

Installation Manual

LCD SEARCHLIGHT SONAR CH-270

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IME13220A00



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 display unit or
transceiver unit where it may get wet
from rain or water splash.**

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



WARNING

**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.

**Install the specified transducer tank
in accordance with the installation
instructions. If a different tank is to be
installed the shipyard is solely respon-
sible 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.

CAUTION

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

	Standard	Steering
CH-252/ MU-100C	0.80 m	0.55 m
CH-273	0.60 m	0.35 m
IF-8000	0.95 m	0.65 m

Keep hands away from the raise/lower shaft of the hull unit when it is working.

Injury to hands may result if they become caught in the shaft.

During sea trials, do not exceed 20 knots when operating the equipment and do not exceed 15 knots when raising or lowering the transducer.

The transducer shaft may become damaged.

Do not turn on the equipment with the transducer exposed to air as this may damage the transducer.

Do not swing the soundome by holding the transducer cable.

The cable and soundome may become damaged.

CAUTION

WORKING WITH THE SONAR OIL

Precautions

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

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

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

Keep the oil out of reach of children.

Emergency

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

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

If the oil is ingested, see a physician immediately.

Disposal of oil and its container

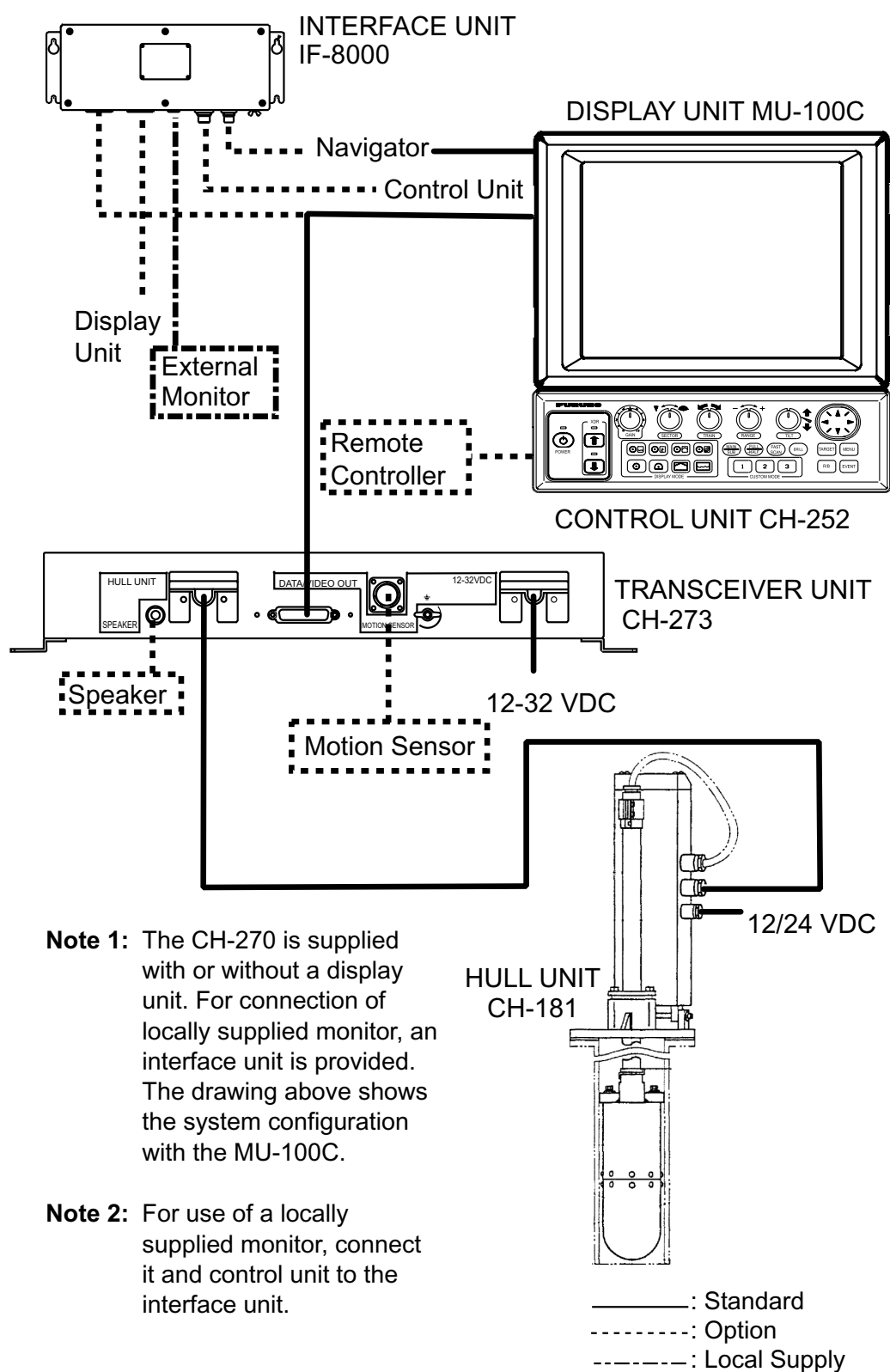
Dispose of oil and its container in accordance with local regulations. For further details, contact place of purchase.

Storage

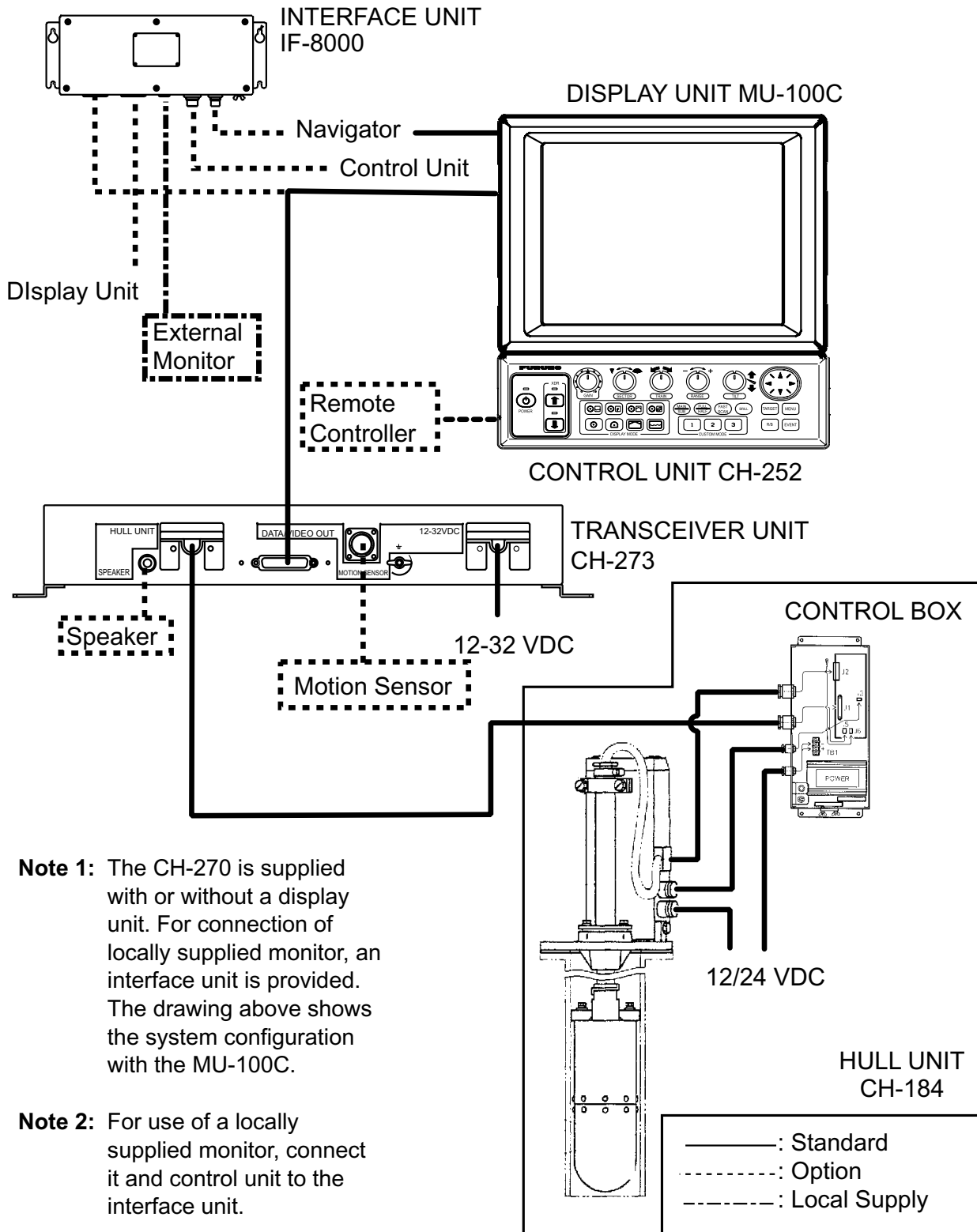
Seal container to keep out foreign material. Store in dark place.

SYSTEM CONFIGURATION

CH-270 (350 stroke)



CH-270 (250 stroke)



EQUIPMENT LISTS

Standard supply

Name	Type	Code No.	Qty	Remarks	
Control Unit/ Display Unit	CH-252/MU-100C	—	1	System with FURUNO-supplied monitor	
Control Unit	CH-252	—	1	System with locally supplied monitor	
Interface Unit	IF-8000	—	1		
Transceiver Unit	CH-273	—	1		
Hull Unit	CH-181-270	—	1	350 stroke	See table on next page for hull units.
	CH-184-270	—		250 stroke	
Spare Parts	SP06-01201*	006-559-590	1	For Hull Unit	
	SP06-01102*	006-556-210	1		
Installation Materials	See page ix.		1 set	Three types of cables	
	CP06-00403	006-573-730	1 set	For CH-184-270	
	CP06-06600	000-012-474	1	For CH-252/MU-100C	
	CP02-06610	000-012-480	1	MJ-A10SPF0002-015	Choose either one.
	CP02-06620	000-012-481	1	MJ-A10SPF0002-050	
Accessories	FP02-05101	000-012-474	1	FP06-01102*, FP02-05101* For display unit	
	FP06-01102*	006-556-260		For control unit	

* See packing list at back of manual for details.

Hull Unit (CH-181-270)

Type	Specifications			
	Cable Length	Shaft Length	Power	Stroke
CH-181-1-11-24	2.4 m	1.17 m	12 VDC	350 mm
CH-181-1-11-35	3.5 m			
CH-181-1-22-35		5.2 m		
CH-181-1-22-52				
CH-181-1-38-52				
CH-181-2-11-24	2.4 m	1.17 m	24 VDC	
CH-181-2-11-35	3.5 m	2.2 m		
CH-181-2-22-35				
CH-181-2-22-52				
CH-181-2-38-52				

Hull Unit (CH-184-270)

Type	Specifications			
	Cable Length	Shaft Length	Power	Stroke
CH-184-1-11-52	5.2 m	1.17 m	12 VDC	250 mm
CH-184-1-11-80	8 m			
CH-184-1-22-52	5.2 m	2.2 m		
CH-184-1-22-80	8 m			
CH-184-2-11-52	5.2 m	1.17 m	24 VDC	
CH-184-2-11-80	8 m			
CH-184-2-22-52	5.2 m	2.2 m		
CH-184-2-22-80	8 m			

Hull Unit Shipped Configuration (CH-181-270)

Name	Type	Code No.	Qty	Remarks	
Raise/Lower Drive Assy.	CH-1811-1	—	1 set	12 VDC	
	CH-1811-2	—		24 VDC	
Train/Tilt Assy.	CH-1812-1-24	—	1 set	2.4 m	12 VDC
	CH-1812-1-35	—		3.5 m	
	CH-1812-1-52	—		5.2 m	
	CH-1812-2-24	—		2.4 m	24 VDC
	CH-1812-2-35	—		3.5 m	
	CH-1812-2-52	—		5.2 m	
Soundome (D) Assy.	CH-1813	006-541-410	1		
Main Body Flange Assy.	CH-1814	006-541-420	1 set	Flange, Grease cotton	
Assembling Kit for Field	CH-1815-11	006-546-420	1 set	Shaft length 1.17 m	See next table
	CH-1815-22	006-546-430		Shaft length 2.2 m/3.8 m	
Main Shaft	06-008-1021	100-028-501	1	1.17 m	
	SHJ-0006	661-000-062		2.2 m	
	06-007-1572	600-715-721		3.8 m	
Sonar Oil	4-liter can	000-824-033	1		

Hull Unit Shipped Configuration (CH-184-270)

Name	Type	Code No.	Qty	Remarks	
Control Box	CH-1841-1	—	1 set	12 VDC	
	CH-1841-2	—		24 VDC	
Raise/Lower Drive Assy.	CH-1842-1	—	1 set	See Raise/lower drive assy.	
	CH-1842-2	—			
Train/Tilt Assy.	CH-1812-1-52	—	1 set	5.2 m	12 VDC
	CH-1812-1-80	—		8 m	
	CH-1812-2-52	—		5.2 m	24 VDC
	CH-1812-2-80	—		8 m	
Soundome (D) Assy.	CH-1813	006-541-420	1		
Main Body Flange Assy.	CH-1844	006-573-720	1 set	Flange, Grease cotton	
Assembling Kit for Field	CH-1845-11	006-546-380	1 set	Shaft length 1.17 m	See next table
	CH-1845-22	006-546-410		Shaft length 2.2 m	
Main Shaft	06-008-1021	100-028-500	1	1.17 m	
	SHJ-0006-1	661-000-061		2.2 m	
Sonar Oil	4-liter can	000-824-033	1		
Installation Materials	CP06-00403	006-573-730	1	For CH-184-270, includes Ground plate WEA-1004 (Code No. 006-543-980) Cable assy. 06S4054 (Code No. 000-122-879)	

Installation Materials

Type	Code No.	Specifications (Cable between units)		Crimp-on Lug
		Display Unit (or I/F Unit) ↔ Transceiver Unit	Transceiver Unit ↔ Hull Unit	
CP06-01300	000-068-593	06S4078 *5m*	06S4086*10m*	CP06-01301*
CP06-01310	000-068-594		06S4086*15m*	CP06-01301*
CP06-01320	000-068-595		06S4086*20m*	CP06-01301*
CP06-01330	000-068-596		06S4086*30m*	CP06-01301*
CP06-01340	000-068-597	06S4078 *10m*	06S4086*10m*	CP06-01301*
CP06-01350	000-068-598		06S4086*15m*	CP06-01301*
CP06-01360	000-068-599		06S4086*20m*	CP06-01301*
CP06-01370	000-068-600		06S4086*30m*	CP06-01301*

Control Unit Cable

Type	Code No.	Qty	Remarks	
CP02-06600*	000-012-486	1	MJ-A10SPF0002-0015, For system with FURUNO-supplied monitor	
CP02-06610*	000-012-480	1	MJ-A10SPF0002-015, 1.5 m	Select one, for system with locally supplied monitor
CP02-06620*	000-012-481		MJ-A10SPF0002-050, 5 m	

*: See packing list at back of manual for details.

Option

Name	Type	Code No.	Qty	Remarks
Monitor	MU-150C	—	1 set	
	MU-100C	—		
Control Unit	CH-252	—	1 set	
Remote Controller	CH-256-E	—	1 set	
Interface Unit	IF-8000	—	1 set	
Motion Sensor	MS-100	—	1 set	
Clinometer	BS-704	—	1 set	
Speaker	SC-05WR	000-136-156	1	
Signal Cable	S06-9-5	006-556-270	1	Speaker extension cable, 5 m
Cable Assy.	MJ-A6SPF0012-050	000-134-424	1	6 pin-6 pin, 5 m
	MJ-A6SPF0012-100	000-133-817	1	6 pin-6 pin, 10 m
	MJ-A6SPF0011-050	000-132-244	1	6 pin-4 pin, 5 m
	MJ-A6SPF0011-100	000-132-336	1	6 pin-4 pin, 10 m
Installation Kit for Separate Type Control Unit	OP06-15-1.5 NEW	006-559-140	1	With 1.5-m cable, for desktop mounting
	OP06-15-5 NEW	006-559-150	1	With 5 m cable, for desktop mounting
	OP02-83-1.5	001-413-600	1	With 1.5 m cable, for flush mounting
	OP02-83-5	001-413-610	1	With 5 m cable, for flush mounting
Flush Mount Kit for Display Unit/Control Unit (integrated)	OP06-16	006-556-300	1	For display unit and control unit
Flush Mount Kit for Display Unit (separate)	OP06-17	006-556-310	1	For display unit
Flush Mount Kit for Control Unit	OP06-18	006-556-320	1	
CH-270 Retrofit Kit	OP06-19	000-068-628	1	
Rectifier	RU-1746B-2	000-030-439	1	
Retraction Tank	06-013-2501	100-099-192	1	Steel, 1 m
	06-013-2502	100-100-322	1	Steel, 1.8 m
	06-013-2503	100-100-332	1	Steel, 3.5 m
	06-022-2201	100-306-180	1	FRP, 1 m
	06-022-2202	100-306-200	1	FRP, 1.8 m

1. MOUNTING

1.1 Display Unit, Control Unit

This searchlight sonar is available in two configurations: one with the FURUNO-supplied display unit or one with no display unit and an interface unit (with which to connect a monitor, locally supplied). For installation of the system which uses a locally supplied monitor, see paragraph 1.1.3 on page 6 for monitor requirements and installation information.

The control unit can be installed together with the display unit, or independently, using the optional mounting kit. These units may be installed on a desktop or flush mounted in a console.

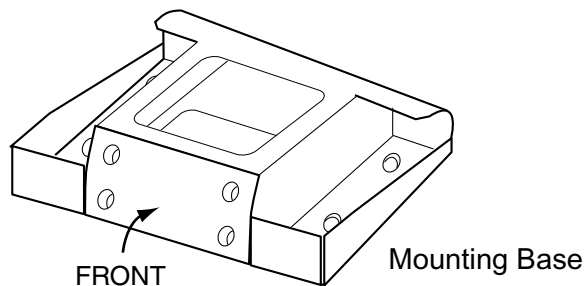
1.1.1 General mounting considerations

- Keep the units out of direct sunlight.
- Select a location where the units 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 units and leave slack in cable. (Refer to the outline drawing at the back of this manual for recommended maintenance space.)
- A magnetic compass will be affected if the display unit (or control unit when it is installed separately) is placed too close to the compass. Observe the following compass safe distances to prevent deviation to the compass: Standard compass: 0.80 m, Steering compass: 0.55 m.

1.1.2 Mounting the FURUNO-supplied display unit MU-100C

Desktop mounting

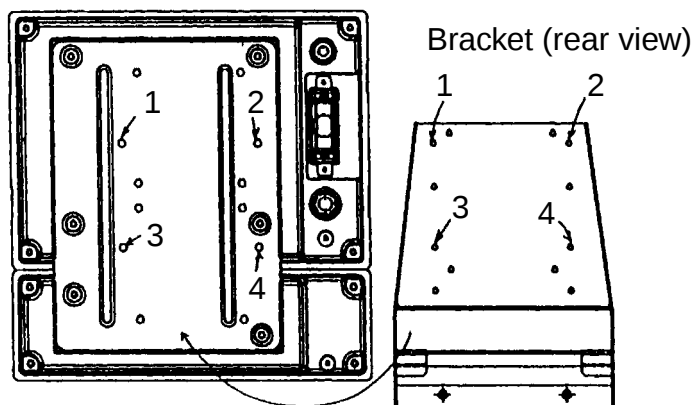
1. Fasten the mounting base to the mounting location with four tapping screws.



2. Do one of the following:

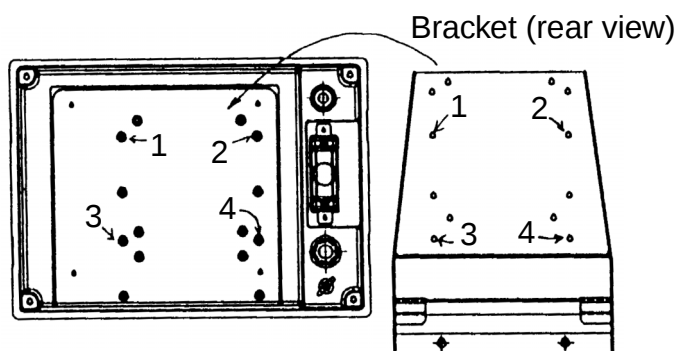
♦ Mounting the display unit and control unit together:

- 1) Fasten the bracket at the rear of monitor and control units with four binding screws (M4X10).



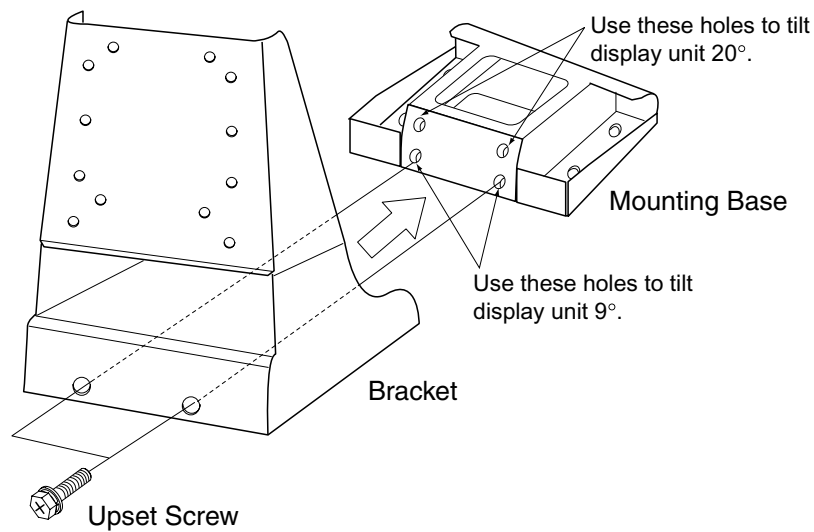
♦ Mounting the display unit separately from the control unit:

- 1) Dismount the coupling plate at the rear of the display unit to separate the display unit from the control unit.
- 2) Attach the bracket at the rear of the display unit with four binding screws (M4X10).



3. Coat threads of upset screws (M6X16, 2 pcs.), which are used to fasten the bracket to the mounting base, with grease.

4. Fasten the bracket to the mounting base with two upset screws: Use the upper holes to tilt the display unit 20°; lower holes to tilt it 9°.



Mounting the control unit separate from the display unit

The optional control unit mounting kit is required. See the outline drawing at the back of this manual for mounting details.

Control Unit Mounting Kit

Type: OP06-15-1.5 NEW (Code no. 006-559-140, with 1.5 m cable)

Type: OP06-15-5 NEW (Code no. 006-559-150, with 5 m cable)

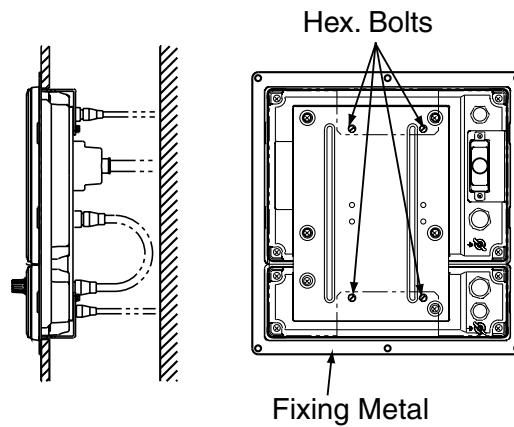
Name	Type	Code No.	Qty	Remarks
Cable	MJ-A10SPF0002-015	000-142-878	1	For 1.5 m cable
	MJ-A10SPF0002-050	000-131-411		For 5 m cable
Bracket	06-021-2112	100-281-880	1	
Mounting Plate	06-021-2111	100-279-740	1	
Tapping Screw	5X20	000-802-081	2	
Cosmetic Cap	DP-687	000-808-417	2	
Hex. Screw	M4X12	000-882-040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

Flush mounting the display unit together with control unit

*Flush Mount Kit for Display Unit/Control Unit
(Type OP06-16, Code no. 006-556-300)*

Name	Type	Code No.	Qty	Remarks
Fixing Metal	06-021-1311	100-279-611	1	
Tapping Screw	5X20	000-802-840	6	
Hex. Bolt	M4X12	000-882-040	4	

1. Cut out hole (297(H) X 287(W)) in mounting location.
2. Fasten the fixing metal to the display and control units with four hex. bolts (M4X12).



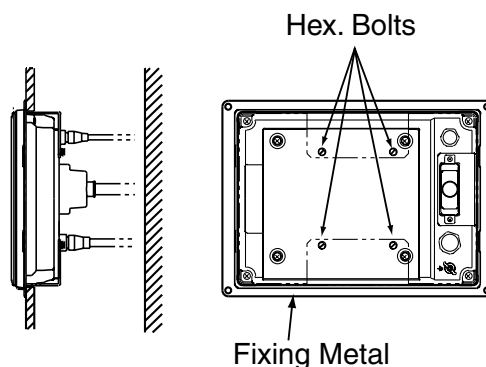
3. Using four tapping screws (5X20), fasten the fixing metal attached at step 2 to the mounting location.

Flush mounting the display unit

*Flush Mount Kit for Display Unit
(Type OP06-17, Code no. 006-556-310)*

Name	Type	Code No.	Qty	Remarks
Fixing Metal	06-021-1321	100-279-622	1	
Tapping Screw	5X20	000-802-840	4	
Hex. Bolt	M4X12	000-882-040	4	

1. Cut out hole (207(H) X 287(W)) in mounting location.
2. Fasten the fixing metal to the display unit with four hex. bolts (M4X12).



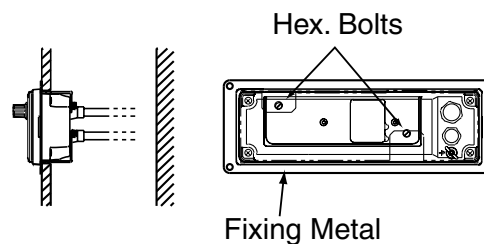
3. Using four tapping screws (5X20), fasten the fixing metal attached at step 2 to the mounting location.

Flush mounting the control unit

*Flush mount kits for control unit
Type OP02-83-1.5, Code no. 001-413-600 (1.5 m cable)
Type OP03-83-5, Code no. 001-413-610 (5 m cable)
Type OP06-18, Code no. 006-556-320 (no 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 Assy.	MJ-A10SPF0002-015	000-142-878	1	1.5 m	Choose either one.
	MJ-A10SPF0002-050	000-131-411		5 m	

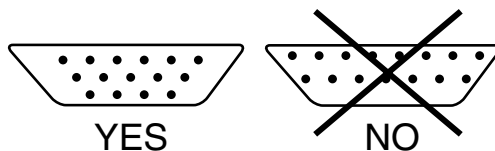
1. Cut out hole (87(H) X 287(W)) in mounting place.
2. Fasten the fixing metal to the control unit with two hex. bolts (M4X12).
3. Using four tapping screws (5X20), fasten the fixing metal assembled at step 2 to the mounting location.



1.1.3 System with locally supplied monitor

Monitor requirements

This system requires a standard VGA monitor, connected to the interface unit IF-8000. Supply monitor and interconnection cable locally. A D-sub 15P connector is required for connection to the DATA/VIDEO OUT port on the IF-8000. Use the three rows-type D-sub connector; not the two rows-type.



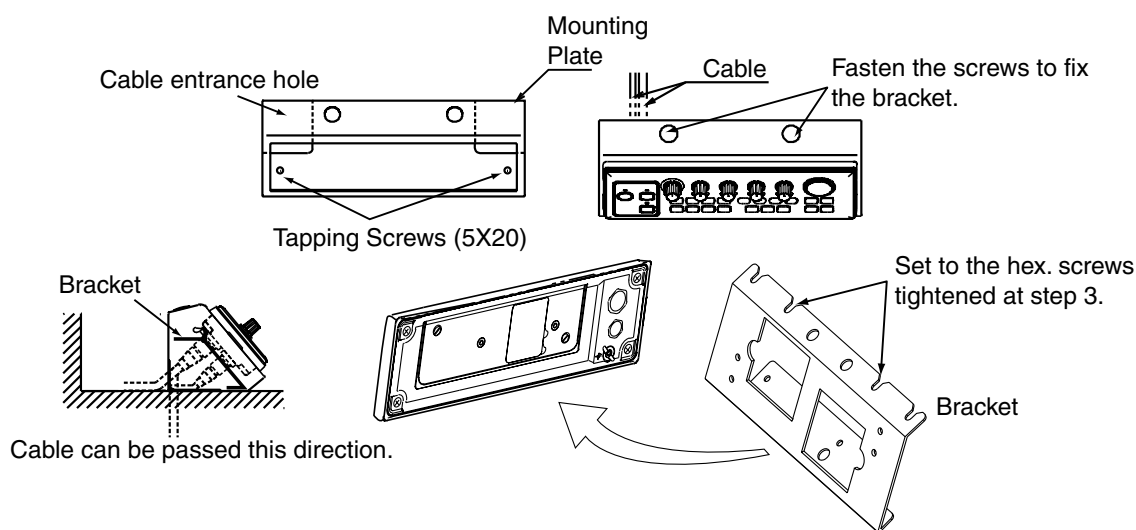
The monitor should satisfy the specifications shown below.

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

Mounting the control unit on a desktop

For the system which uses a locally supplied monitor, fix the control unit to the mounting plate (supplied as accessories) as shown below. See the parts list FP06-01120 and outline drawings at the back of this manual for details.

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



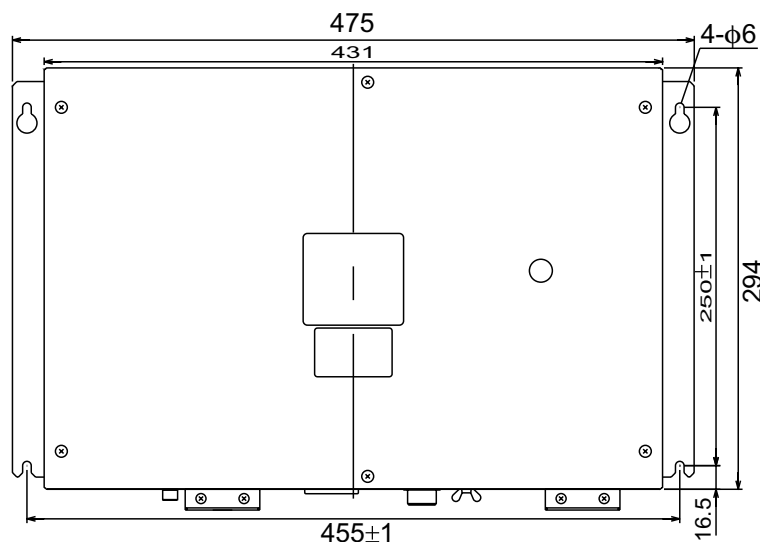
1.2 Transceiver Unit

1.2.1 General mounting considerations

- The mounting location should be well ventilated and dry.
- The unit can be mounted on a bulkhead or a desktop. For bulkhead mounting, be sure the bulkhead is strong enough to support the weight of the unit under the vibration normally experienced onboard the vessel. If necessary, reinforce the mounting location.
- Secure maintenance space for ease of maintenance and service, referring to the outline drawing for recommended maintenance space.
- The maximum length of the cable between the transceiver unit and the raise/lower drive assy. is 30 m.
- The maximum length of the cable between the transceiver unit and the display unit (or interface) is 10 m.
- A magnetic compass will be affected if the transceiver unit is placed too close to the compass. Observe the following compass safe distances to prevent deviation to the compass: Standard compass: 0.60 m, Steering compass: 0.35 m.

1.2.2 Mounting procedure

The transceiver unit may be mounted a desktop or a bulkhead. Fasten the unit to the mounting location with four tapping screws (5 mm diameter, local supply).



For bulkhead mounting:

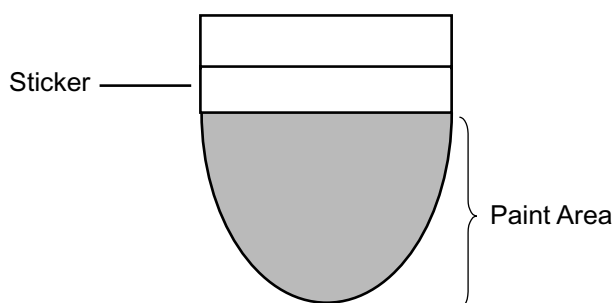
1. Screw in upper tapping screws, leaving 5 mm gap between bottom of screw head and bulkhead as shown right.
2. Set the unit to the tapping screws and tighten screws.
3. Screw in lower tapping screws.

1.3 Hull Unit

1.3.1 General handling considerations

⚠ CAUTION
Do not turn on the equipment with the transducer exposed to air as this may damage the transducer.

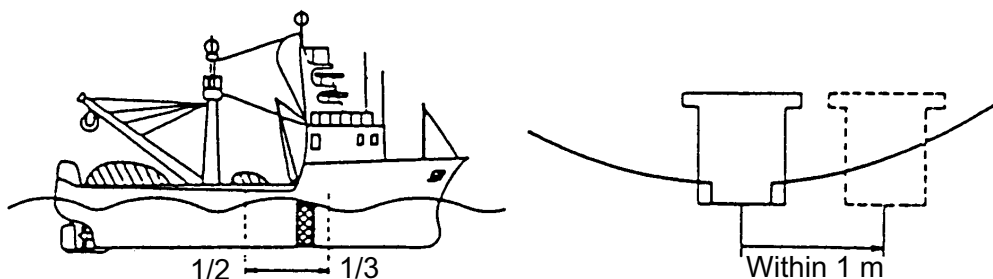
The soundome may be painted with antifouling paint to keep marine life of the transducer. Use "Marine Star 20," manufactured by Chugoku Marine Co., Ltd., or equivalent. Paint only the portion below the sticker. Painting metal parts will cause corrosion.



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 m of the keel to prevent a rolling effect.

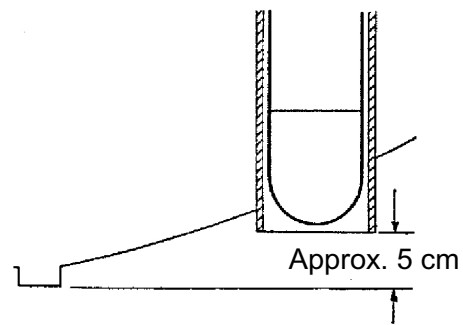


- Select a place where interference from the transducers of other sounding equipment is minimal. The hull unit should be at least 2.5 m away from the transducers of other sounding equipment.
- An obstacle in the fore direction not only causes a shadow zone but also aerated water, resulting in poor sonar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

1.3.3 Mounting the retraction tank

Mounting method

Careful attention should be paid to safety (strength, watertightness, etc.) of the tank and also the ease of maintenance and checking. In the off-the-keel installation, it is recommended that the retraction tank protrude through the hull down to 5 cm above the keel for minimizing the effects of air bubbles.



Determining tank length

The mounting method determines the necessary tank length “Lt,” and any excess portion should be cut. In addition, the tank length is necessary as the reference value for cutting the main shaft, so make a note of the length.

CH-181-270 (350 mm stroke)

It is not necessary to cut the main shaft or tank when the standard combination (main shaft: 1.17 m, tank: 1 m) is used. If you wish to position the top of the tank above the water line, use the optional 2.2 or 3.8 m long main shaft. In this case, determine the shaft length (Ls) and the tank length (Lt) as follows: $L_s = L_t + 170 \text{ mm}$

CH-184-270 (250 mm stroke)

It is not necessary to cut the main shaft or tank when the standard combination (main shaft: 1.17 m, tank: 1 m) is used. However, the shaft protrudes slightly above the hull unit. If it is necessary to position the top of the tank above the water line, use the optional 2.2 m long main shaft. In this case, determine the shaft length (Ls) and the tank length (Lt) as follows:
 $L_s = L_t - 17 \text{ mm}$

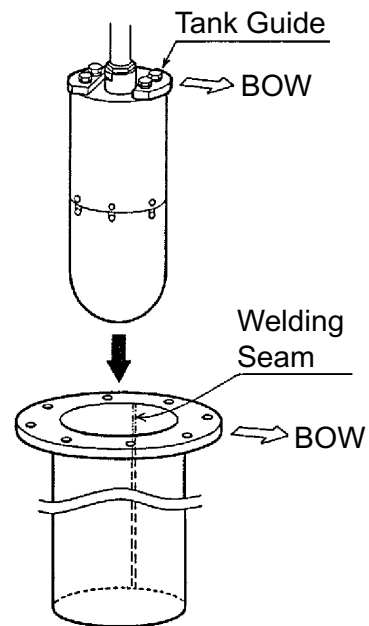
CH181-270	
CH184-270	

Installing the retraction tank

Install the retraction tank referring to outline drawing for the retraction tank.

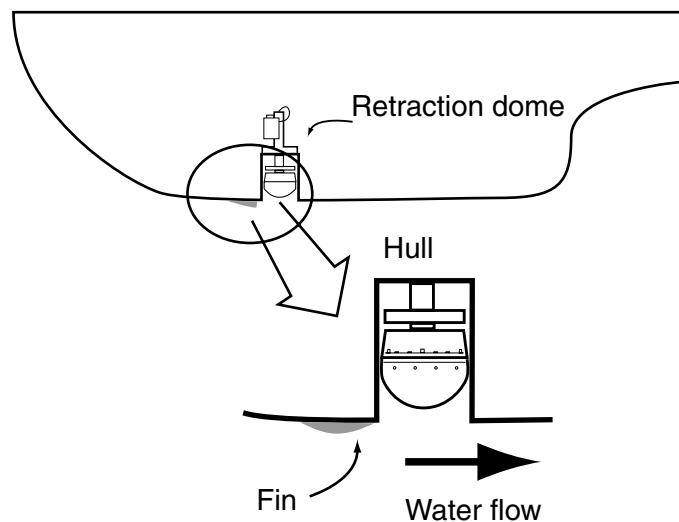
Note 1: The seam of the tank should be positioned either at the port or starboard side, otherwise the tank guide on the soundome will contact the welded portion of the retraction tank, preventing smooth retraction.

Note 2: When the retraction tank is locally made, it is recommended that the seamless pipe STPG38-S-C (carbon steel pipe, for pressure release) or equivalent be used.



Installation on an FRP vessel

The retraction tank is usually installed vertical to the ship's draft line. For a small FRP vessel tilt it 2°. However, since this method increases water pressure in the tank because of resistance at the rear of the tank well, install a fin at the location shown below to provide smooth water flow.



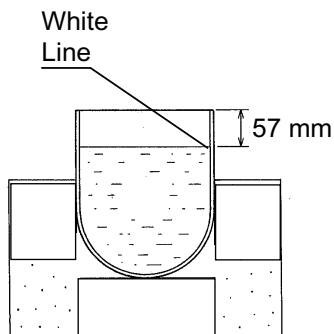
The fin creates a rise of 1-1.5 cm at the front side of the retraction tank. This allows water to flow smoothly along the ship's hull, eliminating swirls.

1.3.4 Assembling and installation of hull unit

The hull unit is ship disassembled. Follow the procedure below to assemble and install the hull unit.

Assembling of soundome

1. Stand the soundome vertically and fill to the white line inside the soundome with the sonar oil.



2. Remove the vinyl cap from the train/tilt assy. Confirm that the O-ring is properly seated in its groove.
3. Set the upper dome assy. to the lower dome assy., aligning screw holes.



CAUTION

WORKING WITH THE SONAR OIL

Precautions

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

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

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

Keep the oil out of reach of children.

Emergency

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

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

If the oil is ingested, see a physician immediately.

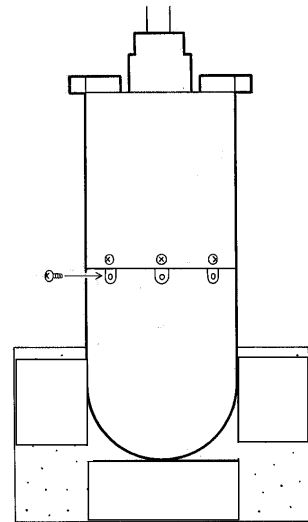
Disposal of oil and its container

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

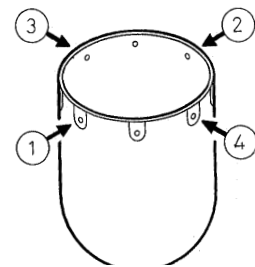
Storage

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

4. While pressing down on the upper dome assy., temporarily set two self-locking screws to diagonal holes in the soundome assy. Note that the self-locking screws do not require washers.



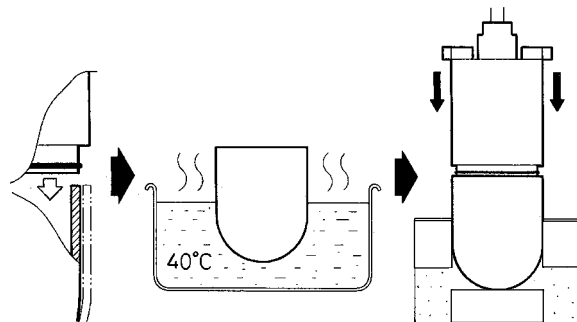
5. Fit remaining eight self-locking screws, fastening the screws in diagonal order. This is especially important for the first four screws.



IMPORTANT!

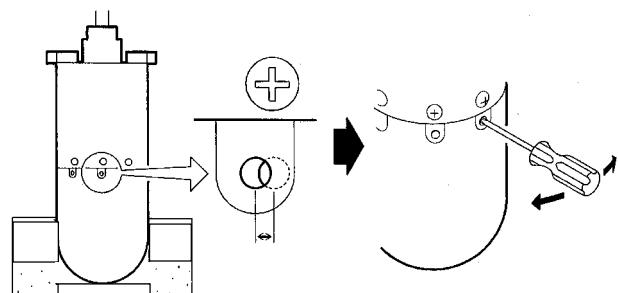
When the soundome is installed in a low ambient temperature

The soundome may shrink and become difficult to fit to the upper dome assy. To prevent this, warm it in water of approx 40°C (104°F) or leave it in room temperature above 20°C (68°F) for at least one hour.



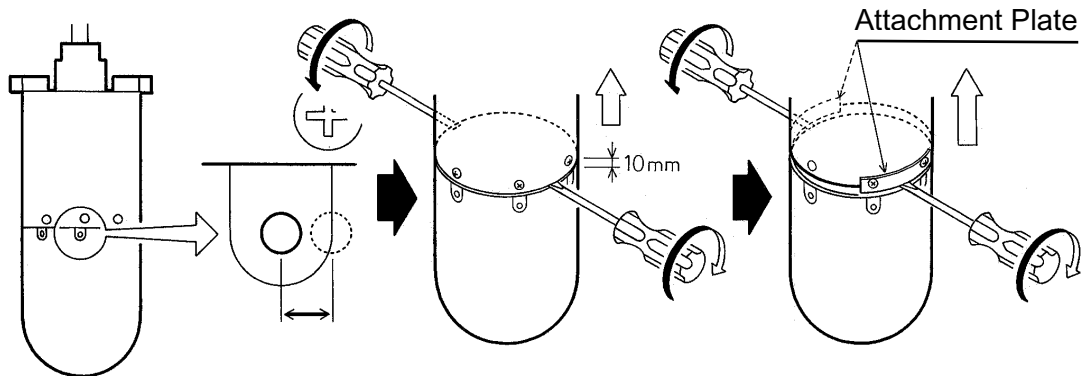
When screw holes are not aligned

When screw holes on the soundome are not aligned with screw holes on the upper dome assy., insert a screwdriver in holes to align them.



When screw holes are totally out of alignment, detach the soundome as shown below and then reattach it

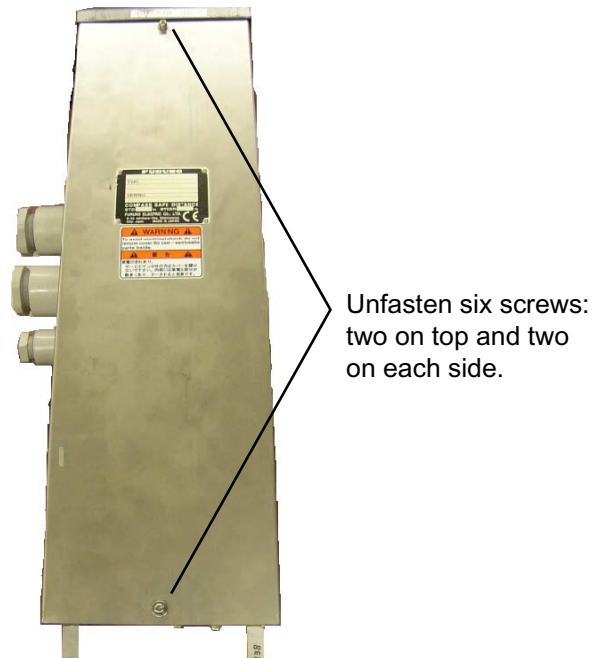
1. Orient the soundome vertically.
2. Insert two screwdrivers having blade width of 7 to 10 mm in the slits on the soundome as shown below and rotate them in the opposite directions of each other. The upper dome assy. should slide up by the width of the blade.
3. Insert the screwdrivers between the attachment plates and the slits on the soundome and rotate them. The upper dome assy. is pushed upward further in increments of about 10 mm and will become loose enough to be removed by hand.



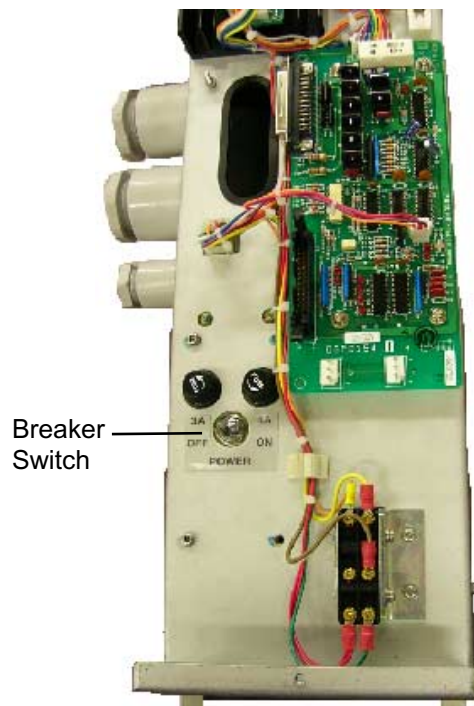
Assembling of Hull Unit CH-181-270 (350 mm stroke)

BEFORE beginning the installation turn off the breaker inside the hull unit as shown below. Turn it on after completing the installation section.

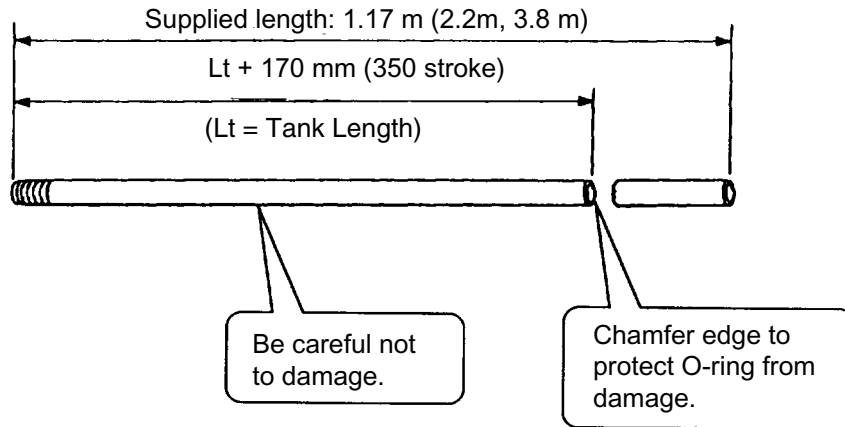
1. Unfasten six screws to remove the cover from the hull unit.



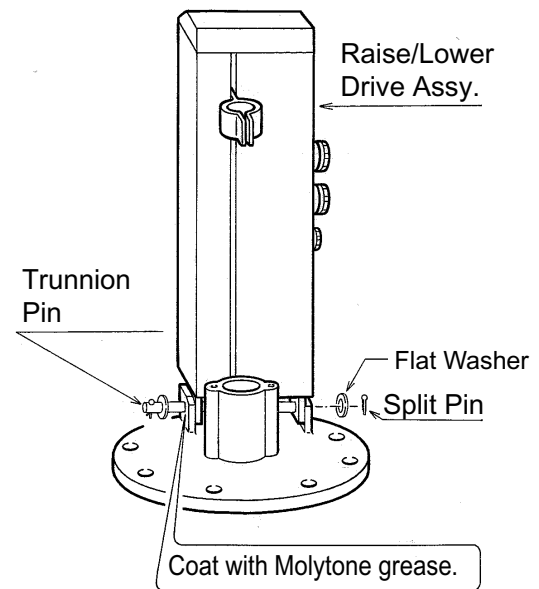
2. Turn off the breaker switch. Close the cover.



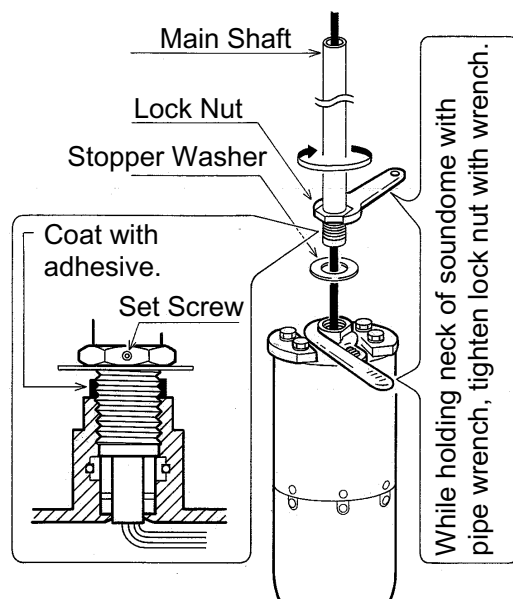
- Calculate the length of the main shaft according to tank length "Lt."



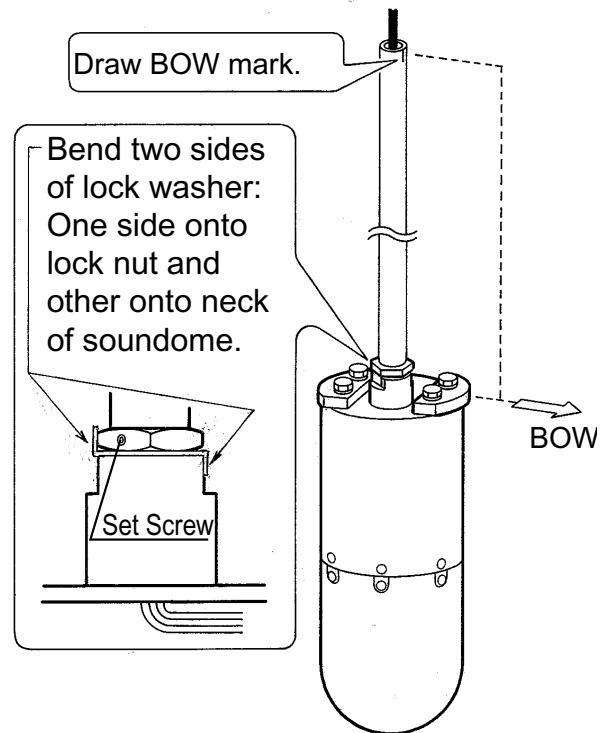
- Set the raise/lower drive assy. on the main body flange assy. and insert trunnion pin.



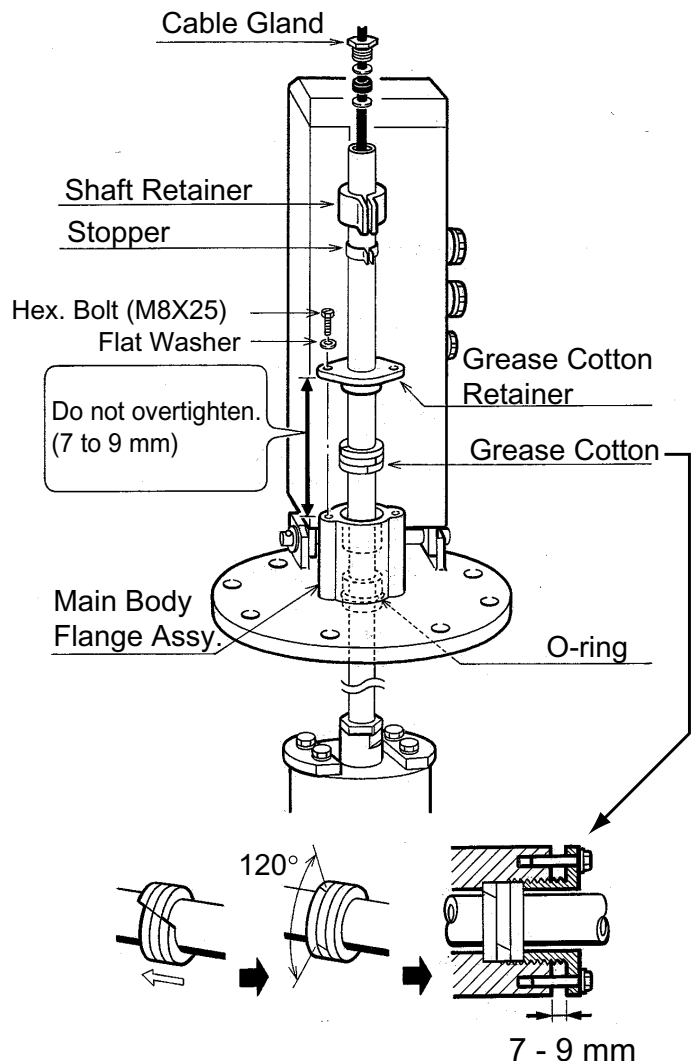
- Slide lock nut and stopper washer onto the main shaft and transducer cable into the main shaft.
- Screw main shaft tightly into the neck of the soundome. Unscrew the shaft by five turns and coat threads with adhesive.
- Fasten main shaft completely and tighten lock nut with wrench.



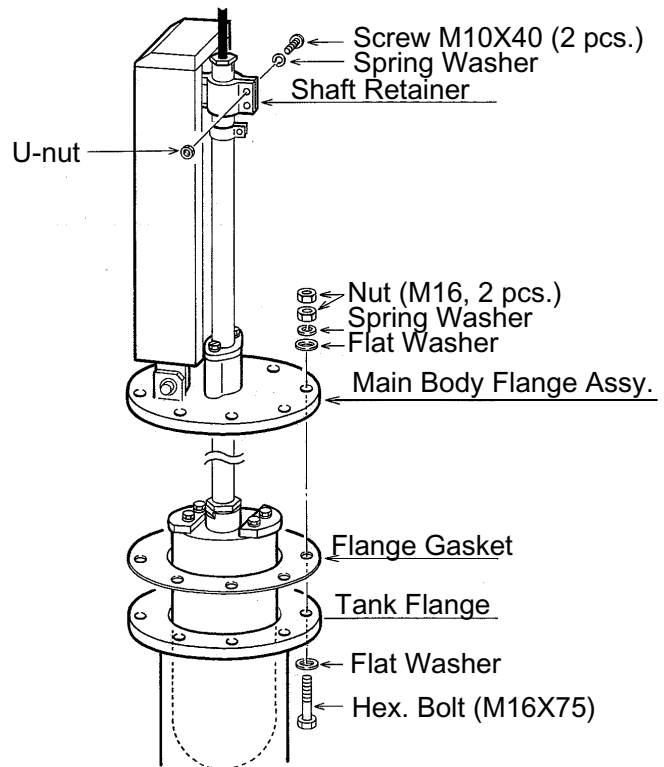
8. Tighten set screw on lock nut.
9. Using a hammer, bend two sides of lock washer: One side upward onto lock nut and other side downward on main shaft.
10. Mark bow mark on the main shaft with felt tip pen.



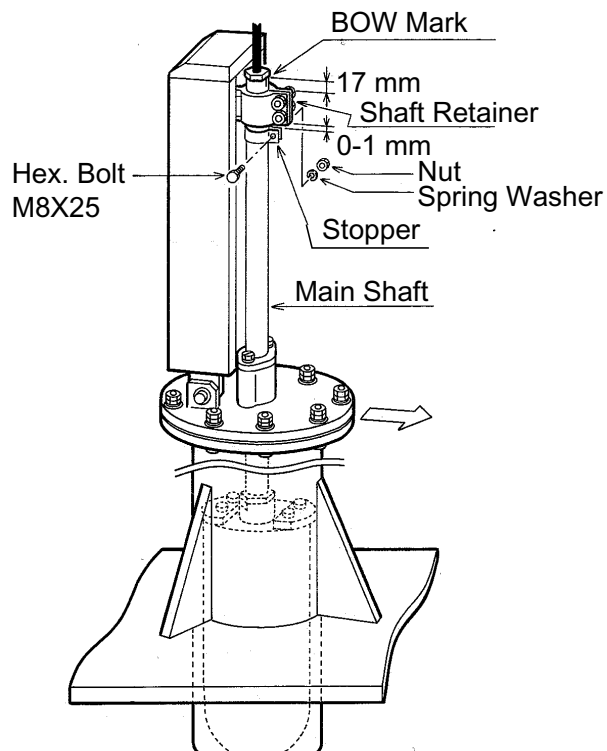
11. Make sure that the O-ring is correctly positioned on the main body flange assy.
12. Pass the main shaft thru the main body flange assy., grease cotton retainer, stopper and shaft retainer.
13. Wind grease cotton onto the main shaft, mark on grease cotton where to cut, remove grease cotton from shaft and then cut it as marked. Discard unnecessary grease cotton. (Cut the grease cotton **AFTER** removing it from the main shaft to prevent damage to the shaft.)
14. Set three pieces of grease cotton on the main shaft so their joints are spaced 120° and then set them to the grease cotton retainer.
15. **For 1.17 m shaft**, pass washer, gasket and cable gland onto shaft. Tighten gland until it contacts shaft.
For other shaft lengths, screw pipe cap onto the main shaft instead of above-mentioned parts.



16. Temporarily fix the shaft retainer to the main shaft with two bolts.
Tighten it referring to Note 3 on the next page, after completing this procedure.
17. Place the flange gasket and hull unit on the tank flange and temporarily fix them with bolts and nuts.
18. Using the hand crank, manually raise and lower the soundome to check that it moves smoothly without hitting the tank. If it does not move smoothly, adjust the position of the hull unit by sliding it on the tank. See Note 1 on the next page.
19. Securely fasten nuts and bolts temporarily fastened at step 17.

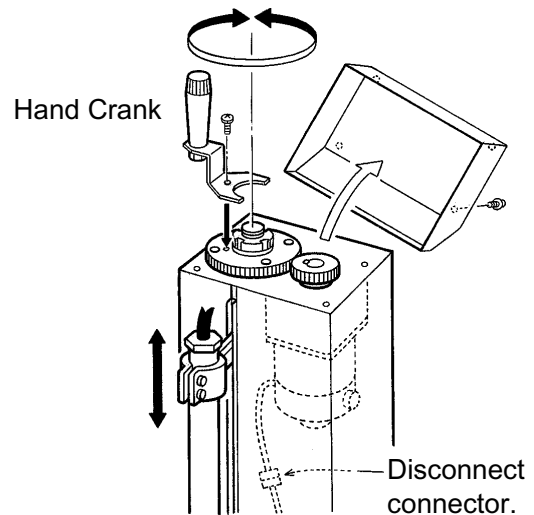


20. Orient the main shaft so that the BOW mark is facing ship's bow.
Tighten the shaft retainer.
21. Fix the stopper.

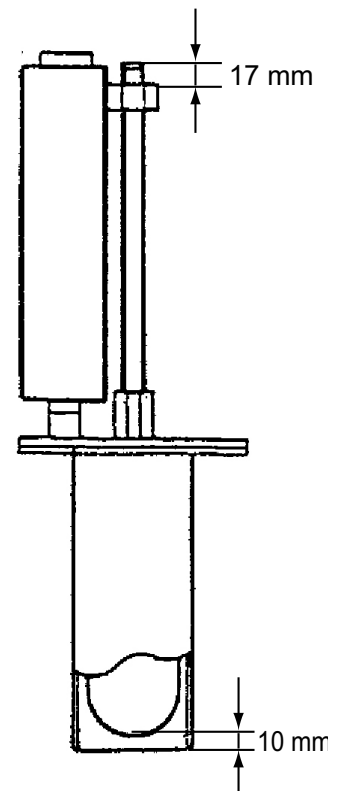


Note 1: Manual raising and lowering of transducer

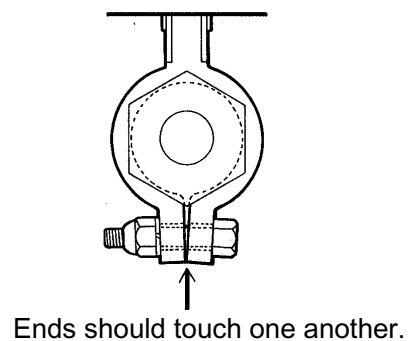
Remove the top cover of the raise/lower drive assembly and set the hand crank as shown left. Turn off the power switch and disconnect the connector from the motor lead wires on the hull unit before using the hand crank. The soundome can be easily raised and lowered manually because the motor which works as a generator is isolated from the load.



Note 2: The bottom of the soundome is placed 10 mm above the bottom of the retraction tank when the top of the shaft retainer is fastened 17 mm below the top of the main shaft.



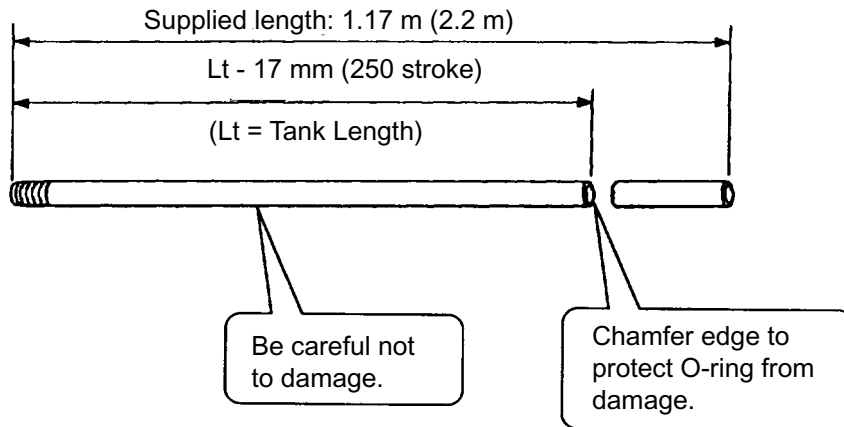
Note 3: The shaft retainer should be securely fastened. It is recommended to use a wrench with a length of approx. 300 mm. The torque should be 20-25 Nm.



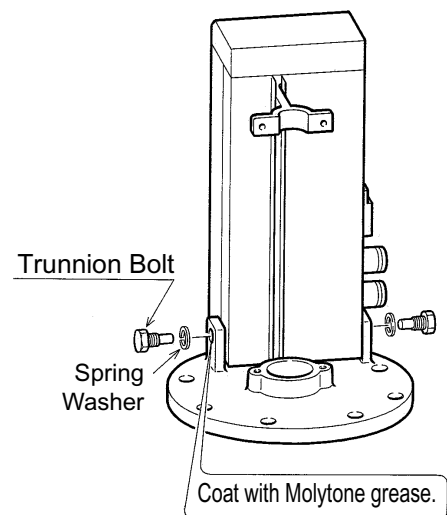
Assembling of Hull Unit CH-184-270 (250 mm stroke)

See Note 1 on page 22 **BEFORE** starting the installation.

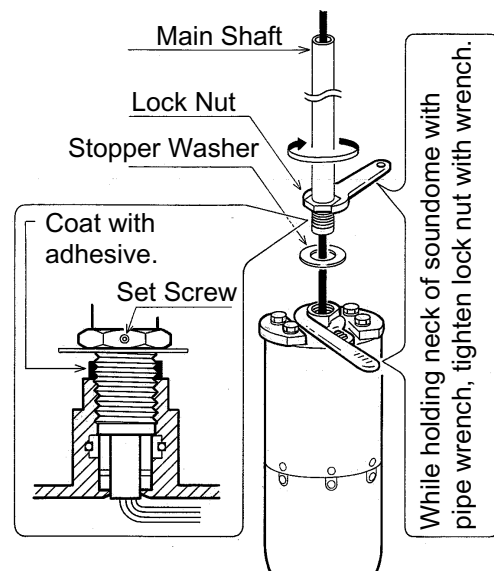
1. Calculate the length of the main shaft according to tank length "Lt."



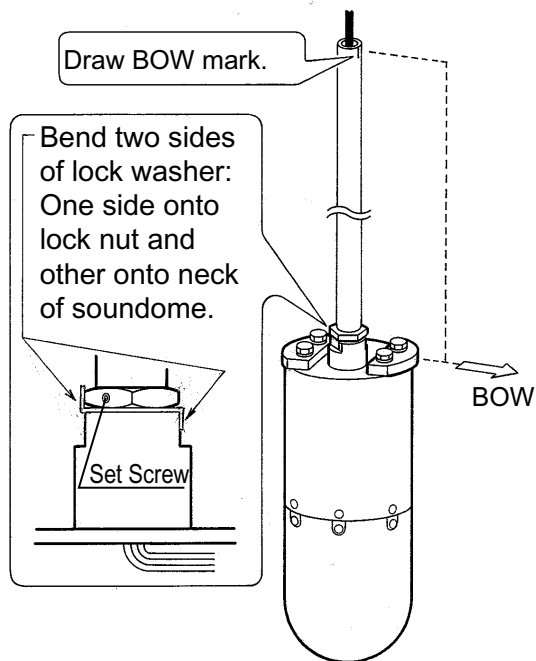
2. Set the raise/lower drive assy. on the main body flange assy. and insert trunnion pin.



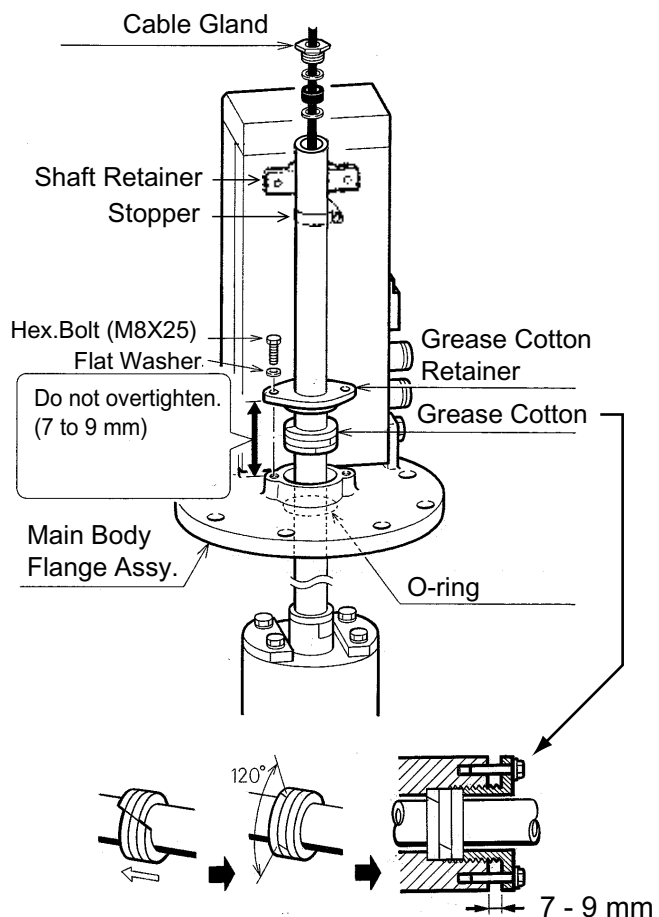
3. Slide lock nut and stopper washer onto the main shaft.
4. Screw main shaft tightly into the neck of the soundome. Unscrew the shaft by five turns and coat threads with adhesive.
5. Fasten main shaft completely and tighten lock nut with wrench.



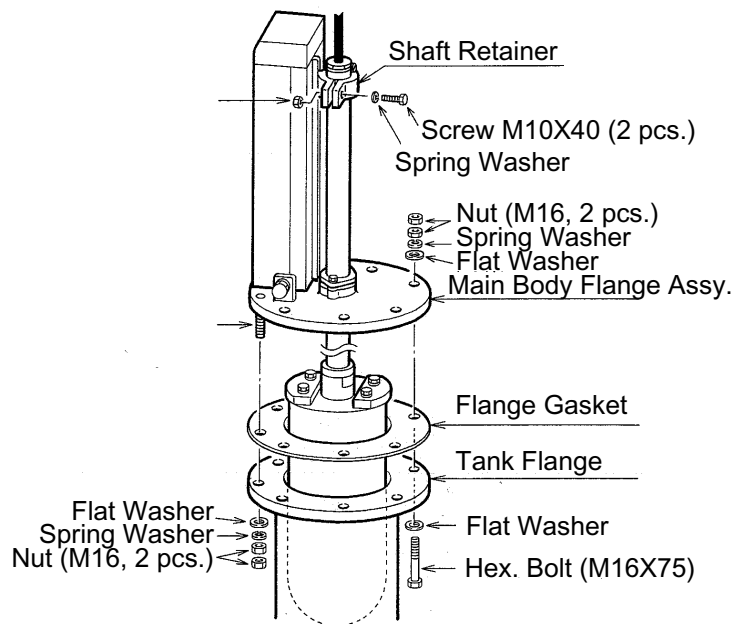
6. Tighten set screw on lock nut.
7. Using a hammer, bend two sides of lock washer: One side upward onto lock nut and other side downward on main shaft.
8. Mark bow mark on the main shaft with felt tip pen.



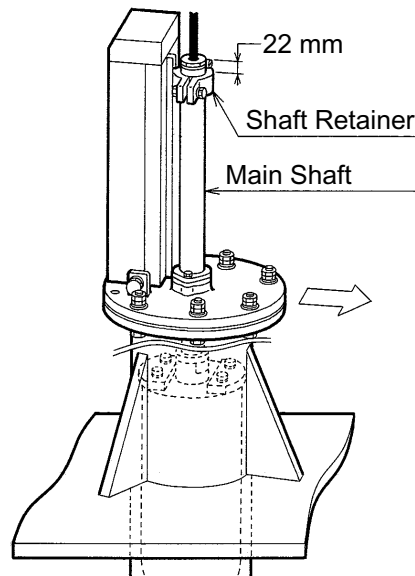
9. Make sure that the O-ring is correctly positioned on the main body flange assy.
10. Pass the main shaft thru the main body flange assy., grease cotton retainer, stopper and shaft retainer.
11. Wind grease cotton onto the main shaft, mark on grease cotton where to cut, remove grease cotton from shaft and then cut it as marked. Discard unnecessary grease cotton. (Cut the grease cotton **AFTER** removing it from the main shaft to prevent damage to the shaft.)
12. Set three pieces of grease cotton on the main shaft so their joints are spaced 120° and then set them to the grease cotton retainer.
13. **For 1.17 m shaft**, pass washer, gasket and cable gland onto shaft. Tighten gland until it contacts shaft.
For other shaft lengths, screw pipe cap onto the main shaft instead of above-mentioned parts.



14. Temporarily fix the shaft retainer to the main shaft with two bolts. Tighten it referring to Note 4 on the next page, after completing this procedure.
15. Place the flange gasket and hull unit on the tank flange and temporarily fix them with bolts and nuts.
16. Lift and lower the shaft by hand to check that it rises and lowers smoothly.
17. Securely fasten nuts and bolts temporarily fastened at step 15.

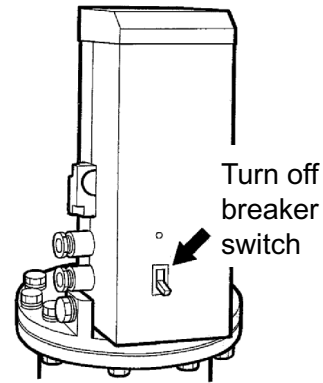


18. Orient the main shaft so that the BOW mark is facing ship's bow. Tighten the shaft retainer.
19. Fix the stopper.

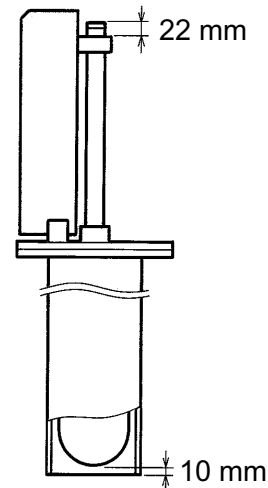


Note 1: Turn off the breaker switch and cover it with packing tape before starting work on the hull unit. Bodily injury can result if the hull unit is powered while work on it is being performed. Be sure to turn it on after completing this section.

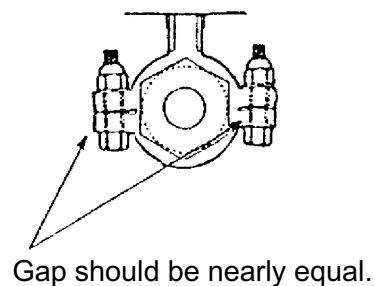
Note 2: Manual raising and lowering cannot be performed. This is because the motor brakes itself when the power is not applied. Check raising and lowering by turning on the breaker switch. Also, confirm that no obstructions exist along the travel of the main shaft. Raising or lowering cannot be stopped once initiated.



Note 3: The bottom of the soundome is placed 10 mm above the bottom of the retraction tank when the top of the shaft retainer is 22 mm below the top of the main shaft.

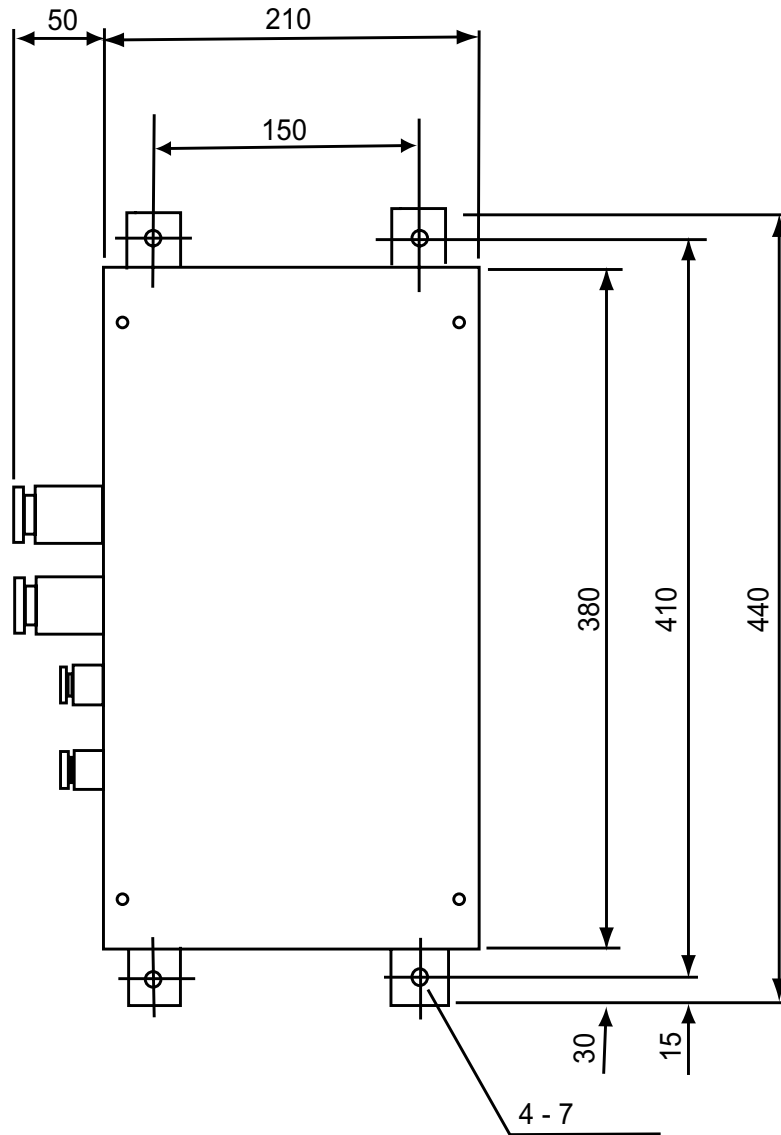


Note 4: Securely fasten the shaft retainer. Use a wrench having a length of approx. 300 mm. Torque: 20-25 Nm



1.4 Control Box (for Hull Unit CH-184)

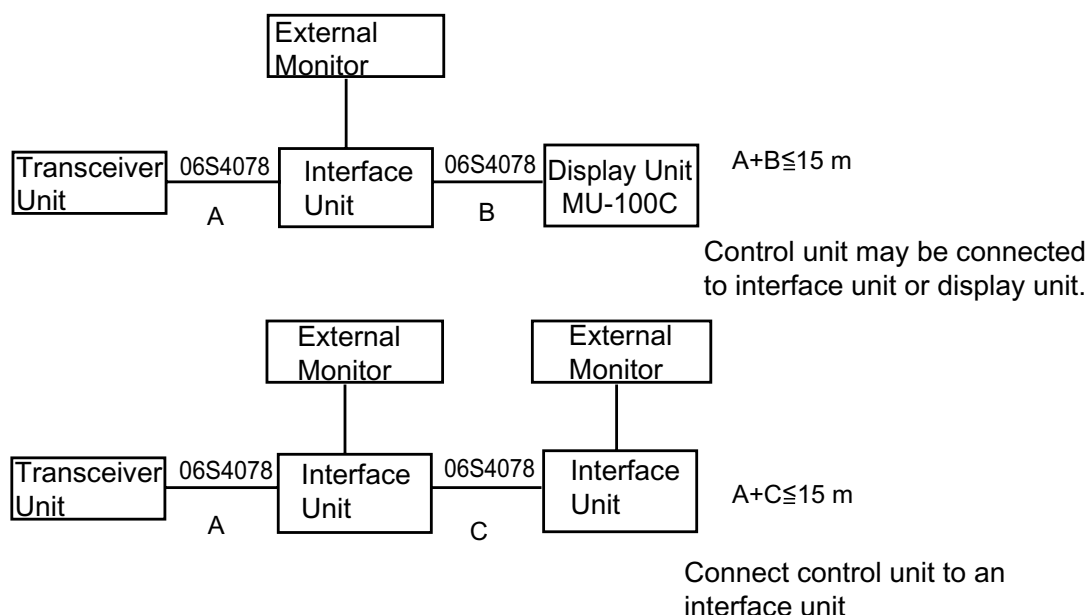
Install the Control Box close to the hull unit. The length of the connection cable between the Control Box and the soundome assy. is 5.2 or 8 m long and the connection cable from the hull unit is 5 m long. Keep those lengths in mind when choosing a mounting location for the Control Box. Be sure to ground the unit with the copper strap (supplied).



1.5 Interface Unit

The interface unit is supplied as standard equipment in the system which uses a locally supplied monitor. Mount the unit referring to the outline drawing at the back of this manual and the mounting considerations below.

- Choose a location not subject to rain or water splash
- The location should be low in humidity and well ventilated.
- The unit may be mounted on the deck or a bulkhead.
- If the interface unit is connected to the Display Unit MU-100C or two interface units are connected in parallel to the transceiver unit, note the cable lengths shown in the illustration below. Note that the lengths of the two cables type 06S4078 must not exceed 10 m each.
- A magnetic compass will be affected if the interface unit is placed too close to the compass. Observe the following compass safe distances to prevent deviation to a magnetic compass: Standard compass: 0.95 m, Steering compass: 0.65 m.



Mounting procedure

- Use four tapping screws (5 mm diameter) to fix the unit to the mounting location.
- **For bulkhead mounting**, screw in the top two tapping screws in the mounting location, leaving 5 mm gap between the bulkhead and the bottom of screw head. Set the unit to the screws and tighten screws. Screw in the lower two tapping screws.

1.6 Motion Sensor, Clinometer

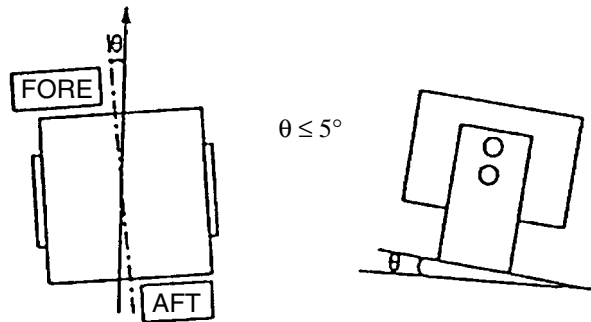
1.6.1 Motion sensor

The motion sensor can be installed almost anywhere, taking into account the following mounting considerations.

- Choose a place where vibration is minimal.
- The ambient temperature of the mounting location should not be more than 50°C (122°F).
- Do not install the equipment in the engine room, or fix it to a thin wall or the overhead.
- The usual mounting location is on the deck in the bridge. Refer to the outline drawing for the motion sensor for mounting dimensions.

Mounting procedure

Orient the FORE mark on the unit toward ship's bow. Mount the unit level within 5° in all directions. For adjustment see paragraph 3.3.



1.6.2 Clinometer

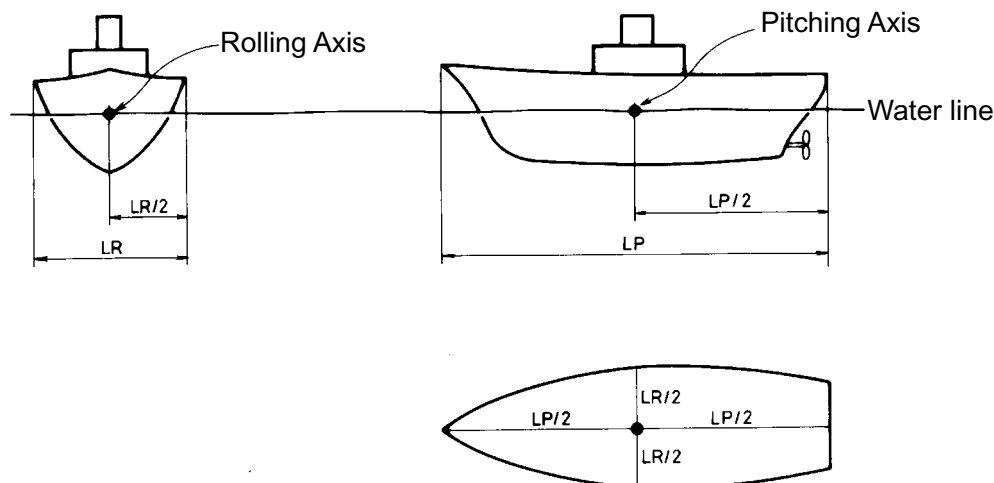
The clinometer detects ship's inclination caused by ship's rolling and pitching and its output is used to stabilize the sonar beam against rolling and pitching.

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

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

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

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



Note 1: The vicinity of the hull unit is too low to install the Clinometer and should be avoided, since the polarity of the measured value is reversed.

Note 2: When it is impossible to install the clinometer on the intersection point of both rolling and pitching rotational axes, a special effort should be made to install it at a place where the vertical distance to the intersecting point is minimum.

Note 3: Install the clinometer with the bow mark pointing toward ship's bow.

Note 4: Be sure to adjust the clinometer following the procedure in paragraph 3.4.

2. WIRING

2.1 Wiring Among Units

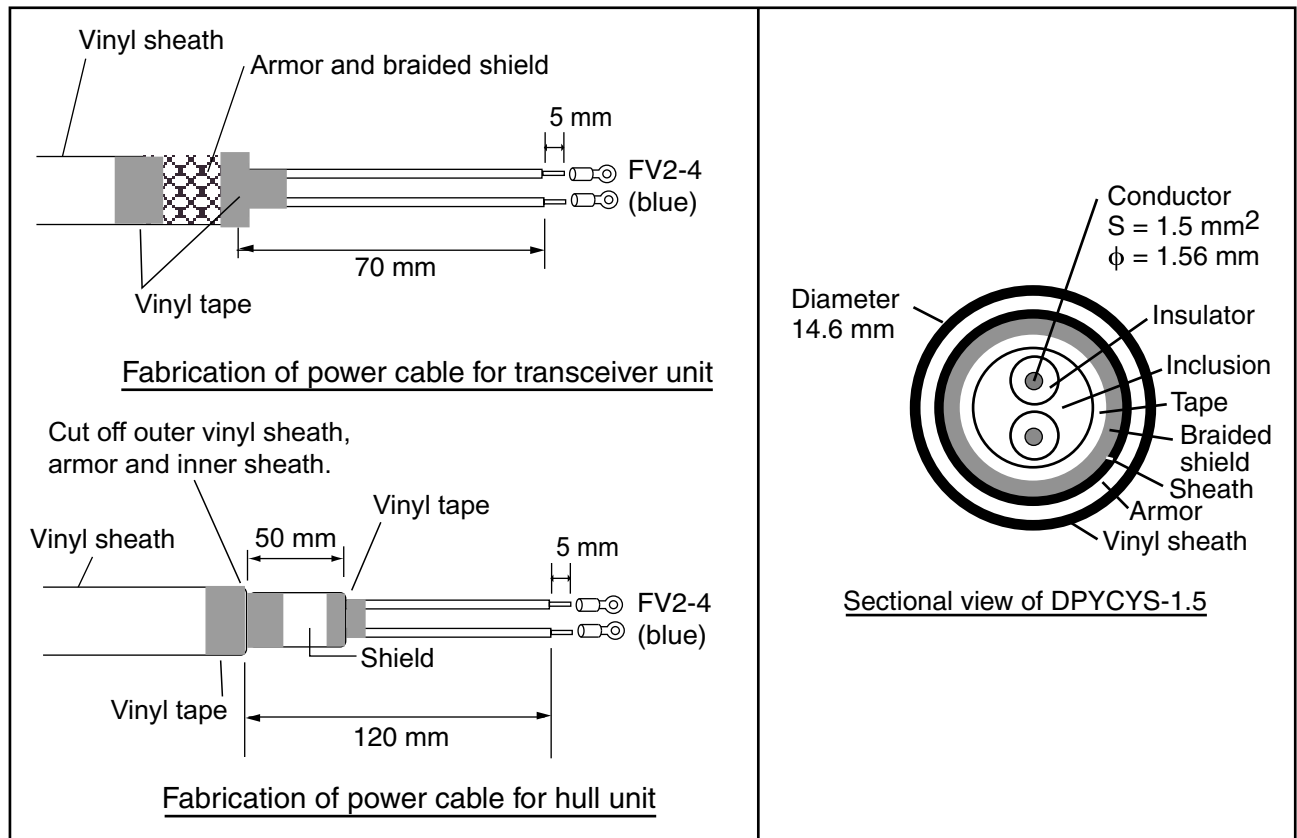
Wire units referring to the drawing on the next several pages. Cables which connect between units have connectors at both ends. Refer to the interconnection diagram at the back of this manual for wiring information.

- The type of raise/lower drive motor and breaker used depends on ship's mains.
- If the D-sub connector used with the display unit, transceiver unit and interface unit is too large to pass through a hole, remove the connector cover. Wrap wires and rubber cover with vinyl tape to ease passing the cable through the hole. Reattach the cover after passing the cable through the hole. The cable can be passed through a hole of up to 30 mm in diameter.
- The power cable should be arranged locally, fabricating it as shown below. Use power cable type DPYCYS-1.5 (Japan Industrial Standard cable) or equivalent. See the illustration below for cable specifications.

Fabrication of power cable for transceiver unit and hull unit

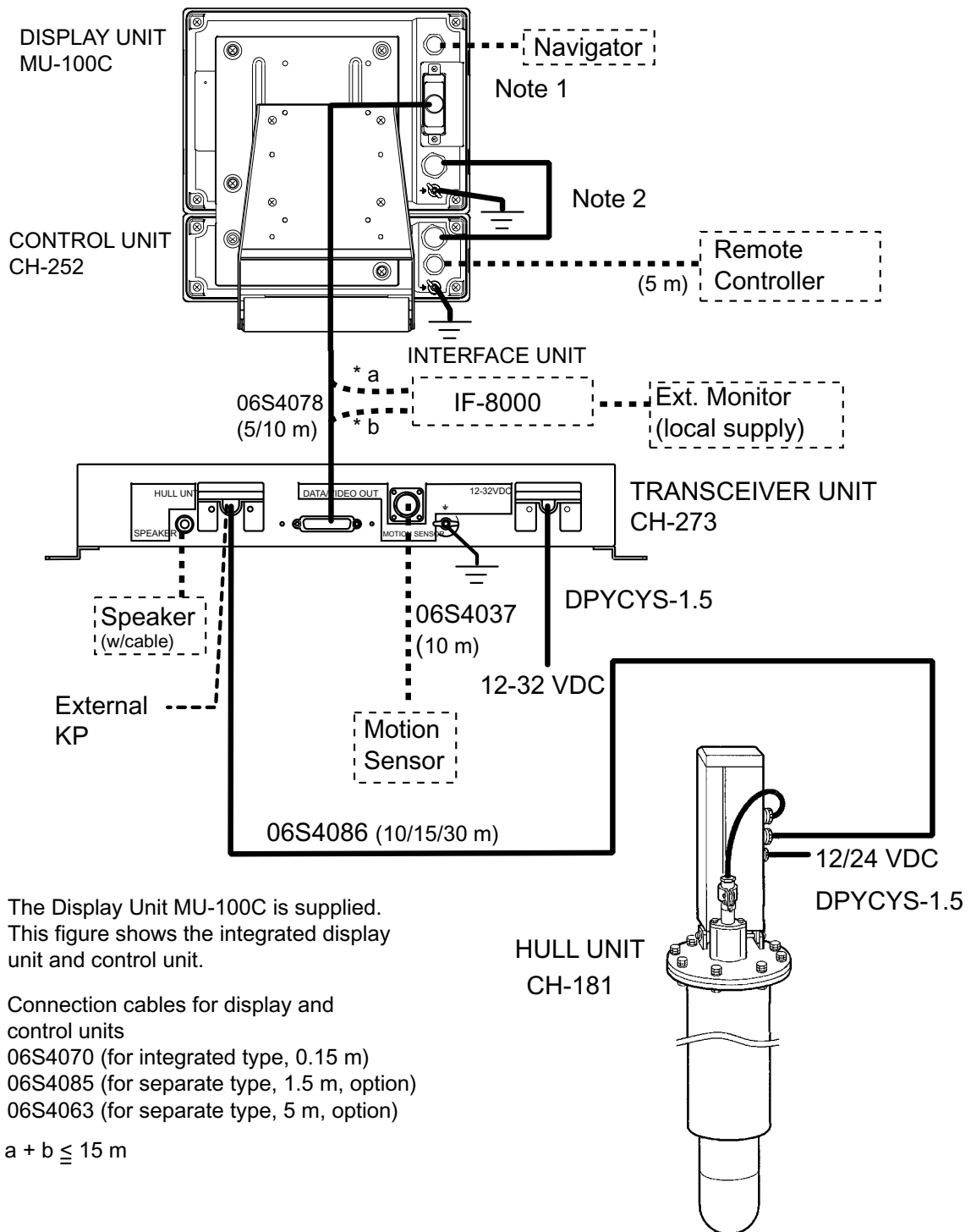
Transceiver unit: Fabricate as shown below. Fold back the braided shield and tape it with vinyl tape.

Hull unit: Fabricate as shown below.

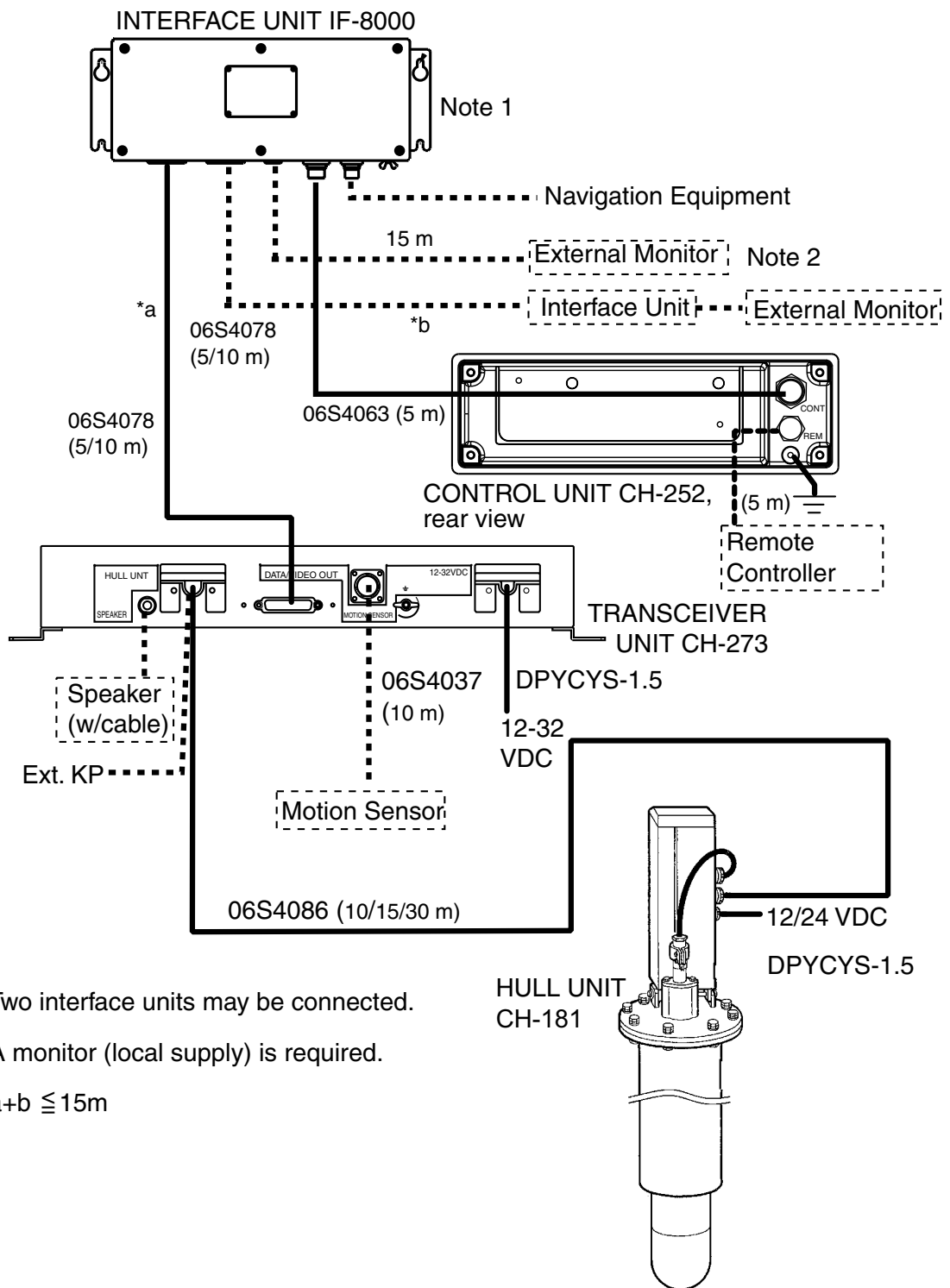


Fabricating power cable DPYCYS-1.5

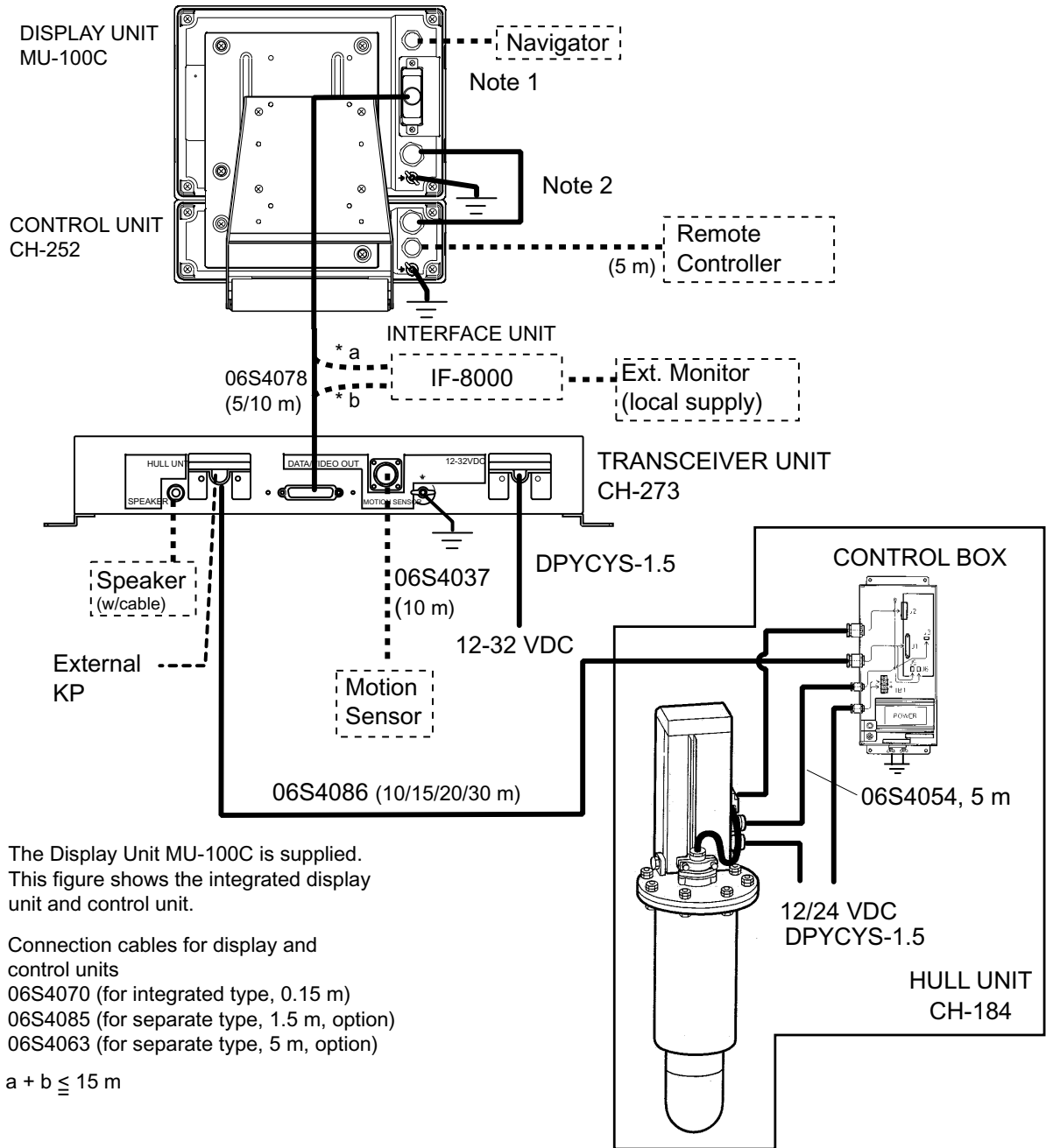
Hull Unit CH-181, FURUNO-supplied display unit



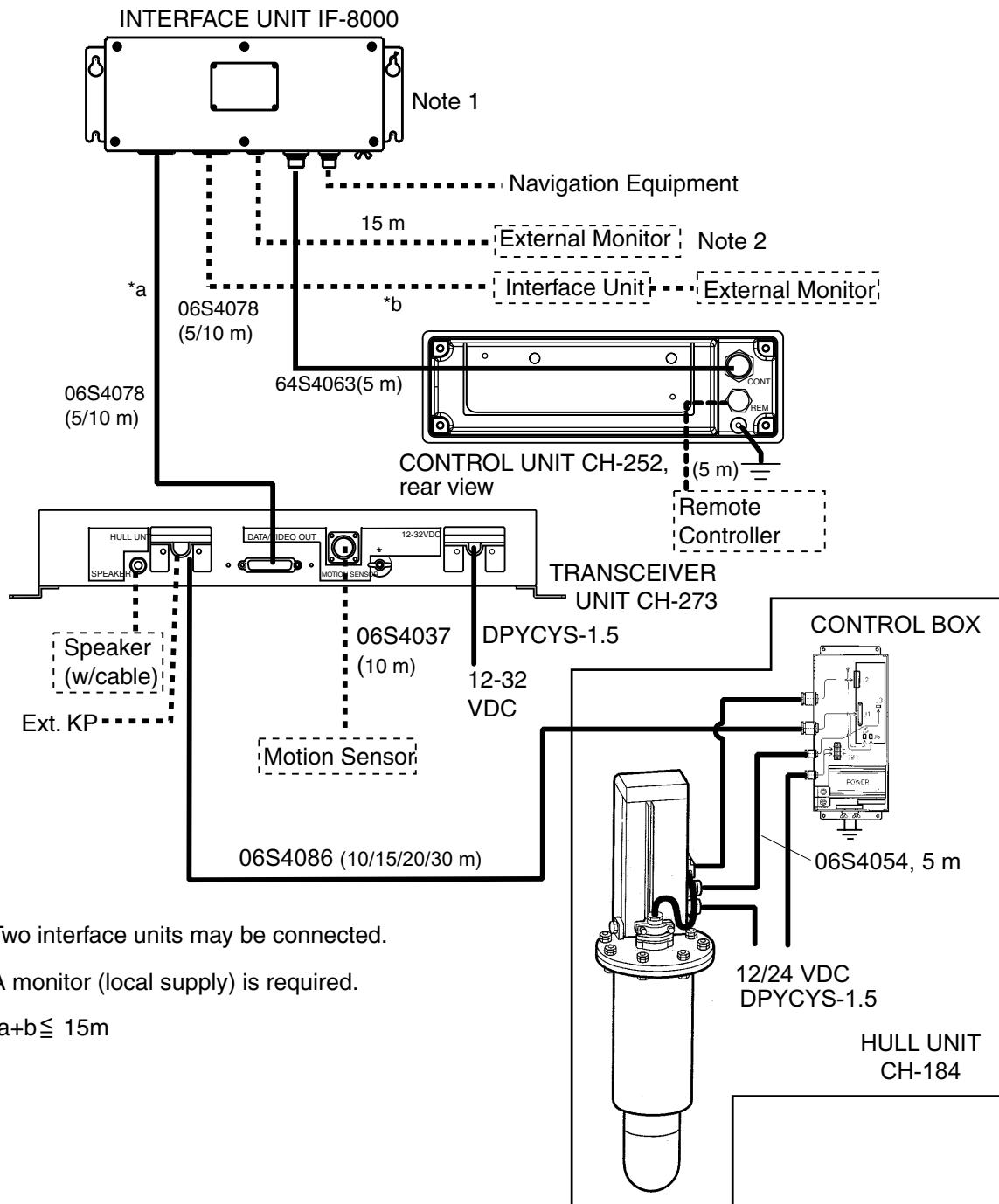
Hull Unit CH-181, locally supplied monitor



Hull Unit CH-184, FURUNO-supplied display unit



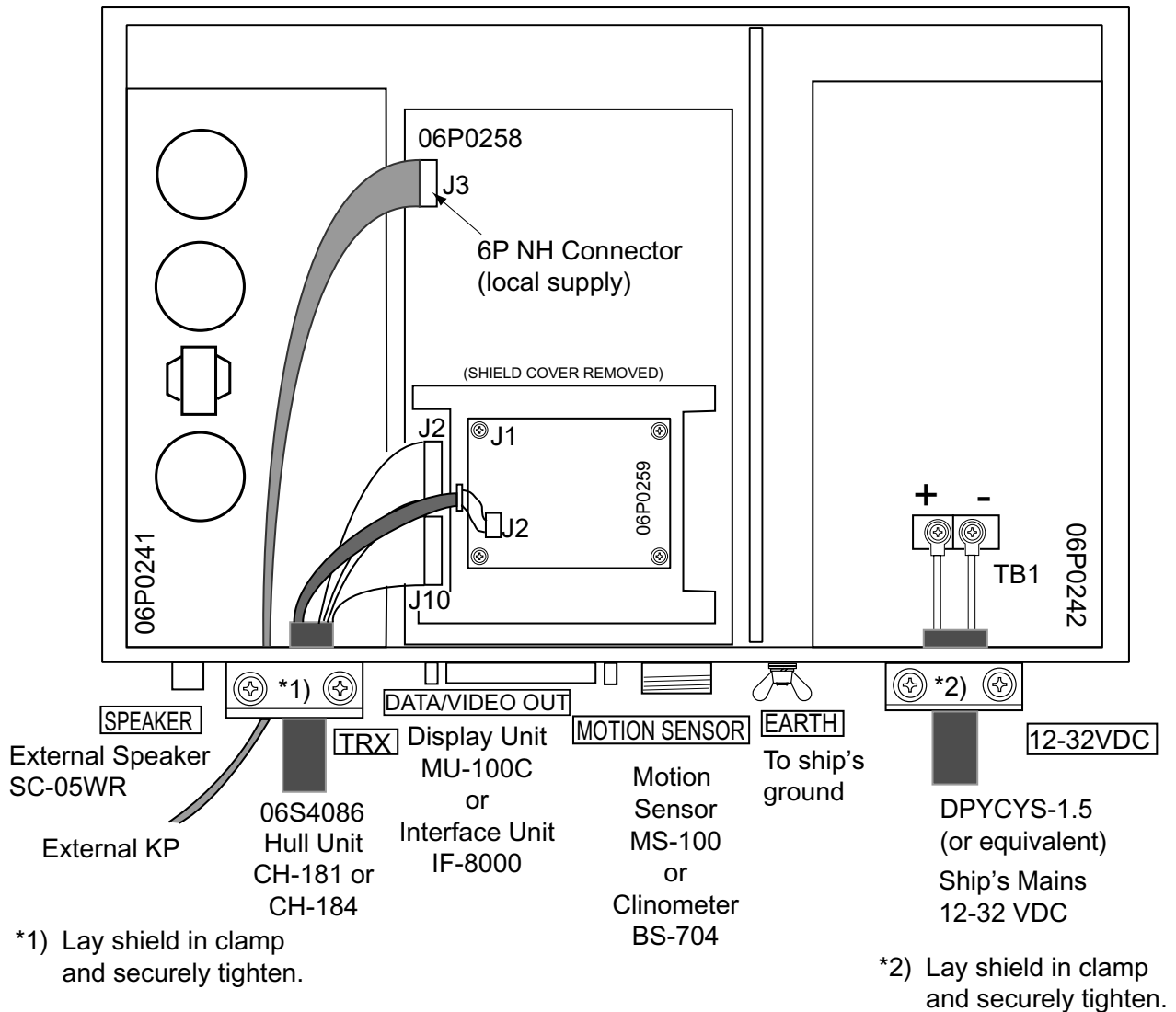
Hull Unit CH-184, locally supplied monitor



2.2 Transceiver Unit

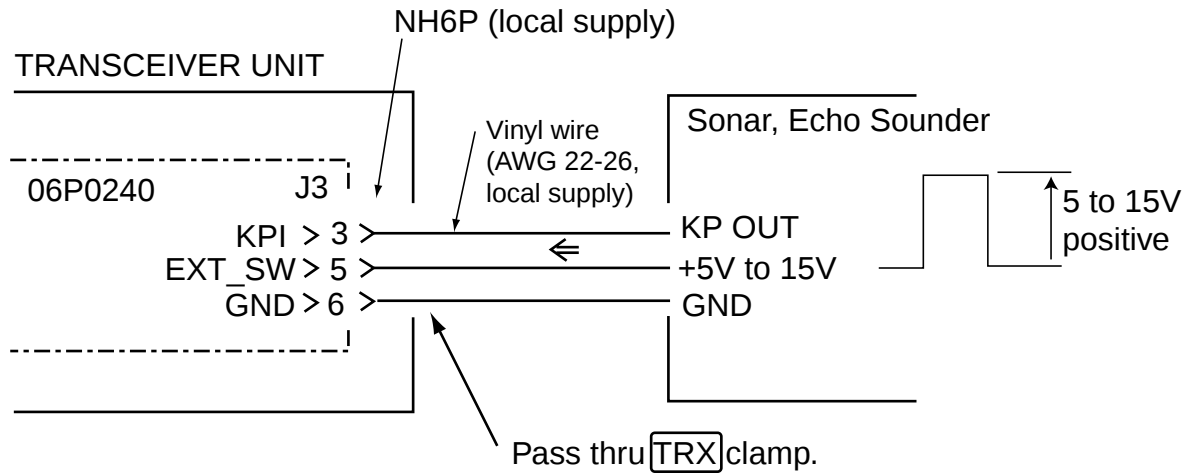
2.2.1 Wiring inside the transceiver unit

Detach the cover of the transceiver unit and connect cables as shown in the figure below. Remove the cover of the power terminal board to access connectors on that board.

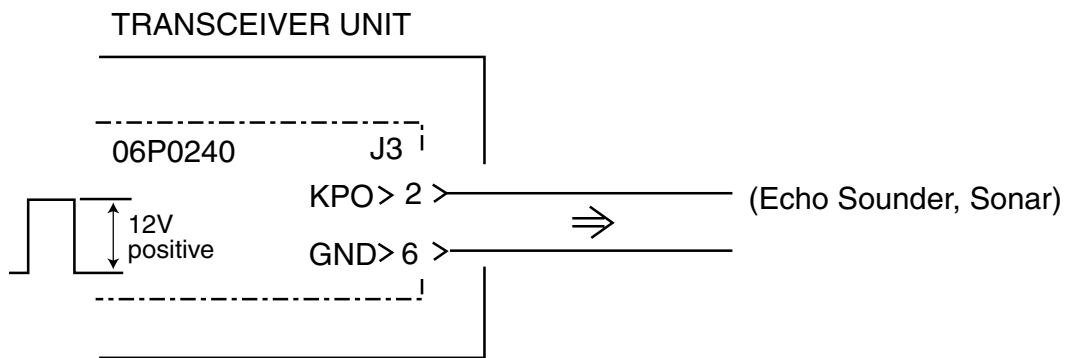


2.2.2 Synchronizing transmission with echo sounder or other sonar

To synchronize transmission of the CH-270 with an echo sounder or other sonar, wire the CH-270 as shown below. Also, see page 40 for how to set up to use external keying pulse.



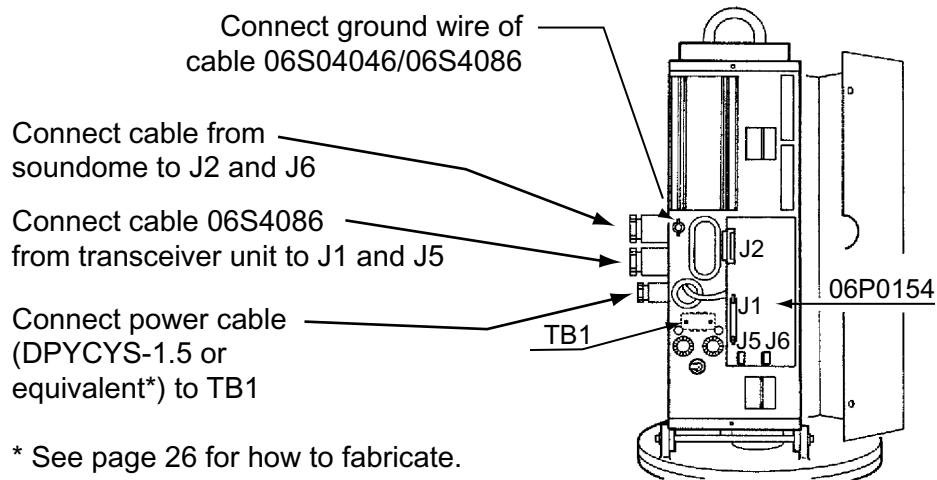
Note: To synchronize transmission of external echo sounder or other sonar with the CH-270, wire the CH-270 as shown below.



2.3 Hull Unit

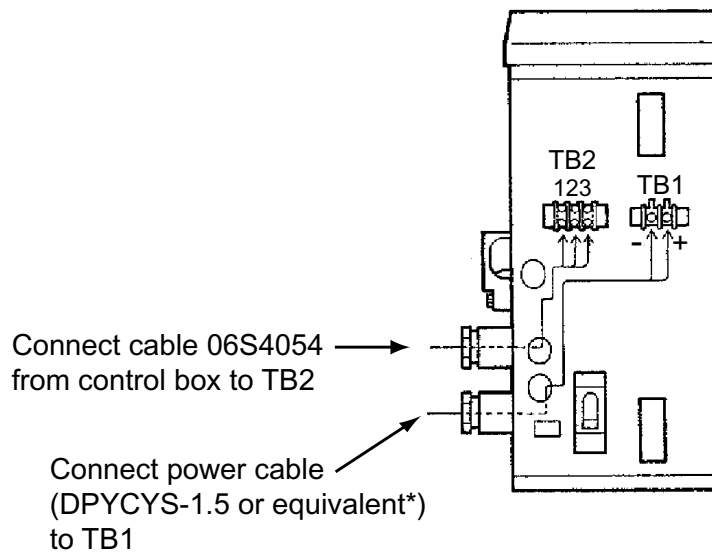
Hull unit CH-181

Open the cover of the control box on the hull unit and wire it as shown below.



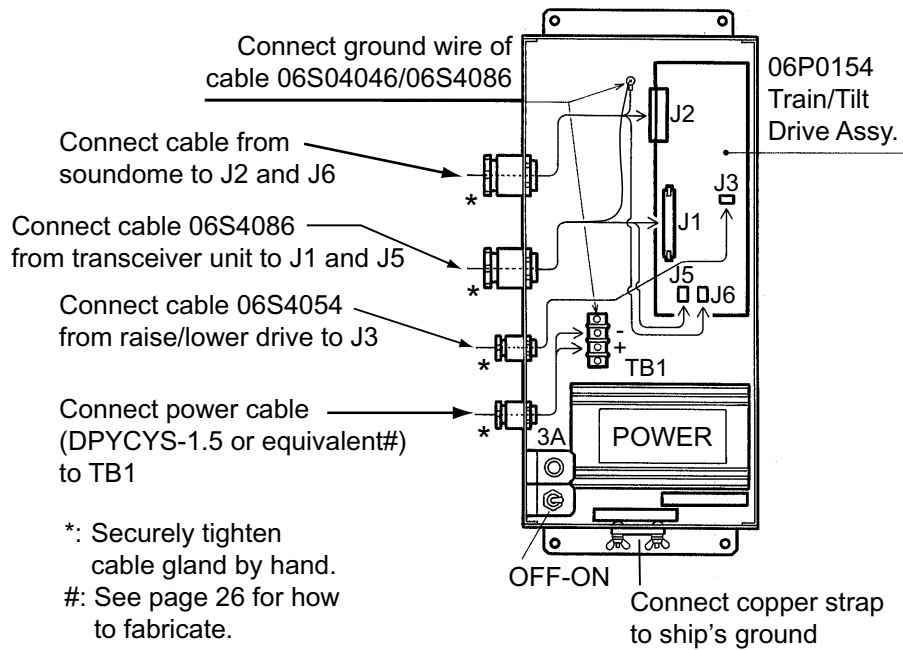
Hull unit CH-184

Open the cover of the hull unit CH-184 and wire it as shown below.

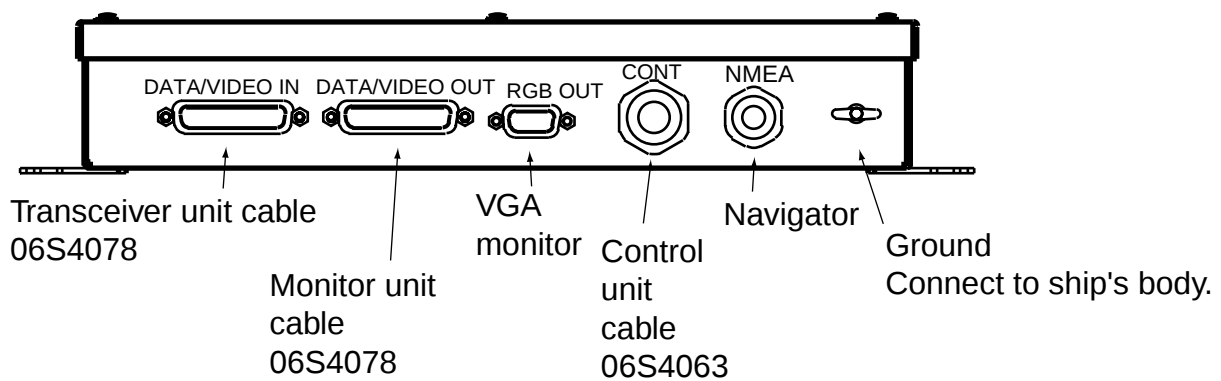


2.4 Control Box (for Hull Unit CH-184)

Open the cover of the Control Box and wire it as shown below.



2.5 Interface Unit



The blackbox-type system (monitor supplied locally) requires a standard VGA monitor, connected to the interface unit IF-8000. Supply monitor and interconnection cable locally. The recommended cable is type EVNPS05-50ft, male-female, max. 15 m, manufacturer Blackbox Japan, or equivalent. Attach a D-sub 15P connector to the cable.

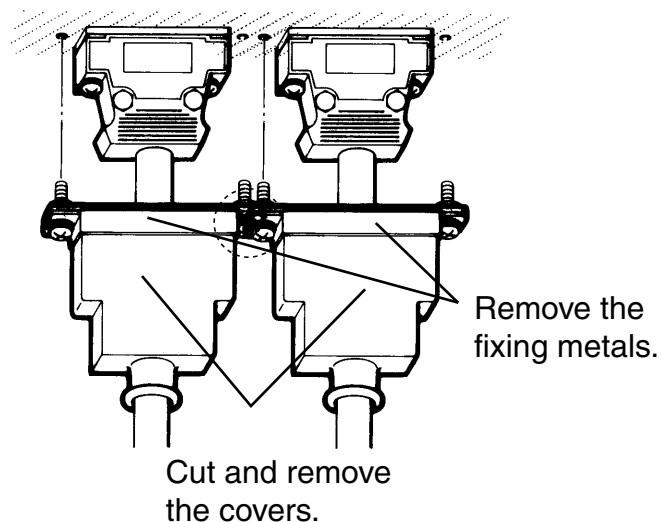
The monitor used should satisfy the specifications shown below.

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

Note 1: The D-sub connector has three rows of pins. Use 15 pins (two rows of pins are not used.)

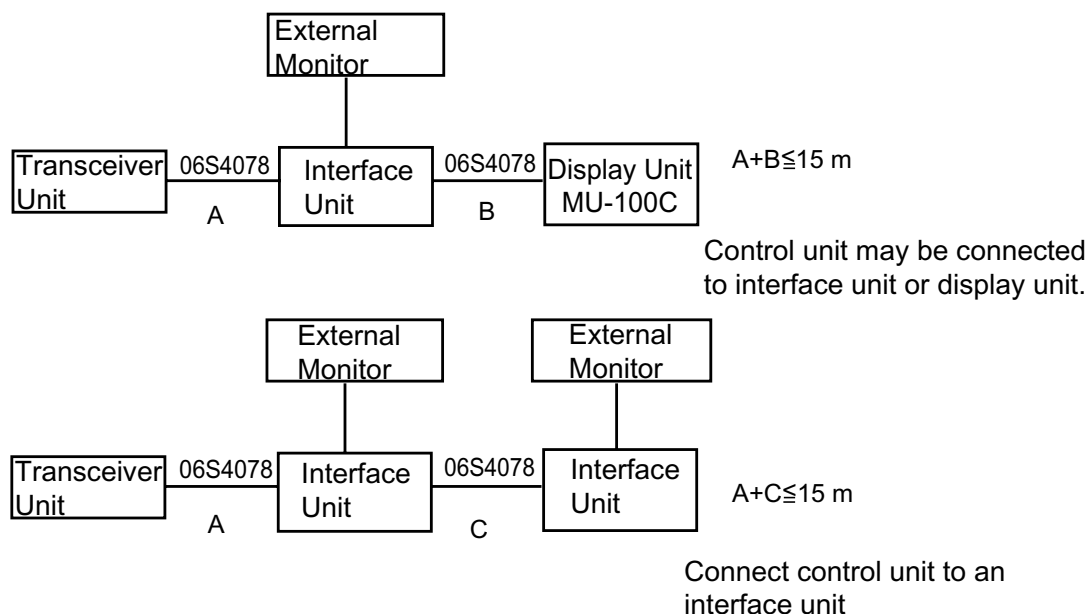
Note 2: Two interface units may be connected, in series.

Note 3: Cut and remove the rubber covers as below to attach connectors to the interface unit.



Note 4: The control unit or a navigator may be connected to either the display unit or the interface unit.

Note 5: When connecting the Display Unit MU-100C to the Interface Unit, or two interface units in parallel to the transceiver unit, the length of cables should be as shown below. Note that the length of two cables type 06S4078 cannot exceed 10 m each.



2.6 I/O Sentences

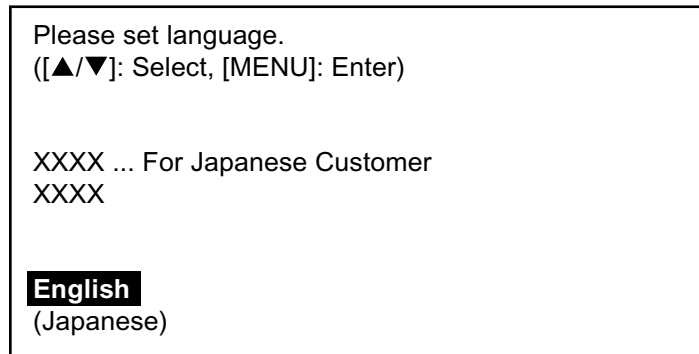
Talkers may be chosen from among GP, LC, LA, DR and DE and other (II). Refer to “NAV DATA” in System Setting 1 menu.

Available I/O sentences

Sentence	I/O	Remarks
GLL	I	Geographic position, latitude/longitude
GGA	I	Global positioning system fix data
RMA	I	Recommended minimum specific LORAN-C data
RMC	I	Recommended minimum specific GPS/TRANSIT data
VTG	I	Course over ground and ground speed
VHW	I	Water speed and heading, any talker
HDG	I	Heading, magnetic, any talker
HDM	I	Heading, magnetic, any talker
HDT	I	Heading, true, any talker
VDR	I	Set and drift, any talker
DBS	I	Depth below surface, any talker
DBT	I	Depth below transducer, any talker, NMEA Version 1.5
DPT	I	Depth, any talker, NMEA Version 2.0
MTW	I	Water temperature, any talker
MDA	I	Water temperature, any talker
TLL	O	Target latitude and longitude

3. ADJUSTMENTS

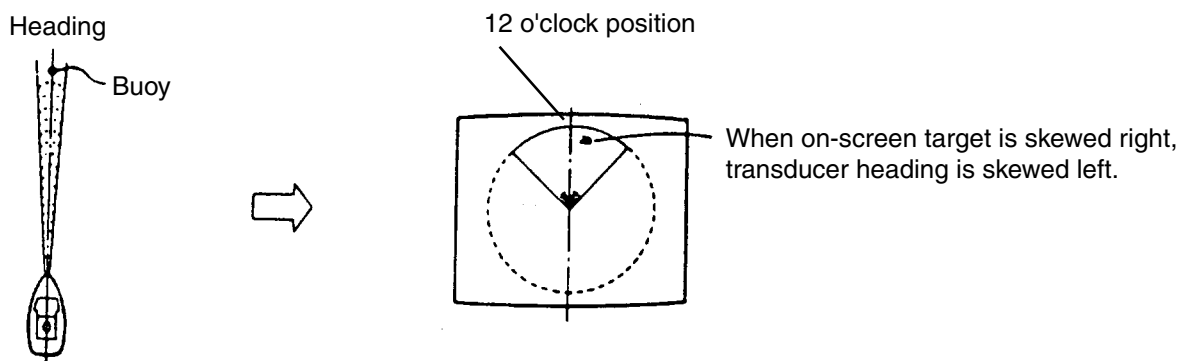
Turn on the power for the hull unit at the ship's mains switchboard. Press the [POWER] switch on the control unit. The language selection screen, shown below, appears the first time the power is turned on after completing the installation. English is selected; press the [MENU] key to escape.



3.1 Heading Alignment and Draft Adjustments

The soundome assy., main body flange assy. and main shaft have been oriented toward the ship's bow. However, some fine alignment may be required. You can align the heading from the System menu, in the range of -180° to $+180^{\circ}$. (Although the adjustment range is -180° to $+180^{\circ}$ be sure to align the tank guide with ship's fore and aft line.)

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



2. Press the [MENU] key to open the menu.

MENU	COM1	COM2	HORZ	VERT	ES	PRESET	SYS
TX POWER	MAX						
PULSELENGTH	LONG						
TX RATE	10						
INT REJECT	OFF						
AGC	OFF						
AUDIO LEVEL	0						

▲ ▼ : SELECT ◀ ▶ : CHANGE MENU: END

3. Operate the Omnipad to select "SYS" at the far right-hand side of the menu.

MENU	COM1	COM2	HORZ	VERT	ES	PRESET	SYS
GO TO SYS MENU	YES	NO					

▲ ▼ : SELECT ◀ ▶ : CHANGE MENU: END

4. Press ▼ to choose GO TO SYS MENU.
5. Press ▶ 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

6. Press ▼ to choose HEADING OFFSET, DRAFT OFFSET and then press ►.

** HEADING OFFSET, DRAFT OFFSET **		
HEADING	:	0° (-180° - +180°)
DRAFT	:	0.0m (0.0 - 60.0 m)
▲▼ : SELECT ◀▶ : CHANGE MENU: END		

7. HEADING is selected; press ◀ or ▶ so that the target selected at step 1 appears at the twelve o'clock position.
8. Press ▼ to choose DRAFT.
9. Press ◀ or ▶ to set ship's draft.
10. Press the [MENU] key several times to close the menu.
11. Confirm that the target in the heading direction appears at the twelve o'clock position on the display.

3.2 Using External KP (Keying Pulse)

To synchronize transmission of the CH-270 with an echo sounder or other sonar, follow the procedure below. Also, see page 33 for wiring.

1. Press the [MENU] key to open the menu.
2. Operate the Omnipad to choose COM1 at the top of the screen.

MENU	COM1	COM2	HORZ	VERT	ES	PRESET	SYS
TX POWER		MAX					
PULSELENGTH		LONG					
TX RATE		10					
INT REJECT		OFF					
AGC		OFF					
AUDIO LEVEL		0					
▲▼ : SELECT ◀▶ : CHANGE MENU: END							

3. Press ▼ to choose TX RATE.

4. Press ◀ to show the TX RATE dialog box.

TX RATE		5	
EXT.	MIN	☒ ☒ ☒ ☒ ☒ ☐ ☐ ☐ ☐ ☐	
(EXT, 1-10)			

5. Press ◀ to display “EXT” in the sub window at top right-hand corner of the TX RATE dialog box.
6. Press the [MENU] key to close the menu.

3.3 Adjusting the Motion Sensor, Clinometer

When the ship has a semi-permanent inclination, offset it as below to enable detection of motion by the motion sensor or clinometer. Turn on the CH-270 and wait one minute before setting.

1. Press the [MENU] key to open the menu.

MENU	COM1	COM2	HORZ	VERT	ES	PRESET	SYS
TX POWER MAX PULSELENGTH LONG TX RATE 10 INT REJECT OFF AGC OFF AUDIO LEVEL 0							
▲▼ : SELECT ◀▶ : CHANGE MENU: END							

2. Operate the Omnipad to select “SYS” at the far right-hand side of the menu.

MENU	COM1	COM2	HORZ	VERT	ES	PRESET	SYS
GO TO SYS MENU YES ☐ NO							
▲▼ : SELECT ◀▶ : CHANGE MENU: END							

3. Press ▼ to choose GO TO SYS MENU.

4. Press ◀ 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

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

** ADJ MOTION SENSOR **

ROLL ANGLE: 0° ADJ: °* (-10° - +10°)

PITCH ANGLE: 0° ADJ: °* (-10° - +10°)

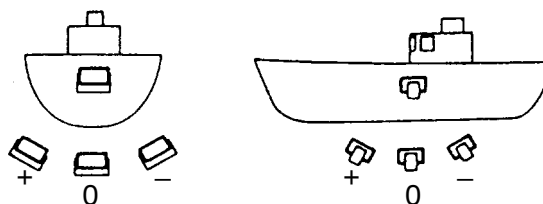
▲ ▼ : SELECT ◀ ▶ : CHANGE MENU: END

*: For Clinometer BS-704, tilt angle is displayed. For Motion Sensor MS-100, the readout is "0" (zero) when the ship is stopped, regardless of actual roll or pitch.

6. Press ▲ or ▼ to select ROLL ANGLE or PITCH ANGLE.
7. Press ◀ or ▶ to adjust (Adjustment range: -10° to +10°).

For Motion Sensor MS-100

Using a clinometer or similar device, measure ship's semi-permanent inclination angle. Polarity of the values represents ship's inclination. 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

For Clinometer BS-704

Adjust so that displayed roll and pitch angles become zero (0).

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

3.4 System Backup

After the equipment has been set up, 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 open the menu.

MENU	COM1	COM2	HORZ	VERT	ES	PRESET	SYS
TX POWER		MAX					
PULSELENGTH		LONG					
TX RATE		10					
INT REJECT		OFF					
AGC		OFF					
AUDIO LEVEL		0					

▲ ▼ : SELECT ◀ ▶ : CHANGE MENU: END

2. Operate the Omnipad to select “SYS” at the far right-hand side of the menu.

MENU	COM1	COM2	HORZ	VERT	ES	PRESET	SYS
GO TO SYS MENU YES NO							
▲▼ : SELECT ◀▶ : CHANGE MENU: END							

3. Press ▼ to choose GO TO SYS MENU.
4. Press ◀ 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	

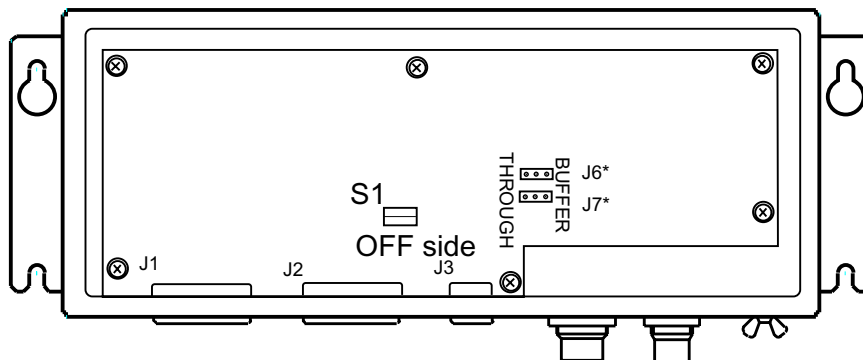
5. Press ▼ to select SYSTEM BACKUP.
6. Press ▶ to display the System Backup menu.

** SYSTEM BACK UP**	
ARE YOU SURE? :	NO YES
NOTE: OVERWITES PREVIOUS BACKUP DATA	
◀▶ : CHANGE MENU: END	

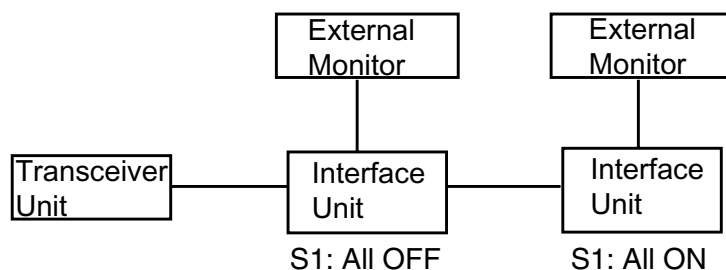
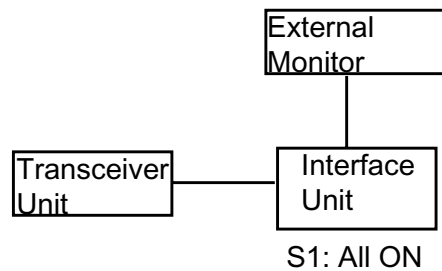
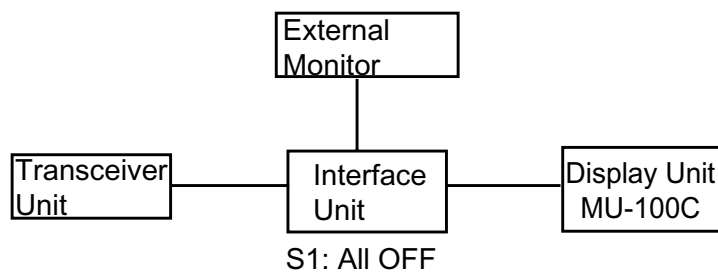
7. Press ▶ to choose YES.
8. Press the [MENU] key. The system loads backup data. After backup data has been loaded the System menu appears.
9. Press the [MENU] key to close the menu.

3.5 Setting of Interface Unit

When the Display Unit MU-100C is connected to the **DATA/VIDEO OUT** port on the interface unit, turn OFF all switches on the DIP switch S1. If nothing is connected to the **DATA/VIDEO OUT** port, turn ON all switches on the DIP switch S1.



*: J6 and J7 should be set for "THROUGH" (default setting).

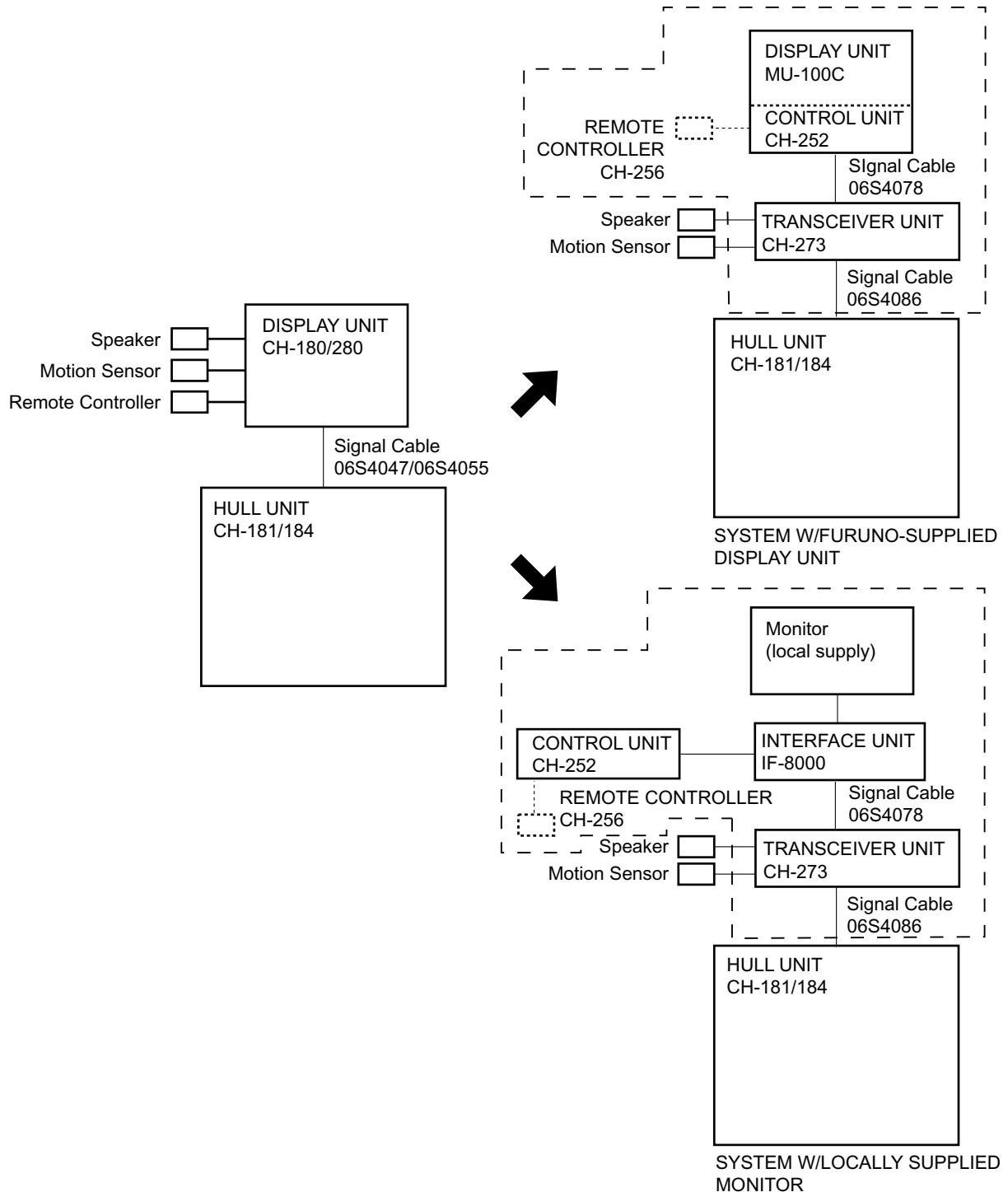


APPENDIX

Retrofitting CH-18/CH-28

This retrofit uses the existing hull unit. A display unit (FURUNO supplied or locally supplied), control unit and transceiver unit are newly installed.

Note: The maximum allowable speed with the transducer descended is 15 knots. Please explain this to the owner of the equipment.



Retrofit for system with FURUNO-supplied display unit

Previous Configuration	New Configuration
Display Unit CH-180/CH-280	Display Unit/Control Unit/Transceiver Unit MU-100C/CH-252/CH-273
Hull Unit↔Display Unit Signal Cable 06S4047/06S4055	Hull Unit↔Transceiver Unit Signal Cable 06S4086

Retrofit for system with locally supplied monitor

Previous Configuration	New Configuration
Display Unit CH-180/CH-280	Interface Unit/Control Unit/Transceiver Unit IF-8000/CH-252/CH-273
Hull Unit↔Display Unit Signal Cable 06S4047/06S4055	Hull Unit↔Transceiver Unit Signal Cable 06S4086

Notes

- Supply VGA monitor locally.
- The E/S Interface cannot be used.
- The existing speaker and motion sensor may be used, however Remote Controller CH-143/185 cannot be used. Use the optional Remote Controller CH-256.

CH-270 Retrofit Kit OP06-19 (Code No.: 000-068-628)

Integrated display unit, control unit

Name	Type	Code No.	Qty	Remarks
Transceiver Unit	CH-273	—	1	With SP06-01102
Control Unit/Display Unit	CH-252/MU-100C	—	1	With CP02-06600, FP02-05100, SP06-01101
Installation Materials	FV2-4, Blue	000-538-118	8	For transceiver unit
	06S4078*10 m*	000-142-900	1	For display unit, 10 m
	06S4078*5 m*	000-142-902		For display unit, 5 m
	06S4086*10 m*	000-146-974	1	For transceiver unit, 10 m
	06S4086*15 m*	000-146-975		For transceiver unit, 15 m
	06S4086*20 m*	000-146-976		For transceiver unit, 20 m
	06S4086*30 m*	000-146-977		For transceiver unit, 30 m

Blackbox type

Name	Type	Code No.	Qty	Remarks
Transceiver Unit	CH-273	—	1	With SP06-01102
Interface Unit	IF-8000	—	1	With SP06-01111
Control Unit	CH-252-15	—	1	With CP02-06610 (1.5 m cable) and FP06-01120
	CH-252-50	—		With CP02-06620 (5 m cable) and FP06-01120
Installation Materials	FV2-4, Blue	000-538-118	8	For transceiver unit
	06S4078*10 m*	000-142-900	1	For monitor, 10 m
	06S4078*5 m*	000-142-902		For monitor, 5m
	06S4086*10m*	000-146-974	1	For transceiver unit, 10 m
	06S4086*15 m*	000-146-975		For transceiver unit, 15 m
	06S4086*20 m*	000-146-976		For transceiver unit, 20 m
	06S4086*30 m*	000-146-977		For transceiver unit, 30 m

Installation and wiring

Refer to chapters 1 and 2 to install and wire the display unit, control unit, interface unit and transceiver unit.

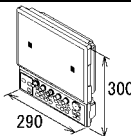
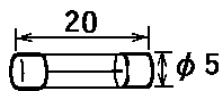
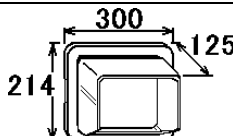
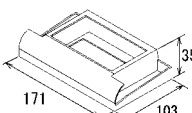
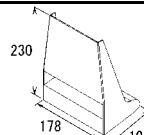
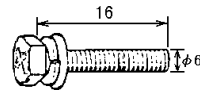
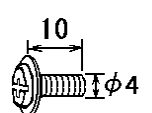
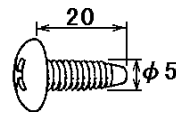
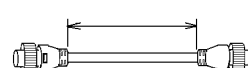
Installation check

Run the diagnosis test to confirm proper operation, referring to the operator's manual for the procedure.

PACKING LIST

06AS-X-9851 -2 1/1

CH-250/CH-270

NAME		OUTLINE		DESCRIPTION/CODE No		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			
ヒューズ FUSE				FGMB 3A 125V 000-104-909		3	
付属品		ACCESSORIES		FP06-01102			
フード クミ Bin HOOD ASSY.				FP06-01102 006-556-240		1	
付属品		ACCESSORIES		FP02-05101			
トリツケダ イ MOUNTING BASE				02-127-1301-1 100-285-141		1	
ハンガ ー BRACKET				02-127-1302-1 100-285-151		1	
+アブ セット U セムス B +HEX. BOLT				M6X16 SUS304 000-800-420		2	
+ハ イント セムス F WASHER BINDING HEAD SCREW				M4X10 C2700W 000-881-964		4	
+トラス タッピ ンネジ +TAPPING SCREW				5X20 SUS304 1ヶ 000-802-081		4	
工事材料		INSTALLATION MATERIALS		CP02-06600			
ケーブル組品MJ CABLE ASSY.				MJ-A10SPF0002-0015 *0.15M* 000-142-879		1	

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

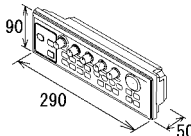
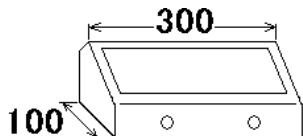
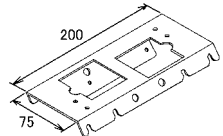
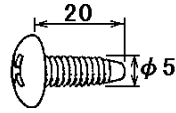
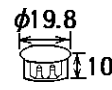
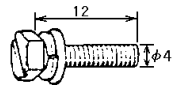
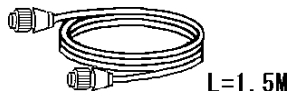
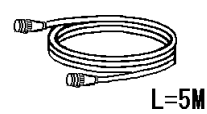
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

06AS-X-9851

PACKING LIST

06AS-X-9852 -1 1/1

CH-250/CH-270

NAME	OUTLINE	DESCRIPTION/CODE No	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
ソケット BRACKET		06-021-2112-0 100-281-880	1
+トラスタップネジ +TAPPING SCREW		5X20 SUS304 1ヶ 000-802-081	2
ホールプラグ HOLE PLUG		DP-687 1ヶ 000-808-417	2
六角ボルト スリット HEX.BOLT (SLOTTED, WASHER HEAD)		M4X12 SUS304 000-882-040	4
工事材料 INSTALLATION MATERIALS			
CP02-06610			
ケーブル組品MJ CABLE ASSY.		MJ-A10SPF0002-015 000-142-878	1 (*)
工事材料 INSTALLATION MATERIALS			
CP02-06620			
ケーブル組品MJ CABLE ASSY.		MJ-A10SPF0002-050 000-131-411	1 (*)

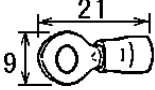
注記) 1.(*)印の信号ケーブル組品は、選択できます。
 CABLE IS SELECTIVE ON DEMAND.
 2.コード末尾に[**]の付いたユニットは代表の型式/コードを表示しています。
 DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.

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

06AS-X-9852

FURUNO

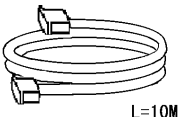
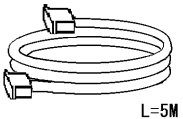
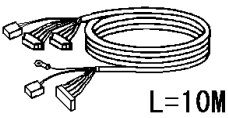
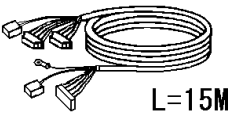
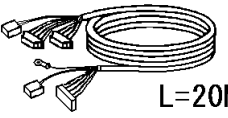
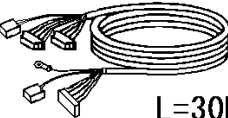
CODE NO.	006-559-570	06AT-X-9401 -0 1/1
TYPE	CP06-01301	

工事材料表 INSTALLATION MATERIALS					
番 号 NO.	名 称 NAME	略 図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	圧着端子 CRIMP-ON LUG		FV2-4 7才 CODE NO. 000-538-118	8	

06AT-X-9401

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

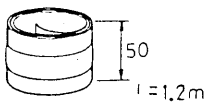
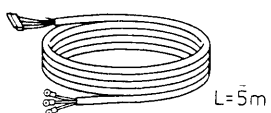
CODE NO.		06AT-X-9402 -0
TYPE		1/1

工事材料表 INSTALLATION MATERIALS		CH-270			
番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q' TY	用途／備考 REMARKS
1	ケーブル組品 CABLE ASSY.	 L=10M	06S4078 *10M*	1	選択 TO BE SELECTED
			CODE NO. 000-142-900		
2	ケーブル組品 CABLE ASSY.	 L=5M	06S4078 *5M*	1	選択 TO BE SELECTED
			CODE NO. 000-142-902		
3	ケーブル組品 CABLE ASSY.	 L=10M	06S4086 *10M*	1	選択 TO BE SELECTED
			CODE NO. 000-146-974		
4	ケーブル組品 CABLE ASSY.	 L=15M	06S4086 *15M*	1	選択 TO BE SELECTED
			CODE NO. 000-146-975		
5	ケーブル組品 CABLE ASSY.	 L=20M	06S4086 *20M*	1	選択 TO BE SELECTED
			CODE NO. 000-146-976		
6	ケーブル組品 CABLE ASSY.	 L=30M	06S4086 *30M*	1	選択 TO BE SELECTED
			CODE NO. 000-146-977		

06AT-X-9402

FURUNO

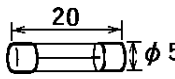
CODE No.	006-573-730	06AL-X-9407
TYPE	CP06-00403	

工 事 材 料 表 INSTALLATION MATERIALS		CH-184 カラー P P I ソナー 上下装置 COLOR SEARCHLIGHT SONAR HULL UNIT			
番号 No.	名 称 N A M E	略 図 O U T L I N E	型 名 / 規 格 D E S C R I P T I O N S	数量 Q'TY	用 途 / 備 考 R E M A R K S
1	ア ー ス 板 COPPER STRAP		WEA-1004-0 CODE No. 500-310-040	1	
2	ケ ー ブ ル 組 品 CABLE ASSY.		06S4054-1 *5M* CODE No. 000-122-879	1	
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			CODE No.		
			図 番 DWG. No. C1271-M01-A	1/1	
			検 査 CHECKED		

FURUNO ELECTRIC CO., LTD.

FURUNO

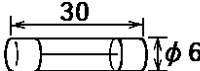
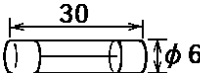
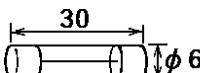
CODE NO.	006-556-210	06AS-X-9302 -1 1/1
TYPE	SP06-01102	BOX NO. P

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	ヒューズ FUSE		FGMB 10A AC125V			3		
							000-104-815	
MFR'S NAME		FURUNO ELECTRIC CO.,LTD.		DWG NO.	06AS-X-9302		1/1	

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

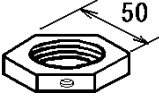
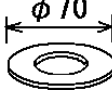
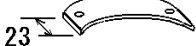
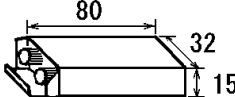
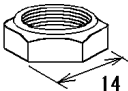
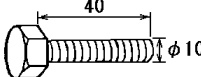
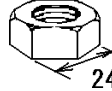
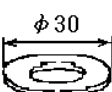
FURUNO

CODE NO.	006-559-590	06AT-X-9301 -0 1/1
TYPE	SP06-01201	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	ヒューズ FUSE		FGB0-A 4A AC125V			3		
							000-127-233	
2	ヒューズ FUSE		FGB0 7A AC125V			3		
							000-549-013	
3	ヒューズ FUSE		FGB0-A 3A AC125V			3		
							000-549-063	
4	ボールレンチ BALL WRENCH		TWB-25			1		
							000-801-713	
MFR'S NAME		FURUNO ELECTRIC CO.,LTD.		DWG NO.		C1322-P01-A		1/1

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

CODE NO.	006-546-420	06AL-X-9408 -2 1/3
TYPE	CH-1815-11	

現地組立品 LOCAL ASSEMBLING PARTS					
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	止めナット LOCK NUT		06-013-2401-0	1	
			CODE NO. 100-098-730		
2	廻り止め用座金 STOPPER WASHER		06-013-2402-0	1	
			CODE NO. 100-098-740		
3	ドーム抜き用当て板 ATTACHMENT PLATE		06-013-2701-1	2	
			CODE NO. 100-099-170		
4	セメダインハイパー CEMEDINE HIGH SUPER		6セット	1	
			CODE NO. 000-856-520		
5	Uナット U-NUT		M10 SUS304	2	
			CODE NO. 000-863-930		
6	バネ座金 SPRING WASHER		M10 SUS304	2	
			CODE NO. 000-864-261		
7	六角ボルト HEX. BOLT		M10X40 SUS304	2	
			CODE NO. 000-862-184		
8	六角ナット1種 HEX. NUT		M16 SUS304	16	
			CODE NO. 000-863-114		
9	バネ座金 SPRING WASHER		M16 SUS304	8	
			CODE NO. 000-864-265		
10	ミガキ平座金 FLAT WASHER		M16 SUS304	16	
			CODE NO. 000-864-134		

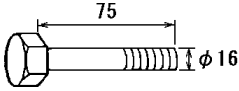
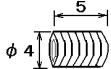
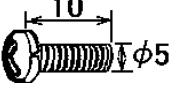
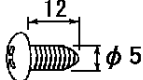
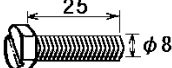
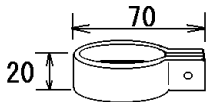
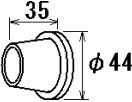
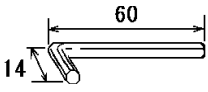
*1印は組み立て済みです。

*1.ASSEMBLED AT. FACTORY.

06AL-X-9408

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

CODE NO.	006-546-420	06AL-X-9408 -2
TYPE	CH-1815-11	2/3

現地組立品 LOCAL ASSEMBLING PARTS						
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS		数量 Q'TY	用途 / 備考 REMARKS
11	六角ボルト HEX.BOLT		M16X75 SUS304		8	
			CODE NO.	000-801-703		
12	六角穴付止めねじ SOCKET SET SCREW		M4X5 SUS		1	
			CODE NO.	000-801-527		
13	+ワッシャー セムスネジ A WASHER HEAD SCREW A		M5X10 C2700W MBNI 2		1	
			CODE NO.	000-881-185		
14	+プラスネジ +PAN HEAD SCREW		M5X12 SUS304		10	
			CODE NO.	000-801-704		
15	六角ナット 1種 HEX.NUT		M8 SUS304		1	
			CODE NO.	000-863-110		
16	バネ座金 SPRING WASHER		M8 SUS304		1	
			CODE NO.	000-864-262		
17	六角ボルト スリワ HEX.BOLT		M8X25 SUS304		1	
			CODE NO.	000-862-149		
18	抜止め金具 STOPPER		SHN-0003-2		1	
			CODE NO.	661-400-032		
19	パイプキャップ PIPE CAP		SHN-0011-1		1	
			CODE NO.	661-400-111		
20	六角レンチ HEX.WRENCH		タイハン 2MM		1	
			CODE NO.	000-830-108		

*1印は組み立て済みです。

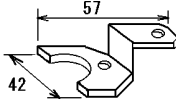
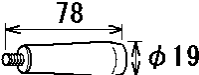
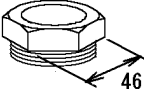
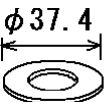
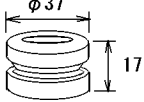
*1.ASSEMBLED AT. FACTORY.

06AL-X-9408

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

FURUNO

CODE NO.	006-546-420	06AL-X-9408 -2 3/3
TYPE	CH-1815-11	

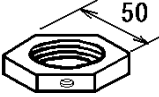
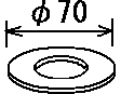
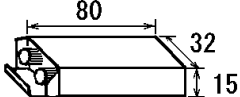
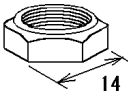
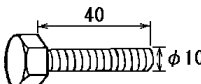
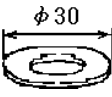
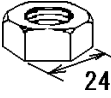
現地組立品 LOCAL ASSEMBLING PARTS					
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS		数量 Q'TY 用途 / 備考 REMARKS
21	手動ハンドル HAND CRANK		06-013-2601-0		1 *1
			CODE NO.	100-098-770	
22	回転グリップ GRIP		GTR-19 X M6		1 *1
			CODE NO.	000-808-457	
23	ハネ座金 SPRING WASHER		M6 SUS304		1 *1
			CODE NO.	000-864-260	
24	六角ナット 1種 HEX.NUT		M6 SUS304		1 *1
			CODE NO.	000-863-109	
25	締付グランド GLAND		06-008-1031-0		1 締付グランド用 FOR CABLE GLAND
			CODE NO.	100-028-520	
26	座金 WASHER		06-011-2111-0		2 締付グランド用 FOR CABLE GLAND
			CODE NO.	100-057-940	
27	パッキン PACKING		06-011-2209-1		1 締付グランド用 FOR CABLE GLAND
			CODE NO.	100-306-171	

*1印は組み立て済みです。
*1.ASSEMBLED AT. FACTORY.

06AL-X-9408

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

CODE NO.	006-546-430	06AL-X-9409 -2 1/3
TYPE	CH-1815-22	

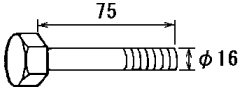
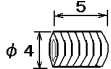
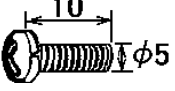
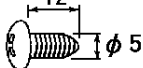
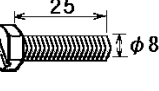
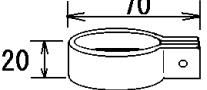
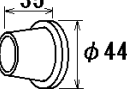
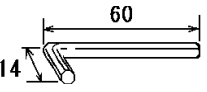
現地組立品 LOCAL ASSEMBLING PARTS					
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	止めナット LOCK NUT		06-013-2401-0	1	
			CODE NO. 100-098-730		
2	廻り止め用座金 STOPPER WASHER		06-013-2402-0	1	
			CODE NO. 100-098-740		
3	ドーム抜き用当て板 ATTACHMENT PLATE		06-013-2701-1	2	
			CODE NO. 100-099-170		
4	セメダインハイパー CEMEDINE HIGH SUPER		6セット	1	
			CODE NO. 000-856-520		
5	Uナット U-NUT		M10 SUS304	2	
			CODE NO. 000-863-930		
6	ハネ座金 SPRING WASHER		M10 SUS304	2	
			CODE NO. 000-864-261		
7	六角ボルト HEX. BOLT		M10X40 SUS304	2	
			CODE NO. 000-862-184		
8	ハネ座金 SPRING WASHER		M16 SUS304	8	
			CODE NO. 000-864-265		
9	ミカキ平座金 FLAT WASHER		M16 SUS304	16	
			CODE NO. 000-864-134		
10	六角ナット1種 HEX. NUT		M16 SUS304	16	
			CODE NO. 000-863-114		

*1印は組み立て済みです。
*1.ASSEMBLED AT. FACTORY.

06AL-X-9409

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

CODE NO.	006-546-430	06AL-X-9409 -2 2/3
TYPE	CH-1815-22	

現地組立品 LOCAL ASSEMBLING PARTS					
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
11	六角ボルト HEX.BOLT		M16X75 SUS304	8	
			CODE NO. 000-801-703		
12	六角穴付止めねじ SOCKET SET SCREW		M4X5 SUS	1	
			CODE NO. 000-801-527		
13	+ナハセムスネジ A WASHER HEAD SCREW A		M5X10 C2700W MBNI 2	1	
			CODE NO. 000-881-185		
14	+トラスネジ +PAN HEAD SCREW		M5X12 SUS304	10	
			CODE NO. 000-801-704		
15	六角ナット 1種 HEX.NUT		M8 SUS304	1	
			CODE NO. 000-863-110		
16	バネ座金 SPRING WASHER		M8 SUS304	1	
			CODE NO. 000-864-262		
17	六角ボルト スリワ HEX.BOLT		M8X25 SUS304	1	
			CODE NO. 000-862-149		
18	抜止め金具 STOPPER		SHN-0003-2	1	
			CODE NO. 661-400-032		
19	パイプキャップ PIPE CAP		SHN-0011-1	1	
			CODE NO. 661-400-111		
20	六角レンチ HEX.WRENCH		タイヘン 2MM	1	
			CODE NO. 000-830-108		

*1印は組み立て済みです。

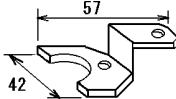
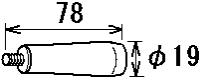
*1.ASSEMBLED AT. FACTORY.

06AL-X-9409

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

FURUNO

CODE NO.	006-546-430	06AL-X-9409 -2 3/3
TYPE	CH-1815-22	

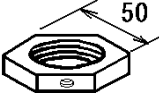
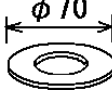
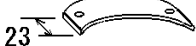
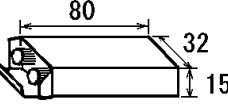
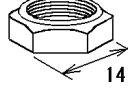
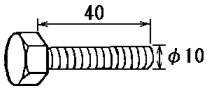
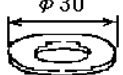
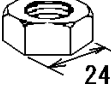
現地組立品 LOCAL ASSEMBLING PARTS					
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS		数量 Q'TY 用途 / 備考 REMARKS
21	手動ハンドル HAND CRANK		06-013-2601-0		1 *1
			CODE NO.	100-098-770	
22	回転グリップ GRIP		GTR-19 X M6		1 *1
			CODE NO.	000-808-457	
23	バネ座金 SPRING WASHER		M6 SUS304		1 *1
			CODE NO.	000-864-260	
24	六角ナット 1種 HEX.NUT		M6 SUS304		1 *1
			CODE NO.	000-863-109	

*1印は組み立て済みです。
*1.ASSEMBLED AT. FACTORY.

06AL-X-9409

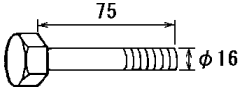
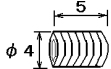
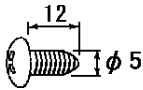
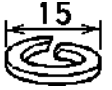
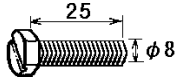
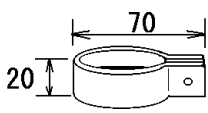
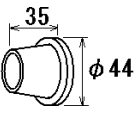
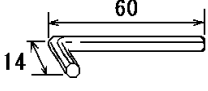
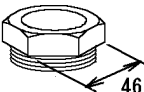
FURUNO ELECTRIC CO., LTD.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

CODE NO.	006-546-380	06AL-X-9410 -1 1/3
TYPE	CH-1845-11	

現地組立品 LOCAL ASSEMBLING PARTS					
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	止めナット LOCK NUT		06-013-2401-0	1	
			CODE NO. 100-098-730		
2	廻り止め用座金 STOPPER WASHER		06-013-2402-0	1	
			CODE NO. 100-098-740		
3	ドーム抜き用当て板 ATTACHMENT PLATE		06-013-2701-1	2	
			CODE NO. 100-099-170		
4	セメダインハイスーパー CEMEDINE HIGH SUPER		6セット	1	
			CODE NO. 000-856-520		
5	Uナット U-NUT		M10 SUS304	2	
			CODE NO. 000-863-930		
6	バネ座金 SPRING WASHER		M10 SUS304	2	
			CODE NO. 000-864-261		
7	六角ボルト HEX. BOLT		M10X40 SUS304	2	
			CODE NO. 000-862-184		
8	ミカキ平座金 FLAT WASHER		M16 SUS304	16	
			CODE NO. 000-864-134		
9	六角ナット1種 HEX. NUT		M16 SUS304	16	
			CODE NO. 000-863-114		
10	バネ座金 SPRING WASHER		M16 SUS304	8	
			CODE NO. 000-864-265		

06AL-X-9410

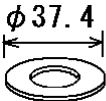
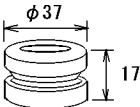
CODE NO.	006-546-380	06AL-X-9410 -1
TYPE	CH-1845-11	2/3

現地組立品 LOCAL ASSEMBLING PARTS					
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
11	六角ボルト HEX. BOLT		M16X75 SUS304	8	
			CODE NO. 000-801-703		
12	六角穴付止めねじ SOCKET SET SCREW		M4X5 SUS	1	
			CODE NO. 000-801-527		
13	+トラスねじ +PAN HEAD SCREW		M5X12 SUS304	10	
			CODE NO. 000-801-704		
14	バネ座金 SPRING WASHER		M8 SUS304	1	
			CODE NO. 000-864-262		
15	六角ナット 1種 HEX. NUT		M8 SUS304	1	
			CODE NO. 000-863-110		
16	六角ボルト スリワ HEX. BOLT		M8X25 SUS304	1	
			CODE NO. 000-862-149		
17	抜止め金具 STOPPER		SHN-0003-2	1	
			CODE NO. 661-400-032		
18	パイプキャップ PIPE CAP		SHN-0011-1	1	
			CODE NO. 661-400-111		
19	六角レンチ HEX. WRENCH		タイハ 2MM	1	
			CODE NO. 000-830-108		
20	締付グランド GLAND		06-008-1031-0	1	締付グランド用 FOR CABLE GLAND
			CODE NO. 100-028-520		

06AL-X-9410

FURUNO

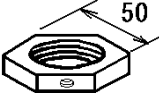
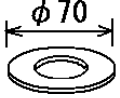
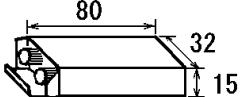
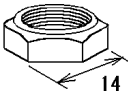
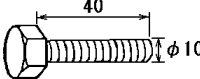
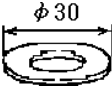
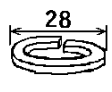
CODE NO.	006-546-380	06AL-X-9410 -1 3/3
TYPE	CH-1845-11	

現地組立品 LOCAL ASSEMBLING PARTS					
番 号 NO.	名 称 NAME	略 図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
21	座金 WASHER		06-011-2111-0	2	締付クランド用 FOR CABLE GLAND
			CODE NO. 100-057-940		
22	パッキン PACKING		06-011-2209-1	1	締付クランド用 FOR CABLE GLAND
			CODE NO. 100-306-171		

06AL-X-9410

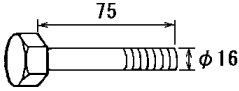
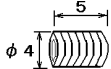
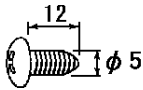
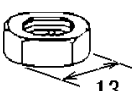
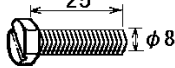
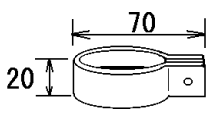
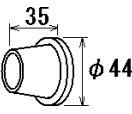
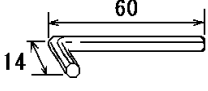
FURUNO ELECTRIC CO., LTD.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

CODE NO.	006-546-410	06AL-X-9411 -1 1/2
TYPE	CH-1845-22	

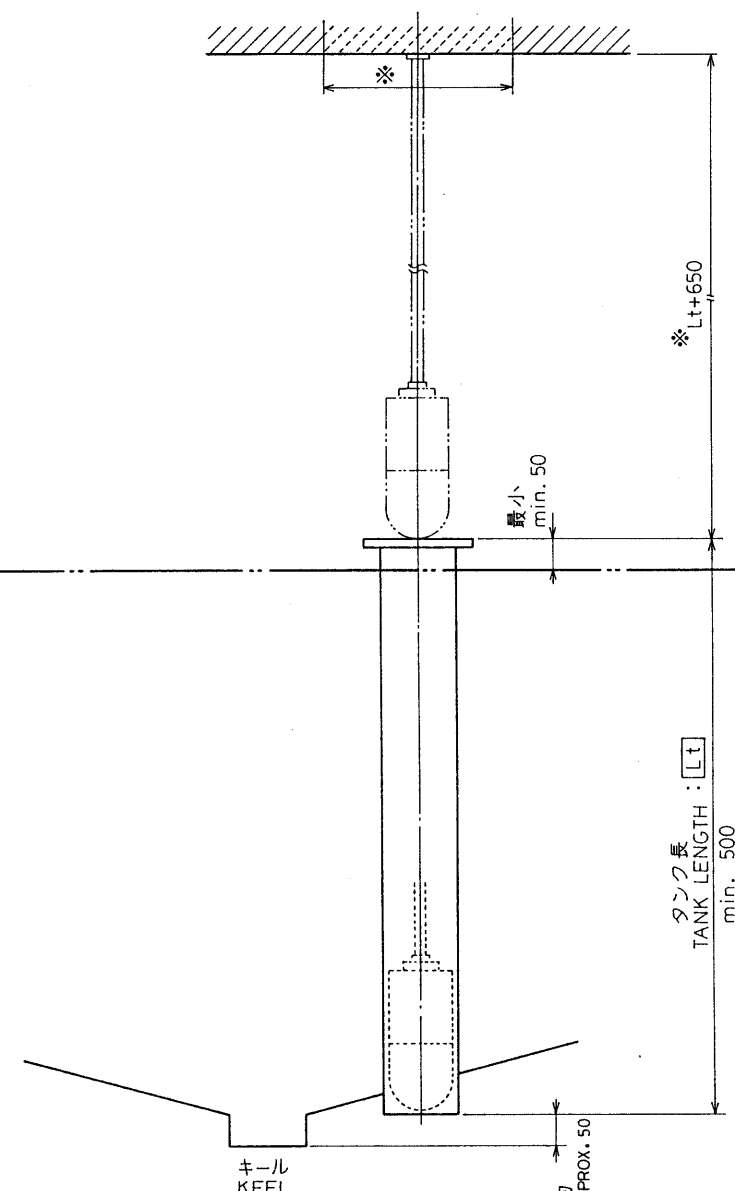
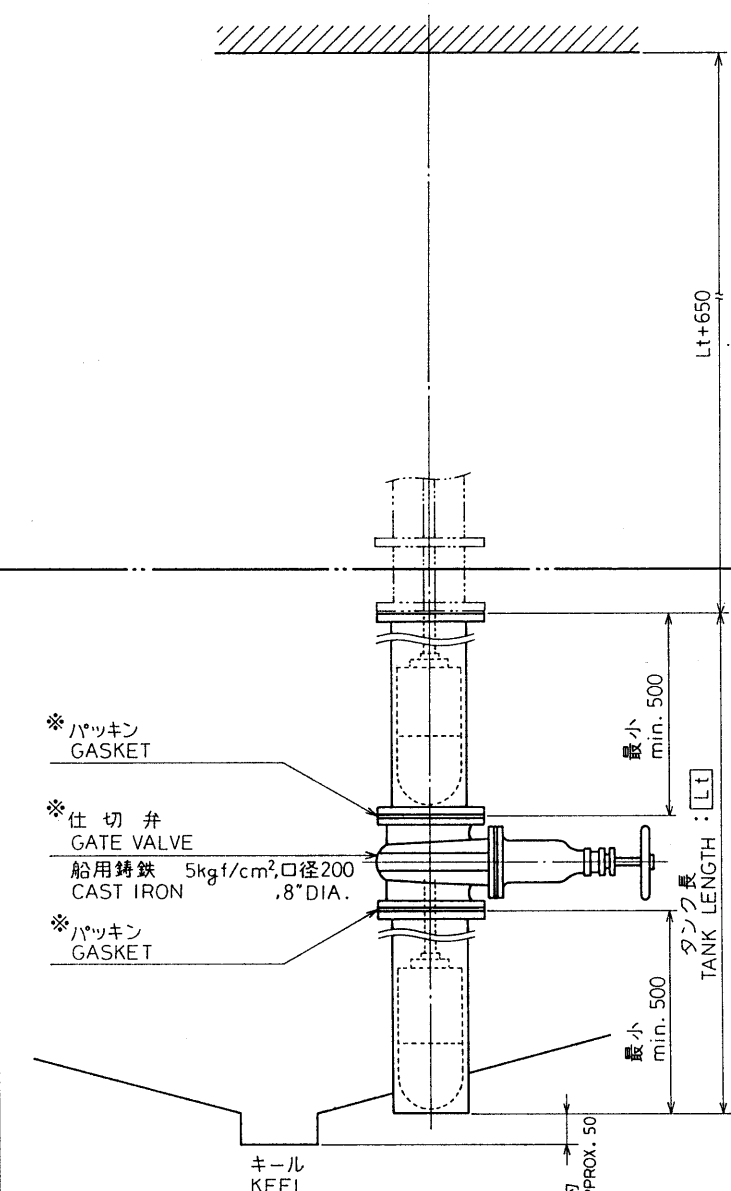
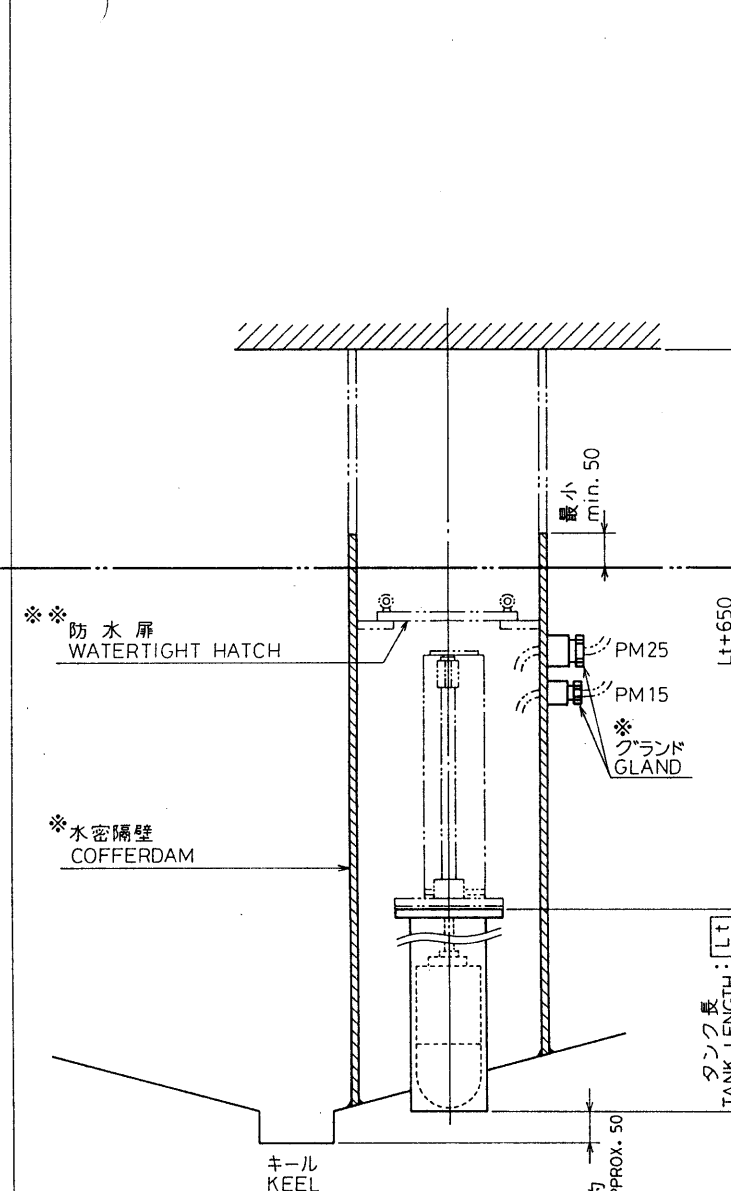
現地組立品 LOCAL ASSEMBLING PARTS					
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	止めナット LOCK NUT		06-013-2401-0	1	
			CODE NO. 100-098-730		
2	廻り止め用座金 STOPPER WASHER		06-013-2402-0	1	
			CODE NO. 100-098-740		
3	ドーム抜き用当て板 ATTACHMENT PLATE		06-013-2701-1	2	
			CODE NO. 100-099-170		
4	セメダインハイパー CEMEDINE HIGH SUPER		6セット	1	
			CODE NO. 000-856-520		
5	Uナット U-NUT		M10 SUS304	2	
			CODE NO. 000-863-930		
6	バネ座金 SPRING WASHER		M10 SUS304	2	
			CODE NO. 000-864-261		
7	六角ボルト HEX. BOLT		M10X40 SUS304	2	
			CODE NO. 000-862-184		
8	ミカキ平座金 FLAT WASHER		M16 SUS304	16	
			CODE NO. 000-864-134		
9	六角ナット1種 HEX. NUT		M16 SUS304	16	
			CODE NO. 000-863-114		
10	バネ座金 SPRING WASHER		M16 SUS304	8	
			CODE NO. 000-864-265		

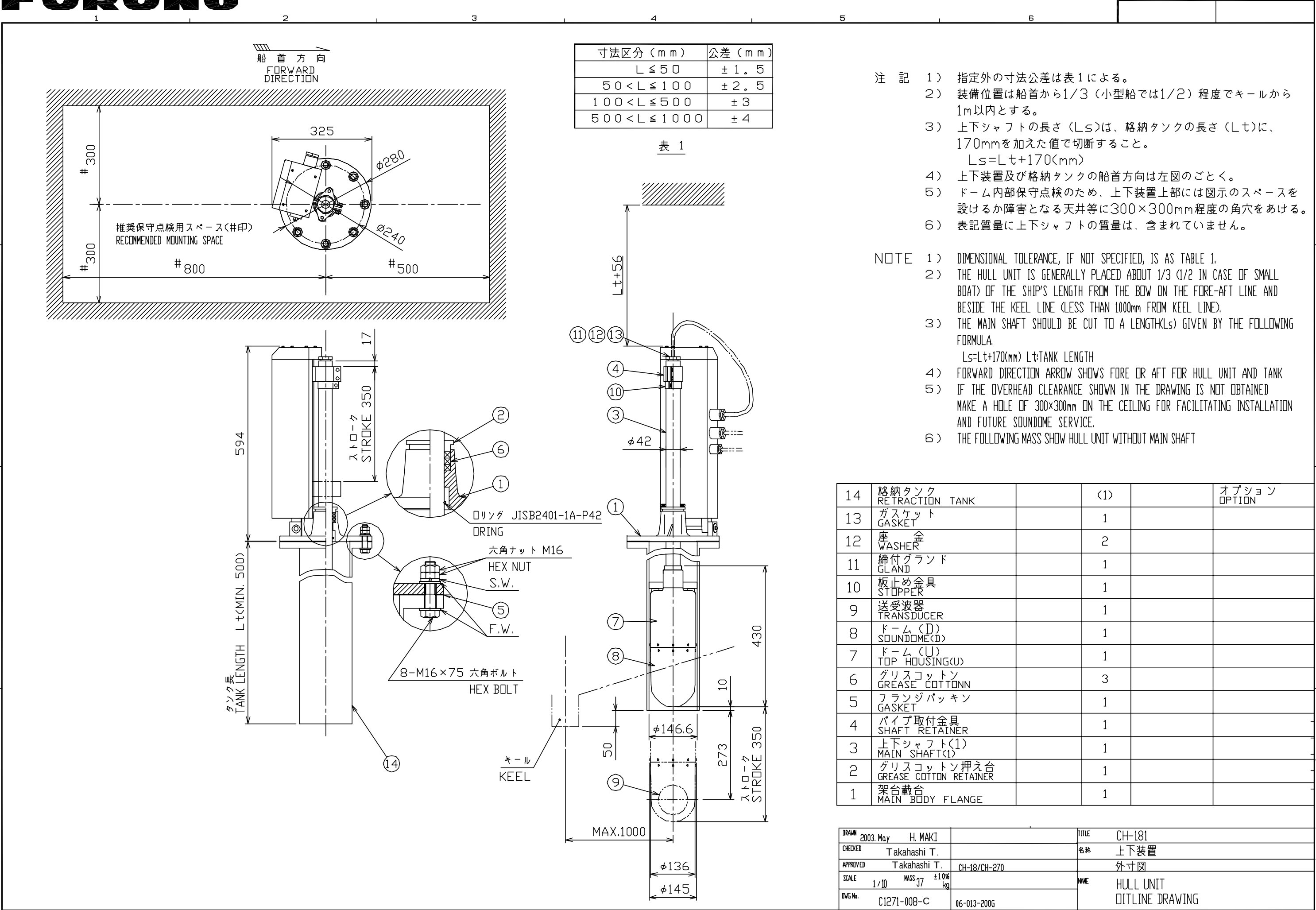
06AL-X-9411

CODE NO.	006-546-410	06AL-X-9411 -1 2/2
TYPE	CH-1845-22	

現地組立品 LOCAL ASSEMBLING PARTS					
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
11	六角ボルト HEX.BOLT		M16X75 SUS304	8	
			CODE NO. 000-801-703		
12	六角穴付止めねじ SOCKET SET SCREW		M4X5 SUS	1	
			CODE NO. 000-801-527		
13	+トラスコねじ +PAN HEAD SCREW		M5X12 SUS304	10	
			CODE NO. 000-801-704		
14	六角ナット 1種 HEX.NUT		M8 SUS304	1	
			CODE NO. 000-863-110		
15	バネ座金 SPRING WASHER		M8 SUS304	1	
			CODE NO. 000-864-262		
16	六角ボルト スリワ HEX.BOLT		M8X25 SUS304	1	
			CODE NO. 000-862-149		
17	板止め金具 STOPPER		SHN-0003-2	1	
			CODE NO. 661-400-032		
18	パイプキャップ PIPE CAP		SHN-0011-1	1	
			CODE NO. 661-400-111		
19	六角レンチ HEX.WRENCH		タイハ 2MM	1	
			CODE NO. 000-830-108		

06AL-X-9411

1		2		3		4		5		6	
条 件 CONDITION		タンク長を満載時の吃水線の上までとれる場合。 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外しておく場合。 THIS METHOD ALLOWS TO EASILY REMOVE THE SOUNDOME DURING A PERIOD OF NON-OPERATION OR SERVICING. 2. タンク長を吃水線の上まで取れない場合。 WHEN THE LONGER TANK IS NOT USED DUE TO LIMITED CLEARANCE.		A タンク長を吃水線までとれない場合で、仕切り弁を使用しない時。 WHEN THE LONGER TANK OR A GATE VALVE CAN NOT BE USED.					
装 備 法 METHOD											
D		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 "Lt+650" のサービス空間が取れない場合は、天井に "300×300" の穴を明けておくこと。 ※ ; IF OVERHEAD CLEARANCE "Lt+650" IS NOT ALLOWED, MAKE A HOLE OF 300×300mm ON CEILING FOR FACILITATING INSTALLATION AND FUTURE SOUNDOME SERVICE.		条件 (1) の目的でこの装備法を行う場合には、左図 (A) と同様に、吃水線の上までタンク長をとる方が望ましい。 LIKE THE INSTALLATION METHOD A, THE TANK FLANGE POSITION IS DESIRED TO BE ABOVE WATER LINE.		1. 水密隔壁は船級協会規則を参照し、造船所で製作下さい。その際サービススペースも考慮して下さい。 FABRICATE THE COFFERDAM BY SHIPYARD IN ACCORDANCE WITH CONCERNED REGULATIONS. ALSO ALLOW ENOUGH MAINTENANCE SPACE. 2. ※※ ; 水密隔壁の上限を吃水線の上までとれない場合には、上下装置取り外しの為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		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、それに合わせて保守・点検の容易さも配慮のこと。 DECIDE AN INSTALLATION METHOD CONSIDERING SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE SHIP'S HULL. ALSO PROVIDE ENOUGH MAINTENANCE SPACE. 2. ※※※ ; 造船所手配 SHIPYARD SUPPLY. 3. 単位 : mm UNIT		CH-18/28		承認 APPROVED AUG. 5. '88 T. NAKANO 検 図 CHECKED AUG. 4. '88 T. KODAI 製 図 DRAWN AUG. 3. '88 M. USUDA		品 番 ITEM 品 名 NAME 材 質 MATERIAL 数 量 Q'TY 図 番 DWG.NO. 摘 要 REMARKS		三角 法 THIRD ANGLE PROJECTION 尺 度 SCALE 重 量 WEIGHT kg 名 称 TITLE 格納タンクの装備例 RETRACTION TANK INSTALLATION METHOD 図 番 DWG.NO. C 1 2 7 1 - 0 0 2 - C	

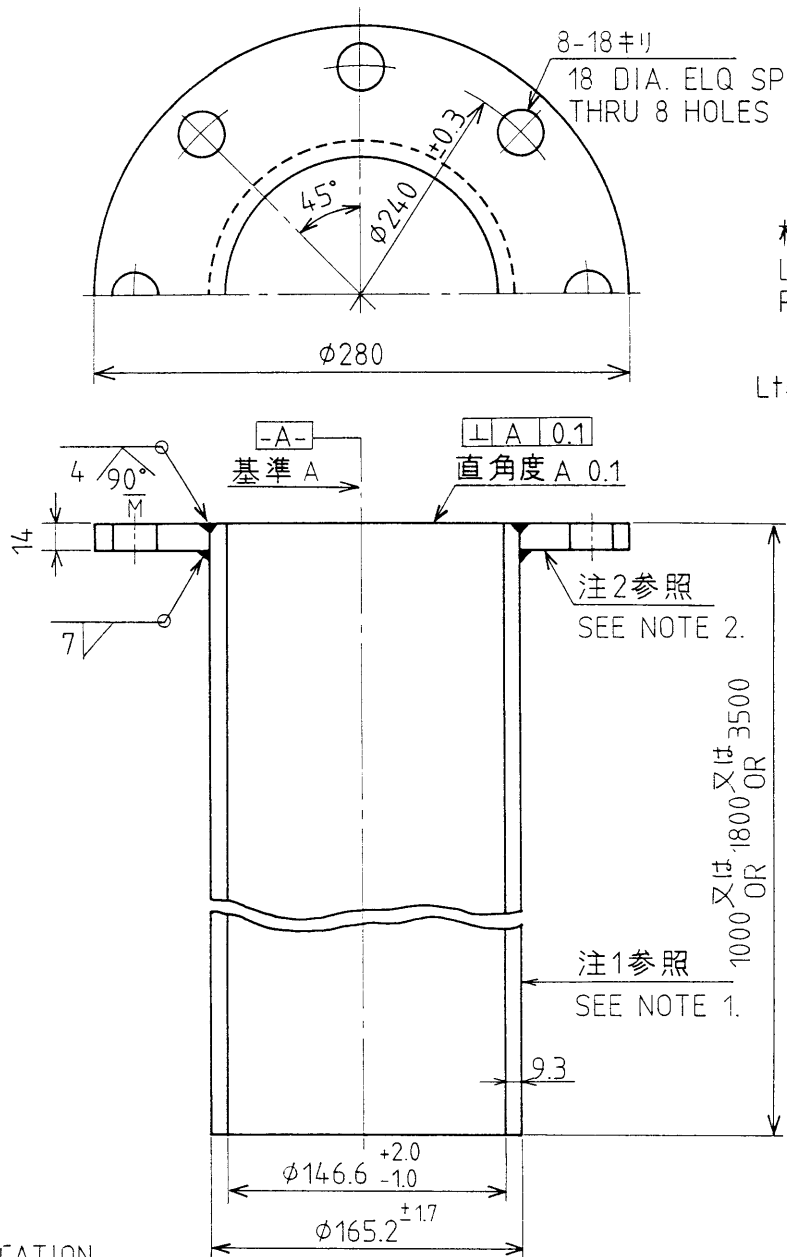


A

B

C

D



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)の150A×Sch60 (外径φ165.2,厚さ9.3)で内径がφ146.6 ± 2.0 / -1.0 のものを使用のこと。
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プライマー(ブラウン)を1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 (CARBON STEEL PIPE FOR PRESSURE SERVICE) WITH OUTER DIAMETER φ165.2, INNER DIAMETER φ146.6 ± 2.0 / -1.0 AND THICKNESS 9.3.
2. USE SS41P (JIS G3101, ROLLED STEEL FOR GENERAL STRUCTURE).
3. GIVE ONE COAT 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 SURFACE OF FLANGE.

単位 UNIT : mm

品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG.NO.	摘要 REMARKS
------------	------------	----------------	-----------	---------------	---------------

承認
APPROVED

三角法
THIRD ANGLE PROJECTION

名称
TITLE 鉄製格納タンク外觀図

検
CHECKED

尺
SCALE

1/4

STEEL RETRACTION
TANK OUTLINE DRAWING

製
DRAWN

409・30・88
M. USUDA

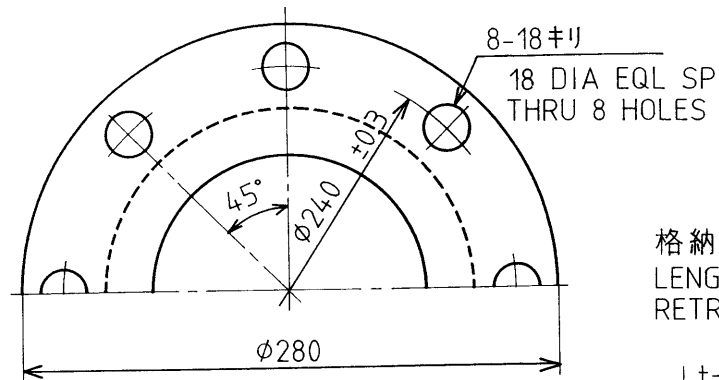
重量
WEIGHT

1000mm: 46
1800mm: 69 kg
3500mm: 130

図番
DWG.NO.

C1271-003-A

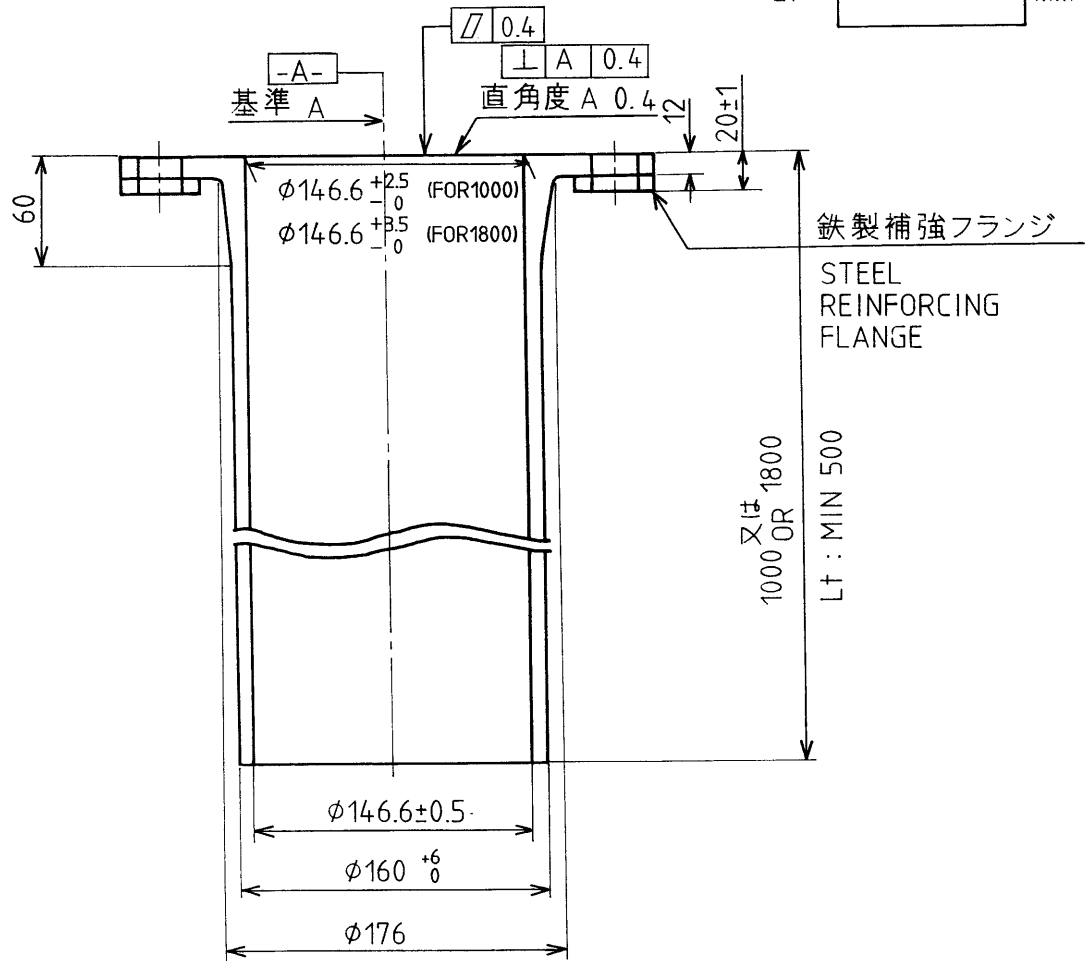
A



格納タンクの長さ;
LENGTH OF
RETRACTION TANK;

Lt = mm

B



C

D

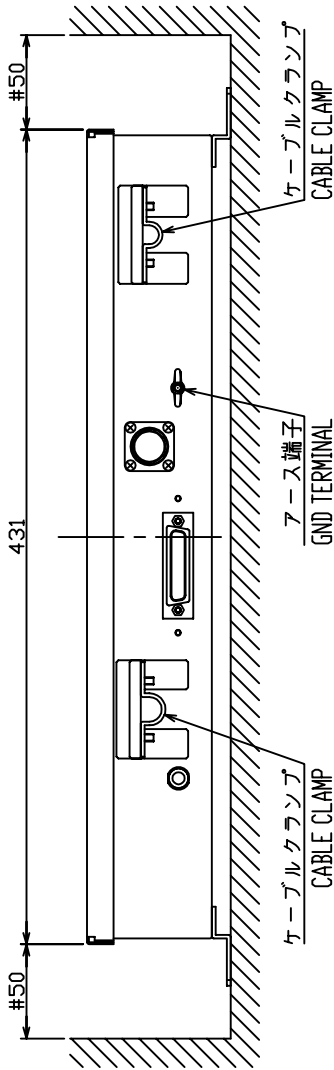
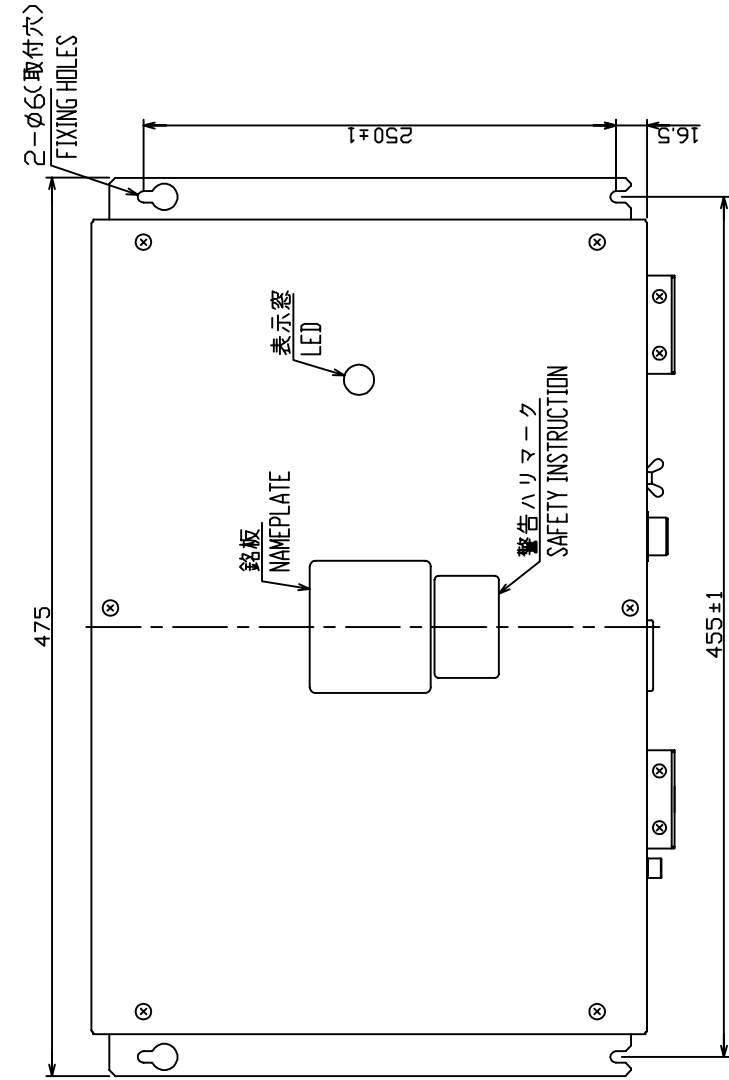
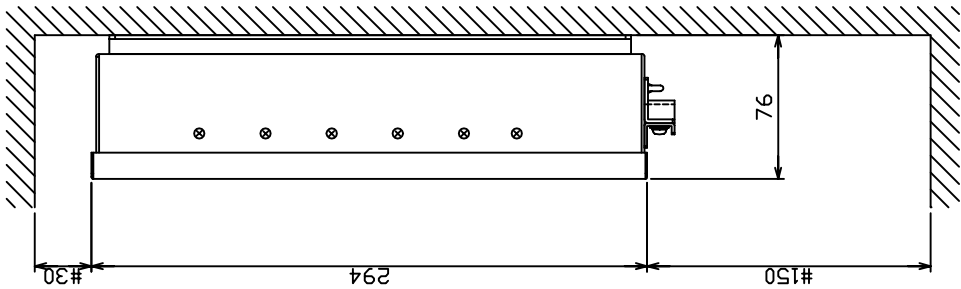
品 番 ITEM	品 名 NAME	材 質 MATERIAL	数 量 Q'TY	図 番 DWG.NO.	摘 要 REMARKS
承 認 APPROVED	SEP. 6.88 T. NAKANO	三 角 法 THIRD ANGLE PROJECTION	名 称 TITLE	FRP製格納タンク外觀図 FRP RETRACTION TANK OUTLINE DRAWING	
検 図 CHECKED	SEP. 6.88 T. NAKANO	尺 度 SCALE	1/4		
製 図 DRAWN	AUG. 30.88 M. USUDA	重 量 WEIGHT	1000mm: 10 kg 1800mm: 16	図 番 DWG.NO.	C1271-004-A



FURUNO ELECTRIC CO., LTD.

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

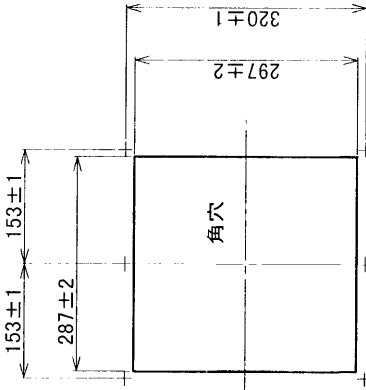
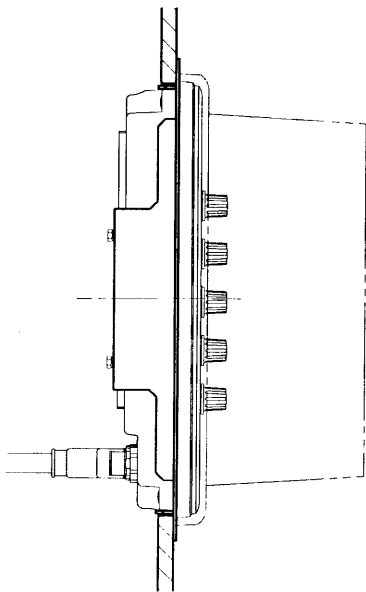
表 1 TABLE 1



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. 31 '03 I. YAMASAKI	TITLE	CH-273
CHECKED	Mar. 31 '03 T. MATSUGUCHI	名 称	送受信装置
APPROVED	Mar. 31 '03 s.yoshimura	外 図	CH-270
SCALE	1/4 MASS 3.5 40% kg	NAME	TRANSCIEVER UNIT
FIG.No.	C1322-G01-A	06-022-300G-0	OUTLINE DRAWING

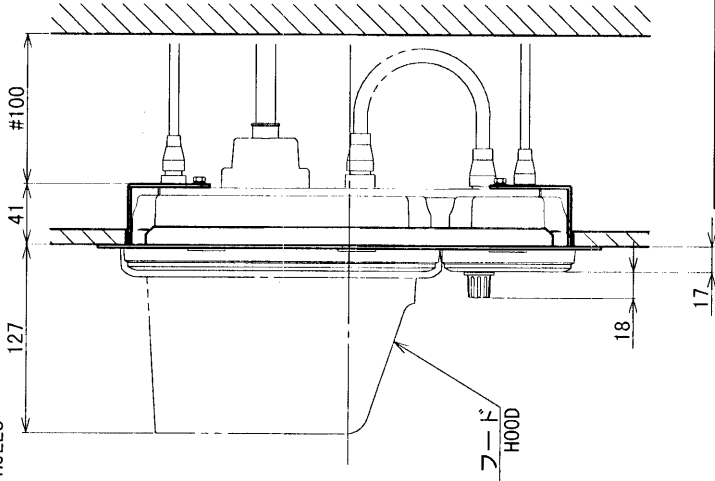
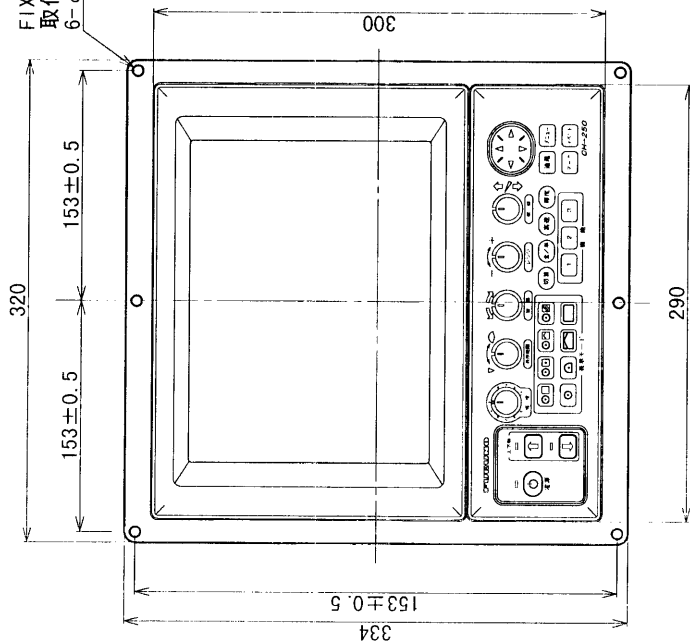


寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≤ 50	± 1. 5
50 < L ≤ 100	± 2. 5
100 < L ≤ 500	± 3

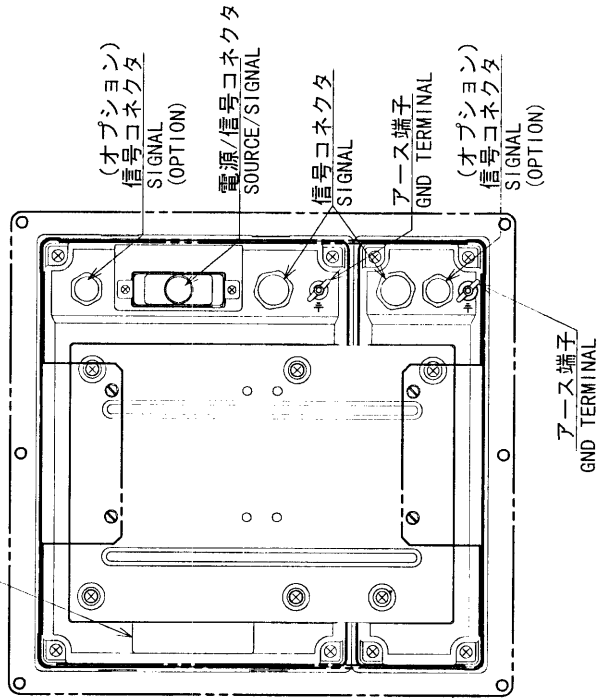
表 1
TABLE 1

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

FIXING HOLES
取付穴
6-φ7



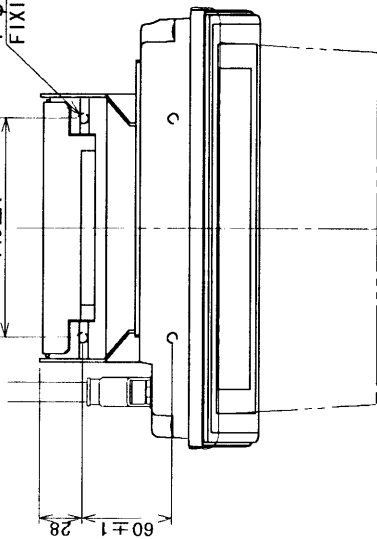
銘板
NAMEPLATE



DRAWN	1/22/02 T.YAMASAKI
CHECKED	1/22/02 Y. Kume
APPROVED	1/22/02 S. Yamashita
SCALE	1/5
MASS	4.2 kg

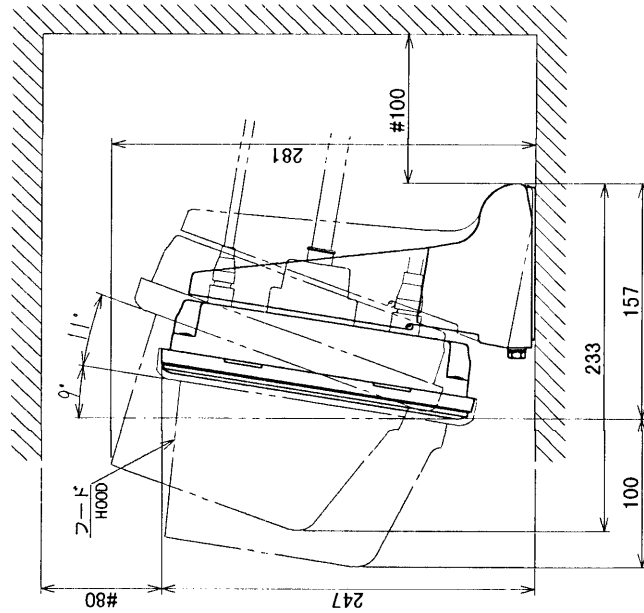
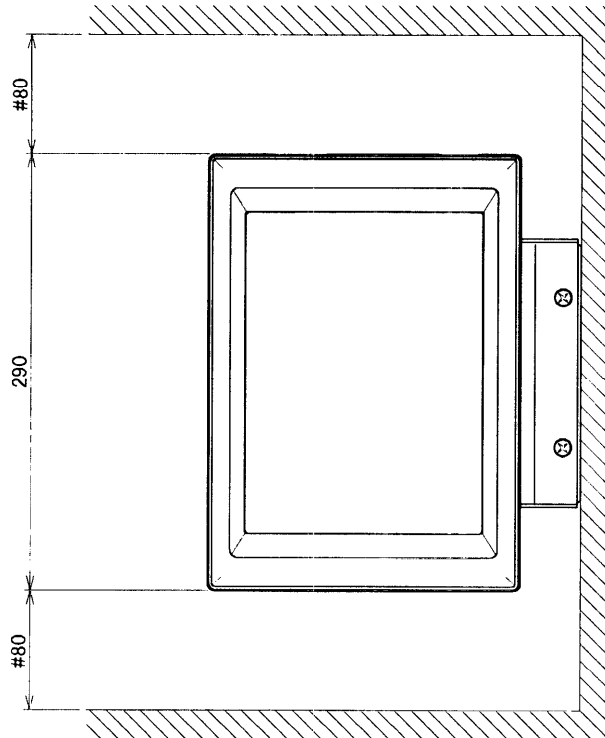
TITLE	MU-100C
名称	表示部 (埋込装備)
外寸図	
NAME	DISPLAY UNIT (FLASHMOUNT)
DWG. No.	C1316-G09- A
OUTLINE DRAWING	

4-φ7 取付穴
FIXING HOLES

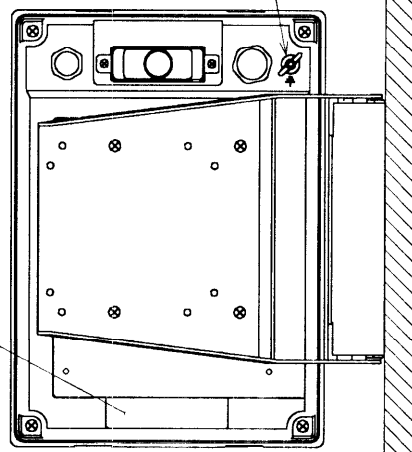


寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≤ 50	±1. 5
50 < L ≤ 100	±2. 5
100 < L ≤ 500	±3

表 1
TABLE 1



銘板
NAMEPLATE



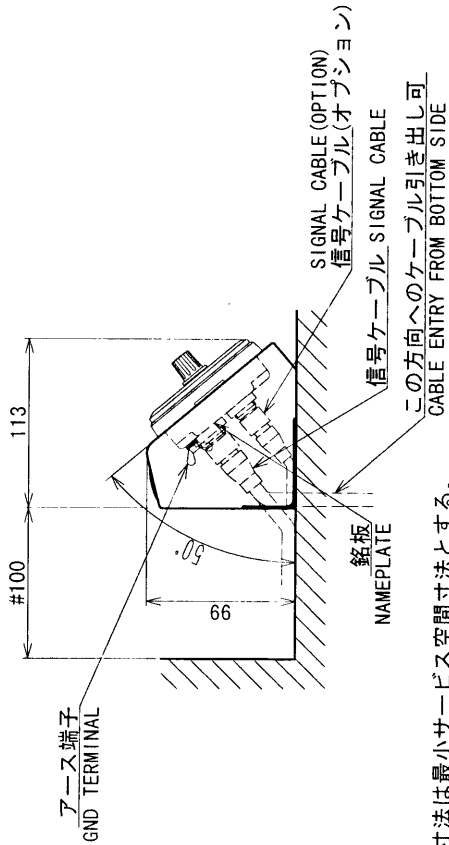
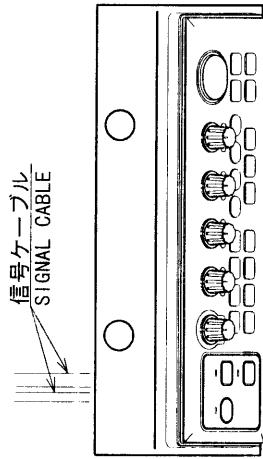
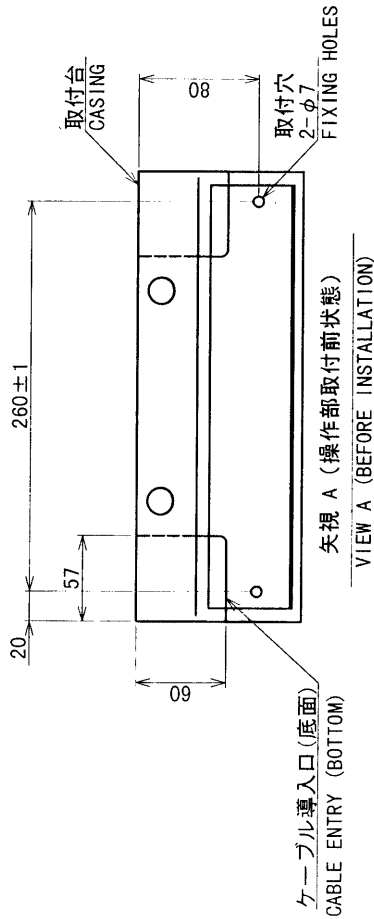
アース端子
GND TERMINAL

- 注 記 1) #印寸法は最小サージ空間寸法とする。
2) 指定外の寸法公差は表 1 による。
3) 取付用ネジは+トラスタップピンネジ呼び径5x20を使用のこと。
4) 装備ケーブルはサージビス時、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. KANE	名称 表示部 (分離型、卓上装備)
APPROVED JUN 2 '00 Y. KANE	外寸図
SCALE 1/5 MASS ±10% 4.2 kg	NAME DISPLAY UNIT
DWG No. C1316-G08-B	OUTLINE DRAWING

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$0 < L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 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) 取付用ネジはプ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。

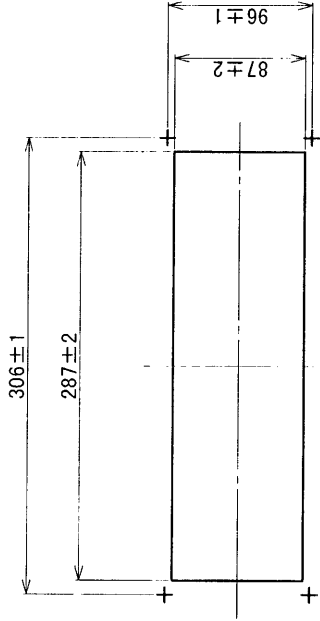
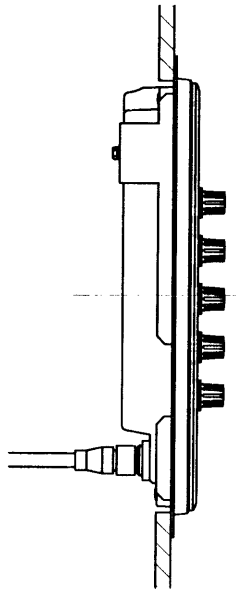
NOTE

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

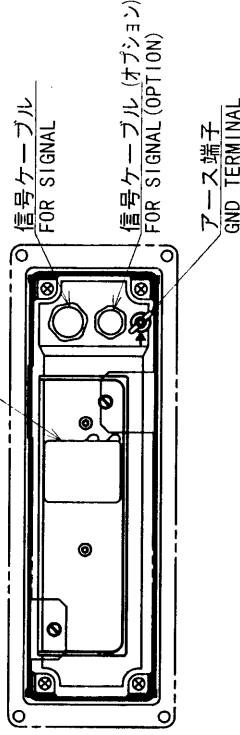
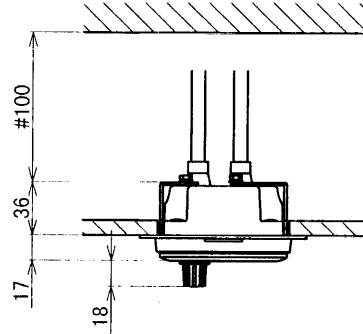
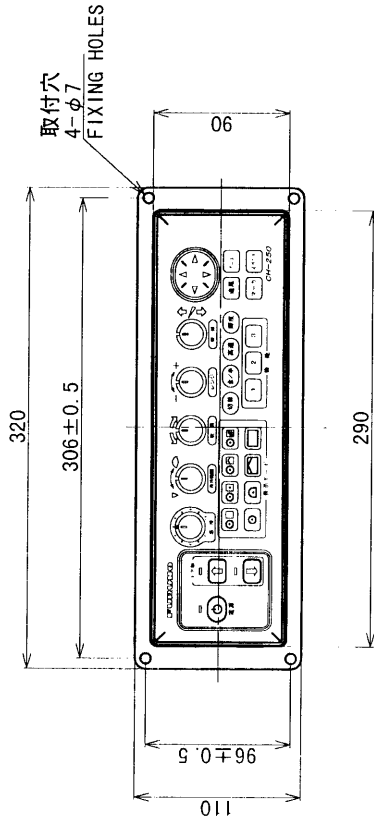
DRAWN Moriyoshi T. YAMASAKI	TITLE CH-252
CHECKED Moriyoshi T. YAMASAKI	名称 操作部 (分離型卓上装備タイプ)
APPROVED Moriyoshi T. YAMASAKI	外寸図
SCALE 1/5	NAME CH-250/S
DWG. No. C1316-G02-A	CONTROL UNIT (SEPARATE TYPE)
06-021-2000-G1	OUTLINE DRAWING

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

表 1
TABLE 1



取付穴寸法図
OUTOUT 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ネジ呼び径 5 x 2.0 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。

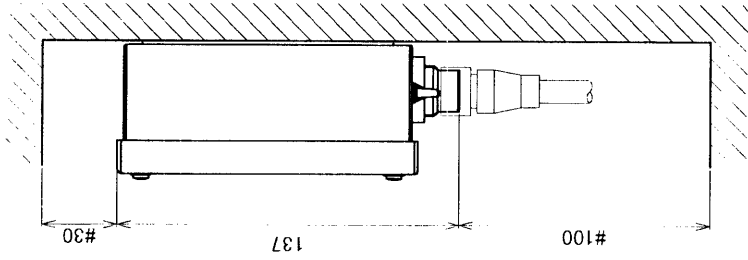
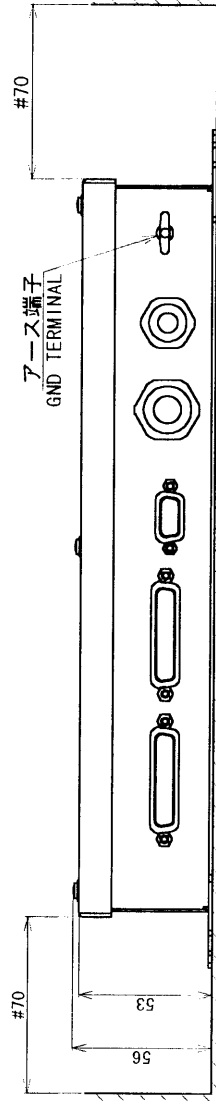
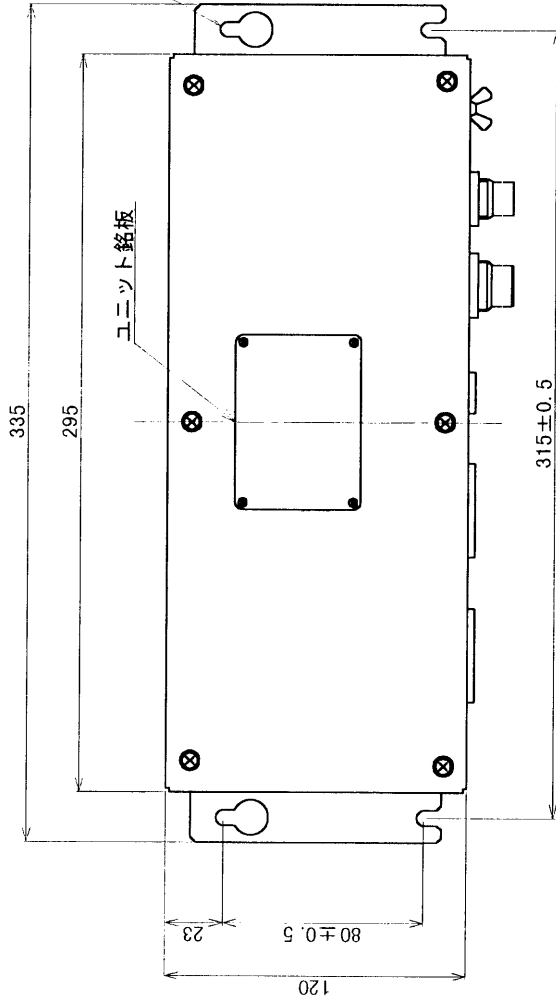
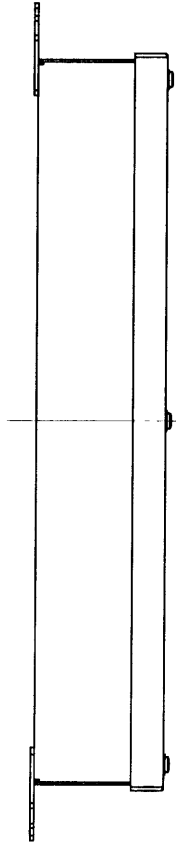
NOTE 1. #: RECOMMENDED SERVICE CLEARANCE.

2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

3. USE TAPPING SCREWS 5x2.0 FOR FIXING UNIT.

4. KEEP ADEQUATE CABLE LENGTH BEHIND UNIT.

DRAWN Mar 22 '00 T. IYASAKI	TITLE CH-252
CHECKED Mar 22 '00 Y. KIKUCHI	名称 操作部 (分離型・埋込装備)
APPROVED Mar 23 '00 S. YAMAGUCHI	外寸図
SCALE 1/5 MASS 1.1 kg	NAME CONTROL UNIT (SEPARATE TYPE/FLASH MOUNT)
DWG. No. C1316-G11-A	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) #印寸法は最小サービスペース寸法とする。
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 22 100 T. KAWASAKI	TITLE	IF-8000
CHECKED	Mar 22 100 T. KAWASAKI	名称	インターフェースユニット
APPROVED	Apr 23 00 S. KAWASAKI	外寸図	
SCALE	1/3	NAME	INTERFACE UNIT
	1.1 kg		
DWG No.	C1316-G07- A	06-021-5000-G1	OUTLINE DRAWING

A

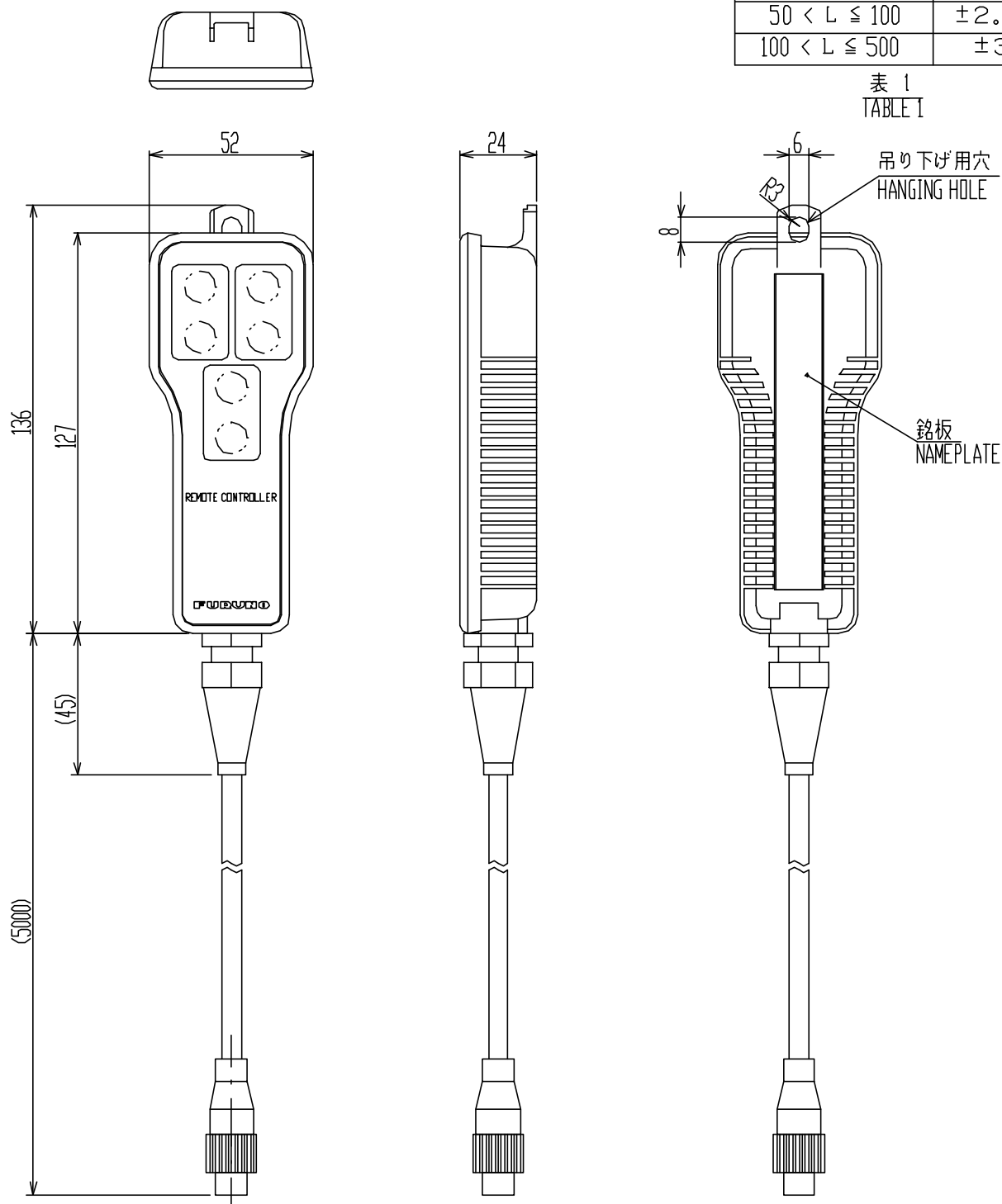
B

C

D

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$0 < L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 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.

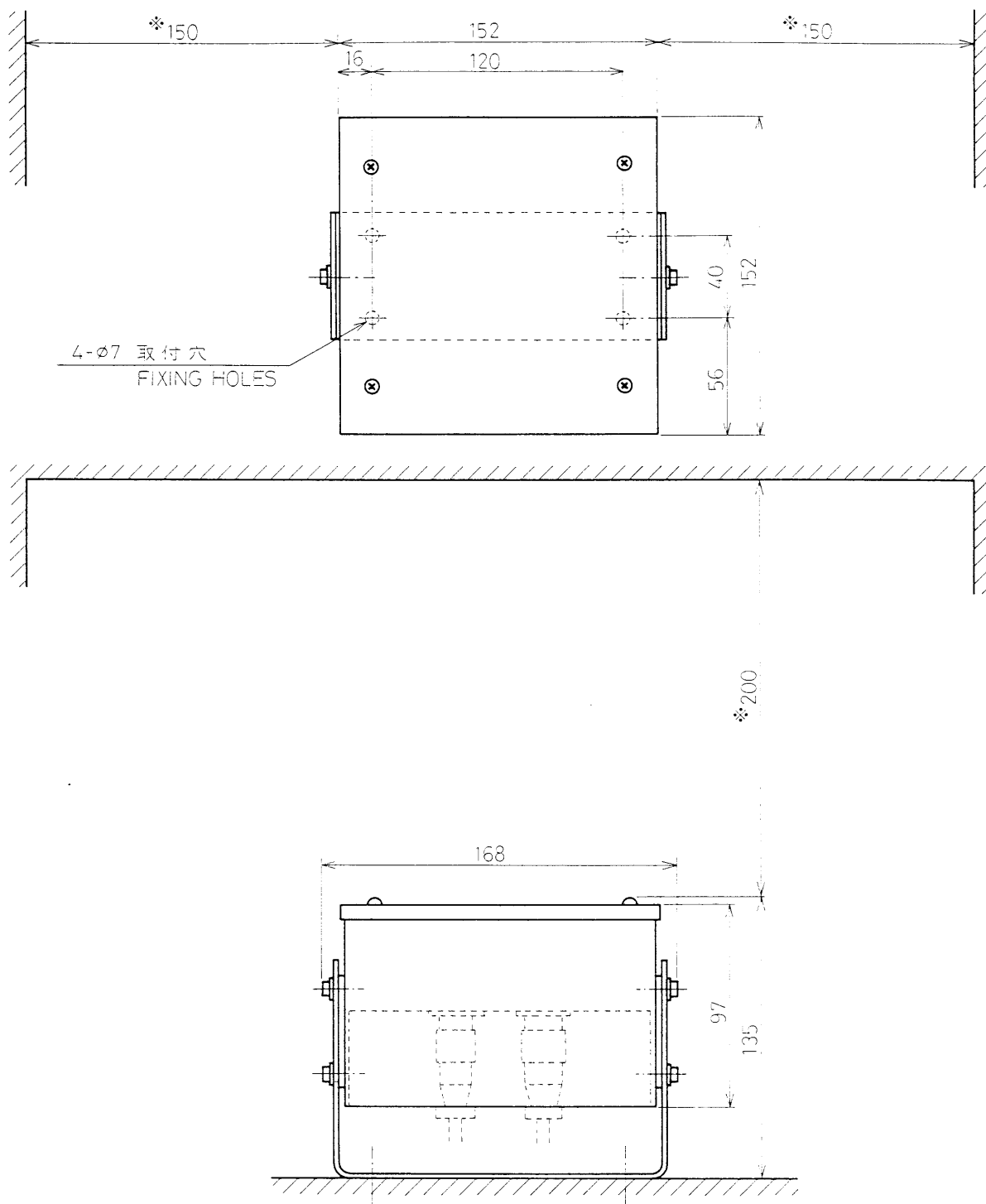
DRAWN 2003. June	H. MAKI		TITLE CH-256
CHECKED	Takahashi T.		名称 リモートコントローラ
APPROVED	Takahashi T.	CH-250/CH-270	外寸図
SCALE 1/2	MASS 0.3 ±10% kg	質量はケーブル重さを含む MASS W/ CABLE	NAME REMOTE CONTROLLER
DWG.No. C1316-G06-D	06-021-6000-G2		OUTLINE DRAWING

A

B

C

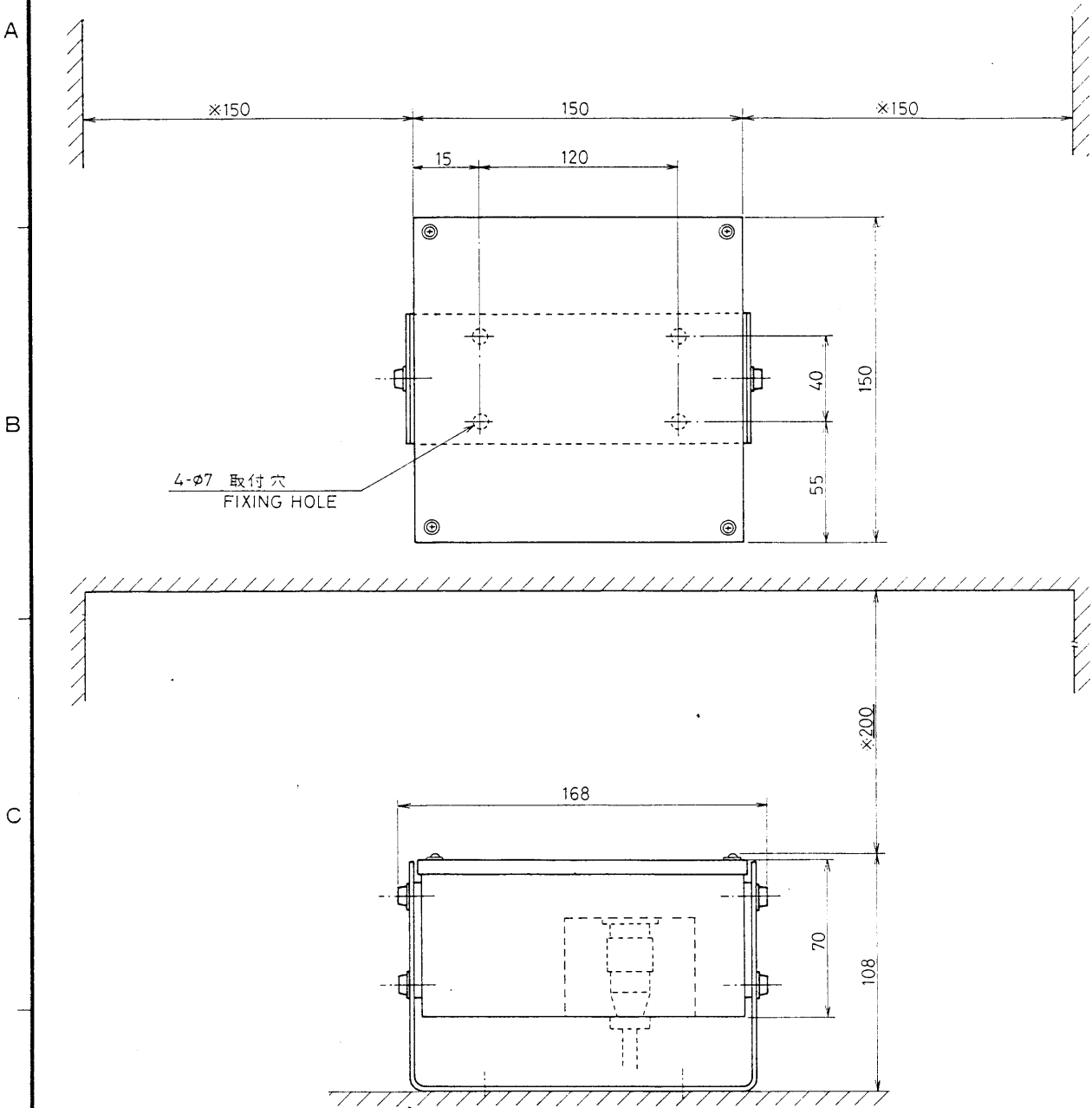
D



NOTE 1. 保守点検及び放熱用として ※印のスペースをとること。
DIMENSIONS MARKED "※" SHOW RECOMMENDED MAINTENANCE AND VENTILATION SPACE.

2. 船首マーク[FORE]を船首方向に向けて、筐体が水平になるように取り付けること。
ORIENT THE [FORE] MARK ON THE UNIT TOWARD SHIP'S BOW AND MOUNT THE UNIT LEVEL.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	JUL. 20. 90 TAKAKO	三角法 THIRD ANGLE PROJECTION	名称 TITLE	動揺検出器	
検 CHECKED	JUL. 20. 90 TAKAKO	尺度 SCALE	MS-100	MOTION SENSOR	
製 DRAWN	JUL. 20. 90 TAKAKO	重量 WEIGHT	2 kg	図番 DWG.NO.	C1278-G01-A



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.

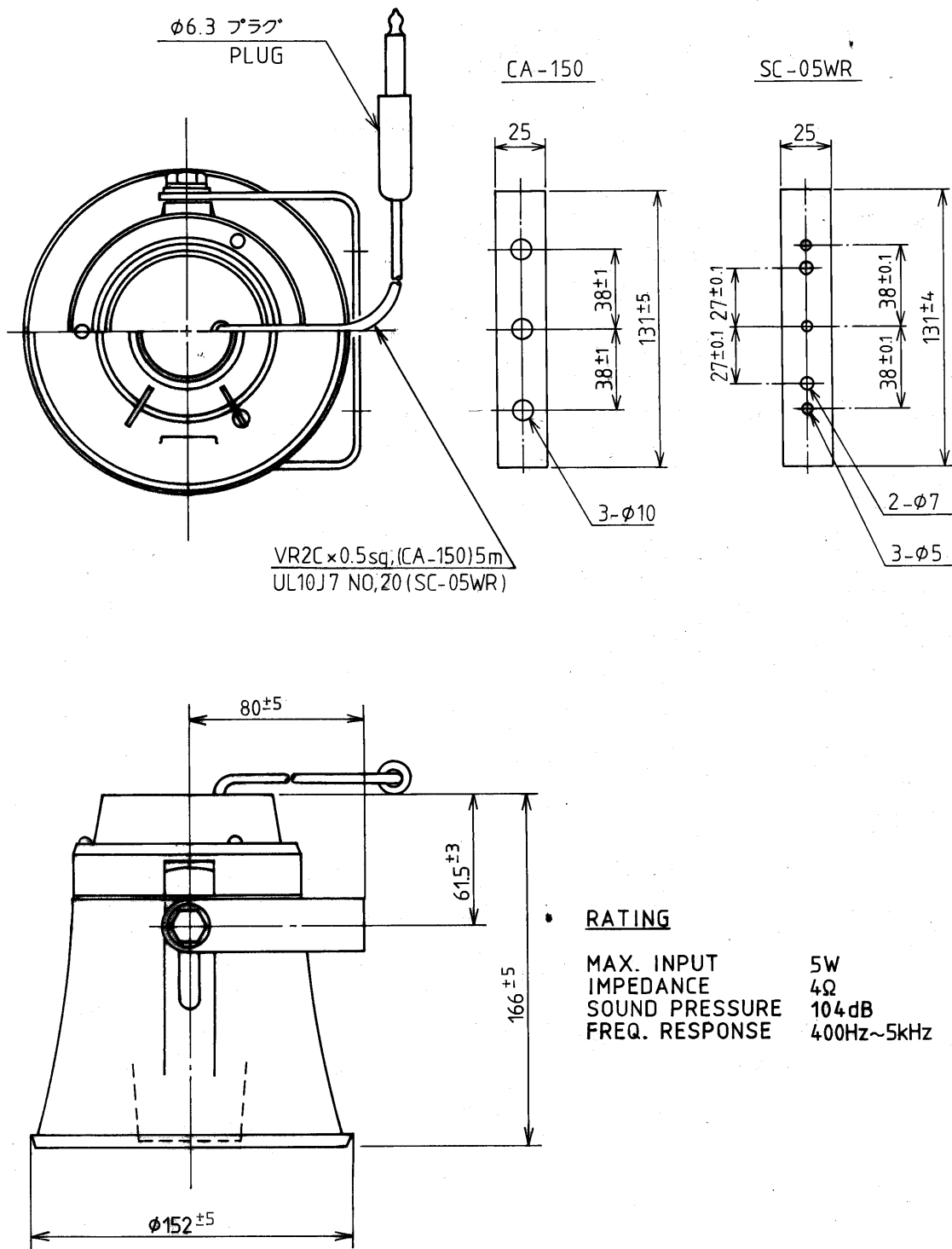
品番 ITEM		品名 NAME		材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	JAN. 8 '86 	三角法 THIRD ANGLE PROJECTION		名称 TITLE 傾斜角検出器 CLINOMETER BS-704			
検査 CHECKED	JAN. 8 '86 	尺度 SCALE	1 / 3				
製図 DRAWN	01.29.15 	重量 WEIGHT	2 kg	図番 DWG.NO.	C1259-009-C		

A

B

C

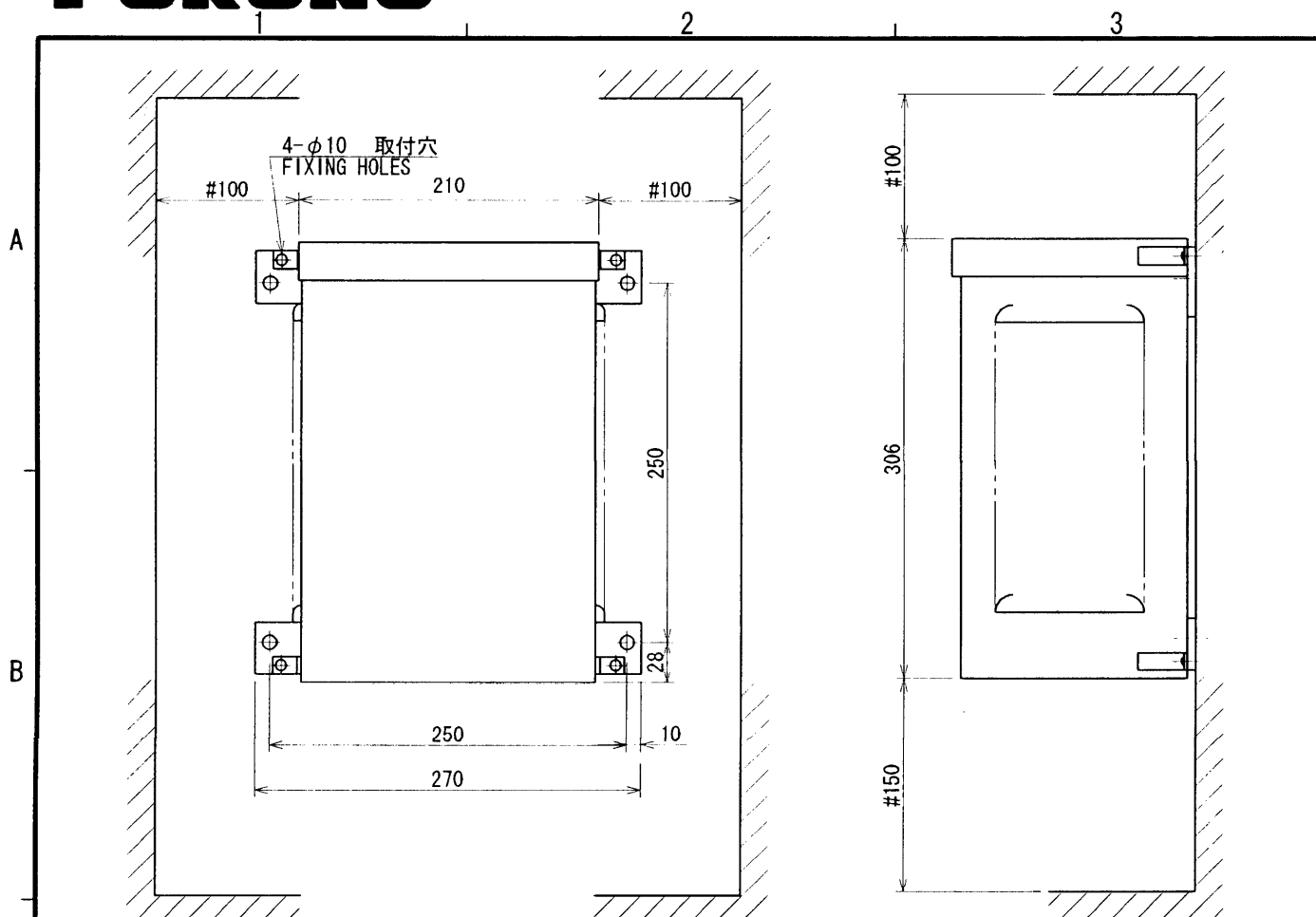
D



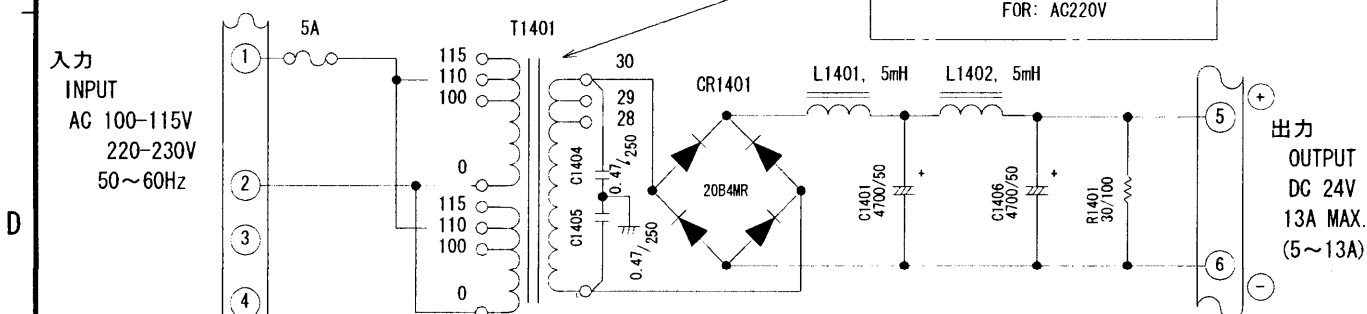
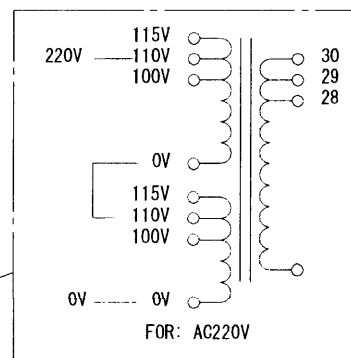
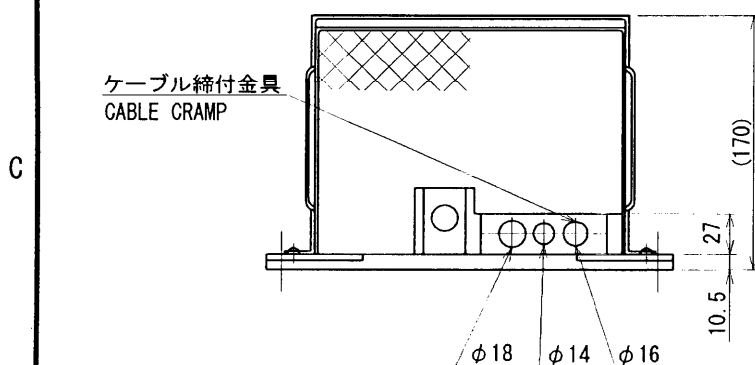
RATING

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



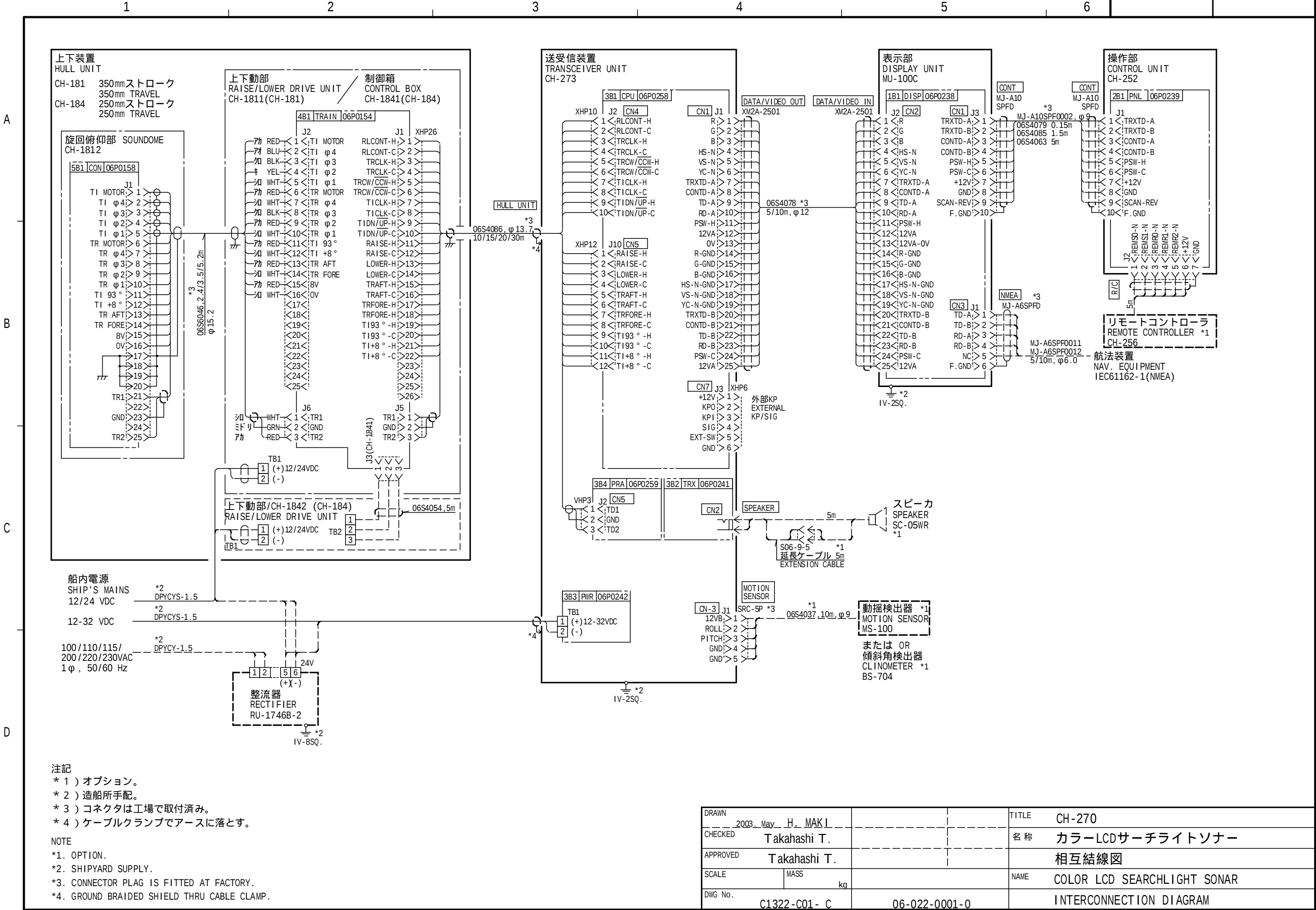
NOTE 1. # : 推奨サービス空間
RECOMMENDED SERVICE CLEARANCE.

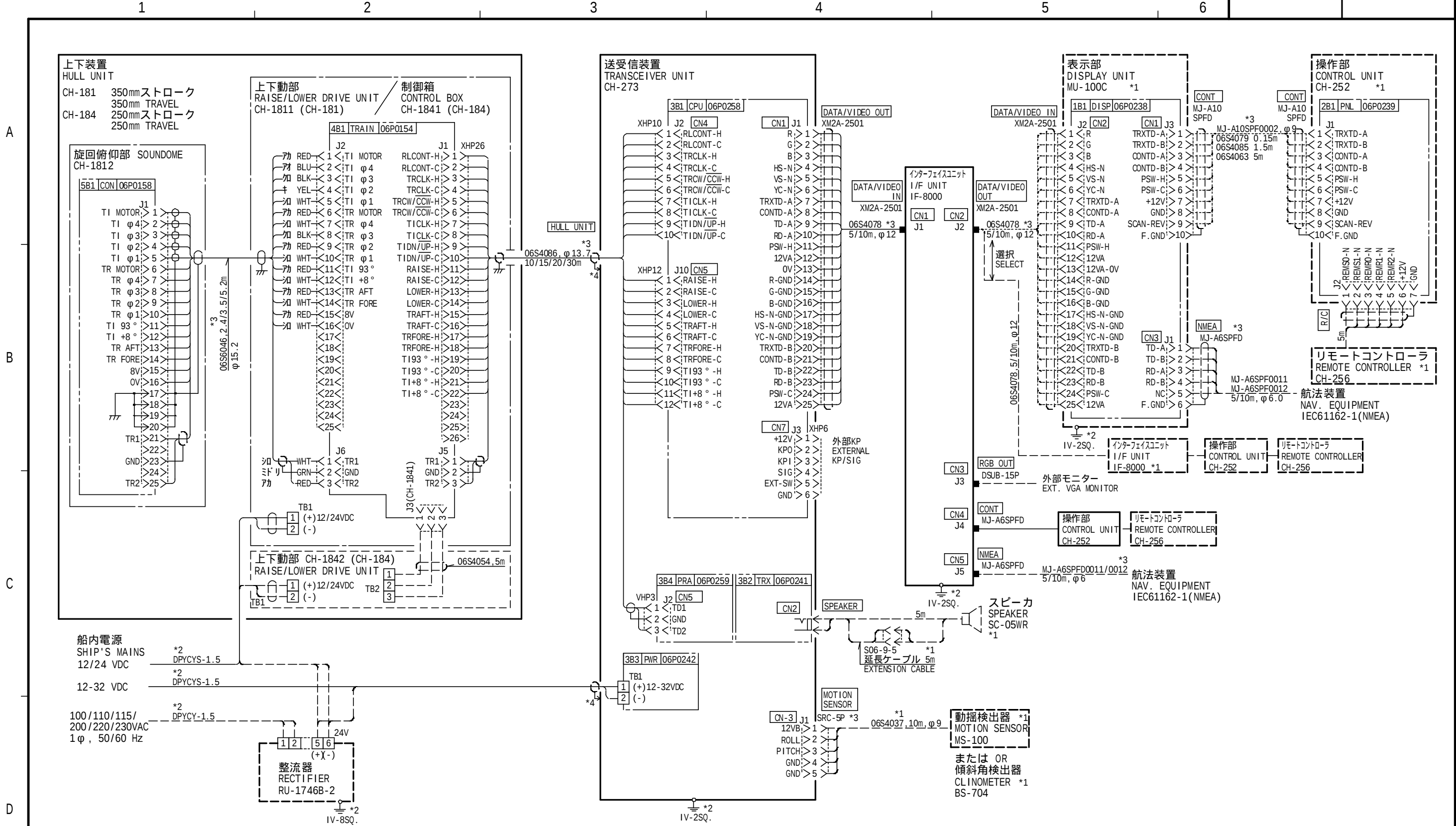


注記 NOTE AC220V入力に対しては T1401の一次巻線を直列に接続する。
FOR 220V AC INPUT, CONNECT T1401 PRIMARY WINDINGS IN SERIES.

DRAWN Aug 16 '00 T. YAMASAKI
CHECKED Aug 17 '00 Y. K. I.
APPROVED Aug 17 '00 Y. K. I.
SCALE 1/5 MASS ±10% 17 kg
DWG. No. C3002-002- N

TITLE RU-1746B-2
名称 整流器
外寸図
NAME RECTIFIER UNIT
OUTLINE DRAWING





注記
 * 1) オプション。
 * 2) 造船所手配。
 * 3) コネクタは工場で取付済み。
 * 4) ケーブルクランプでアースに落とす。
 NOTE
 *1. OPTION.
 *2. SHIPYARD SUPPLY.
 *3. CONNECTOR PLAG IS FITTED AT FACTORY.
 *4. GROUND BRAIDED SHIELD THRU CABLE CLAMP.

DRAWN	2003. May H. MAKI	TITLE	CH-270
CHECKED	Takahashi T.	名称	カラーLCDサーチライトソナー (I/Fユニット使用)
APPROVED	Takahashi T.		相互結線図
SCALE	MASS kg	NAME	COLOR LCD SEARCHLIGHT SONAR (W/IF UNIT)
DWG No.	C1322-C02- B		INTERCONNECTION DIAGRAM