit	0.80 m	0.55 m
Transceiver unit	0.50 m	0.35 m
Interface unit	0.95 m	0.65 m

Install the monitor unit MU-100C out of direct sunlight.

It is difficult to see the display in direct sunlight.

Turn the main power off before this check, otherwise the raise/lower motor action may cause injurely

⚠ CAUTION

WORKING WITH THE SONAROIL

Precautions
Keep oil away from eyes. Wear protective gloves when working with the oil. The oil can cause inflammation of the eyes.

Do not touch the oil. Wear protective gloves when working with the oil. The oil can cause inflammation of the skin.

Do not ingest the oil. Diarrhea or vomiting can result.

Keep the oil out of reach of children.

Emergency
If the oil enters eyes, flush with clean water about 15 min. Consult a physician.

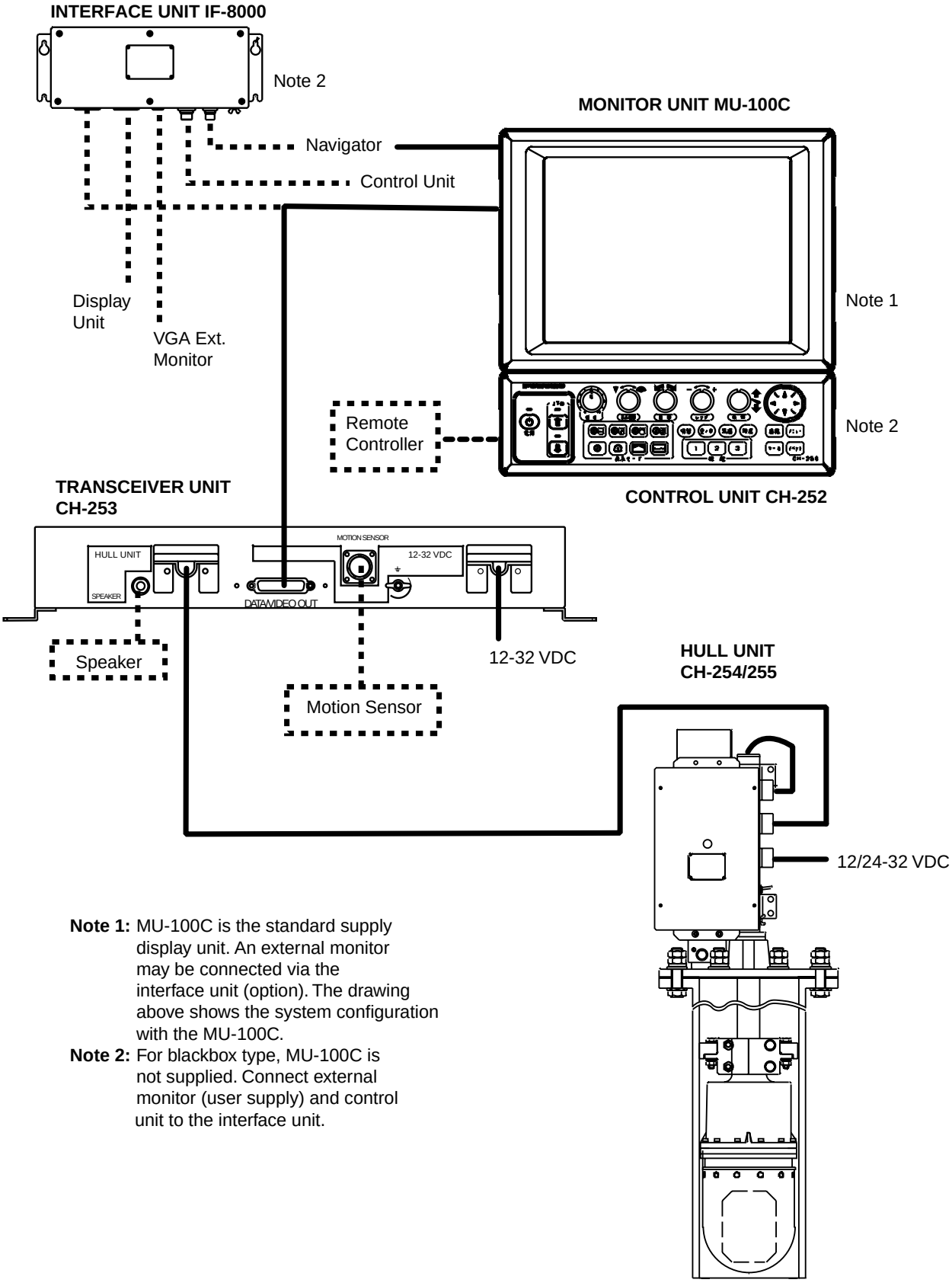
If the oil contacts skin, wash within soap and water.

If the oil is ingested, see a physician immediately.

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

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

SYSTEM CONFIGURATION



Note 1: MU-100C is the standard supply display unit. An external monitor may be connected via the interface unit (option). The drawing above shows the system configuration with the MU-100C.

Note 2: For blackbox type, MU-100C is not supplied. Connect external monitor (user supply) and control unit to the interface unit.

EQUIPMENT LISTS

Standard Supply

Name	Type	Code no.	Qty	Remarks	
Control Unit/ Monitor Unit	CH-252/ MU-100C		1	Not supplied with blackbox type	
Control Unit	CH-252		1	Not supplied with unibody type	
Interface Unit	IF-8000		1	For blackbox type	
Transceiver Unit	CH-253		1		
Hull Unit	CH-254		1	400 stroke	See the following table for Hull Unit Standard Supply.
	CH-255			250 stroke	
Spare Parts	SP06-01100	000-068-488	1	For unibody type, SP06-01102*, SP06-01103*	
	SP06-01110	000-068-489		For blackbox type, SP06-01102*, SP06-01111*, SP06-01103*	
	SP06-01101*	006-556-200		For unibody type	
Installation Materials			1	CP06-01251* and two cables (page viii)	
Accessories	FP02-05100	000-012-474	1	For unibody type, FP02-05101*, FP06-01102*	
	FP06-01120*	006-556-260		For control unit	

*: See the lists at the back of this manual.

Hull Unit (1)

Code no.	Type	Spec.				
		Stroke	Power	Frequency	Shaft	Cable
000-068-515	CH-254-1-60-22-35	400 mm	12 V	60 kHz	2.2 m	3.5 m
000-068-516	CH-254-1-88-22-35			88 kHz		
000-068-517	CH-254-1-150-22-35			150 kHz		
000-068-518	CH-254-1-180-22-35			180 kHz		
000-068-519	CH-254-1-240-22-35			240 kHz		
000-068-559	CH-254-1-60-22-52			60 kHz	2.2 m	5.2 m
000-068-560	CH-254-1-88-22-52			88 kHz		
000-068-561	CH-254-1-150-22-52			150 kHz		
000-068-562	CH-254S-1-180-22-52			180 kHz		
000-068-563	CH-254S-1-240-22-52			240 kHz		
000-068-520	CH-254-1-60-38-52			60 kHz	3.8 m	5.2 m
000-068-521	CH-254-1-88-38-52			88 kHz		
000-068-522	CH-254-1-150-38-52			150 kHz		
000-068-523	CH-254S-1-180-38-52			180 kHz		
000-068-524	CH-254S-1-240-38-52			240 kHz		
000-068-525	CH-254-2-60-22-35		24 V-32 V	60 kHz	2.2 m	3.5 m
000-068-526	CH-254-2-88-22-35			88 kHz		
000-068-527	CH-254-2-150-22-35			150 kHz		
000-068-528	CH-254S-2-180-22-35			180 kHz		
000-068-529	CH-254S-2-240-22-35			240 kHz		
000-068-564	CH-254-2-60-22-52			60 kHz	2.2 m	5.2 m
000-068-565	CH-254-2-88-22-52			88 kHz		
000-068-566	CH-254-2-150-22-52			150 kHz		
000-068-567	CH-254S2-180-22-52			180 kHz		
000-068-568	CH-254S-2-240-22-52			240 kHz		
000-068-530	CH-254-2-60-38-52			60 kHz	3.8 m	5.2 m
000-068-531	CH-254-2-88-38-52			88 kHz		
000-068-532	CH-254-2-150-38-52			150 kHz		
000-068-533	CH-254S-2-180-38-52			180kHz		
000-068-534	CH-254S-2-240-38-52			240 kHz		
000-068-535	CH-255-1-60-22-35	250 mm	12 V	60 kHz	2.2 m	3.5 m
000-068-536	CH-255-1-88-22-35			88 kHz		
000-068-537	CH-255-1-150-22-35			150 kHz		
000-068-538	CH-255S-1-180-22-35			180 kHz		
000-068-539	CH-255S-1-240-22-35			240 kHz		
000-068-540	CH-255-1-60-38-52			60 kHz	3.8 m	5.2 m
000-068-543	CH-255-1-88-38-52			88 kHz		
000-068-544	CH-255-1-150-38-52			150 kHz		
000-068-547	CH-255S-1-180-38-52			180 kHz		
000-068-548	CH-255S-1-240-38-52			240kHz		
000-068-569	CH-255-1-60-22-52			60 kHz	2.2 m	5.2 m
000-068-570	CH-255-1-88-22-52			88 kHz		
000-068-571	CH-255-1-150-22-52			150 kHz		
000-068-572	CH-255S-1-180-22-52			180 kHz		
000-068-573	CH-255S-1-240-22-52			240 kHz		
000-068-549	CH-255-2-60-22-35		24 V-32 V	60 kHz	2.2 m	3.5 m
000-068-550	CH-255-2-88-22-35			88 kHz		
000-068-551	CH-255-2-150-22-35			150 kHz		
000-068-552	CH-255S-2-180-22-35			180 kHz		
000-068-553	CH-255S-2-240-22-35			240 kHz		
000-068-554	CH-255-2-60-38-52			60 kHz	3.8 m	5.2 m
000-068-555	CH-255-2-88-38-52			88 kHz		
000-068-556	CH-255-2-150-38-52			150 kHz		
000-068-557	CH-255S-2-180-38-52			180 kHz		
000-068-558	CH-255S-2-240-38-52			240 kHz		
000-068-574	CH-255-2-60-22-52			60 kHz	2.2 m	5.2 m
000-068-575	CH-255-2-88-22-52			88 kHz		
000-068-576	CH-255-2-150-22-52			150 kHz		
000-068-577	CH-255S-2-180-22-52			180 kHz		
000-068-578	CH-255S-2-240-22-52			240 kHz		

Hull Unit Standard Supply

Name	Type	Code no.	Qty	Remarks
Raise/lower Drive Unit	CH-2541	-	1 set	
	CH-2551	-		
Soundome	CH-2542	-	1 set	See the following Soudome table.
Flange	CH-2543	006-557-810	1 set	Flange, grease cotton
Assembly Kit for field	CH-2544	006-557-820	1 set	Shaft, retraction tank, seal, adhesives, tank guide, material box
Shaft	SHJ-0006-1	661-000-061	1	2.2 m, for 3.5/5.2 m cable
	06-007-1572-0	600-715-720		3.8 m, for 5.2m cable
Sonar Oil	4 lit.	000-824-033	1	

Shaft parts

Name	Type	Code no.	Qty	Remarks
Pipe cap	SHN-0011-0	661-400-110	1	
Jubilee Clip	1X28-41	000-801-857	1	
Hex. bolt	M10X35 SUS304	000-862-175	2	
U-nut	M10 SUS304	000-863-930	2	
Flat washer	M10 SUS304	000-864-131	4	

Tank parts

Name	Type	Code no.	Qty	Remarks
Hex. bolt	M20X80 SUS304	000-801-893	8	
Hex. nut	M20 SUS304	000-863-116	16	
Flat washer	M20 SUS304	000-864-136	16	
Spring washer	M20 SUS304	000-864-270	8	

Adhesives

Name	Type	Code no.	Qty	Remarks
Kinolastar	855	000-801-328	1	Anti-corrosion
Three Bond	1104	000-854-104	1	Sealant, 200g
Cemedine High Super	6G	000-856-520	1	adhesive

Tank guide

Name	Type	Code no.	Qty	Remarks
Tank guide	CH-2544	006-557-200	1	

Assembly kit for field (Material Box)

Name	Type	Code no.	Qty	Remarks
Socket set screw	TWB-40	000-804-423	1	4 mm
Shim (0.5)	06-021-4035	100-295-420	2	0.5 mm
Shim (1.0)	06-021-4036	100-295-430	2	1.0 mm
Shim (2.0)	06-021-4037	100-295-440	4	2.0 mm

Cables for Installation materials

Type	Code no.	Specification (Cable between unit)		
		Monitor unit (or IF) and Transceiver unit	Transceiver unit and Hull unit	Crimp-on lug
CP06-01200	000-068-496	06S4078*5m*	06S4080*15m*	CP06-01251*
CP06-01201	000-068-497		06S4080*30m*	CP06-01251*
CP06-01202	000-068-498		06S4080*50m*	CP06-01251*
CP06-01203	000-068-499	06S4078*10m*	06S4080*15m*	CP06-01251*
CP06-01204	000-068-500		06S4080*30m*	CP06-01251*
CP06-01205	000-068-502		06S4080*50m*	CP06-01251*

Control unit cable

Type	Code no.	Qty	Remarks	
CP02-06600*	000-012-486	1	MJ-A10SPF0002-0015, for unibody type	
CP02-06610*	000-012-480	1	MJ-A10SPF0002-015, 1.5 m	For blackbox type
CP02-06620*	000-012-481		MJ-A10SPF0002-050, 5 m	

*: See lists at the back of this manual.

Options

Name	Type	Code no.	Qty	Remarks
Remote Controller	CH-256-E	000-068-492	1 set	
Interface Unit	IF-8000	000-068-495	1 set	
Motion Sensor	MS-100	-	1 set	
Speaker	SC-05WR	000-136-156	1	
Signal Cable	S06-9-5	006-556-270	1	Extension cable for speaker
Cable assy.	MJ-A6SSPF0012-050	000-134-424	1	6pin-6pin, 5m
	MJ-A6SSPF0012-100	000-133-817		6pin-6pin, 10m
	MJ-A6SSPF0011-050	000-132-244		6pin-4pin, 5m
	MJ-A6SSPF0011-100	000-132-336		6pin-4pin, 10m
Control Unit Separate Kit	OP06-15-1.5	006-556-280	1	For desktop, with 1.5 m
	OP06-15-5	006-556-290		For desktop, with 5 m
	OP02-83-1.5	001-413-600	1	For flush mount, with 1.5 m cable
	OP02-83-5	001-413-610	1	For flush mount, with 5m cable
Flush mount kit	OP06-16	006-556-300	1	For unibody type
	OP06-17	006-556-310	1	For separate type display unit
Control unit flush mount kit	OP06-18	006-556-320	1	
Rectifier	RU-1746B-2	000-030-439	1	
Tank	06-007-1570-1	600-715-701	1	Steel, 1m
	SHJ-0001-1	661-000-011	1	Steel, 1.8m
	06-007-1571-1	600-715-711	1	Steel, 3.5m
	SHJ-0022	661-000-220	1	FRP, 1m
	06-007-1573-0	600-715-730	1	FRP, 1.8m
	OP10-5	000-069-763	1	Aluminum, 1m

1. Mounting

1.1 Monitor Unit/Control Unit

This searchlight sonar has two types of shipment, standard type which is shipped with monitor unit and blackbox type which is shipped without monitor unit, but has interface unit. For blackbox type, see page 4.

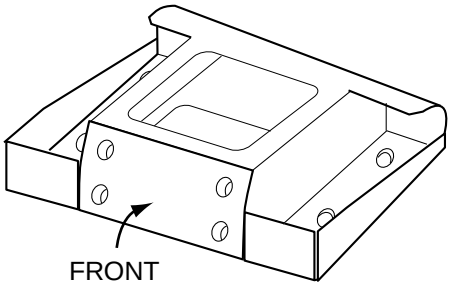
The control unit can be installed together with the monitor unit, or independently of the monitor unit. On installing separately, the optional monitor kit is required. These units can be installed on a tabletop or flush mounted in a console or panel.

1.1.1 General mounting considerations

- Keep the monitor unit out of direct sunlight.
- Select a location where the unit(s) can easily be operated while observing the fishing ground or area surrounding the vessel.
- For maintenance and checking purposes, leave sufficient space at the sides and rear of the unit and leave slack in cable. (Refer to the outline drawing at the back of this manual.)
- A magnetic compass will be affected if place too close to the monitor unit. Observe the following compass safe distance to prevent deviation to a magnetic compass: Standard compass: 0.80 m, Steering compass: 0.55 m.

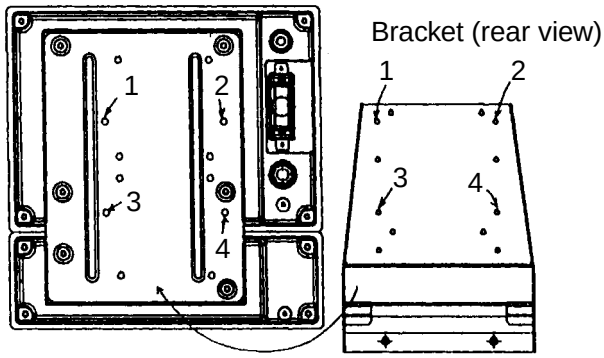
1.1.2 Mounting method of monitor unit (Standard type)

1. Fasten the mounting base to the mounting location with four tapping screws.



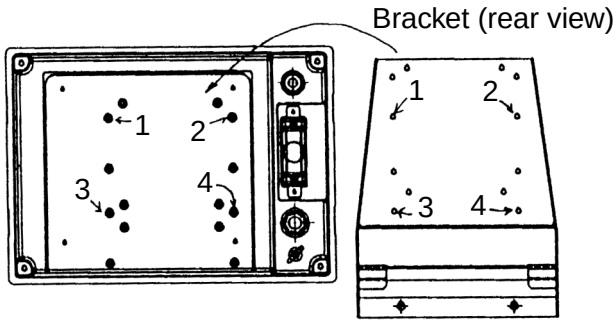
Mounting base

2. For unibody mounting;
   a) Fasten the bracket at the rear of monitor and control units with four binding screws (M4x10).



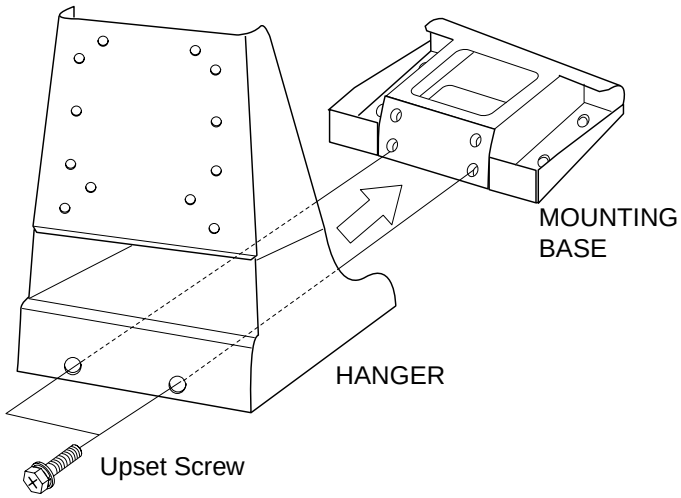
Bracket, rear view

3. For separate/blackbox mounting;
   a) Dismount the coupling plate to separate monitor unit and control unit.
   b) Attach the bracket at rear of the monitor unit with four binding screws (M4x10).



Bracket, rear view

4. Coat threads of upset screws (M6x16, 2 pcs.) used to fasten bracket to mounting base.
5. Fasten the bracket to the mounting base with two upset screws. (Use the upper holes to tilt the monitor unit 20°; lower holes to tilt it 9°.)



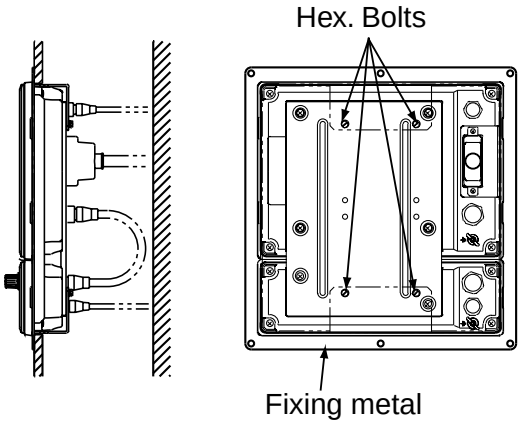
Fastening hanger to mounting base

Flush mounting

Flush mounting for unibody (Type: OP06-16, Code no.: 006-556-300)

Name	Type	Code No.	Qty	Remarks
Fixing metal	06-021-1311	100-279-610	1	
Tapping screw	5X20	000-802-840	6	
Hex. bolt	M4X12	000-882-040	4	

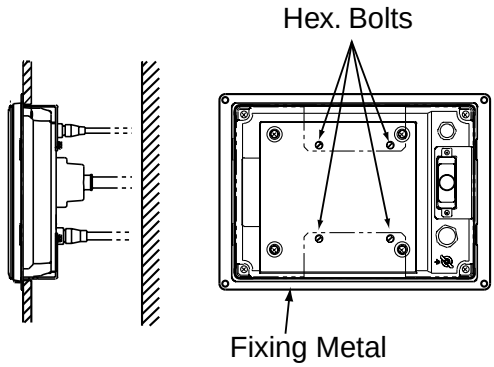
1. Make holes at the place to mount (W287 X H297).
2. Fasten monitor and control units with the fixing metal (supplied as option) and four hex. bolts (supplied as option).
3. Fasten the fixing metal assembled at step 2 to holes made at step 1 with six tapping screws (supplied as option).



Flush mounting for monitor unit (Type: OP06-17, Code no. 006-556-310)

Name	Type	Code No.	Qty	Remarks
Fixing metal	06-021-1321	100-279-621	1	
Tapping screw	5X20	000-802-840	4	
Hex. bolt	M4X12	000-882-040	4	

1. Make holes at the place to mount (W287 X H207).
2. Fasten the fixing metal (supplied as option) to the monitor unit with four hex. bolts (M4x12, supplied as option).
3. Fasten the fixing metal assembled at step 2 to holes made at step 1 with four tapping screws (5x20, supplied as option).



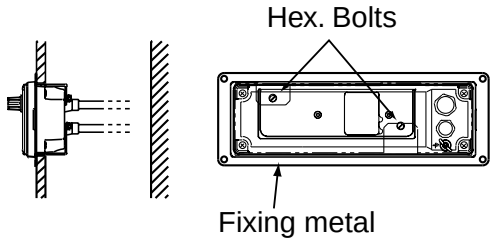
Flush mounting for control unit Type:

OP02-83-1.5, Code no.: 001-413-600 (1.5 m cable)

OP03-83-5, Code no.: 001-413-610 (5m cable)

Name	Type	Code No.	Qty	Remarks	
Fixing metal	06-021-2101	100-279-731	1		
Tapping screw	5X20	000-802-840	4		
Hex. bolt	M4X12	000-882-040	2		
Cable assembly	MJ-A10SPF0002-015	000-142-878	1	1.5 m	Select one.
	MJ-A10SPF0002-050	000-131-411	1	5 m	

1. Make holes at the place to mount (W287 X H87).
2. Fasten the fixing metal to the control unit with two hex. bolts (supplied as option).
3. Fasten the fixing metal assembled at step 2 to holes made at step 1 with four tapping screws (supplied as option).



1.1.3 Blackbox type

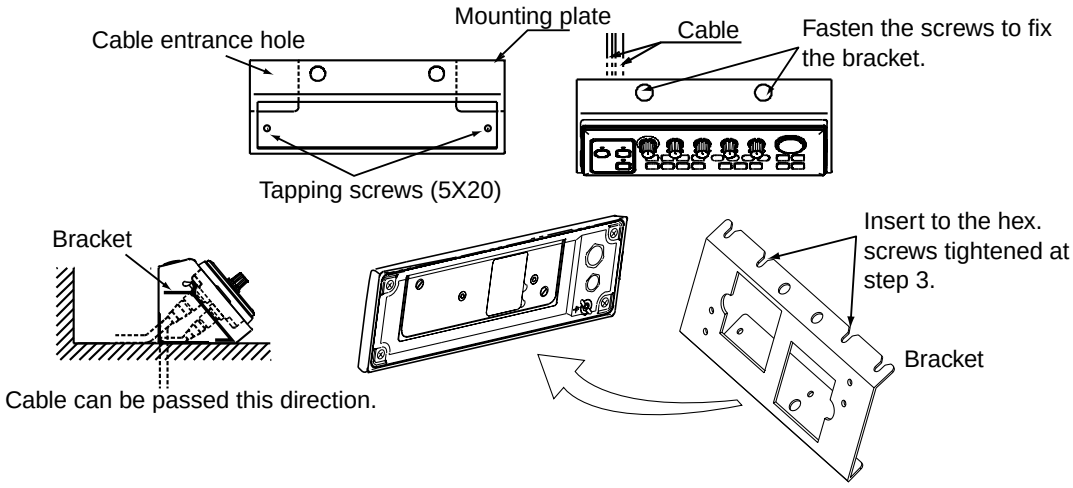
The blackbox type is required to connect a standard VGA monitor via the interface unit IF-8000. Supply monitor and interconnection cable (Max. length 15 m with Dsub-15P connectors of male, three rows of 15 pins) locally. The monitor used should satisfy the specifications shown below.

- VGA type
- ANALOG RGB 0.7 Vpp, positive polarity
- TLL level H, V, Negative polarity

1.1.4 Control unit

On blackbox type, fix the control unit to the mounting plate (supplied as accessories).
See the parts list of FP06-01120 and outline drawings at the back of this manual.

1. Fix the mounting plate to the place selected with two tapping screws (5X20, supplied).
2. Fix the bracket to the control unit with two hex. screws (M4X12, supplied).
3. Insert the screw driver from the top of the mounting plate holes and then tighten two hex. screws (M4X12) loosely.
4. Attach the control unit to the mounting plate, and fasten two hex. screws tightly.
5. Attach two cosmetic caps to holes at the top of the mounting plate.



On mounting the control unit separate from the monitor unit, the optional control unit separate kit is required. Mount the control unit same as the above procedure. See the outline drawing at the back of this manual to mount.

Type: OP06-15-1.5 Code no.: 006-556-280: with 1.5 m cable
Type: OP06-15-5 Code no.: 006-556-290: with 5 m cable

Name	Type	Code no.	Qty	Remarks
Cable	MJ-A10SPF0002-015	000-142-878	1	For 1.5 m cable
	MJ-A10SPF0002-050	000-131-411		For 5 m cable
Bracket	06-021-2112	100-281-880	1	
Mounting Plate	06-021-2111	100-279-740	1	
Tapping Screw	5X20	000-802-081	2	
Cosmetic Cap	DP-687	000-808-417	2	
Hex. Screw	M4X12	000-882-040	4	
Bind Screw	M4X10	000-807-331	4	For monitor

1.2 Transceiver Unit

1.2.1 General mounting considerations

- The mounting location should be well ventilated and dry.
- The unit can be mounted on bulkhead or the deck.
- Secure the maintenance space shown in drawing below for ease of maintenance and service.
- The maximum cable length between the transceiver unit and the raise/lower drive unit cable is 50 m.
- The maximum cable length between the transceiver unit and the monitor (interface) unit is 10 m.

1.2.3 Mounting method

Fasten the transceiver unit with four tapping screws (5X20, local supplied).

For bulkhead mounting, tighten upper tapping screws so there is 5 mm clearance between bottom of screw head and bulkhead, and screw slots of the unit. Then fasten lower screws.

1.3 Hull Unit

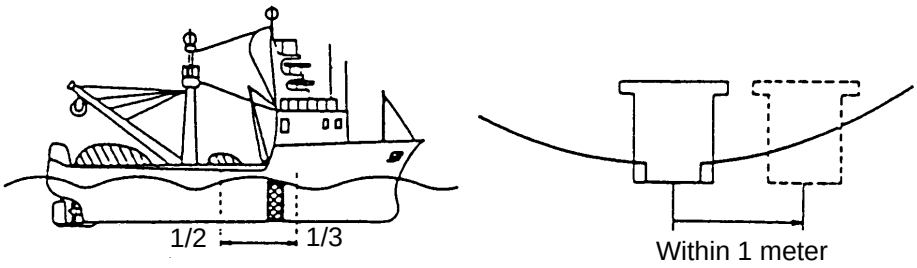
1.3.1 General mounting considerations

- Noise and air bubbles will affect performance.
- Do not turn on the equipment with the transducer exposed to air. Exposing the transducer to air may damage it.

1.3.2 Installation position considerations

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

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



Installation location for hull unit

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

Mounting method

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

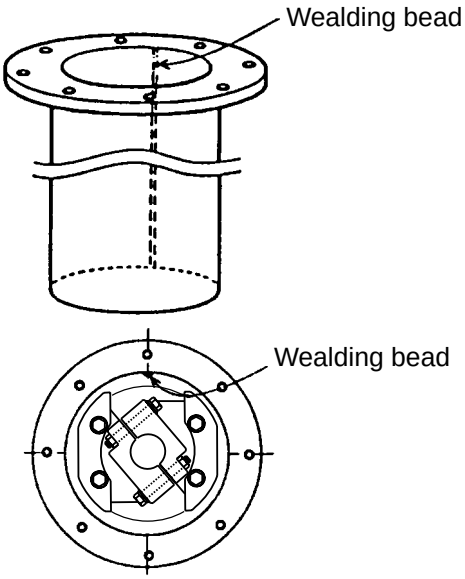
1.3.3 Transducer tank

Tank length

Shorten the transducer tank so the transducer is lowered into water as deep as possible. Pay particular attention to the tank length Lt. Determine the length of the main shaft.

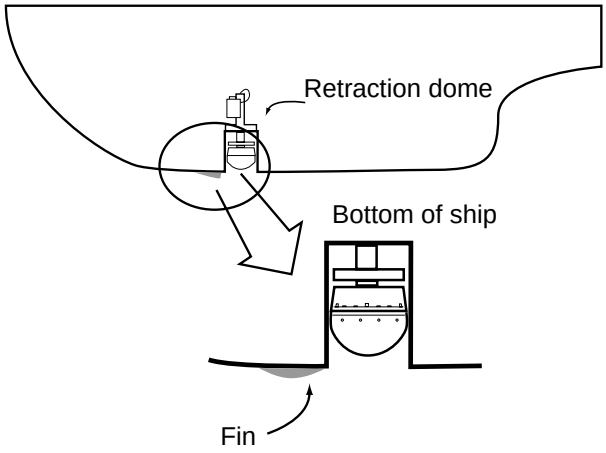
- Length of main shaft = Lt + 200 mm (for 400 stroke)
- Length of main shaft = Lt + 50 mm (for 250 stroke)

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



For small FRP ship

For small FRP ship retraction tank should be 2 degrees against ship's draft. Therefore, this creates high water pressure in the tank because of the resistance at the rear of the tank well. To solve this problem, attach a fin to the hull at the location shown in figure below.



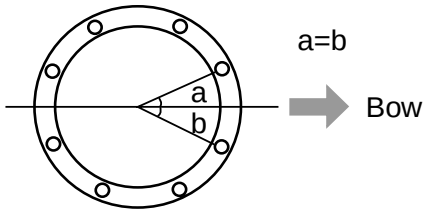
This fin makes a smooth stream in the retraction dome. Attach the fin (height:1-1.5 cm, FRP).

Mounting of transducer tank

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

Note 1: When making a retraction tank locally, the inside diameter of the retraction tank should not be more than $\phi 190 \pm 0.5$ as shown on outdrawing at the back of this manual. If larger, the hull unit may be danger.

Note 2: Locate the retraction tank so that the center of any two bolt holes is facing the ship's bow.



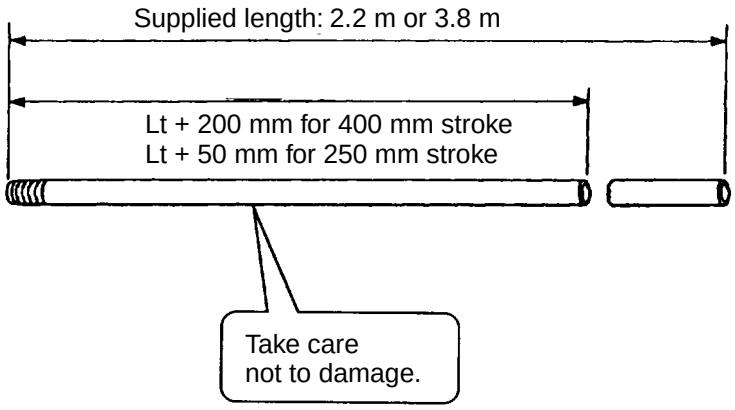
1.3.4 Assembling and mounting of hull unit

The hull unit is shipped as the parts shown in the hull unit kit on Equipment Lists (page iv and after). Assemble the hull unit as shown in the procedure below.

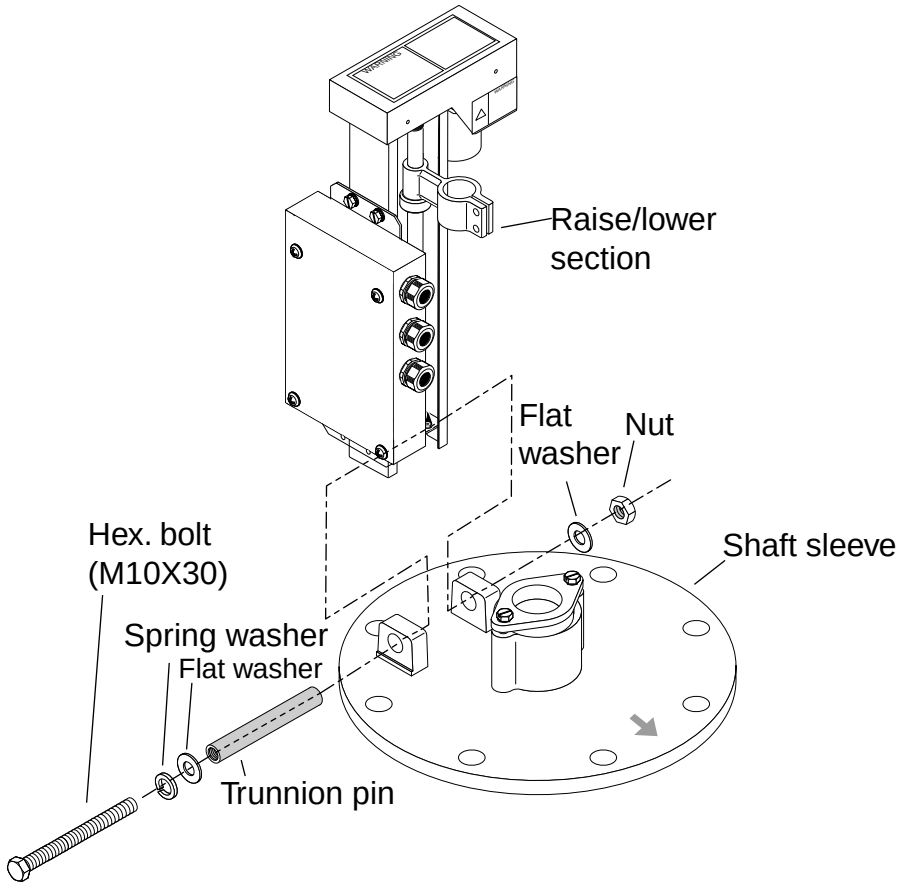
Necessary tools

Name	Specification	Remarks
Wrench	For M10 (Hex. size 17 mm)	Recommended: double offset wrench
Wrench	For M20 (Hex. size 20 mm)	
Pipe Wrench	55 mm	For fixing gland
Ball Wrench	Hex size 4 mm	For fixing the dome

1. Calculate necessary length of main shaft from the length of retraction tank Lt and cut off the spare portion. When 1 m or 1.8 m long tank is used, main shaft (1.17 m or 1.97 m) can be used without cutting off any portion.



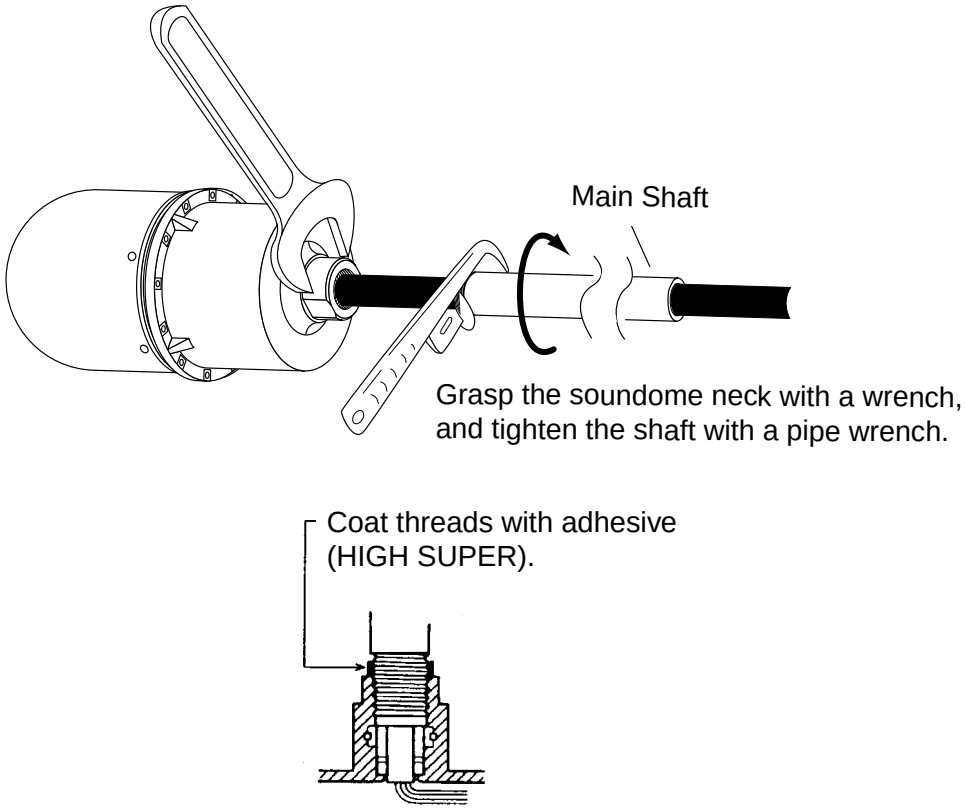
2. Remove hex bolt, nut, spring washers, flat washers and trunnion pins from the main body flange. And then, mount the raise/lower drive unit on the shaft sleeve by using the hardware removed.



Shaft sleeve and raise/lower drive unit assembly

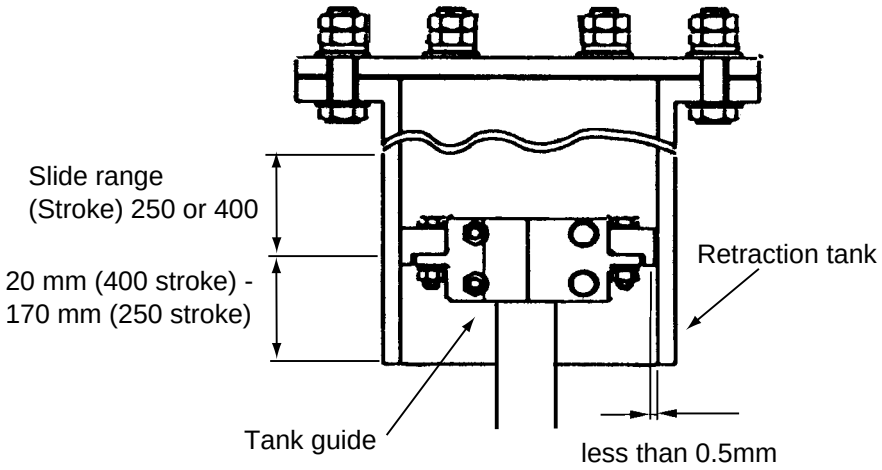
3. Pass the transducer cable through the main shaft.

4. Fully screw main shaft into the soundome neck, and then unscrew by four turns. Coat threads with adhesive (HIGH SUPER).



Applying Adhesive (HIGH SUPER) to main shaft

5. Screw in main shaft completely.
6. As shown in the drawing below, confirm that the narrowest gap between the tank guide, and retraction tank in the range (20 to 170 mm) is within 0.5 mm.

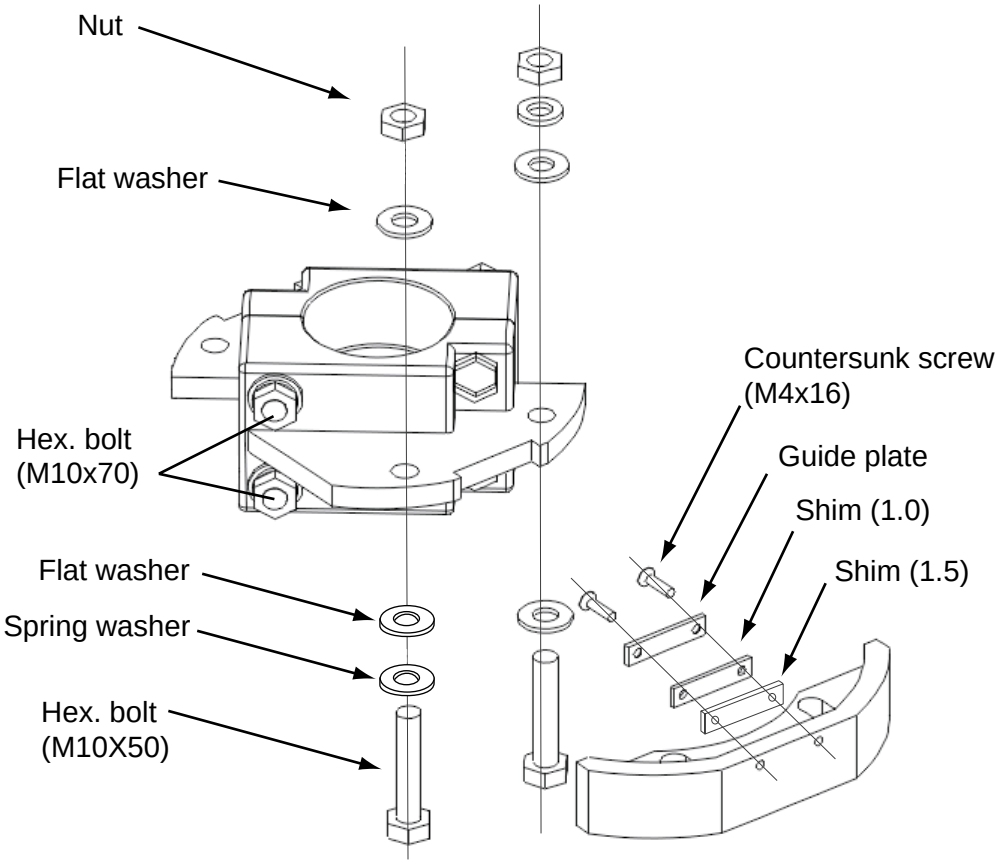


Tank and tank guide, sectional view

7. If the gap at a side is more than 0.5 mm, install a shim to make the gap within 0.5 mm.

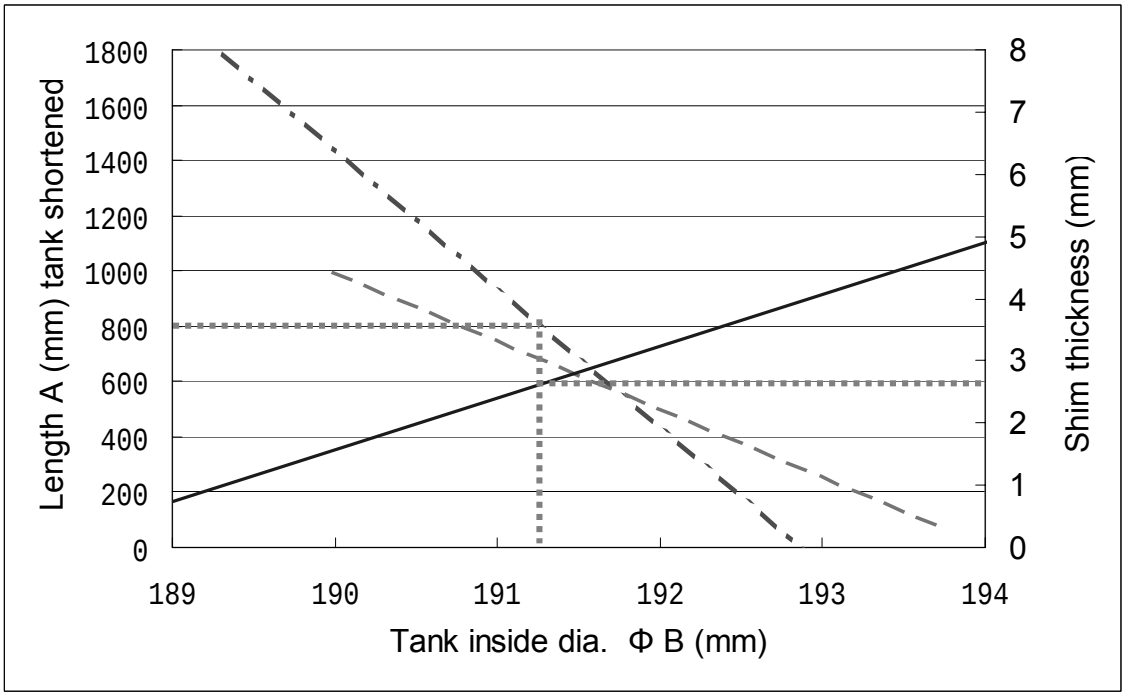
   a) Unscrew four M10x50 bolts.

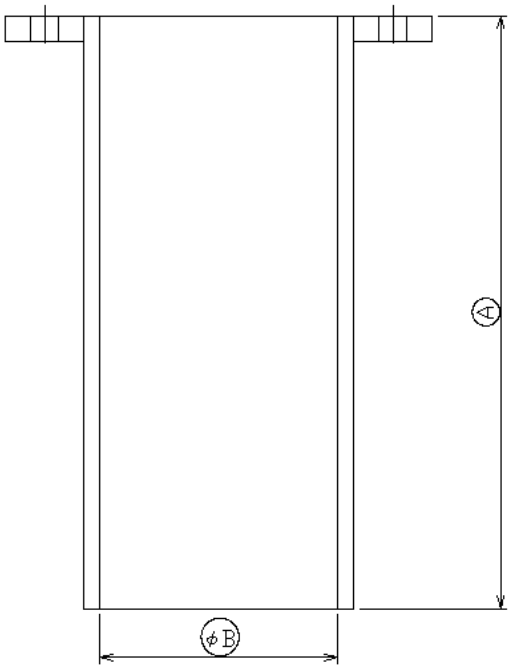
   b) Unscrew four countersunk screws, then attach the shim with the countersunk screws as shown below.

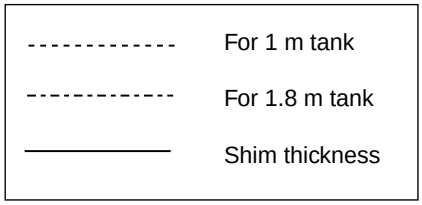


Installing shims

The table below shows tank length and necessary shim thickness. In addition, the shim thickness shown is for one side. For example, when cutting the 1800 mm tank to 800 mm, the tank inside diameter is 191.25 mm, shim thickness is 2.5 mm as shown the table in below.



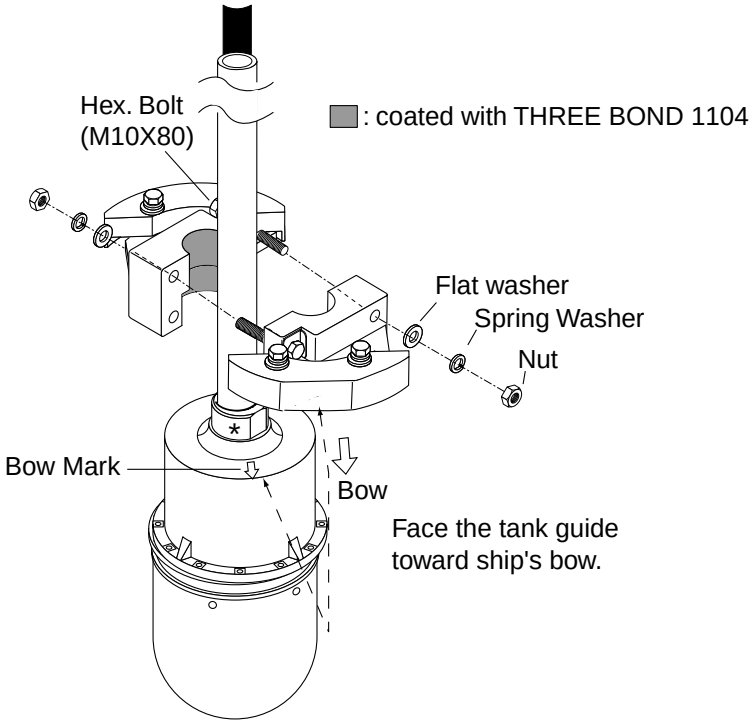




The table below shows number of shims required and shim thickness.

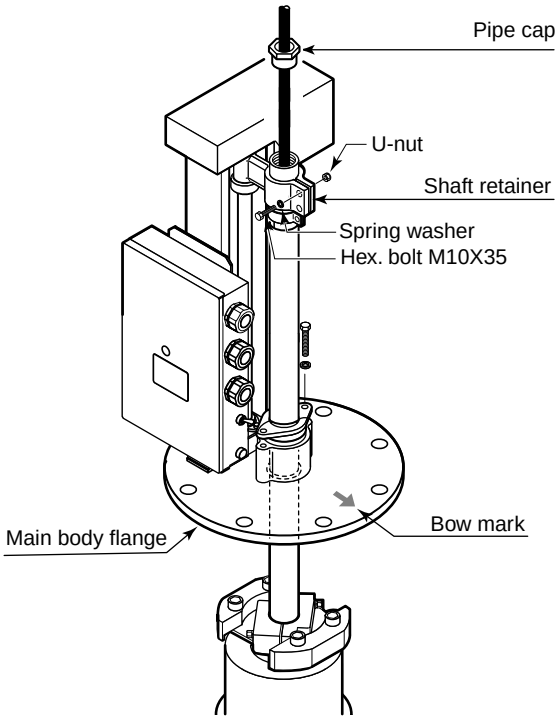
Shim thickness	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5
t2.0					1	1	1	1	2	2	2	2	2	2
t1.0			1	1			1	1			1	1	2	2
t0.5		1		1		1		1		1		1		1
Inside dia of tank	188.1	188.7	189.3	189.9	190.5	191.1	191.7	192.3	192.9	193.5	194.1	194.7	195.3	195.9

8. Apply THREE BOND 1104 to the inside of tank guide. And then, fasten tank guide at the neck* of the main shaft securely with M10X80 bolts.

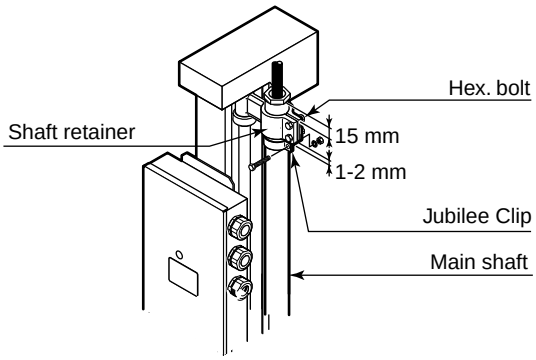


Tank guide attachment

9. Pass the main shaft through shaft sleeve.
10. Pass the main shaft through the shaft retainer at the raise/lower drive unit.

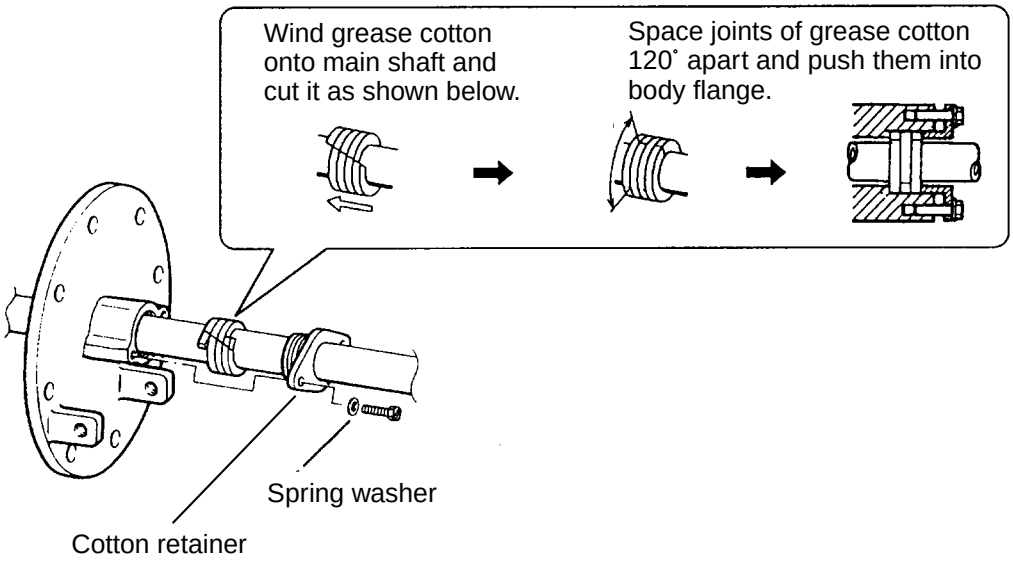


11. Face the bow mark on the soundome with the bow mark on the shaft sleeve, and then fix the main shaft with and shaft retainer.
12. Fix the jubilee clip to the main shaft.



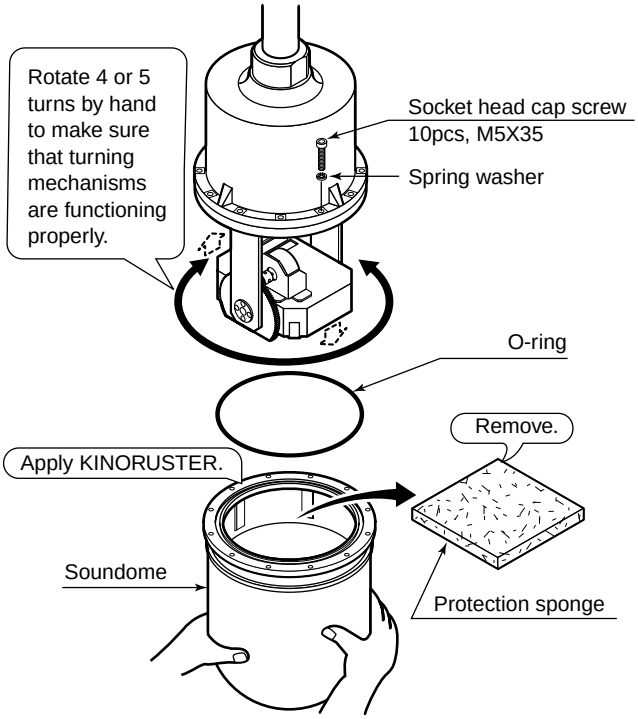
Note: Attach the shaft retainer so it is 15 mm from the top of the shaft. The soundome is then placed 10 mm above the bottom of tank when retracted.

13. Insert grease cotton (supplied with shaft sleeve), and fix them with the cotton retainer as follows.
    a) Wind grease cotton onto main shaft.
    b) Mark on the cotton as below.
    c) Remove the cotton from the shaft, and then cut it at the position of the mark. Discard the ends.
    d) Wind cottons as shown below.
    e) Push cottons into the main body flange.
    f) Tighten the grease cotton retainer.



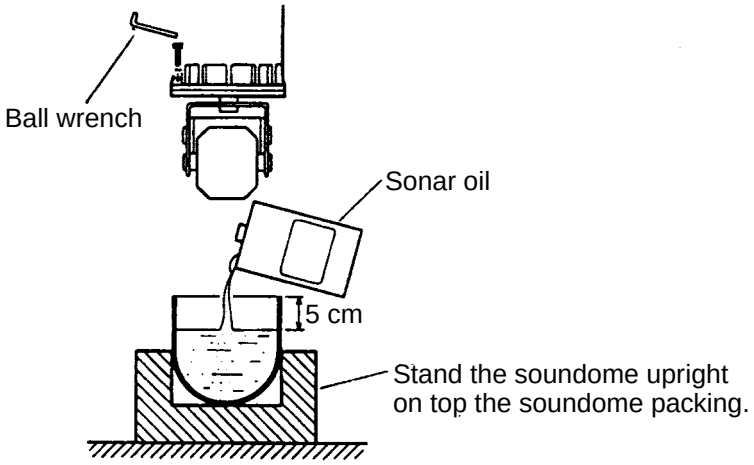
Installing grease cotton on the main shaft

14. Fasten the pipe cap (supplied) to main shaft.
15. Unscrew 10 pcs of M5X35 socket head cap screws with soundome fixing tool to separate soundome.



Detaching the soundome

16. Throw away protection sponge placed in soundome.
17. Stand the soundome upright on top of the soundome packing. Fill the soundome with oil (supplied) so the level is 5 cm on the top of the soudome. Keep the soundome packing for future use.



Filling the soundome with sonar oil

⚠ CAUTION

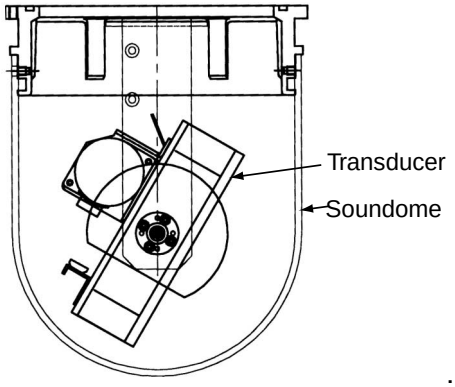
Keep oil away from eyes. Where protective goggles when working with the oil. The oil cause inflammation of the eyes.
Do not touch the oil. The oil can cause inflammation of the skin. Wear protective gloves when working with the oil.
Do not ingest the oil. Diarrhea or vomiting can result.
Keep the oil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

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

DISPOSAL OF OIL AND ITS CONTAINER
Dispose of oil and its container in accordance with local regulations.
For further information,contact place of purchase.

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

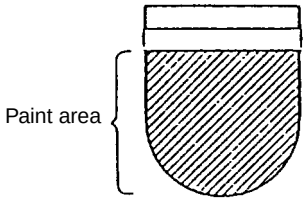
18. Rotate the transducer manually as shown angle in below, and then refit soudome.



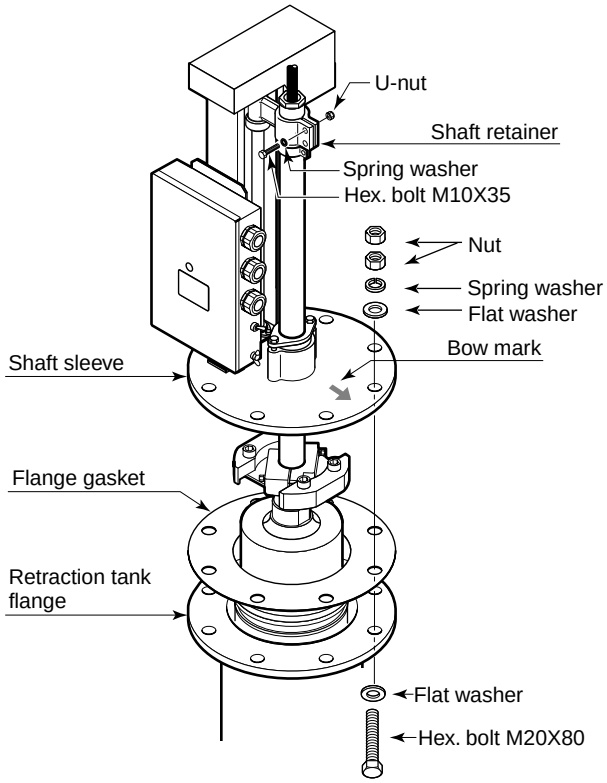
Note 1: Do not lay the oil-filled soundome for five minutes. Oil may leak.

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

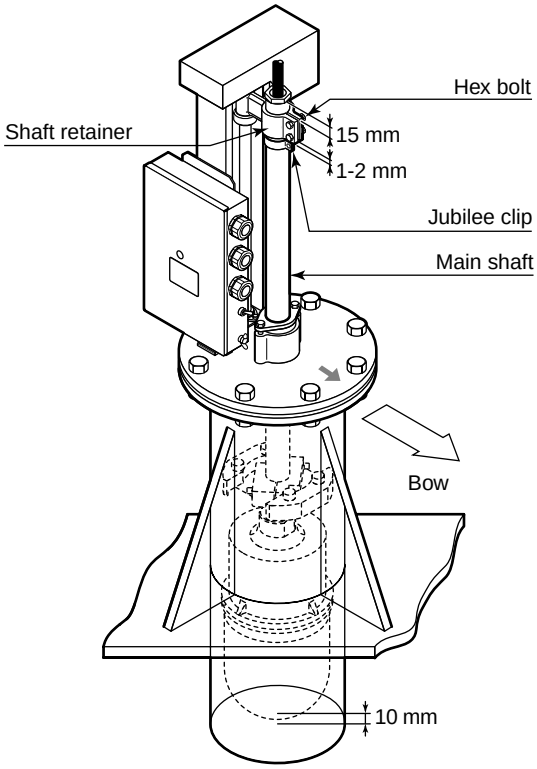
- Use only anti-fouling paint type MARINE STAR 20 (Manufacture: Chugoku Marine Paint Co., Ltd., Japan).
- Paint only the plastic portion of the dome. Painting the metal parts causes corrosion.



19. Clean surface of gasket, tank flange and shaft sleeve, and then apply THREE BOND 1104 to flange gasket.
20. Apply a slight coat of KINORUSTER to bolts, nuts and washers.
21. Set the hull unit into the retraction tank, taking care not to damage soundome.



22. Fix the shaft sleeve and retraction tank with hex bolts, flat washers and spring washers.



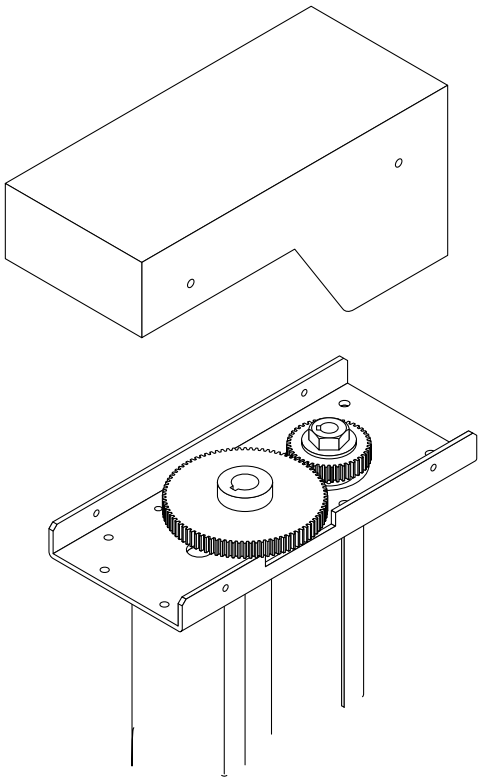
Checking manual raise/lower of soundome with hand crank

Perform this check after all wiring has been completed.

> **⚠ CAUTION**
>
> Turn the main power off before this check, otherwise the raise/lower motor action may cause injurely.

1. Turn off the breaker on the hull unit.
2. Detach the gear cover.
3. Set wrench (opposite side19 mm) to the screw shaft gear.
4. The transducer should rise/lower smoothly with even force in upper to lower limits. If not, the centers of the shaft sleeve and the retraction tank are not aligned. Adjust the hull mounting position if necessary. Check the following points.

- Painting inside tank not smooth
- Inner diameter of tank not uniform
- Welding bead

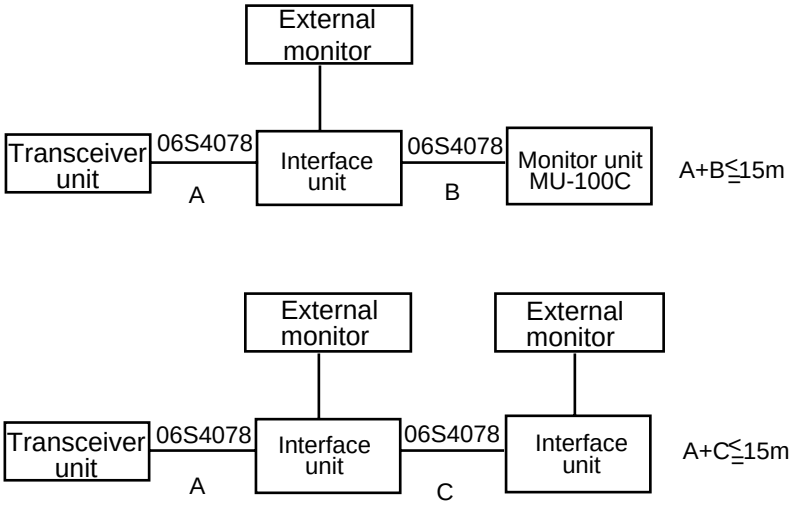


1.4 Interface Unit

For the blackbox type, the interface unit is shipped as standard.

1.4.1 General mounting considerations

- The mounting location should be well ventilated and dry, avoiding splay or rain.
- The unit can be mounted on a bulkhead or the deck.
- Secure the maintenance space shown in drawing below for ease of maintenance and service.
- The maximum cable length between the interface unit and the transceiver unit is 10 m.



1.4.2 Mounting method

Fasten the interface unit with four tapping screws (5X20, local supplied).

For bulkhead mounting, tighten upper tapping screws so there is 5 mm clearance between bottom of screw head and bulkhead, and screw slots of the unit. Then fasten lower screws.

1.5 Motion Sensor MS-100 (option)

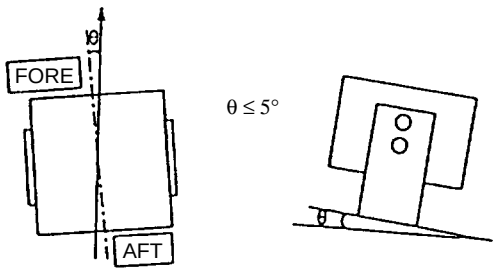
The MS-100 measures ship's pitching and rolling angles with sensor using the principles of the gyroscope. The MS-100 is free from error caused by ship's vertical and horizontal motion. Therefore, it can be installed at any convenient location. However, ship's semi-permanent inclination due to loading imbalance cannot be detected. Compensate for this as described in Chapter 3.

1.5.1 Mounting considerations

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

1.5.2 Mounting procedure

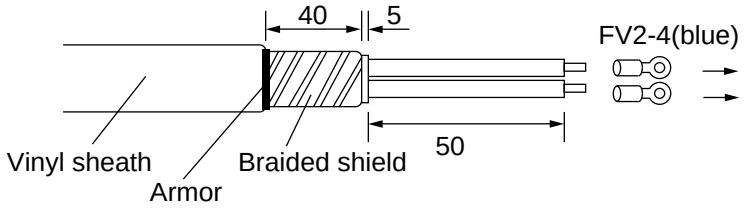
Orient the FORE mark on the unit toward the ship's bow and mount the unit level to within 5° in all direction. For the offset, see Chapter 3.

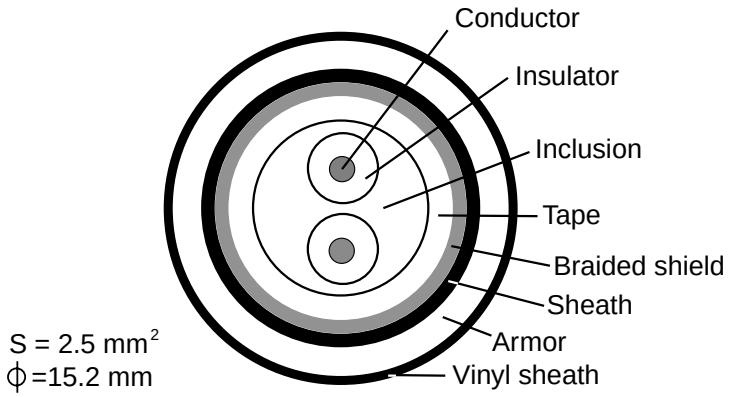


2. Wiring

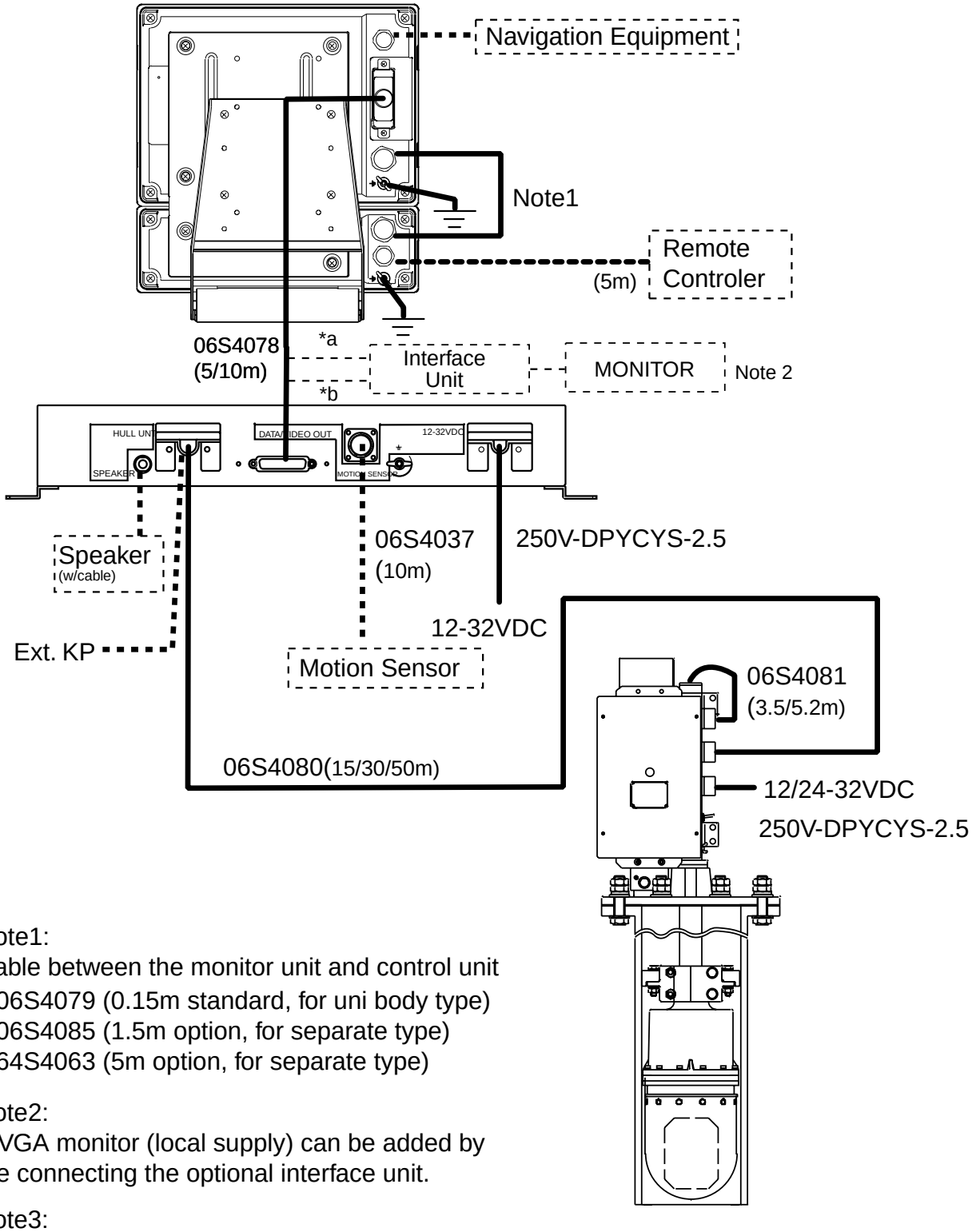
2.1 Wiring among Units

- The figure on the next page shows wiring among units.
- The signal cables are fitted with connectors. Connect the cables to the display, transceiver and hull units referring to the interconnection diagram and the drawing on page S-1.
- The power cable should be arranged locally. Use power cable type DPYCYS-2.5 (Japan Industrial Standard cable) or equivalent cables. Attach climp on lugs as shown below.





- The raise/lower drive motor and breaker are different depending on ship's mains.
- Install the main switch for the sonar where it can be easily accessed. Turn off this switch when the sonar is not being used, to reduce power consumption and to prevent the transducer from slipping by vibration.
- If D-sub connector is too large to pass through the hole on the monitor, transducer and/or interface unit, remove the connector cover.



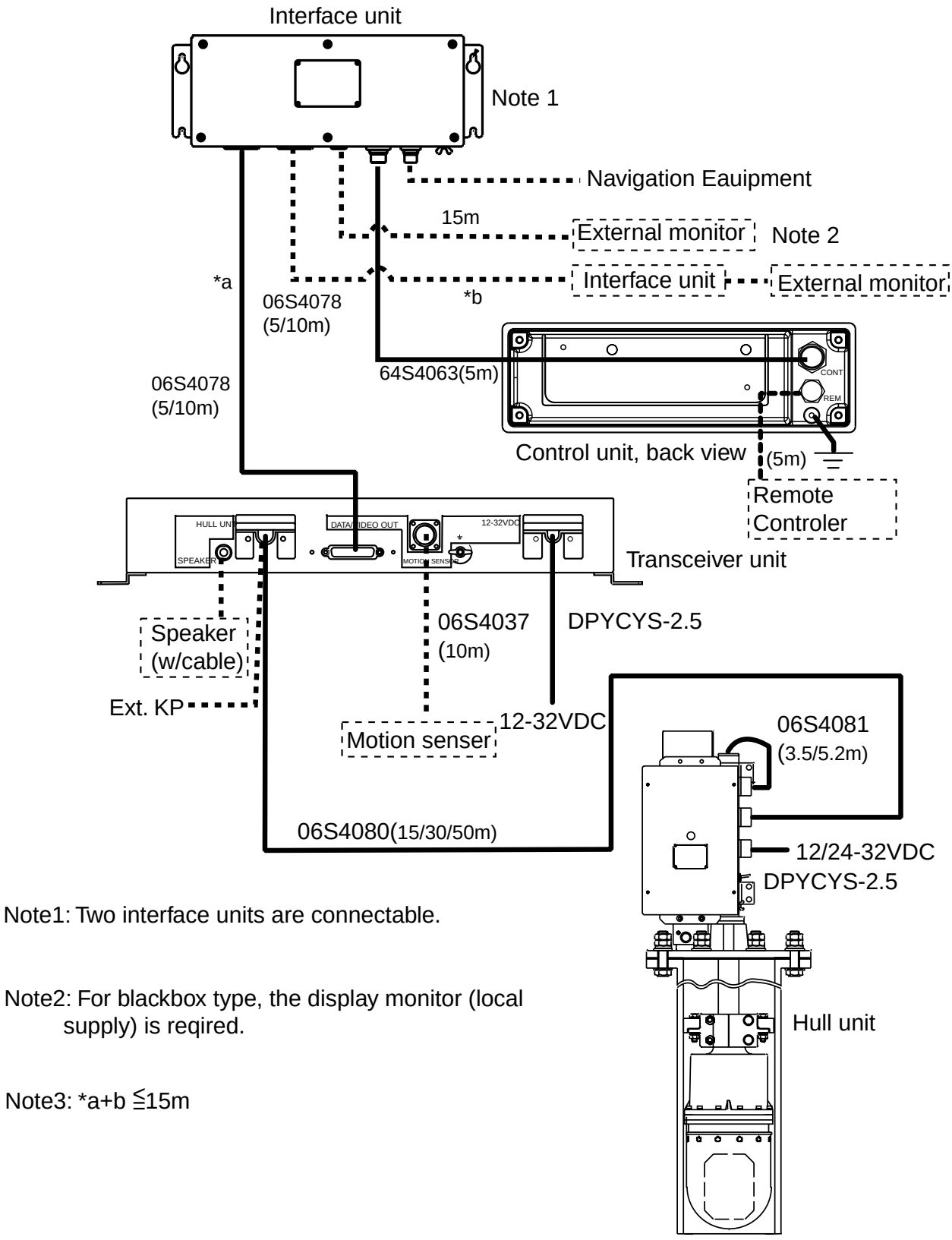
Note1:
Cable between the monitor unit and control unit

- 06S4079 (0.15m standard, for uni body type)
- 06S4085 (1.5m option, for separate type)
- 64S4063 (5m option, for separate type)

Note2:
A VGA monitor (local supply) can be added by the connecting the optional interface unit.

Note3:
*: a+b≦15m

Wiring, with monitor



Note1: Two interface units are connectable.

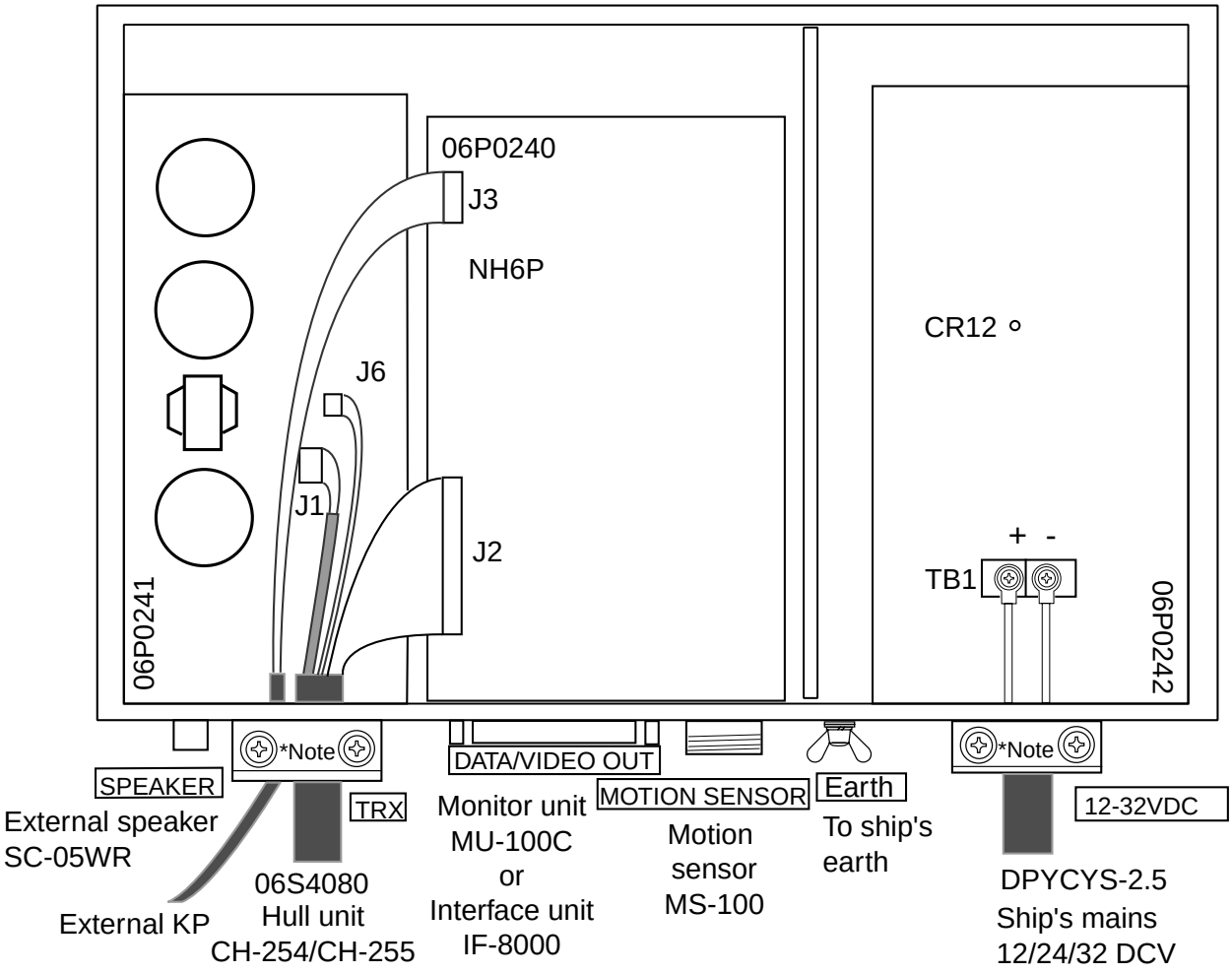
Note2: For blackbox type, the display monitor (local supply) is reqired.

Note3: *a+b ≦15m

Wiring, no monitor

2.2 Transceiver Unit

Connect the cables as figure in below. Remove the cover of the power terminal board.

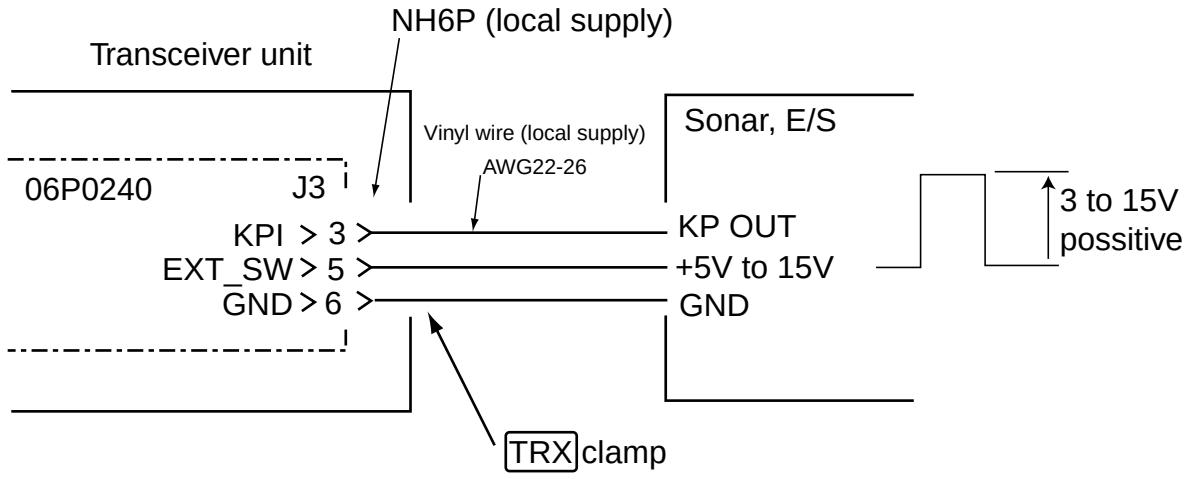


*Note: Fix the braided shield with the clamp.

Transceiver unit, internal view

2.2.1 Synchronizing Transmission with Echo Sounder or Other Sonar

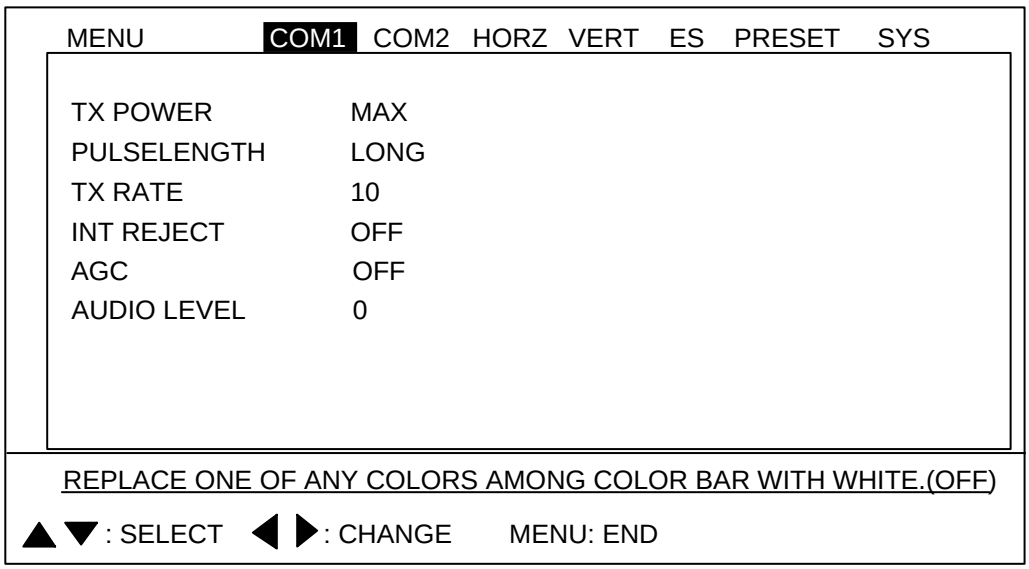
To synchronize transmission of the CH-250 with an echo sounder or other type of sonar, connect it as shown below.



Connection of transceiver unit to other sonar

Menu setting

1. Press the [MENU] key to display the user menu.
2. Operate the cursor pad to select COM1 at the top of menu display.



User menu (COMN)

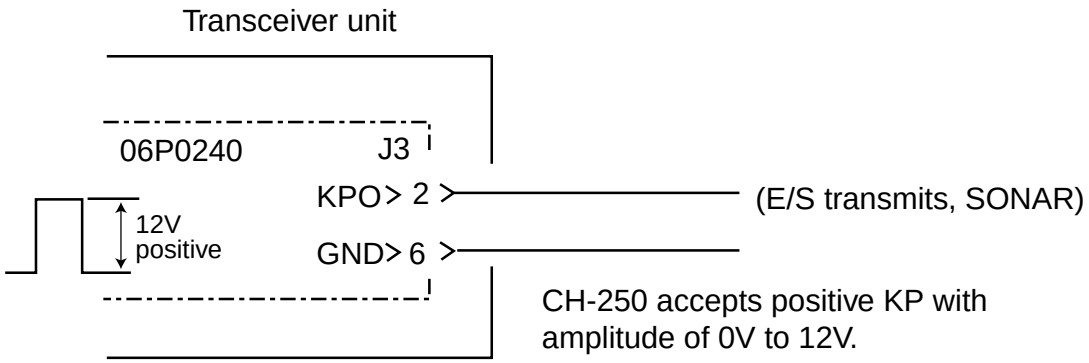
3. Press the [▼] to select TX RATE.
4. Press the [◀] to display the setting window.

TX rate setting window

5. Press the [◂] to select EXTERNAL.
6. Press the [MENU] key to close the user menu.

g)

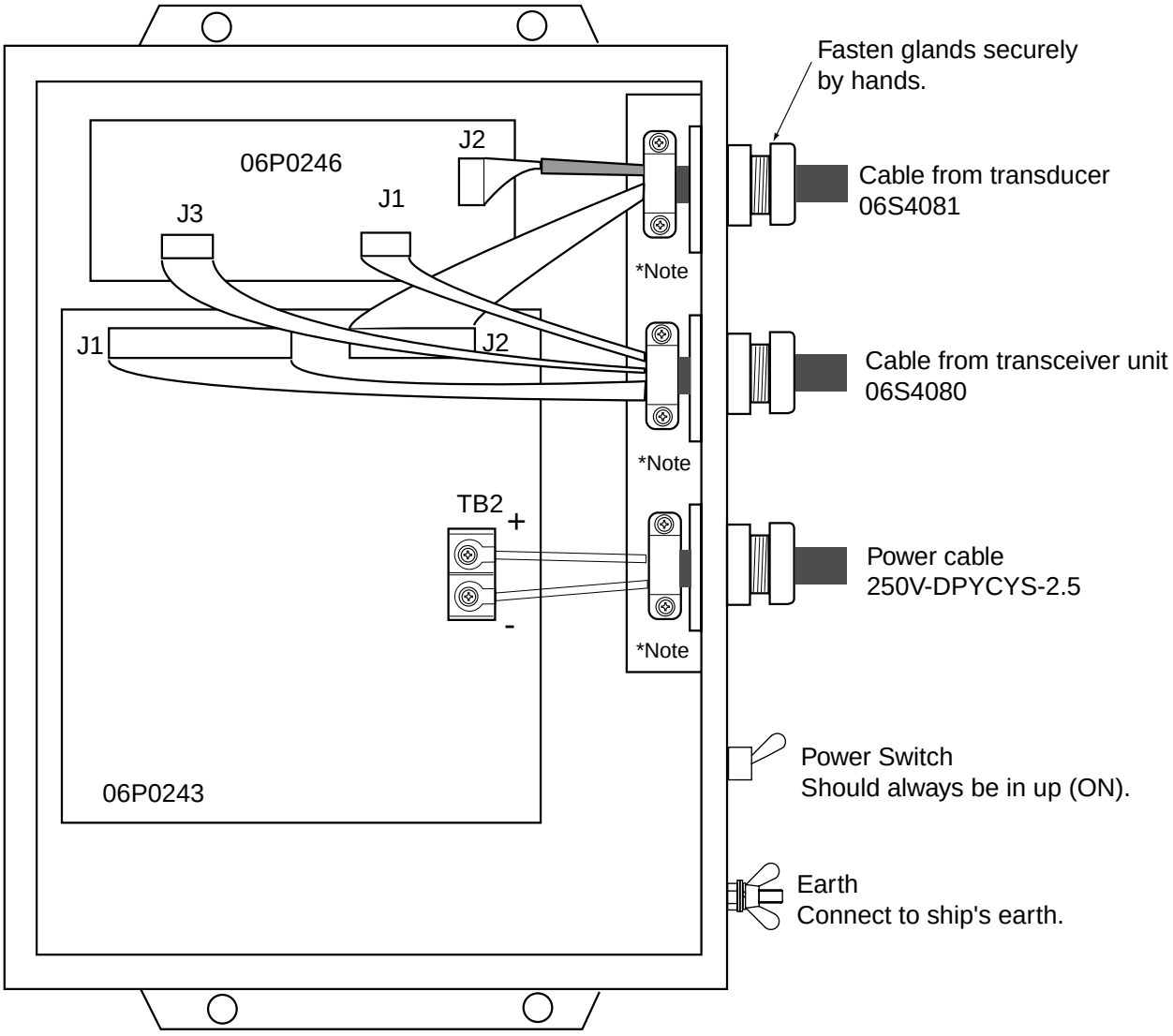
Note: Outputting KP of CH-250 to other sonar, echo sounder



Outputting KP of CH-250 to other sonar, echo sounder

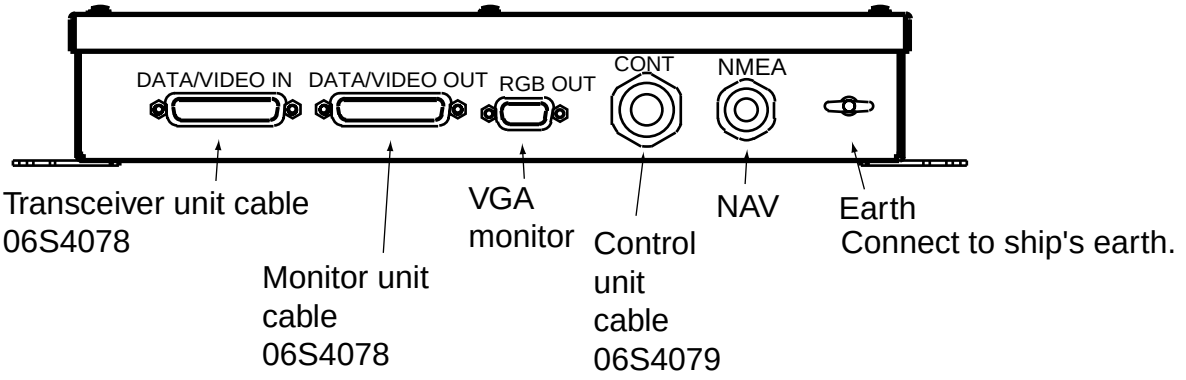
2.3 Hull Unit

Pass the cables to 06P0426 Board through the cable protectors.



*Note: Fix the braided shield with cable clamp.

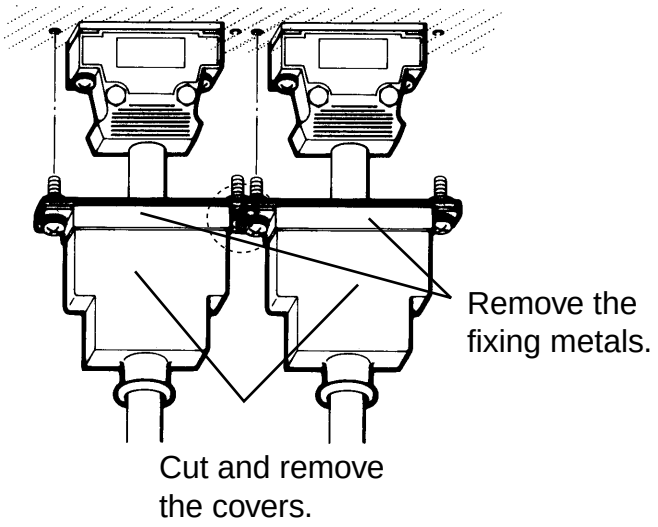
2.4 Interface Unit



The blackbox type is required to connect a standard VGA monitor via the interface unit IF-8000. Supply monitor and interconnection cable (Max. length 15 m with Dsub-15P connectors of male, three rows of 15 pins) locally. The monitor used should satisfy the specifications shown below.

- VGA type
- ANALOG RGB 0.7 Vpp, positive polarity
- TLL level H, V, Negative polarity

Note: Cut and remove the rubber covers as below to attach connectors to the interface unit..



Note: Connect control unit or navigator equipment to either interface unit or monitor unit (supplied by FURUNO).

3. ADJUSTMENTS

3.1 General Checks

Table 3-1 General checks

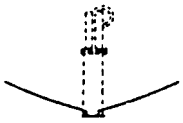
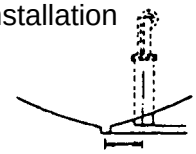
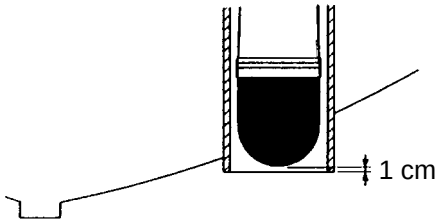
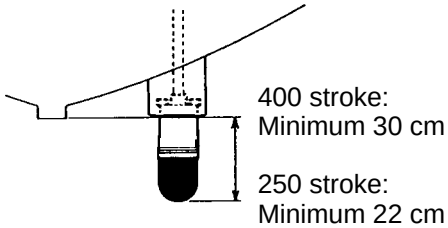
Check Item	Check point, Rating
Retraction tank level	On-keel Installation 
	Off-keel Installation  Within 1 m
Clearance between transducer and bottom of retraction tank when transducer is completely retracted by hand crank	
Transducer travel (lowered by hand clank) **Note:** When checking, a clearance of approximately 1 meter is required under the bottom of the transducer.	 400 stroke: Minimum 30 cm 250 stroke: Minimum 22 cm
Transducer heading	Bow mark on the shaft sleeve should face ship's bow.

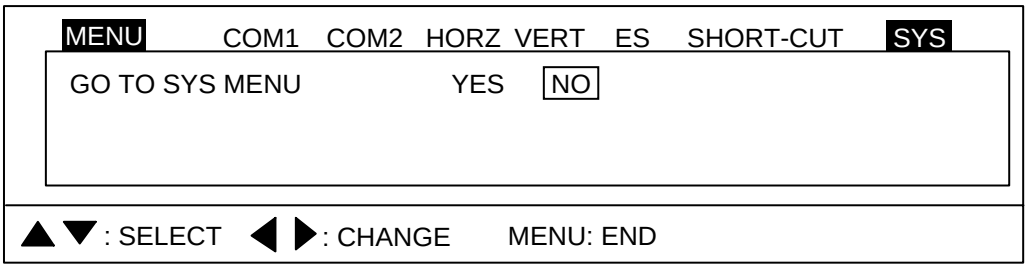
Table 3-1 general checks (con't)

Check Item	Check point, Rating
Wiring check	• All cables are correctly connected. • All lead wires are tightly fixed with contact pins or crimp-on lugs. • All screws are firmly fastened. • Cables are firmly secured. • Cables shields are properly grounded.
Rejecting source of noise and interference	• Noise generating machinery (motor, radiotelephone, TV set, etc.) are not placed nearby. • Magnetic devices are not placed in the vicinity of display unit.
Earth	• Each unit is grounded with a copper strap.
Ship's mains voltage	• Ship's mains voltage is stable 12, 24 or 32 VDC.
Watertightness	• Water should not leak from the main body flange or along the main shaft.

3.2 TX Frequency Checking

Check the TX frequency after the installation.

1. Press the [MENU] key to open the user menu.
2. Press the cursor pad to select SYS at the top of the menu display.



User menu (SYS)

3. Press the [▼] to select GO TO SYS MENU.
4. Press the [◀] to select YES to display the system menu.

** SYSTEM MENU **

SYSTEM SETTING ▶
RANGE-SONAR MODE
RANGE-VERTICAL MODE
RANGE-E/S MODE
RANGE-TRACK MODE
COLOR PALETTE
LANGUAGE
SYSTEM BACKUP
LOAD BACKUP DATA
HEADING OFFSET, DRAFT OFFSET
ADJ MOTION SENSOR
TX FREQ ADJUST
TEST
TEST PATTERN
DEMO MODE
DEFAULT

▲▼: SELECT ◀ ▶: MENU DISPLAY MENU: END

System menu

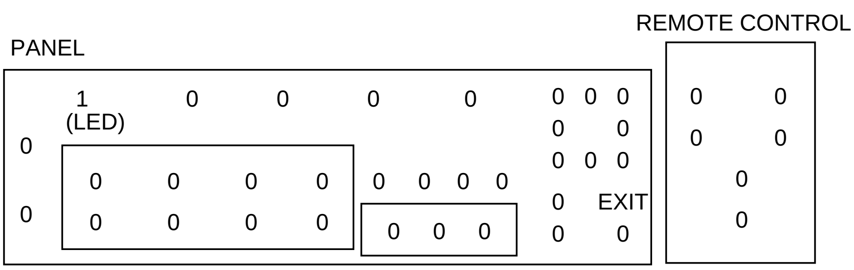
5. Press the [▼] to select TEST.
6. Press the [▶] to show the test display.

MAIN PROGRAM NO. 0650110-**.**
PANEL PROGRAM NO. 0650104-0**

ROM	: OK
RAM	: OK
VRAM	: OK
NMEA	: OK
PANEL CPU	: OK
TX FREQUENCY	: 180 kHz
ROLL	: 10
PITCH	: 10

	PULSES	NG
TRAIN	359	0

TEST COUNT= : 0



** Program Version No.

Test display

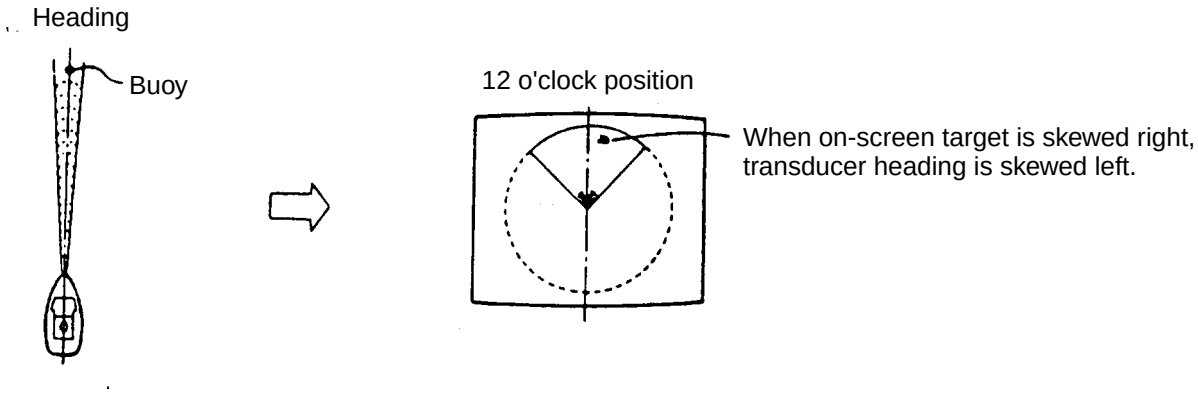
7. Check the frequency at the TX FREQUENCY line on the test display.
8. Press the [MENU] key several times to close the menu.

3.3 Heading Alignment/Soundome Setting

Heading alignment

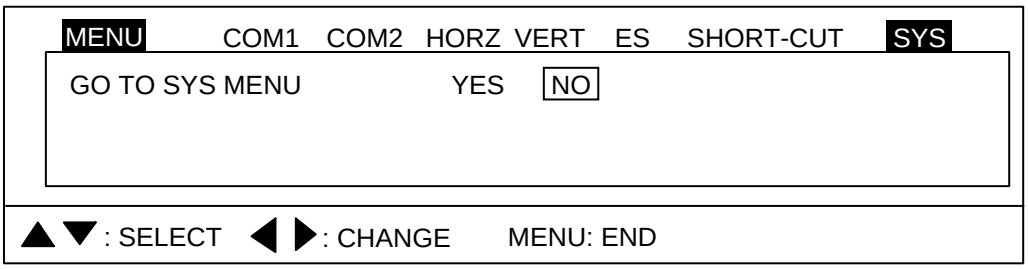
The heading line can be compensated through the system menu (–30° to +30°).

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



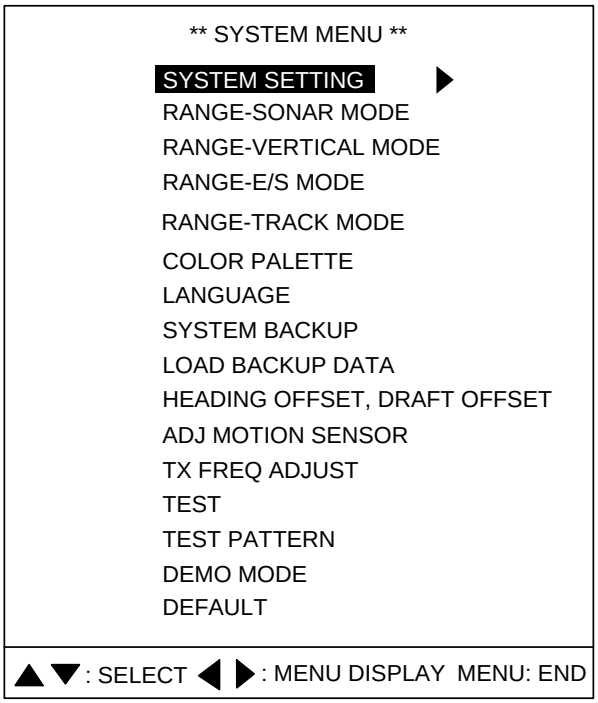
Checking heading alignment

2. Press the [MENU] key to display the user menu.
3. Press the cursor pad to select SYS at the top of menu display.



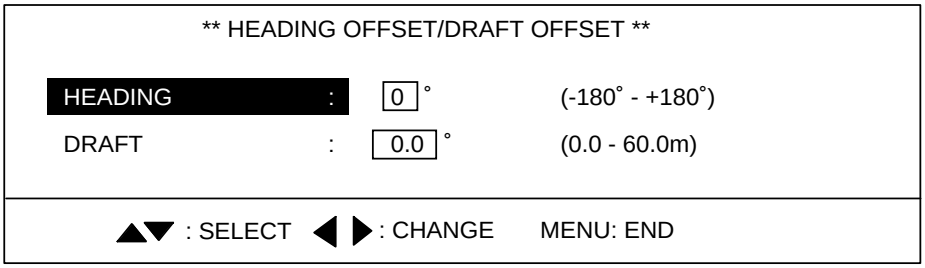
User menu (SYS)

4. Press the [▼] to select GO TO SYS.
5. Press the [◀] to select YES to display the system menu.



System menu

6. Press the [▼] to select HEADING OFFSET, DRAFT OFFSET, and then press the [▶] to display the heading offset display.



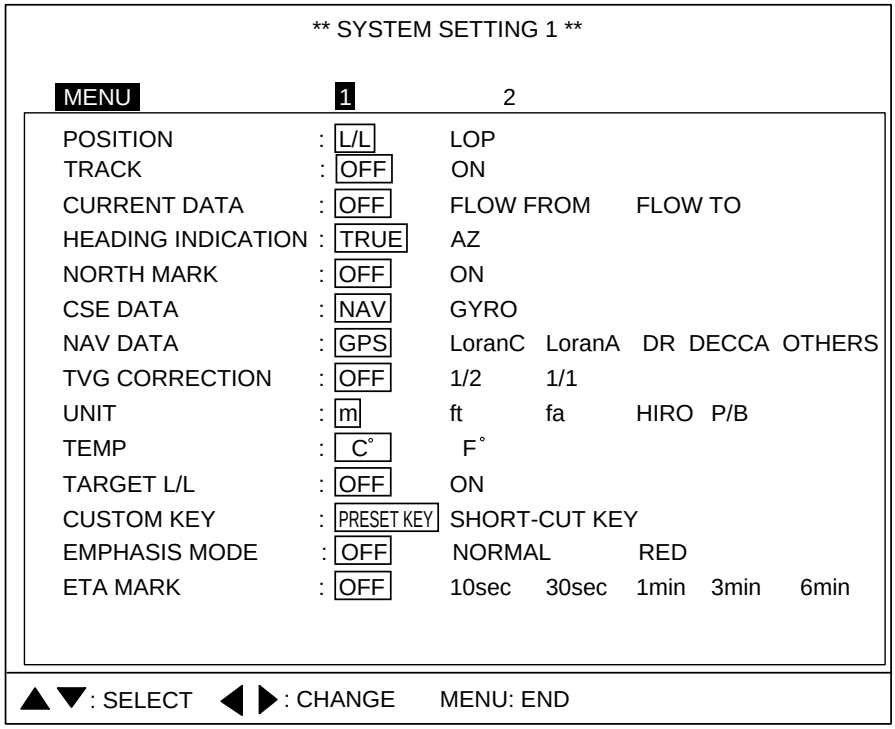
Head offset display

7. Press the [◀] [▶] to align heading (1 step) so that the target on heading direction appears at the twelve o'clock position.
8. Press the [▼] to choose draft.
9. Press the [◀] [▶] to set ship's draft.
10. Press the [MENU] key several times to close the menu.
11. Confirm that the target on heading direction appears at the twelve o'clock position.

Soundome setting Confirmation

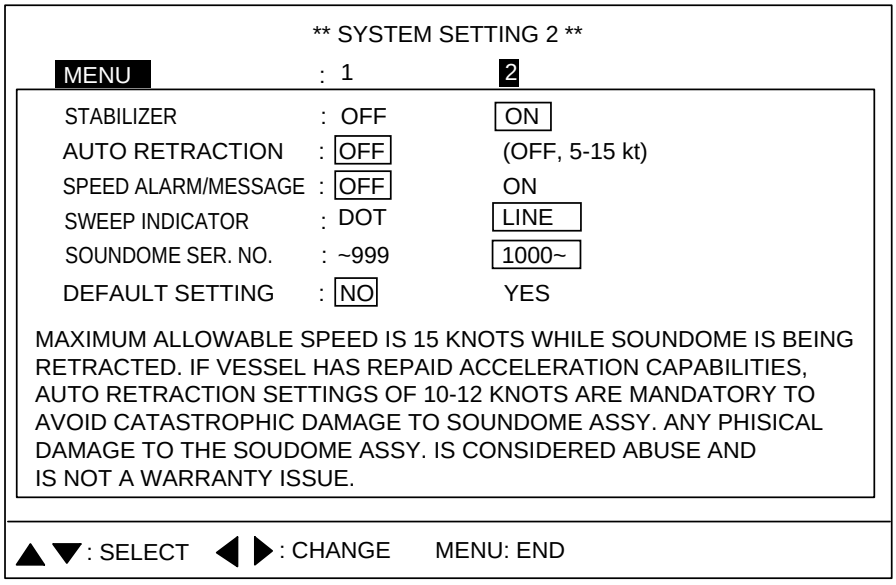
Set the serial number for the soundome connected, under nine-999 or over 1000.

1. Open the SYSTEM MENU following step 1 to 4 in the above.
2. Select SYSTEM SETTING, and then press the [▶] to open the SYSTEM SETTING 1 menu.



System setting 1 menu

3. Press the cursor pad to select 2 and press the [▸] to show SYSTEM SETTING 2 menu.



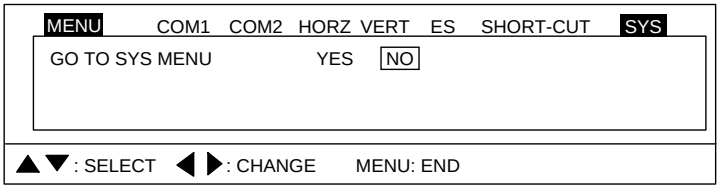
System setting 2 menu

4. Confirm the soundome serial number at SOUNDOME SER. NO. If change, press [▾] to select SOUNDOME SER. NO. and then press the [▸] to select ~999 or 1000~ appropriately.
5. Press the [MENU] key several times to close the menu.

3.4 Adjustment of Motion Sensor

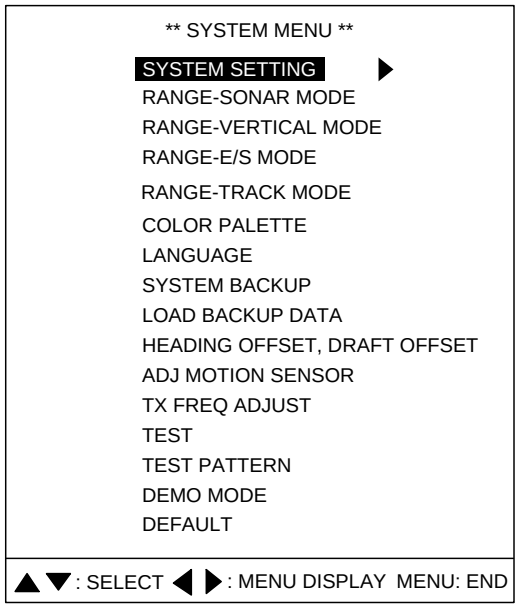
When the ship has a semi-permanent inclination, offset it as follows.

1. Press the [MENU] key to display the user menu.
2. Press the cursor pad to select SYS at the top of the menu display.



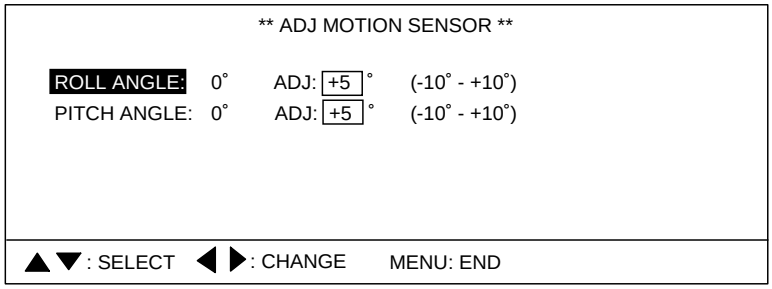
Display to select the system menu

3. Press the [▼] to select GO TO SYS.
4. Press the [◀] to select YES.



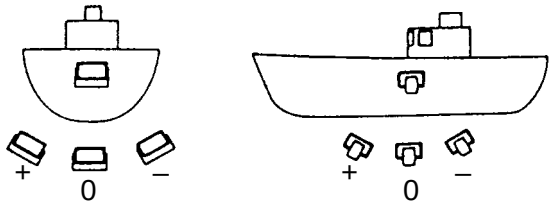
System menu

5. Press the [▼] to select ADJ MOTION SENSOR, and then press the [▶] to display ADJ MOTION SENSOR menu.



Adj motion sensor menu

6. Press [▲] [▼] to select ROLL ANGLE or PITCH ANGLE.
7. Press [◀] [▶] to adjust (-10° to +10°).
   By using a clinometer or other means, measure ship's semi-permanent inclination angle. Take the polarity of the angle as follows. For example, if the stern is 3° down, set -3°.



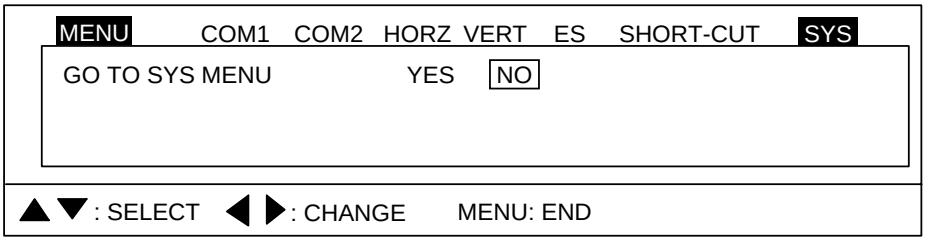
	+	-
ROLL ANGLE	Starboard up	Starboard down
PITCH ANGLE	Stern up	Stern down

8. Press the [MENU] key several times to close the menu.

3.5 System Back Up

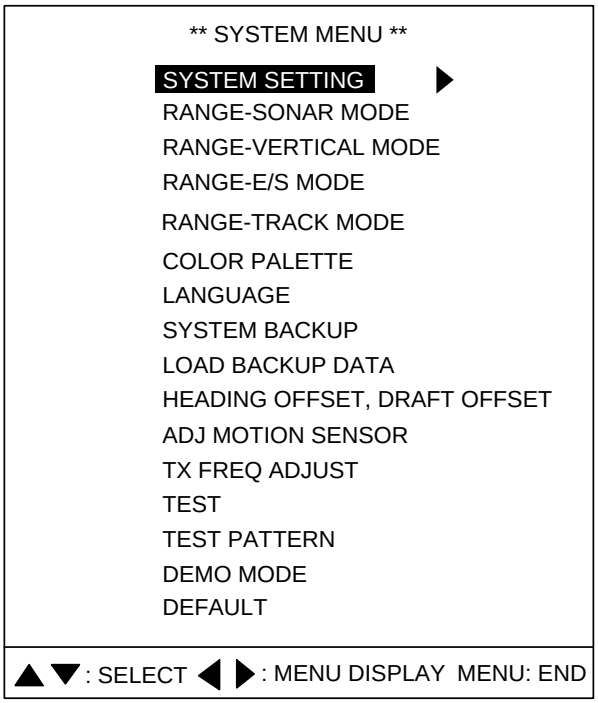
After setting the equipment follow the procedure below to back up system settings. Backup data can be loaded in the event of equipment trouble, to restore previous system settings.

1. Press the [MENU] key to display the user menu.
2. Press the cursor pad to select SYS at the top of the menu.



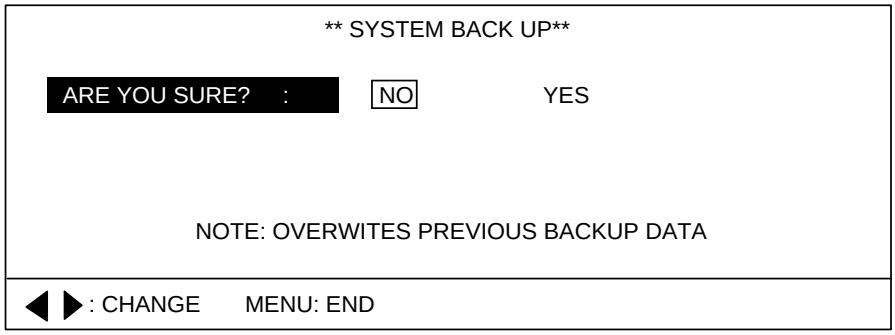
Display to select the system menu

3. Press [▼] to select GO TO SYS MENU.
4. Press [◀] to select YES.
   The system menu appears.



System menu

5. Press [▼] to select SYSTEM BACKUP.
6. Press [▶] to display the system backup menu.



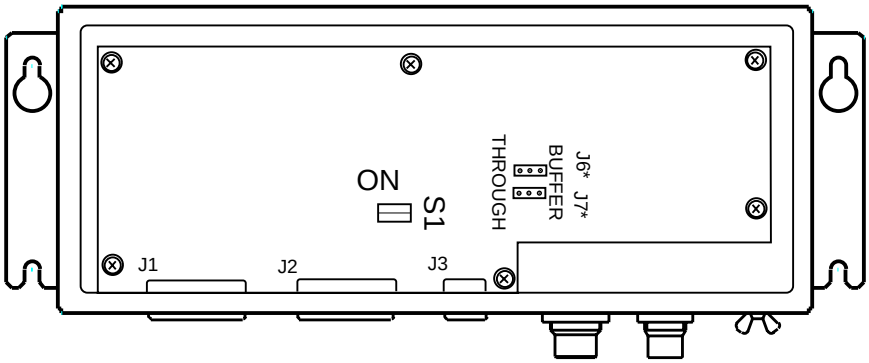
System backup menu

7. Press [▶] to select YES.
8. Press the [MENU] key.
   The backup data is loaded, and then return to the system menu.
9. Press the [MENU] key to return to the normal display.

3.6 Setting of Interface Unit

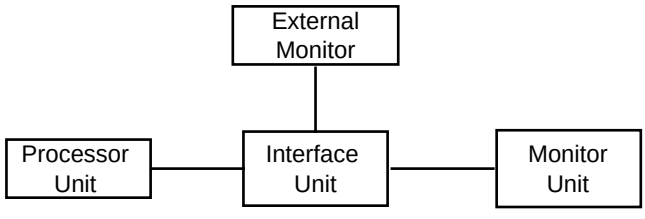
Set DIP switch S1 in the interface unit as follows.

- The monitor unit MU-100C or the interface unit is connected to DATA/VIDEO OUT port of the interface unit : all OFF.
- Nothing is connected to DATA/VIDEO OUT port of the interface unit : all ON.

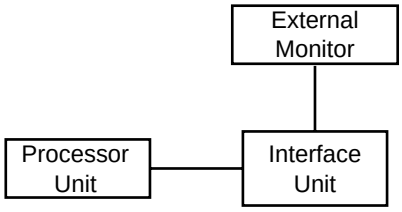


*: J6 and J7 set to "THROUGH" side.

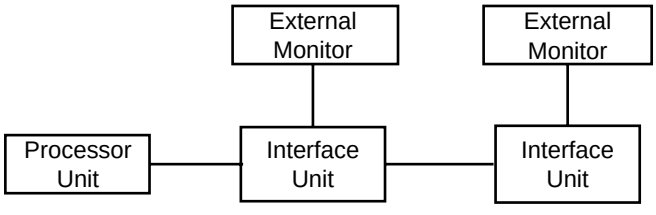
Interface unit, DIP switch S1 location



S1:All OFF



S1:All ON



S1:All OFF S1:All ON

Input/Output Description

The CH-250 can receive/transmit the following sentences in NMEA 0183 format.

Input

- GLL: GPS position
- VTG: Ground speed/true course
- DBT: Depth (Ignore talker, NMEA Ver1.5)
- DBS: Depth (Ignore talker)
- DPT: Depth (Ignore talker, NMEA Ver2.0)
- GGA: GPS position/Speed/Course (Ignore talker)
- VDR: Current direction/current speed (Ignore talker)
- RMA: Loran C position/LOP/Speed/Course
- RMC: GPS position/Speed/Course
- VHW: Water speed/Heading
- HDG: Heading
- MTW: Temperature
- HDM: Heading
- HDA: Temperature (Ignore talker)
- HDT: Heading

Output

- TLL: When entering event mark.

Priority (Input)

Own ship's position	GGA>RMC>RMA>GLL	LOP can be displayed only when RMA is inputted.
Course	RMC>RMA>VTG	
Heading	HDG>VHW>HDM	
Speed	RMC>RMA>VTG>VHW	
Depth	DPT>DBT>DBS	
Temperature	MTW>MDA	
Current	VDR	

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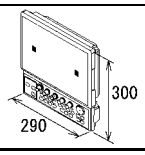
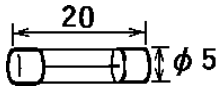
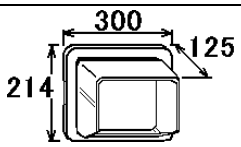
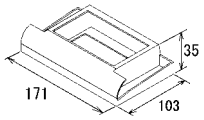
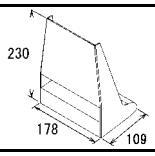
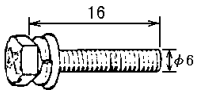
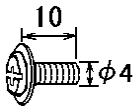
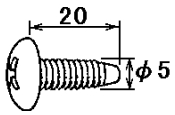
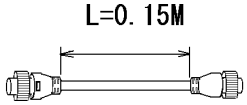
PACKING LIST

CH-250/CH-270

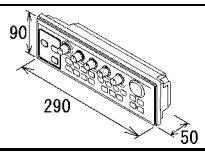
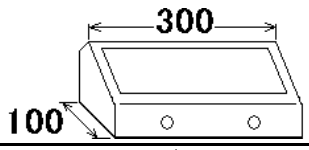
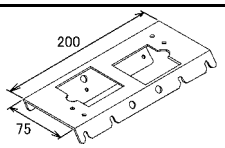
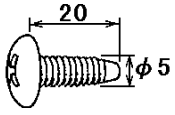
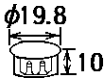
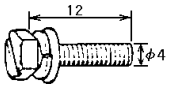
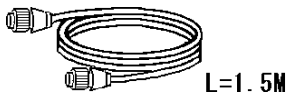
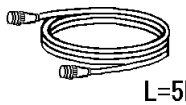
NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
操作／表示部 CONTROL/DISPLAY UNIT		CH252/MU100C 000-068-586 **	1
予備品 SPARE PARTS		**SP06-01101**	
ﾋｭｰｽﾞ FUSE		FGMB 3A 125V 000-104-909	3
付属品 ACCESSORIES		**FP06-01102**	
ﾌｰﾄﾞｸﾐﾋﾝ HOOD ASSY.		FP06-01102 006-556-240	1
付属品 ACCESSORIES		**FP02-05101**	
ﾄﾘﾂｹﾀﾞｲ MOUNTING BASE		02-127-1301-1 100-285-141	1
ﾊﾝｶﾞｰ BRACKET		02-127-1302-1 100-285-151	1
+ｱﾌﾟｾｯﾄUIｾﾑｽB +HEX.BOLT		M6X16 SUS304 000-800-420	2
＋ﾊﾞｲﾝﾄﾞｾﾑｽF WASHER BINDING HEAD SCREW		M4X10 C2700W 000-881-964	4
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X20 SUS304 1ｼｭ 000-802-081	4
工事材料 INSTALLATION MATERIALS		**CP02-06600**	
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A10SPF0002-0015 *0.15M* 000-142-879	1

注記）ｺｰﾄﾞ末尾に[**]の付いたﾕﾆｯﾄは代表の型式/ｺｰﾄﾞを表示しています。
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.

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

PACKING LIST

CH-250/CH-270

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
操作部 CONTROL UNIT		CH-252 000-068-484 **	1
付属品 ACCESSORIES		**FP06-01120**	
操作取付台 CONTROL UNIT MOUNTING PLATE		06-021-2111-0 100-279-740	1
ｿｳｻﾌﾞﾗｹｯﾄ BRACKET		06-021-2112-0 100-281-880	1
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X20 SUS304 1ｼｭ 000-802-081	2
ﾎｰﾙﾌﾟﾗｸﾞ HOLE PLUG		DP-687 ｸﾛ 000-808-417	2
六角ｾﾑｽB ｽﾘﾜﾘ HEX.BOLT (SLOTTED,WASHER HEAD)		M4X12 SUS304 000-882-040	4
工事材料 INSTALLATION MATERIALS		**CP02-06610**	
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A10SPF0002-015 000-142-878	1 (*)
工事材料 INSTALLATION MATERIALS		**CP02-06620**	
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A10SPF0002-050 000-131-411	1 (*)

注記）1.(*)印の信号ｹｰﾌﾞﾙ組品は、選択できます。
CABLE IS SELECTIVE ON DEMAND.
2.ｺｰﾄﾞ末尾に[**]の付いたﾕﾆｯﾄは代表の型式/ｺｰﾄﾞを表示しています。
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.

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

FURUNO

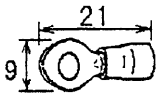
CODE NO.	006-556-630	06AS-X-9401 -0
TYPE	CP06-01251	1/1

工事材料表

INSTALLATION MATERIALS

CH-250/250S　10.4インチカラーLCDサーチライトソナー

10.4INCH COLOR SEARCHLIGHT 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	圧着端子 CRIMP-ON LUG		FV2-4 アオ CODE NO. 000-538-118	8	

DWG NO. C1316-M01- A

FURUNO ELECTRIC CO., LTD.

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

FURUNO

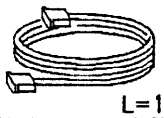
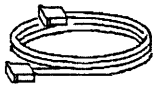
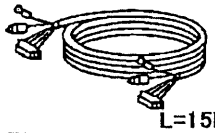
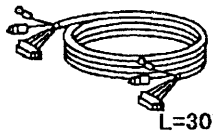
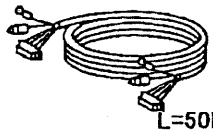
CODE NO.		06AS-X-9402 -1
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

CH-250/250S　10.4インチカラーLCDサーチライトソナー

10.4INCH COLOR SEARCHLIGHT 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	ケーブル(クミヒン) CABLE ASSY.	 L=10M	06S4078 *10M* / CODE NO. 000-142-900	1	選択 TO BE SELECTED
2	ケーブル(クミヒン) CABLE ASSY.	 L=5M	06S4078 *5M* / CODE NO. 000-142-902	1	選択 TO BE SELECTED
3	ケーブル(クミヒン) CABLE ASSY.	 L=15M	06S4080 *15M* / CODE NO. 000-142-907	1	選択 TO BE SELECTED
4	ケーブル(クミヒン) CABLE ASSY.	 L=30M	06S4080 *30M* / CODE NO. 000-142-908	1	選択 TO BE SELECTED
5	ケーブル(クミヒン) CABLE ASSY.	 L=50M	06S4080 *50M* / CODE NO. 000-142-909	1	選択 TO BE SELECTED

DWG NO.
C1316-M02- B

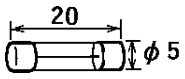
FURUNO ELECTRIC CO., LTD.

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

FURUNO

CODE NO.	006-556-210	06AS-X-9302 -1 1/1
TYPE	SP06-01102	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	ﾋｭｰｽﾞ FUSE		FGMB 10A AC125V			3	000-104-815

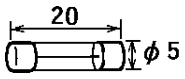
MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C1316-P02-B	1/1

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

FURUNO

CODE NO.	006-556-220	06AS-X-9303 -3 1/1
TYPE	SP06-01111	BOX NO. P

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

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY			REMARKS/CODE NO.
				WORKING PER SET	WORKING PER VES	SPARE	
1	ﾋｭｰｽﾞ FUSE		FGMB 0.2A 125V			3	000-121-723

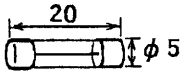
MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C1316-P03-C	1/1

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

FURUNO

CODE NO.	006-558-990	06AS-X-9304 -0
TYPE	SP06-01103	BOX NO. P

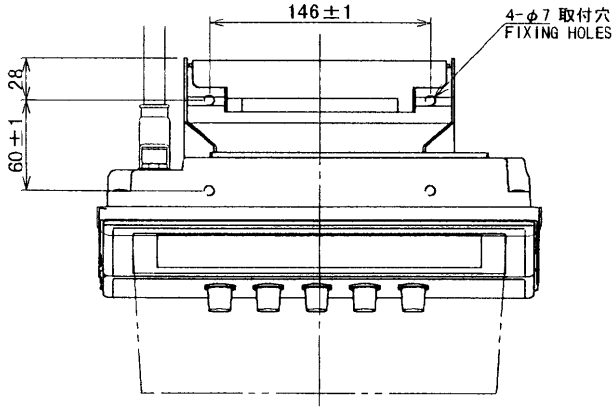
SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL
	CH-250 10.4インチカラーLCDサーチライトソナー CH-250S 10.4INCH COLOR SEARCHLIGHT SONAR		

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
1	ヒューズ FUSE		FGMB 7A 125V	1		3	000-105-868

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C1316-P04- A	1/1

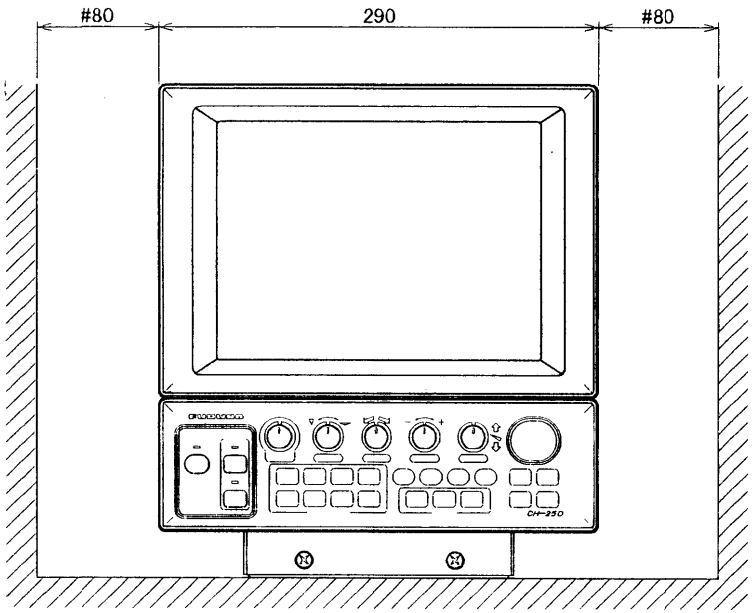
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

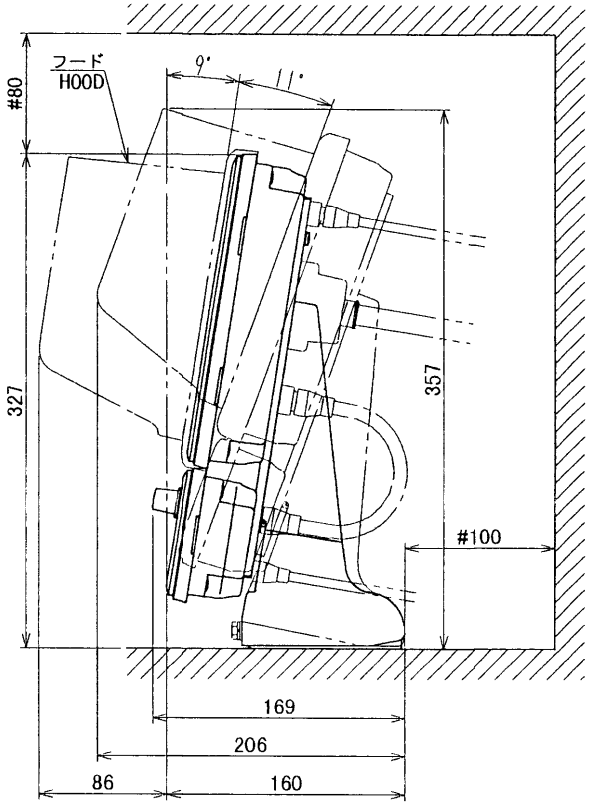
FURUNO

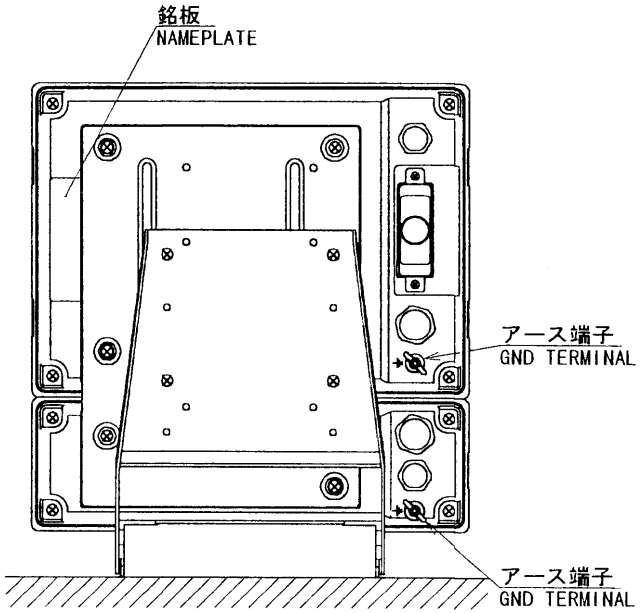


寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

表 1
TABLE 1







注 記 1）#印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表1による。
3）取付用ネジは＋トラスタッピンネジ呼び径5x20を使用のこと。
4）装備ケーブルはサービス時、本体を前方に十分引出せるよう余裕を持たせること。

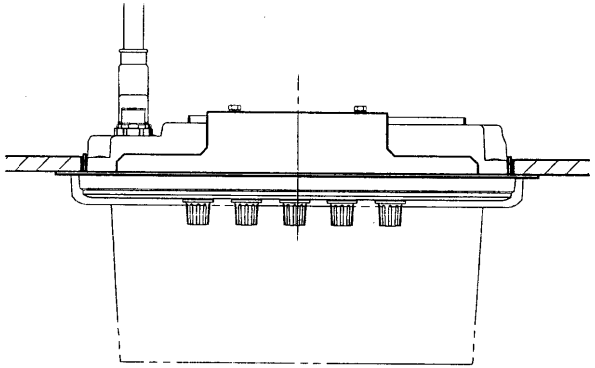
NOTE 1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE TAPPING SCREWS 5x20 FOR FIXING UNIT.
4. KEEP ENOUGH CABLE LENGTH BEHIND UNIT.

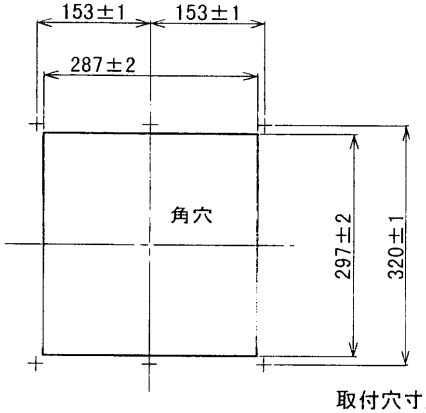
DRAWN Jun 1 '00 T.YAMASAKI			TITLE MU-100C
CHECKED Jun 2 '00 Y.K			名称 表示部
APPROVED Jun 2 '00 Y.K		CH-250/S	外寸図
SCALE 1/5	MASS ±10% 5.7 kg		NAME DISPLAY UNIT
DWG. No. C1316-G01- B		06-021-190G- 3	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

D-1

FURUNO

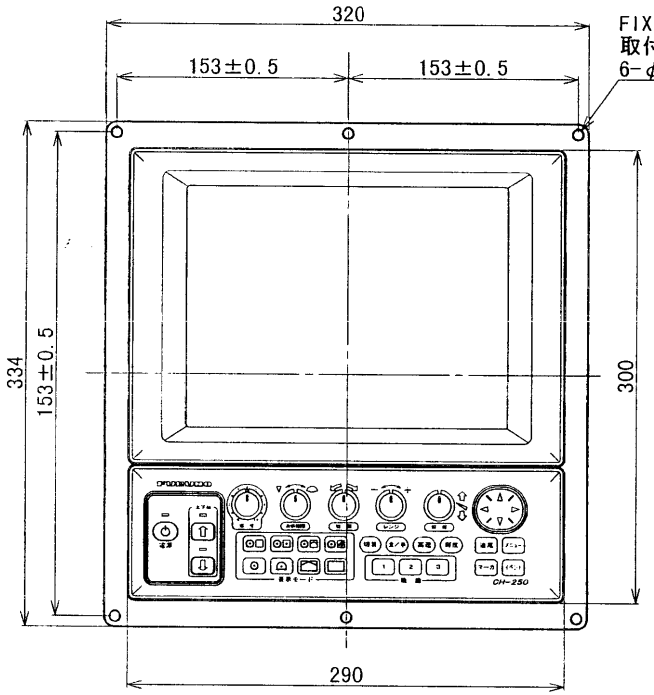


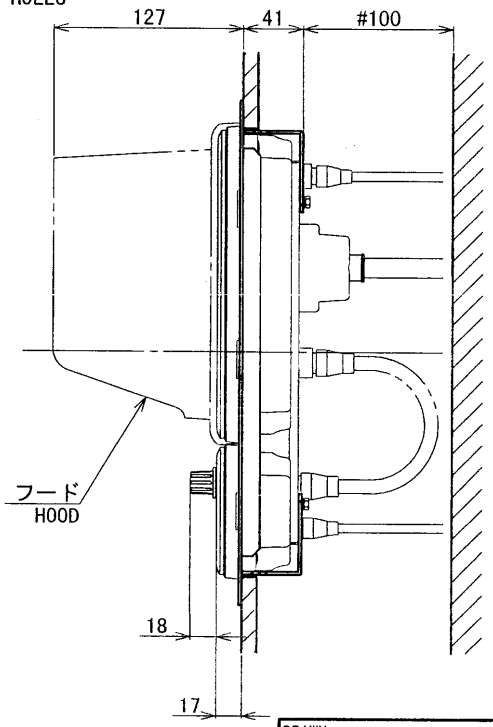


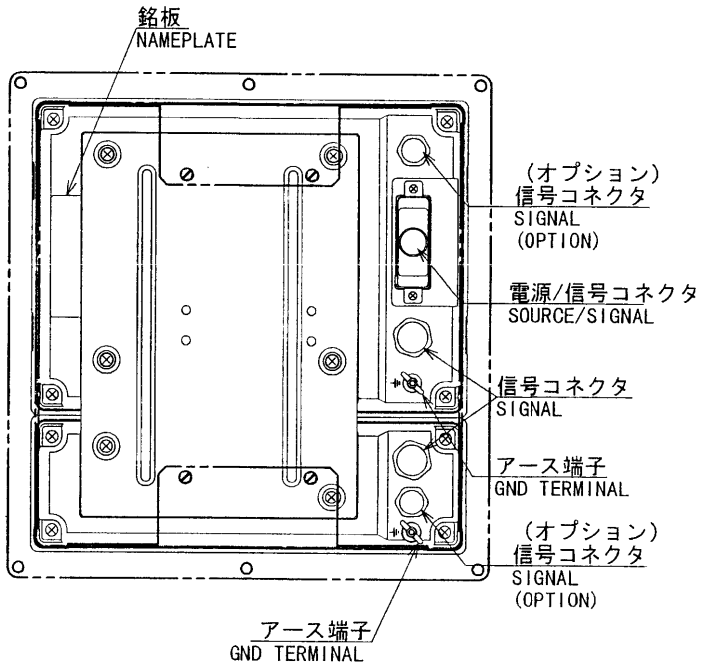
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

表 1
TABLE 1

取付穴寸法図 尺度 1/10
CUTOUT DIMENSIONS (SCALE 1/10)







DRAWN Mar22'00 T.TAHASAKI			TITLE MU-100C
CHECKED Mar 22 '00 Y. Kimura			名称 表示部（埋込装備）
APPROVED Mar 23'00 S. Yoshimura		CH-250	外寸図
SCALE 1/5	MASS ±10% 4.2 kg		NAME DISPLAY UNIT (FLASHMOUNT)
DWG. No. C1316-G09- A		06-021-1920-G0	OUTLINE DRAWING

D-1A

FURUNO ELECTRIC CO., LTD.

FURUNO

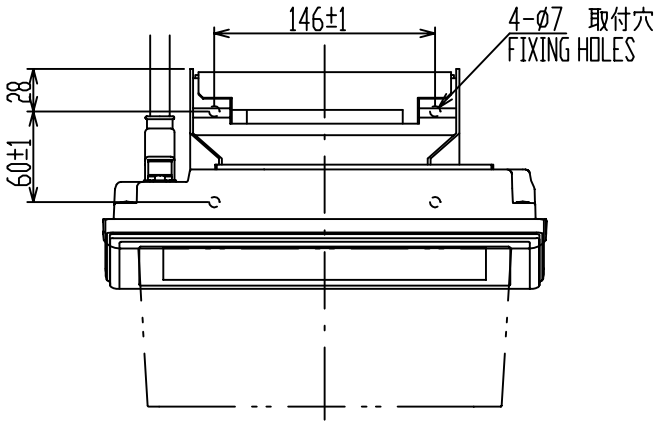
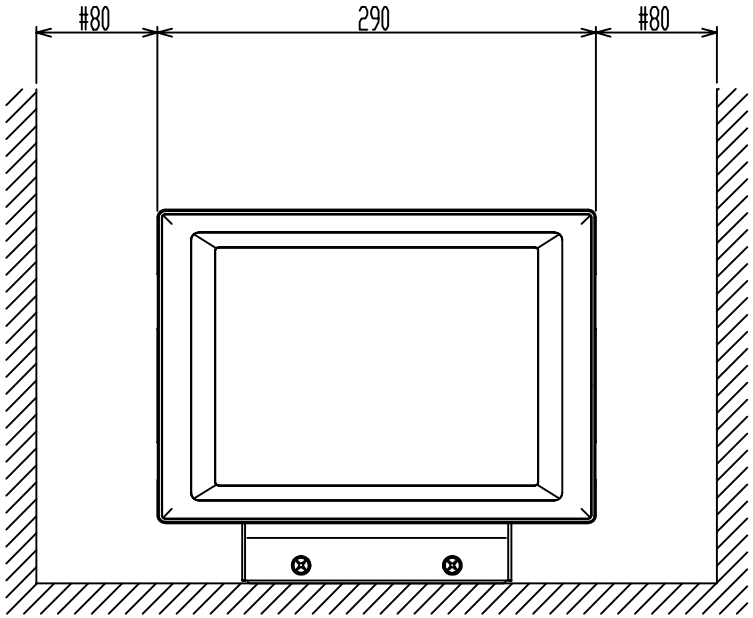
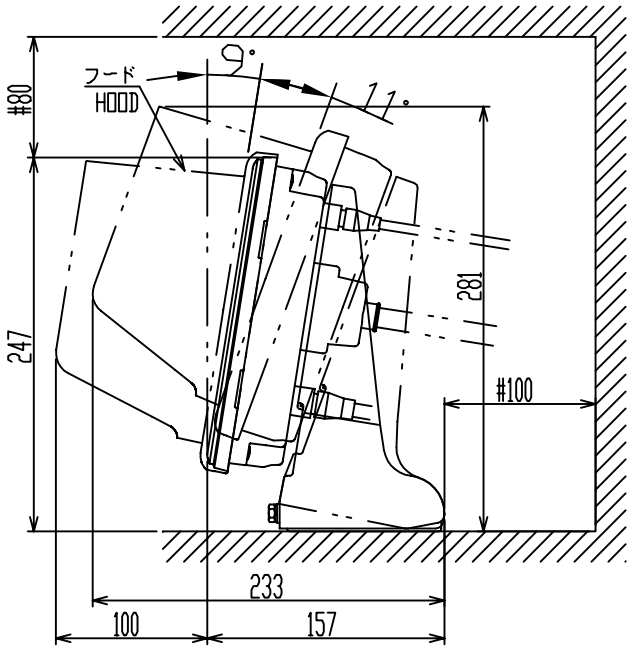
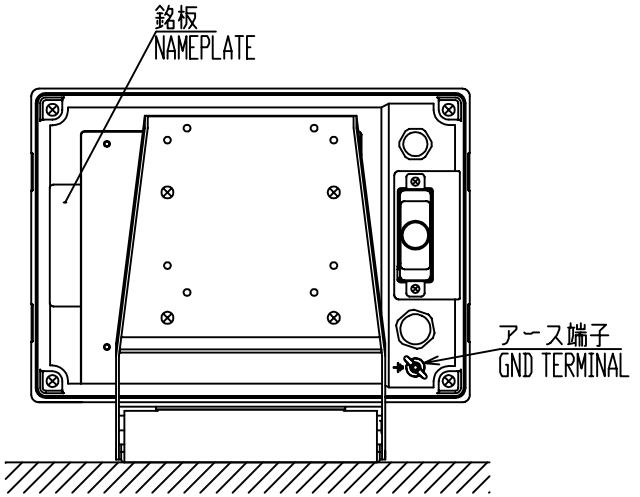


表 1
TABLE 1

寸法区分（mm）DIMENSIONS	公差（mm）TOLERANCE
0 < L ≦ 50	±1．5
50 < L ≦ 100	±2．5
100 < L ≦ 500	±3







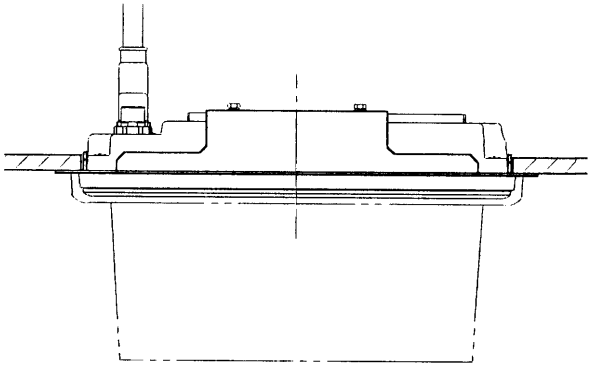
注 記 1）#印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表 1 による。
3）取付用ネジは＋トラスタッピンネジ呼び径5x20を使用のこと。
4）装備ケーブルはサービス時、本体を前方に十分引出せるよう余裕を持たせること。

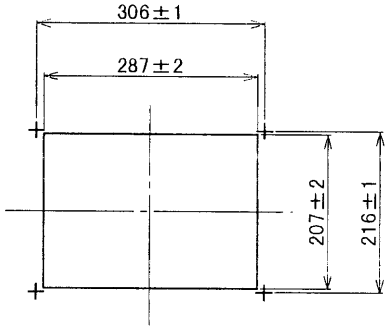
NOTE 1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREWS 5x20 FOR FIXING UNIT.
4. KEEP ENOUGH CABLE LENGTH BEHIND UNIT.

DRAWN Oct. 29 '03 E.MIYOSHI		TITLE	MU-100C
CHECKED		名称	表示部（分離型、卓上装備）
APPROVED	CH-250/S		外寸図
SCALE 1/5 MASS 4.2 ±10% kg		NAME	MONITOR UNIT (DESKTOP MOUNT)
DWG.No. C1316-G08- C	06-021-191G- 2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

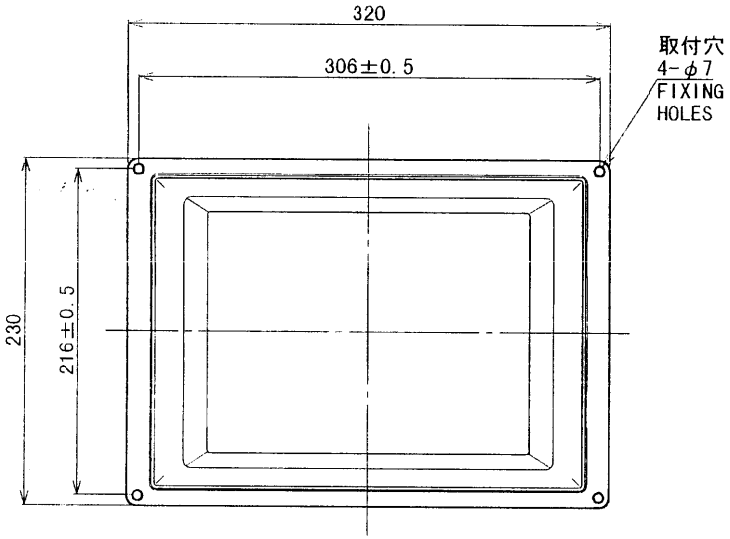


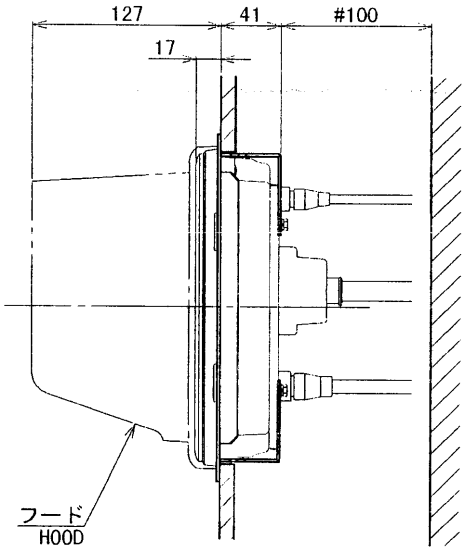


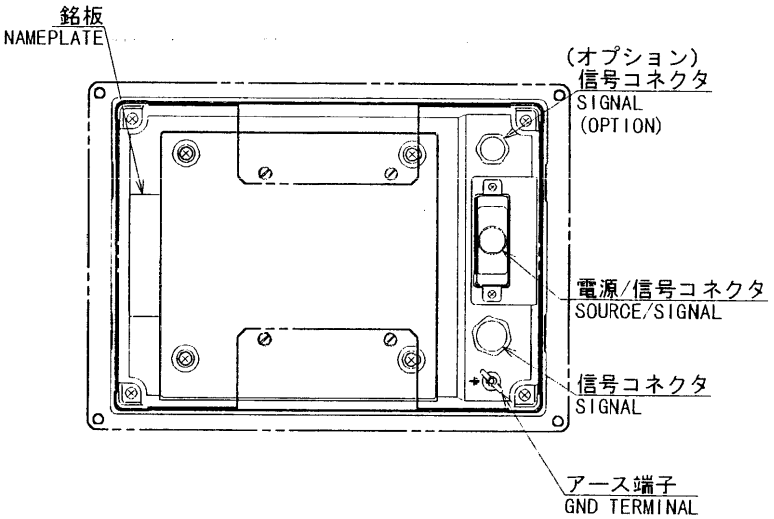
取付穴寸法図　尺度1/10
CUTOUT DIMANSIONS (SCALE 1/10)

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 ＜ L ≦ 50	±1．5
50 ＜ L ≦ 100	±2．5
100 ＜ L ≦ 500	±3

表 1
TABLE 1







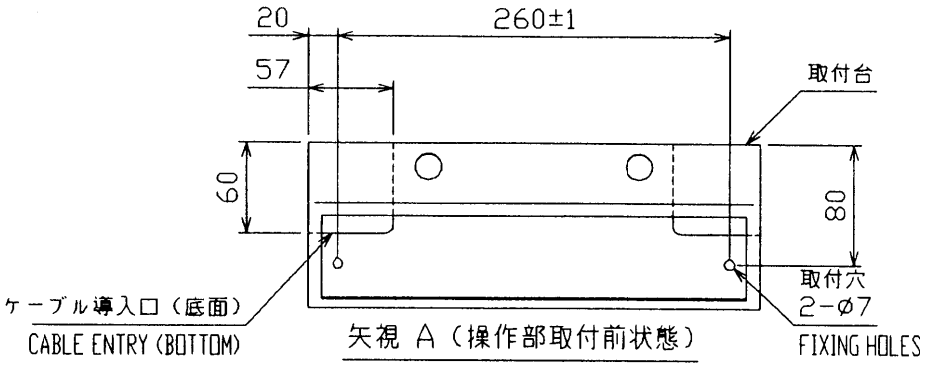
注 記　1）#印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表1による。
3）取付用ネジは＋トラスタッピンネジ呼び径5x20を使用のこと。
4）装備ケーブルはサービス時、本体を前方に十分引出せるよう余裕を持たせること。

NOTE　1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE TAPPING SCREWS 5x20 FOR FIXING UNIT.
4. KEEP ENOUGH CABLE LENGTH BEHIND UNIT.

DRAWN Mar22'00 T.YAMASAKI		TITLE	MU-100C
CHECKED Mar22'00 Y.Kimura		名称	表示部（分離型、埋込装備）
APPROVED Mar23'00 S.Yuchara	CH-250/S		外寸図
SCALE 1/5	MASS ±10% 3.0 kg	NAME	DISPLAY UNIT (FLASH MOUNT)
DWG. No. C1316-G10- A	06-021-1930-G0		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

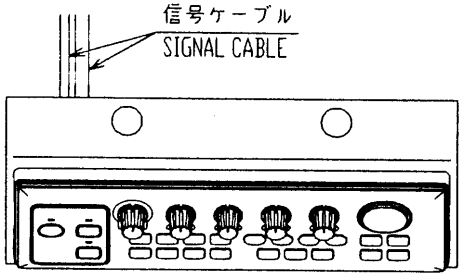


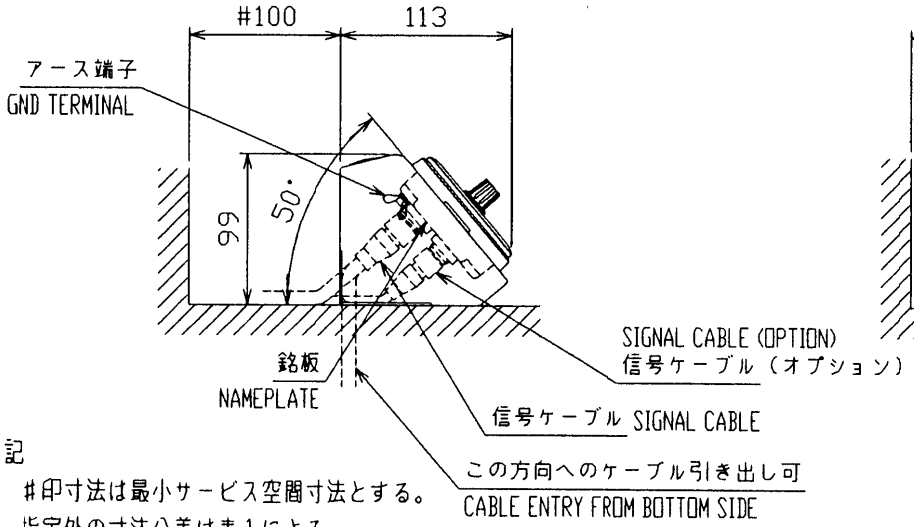
矢視 A（操作部取付前状態）

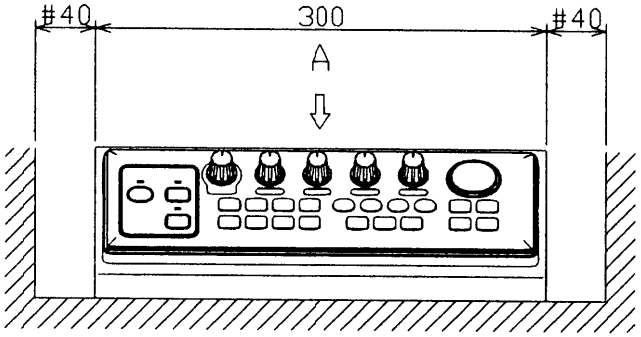
VIEW A (BEFORE INSTALLATION)

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

表 1 TABLE 1







注 記

1） #印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表1による。
3） 取付用ネジは＋トラスタッピングネジ呼び径5x20を使用のこと
4） 装備ケーブルはサービス時、本体を前方に十分引き出せるよう余裕を持たせること。

NOTE

1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE TAPPING SCREWS 5x20 FOR FIXING UNIT.
4. KEEP SUFFICIENT CABLE LENGTH BEHIND UNIT.

DRAWN Aug.16'02 T.YAMASAKI			TITLE CH-252
CHECKED Aug.16'02 Y.K			名称 操作部（分離型・卓上装備）
APPROVED Aug.16'02 Y.K	CH-250/S		外寸図
SCALE 1/5 MASS 1.6 kg ±10%			NAME CONTROL UNIT (DESKTOP MOUNT)
DWG.No. C1316-G02-B	06-021-2000-G1		OUTLINE DRAWING

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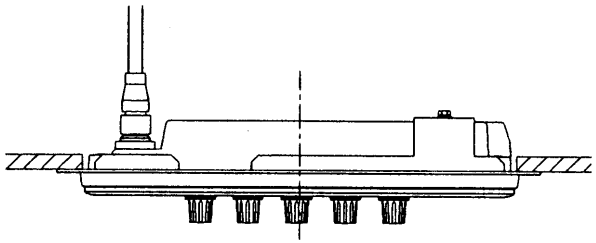
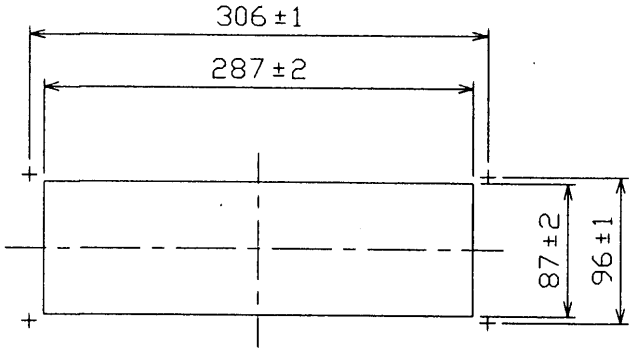
FURUNO

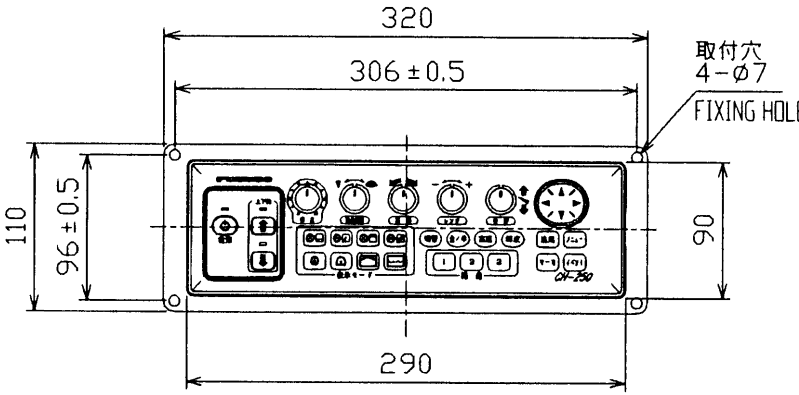
寸法区分（ｍｍ） DIMENSION	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３

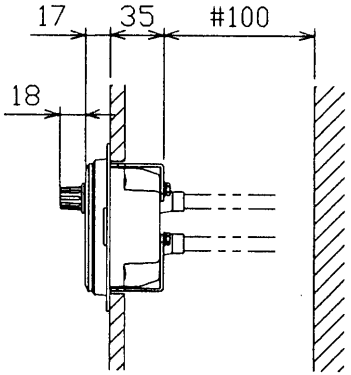
表１ TABLE 1

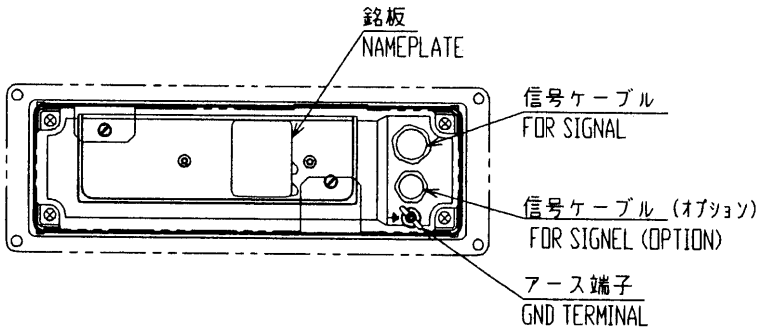




取付穴寸法図
CUTOUT DIMENSIONS







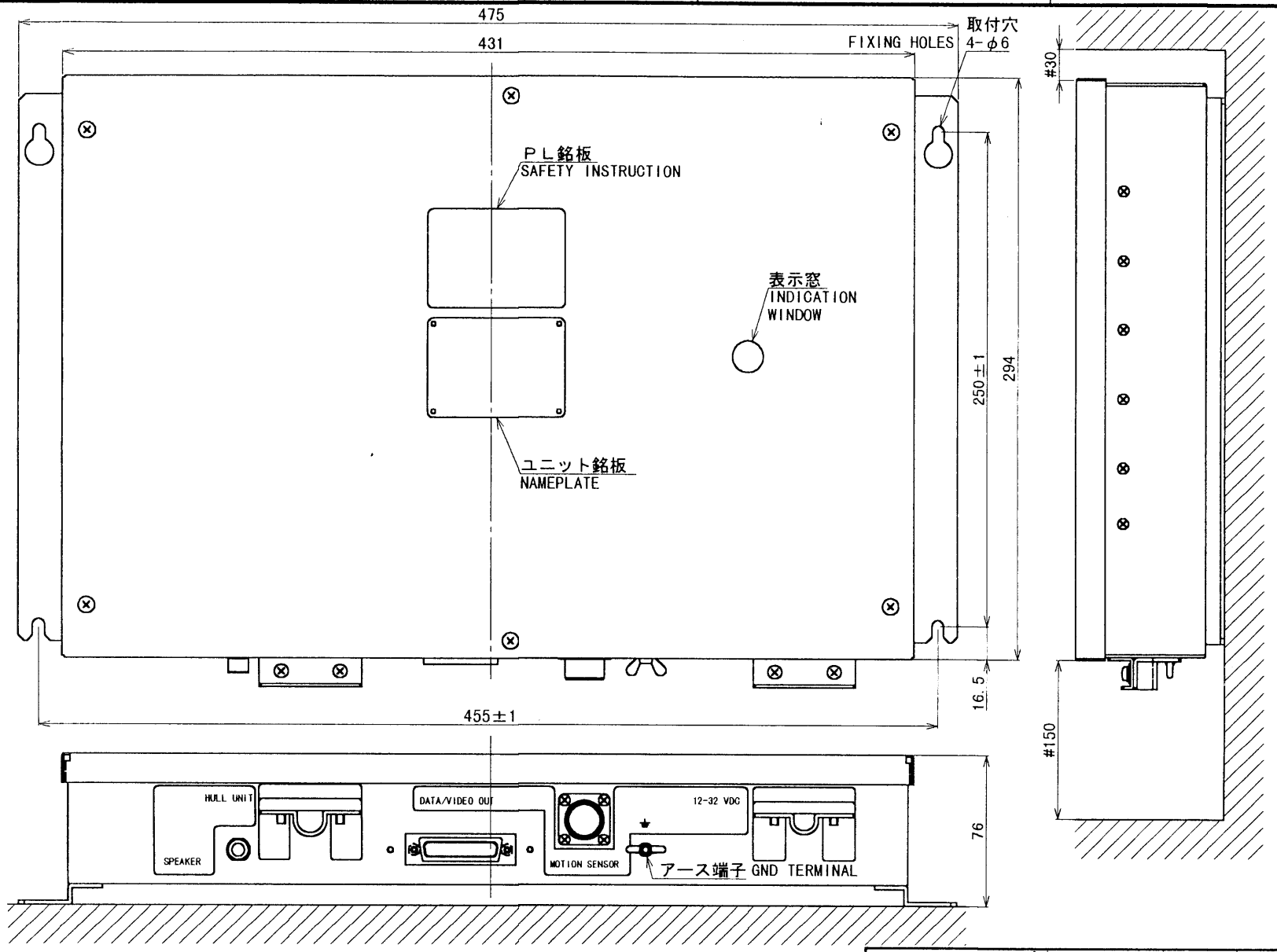
注　記　１）　＃印寸法は最小サービス空間寸法とする。
　　２）　指定外の寸法公差は表１による。
　　３）　取付用ネジは＋トラスタッピングネジ呼び径５ｘ２０を使用のこと
　　４）　装備ケーブルはサービス時、本体を前方に十分引き出せるよう余裕を持たせること。

NOTE　1.　#: RECOMMENDED SERVICE CLEARANCE.
　　2.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
　　3.　USE TAPPING SCREWS 5x20 FOR FIXING UNIT.
　　4.　KEEP SUFFICIENT CABLE LENGTH BEHIND UNIT.

DRAWN Aug.16'02 J.YAMASAKI			TITLE CH-252
CHECKED Aug.16'02 Y.K.			名称 操作部（分離型・埋込装備）
APPROVED Aug.16'02 Y.K.		CH-250/S	外寸図
SCALE 1/5	MASS 1.1 kg ±10%		NAME CONTROL UNIT (FLUSH MOUNT)
DWG.No. C1316-G11-B		06-021-2900-G0	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



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

表 1
TABLE 1

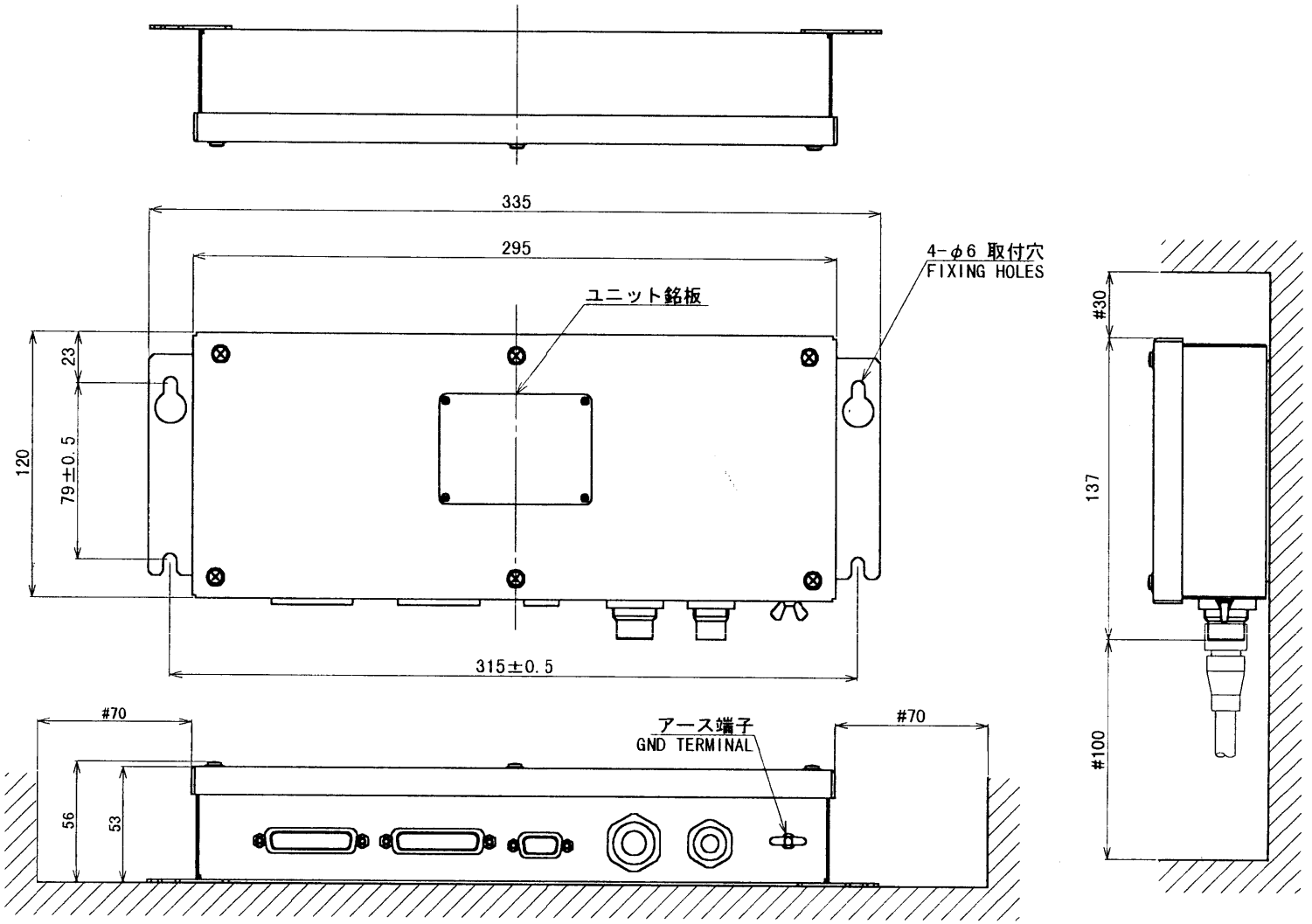
注 記
1) #印寸法は最小サービス空間寸法とする。
2) 指定外の寸法公差は表1による。

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

DRAWN Apr 7'00 T.YAMASAKI		TITLE	CH-253
CHECKED Apr 7'00 Y.Kimura		名称	送受信装置
APPROVED Apr 7'00 T.Kimura	CH-250/250S		外寸図
SCALE 1/3	MASS ±10% 3.2 kg	NAME	TRANSCEIVER UNIT
DWG. No. C1316-G03- B	06-021-3800-G2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 ＜ L ≦ 50	±1．5
50 ＜ L ≦ 100	±2．5
100 ＜ L ≦ 500	±3

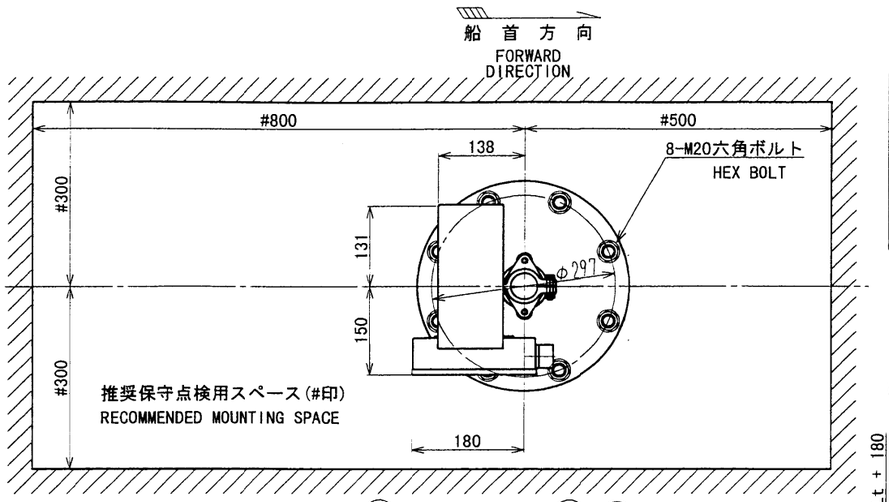
表 1
TABLE 1

注　記　1）　#印寸法は最小サービス空間寸法とする。
　　2）　指定外の寸法公差は表１による。

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

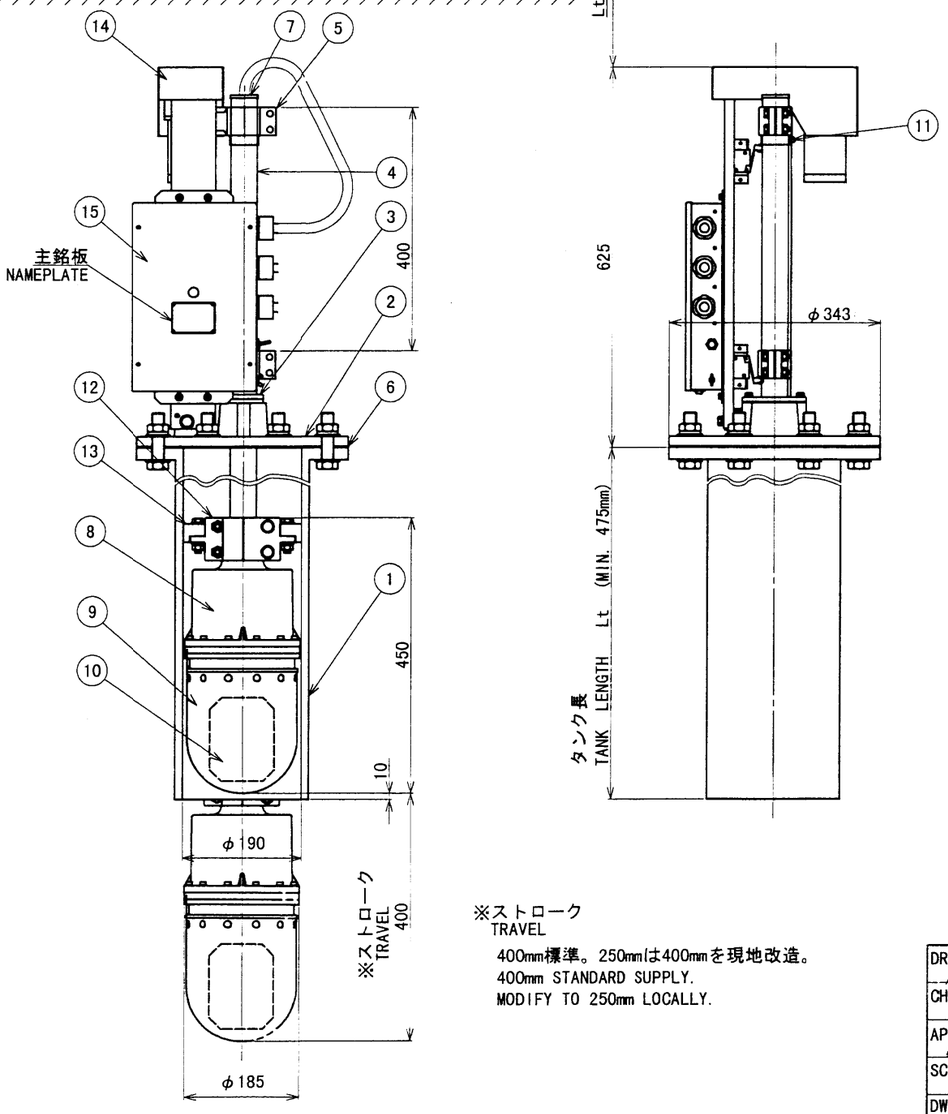
DRAWN Mar.29'00 T.YAMASAKI		TITLE	IF-8000
CHECKED Mar.30'00 Y.Kuno		名称	インターフェイスユニット
APPROVED Mar.30'00 Y.Kuno	FCV-1200L/1200LM CH-250/250S		外寸図
SCALE 1/3	MASS ±10% 1.1 kg	NAME	INTERFACE UNIT
DWG.No. C1316-607- B	06-021-5000-G1		OUTLINE DRAWING

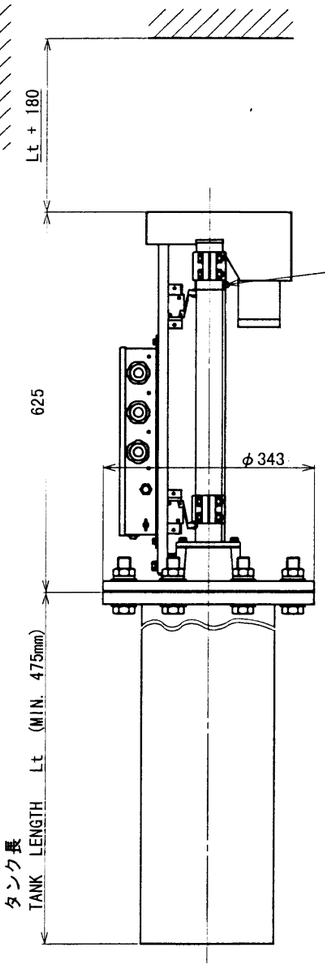
FURUNO ELECTRIC CO., LTD.



寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
0 ＜ L ≦ 50	±1．5
50 ＜ L ≦ 100	±2．5
100 ＜ L ≦ 500	±3
500 ＜ L ≦ 1000	±4

表 1
TABLE 1





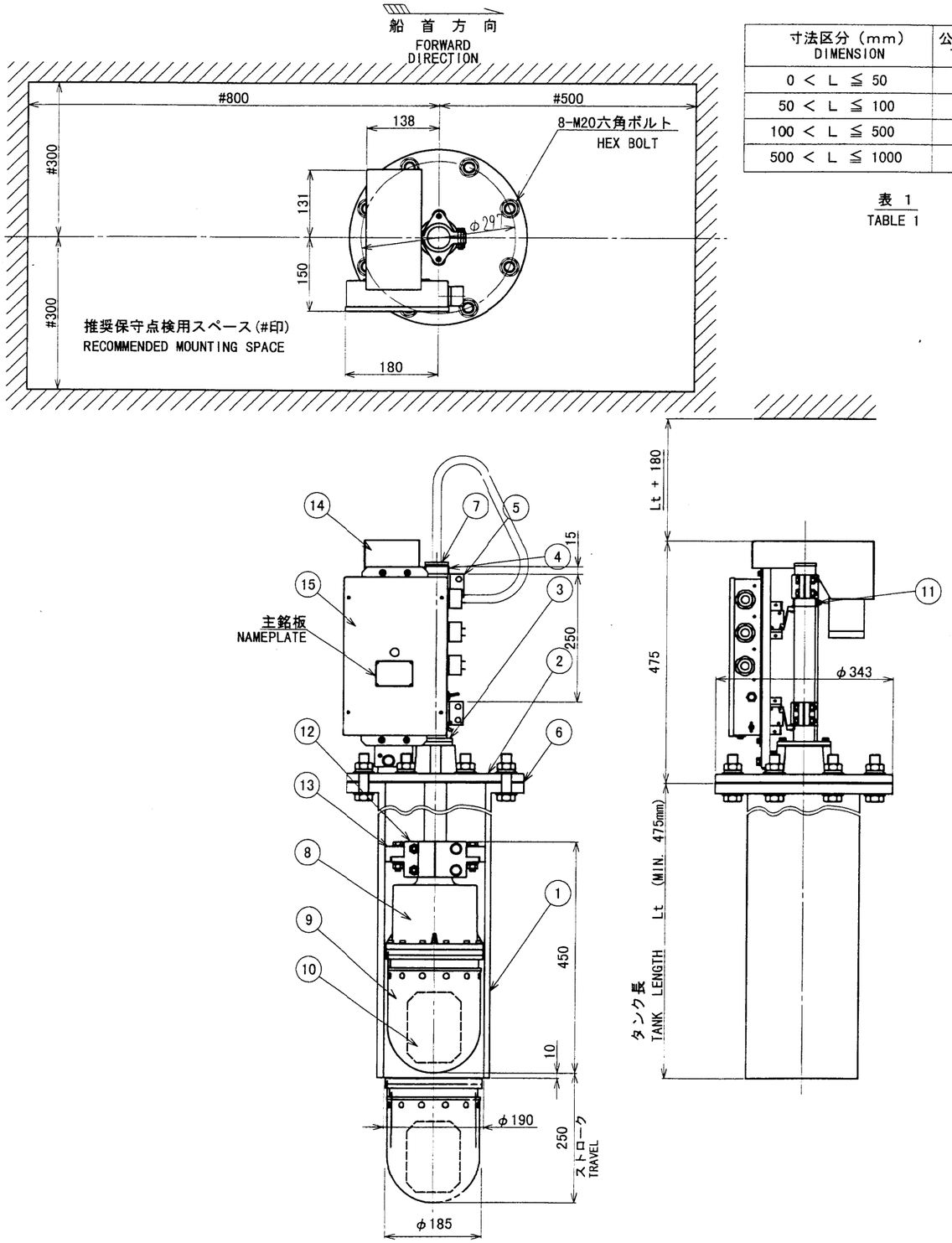
※ストローク
TRAVEL
400mm標準。250mmは400mmを現地改造。
400mm STANDARD SUPPLY.
MODIFY TO 250mm LOCALLY.

注　記
1）　指定外の寸法公差は表１による。
2）　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。
3）　上下シャフトの長さ（Ls）は、格納タンクの長さ（Lt）に200mmを加えた値で切断すること。
Ls=Lt+200(mm)
4）　上下装置及び格納タンクの船首方向は左図のごとく。
5）　ドーム内部保守点検のため、上下装置上部には図示のスペースを設けるか、障害となる天井等に300×300mm程度の角穴をあける。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. 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).
3. THE MAIN SHAFT SHOULD BE CUT TO A LENGTH(Ls) GIVEN BY THE FOLLOWING FORMULA.
Ls=Lt-200(mm)　Lt:TANK LENGTH
4. FORWARD DIRECTION ARROW SHOWS FORE OR AFT FOR HULL UNIT AND TANK.
5. IF THE OVERHEAD CLEARANCE SHOWN IN THE DRAWING IS NOT OBTAINED MAKE A HOLE OF 300×300mm ON THE CEILING FOR FACILITATING INSTALLATION AND FUTURE SOUNDOME SERVICE.

ITEM 品番	NAME 品名	MATERIAL 材質	Q'TY 数量	DWG. No 図番	REMARKS 摘要
15	上下動制御箱 HULL UNIT CONTROL BOX		1		
14	ギヤカバー GEAR COVER	SUS304	1	06-021-4006	
13	タンクガイド（2） TANK GUIDE(2)	POM	2	06-021-4032	
12	タンクガイド（1） TANK GUIDE(1)	FRP	2	06-021-4031	
11	ジュビリークリップ HOSE CLAMP	SUS304	1	1X	
10	送受波器 TRANSDUCER		1		
9	ドーム（2） SOUNDOME		1		
8	ドーム（1） TOP HOUSING	BC2	1	06-021-4201	
7	パイプキャップ PIPE CAP	CR	1	SHN-0011	
6	フランジパッキン GASKET	CR	1	SHJ-0009	
5	スライド金具 SHAFT RETAINER	BC6	1	06-021-4009	
4	上下シャフト MAIN SHAFT	SUS304	1		
3	グリスコットン押え台 GREASE COTTON RETAINER	BC2	1	SHJ-0003	
2	架台載台 SHAFT SLEEVE	FC200	1	06-021-4021	
1	格納タンク RETRACTION TANK		1		

DRAWN	Apr. 4 '00 T.YAMASAKI	TITLE	CH-254
CHECKED	APR 4 '00 Y. Kuno	名称	上下装置(400mmストローク)
APPROVED	APR 5 '00 S. Yoshimura	CH-250/S	外寸図
SCALE	1/10	MASS	43 kg ±10% MASS W/O TANK/SHAFT/CABLE 質量はタンク、シャフト、ケーブル含まず
NAME	HULL UNIT(400mm TRAVEL)		
DWG No.	C1316-G04- B	06-021-4000-G3	OUTLINE DRAWING



寸法区分（mm）DIMENSION	公差（mm）TOLERANCE
0 ＜ L ≦ 50	±1．5
50 ＜ L ≦ 100	±2．5
100 ＜ L ≦ 500	±3
500 ＜ L ≦ 1000	±4

表 1
TABLE 1

注 記
1）指定外の寸法公差は表１による。
2）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。
3）上下シャフトの長さ（Ls）は、格納タンクの長さ（Lt）に50mmを加えた値で切断すること。
Ls=Lt+50(mm)
4）上下装置及び格納タンクの船首方向は左図のごとく。
5）ドーム内部保守点検のため、上下装置上部には図示のスペースを設けるか障害となる天井等に300×300mm程度の角穴をあける。
6）ストローク長さは標準400mm。250mmの場合は現地改造。

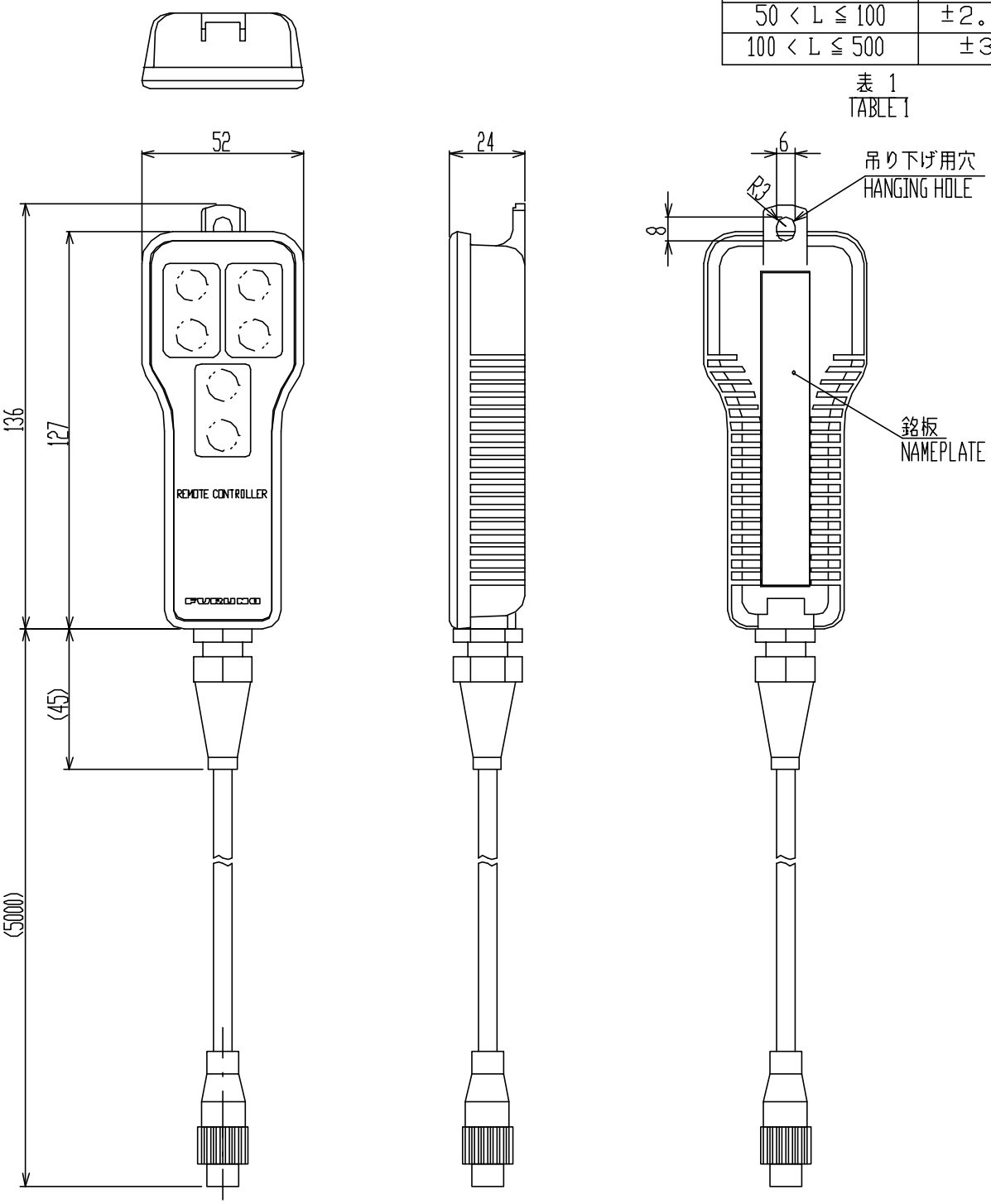
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. THE HULL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF THE SHIP'S LENGTH FROM THE BOW ON THE FORE-AFT LINE AND BESIDE THE KEEL LINE (LESS THAN 1000mm FROM KEEL LINE).
3. THE HULL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL FORMULA.
Ls=Lt+50(mm) Lt:TANK LENGTH
4. FORWARD DIRECTION ARROW SHOWS FORE OR AFT FOR HULL UNIT AND TANK
5. IF THE OVERHEAD CLEARANCE SHOWN IN THE DRAWING IS NOT OBTAINED MAKE A HOLE OF 300×300mm ON THE CEILING FOR FACILITATING INSTALLATION AND FUTURE SOUNDOME SERVICE.
5. THE STANDARD TRAVEL LENGTH IS 400 mm. THE 250 mm TRAVEL SHOULD BE MODIFIED LOCALLY.

ITEM 品番	NAME 品名	MATERIAL 材質	Q'TY 数量	DWG. No. 図番	REMARKS 摘要
15	上下動制御箱 HULL UNIT CONTROL BOX		1		
14	ギヤカバー GEAR COVER	SUS304	1	06-021-4006	
13	タンクガイド（2） TANK GUIDE(2)	POM	2	06-021-4032	
12	タンクガイド（1） TANK GUIDE(1)	FRP	2	06-021-4031	
11	ジュビリークリップ HOSE CLAMP	SUS304	1	1X	
10	送受波器 TRANSDUCER		1		
9	ドーム（2） SOUNDOME		1		
8	ドーム（1） TOP HOUSING	BC2	1	06-021-4201	
7	パイプキャップ PIPE CAP	CR	1	SHN-0011	
6	フランジパッキン GASKET	CR	1	SHJ-0009	
5	スライド金具 SHAFT RETAINER	BC6	1	06-021-4009	
4	上下シャフト MAIN SHAFT	SUS304	1		
3	グリスコットン押え台 GREASE COTTON RETAINER	BC2	1	SHJ-0003	
2	架台載台 SHAFT SLEEVE	FC200	1	06-021-4021	
1	格納タンク RETRACTION TANK		1		

DRAWN Apr.4'00 T.YAMASAKI		TITLE CH-255
CHECKED APR.4'00 Y.K		名称 上下装置(250mmストローク)
APPROVED Apr.5'00	CH-250/S	外寸図
SCALE 1/10	MASS 42 kg ±10% MASS W/O TANK/SHAFT/CABLE 質量はタンク、シャフト、ケーブル含まず	NAME HULL UNIT (250mm TRAVEL)
DWG No. C1316-G05- B	06-021-4100-G3	OUTLINE DRAWING

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

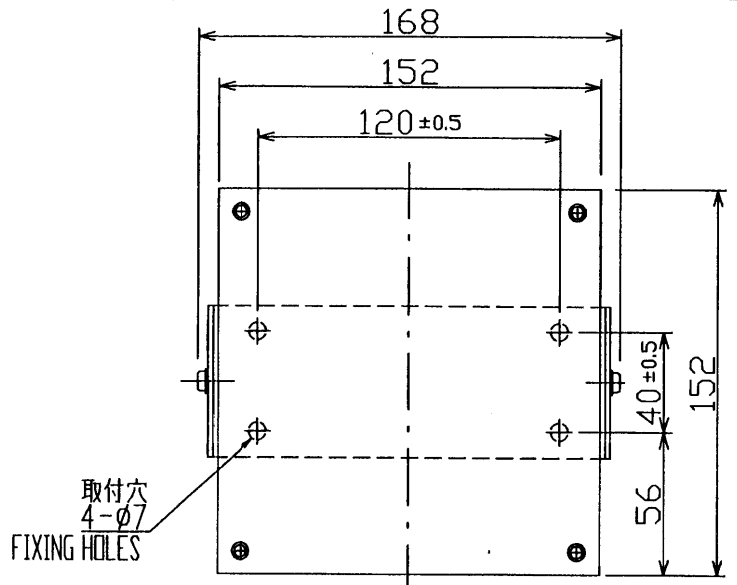
表 1
TABLE 1



注記　1）　指定なき寸法公差は表 1 による。
NOTE　1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN June 1, 2003 H. MAKI		TITLE	CH-256
CHECKED Takahashi T.		名称	リモートコントローラ
APPROVED Takahashi T.	CH-250/CH-270		外寸図
SCALE 1/2 MASS 0.3 ±10% kg	質量はケーブル重さを含む MASS W/ CABLE	NAME	REMOTE CONTROLLER
DWG.No. C1316-G06- D	06-021-6000-G2		OUTLINE DRAWING

FURUNO



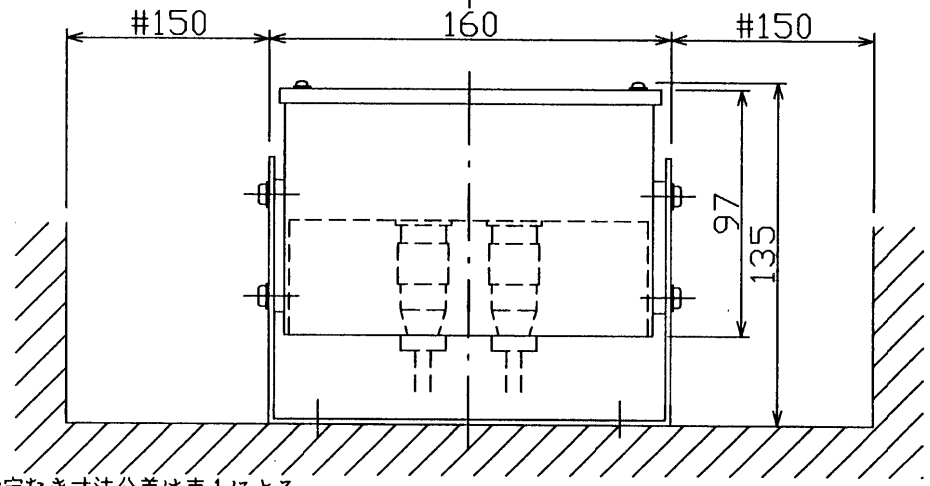
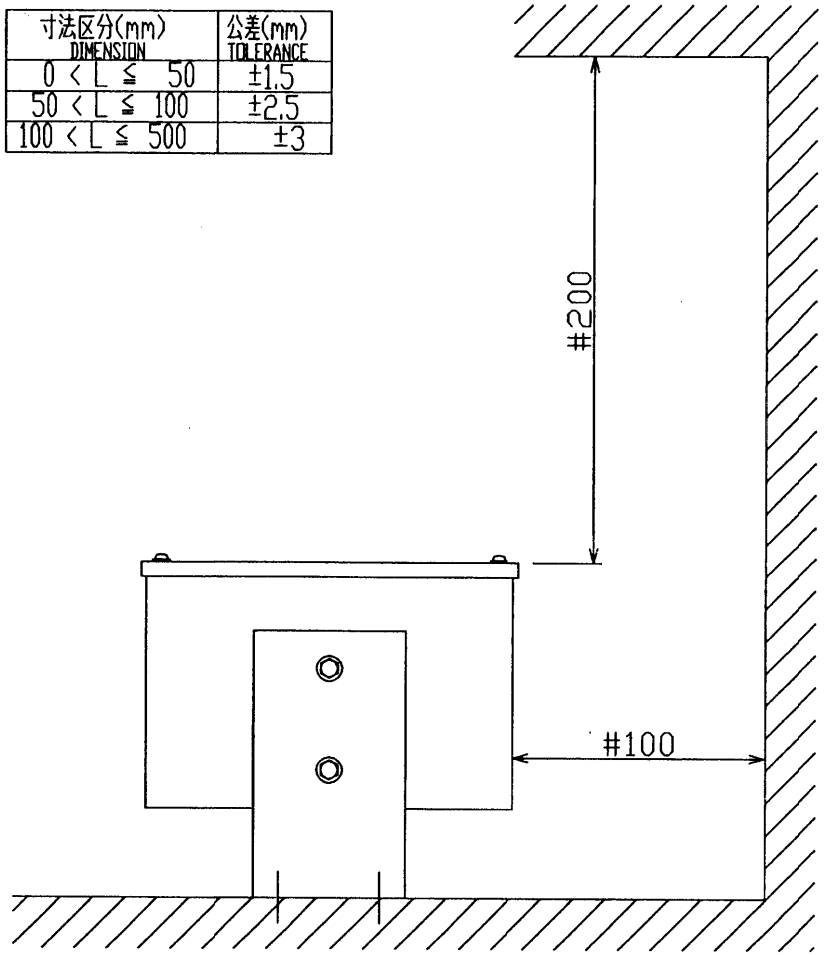


表1 TABLE 1

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

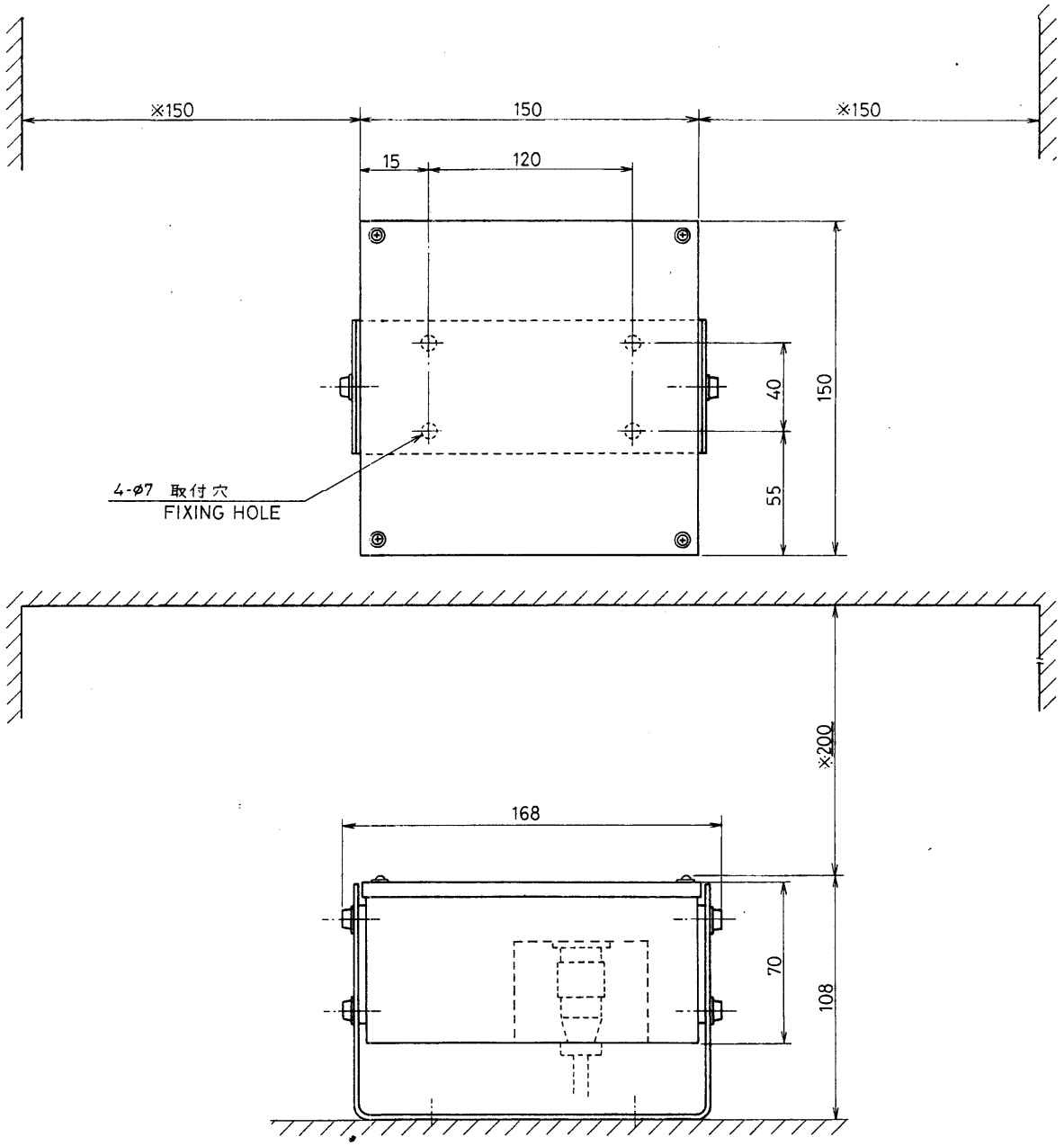


注記
1）指定なき寸法公差は表1による。
2）#：推奨する最小サービス空間寸法。
3）船首マーク(FORE)を船首方向に向けて、
きょう体を水平に取り付けること。

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

DRAWN	Nov.6'01 I.YAMASAKI
CHECKED	Nov6'01
APPROVED	Nov6'01
SCALE	1/3
MASS	1.1 ±10% kg
DWG.No.	C1278-G01- B
TITLE	MS-100
名称	動揺検出器
	外寸図
NAME	MOTION SENSOR
	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

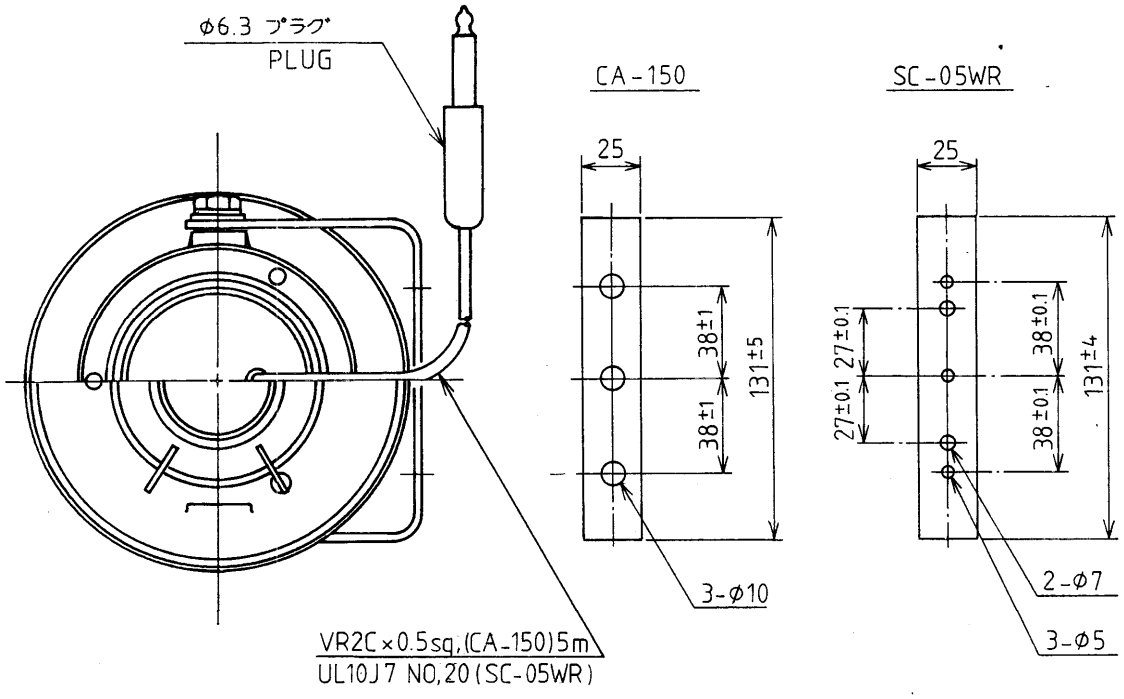


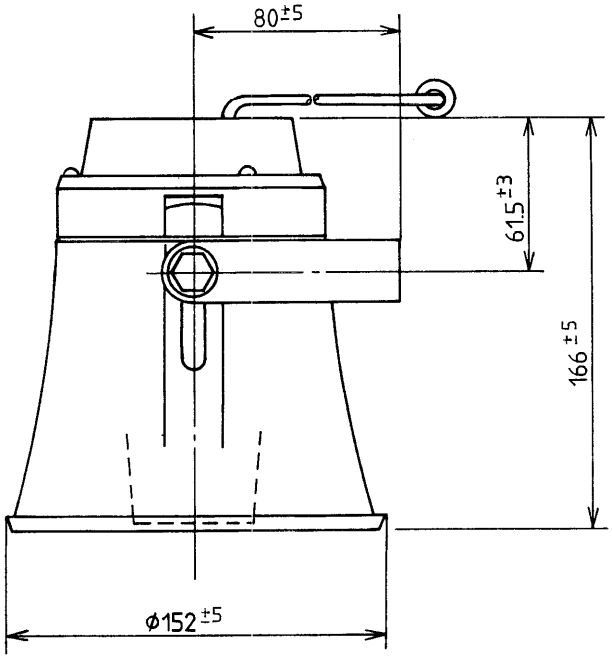
NOTE 1. 保守点検及び放熱用として ※印のスペースをとる事。
DIMENSIONS MARKED "※" SHOW RECOMMENDED MAINTENANCE AND VENTILATION SPACE.
2. 船体の回転の中心に水平に取り付ける事。
INSTALL THE UNIT HORIZONTALLY ON THE ROTATION AXES OF SHIP'S ROLLING AND PITCHING.

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

承認 APPROVED	JAN. 8 '86	三角法 THIRD ANGLE PROJECTION		名称 TITLE	傾斜角検出器
検図 CHECKED	Jan. 8. '86	尺度 SCALE	1/3	BS-704	CLINOMETER
製図 DRAWN	Oct. 29. '85	重量 WEIGHT	2 kg	図番 DWG. NO.	C1259-009-C

FURUNO ELECTRIC CO., LTD.





RATING

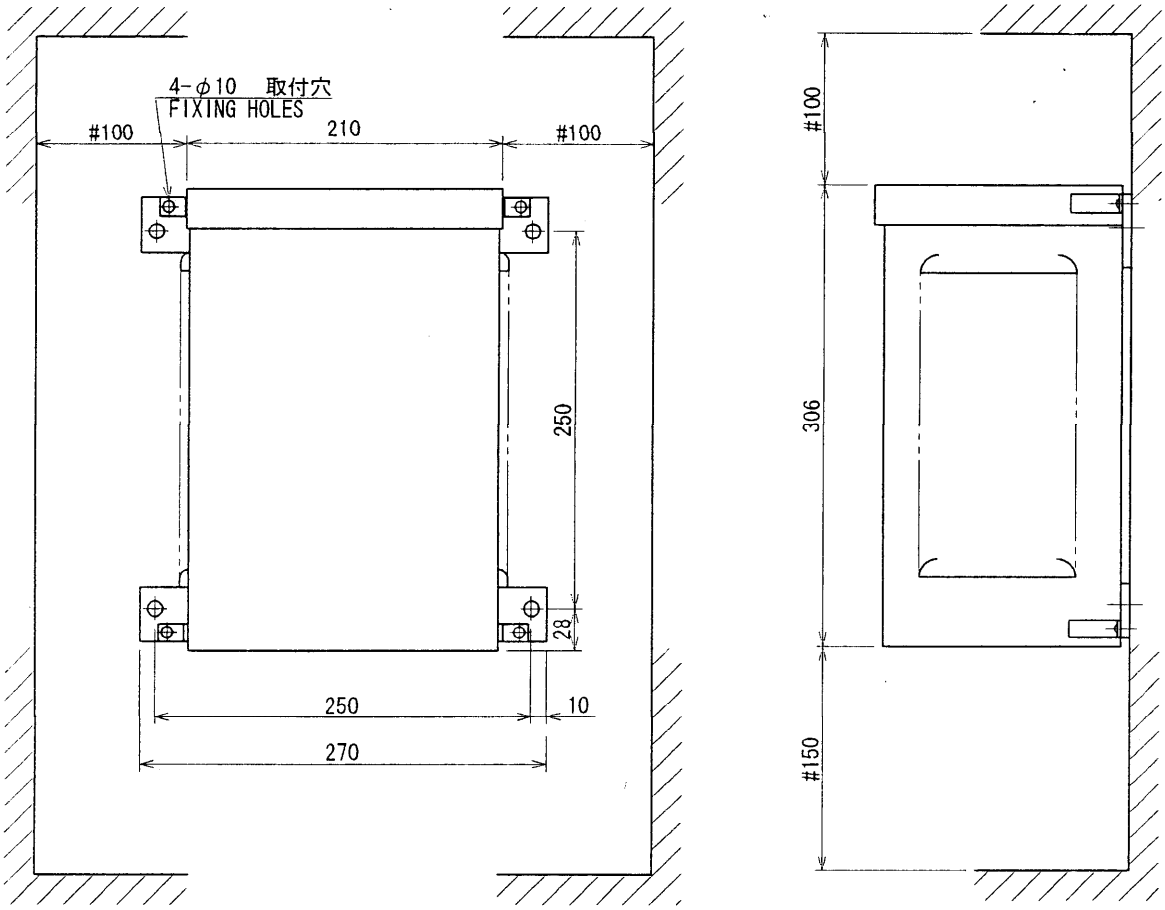
MAX. INPUT	5W
IMPEDANCE	4Ω
SOUND PRESSURE	104dB
FREQ. RESPONSE	400Hz~5kHz

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

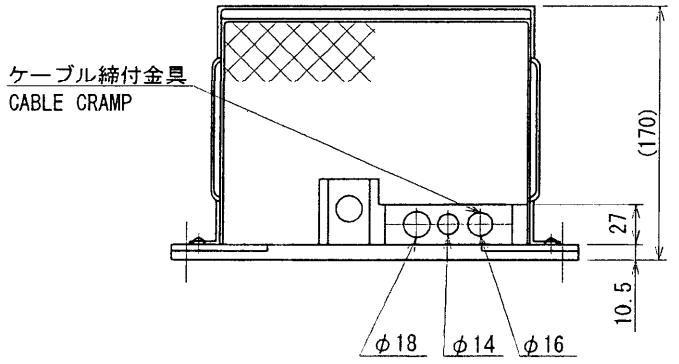
承認 APPROVED	SEP.20.'88 T.NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	5W トランペットスピーカ
検図 CHECKED	Sept.20.'88 M.IKEDA	尺度 SCALE	1/3	CA-150 SC-05WR	TRUMPET SPEAKER
製図 DRAWN	Aug.30.'88 K.Kusunoki	質量 MASS	1.2 kg	図番 DWG.NO.	C5016-101-D

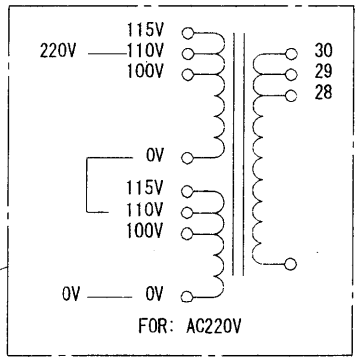
FURUNO ELECTRIC CO., LTD.

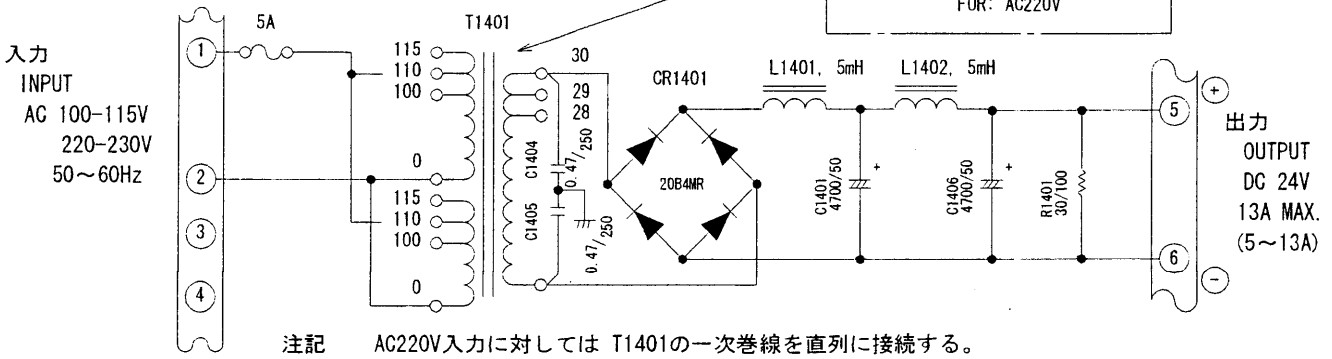
FURUNO



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







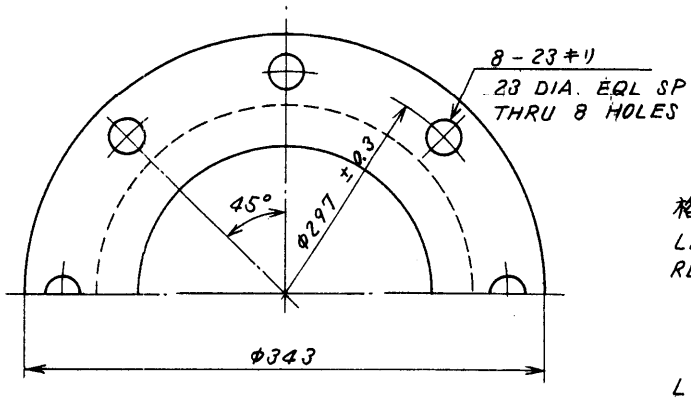
注記 AC220V入力に対しては T1401の一次巻線を直列に接続する。
NOTE FOR 220V AC INPUT, CONNECT T1401 PRIMARY WINDINGS IN SERIES.

DRAWN Aug16'00 T.YAMASAKI		TITLE	RU-1746B-2
CHECKED Aug17'00 T.K		名称	整流器
APPROVED Aug17'00 T.K			外寸図
SCALE 1/5	MASS 17 kg ±10%	NAME	RECTIFIER UNIT
DWG. No. C3002-002- N			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

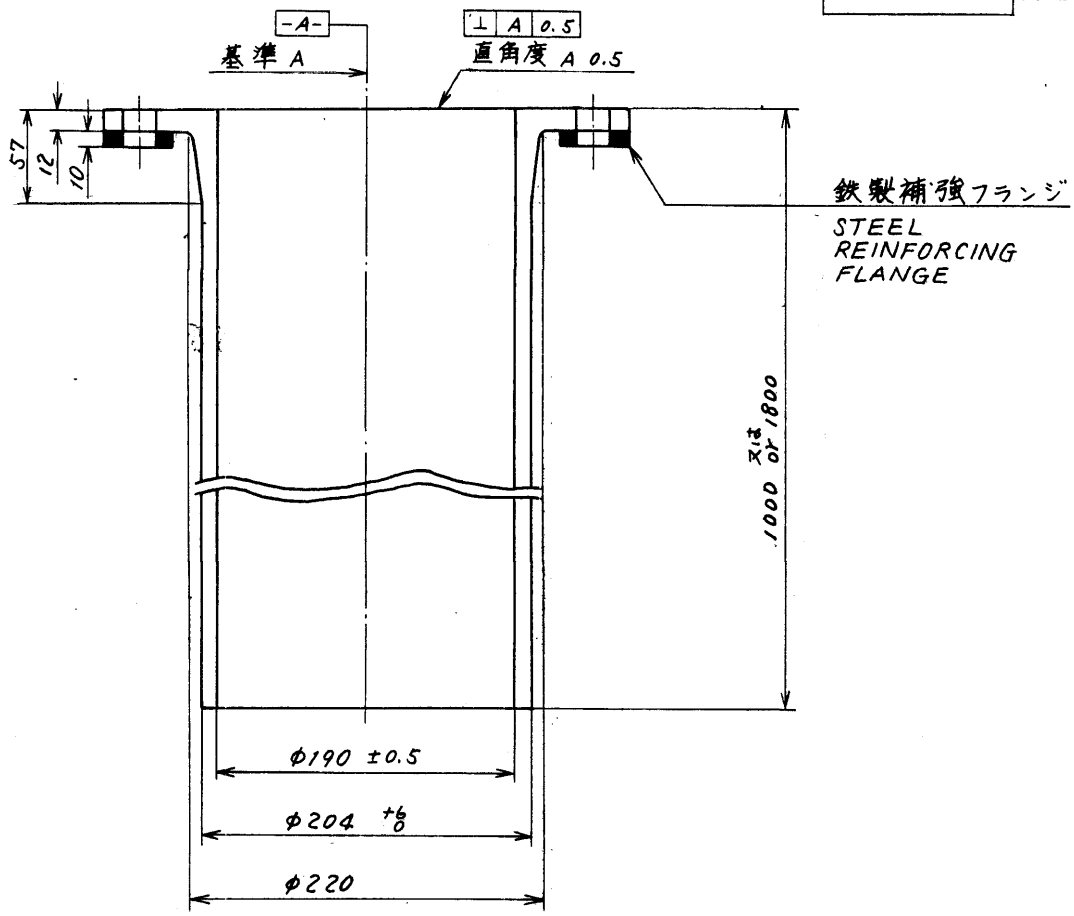
FURUNO

D-13



格納タンクの長さ；
LENGTH OF
RETRACTION TANK;

Lt = [ ] mm



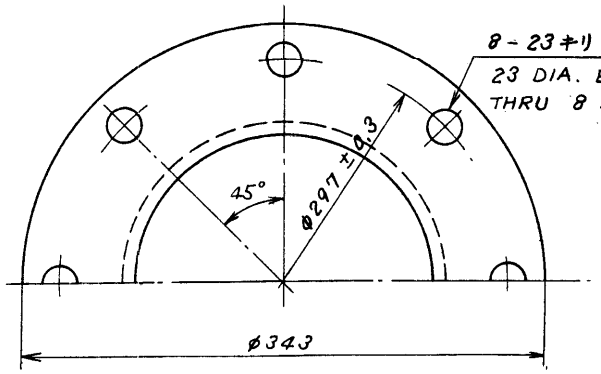
単位 UNIT : mm	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

承認 APPROVED		三角法 THIRD ANGLE PROJECTION		名称 TITLE	FRP製格納タンク外観図 FRP RETRACTION TANK OUTLINE DRAWING
検図 CHECKED	July·18·'95	尺度 SCALE	1/5		
製図 DRAWN	July·18·'95	重量 WEIGHT	1000mm: 20kg 1800mm: 27kg	図番 DWG. NO.	C1229-007-E

FURUNO ELECTRIC CO., LTD.

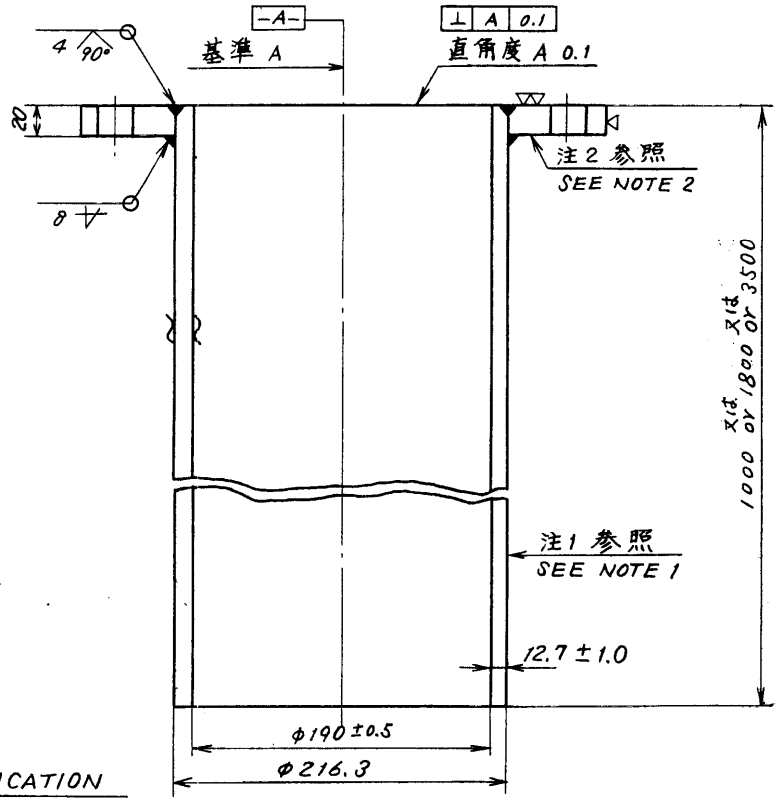
FURUNO

D-14



格納タンクの長さ；
LENGTH OF RETRACTION TANK;

Lt = [ ] mm



製作時の注意
NOTE FOR FABRICATION

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

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

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

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

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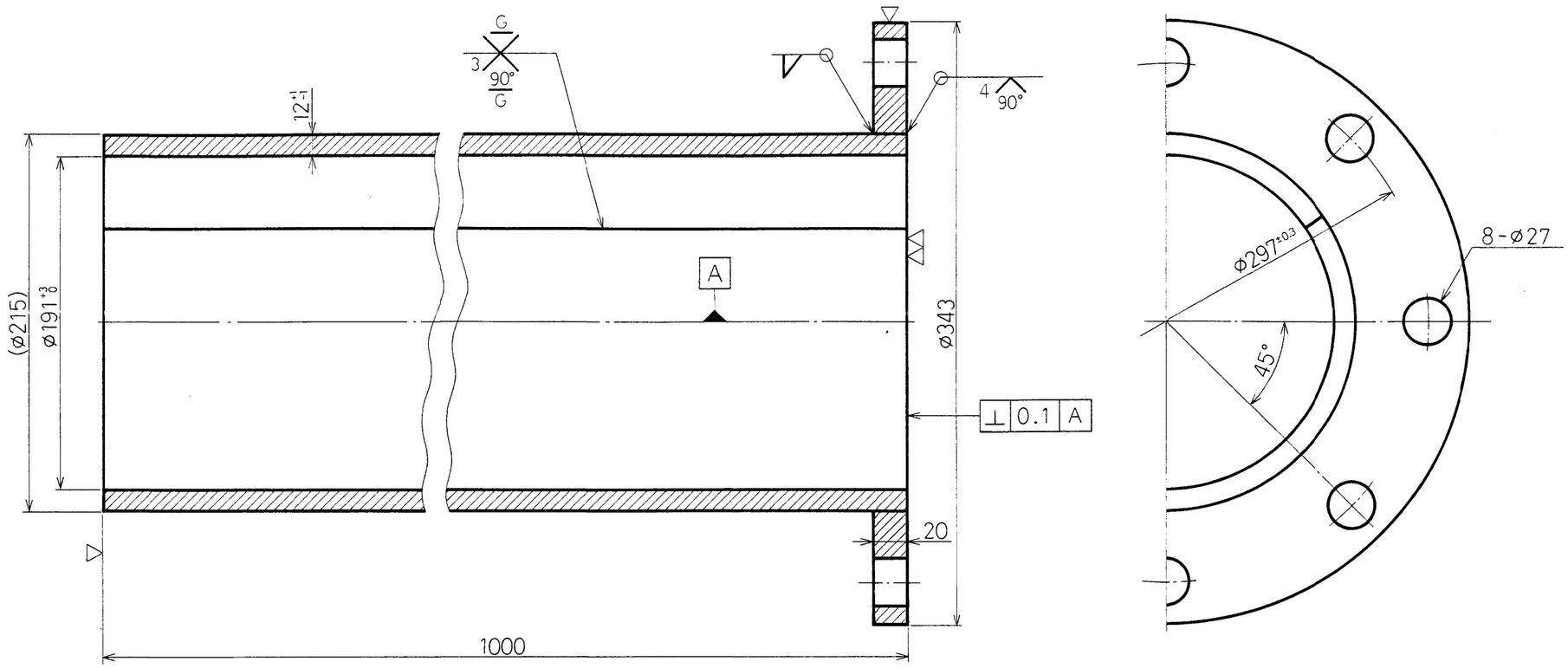
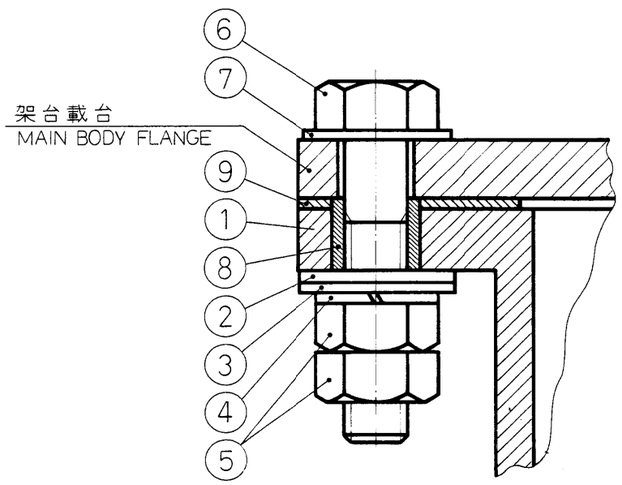
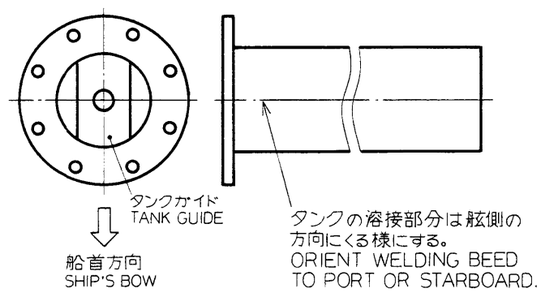




a) 格納タンク装備要領
ORIENTATION OF TANK



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

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

承認 APPROVED	DEC. 27.'90 T. NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	格納タンク(アルミ)外寸図 RETRACTION TANK (ALUMINUM)
検図 CHECKED	DEC. 27.'90 T. MIYOSHI	尺度 SCALE	1/3		
製図 DRAWN	DEC. 27.'90 M. USUDA	重量 WEIGHT	35 kg	図番 DWG. NO.	C1273-G09-A

CSH-5

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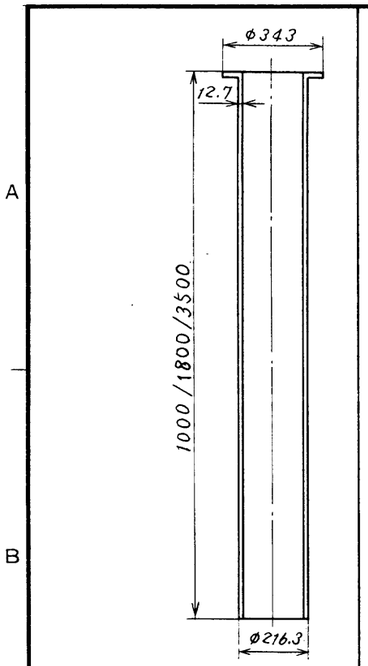
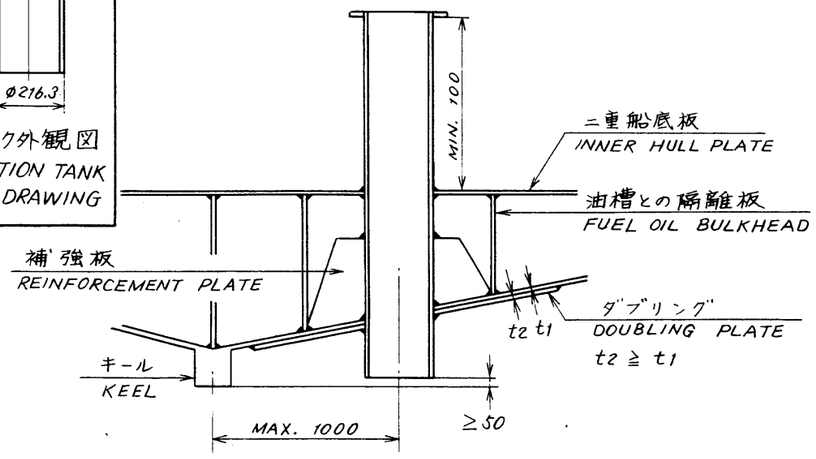
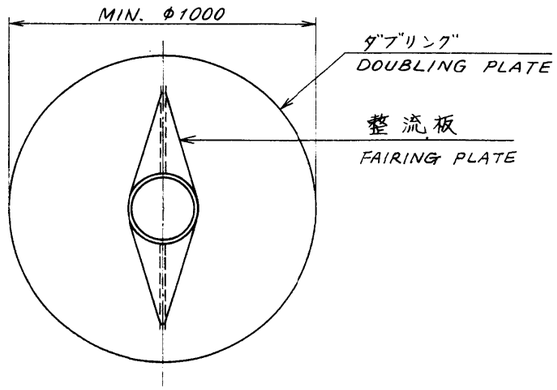


格納タンク外観図
RETRACTION TANK
OUTLINE DRAWING





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

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

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

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

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

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

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

承認 APPROVED	NOV. 9. '77	三角法 THIRD ANGLE PROJECTION		名称 TITLE	格納タンク船底装備図（鋼船） RETRACTION TANK INSTALLATION ON STEEL HULL
検図 CHECKED	NOV. 8. '77	尺度 SCALE	1/20		
製図 DRAWN	1977. 11. 7	重量 WEIGHT	kg	図番 DWG.NO.	C1243-017-F

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

単位 UNIT: mm

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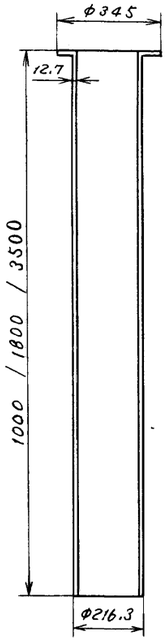
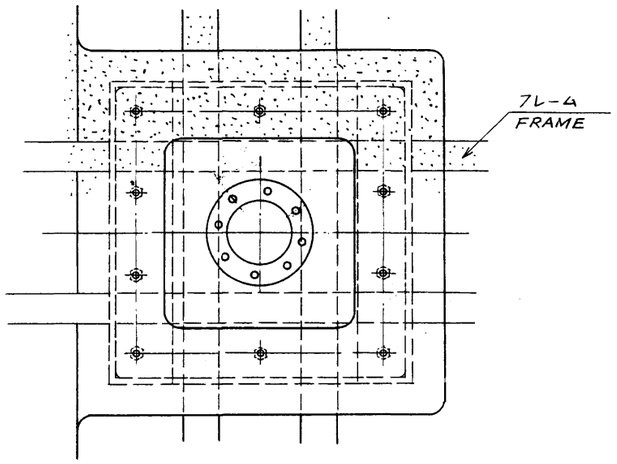
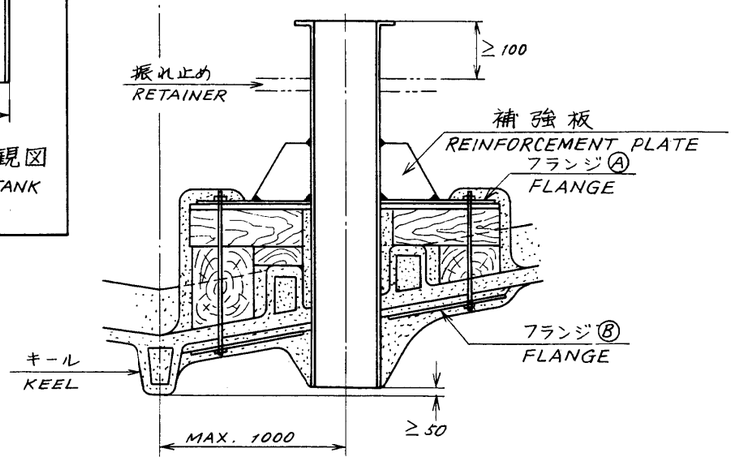
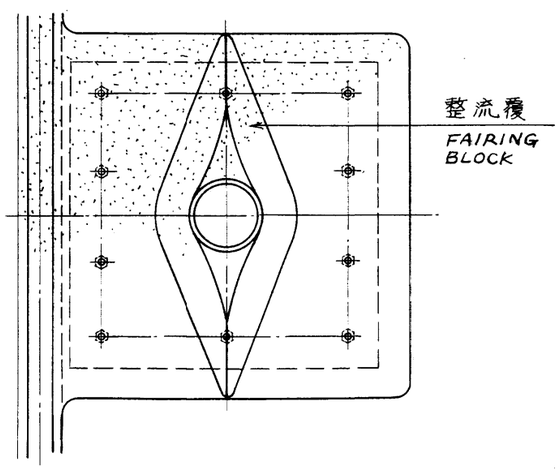


鉄製格納タンク外観図
STEEL RETRACTION TANK
OUTLINE DRAWING







1. 格納タンクの装備は次の条件を満すこと。
   1) 取付位置は船首から 1/3 (小型船の場合は 1/2) 程度。
   2) キールより 1 m 以内。
   3) フランジのボルト締めのため フランジ下面と障害物 (二重船底等) との間に 100 mm 以上のスペースがあること。
   4) タンクの先端はキールの先端より 50 mm 上であること。
   5) タンクのフランジ面は標準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) フレーム間の船底にタンクが通る穴をあける。
   2) タンクあるいは タンクと同径の中子を貫通させ、その回りに フランジ Ⓐ の乗せられる取付台を作り FRP で フレーム、船底間に固定する。
   3) フランジ Ⓐ の取付穴に合わせて取付台にボルトを立てておく。 必要があれば フランジ Ⓑ を作り ボルトを船底から貫通させる。
   4) FRP 硬化後タンクあるいは中子を抜き取る。
   5) フランジ Ⓐ をタンクに溶接する。
   6) フランジ Ⓐ 下面及びタンク外周に FRP－鉄接着剤を塗布した後 タンクを取りつける。
   7) 浸水を防ぐため充分に FRP で必要個所を塗り固める。特にタンク回りは 流線型に成型し 水による抵抗及び気泡発生を最少限におさえる様 努めること。
   8) 必要に応じて タンクのフランジ面 下部 100 mm の位置より 隔壁等に向けて振れ止めを設けること。 また フランジ Ⓐ 溶接時、タンクの周囲 3, 4 ヶ所で フランジ Ⓐ に向けて、補強板を溶接する。

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

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

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

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

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

承認 APPROVED	NOV. 9. '77	三角法 THIRD ANGLE PROJECTION		名称 TITLE	鉄製格納タンク船底装備図(FRP船) STEEL RETRACTION TANK INSTALLATION ON FRP HULL
検図 CHECKED	NOV. 8. '77	尺度 SCALE	1/20		
製図 DRAWN	1977. 11. 7	重量 WEIGHT	kg	図番 DWG.NO.	C1243-019-F

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

単位 UNIT: mm

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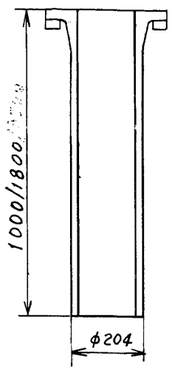
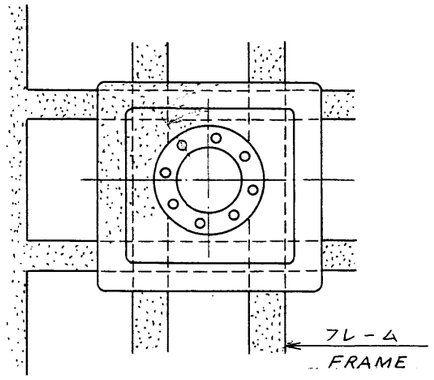
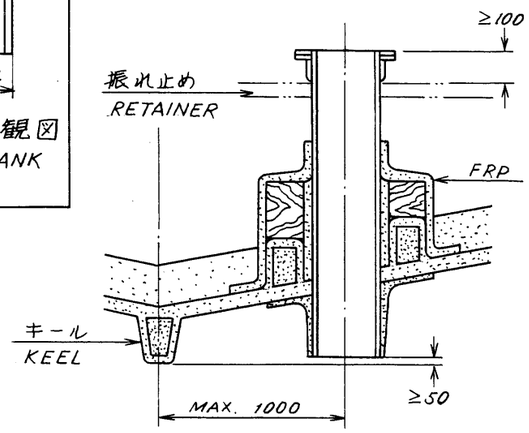
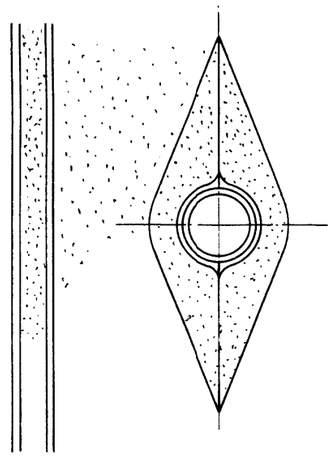


FRP製格納タンク外観図
FRP RETRACTION TANK
OUTLINE DRAWING







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

2. 浸水を防ぐため充分にFRPで必要個所を塗り固める。特にタンク回りは流線型に成型し水による抵抗及び気泡発生を最少限におさえる様努めること。

3. 必要に応じてタンクのフランジ面下部100mmの位置より隔壁等に向けて振れ止めを設けること。

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

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

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

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

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

承認 APPROVED		三角法 THIRD ANGLE PROJECTION	名称 TITLE FRP製格納タンク船底装備図(FRP船) FRP RETRACTION TANK INSTALLATION ON FRP HULL
検図 CHECKED	May. 14. 1978	尺度 SCALE 1/20	
製図 DRAWN	July. 18. 1978 M. Mori.	重量 WEIGHT kg	図番 DWG.NO. C1220-038-F

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

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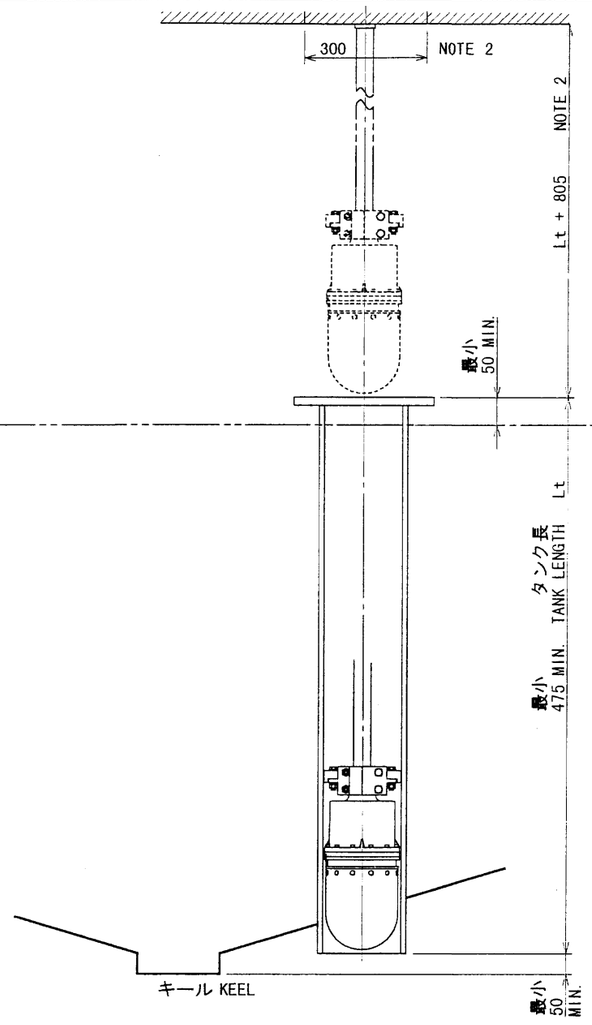
条 件 CONDITION

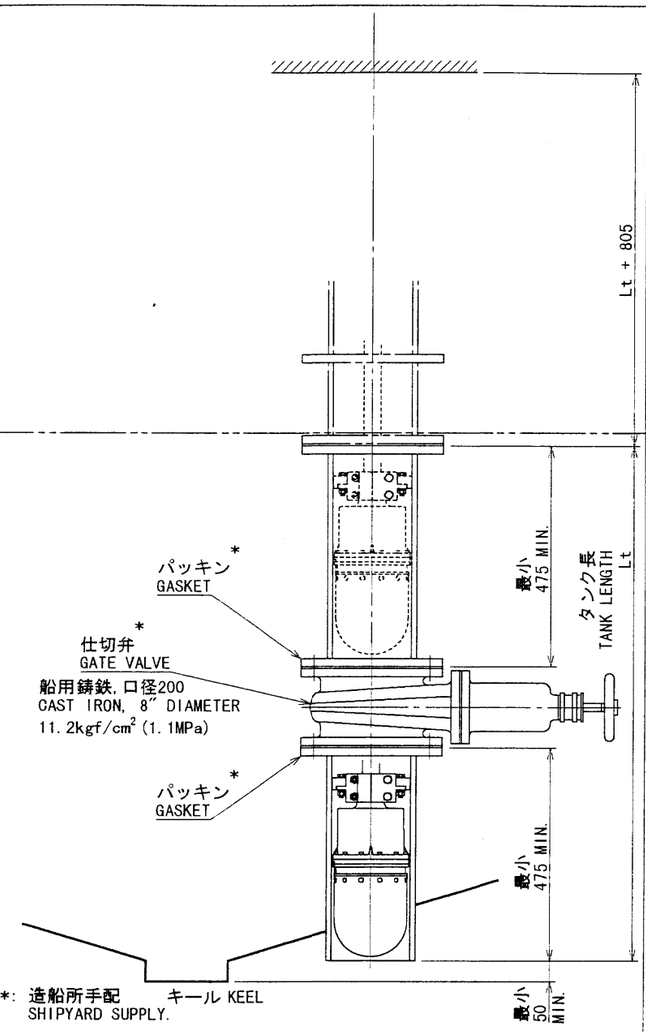
A タンク長を満載時の喫水線の上まで取れる場合。
WHEN THE LONGER TANK IS USED SO THAT ITS FLANGE POSITIONS ABOVE WATER LINE.

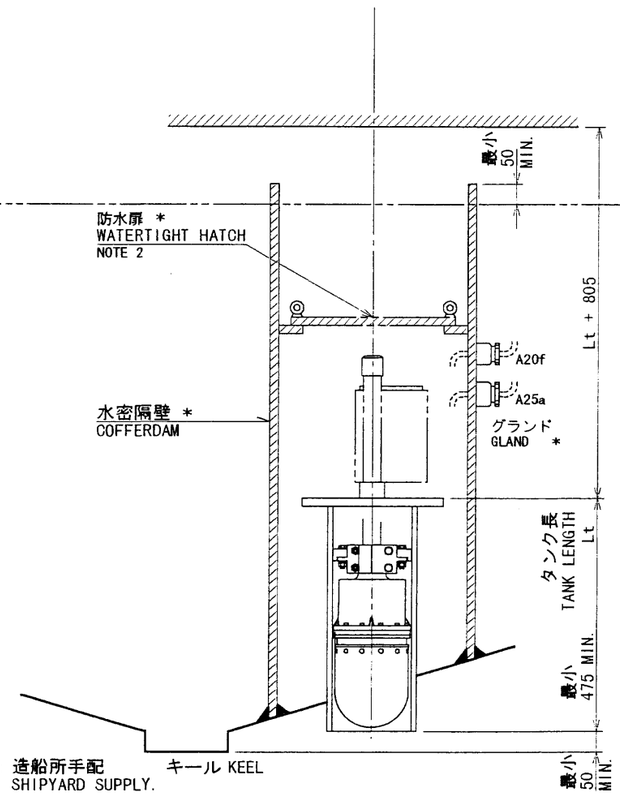
B 1. オフシーズンに上下装置を取りはずしておく場合。
WHEN THE LONGER TANK IS USED SO THAT ITS FLANGE POSITIONS ABOVE WATER LINE.
2. タンク長を喫水線の上まで取れない場合。
WHEN THE LONGER TANK IS USED DUE TO LIMITED CLEARANCE.

C タンク長を喫水線まで取れない場合で、仕切弁を使用しないとき。
WHEN THE LONGER TANK OR A GATE VALVE CANNOT BE USED.

装備法 METHOD







注 記 NOTE

1. この装備法を標準として推奨する。
THIS METHOD IS RECOMMENDED AS STANDARD INSTALLATION.
2. 上下装置の上部に十分なサービス空間が取れない場合は、天井に"300×300"の穴をあけておくこと。
WHEN OVERHEAD CLEARANCE IS NOT ALLOWED, MAKE A HOLE OF 300x300 mm ON CEILING FOR FACILITATING INSTALLATION AND FUTURE SOUNDOME SERVICE.

1. 上記の(1)の目的でこの装備法を行う場合には左図(A)と同様に喫水線の上までタンク長を取る方が望ましい。
THE TANK FLANGE POSITION IS DESIRED TO BE ABOVE WATER LINE, AS LIKE THE INSTALLATION METHODE 'A'.

1. 水密隔壁は、船級協会規則を参照し、造船所で製作してください。その際、サービス空間も考慮してください。
FABRICATE THE COFFERDAM BY SHIPYARD IN ACCORDANCE WITH CONCERNED REGULATIONS. ALSO ALLOW ENOUGH SERVICE CLEARANCE.
2. 水密隔壁の上限を喫水線の上までとれない場合にも、上下装置取り外しのための防水扉を設けること。
PROVIDE A WATERTIGHT HATCH FOR FUTURE MAINTENANCE IF A COFFERDAM IS NOT HIGH ABOVE WATER LEVEL.

注 記
1. 装備法の決定に際しては、安全性（強度、水密性等）を重視し、保守・点検の容易さにも配慮すること。
DECIDE AN INSTALLATION METHOD CONSIDERING SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE SHIP'S HULL. ALSO PROVIDE ENOUGH MAINTENANCE CLEARANCE.

DRAWN Mar13'00 T.YAMASAKI		TITLE	CH-250/S
CHECKED Mar14'00 Y.Kimura		名称	格納タンク
APPROVED Mar14'00 S.Yoshimura			送受波器装備図
SCALE 1/15	MASS - kg	単位 UNIT: mm	NAME RETRUCTION TANK
DWG No. C1316-T01- A			TRANSDUCER INSTALLATION

FURUNO ELECTRIC CO., LTD.

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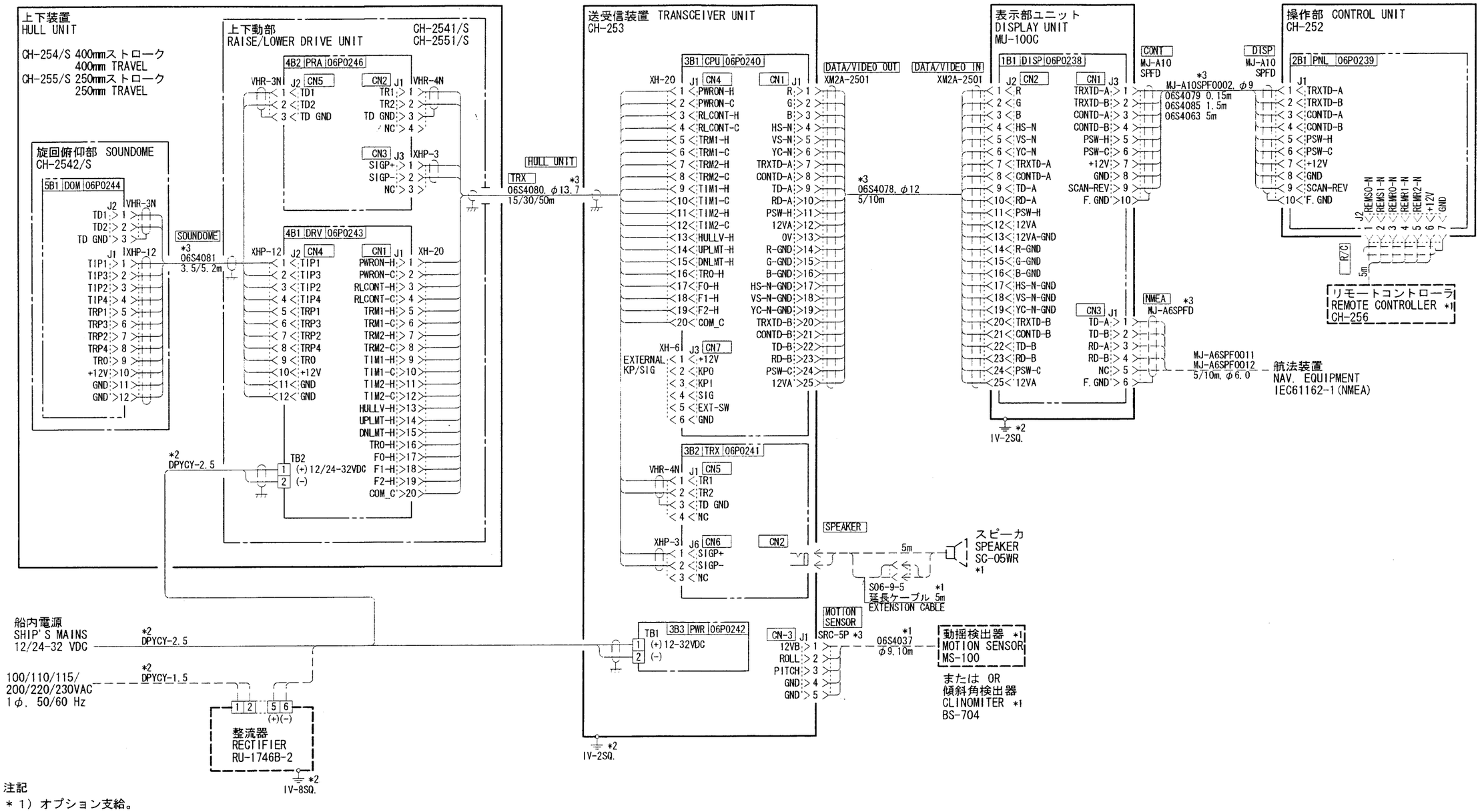
S-1



注記
＊1）オプション支給。
＊2）現地手配。
＊3）コネクタは工場で取付済み。

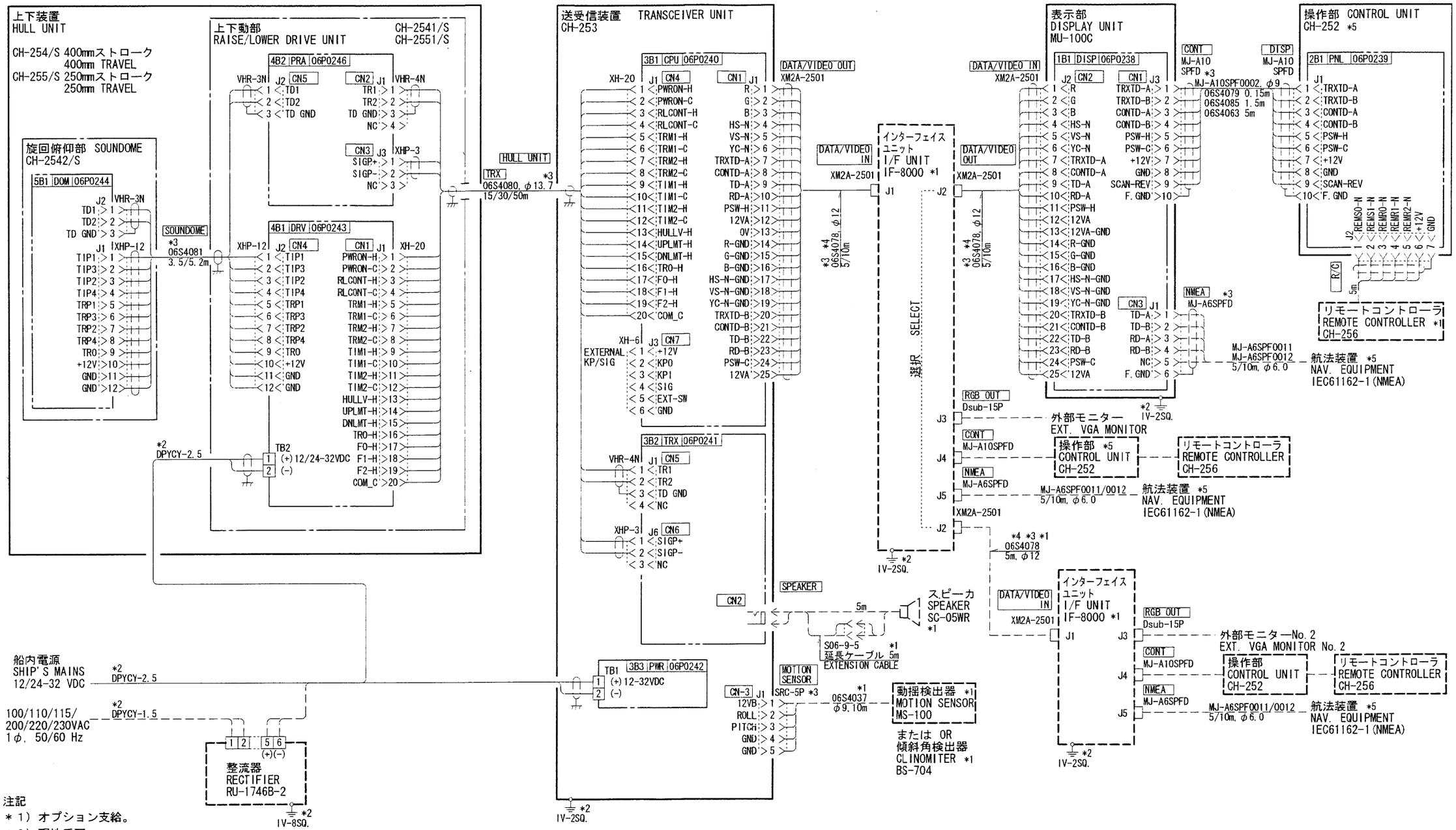
NOTE
*1. OPTION.
*2. LOCAL SUPPLY.
*3. CONNECTOR PLAG IS FITTED AT FACTORY.

DRAWN Aug 16'00 T.YAMASAKI		TITLE	CH-250/S
CHECKED Aug16'00 Y.K		名称	カラーLCDサーチライトソナー
APPROVED Aug/16'00 Y.K			相互結線図
SCALE	MASS kg	NAME	COLOR SEARCHLIGHT SONER
DWG No. C1316-C01- C			INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO

S－2



注記
＊1）オプション支給。
＊2）現地手配。
＊3）コネクタは工場で取付済み。
＊4）送受信装置から表示部までのケーブル長の合計は15m以下であること。
＊5）操作部、航法装置の接続は表示部ユニットかインターフェイスユニットのどちらか一方のみ。

NOTE
*1. OPTION.
*2. LOCAL SUPPLY.
*3. CONNECTOR PLAG IS FITTED AT FACTORY.
*4. CABLE LENGTH BETWEEN TRANSCEIVER AND DISPLAY UNIT SHOULD BE 15 m OR LESS.
*5. CONTROL UNIT AND NAV. EQUIPMENT SHOULD BE CONNECT A SIDE OF DISPLAY UNIT OR I/F UNIT ONLY.

DRAWN	Aug 16'00 T.YAMASAKI	TITLE CH-250/S
CHECKED	Aug 16'00 T. Kimura	名称 カラーLCDサーチライトソナー(I/Fユニット使用)
APPROVED	Aug 16'00 T.K	相互結線図
SCALE	MASS kg	NAME COLOR SEARCHLIGHT SONER (W/ I/F UNIT)
DWG No.	C1316-C02- C	INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.