

Installation Manual

Color Scanning Sonar

FSV-85

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ECF

(Elemental Chlorine Free)

The paper used in this manual
is elemental chlorine free.

FURUNO ELECTRIC CO., LTD.

9-52 Ashihara-cho,
Nishinomiya, 662-8580, JAPAN

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SAFETY INSTRUCTIONS

The installer must read the safety instructions before attempting to install the equipment.

 DANGER	Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.


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


 **DANGER**



Keep away from raise/lower shaft in hull unit when it is moving.


Gears will cause serious injury.

 **WARNING**





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

High voltage exists inside the equipment, and a residual charge remains in capacitors several minutes after the power is turned off. Improper handling can result in electrical shock.

 **Turn off power at the switchboard before starting the installation.**


Electrical shock or fire can result if the the power is left on.

 **WARNING**




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

Water can cause fire or electrical shock, or damage the equipment.

 **Be sure no water leaks in at the hull unit.**

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 responsible for its installation, and it should be installed so the hull will not be damaged if an object strikes the tank.**

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

⚠ WARNING

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

Electrolytic corrosion can damage the hull.

! Be sure to power each unit with proper voltage.

Connection of an improper power supply can cause fire or damage the equipment.

⚠ CAUTION

! Maximum speed while the transducer is projected or being raised or lowered is as below, to prevent damage to the transducer.

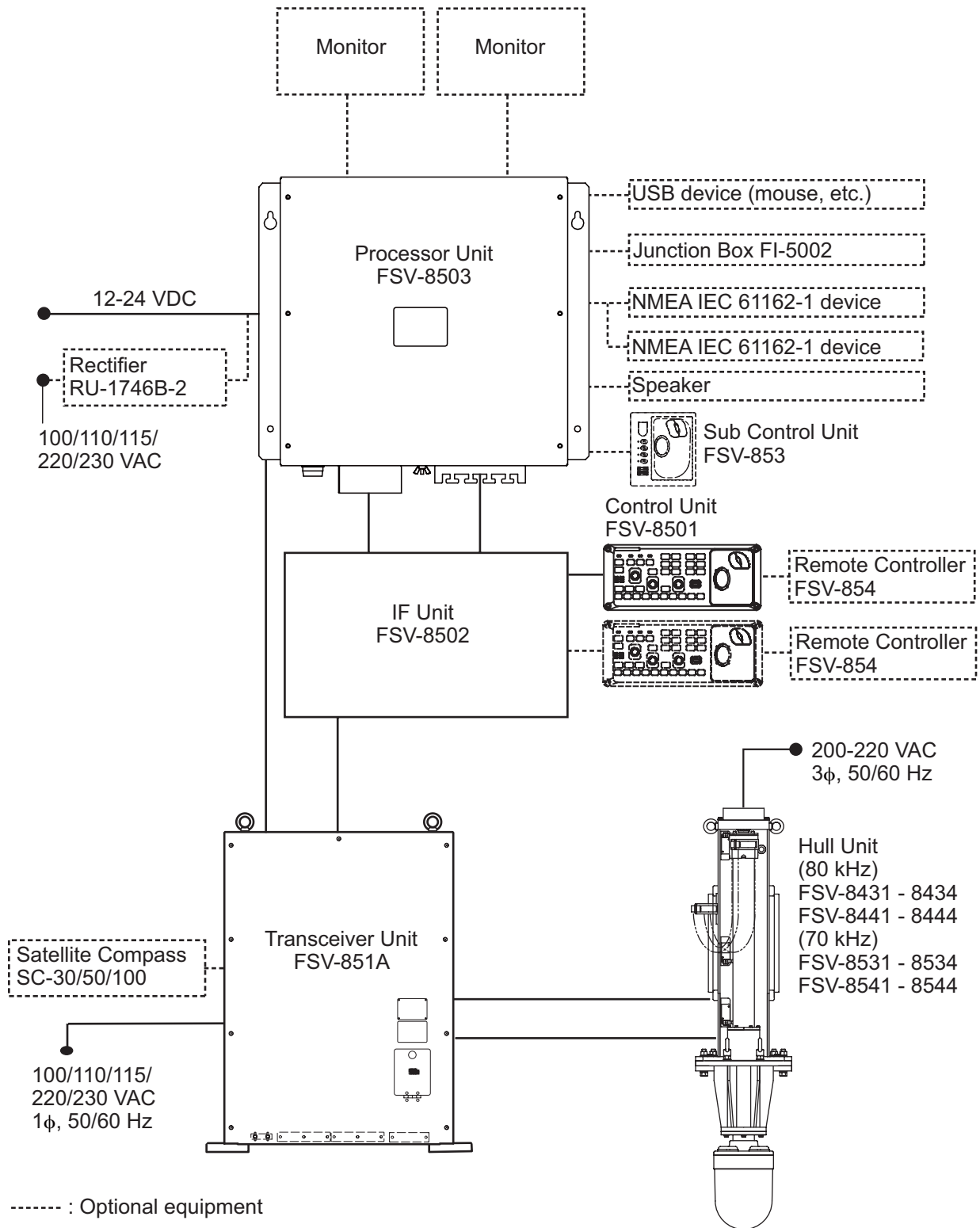
Projected	Raising/ Lowering
Max. 18 kn	Max. 15 kn

⚡ Ground the equipment to prevent electrical shock and mutual interference.

! Observe the following compass safe distances to prevent interference to a magnetic compass:

	Standard compass	Steering compass
Processor Unit	1.45 m	0.90 m
Control Unit FSV-8501	0.35 m	0.30 m
Sub Control Unit FSV-853	0.90 m	0.55 m
IF Unit	0.80 m	0.50 m

SYSTEM CONFIGURATION



Equipment identification tables

Transducer

	FSV-8422	FSV-8423	FSV-8522	FSV-8523
Frequency	80 kHz		70 kHz	
Dome	Yes (thickness: 8mm)	No	Yes (thickness: 9mm)	No
Nameplate	Yes (Unit type and serial no.)			
Color of binding tape	Yellow		Green	
Cable fabrication, label	Yes (Unit name and serial no.)			
Color of unit	Black		Pink/Black	
Dome label	Yes	-	Yes	-
Dome (flange) stamping	No	-	Yes (unit type)	-
Dome (resin) stamping	Yes (10-086-4801)	-	Yes (10-086-4901)	-

Transceiver unit (TRX Board, 10P7010)

	FSV-851A-80	FSV-851A-70
Label above catches on PCB	7010A	7010C

EQUIPMENT LISTS

Standard supply

Name	Type	Code No.	Qty	Remarks
Control Unit	FSV-8501	-	1	With 5 m or 10 m cable
IF Unit	FSV-8502	-	1	
Processor Unit	FSV-8503	-	1	
Transceiver	FSV-851A	-	1	FSV-85
Hull Unit	FSV-8431	-	1	800 travel, for FSV-85-80
	FSV-8432	-		
	FSV-8433	-		
	FSV-8434	-		
	FSV-8441	-		1100 travel, for FSV-85-80
	FSV-8442	-		
	FSV-8443	-		
	FSV-8444	-		
	FSV-8531	-		800 travel, for FSV-85-70
	FSV-8532	-		
	FSV-8533	-		
	FSV-8534	-		
	FSV-8541	-		1100 travel, for FSV-85-70
	FSV-8542	-		
	FSV-8543	-		
FSV-8544	-			
Installation Materials	CP10-06000	000-067-071	1	For FSV-85, no Transducer Cable Extension Kit
	CP10-07200	000-117-257	1	For Control Unit, w/CP10-07201, CP03-33202
	CP10-07300	000-017-123	1	For IF Unit, w/CP10-07301 (incl. cables)
	CP19-06000	000-011-664	1	For Processor Unit, w/CP19-00601
Spare Parts	SP19-00501	001-023-090	1	For Processor Unit

Optional supply

Name	Type	Code No.	Remarks
Control Unit	FSV-8501	-	With 5 m or 10 m cable
Sub Control Unit	FSV-853	000-019-212	
Rectifier	RU-1746B-2	000-030-439	
Remote Controller	FSV-854	000-017-127	Inst. Mat. CP10-07401
Junction Box	FI-5002	000-010-765	For NMEA0183
Retraction Tank	OP10-28	000-067-177	Steel
	OP10-29	000-067-178	FRP
Attachment Kit	OP10-30	000-067-179	
Fixing Materials	OP10-9	006-990-040	For Remote Controller
Flushmount Kit	FP03-09870	008-535-630	
Hull Unit Controller Extension Kit	FSV-846	000-010-215	
Cable	VV-SB-CJ0.3SQ×5P	001-112-320-10	5P, 100 m
8 Core Cable	VV-S0.3×8C	000-555-043	6 m
Cable Assy.	MJ-ASPF0012-050C	000-154-053-10	6P-6P, 5 m
	MJ-ASPF0012-100C	000-154-057-10	6P-6P, 10 m
Installation Materials	CP03-28900	000-082-658	LAN cable (10 m)
	CP03-28910	000-082-659	LAN cable (20 m)
	CP03-28920	000-082-660	LAN cable (30 m)
	CP03-28940	000-090-429	LAN cable (40 m)

1. HOW TO INSTALL THE SYSTEM

1.1 Hull Unit

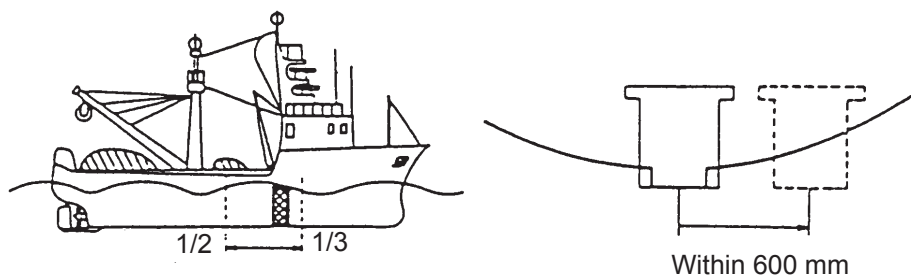
Note 1: The control box on the hull unit contains a motion sensor. Handle the hull unit carefully.

Note 2: Handle the transducer carefully. Rough handling will damage its sensitive components.

1.1.1 Installation considerations

Decide the location of the hull unit through consultation with the dockyard and ship owner. When deciding the location, the following points should be taken into account.

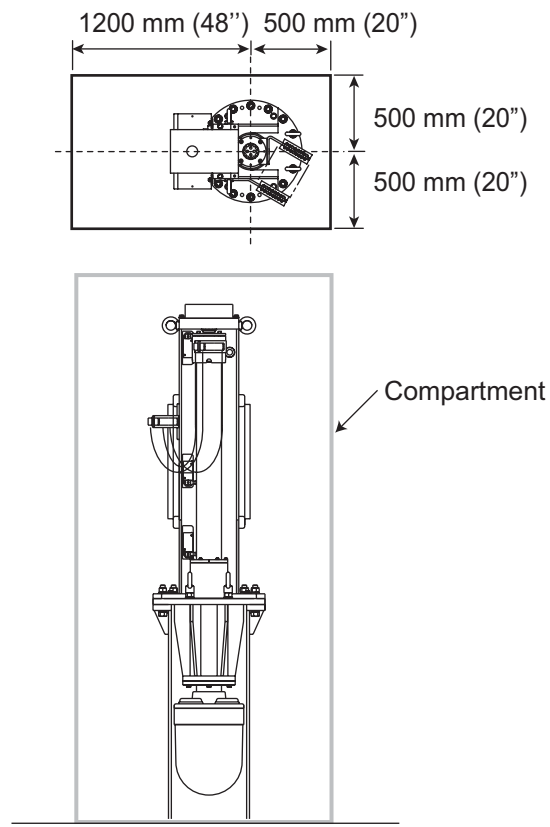
- Select an area where propeller noise, cruising noise, air bubbles and interference from turbulence are at a minimum. Generally, the point at $1/3$ to $1/2$ of the ship's length from the bow on or near the keel is optimum. On-the-keel installation is advantageous for minimizing oil consumption in comparison with off-the-keel. If the hull unit can not be installed on the keel, the center of the retraction tank should be within 600 mm from the keel to prevent a rolling effect. For large ship with deep draft, the hull unit can be installed at the bow.



- Select a place where the hull bottom is flat and the draft is sufficiently deep. Normally, the transducer should protrude at least 500 mm beyond the keel to minimize the effect of air foam and bubbles.
- Select a place where interference from other transducers is minimal. The hull unit should be at least 2.5 m away from the transducers of other equipment.
- No obstacle should be in the fore direction since it causes a shadow zone and aerated water, resulting in poor sonar performance.
- The physical distance between the hull unit and the transceiver unit should be no more than 5 m.
- The space shown in the figure on the next page is required around the hull unit for wiring and maintenance.

1. HOW TO INSTALL THE SYSTEM

- If the ambient temperature around the unit will be below 0°C, provide the sonar compartment with a heater to keep the temperature above 0°C.



Note: After you mount the hull unit, be sure to install anti-vibration stays, referring to page 1-5.

1.1.2 Guideline for how to shorten the retraction tank

Shorten the tank as necessary so that the transducer positions well below the keel when it is fully lowered. The following table provides guidelines for shortening the tank. Refer also to the retraction tank installation drawing at the back of this manual.

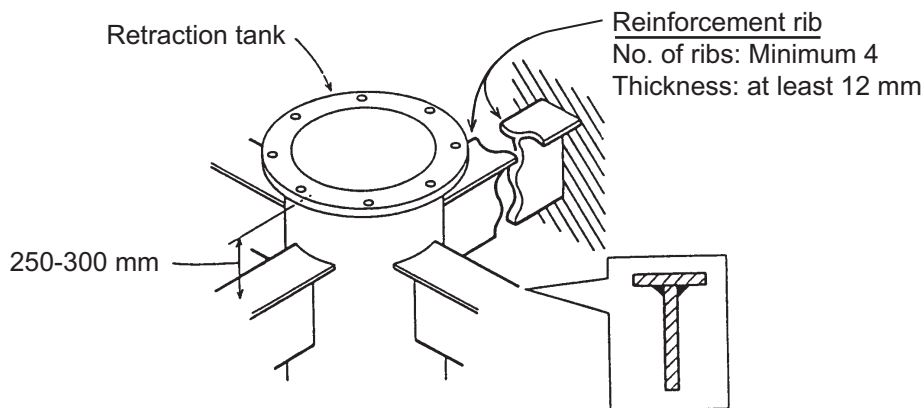
Installation Method				
Stroke				
800 mm stroke	Cut 0-50 mm from the end.	Same as left.	Cut 0-50 mm from the end. Note that the length "D" must be less than 1000 mm.	Same as left.
1100 mm stroke	Cut 0-50 mm from the end.	Same as left.	Cut 0-50 mm from the end. Note that the length "D" must be less than 1200 mm.	Same as left.

Note 1: The transducer will lower to mid-protrusion (500/800 mm stroke) if the tank is not shortened. However, if it is shortened more than 50 mm, the transducer cannot be completely retracted.

Note 2: When maximum length is removed and "D" is minimum, the effect of air foam is minimized because the transducer fully protrudes in water.

Guideline for the installation of the retraction tank

- Install, if possible, the tank on the keel where the tank can be most firmly fixed.
- Install the reinforcement ribs as near as possible to the top of the retraction tank, allowing space for tightening of nuts and bolts.



- Fit a doubling plate (a plate added to another to give extra strength or stiffness) of 700 mm diameter to the location where the retraction tank is welded to the hull bottom. See the outline drawing at back of this manual.

1. HOW TO INSTALL THE SYSTEM

1.1.3 How to install the hull unit on the retraction tank (for steel vessel)

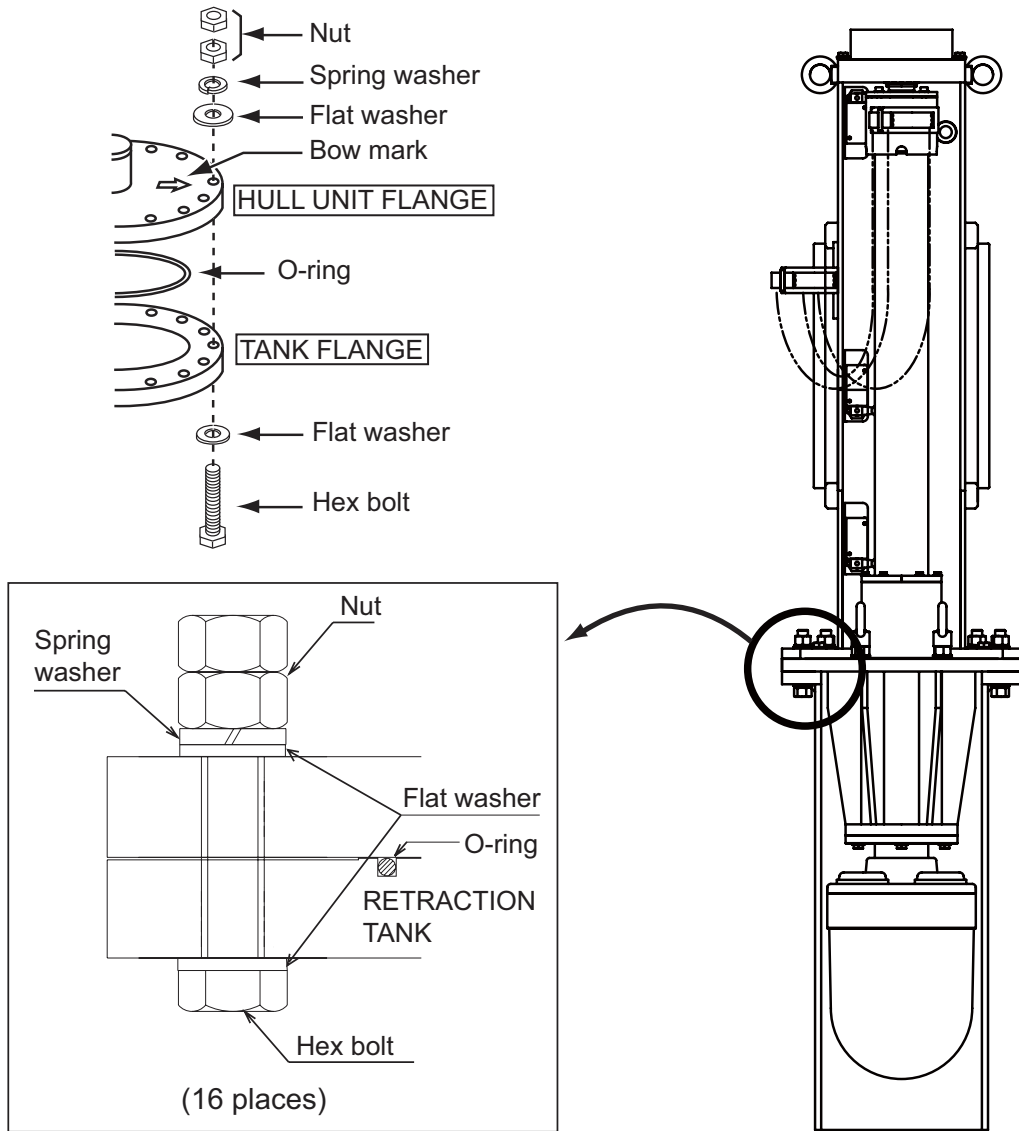
Weld the retraction tank and allow sufficient time for cooling. Install the hull unit as follows:

Prepare the materials and tools as shown below.

Name	Remarks
Screw wrench	M20 (opposite side 30 mm)
Ethyl alcohol	99.5%
Waste cloths	
Lithium grease	For O-ring Common lithium grease (the equivalent of Daphne Eponex Grease #2)
Molytone grease	For drive shaft Molytone grease #2 (by SUMICO LUBRICANT CO., LTD)

Note: See section 1.8.1 to install the hull unit to FRP ship.

1. Clean the flange and O-ring groove of the retraction tank (welded to hull) with ethyl alcohol moistened waste cloths. Coat O-ring and O-ring groove with lithium grease. Place the O-ring in its groove on the tank flange.
2. Orient the hull unit so that the bow mark (inscribed) on its flange points toward the ship's bow. Note that heading adjustment is required if the bow mark is not facing the ship's bow.
3. Confirm the following points as below and place the hull unit on the tank.
 - Clean the flange platform.
 - Wipe the undersurface of the hull unit flange with clean waste cloths.
 - Keep O-ring in its groove.
4. Coat the threads of the bolts with a slight amount of lithium grease to prevent scorching. Insert the bolts with washers from the retraction tank flange, and then put the flat washers and spring washers in this order from above. Fasten bolts with nuts.
5. Reinforce the hull unit against vibration by extending stays to the ship's hull from the two eye-bolts at the top of the hull unit, referring to the procedure on the page 1-5.

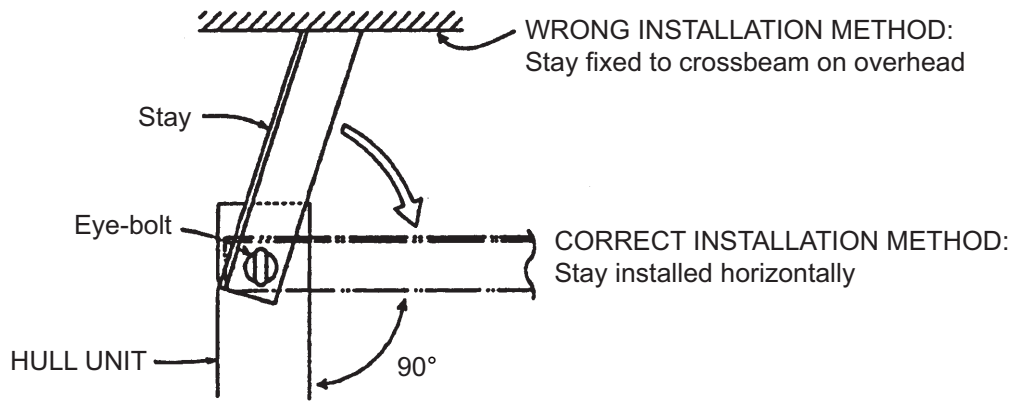


How to install the stays (anti-vibration measure)

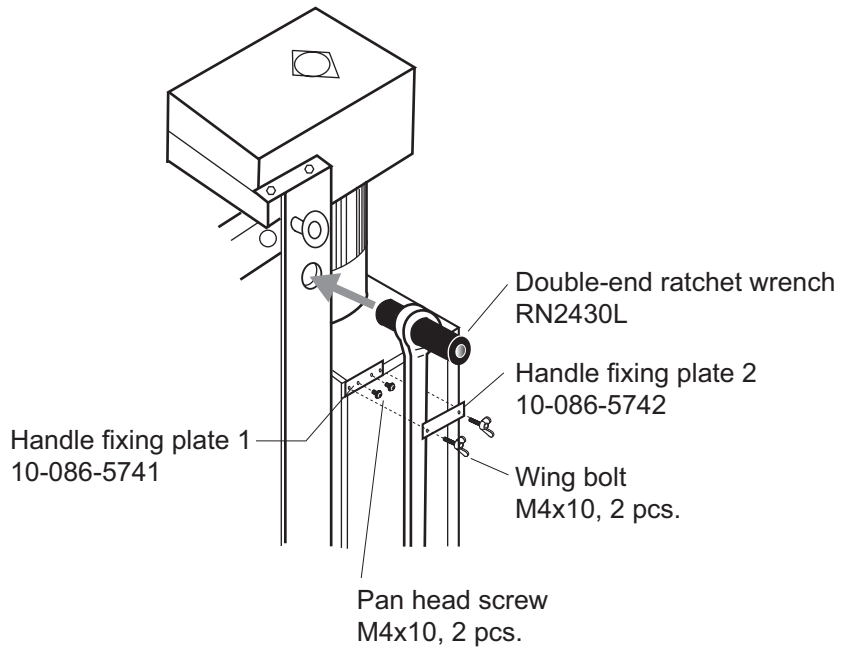
Install stays from the top of the hull unit to the ship's hull. The stays should be angle iron with a size of 75×75×9 mm or more and at least two pieces should be used; one each to ship's bow and stern directions. **This measure must be done to prevent damage to the transducer.**

Do not install the stays on a crossbeam on the overhead. Vibration-resistance effect is reduced since vibration is applied to the stays as rotation force. Install them horizontally.

1. HOW TO INSTALL THE SYSTEM



After you install the hull unit, attach the double-end ratchet wrench to the location shown in the figure below.



1.2 Processor Unit

1.2.1 Installation considerations

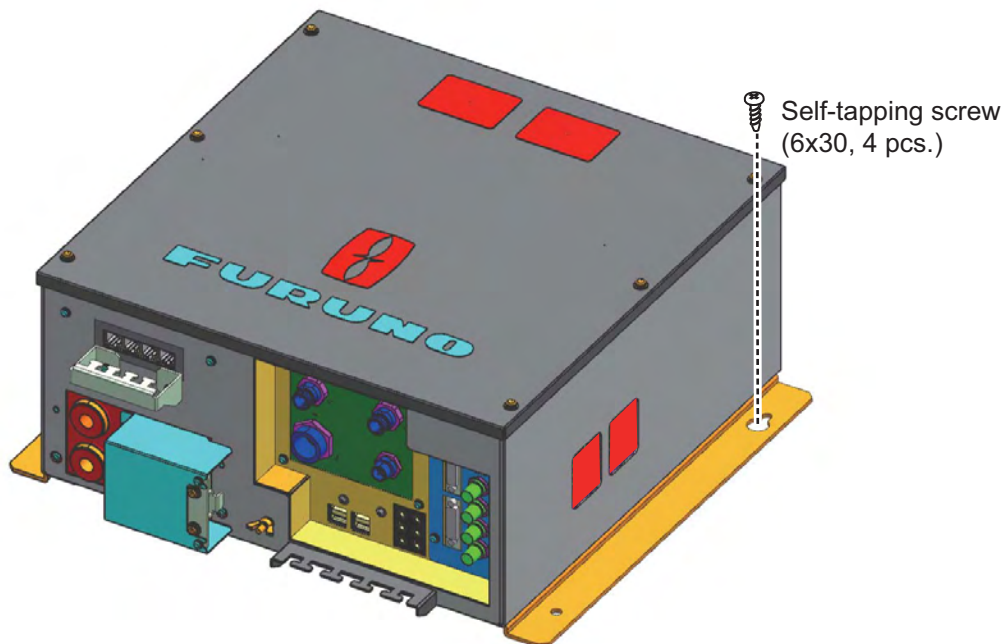
Follow the points below to select an installation location.

- Mount the unit upright.
- Locate the unit out of direct sunlight and away from heat sources because of heat that can build up inside the unit.
- Install the unit away from areas subject to water splash or rain.
- Be sure the mounting location is strong enough to support the weight of the unit under the continued vibration which is normally experienced on the ship. If necessary reinforce the mounting location.
- Determine the mounting location considering the length of these cables: - Signal cable from the transceiver unit - control cable from the control Unit
- Leave sufficient space on the sides of the unit to facilitate maintenance. Also, leave a foot or so of "service loop" in cables for servicing or easy removal of connectors. See the outline drawing for recommended maintenance space.
- Follow the compass safe distances in the Safety Instructions to prevent interference to a magnetic compass.

1.2.2 How to install the processor unit

Desktop installation

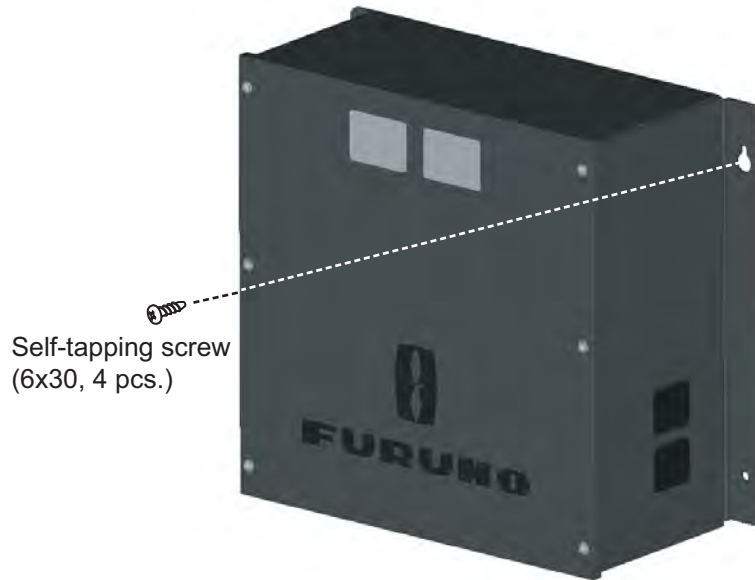
Fasten the unit with four self-tapping screws (6x30).



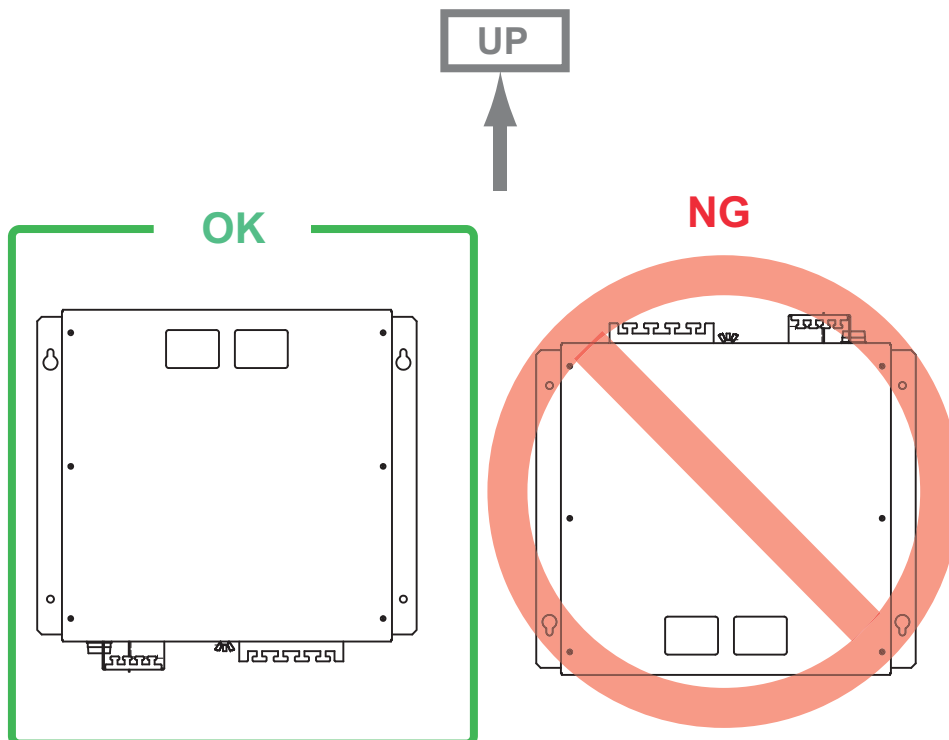
1. HOW TO INSTALL THE SYSTEM

Bulkhead installation

1. Mark locations for four self-tapping screws on the installation location.
2. Insert two self-tapping screws (6×30, supplied) at the top two screw holes, leaving approx. 5 mm of the screws exposed.
3. Hang the processor unit on the two screws inserted at step 2.
4. Insert two self-tapping screws at the bottom of the unit.
5. Tighten all screws.



Note: The processor unit must be installed on the bulkhead with the following direction.



1.3 Control Units

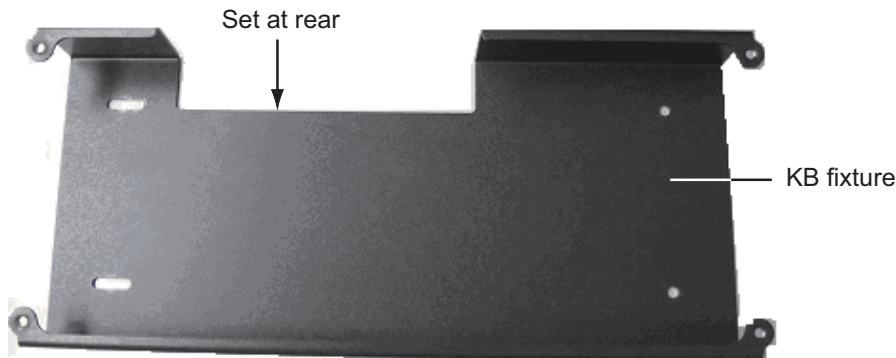
The control units can be installed in a console (flush mount) or on a desktop (with KB fixture). Select a location considering the following points.

- Select a location where the controls can be easily operated.
- Locate the unit out of direct sunlight.
- Keep the unit away from water and water splash
- The length of the cable connected between the control unit and IF unit is 5 or 10 m. Select a location considering the length of the cable.
- Observe the compass safe distance (see the Safety Instructions) to prevent interference to a magnetic compass.

1.3.1 Control Unit FSV-8501

Desktop installation, with KB fixture

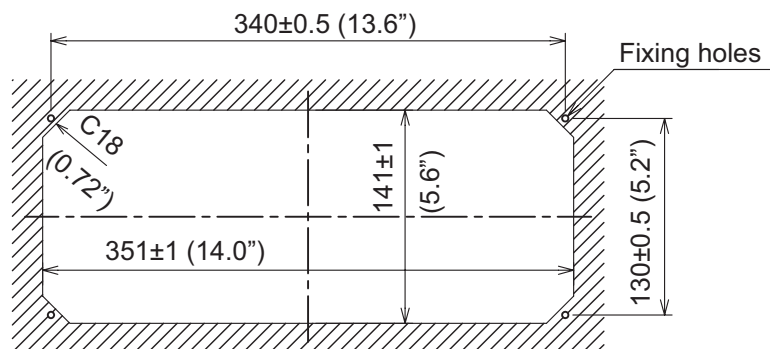
1. Fasten the KB fixture to the selected location with four self-tapping screws (M5×20).



2. Connect a ground wire (1.25sq, local supply) between the ground terminal at the bottom of the unit and ship's ground.
3. Set the unit on top of the KB fixture and fasten the unit with four binding screws (M5×12) and wave washers.
4. Set cosmetic caps to fixing holes.

Flush mount

1. Prepare a cutout in the mounting location referring to outline drawing shown below.



2. Make holes for four self-tapping screws (M5×20).

1. HOW TO INSTALL THE SYSTEM

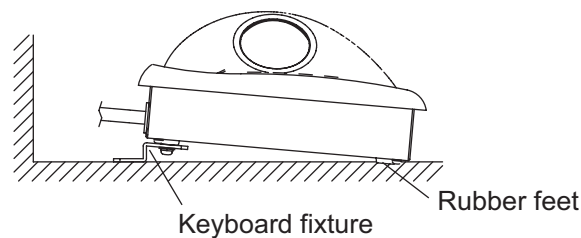
3. Peel the tape from the F mount gasket then attach the gasket to the rear of the Control Unit.
4. Connect a ground wire (1.25sq, local supply) between the ground terminal at the bottom of the unit and ship's ground.
5. Set the unit to the cutout and fasten it with four self-tapping screws (M5×20) and wave washers.
6. Set cosmetic caps to fixing holes.

1.3.2 Sub Control Unit FSV-853 (option)

Desktop installation. with keyboard fixture

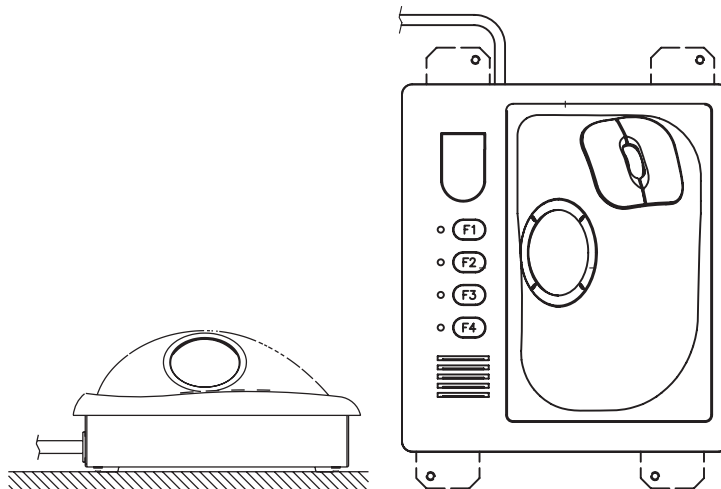
Name	Type	Code No.	Qty
Keyboard fixture	03-163-7821-1	100-306-291-10	1
Washer head screw	M4×12 C2700W MBN12	000-163-192-10	6
Rubber foot	M5x40	000-162-682-10	2

1. Fix the keyboard fixture to the bottom of the unit with the screws supplied.
2. Attach rubber feet (2 pcs.) to the bottom of the unit.
3. Fix the unit to with self-tapping screws (local supply).



Desktop installation. no keyboard fixture

1. Drill four mounting holes of 5 mm diameter, referring to the outline drawing at the back of this manual.
2. Fix the unit with four screws (M4) from under side of the desktop. (Supply the screws locally. Be sure the screws are of a sufficient length for the thickness of the desktop.)

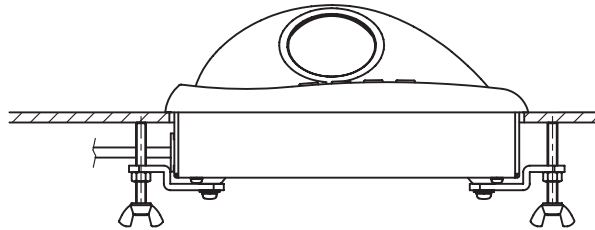


Flush mount

Use the optional flush mount kit to mount the sub control unit.

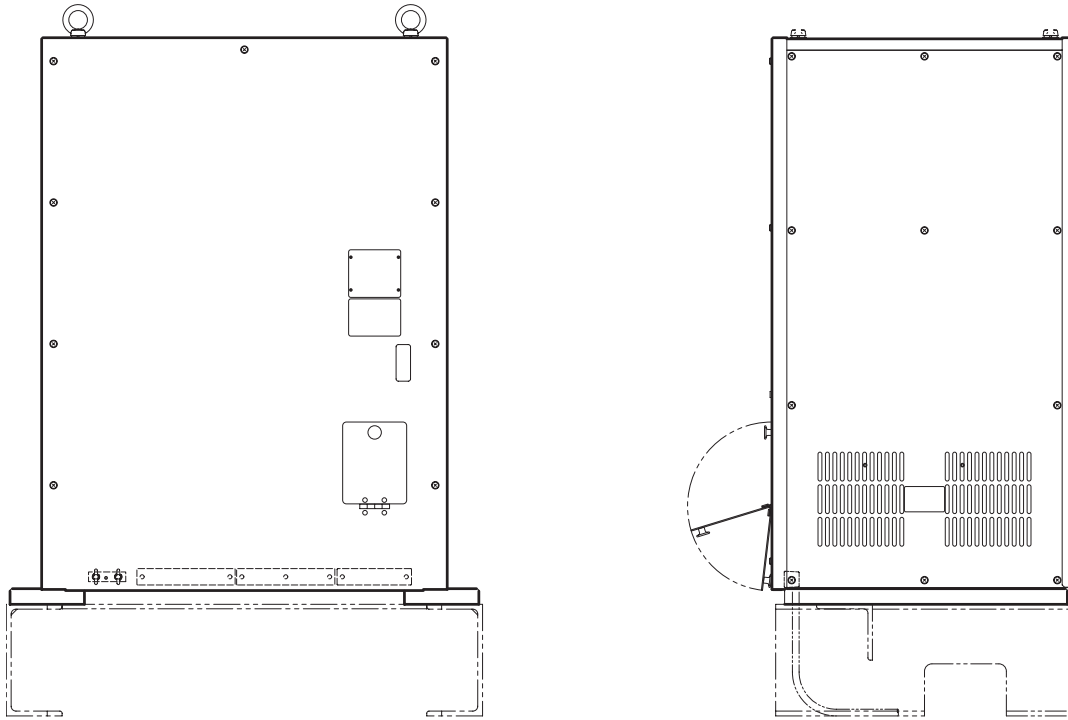
Name	Type	Code No.	Qty
Mounting plate	03-163-7531	100-306-261	4
Hex nut	M5	000-863-108	4
Wing screw	M5x40	000-162-682-10	4
Pan head screw	M4x12	000-163-192-10	4

1. Prepare a cutout in the mounting location referring to the outline drawing at the back of this manual.
2. Set the unit to the cutout.
3. Attach the mounting plate to the unit with four screws from the rear side.
4. Screw the wing screw to each mounting plate and then insert hex bolt to each wing screw.
5. Fasten each wing screw and then fasten the hex nuts.



1.4 Transceiver Unit

The length of the cable between the transceiver unit and the hull unit is 10 m (standard), so select a mounting location within 5 m of the hull unit. The transceiver unit should be fixed to a mounting base (shipyard supply) whose dimensions are as shown in the outline drawing at the back of this manual. Reinforce the transceiver unit against vibration by stays extending from the eye-bolts on the top of the unit. Fasten four bolts (M12, local supply) at the bottom of the transceiver unit to fix the unit to the mounting base.



1.5 IF Unit

Refer to the outline drawing at the back of this manual for mounting dimensions. Fasten the unit with 5×20 self-tapping screws. If the unit is to be installed on a bulkhead, be sure that the location does not allow water to drip into the cable entrance.

1.6 Attachment Kit (option)

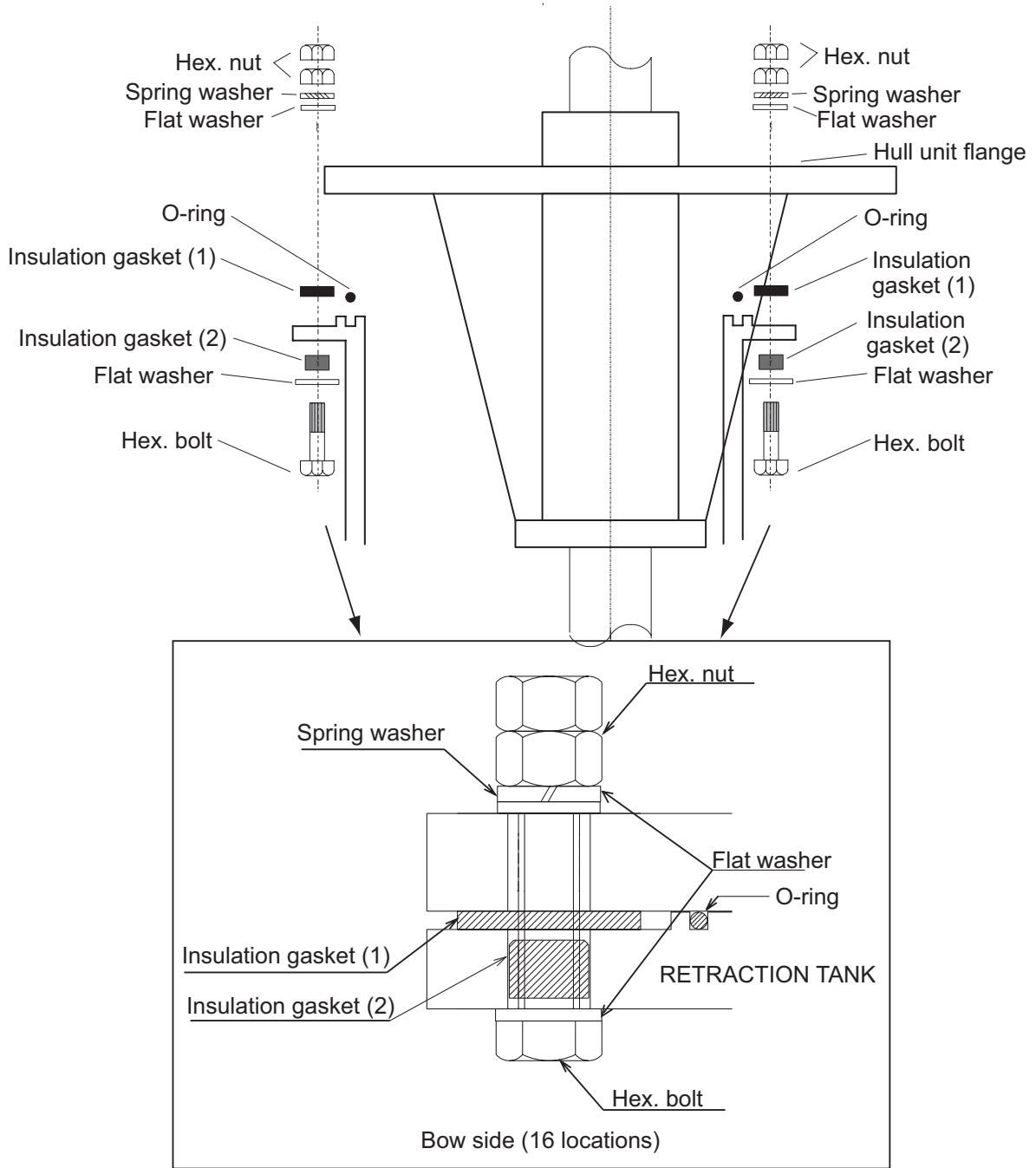
The attachment kit permits use of the retraction tank for the CSH-80 series.

OP10-30. Code No. 000-067-179

Name	Type	Code No.	Qty
Insulation Gasket (1)	SHG-0003-1	100-038-571	1
Insulation Gasket (2)	MS-1000-68-1	100-347-611	16
O-ring	C00117A	000-158-976-10	1

- Clean the flange and O-ring groove of the retraction tank (welded to hull) with ethyl alcohol moistened waste cloths. Coat O-ring and O-ring groove with lithium grease. Place the O-ring in its groove on the tank flange.
- Lay the insulation gaskets (1) on the top of the tank flange.
- Position the hull unit so that the bow mark (inscribed) on its flange points toward the ship's bow. Note that heading adjustment in the monitor is required if the bow mark does not physically face the ship's bow.
- Confirm the following points as below and place the hull unit on the tank.
 - Clean the flange platform.
 - Wipe the undersurface of the hull unit flange with clean waste cloths.
 - Keep O-ring in its groove.
- Insert the flat washers and insulation gaskets (2) into the bolt holes of the tank flange.
- Coat threads of the bolts with a slight amount of lithium grease to prevent scorching. Insert the bolts with washers from the retraction tank flange, and then put the flat washers and spring washers in this order from above. Fasten bolts with nuts.

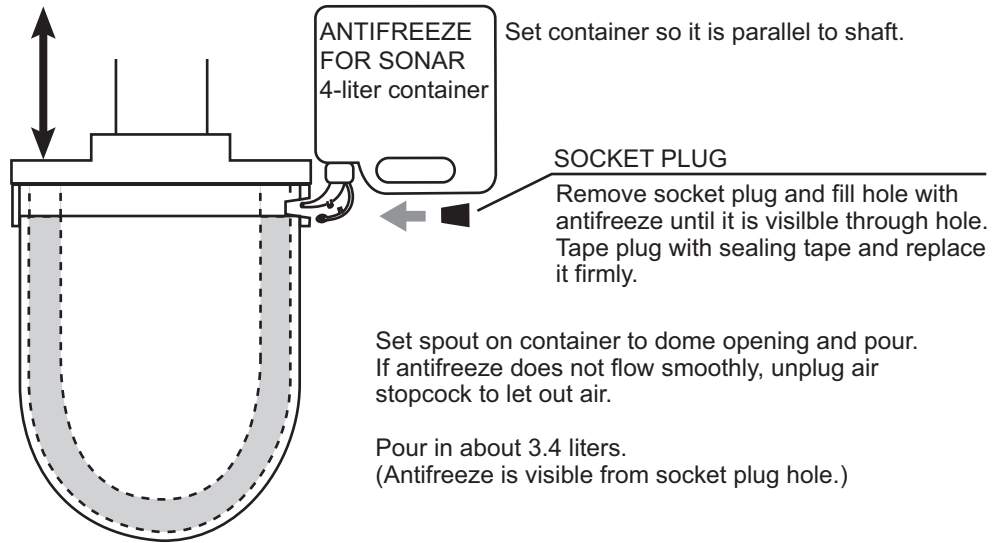
1. HOW TO INSTALL THE SYSTEM



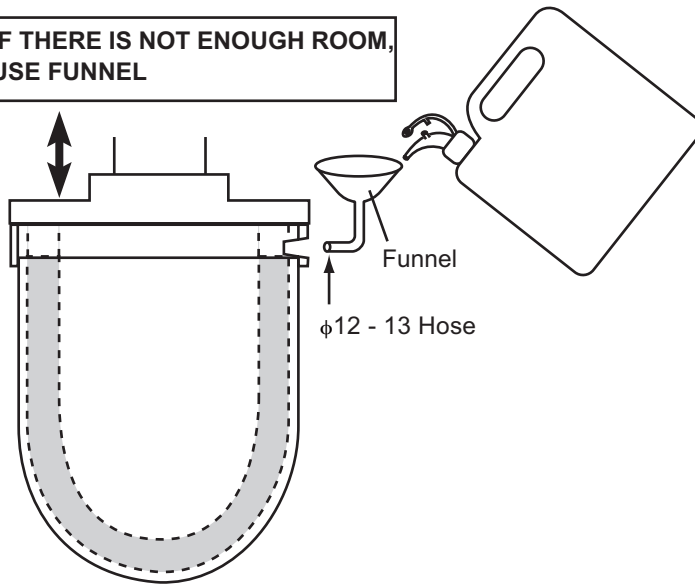
1.7 How to Fill the Soundome with Antifreeze

Fill the soundome with antifreeze as shown below.

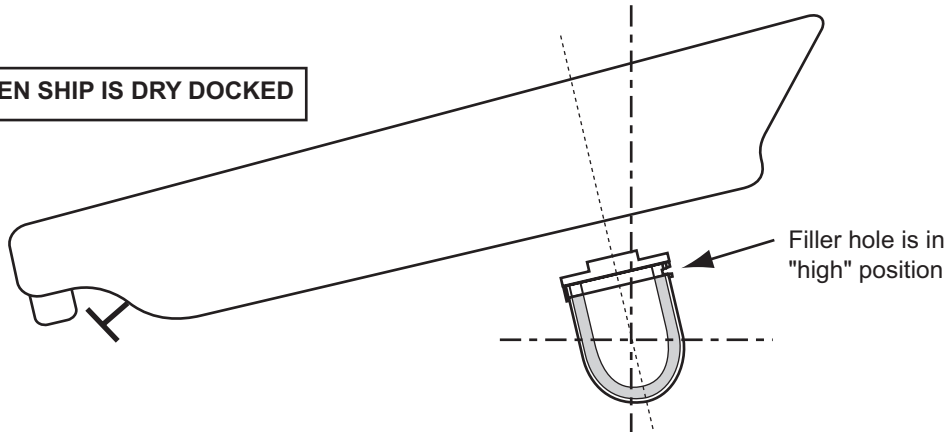
IF THERE IS SUFFICIENT ROOM



IF THERE IS NOT ENOUGH ROOM, USE FUNNEL



WHEN SHIP IS DRY DOCKED



NOTICE: When the ship is dry docked, drain antifreeze from dome when temperature is lower than -20°C. Failure to do so can damage the dome.

1.8 FRP Tank (option)

OP10-29. Code No. 000-067-178

Name	Type	Code No.	Qty
Retraction Tank	OP10-29-1	007-022-920	1
Waterproofing Gasket	SHH-0003-1	660-800-031	1
Liquid Gasket	TB1194 200G	000-164-260-10	1

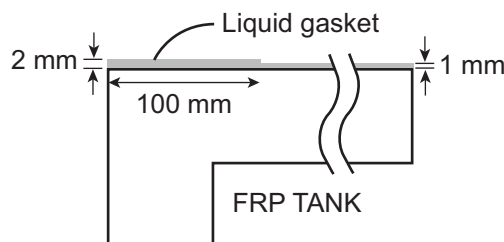
Use an FRP tank supplied by FURUNO. Other makes of tank may be used, however watertightness cannot be guaranteed by FURUNO. A non-FURUNO make of tank should meet the following requirements:

- The surface of the FRP tank flange must be flush (within 0.5 mm) with tank.
- Use the liquid gasket recommended by shipyard.

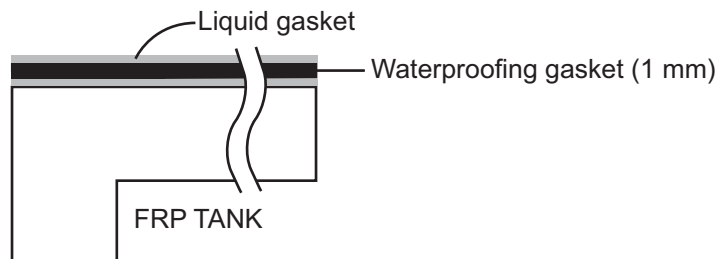
1.8.1 How to install the hull unit to an FRP tank

Fasten the hull unit to the FRP retraction tank as follows:

1. Clean the surface of the tank flange with ethyl alcohol moistened waste cloths. Coat the flange with about 1mm thickness of liquid gasket (supplied). **USE ONLY THE SUPPLIED liquid gasket.**

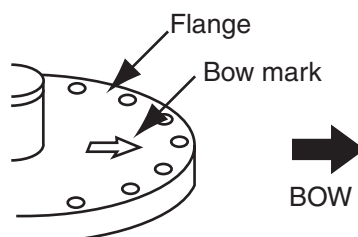


2. Lay the waterproofing gasket on the tank flange and coat the gasket with about 1 mm thickness of liquid gasket.

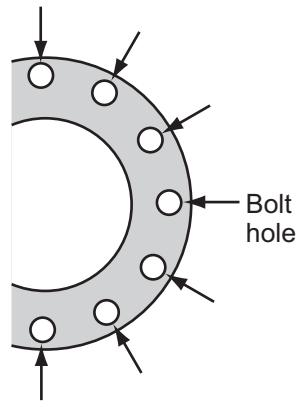


Note: Use only specified waterproofing gasket.

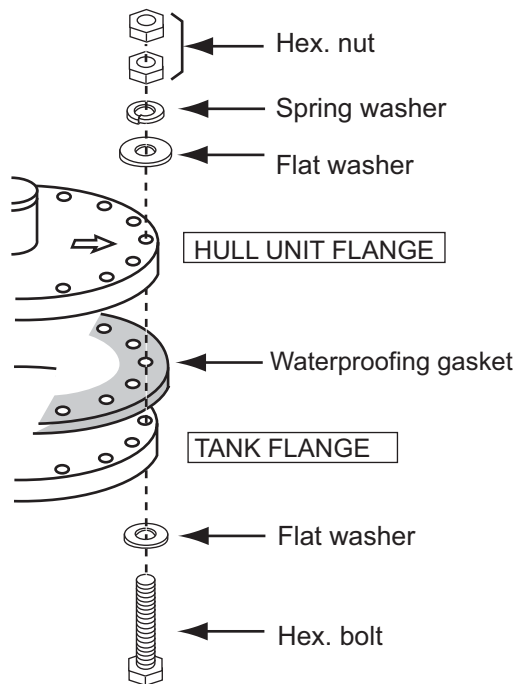
3. Position the bow mark (arrow) on the hull unit flange toward ship's bow. (If the mark can not be perfectly oriented toward ship's bow, adjust heading after installation, as shown later in this manual.)



4. Set the hull unit on the top of the retraction tank, observing the following cautions:
 - Clean the flange platform.
 - Wipe the undersurface of the hull unit flange with clean waste cloths.
 - Confirm that the waterproofing gasket is properly in place.

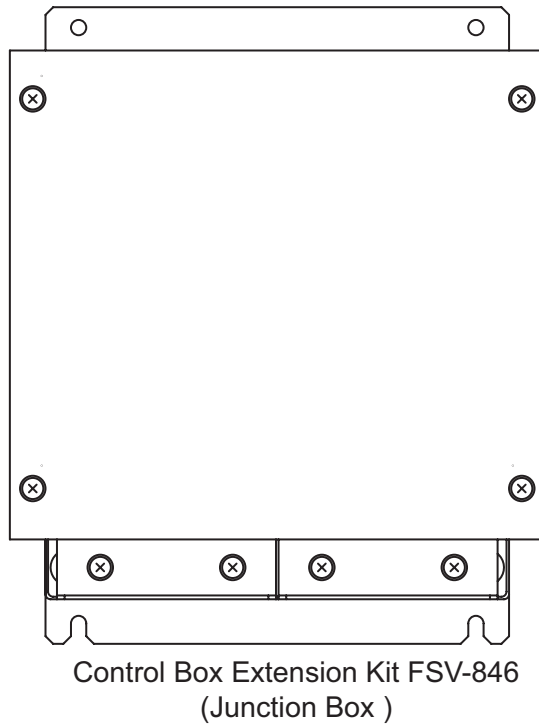
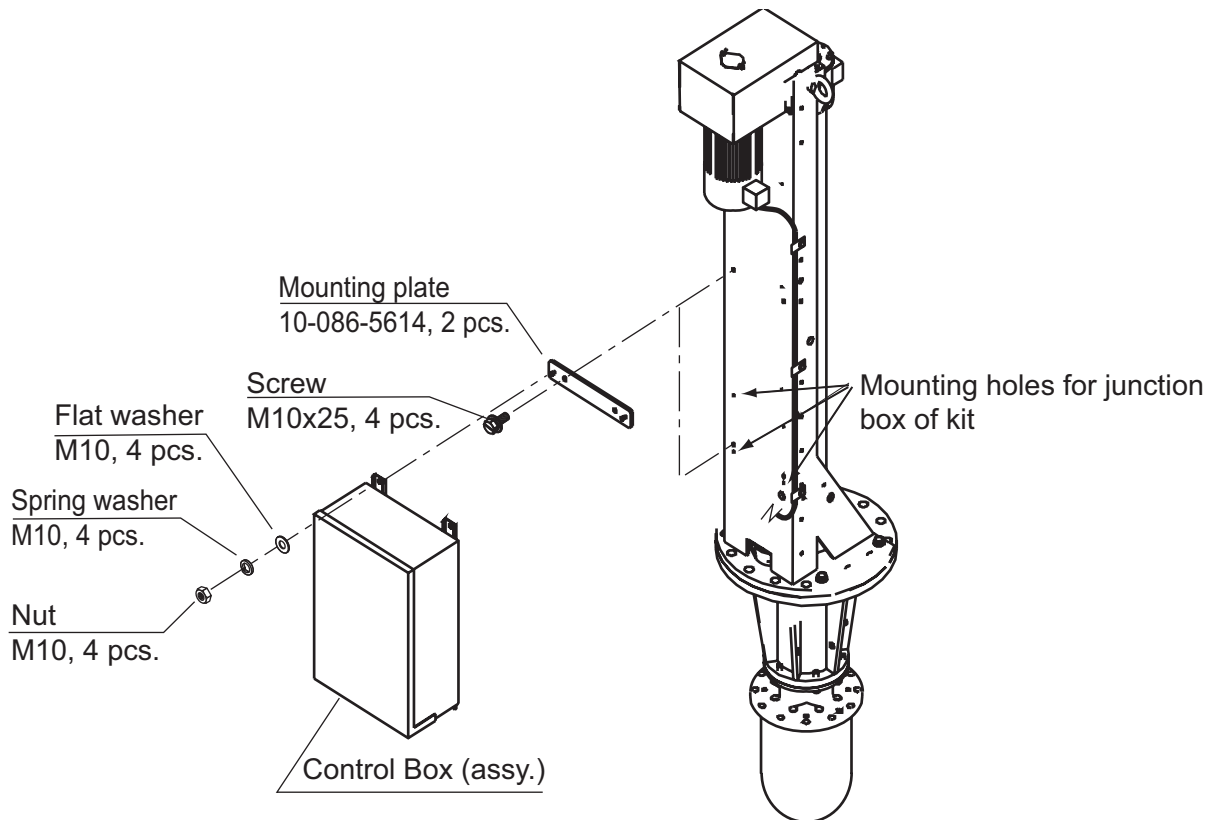


5. Coat threads of the bolts with a slight amount of lithium grease to prevent scorching. Insert the bolts with washers from the retraction tank flange, and then put the flat washers and spring washers in this order from above. Fasten bolts with nuts.



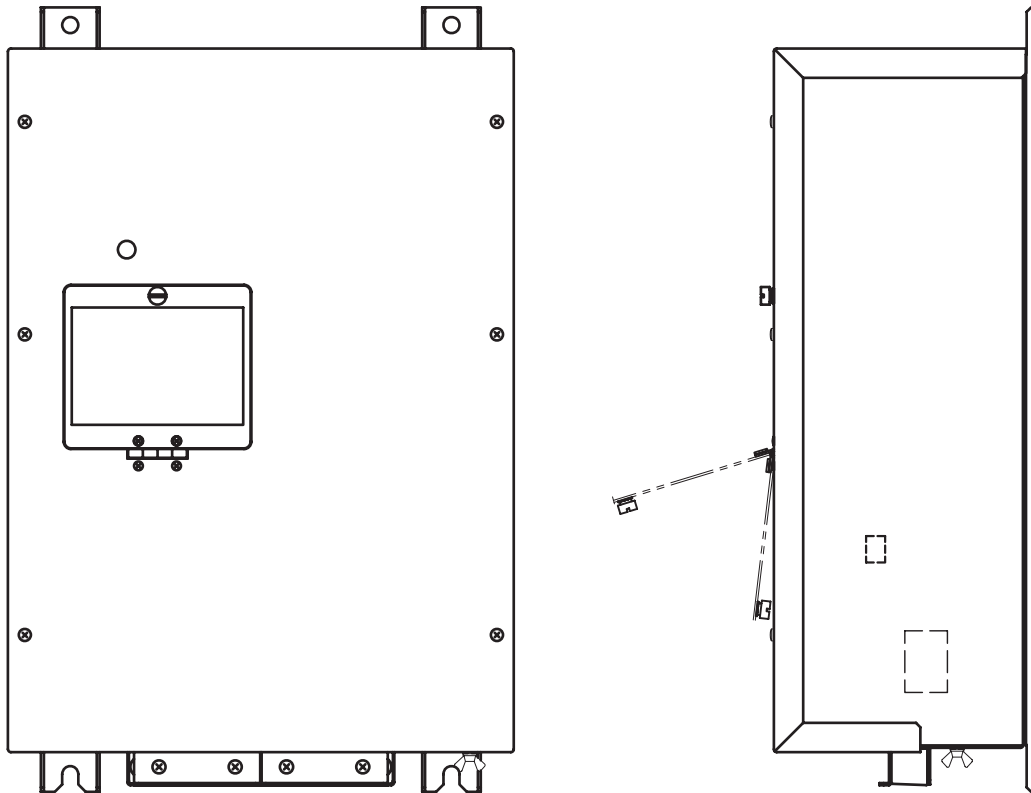
1.9 Control Box Extension Kit (option)

The control box may be mounted separately from the hull unit. Detach the control box and the mounting plate from the hull unit and fix the junction box of the control box extension kit FSV-846 to the hull unit, with four M5 bolts.



Fix the control box to a bulkhead with four M10 bolts.

Note 1: Install the control box on the bulkhead because of the limitation of the electro-magnetic relay in the control box.



Control Box

Note 2: If the motion sensor is installed in the control box, enter its mounting angle when you adjust the heading (Chapter 3). The mounting angle is 0 degrees if the lid of the control box is directed toward ship's stern precisely. The angle is measured in the clockwise direction.

1.10 Remote Controller (option)

Use the mounting kit (Type: OP10-9, Code No. 006-990-040) to install the Remote Controller. Select a location not affected by water splash. See the outline drawing for mounting dimensions.

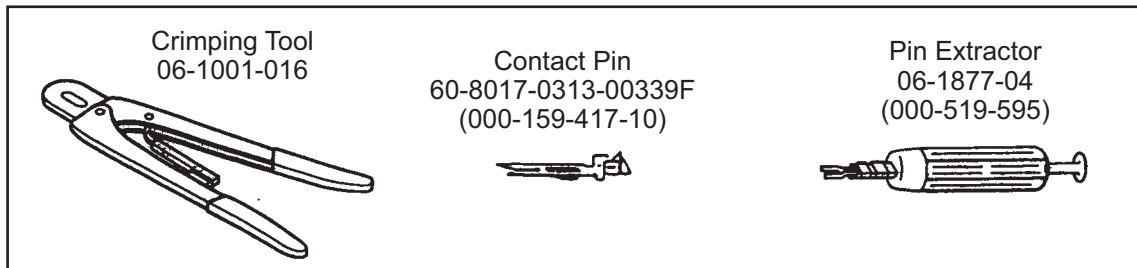
1. HOW TO INSTALL THE SYSTEM

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2. WIRING

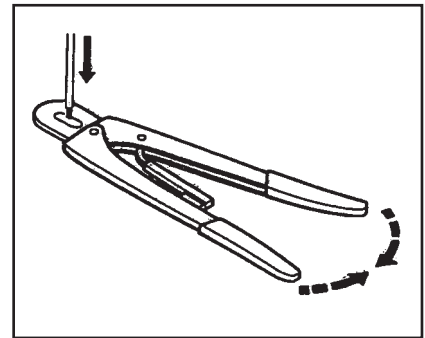
2.1 How to Use the Crimping Tool, Pin Extractor

A special crimping tool is necessary for connection of wires to the contact pins of the 38P connector. The pin extractor removes the contact pin from the connector body. This paragraph describes how to crimp and extract the contact pin.



2.1.1 How to use the crimping tool

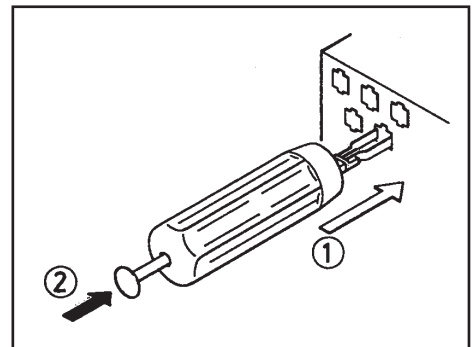
1. Remove the vinyl sheath by 3 to 4 mm to expose the core.
2. Hold the crimping tool horizontally and insert the contact pin with its slit facing downward into the crimp hole on the crimping tool.
3. Insert the wire onto the contact pin and squeeze the handle until the ratchet releases. (The wire should be placed deep enough into the contact pin so that its end comes in contact with the stopper plate of the crimping tool.)
4. With crimping completed, pull the wire while holding the contact pin to make sure that the wire is held firmly by the contact pin.



2.1.2 How to use the pin extractor

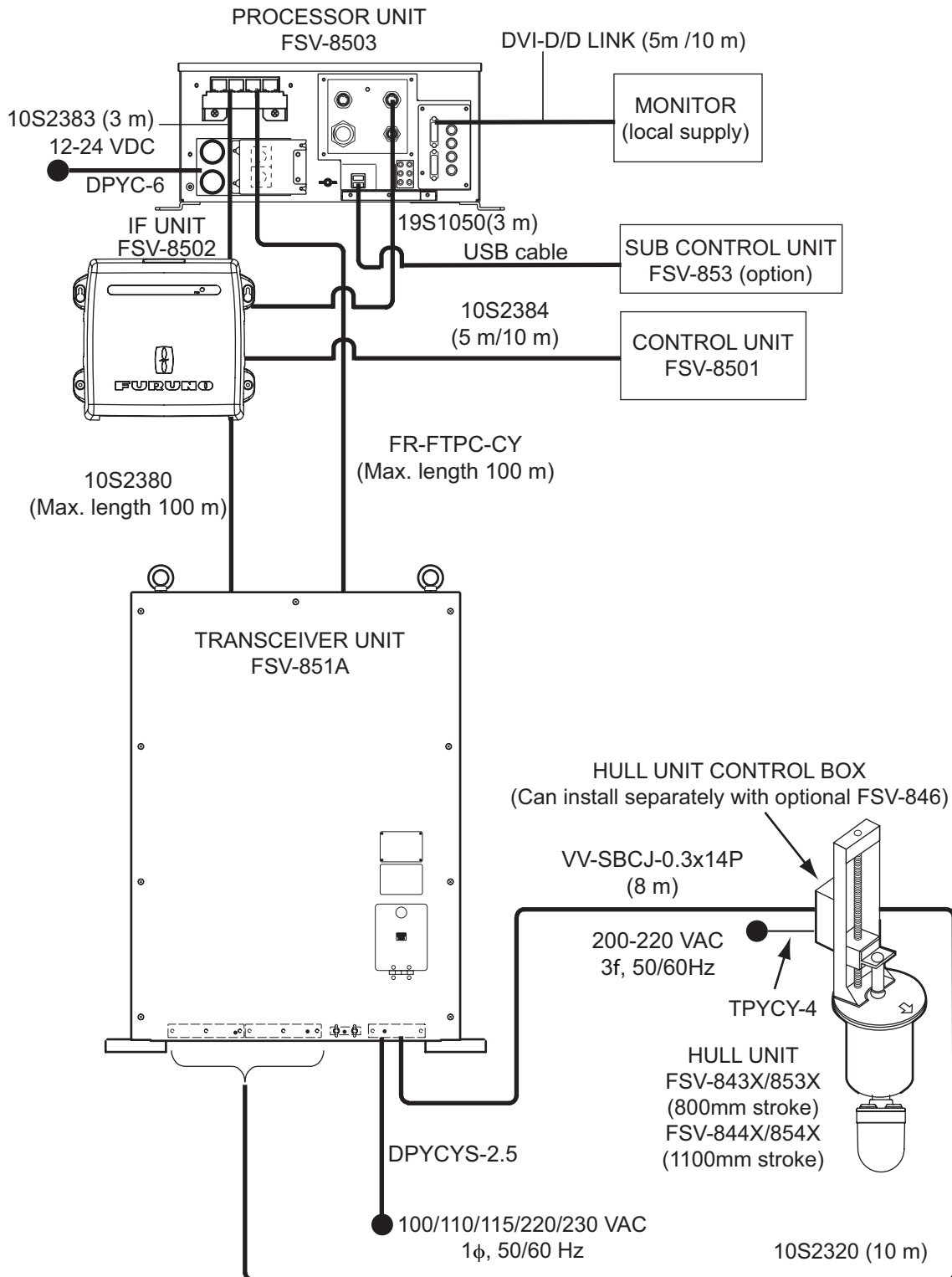
If a contact pin is inserted into an incorrect hole on the connector body, remove it with the pin extractor.

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



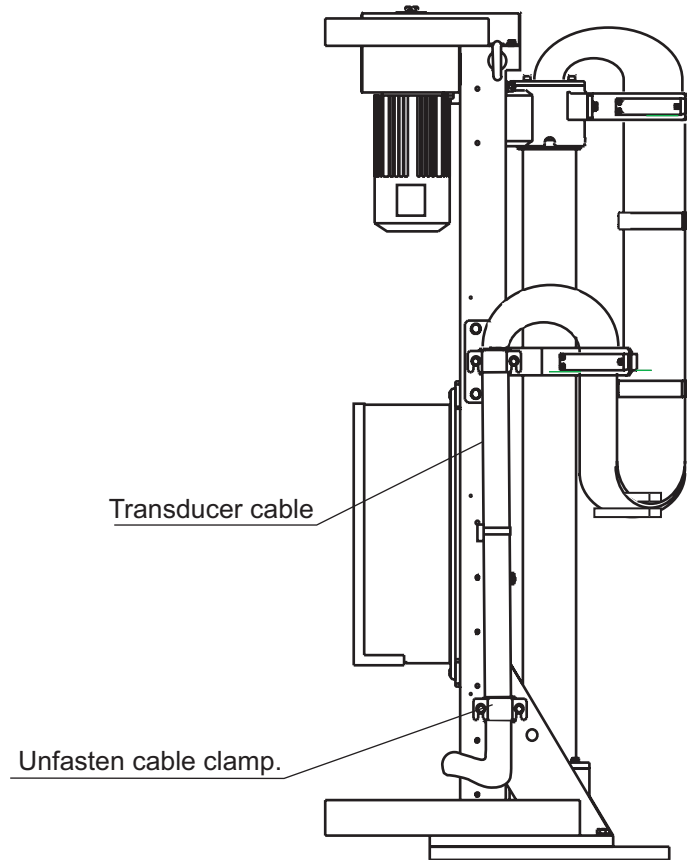
2.2 How to Connect Units

FSV-85



Transducer cable

If the transducer cable is not quite long enough, unfasten the cable clamp to release the cable.

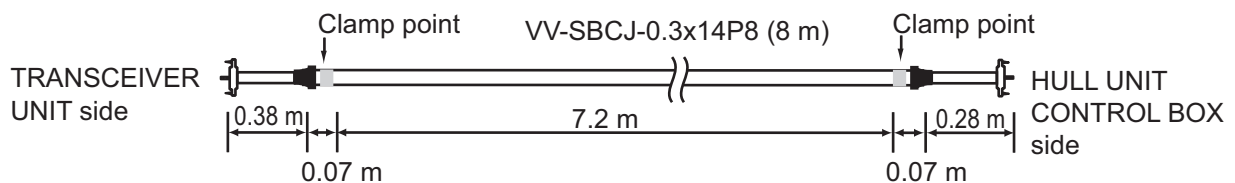


Ground

Ground the processor unit and the hull unit, using an IV-8 sq wire or copper strap, to prevent electrical shock. The transceiver unit also must be grounded, also with an IV-8 sq wire or copper strap of 50 mm width. The transceiver unit is supplied with a copper strap.

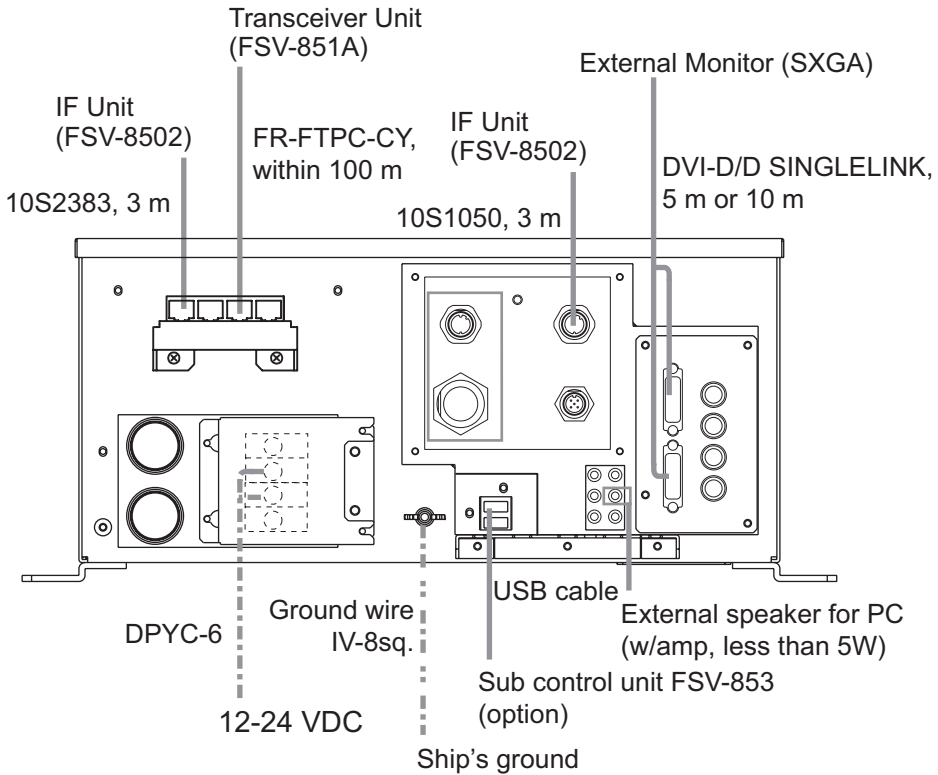
Cable between Hull Unit and Transceiver Unit

The length of the cable between the hull unit and transceiver unit is 8 m. Arrange it as shown below.



2.3 Processor Unit

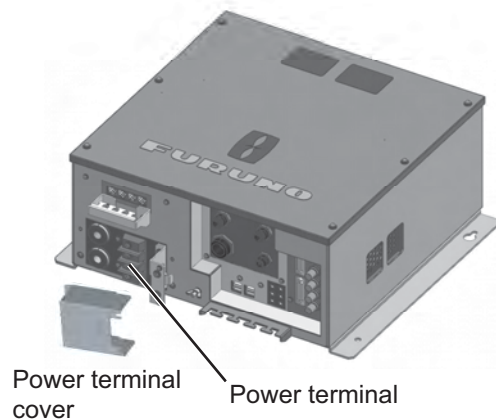
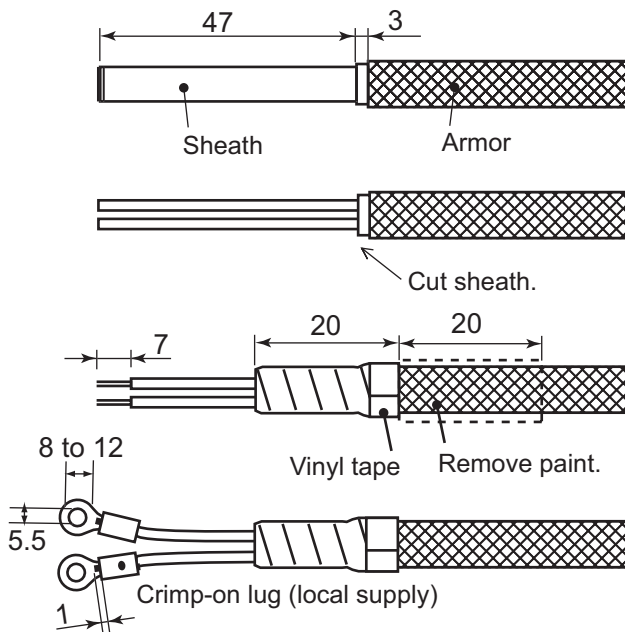
Connect the cables of other equipment at the rear of the processor unit.



Power cable

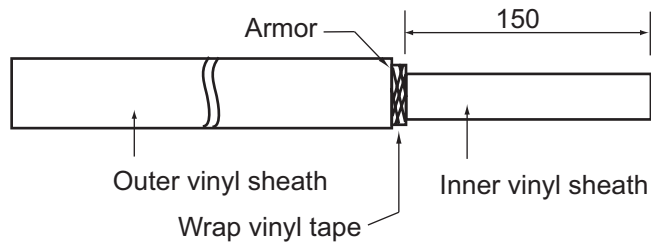
Connect the power cable (DPYC-6, L=5 m, local supply) as follows:

1. Process the cable as shown below.
2. Open the power terminal cover on the processor unit. Connect the power cable: top terminal(#1), +; bottom terminal(#2), -.
3. Close the power terminal cover.



LAN cable

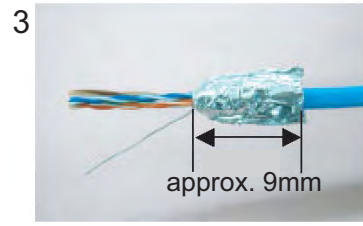
Fabricate the supplied LAN cable (FR-FTPC-CY, 10/20/30/50/100 m) as shown below. Cut the vinyl sheath and armor to the lengths shown and attach the modular connector.



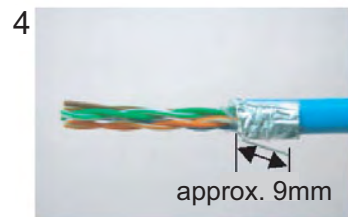
Expose inner vinyl sheath.



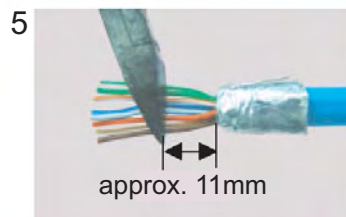
Remove the outer sheath by approx 25 mm. Be careful not to damage inner shield and cores.



Fold back the shield, wrap it onto the outer sheath and cut it, leaving 9 mm.



Fold back drain wire and cut it, leaving 9 mm.



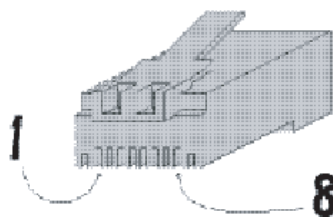
Straighten and flatten the core in order and cut them, leaving 11 mm.



Insert the cable into the modular plug so that the folded part of the shield enters into the plug housing. The drain wire should be located on the tab side of the plug.

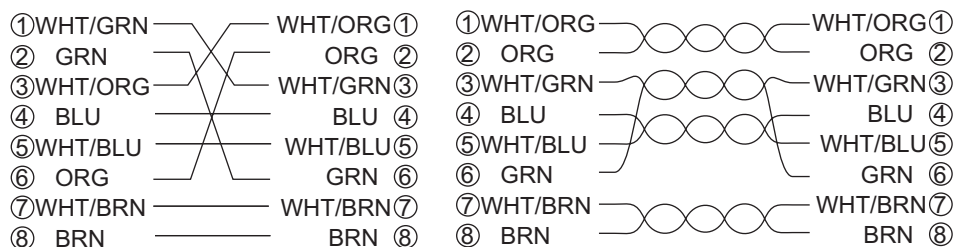


Using special crimping tool MPT5-8 (PANDUIT CORP.), crimp the modular plug. Finally check the plug visually.



[Crose cable]

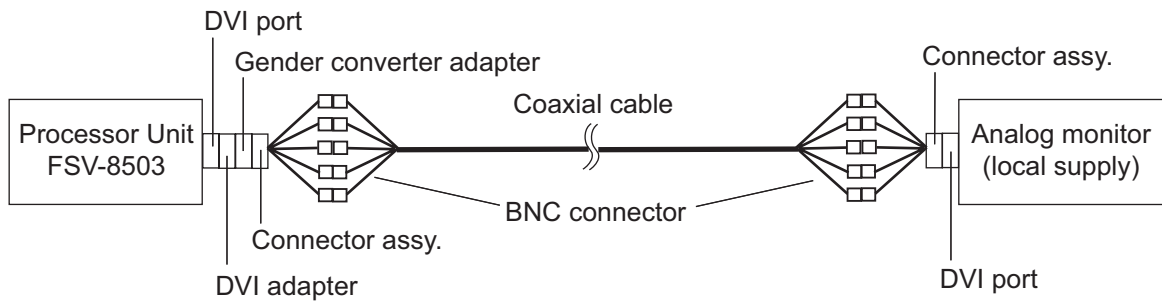
[Straight cable]



How to extend length of cable for external monitor

If the distance from the control unit to the monitor is more than 10 m, follow the procedure below to extend the cable, up to 70 m. The video output is analog so use an analog monitor.

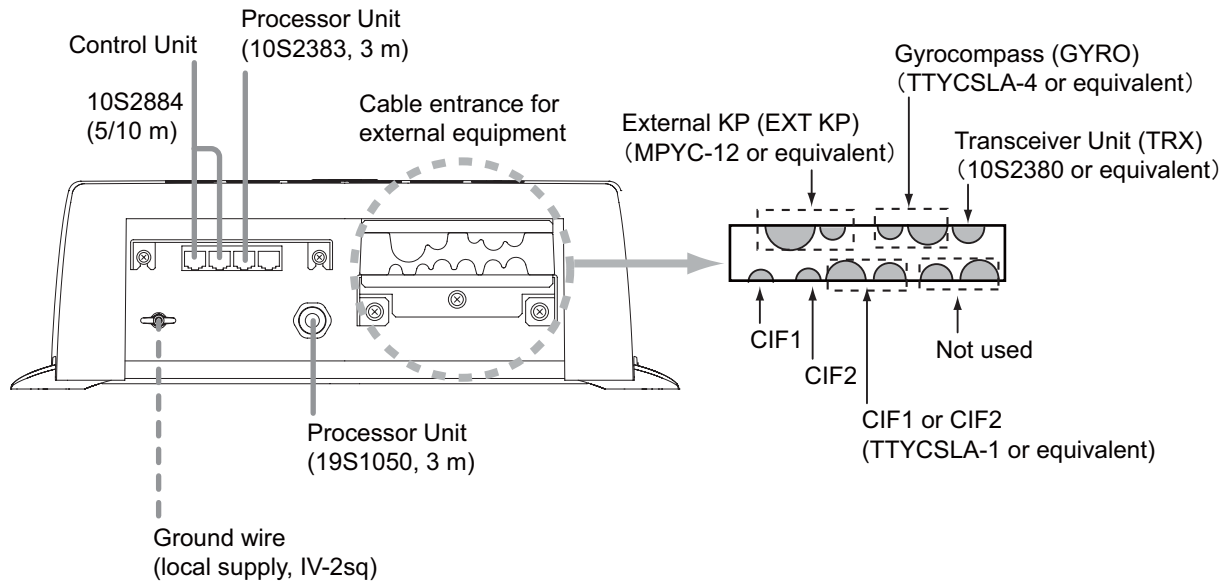
Part	Type	Code No., Maker	Qty	Remarks
Coaxial cable	1.5C2V-3C2V-T-20M	000-164-049-10	1	20 m
	1.5C2V-3C2V-T-30M	000-164-050-10		30 m
	1.5C2V-3C2V-T-70M	000-164-051-10		70 m
Connector assy.	BNCX5-DSUB15-L400	00-159-595-01	2	
BNC connector	BNC-P-3	000-500-396	6	For 3C-2V
	BNC-P-1.5V-CR	DDK	4	Recommended
DVI adapter	AD-DV01	Sanwa Supply	1	Recommended
Gender converter adapter	AD-D9FF	Elecom	1	Recommended, D-sub 9 pin, female



2.4 IF Unit

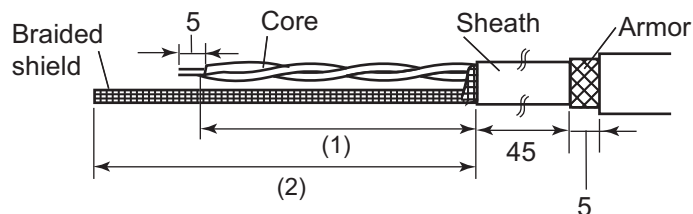
The IF unit installs between the processor unit and the transceiver unit. Connect the cables according to the diagram inscribed on the shield cover of the IF unit. JIS cables and FURUNO cables are available for the connection. To Connect the JIS cables, use the larger cable holes as shown below.

Select a location that provides the maintenance space prescribed in the outline drawing. Follow the compass safety distance in the Safety Instructions to prevent interference to a magnetic compass.



Connection point	Cable type	See (1) below	See (2) below	Remarks
Ext. KP	JIS cable*	400 mm	100 mm	
	FURUNO cable	400 mm	120 mm	
Gyro	JIS cable*	400 mm	100 mm	
	FURUNO cable	400 mm	100 mm	
Transceiver Unit	FURUNO cable	400 mm	100 mm	Standard supply
CIF1	JIS cable*	400 mm	100 mm	
	FURUNO cable	400 mm	100 mm	
CIF2	JIS cable*	400 mm	120 mm	
	FURUNO cable	400 mm	120 mm	

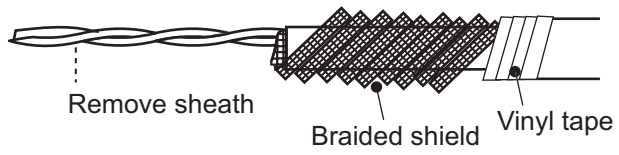
* JIS=Japan Industrial Standard. See the appendix for equivalent cable.



2. WIRING

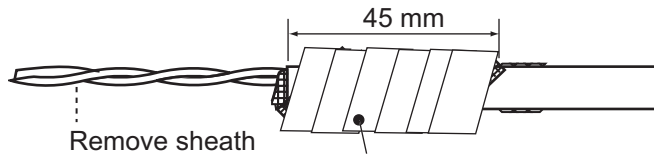
How to fabricate cables

Cable for ext. KP, gyro, Transceiver Unit, CIF2



Wrap braided shield around vinyl sheath.
Cover braided shield with vinyl tape.

Cable for FURUNO CIF1 equipment

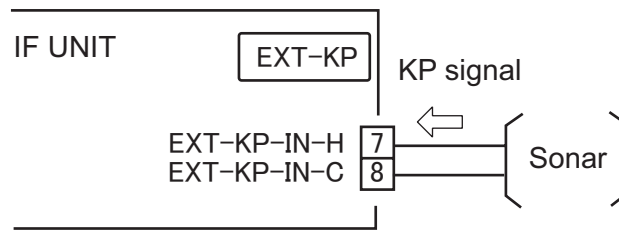


Wrap braided shield around vinyl sheath.
Cover braided shield with conductive fabric tape.

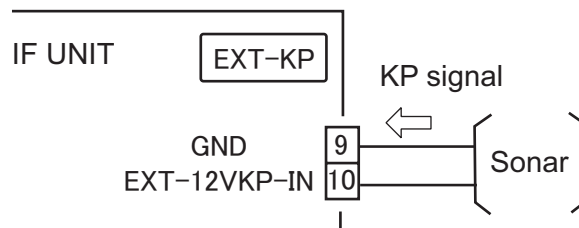
How to connect external KP

Make the connections shown below to synchronize transmission with external sonar.

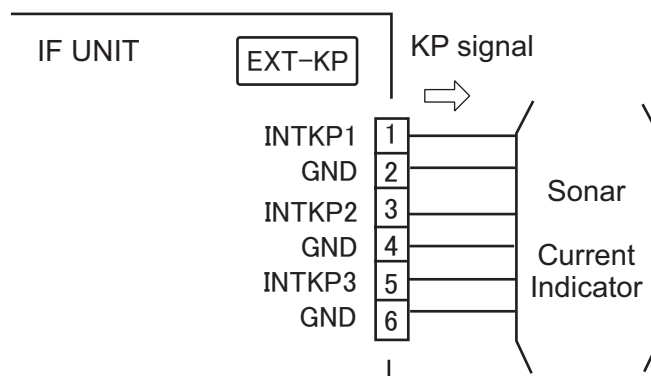
- Current drive KP output



- Voltage drive (12 V) KP output



- Make the connections shown below to output KP for external sonar



2.5 Control Unit and Remote Controller

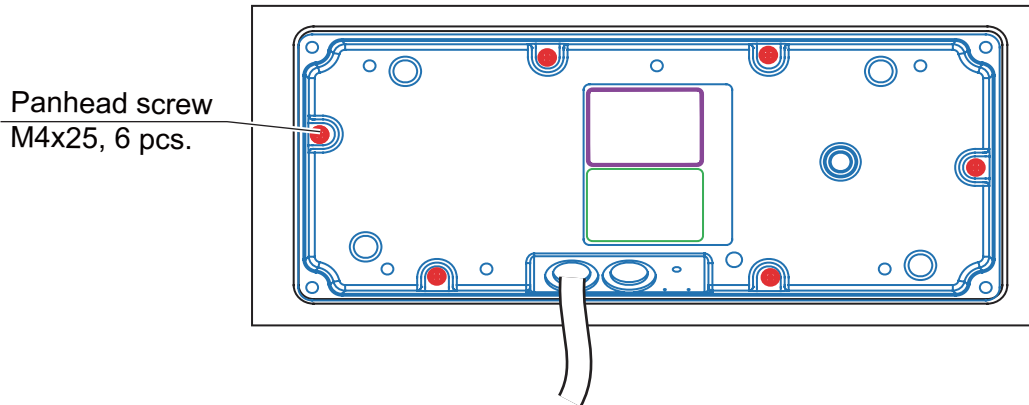
Ground

Connect a IV-1.25sq ground wire (local supply) between the ground terminal on the control unit and the ship's ground.

How to connect the Remote Controller

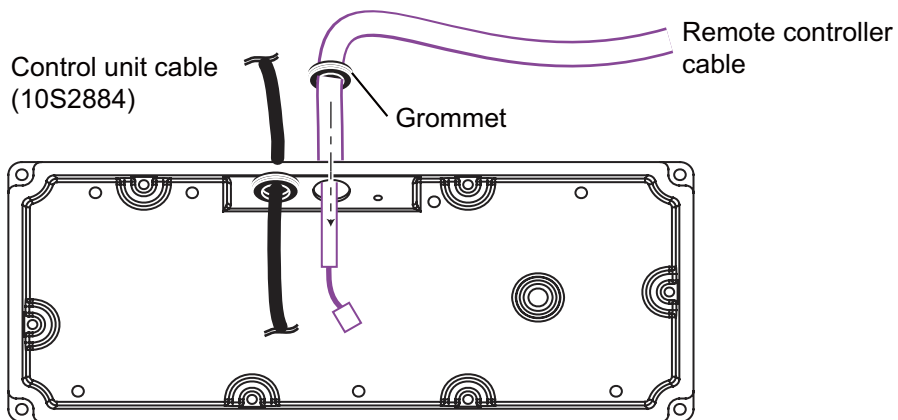
Connect the optional remote controller (FSV-854) as shown below.

1. Unfasten the six panhead screws at the bottom of the unit to detach the cover.



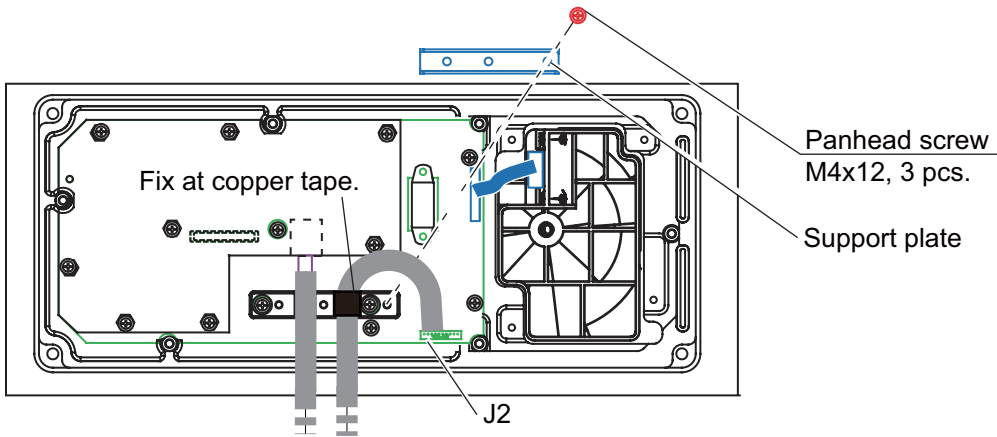
Rear side of the control unit (cover removed)

2. Cut a cross in the grommet on the cover then pass the remote controller cable through the grommet.



Rear side of the control unit (cover removed)

3. Connect the remote controller cable to J2 on the control unit and use the support plate to fix the cable.

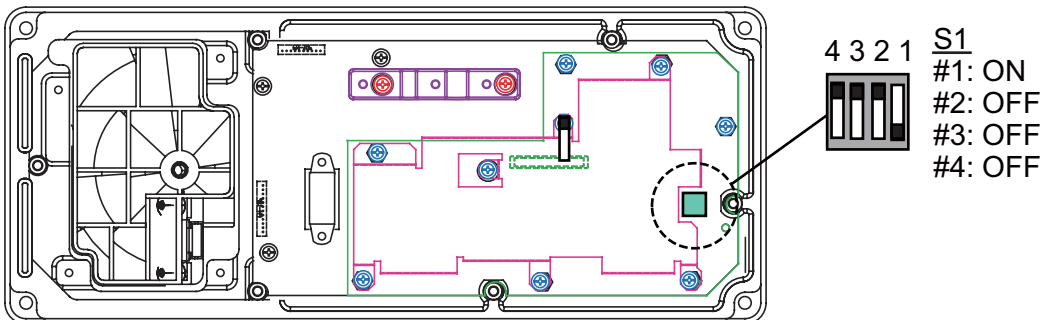


Rear side of the control unit (cover removed)

4. Attach the cover.
5. At a distance of 1 cm from the Control Unit, attach the supplied EMI core (RFC-6) to the remote controller cable.

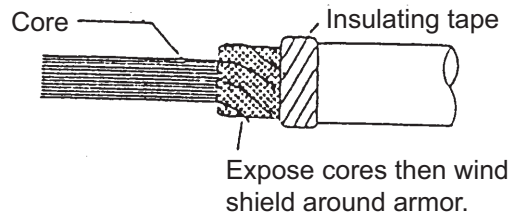
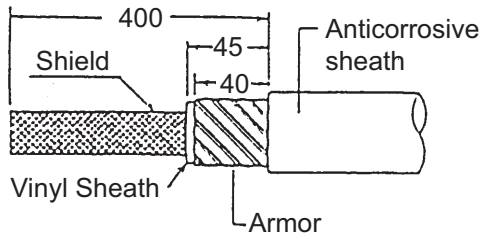
How to connect No.2 control unit (option)

Two control units can be connected. On the No.2 control unit, remove the rear cover and set the DIP Switch as shown below.

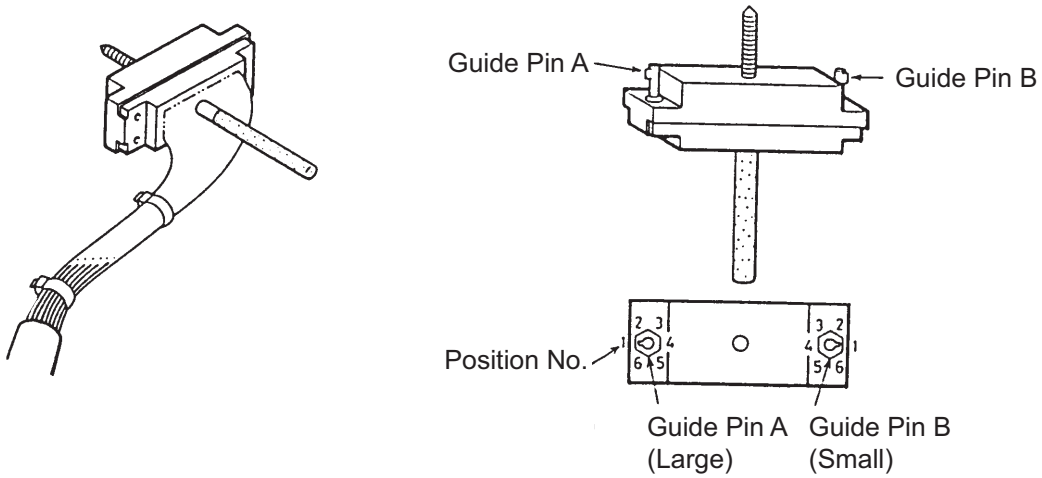


2.6 Transceiver Unit

2.6.1 38P connector 00-8016-038-313761HVF (CN-B102)



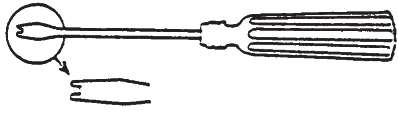
How to fabricate 38P connector



How to assemble 38P connector

How to position guide pins

Use the guide pin insertion tool (Code No. 10-910-0179-0) to correctly insert guide pins to connectors.

Connector	CN-B101	 Tool (Guide pin insertion tool, notch in head)
Guide pin		
Guide pin A (large)	1	
Guide pin B (small)	1	

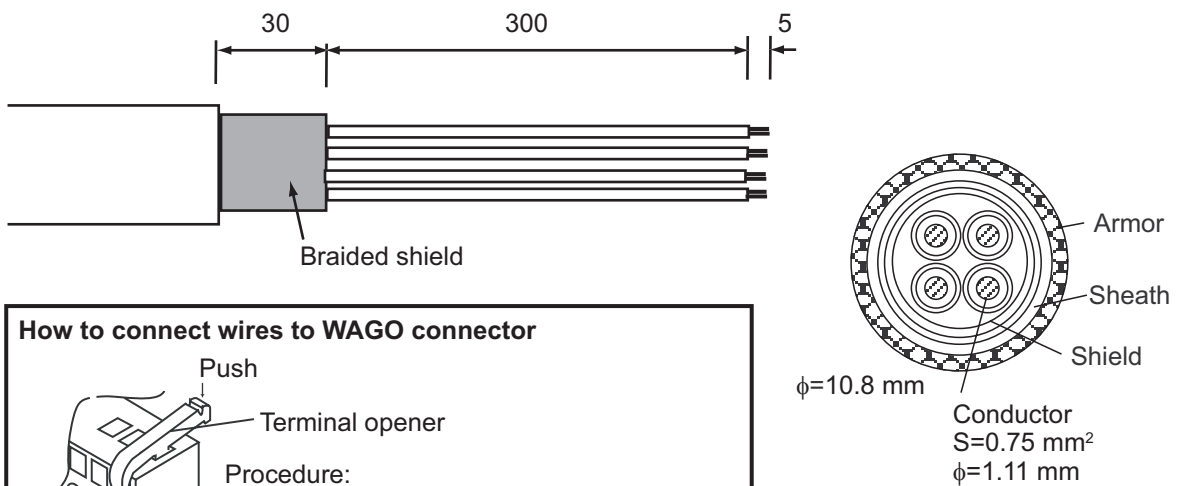
2.6.2 Power cable

Use the power cable DPYCYS-2.5 (or equivalent).

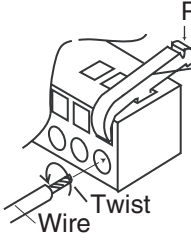


2.6.3 Satellite Compass

Connect a satellite compass to CN-B103 in the transceiver unit, with the cable TTYC-SLA-1.



How to connect wires to WAGO connector



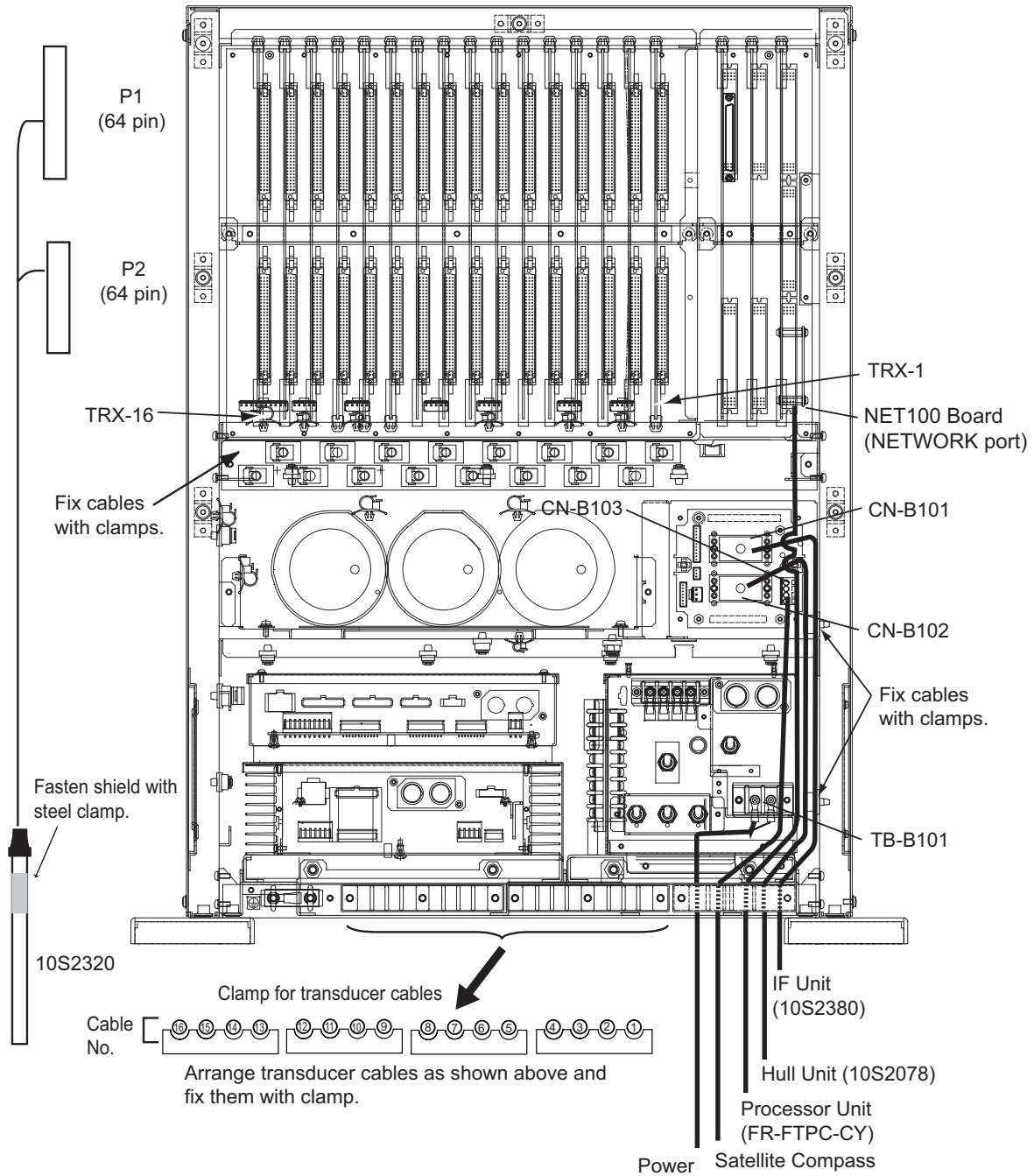
Procedure:

1. Twist core.
2. Insert terminal opener and push.
3. Insert wire into hole.
4. Release terminal opener.
5. Pull wire to confirm it is correctly inserted.

TTYC-SLA-1 (Four core twisted)

2. WIRING

2.6.4 Connections inside the Transceiver Unit

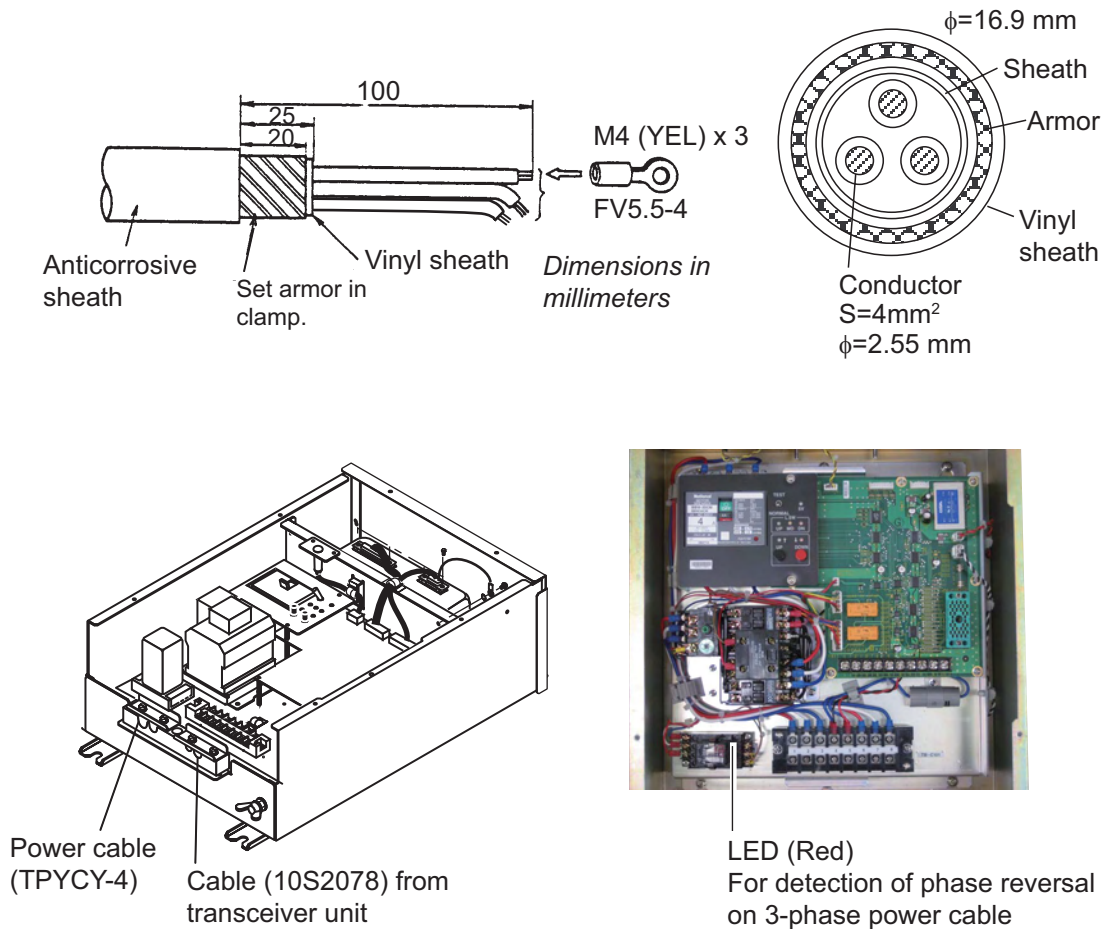


Connect the cables from the transducer referring to cable no. labeled on the chassis and connector no. labeled on each pc board. Connector is locked properly when you hear a “click” sound. For the cable 10S2078 from the control box of the hull unit connect the longer, peeled portion of the cable to the transceiver unit.

Note: To remove or insert a TRX board when the transducer cable is not connected, lock the catch on the transducer cable connector (HIF connector) of that TRX board so that it won’t contact the board release tab.

2.7 Control Box of Hull Unit

Connect the power cable TPYCY-4 (or equivalent) and the transceiver unit cable (10S2078) as shown below.



Confirm that the LED lights in red after wiring is completed. If the LED does not light, turn off power from the mains switchboard, reconnect any two lines of the power cable, turn on the power, and check if the LED lights. The hull unit does not work when this connection is wrong.

Normal phase: LED lights (red).

Phase reversal: LED does not light.

2.8 Input Voltage and Fuses

The transceiver unit is shipped from the factory with its input voltage set for 230 VAC and a 10 A fuse inserted in F601 and F602. For other voltages, change toggle switch positions and fuses as shown below.

Input voltage and toggle switch

Input voltage	S603	S604	S605	Default setting
100 VAC	L	L	L	-
110 VAC	H	L	L	-
115 VAC	H	H	L	-
220 VAC	H	L	H	-
230 VAC	H	H	H	Default

Fuses

Change the fuse in F601 and F602 according to input voltage, referring to the table below.

Input Voltage (TB-B101)	F601	F602	Default setting
100 VAC	20A	20A	-
110 VAC			-
115 VAC			-
220 VAC	10A	10A	-
230 VAC			Default



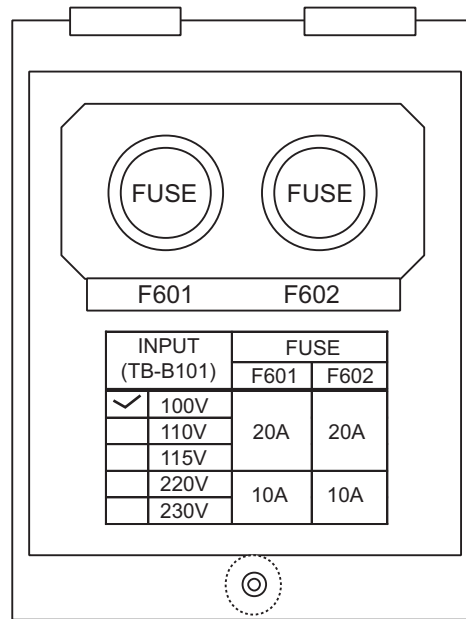
WARNING

Use the proper fuse.

Use of a wrong fuse can result in damage to the equipment or cause fire.

How to mark the input voltage label

After setting toggle switches and changing the fuses, mark the label on the inside of the cover with the voltage that applies. In the example shown below, 100 V is checked; 20A fuses are used.



2.9 DIP SW, Jumper Block Settings

This sonar has DIP switches and jumper blocks in the control unit and IF unit that set the system according to expected usage.

2.9.1 Control Unit

DIP SW1

DIP SW1 is located on the KEY2 Board (10P7033) and it functions as shown in the table below. Default settings are shown in boldface. For use of optional No.2 control unit, see page 2-11.

Segment No.	Function, Setting
1	Function of control unit OFF : Main control unit ON : Sub control unit
2	No use
3	No use
4	No use

2.9.2 IF Unit

The IF unit has two DIP switches and five jumper blocks on its MAIN Board (10P7035).

DIP SW S2, S3

The functions of S2 and S3 are as shown in the table below. Default settings are shown in boldface.

S2		S3	
Segment No.	Function, Setting	Segment No.	Function, Setting
1	Factory use	1	Factory use
2	No use	2	KP input OFF : Leading edge ON : Trailing edge
3	No use	3	KP output logic OFF : Positive ON : Negative
4	No use	4	No use
5	No use	5	No use
6	No use	6	No use
7	No use	7	No use
8	No use	8	No use

Jumper blocks

The functions of the five jumper blocks are shown in the table below. Default settings are shown in boldface.

Jumper Block No.	Function, Setting
J7	Function of CIF1 1-2 : Function OFF 2-3 : Serial loopback
J9	External KP output 1-2 : End of range signal output 2-3 : External KP output
J15	Function of CIF2 1-2 : Function OFF 2-3 : Serial loopback
J18	MAC address write ON : Write Mac address OFF : Function OFF

3. ADJUSTMENTS AND CHECKS

3.1 How to Change the Frequency Setting

The default frequency is 80 kHz. If the sonar frequency is 70 kHz, an alarm sounds and a warning message appears the first time the power is applied after installation. Change to 70 kHz as follows:

1. Turn on the power then press the **R/B AUDIO** key to silence the alarm and erase the message.
2. Press **F1, F3, F5** while pressing and holding down the **MENU/ESC** key to open the System menu.
3. Open the menu then select [Others], [Model] and [FSV-85-70].

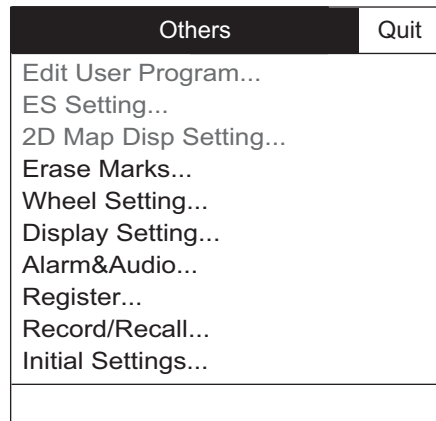
3.2 Hull Unit Check

Do not transmit while doing this procedure.

How to enable transmission

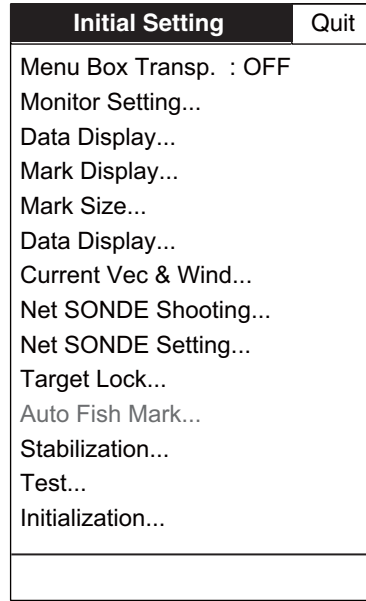
The default transmission state is OFF. Enable transmission as shown in the procedure below. NEVER transmit when the vessel is in dry dock, to prevent damage to the transducer.

1. Turn on the power and press the **MENU/ESC** key to open the menu.
2. Use the trackball to select [Others] then right-click.

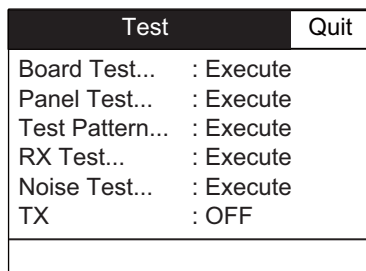


3. ADJUSTMENTS AND CHECKS

3. Select [Initial Settings] then left-click.




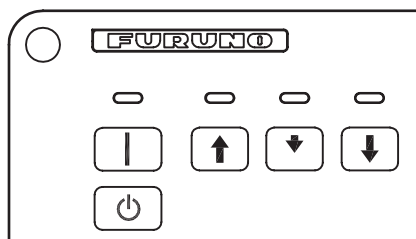
4. Select [Test] then left-click.



5. Select [TX] then left-click.
6. Select [On] then left-click.
7. Select [Quit] then left-click.
8. Select [Quit] on the topmost menu then left-click.

How to check the hull unit

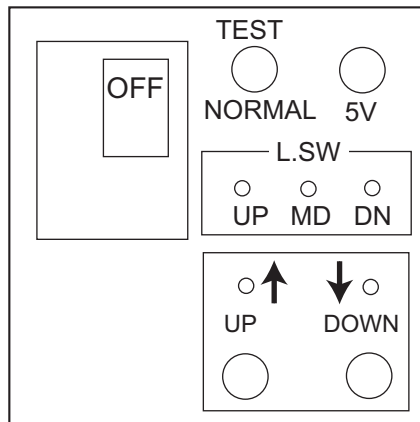
1. Press the POWER (I) switch on the control unit to turn on the system. Check that both the “ON” LED above the POWER switch and the  are lit.



2. Confirm that the 5V and UP LEDs on the control box are lit.
3. Remove the cover of the control box and use a multimeter to measure the following voltages:

Terminal	Terminal No.	Voltage
TB-C101	(1) - (2)	220 VAC
	(2) - (3)	220 VAC
	(1) - (3)	220 VAC

4. In the control box, set the TEST/NORMAL switch to “TEST”. Press the DOWN switch to confirm that the transducer lowers. Also, while the transducer is being lowered, check that the MD LED lights when the MD L. SW kicks. Note that the MD L. SW does not stop the transducer when the TEST/NORMAL switch is in the TEST position.



5. Press and release the [DOWN] switch during lowering. Confirm that the transducer stops lowering.
6. Press the [DOWN] switch again to re-start lowering. Confirm that the transducer stops at the moment the lower limit switch kicks.
7. Confirm that the [UP] switch operates in a similar manner.
8. Check that LEDs on the panel of the control box light as follows:
- 1) The UP, MD and DN LEDs light when corresponding limit switch is kicked.
 - 2) The UP and DN LEDs light while UP and DOWN switches are pressed and extinguish when the switches are released.
9. Set the TEST/NORMAL switch to “NORMAL”.
10. Check that the transducer is fully retracted. At the control unit, press the ▼ (mid-protrusion position) switch. Confirm that the LED above the switch blinks while the transducer is being lowered, a short beep sounds when the mid limit switch kicks, and the LED lights when the transducer stops at the mid position.
11. Press the ▼ switch (fully lowered position) and then the ▲ switch. Confirm that the LED above the respective switch blinks while the transducer is being lowered or raised, and a short beep sounds when the lower or upper limit switch is kicked, and the LED lights when the transducer is fully lowered or raised.
12. Press the OFF switch. Confirm that the transducer is completely retracted and the power is off.
13. With the transducer lowered (mid or fully lowered), confirm that the transducer is raised when the ▲ switch or the OFF switch is pressed.

3.3 Setting for Two Monitors

If two monitors are connected, set the display method for the second monitor as follows.

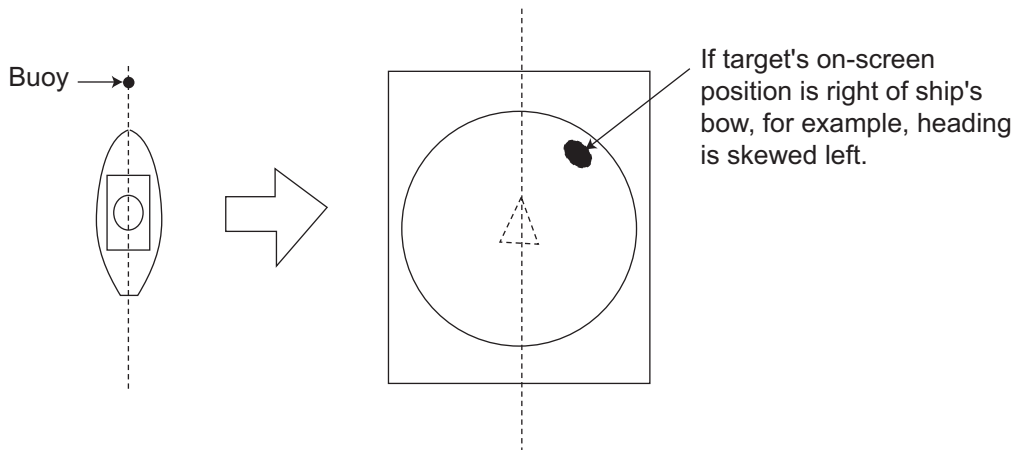
1. At the main menu, left-click [Others], [Initial Setting] and [Monitor Setting].
2. Left-click [2nd Monitor Setting].
3. Left-click [Dual Display] or [Sub Display] as applicable. Select [Dual Display] to show the same picture on both monitors; [Sub Display] to show different images. If only one monitor is connected select [OFF].
4. Select [Quit] then left-click.
5. Turn the power off and on again.

3.4 How to Adjust the Heading

Heading correction at the hull unit

When the BOW mark on the flange of the hull unit cannot be directed toward ship's bow, adjust the heading so an echo which is dead ahead appears dead ahead on the display.

1. Enable transmission as shown in section 3.2.
2. Find a target in the bow direction (buoy, for example) and display it on a near range perfectly. If the target appears at 12 o'clock the heading alignment is correct. If it does not, measure the error and go to next step.



3. If the heading is skewed, measure the skew angle.
4. While pressing and holding down the **MENU/ESC** key, press **F1**, **F3**, and **F5** key in order to show the [System] menu.
5. Select [Others] then push the left-click button.
6. Select [Heading Adjust 1] then left-click.
7. Rotate the scrollwheel to enter the angle measured at step 3. The setting range is -180° to 179° , in one-degree increments.
8. Select [Quit] then push the left-click button.
9. Select Quit on the topmost menu then push the left-click button.

Heading correction at the motion sensor

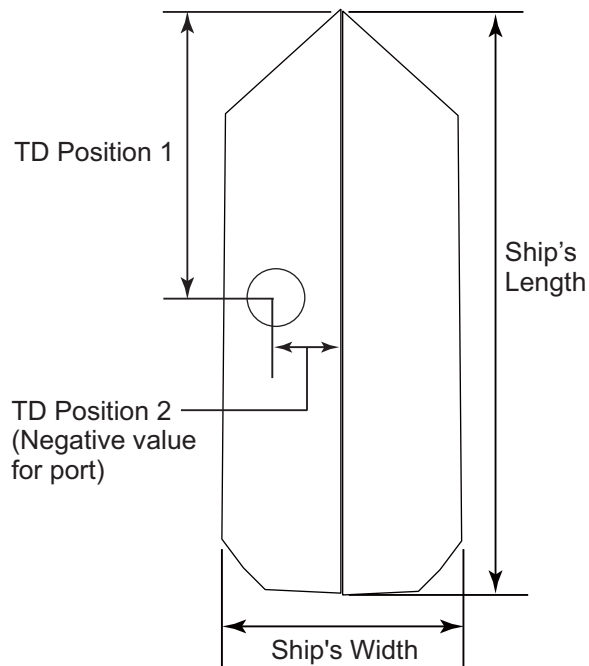
Heading correction at the motion sensor is done with [Heading Adjust 2] on the [Others] menu.

- If the control box is mounted on the hull unit, set the same heading correction as entered for [Heading Adjust 1] (in [Others] menu).
- If the control box is mounted independent of the hull unit, set the angle measured from the bow in the clockwise direction. The angle is 0° degrees if the lid of the control box is directed toward ship's stern precisely.
- If the motion sensor is a GPS gyro, set 0°.

3.5 How to Configure the Own Ship Mark

Set your ship's length and width and the position of the transducer, to accurately display the own ship mark on the screen.

1. Open the [System] menu.
2. Select [Own Ship Mark] then left-click.
3. Select [Ship's Length] then left-click.
4. Use the scrollwheel to set length. The setting range is 15 to 150 m.
5. Set ship's width and transducer positions similarly.
 - [Ship's Width]: The width of the ship at its widest point. (Setting range: 5 to 30 m)
 - [TD Position 1]: Distance from transducer to bow. (Setting range: 5 to 50 m)
 - [TD Position 2]: Distance from transducer to keel. Select "+" for starboard, "-" for port. (Setting range: -10 to 10m)



6. Long-press the **MENU/ESC** key to close all menus.

3.6 Others Menu

The [Others] menu sets the equipment according to the external equipment connected.

3.6.1 Interface Setting menu

NMEA1/2 Baud Rate: Set the transmission rate for the NMEA 1 and NMEA 2 ports. (4800 bps, 9600 bps, 19200 bps, 38400 bps)

CIF1/2 Baud Rate: Set the transmission rate for the CIF 1 and CIF 2 ports. (2400 bps, 4800 bps, 9600 bps, 19200 bps)

Sensor Baud Rate: Set the transmission rate of the satellite compass, which is connected to the transceiver unit. For a FURUNO satellite compass, select 38400. (4800 bps, 9600 bps, 19200 bps, 38400 bps) Set the NMEA output format for the satellite compass as follows: - Output format: IEC ed1 - Sentence: ATT, HVE (disable all other sentences except those two) - Baud rate: 38400 bps - Interval: 25 ms (Any talker)

EXT KP Input: Set the input logic of KP from external equipment. (Disable, Enable)
Disable: Disable external KP. Enable: Use KP from external equipment.

EXT KP Output: Select the KP output logic. (Positive, Negative)

PC Connection: Select whether a PC is connected or not. (Enable, Disable)

3.6.2 EXT Data Setting menu

Date&Time: Select the input format for date and time data. (NONE, CIF, NMEA)

Heading: Select the input format for heading data. (NONE, AD10, CIF, NMEA)

Speed&Course: Select the input format for ship's speed and course data. (NONE, CIF, NMEA)

Speed Sensor: Select the input format for speed data. (NONE, GPS/DR, DOPPLER/DR) If response is slow, select GPS.

Lat/Lon: Select the input format for position data. (NONE, CIF, NMEA)

POS Sensor: Select the type of the navigator used. Select [Auto Sel] when more than one navigator is connected. The priority for auto selection is GPS/DR> Loran-C. (Loran C, GPS/DR, Auto Sel)

Water Depth: Select the input format for water depth. (NONE, CIF, NMEA)

Water Temp: Select the input format for water temperature. (NONE, CIF, NMEA)

Water Current: Select the input format for water current. (NONE, CIF, NMEA)

Wind: Select the input format for wind data. (NONE, CIF, NMEA)

Net Depth: Select the input format for net depth data. (NONE, CIF)

CIF Type: Select the CIF type to use. (CIF-2000, CS-120A)

3.6.3 Others menu

Language: Select the language to use. (English, Japanese)

Trackball Speed: Select the tracking speed for the trackball. (Slow, Small, Fast)

Hull Unit Stroke: Select the stroke of the hull unit. (800 mm, 1100 mm)

Noise Meas. Freq: Select the frequency for which to measure noise. Two settings are available, but keep the default setting. Meas. Freq1: 80 kHz: 95 - 145, 120, 70 kHz: 130 - 260 Meas. Freq2: 80 kHz: -145 to -95, 70 kHz: -130 to -110

Propeller Supp items:

Propeller Supp: Turn the propeller noise suppressor on or off. The setting range is 0 - 13. 0 is OFF. The higher the number the greater the suppression.

Propeller Tilt: Keep the initial setting (0). When [Propeller Supp] above is set to 0, this item appears in gray.

Propeller Dir. : Set the bearing of the propeller as viewed from the transducer position, to set the bearing at which propeller noise is suppressed. The setting range is -180° to 179°.

Exclus. Apt Len: Keep the initial setting (0).

Error Code List: Confirm error codes.

Explorer: Confirm and search files.

APPENDIX 1 JIS CABLE GUIDE

Cables listed in the manual are usually shown as Japanese Industrial Standard (JIS). Use the following guide to locate an equivalent cable locally.

JIS cable names may have up to 6 alphabetical characters, followed by a dash and a numerical value (example: DPYC-2.5). For core types D and T, the numerical designation indicates the *cross-sectional Area (mm²)* of the core wire(s) in the cable. For core types M and TT, the numerical designation indicates the *number of core wires* in the cable.

1. Core Type

D Double core power line

T Triple core power line

M 1 mm Multi core

TT 0.75mm twisted pair communications (1Q=quad cable)

2. Insulation Type

P Ethylene Propylene

3. Sheath Type

Y Vinyl

4. Armor Type

C Steel

5. Shielding Type

Y Corrosive Resistant

6. Core Sheath

S All cores in one sheath

-S Individually sheathed cores

SLA All cores in one sheath, plastic tube sheath w/aluminum tape

-SLA Individually sheathed cores, plastic tube sheath w/aluminum tape



DPYC



TPYC



MPYC-5



TTYCS-4

EX: ^{1 2 3 4 5 6}DPYCY¹S²-³1.5⁴ ^{1 2 3 4}MPYC¹-²5³

Designation type Core Area (mm²) Designation type # of cores

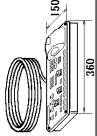


The following reference table lists gives the measurements of JIS cables commonly used with Furuno products:

Type	Core		Cable Diameter	Type	Core		Cable Diameter
	Area	Diameter			Area	Diameter	
DPYC-1.5	1.5mm ²	1.56mm	11.7mm	TTYC-7S	0.75mm ²	1.11mm	20.8mm
DPYC-2.5	2.5mm ²	2.01mm	12.8mm	TTYCSLA-1	0.75mm ²	1.11mm	9.4mm
DPYC-4	4.0mm ²	2.55mm	13.9mm	TTYCSLA-1Q	0.75mm ²	1.11mm	10.8mm
DPYC-6	6.0mm ²	3.12mm	15.2mm	TTYCSLA-4	0.75mm ²	1.11mm	15.7mm
DPYCY-2.5	2.5mm ²	2.01mm	14.8mm	TTYCY-4S	0.75mm ²	1.11mm	17.9mm
DPYCY-4	4.0mm	2.55mm	15.9mm	TTYCYS-1	0.75mm ²	1.11mm	12.1mm
DPYCYSLA-1.5	1.5mm ²	1.56mm	13.9mm	TTYCYS-4	0.75mm ²	1.11mm	18.5mm
DPYCYSLA-2.5	2.5mm ²	2.01mm	15.0mm	TPYCY-1.5	1.5mm ²	1.56mm	14.5mm
MPYC-2	1.0mm ²	1.29mm	10.0mm	TPYCY-2.5	2.5mm ²	2.01mm	15.5mm
MPYC-4	1.0mm ²	1.29mm	11.2mm	TPYCY-4	4.0mm ²	2.55mm	16.9mm
MPYC-7	1.0mm ²	1.29mm	13.2mm	TPYCYSLA-1.5	1.5mm ²	1.56mm	13.9mm
MPYCY-12	1.0mm ²	1.29mm	19.0mm				
MPYCY-19	1.0mm ²	1.29mm	22.0mm				

PACKING LIST

100V-X-9851 -0 1/1
A-1

FSV-8501-J-5/10, E-5/10

N A M E	O U T L I N E	D E S C R I P T I O N / C O D E N o.	Q ' T Y
ユニット			
制御部 CONTROL UNIT		FSV-8501-J-5/10, E-5/10 000-017-117-00 **	1
工事材料			
KB取付金具 KB FIXTURE ASSEMBLY		CP03-33202 001-115-510-00	1
工事材料 INSTALLATION MATERIALS		CP10-07201 001-112-500-00	1

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

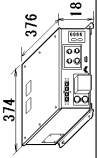



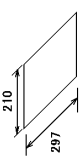
型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

C1335-Z01-A

PACKING LIST

100V-X-9853 -0 1/1
A-2

FSV-8503

N A M E	O U T L I N E	D E S C R I P T I O N / C O D E N o.	Q ' T Y
ユニット			
制御部 PROCESSOR UNIT		FSV-8503 000-017-125-00	1
予備品			
予備品 SPARE PARTS		SP19-00501 001-023-090-00	1
工事材料			
ケーブル組品 CABLE ASSEMBLY		FRUDD-18AFFM-L180 000-164-608-10	1
工事材料 INSTALLATION MATERIALS		CP19-00601 001-023-100-00	1
図書			
図書 NOTIFICATION DOCUMENT		C42-00705-* 000-167-240-1*	1

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
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C1335-Z03-A

PACKING LIST

FSV-851A/B-70/80-J/E

A-4

NAME	OUTLINE	DESCRIPTION/CODE No.	QTY
ユニット			
送受信装置		FSV-851A/B-70/80	1
予備品		000-017-104-00 **	**
SPARE PARTS			
予備品		SP10-03101	1
SPARE PARTS		007-008-530-00	
工事材料			
INSTALLATION MATERIALS			
工事材料		CP10-07011	1
INSTALLATION MATERIALS		001-005-660-00	
図書			
DOCUMENT			
取扱説明書		OM*-13350-*	1
OPERATOR'S MANUAL		000-174-339-1*	**
装備要領書		IM*-13350-*	1
INSTALLATION MANUAL		000-174-341-1*	**
電源設定書		CI2-00602-*	1
INPUT VOLTAGE SETTING		000-162-177-1*	

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

型式コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
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C1335-Z04-C

PACKING LIST

FSV-8502

A-3

NAME	OUTLINE	DESCRIPTION/CODE No.	QTY
ユニット			
IFユニット		FSV-8502	1
予備品		000-017-122-00	
CP10-07300			
工事材料			
INSTALLATION MATERIALS			
ケーブル組品LAN		10CA2383 *3M*	1
CABLE ASSEMBLY (LAN)		000-174-158-10	
ケーブル組品MJ		MJ-A3SPF0026-030C	1
POWER CABLE ASSEMBLY		000-174-486-10	
工事材料		CP10-07301	1
INSTALLATION MATERIALS		001-112-510-00	

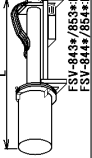

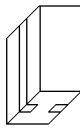
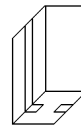
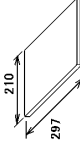
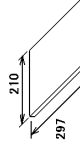
型式コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
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C1335-Z02-B

PACKING LIST

FSV-843*/844*/853*/854*-N

100U-X-9866 -1 1/1
A-5

NAME	OUTLINE	DESCRIPTION/CODE No.	QTY
ユニット			
上下装置 HULL UNIT		FSV-843*/844*/853*/854*-N 000-010-183-00 **	1
予備品			
予備品 SPARE PARTS		SP10-02603 006-921-360-00	1
現地組部品			
現地組部品箱詰品 LOCAL ASSEMBLING PARTS COMPLETE SET		FSV-84/84L 007-023-460-00	1 (*1)
現地組部品箱詰品 LOCAL ASSEMBLING PARTS COMPLETE SET		FSV-84/84L-D 007-023-010-00	1 (*1)
図書			
装備要領書 (英) INSTALLATION MANUAL		IME-13290-* 000-157-429-1*	1
装備要領書 (和) INSTALLATION MANUAL		IMJ-13290-* 000-157-428-1*	1

(*1)の現地組部品は仕様により選択願います。
*1.CHOOSE ONE ACCORDING TO SPECIFICATION.

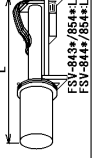

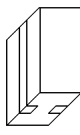

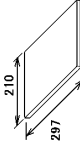
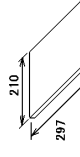
型式・コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

C1329-Z10-B

PACKING LIST

FSV-843*/844*/853*/854*-T

100U-X-9851 -3 1/1
A-6

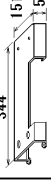
NAME	OUTLINE	DESCRIPTION/CODE No.	QTY
ユニット			
上下装置 HULL UNIT		FSV-843*/844*/853*/854*-T 000-067-169-00 **	1
予備品			
予備品 SPARE PARTS		SP10-02603 006-921-360-00	1
現地組部品			
現地組部品箱詰品 LOCAL ASSEMBLING PARTS COMPLETE SET		FSV-84/84L-D-T 001-008-150-00	1 (*1)
現地組部品箱詰品 LOCAL ASSEMBLING PARTS COMPLETE SET		FSV-84/84L-T 001-008-160-00	1 (*1)
図書			
装備要領書 (英) INSTALLATION MANUAL		IME-13290-* 000-157-429-1*	1
装備要領書 (和) INSTALLATION MANUAL		IMJ-13290-* 000-157-428-1*	1

(*1)の現地組部品は仕様により選択願います。
*1.CHOOSE ONE ACCORDING TO SPECIFICATION.


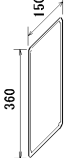



型式・コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

C1329-Z01-C

FURUNO**工事材料表**

INSTALLATION MATERIALS		FSV-8501		CODE NO.	03HE-X-9407-0	1/1
				TYPE	CP03-33202	
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS	
1	KB取付金具 KB FIXTURE		03-177-2201-0 CODE NO. 100-358-860-10	1		

FURUNO**工事材料表**

INSTALLATION MATERIALS		FSV-8501		CODE NO.	10CV-X-9401-0	1/1
				TYPE	CP10-07201	
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS	
1	帽子キャップ CAP		03-177-2204-0 CODE NO. 100-358-860-10	4		
2	フラッシュマウント FLASH MOUNT FIXTURE		10-088-2552-0 CODE NO. 100-360-260-10	1		
3	タップスクリュー TAPPING SCREW		5X20 SUS304 CODE NO. 000-171-997-10	4		
4	バインドヘッドスクリュー BINDING HEAD SCREW		M5X12 SUS304 CODE NO. 000-171-999-10	4		
5	波座金 WAVE WASHER		MW-5 SUS CODE NO. 000-167-383-10	4		

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

FURUNO ELECTRIC CO., LTD.

C3584-M07-A

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

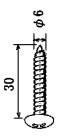
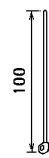
FURUNO ELECTRIC CO., LTD.

C1335-M01-A

工事材料表

INSTALLATION MATERIALS

MPU-001, FSV-8503, FSV-3503/3503S

CODE NO.		19AY-X-9401-3		1/1	
TYPE		CP19-00601			
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	+15mmφ6 SELF-TAPPING SCREW		6X30 SUS304 CODE NO. 000-162-614-10	4	
2	ケーブル CABLE TIE		CV-100N CODE NO. 000-162-167-10	4	

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

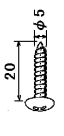
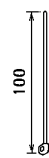
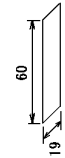
FURUNO ELECTRIC CO., LTD.

C4446-M01-C

工事材料表

INSTALLATION MATERIALS

FSV-8502

CODE NO.		100V-X-9402-0		1/1	
TYPE		CP10-07301			
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	+15mmφ5 SELF-TAPPING SCREW		5X20 SUS304 CODE NO. 000-162-608-10	4	
2	ケーブル CABLE TIE		CV-100N CODE NO. 000-162-167-10	4	
3	導電性布テープ CONDUCTIVE CLOTH TAPE		DK104FR-19 *60MM* CODE NO. 000-173-052-10	1	

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

FURUNO ELECTRIC CO., LTD.

C1335-M02-A

FURUNO**現地組部品**
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
			CODE NO.	TYPE		
FSV-84/84L						
10CU-X-9417 -3						
1/2						
FSV-84/84L-D-T						
1	ハンドル固定板1 HANDLE FIXING PLATE1		10-086-5741-0 CODE NO.	100-334-030-10	1	
2	ハンドル固定板2 HANDLE FIXING PLATE2		10-086-5742-0 CODE NO.	100-334-040-10	1	
3	Oリング O-RING		O0117A CODE NO.	000-158-976-10	1	
4	圧凍液 4L SOMAR ANTI-FREEZE		FSV-84/84L CODE NO.	007-023-030-00	1	
5	圧着端子 CRIMP-ON LUG		FV5.5-4(LF) CODE NO.	000-166-744-10	3	
6	バネ座金 SPRING WASHER		M20 SUS304 CODE NO.	000-167-401-10	16	
7	flat 平座金 FLAT WASHER		M20 SUS304 CODE NO.	000-167-462-10	32	
8	六角ナット HEX NUT		M20 SUS304 CODE NO.	000-167-476-10	32	
9	六角ナット 全長 HEXAGONAL HEAD SCREW		M20X120 SUS304 CODE NO.	000-162-825-10	16	
10	ワッシャーヘッド WASHER HEAD SCREW		MAX10 C2700W MBN12 CODE NO.	000-163-167-10	2	

(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)
型式/コード番号が2段の場合、下段より上段に代わる部品品でどちらが入っています。なお、品質は変わりませ
ん。
TOM TYPES AND CODES MAY BE LISTED. THE BOTTOM PRODUCT MAY BE SHIPPED IN PLACE OF THE TOP PRODUCT.
QUALITY THE SAME.

FURUNO ELECTRIC CO., LTD.

C1329-M12-D(1)

FURUNO**現地組部品**
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
			CODE NO.	TYPE		
FSV-84/84L						
10CU-X-9417 -3						
2/2						
FSV-84/84L-D-T						
11	蝶ボルト 2ヶ WING BOLT		MAX10 SUS304 CODE NO.	000-162-684-10	2	
12	両口アジャスター RATCHET WRENCH		RW2430L CODE NO.	000-158-262-10	1	

(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)
型式/コード番号が2段の場合、下段より上段に代わる部品品でどちらが入っています。なお、品質は変わりませ
ん。
TOM TYPES AND CODES MAY BE LISTED. THE BOTTOM PRODUCT MAY BE SHIPPED IN PLACE OF THE TOP PRODUCT.
QUALITY THE SAME.

FURUNO ELECTRIC CO., LTD.

C1329-M12-D(2)

FURUNO

現地組部品 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
FSV-84/84L					
10CU-X-9403 -5					
1/2					
1	ハンドル固定板1 HANDLE FIXING PLATE1		10-086-5741-0 CODE NO. 100-334-030-10	1	
2	ハンドル固定板2 HANDLE FIXING PLATE2		10-086-5742-0 CODE NO. 100-334-040-10	1	
3	圧着端子 CRIMP-ON LUG		FV5.5-4(LF) CODE NO. 000-166-744-10	3	
4	ハコ座金 SPRING WASHER		M20 SUS304 CODE NO. 000-167-401-10	16	
5	フラット平座金 FLAT WASHER		M20 SUS304 CODE NO. 000-167-462-10	32	
6	六角ナット HEX. NUT		M20 SUS304 CODE NO. 000-167-476-10	32	
7	六角ヘッド 全ネジ HEXAGONAL HEAD SCREW		M20X120 SUS304 CODE NO. 000-162-825-10	16	
8	ワッシャーヘッドネジ WASHER HEAD SCREW		MAX10 C2700W M6N12 CODE NO. 000-163-167-10	2	
9	翼ネジ WING BOLT		MAX10 SUS304 CODE NO. 000-162-684-10	2	
10	開口レンチ RATCHET WRENCH		RW2430L CODE NO. 000-158-252-10	1	

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)
型式/コード番号が2枚の場合、下段より上段に代わる通称部品でどちらが入っています。 なお、品質は変わりませ
ん。
TOW TYPES AND CODES MAY BE LISTED. THE BOTTOM PRODUCT MAY BE SHIPPED IN PLACE OF THE TOP PRODUCT.
QUALITY THE SAME.

FURUNO ELECTRIC CO., LTD.

C1329-M11-E(1)

FURUNO

現地組部品 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
FSV-84/84L					
10CU-X-9403 -5					
2/2					
11	ソナール凍液 4L SONAR ANTIFREEZE		FSV-84/84L CODE NO. 007-023-030-00	1	

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)
型式/コード番号が2枚の場合、下段より上段に代わる通称部品でどちらが入っています。 なお、品質は変わりませ
ん。
TOW TYPES AND CODES MAY BE LISTED. THE BOTTOM PRODUCT MAY BE SHIPPED IN PLACE OF THE TOP PRODUCT.
QUALITY THE SAME.

FURUNO ELECTRIC CO., LTD.

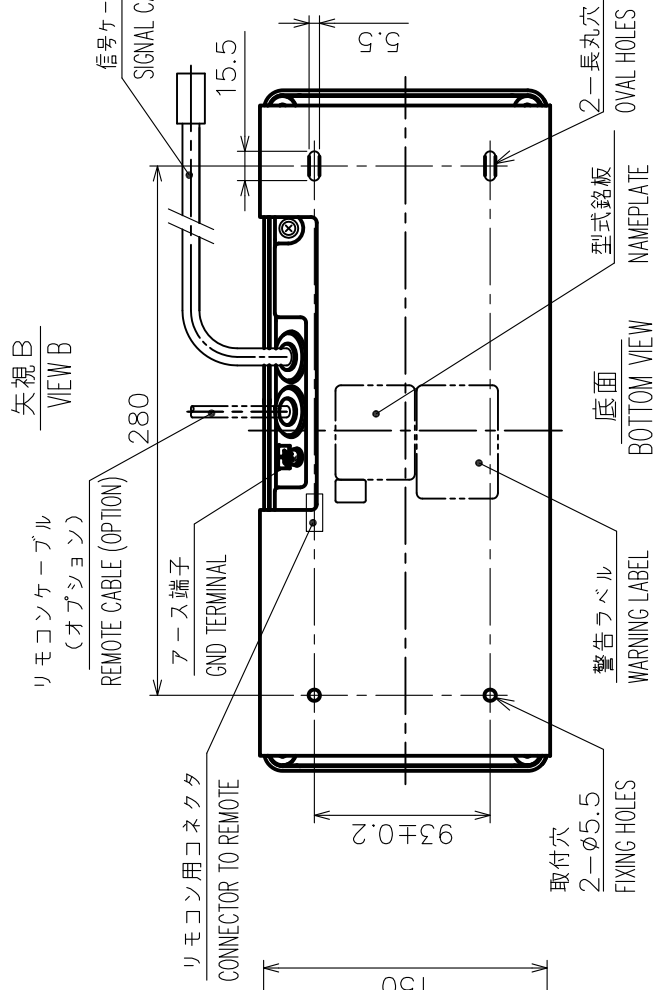
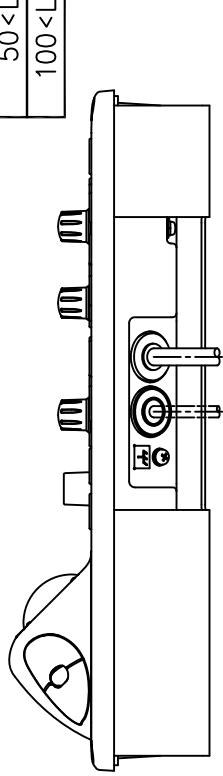
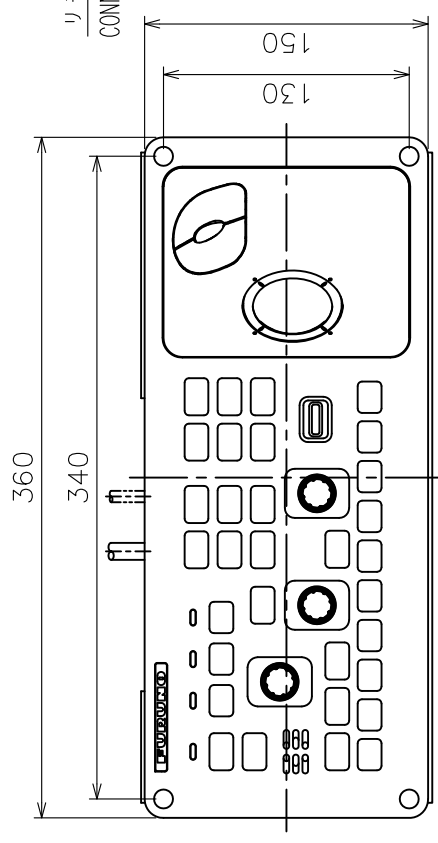
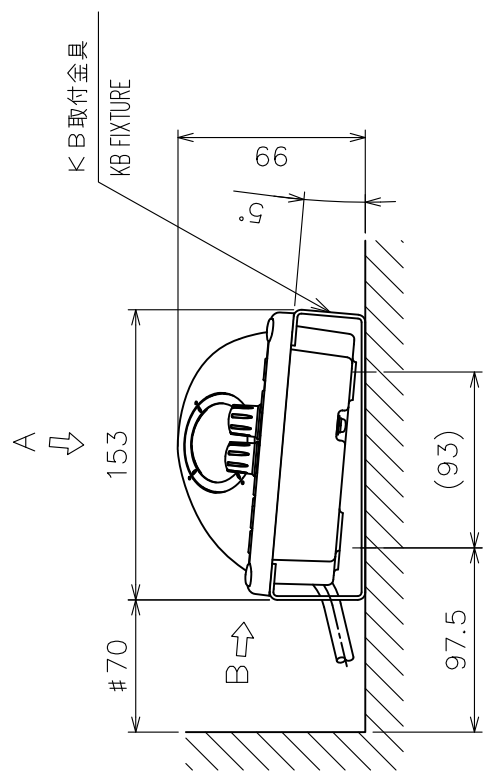
C1329-M11-E(2)

表 1 TABLE 1

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

表 2 TABLE 2

ケーブル長さ CABLE LENGTH (m)	5	10
質量 MASS (kg±10%)	3.8	4.3



注 記

- 1) 指定外の寸法公差は表 1 による
- 2) # 印寸法は最小サービソ空間寸法とする
- 3) 取付用ネジは + バイソドタップピン 1 シュ呼び径 5 × 2.0 を使用のこと

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ5x2.0 FOR FIXING THE UNIT.

DRAWN	9/Sep/2011 T.YAMASAKI	TITLE	FSV-8501
CHECKED	9/Sep/2011 H.MAKI	名称	操作部 (卓上装備)
APPROVED	12/Nov/2010 Y.NISHIYAMA	外寸図	
SCALE	1/4 MASS 表 2 参照 SEE TABLE 2	NAME	CONTROL UNIT (TABLETOP MOUNT)
DWG.No.	C1335-G04-C	REF.No.	10-088-251G-1

表 1 TABLE 1

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

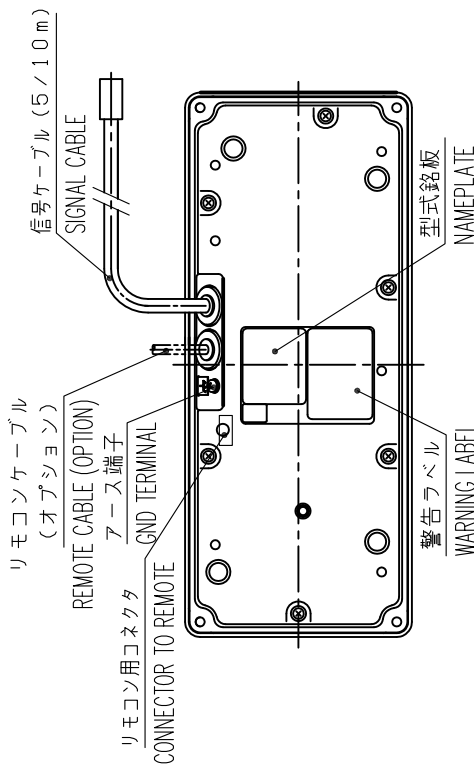
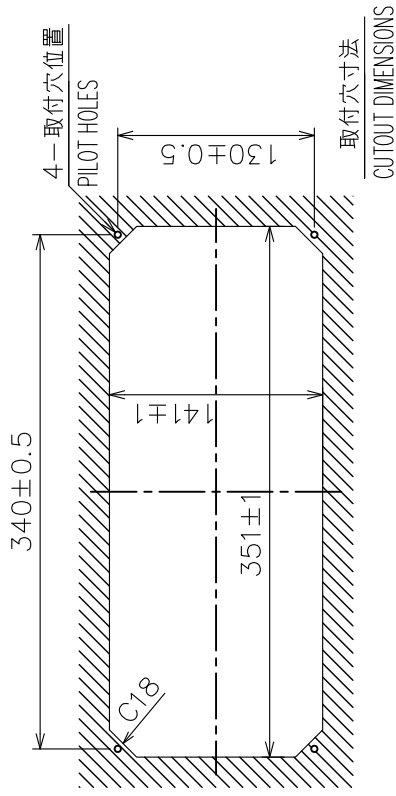
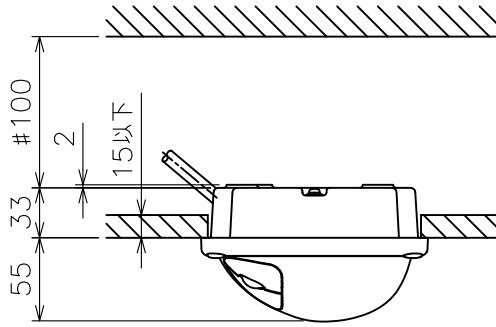
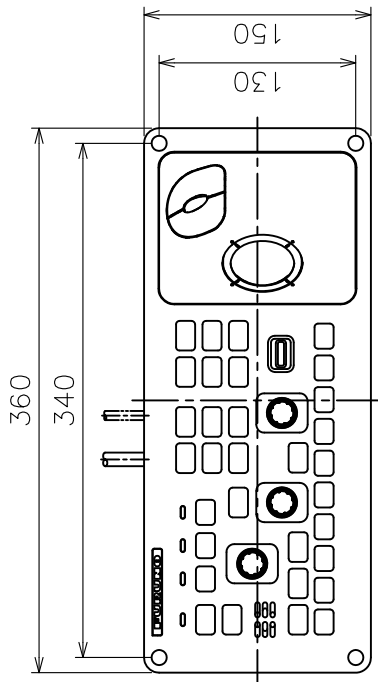
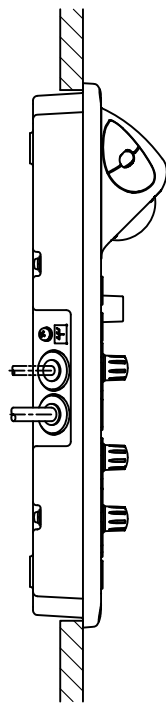


表 2 TABLE 2

ケーブル長さ CABLE LENGTH (m)	5	10
質量 MASS (kg±10%)	2.8	3.2

注 記

- 1) 指定外の寸法公差は表 1 による
- 2) #印寸法は最小サービス空間寸法とする
- 3) 取付用ネジは + バインドットピン 1 シュ呼び径 5 × 2.0 を使用のこと

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #. MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS $\phi 5 \times 2.0$ FOR FIXING THE UNIT.

DRAWN	9/Sep/2011 I.YAMASAKI	TITLE	FSV-8501
CHECKED	9/Sep/2011 H.HAKI	名称	操作部 (埋込装備)
APPROVED	4/Feb/2011 Y.NISHIYAMA	NAME	外寸図
SCALE	1/5 MASS 表 2 参照 SEE TABLE 2	REF.No.	10-088-250G-2
DWG.No.	C1335-003-D		OUTLINE DRAWING

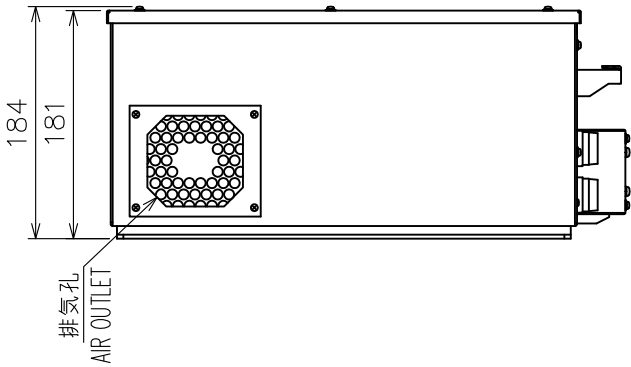
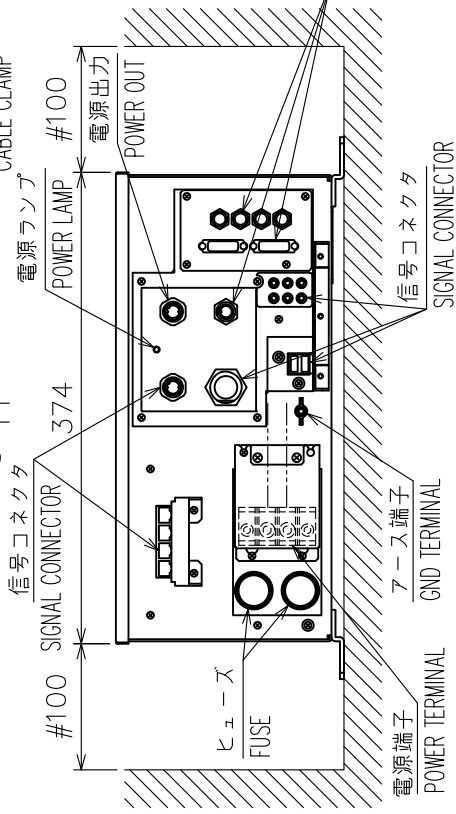
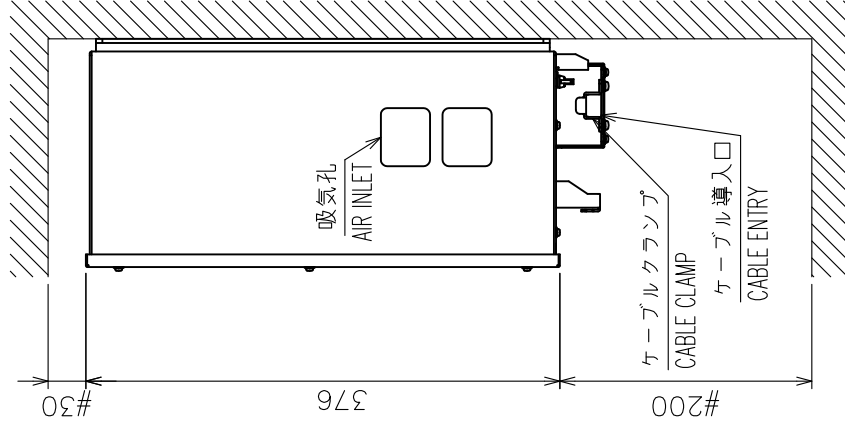


表 1 TABLE 1

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



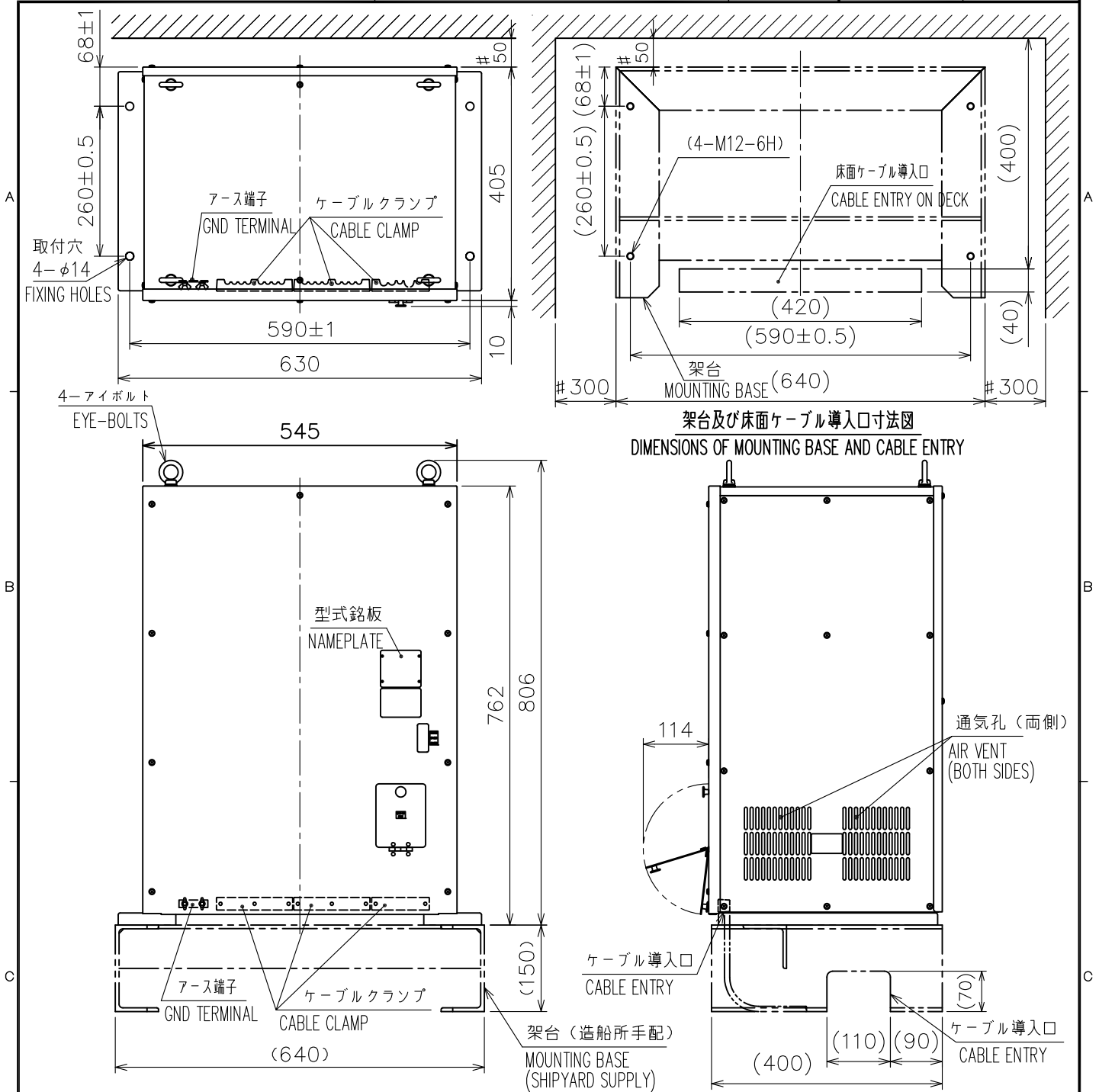
注 記

- 1) 指定外の寸法公差は表 1 による。
- 2) # 印寸法は最小サージ空間寸法とする。
- 3) 取付にはトラスタツピピンネジ呼び径 6 × 3.0 を使用のこと。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. # MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS Ø6x3.0 FOR FIXING THE UNIT.

DRAWN	28/Jun/2012	T. YAMASAKI	TITLE	FSV-3503/3503S/8503
CHECKED	28/Jun/2012	H. MAKI	名称	制御部
APPROVED	5/Nov/2010	Y. NISHIYAMA	NAME	PROCESSOR UNIT
SCALE	1/6	15	図名	外形図
DWG.No.	C1335-G01-C	REF.No.	10-088-360G-1	OUTLINE DRAWING



架台及び床面ケーブル導入口寸法図
DIMENSIONS OF MOUNTING BASE AND CABLE ENTRY

- 注記 1) 指定外の寸法公差は表1による。
 2) #印寸法は最小サービス空間寸法とする。
 3) 取付用ネジはM12ボルト(材質:SUS304)を使用のこと。
 4) 架台(高さ150mm以上)及び床面ケーブル導入口の寸法は参考寸法とする。
 直接床置きの場合のみ床面ケーブル導入口を設ける。(架台材質:SS400)

- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 2. #: MINIMUM SERVICE CLEARANCE.
 3. USE M12 BOLTS (SUS304) FOR FIXING THE UNIT.
 4. DIMENSIONS OF MOUNTING BASE (HEIGHT: AT LEAST 150 mm, MATERIAL: SS400) AND CABLE ENTRY ARE FOR REFERENCE ONLY. CABLE ENTRY ON DECK REQUIRED ONLY WHEN MOUNTING ON DECK DIRECTLY.

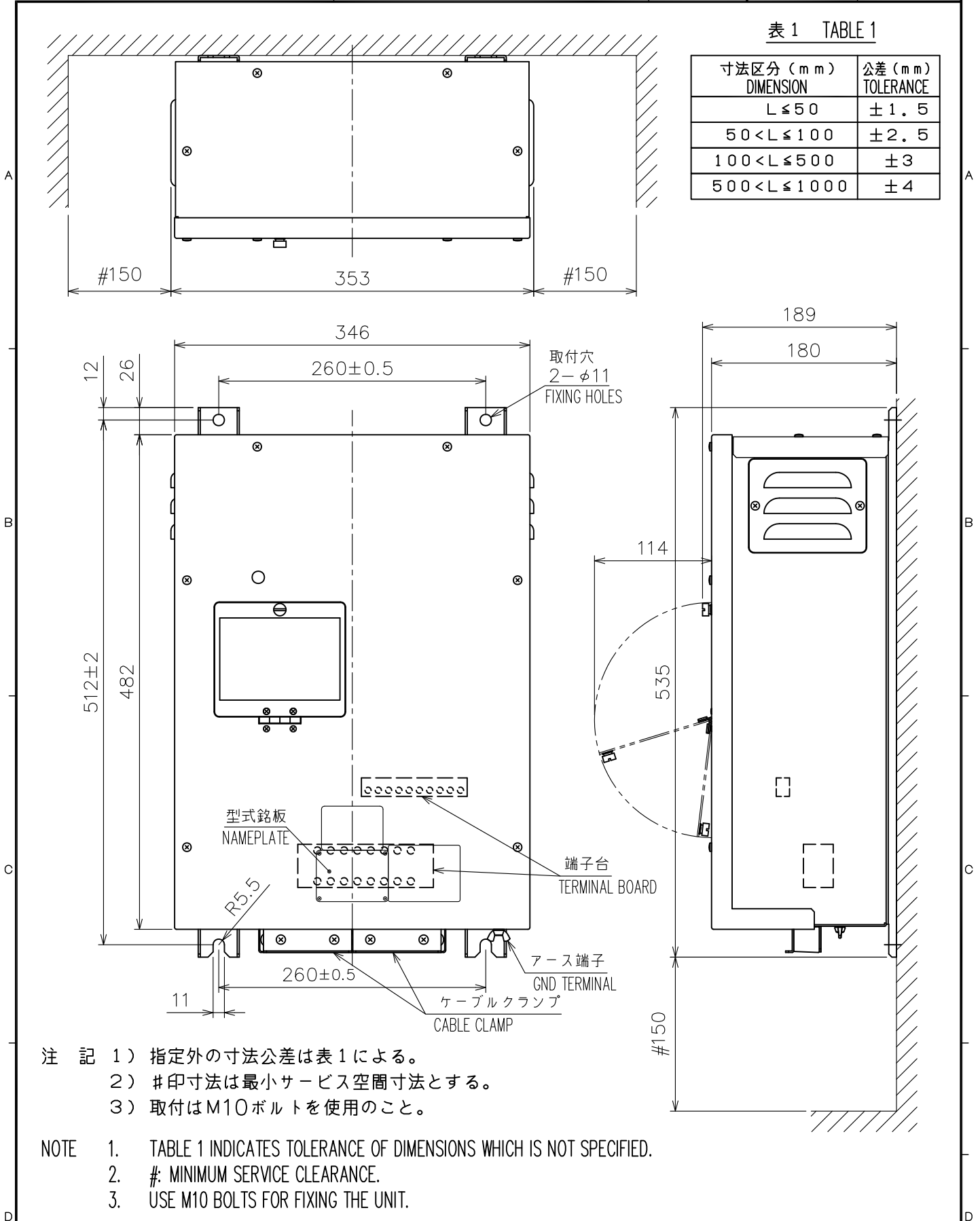
表1 TABLE 1

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

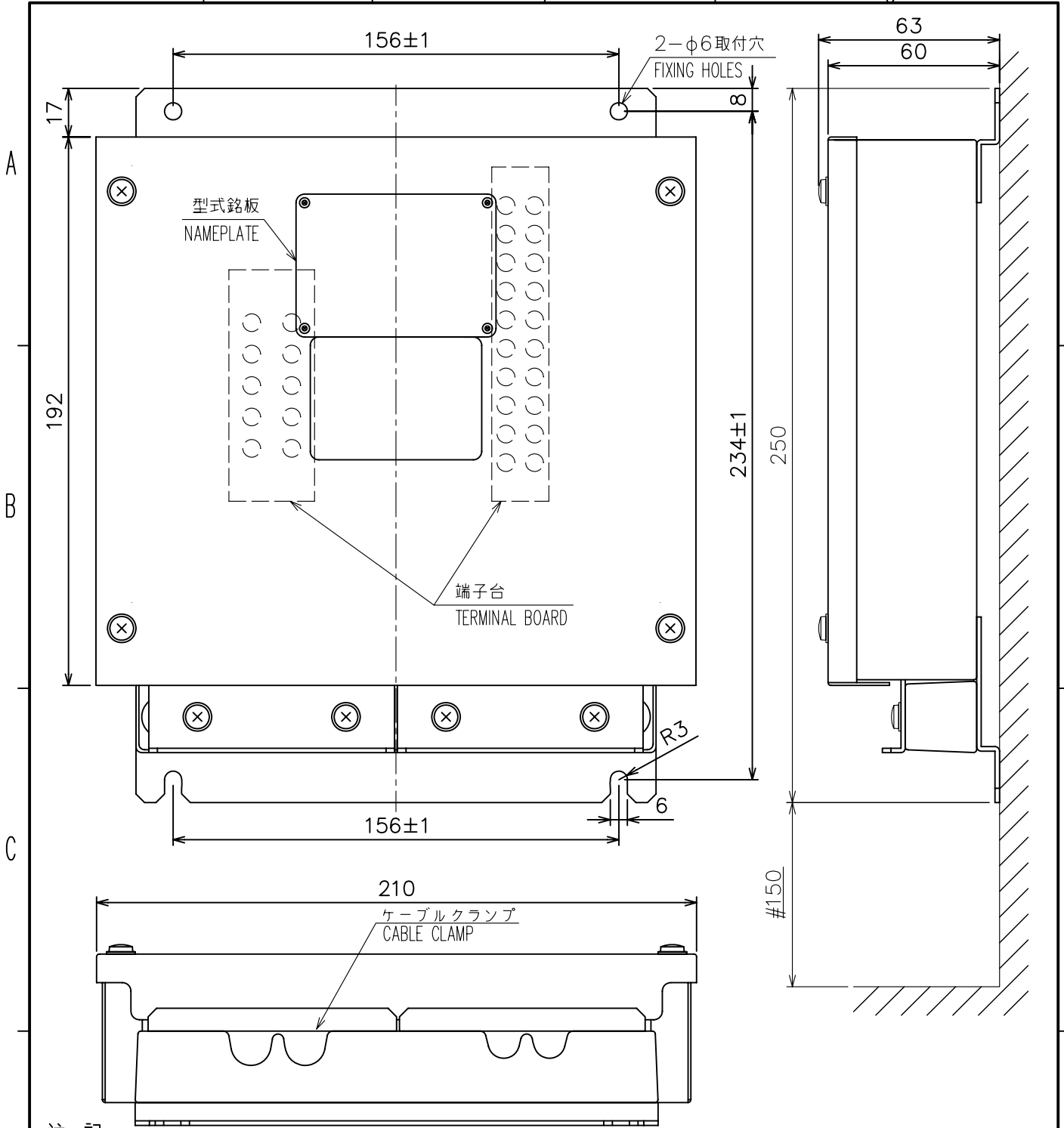
DRAWN 27/Jun/2012 T.YAMASAKI	TITLE FSV-851
CHECKED 27/Jun/2012 H.MAKI	名称 送受信装置
APPROVED 28/Jan/2011 Y.NISHIYAMA	外寸図
SCALE 1/10	NAME TRANSCEIVER UNIT
MASS 95 ±10% kg	OUTLINE DRAWING
DWG. No. C1335-G09-A	REF. No. 10-088-600G-0

表1 TABLE 1

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
$500 < L \leq 1000$	± 4



DRAWN 28/Jun/2012 T.YAMASAKI	TITLE FSV-8420/8421
CHECKED 28/Jun/2012 H.MAKI	名称 上下装置制御器 (壁掛装備)
APPROVED 6/Jul/2012 Y.NISHIYAMA	外寸図
SCALE 1/5	NAME RAISE/LOWER CONTROL BOX (BUHEAD MOUNT)
MASS 16 ±10% kg	OUTLINE DRAWING
DWG. No. C1329-G06-B	REF. No. 10-086-570G-1



注記

- 1) 指定外の寸法公差は表1による。
- 2) #印寸法は最小サービス空間寸法とする。
- 3) 取付用ネジはM5ボルトを使用のこと。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE M5 BOLTS FOR FIXING THE UNIT.

表 1 TABLE 1

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

D

DRAWN Nov. 14 '06 T.YAMASAKI		TITLE FSV-846
CHECKED Nov. 15 '06 T.TAKENO		名称 上下装置制御器延長キット
APPROVED Nov. 22 '06 T.Matsuguchi	FSV-84	外寸図
SCALE 1/2	MASS 1.6 $\pm 10\%$ kg	NAME CONTROL BOX EXTENSION KIT
DWG.No. C1329-G09-B	REF.No. 10-086-590G-2	OUTLINE DRAWING

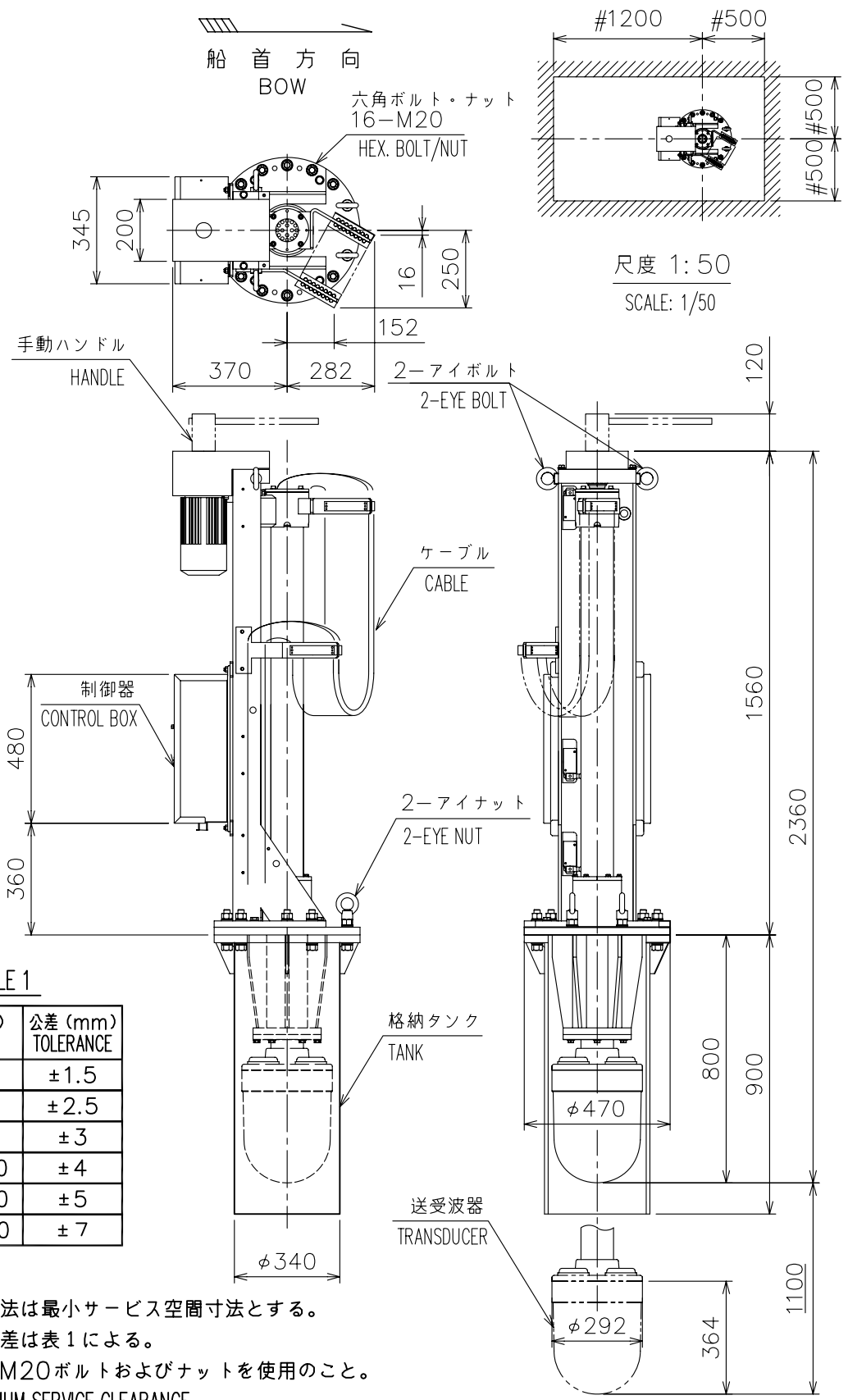


表 1 TABLE 1

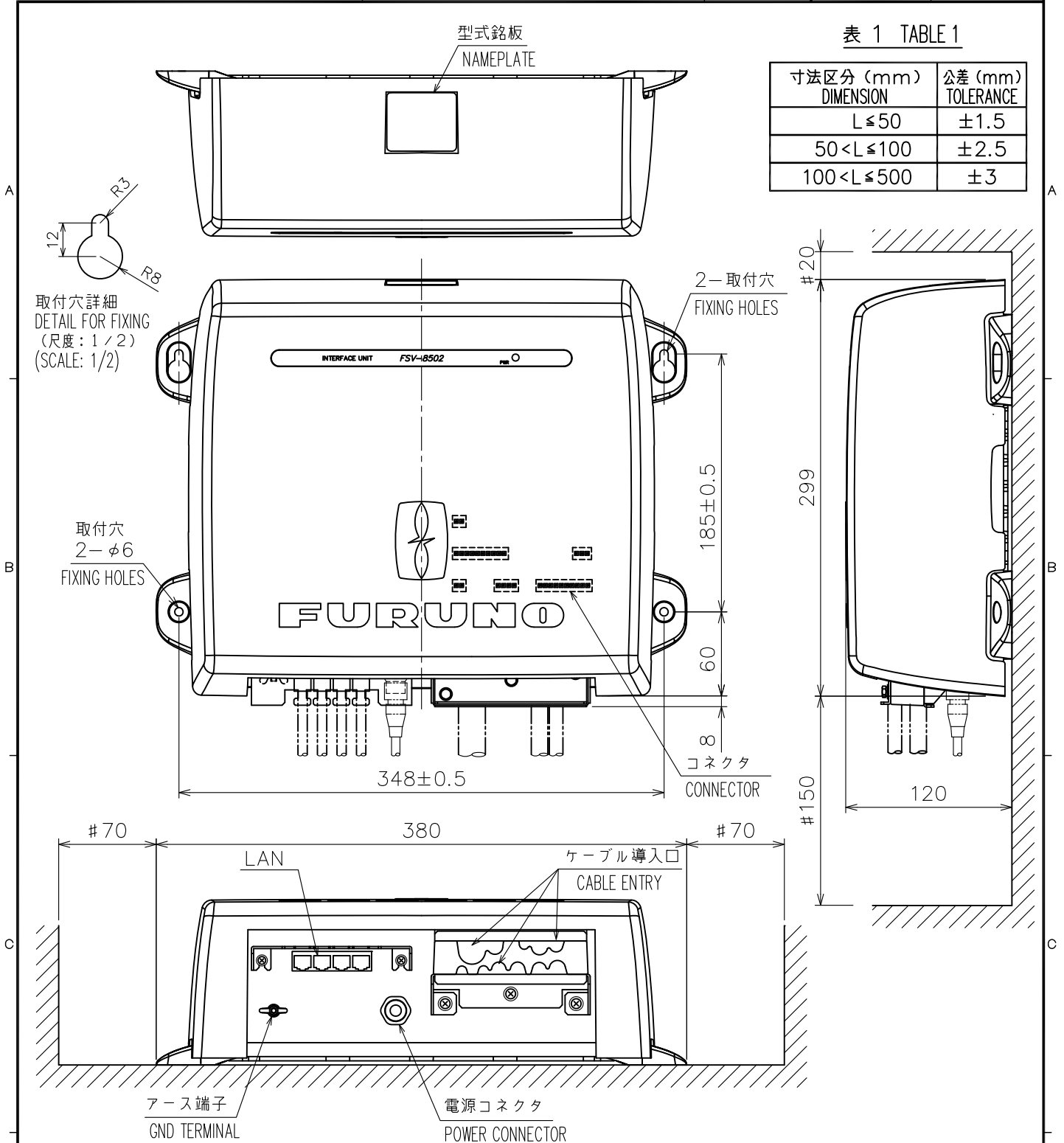
寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
$L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 3
$500 < L \leq 1000$	± 4
$1000 < L \leq 2000$	± 5
$2000 < L \leq 4000$	± 7

- 注記 1) #印寸法は最小サービス空間寸法とする。
 2) 寸法公差は表1による。
 3) 取付はM20ボルトおよびナットを使用のこと。
- NOTE 1. # : MINIMUM SERVICE CLEARANCE.
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
 3. USE M20 BOLTS AND NUTS FOR FIXING THE UNIT.

DRAWN Nov. 24, '06	E. MIYOSHI	TITLE FSV-8441/8443
CHECKED	TAKAHASHI. T	名称 上下装置 (ドーム有、1100ストローク)
APPROVED	Y. Hatai	FSV-84 外寸図
SCALE 1/20	MASS 390 $\pm 10\%$ kg 質量は格納タンクを含まず。 MASS DOES NOT INCLUDE RETRACTION TANK.	NAME HULL UNIT (WITH SOUNDOME, 1100 TRAVEL)
DWG.No. C1329-G03-B	REF.No. 10-086-560G-3	OUTLINE DRAWING

表 1 TABLE 1

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



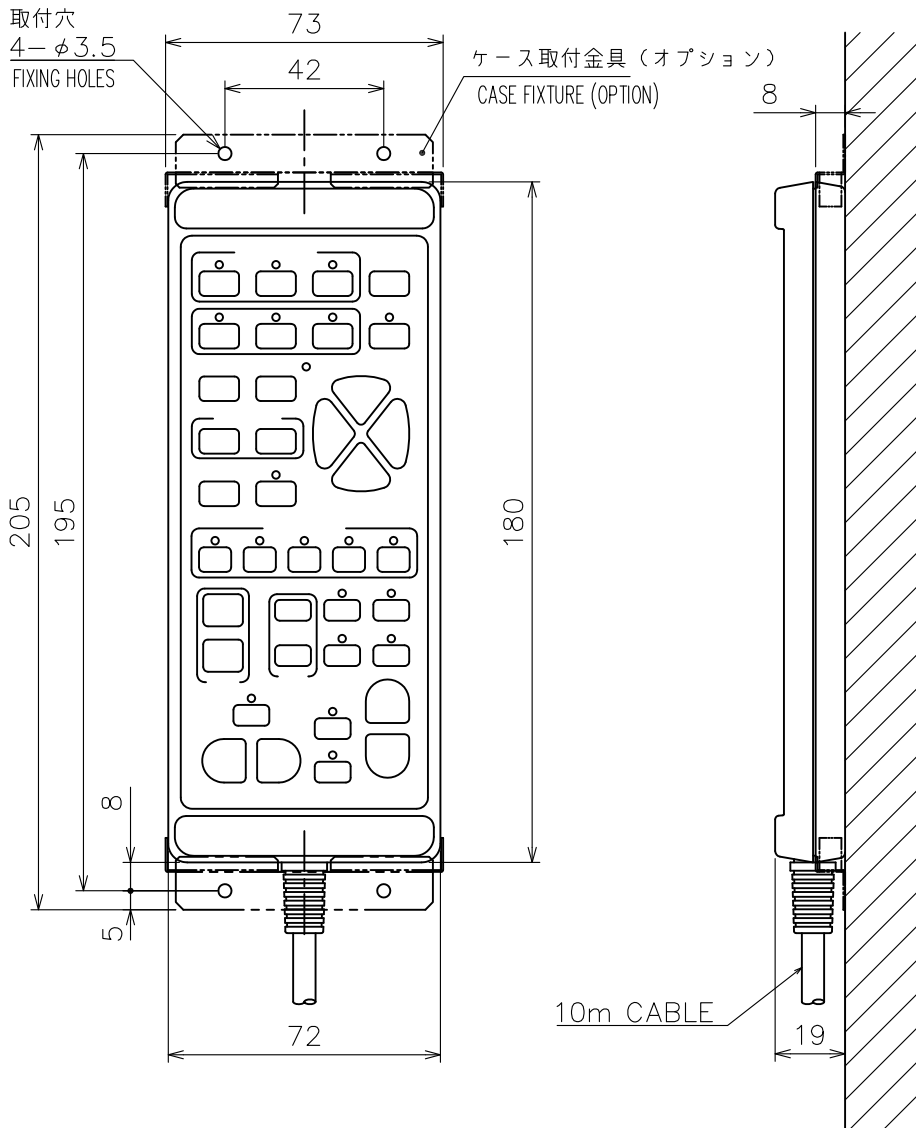
- 注 記 1) 指定外の寸法公差は表 1 による。
 2) # 印寸法は最小サービス空間寸法とする。
 3) 取付用ネジはトラスタッピンネジ呼び径5×20を使用のこと。

- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 2. #: MINIMUM SERVICE CLEARANCE.
 3. USE TAPPING SCREWS $\phi 5 \times 20$ FOR FIXING THE UNIT.

DRAWN	9/Sep/2011 T.YAMASAKI	TITLE	FSV-8502
CHECKED	9/Sep/2011 H.MAKI	名称	インターフェイスユニット
APPROVED	26/Nov/2010 Y.NISHIYAMA		外寸図
SCALE	1/4	MASS	3.4 ±10% kg
DWG. No.	C1335-G02-C	REF. No.	10-088-350G-2
		NAME	INTERFACE UNIT OUTLINE DRAWING

表 1 TABLE 1

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



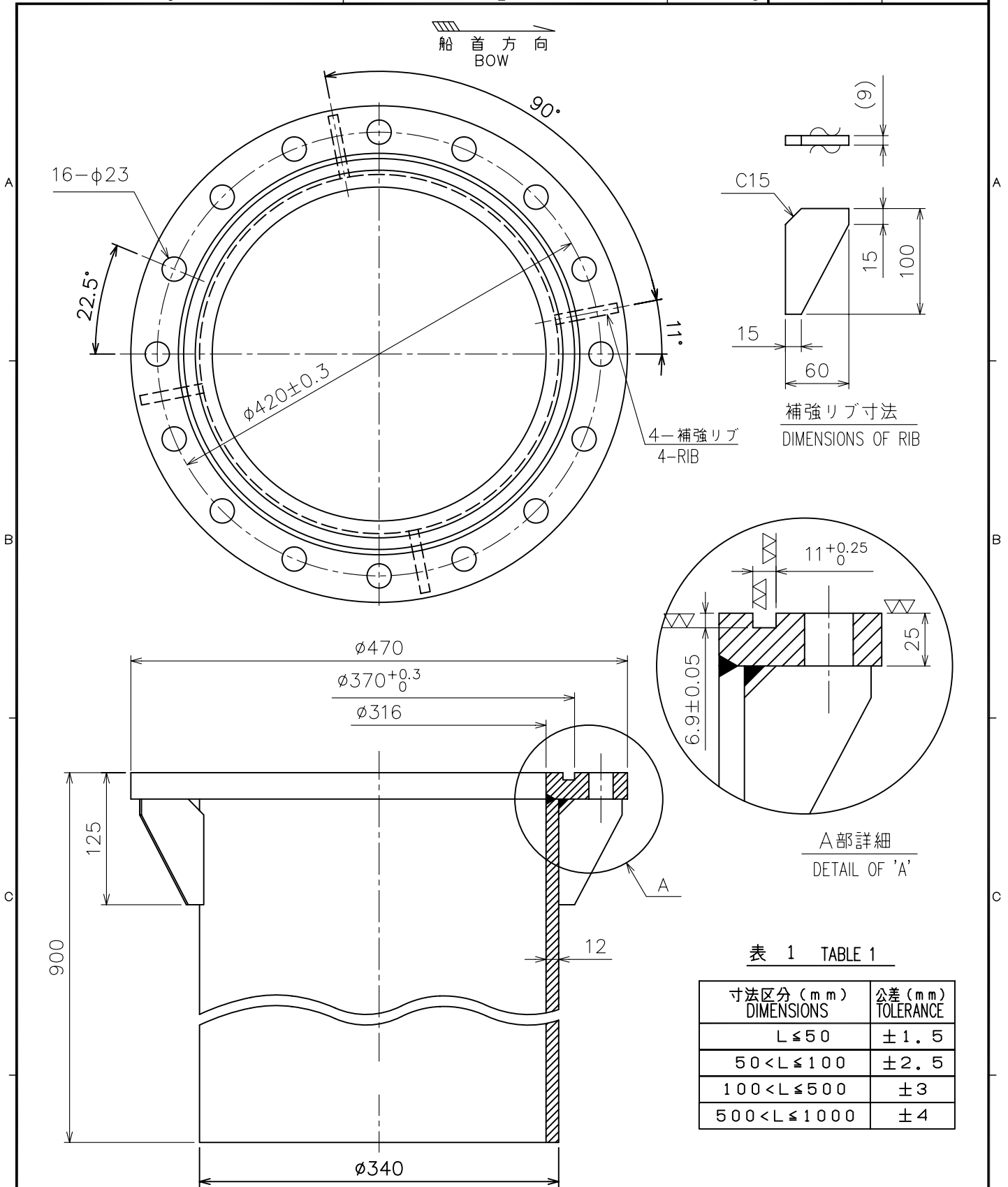
注 記

- 1) 指定外の寸法公差は表 1 による
- 2) 取付用ネジは+バインドタッピン 1 シュ呼び径 3 × 20 を使用のこと

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE TAPPING SCREWS $\phi 3 \times 20$ FOR FIXING THE UNIT.

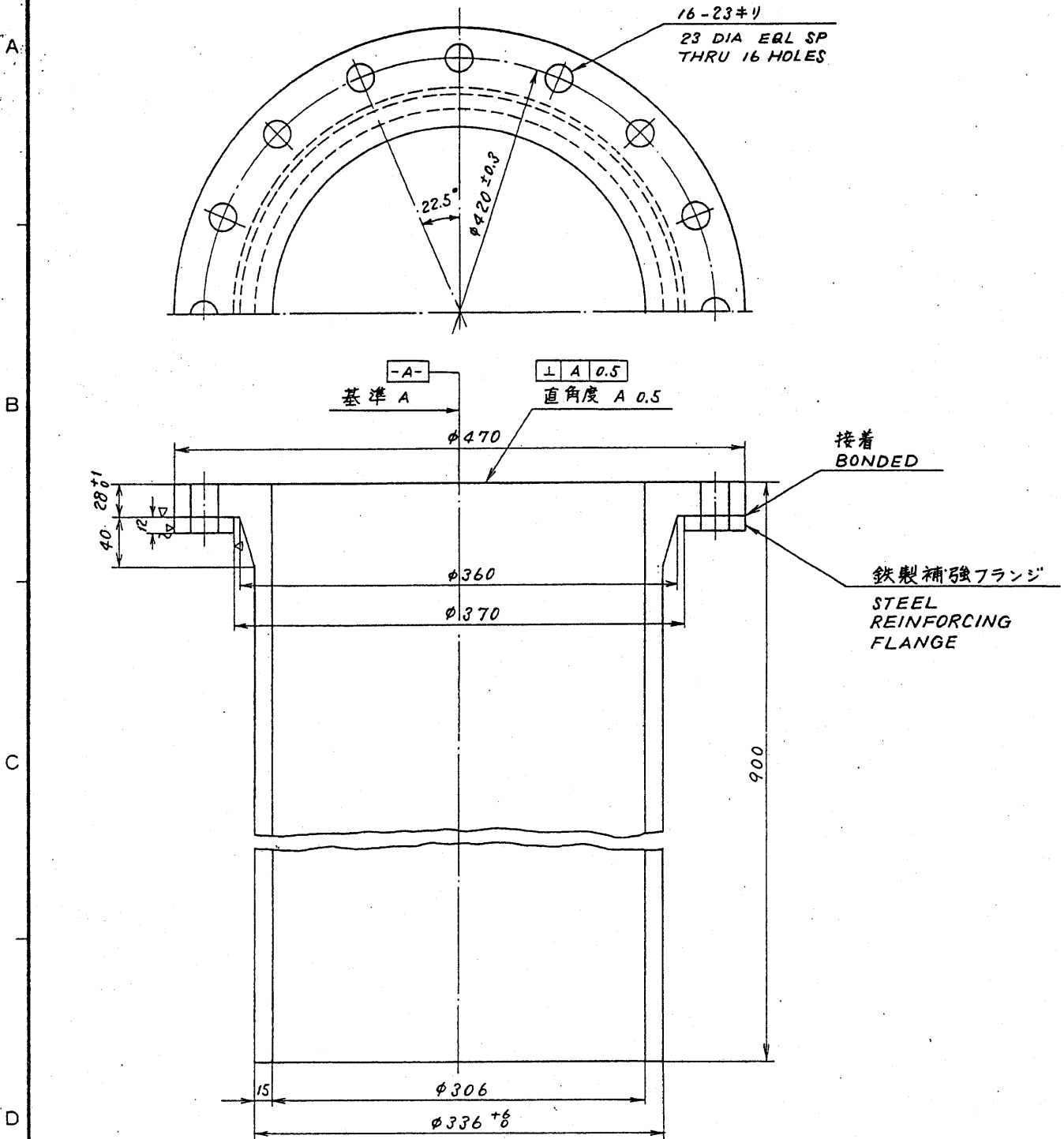
DRAWN	9/Sep/2011 T.YAMASAKI	TITLE	FSV-854
CHECKED	9/Sep/2011 H.MAKI	名称	リモートコントローラ
APPROVED	27/Dec/2010 Y.NISHIYAMA		外寸図
SCALE	1/2	MASS	0.68 ±10% kg
			質量はケーブルを含む。 MASS INCLUDES CABLE.
DWG. No.	C1335-G06-C	REF. No.	10-088-860G-1
		NAME	REMOTE CONTROLLER OUTLINE DRAWING



注 記 1) 指定外の寸法公差は表 1 による。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN Nov. 15 '06 T.YAMASAKI		TITLE OP10-28
CHECKED Nov. 15 '06 T.TAKENO		名称 格納タンク (鉄)
APPROVED Nov. 22 '06 T.Matsuguchi	FSV-84	外寸図
SCALE 1/5	MASS 100 ±10% kg	NAME RETRACTION TANK (STEEL)
DWG.No. C1329-G07-B	10-086-580G- 0	OUTLINE DRAWING



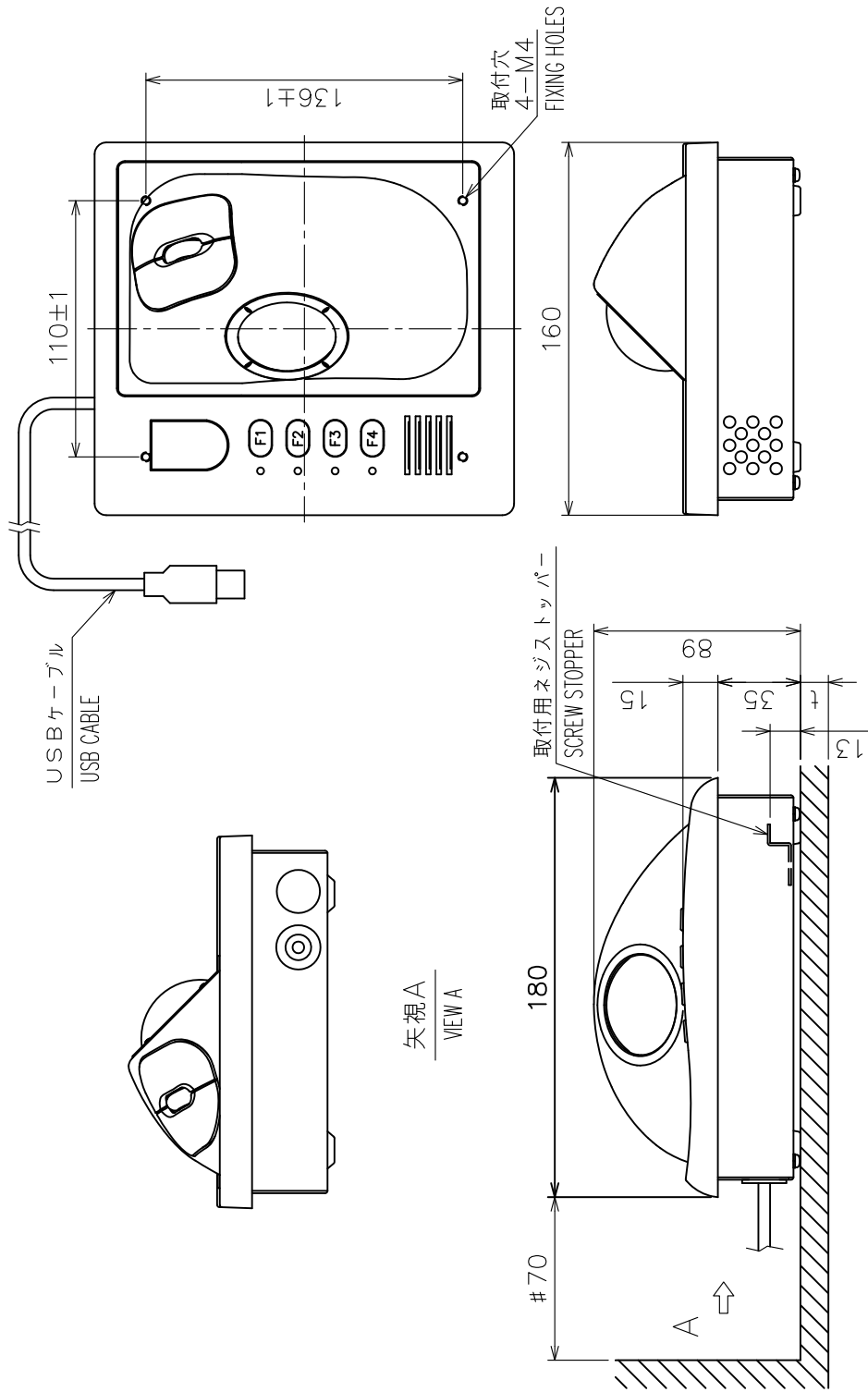
小型上下装置用
SH-754B/884B
SH-164B CSH-7080

承認 APPROVED	品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
MAY. 30. 80 <i>[Signature]</i>		三角法 THIRD ANGLE PROJECTION				名称 FRP 格納タンク外觀図 FRP RETRACTION TANK
MAY. 30. 80 <i>[Signature]</i>		尺度 SCALE				1/5
MAY. 26. 80 <i>[Signature]</i>		重量 WEIGHT				30 kg
					図番 DWG.NO.	C1217-086-C



表 1 TABLE 1

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



- 注 記
- 1) 指定外の寸法公差は表 1 による。
 - 2) # 印寸法は最小サービスクリアランスとする。
 - 3) 取付用ネジはセムスB (M4×12) を使用のこと。取付面板厚は最小2 最大5とする。またはネジ長さ (+7.8, 8) ± 2 のセムスBを使用のこと。

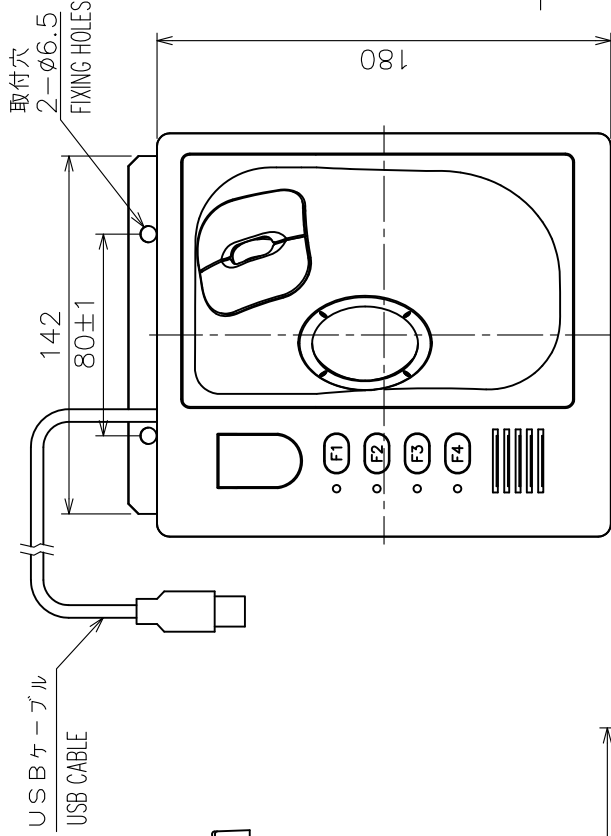
NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE SEMS B SCREWS (M4×12) FOR FIXING THE UNIT. MOUNT BOARD THICKNESS (t): 2 ≤ t ≤ 5. OR SCREW LENGTH SHOULD BE (+7.8) ± 2 FOR THICKER ONE.

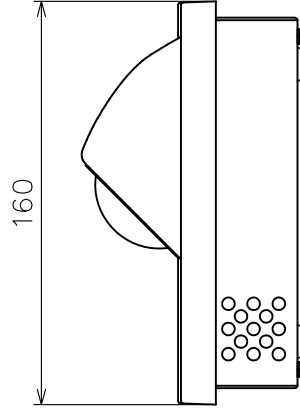
DRAWN	9/Sep/2011	T. YAMASAKI	TITLE	FSV-653
CHECKED	9/Sep/2011	H. MAKI	名称	簡易操作部
APPROVED	27/Mar/2011	Y. NISHIYAMA	外寸図	
SCALE	1/3	質量 1.4 kg 質量はケーブル (5m) を含む。 MASS INCLUDES CABLE (5m).	NAME	SUB CONTROL UNIT
DWG No.	C1335-G05-D	REF No.	10-088-851G-1	OUTLINE DRAWING

表 1 TABLE 1

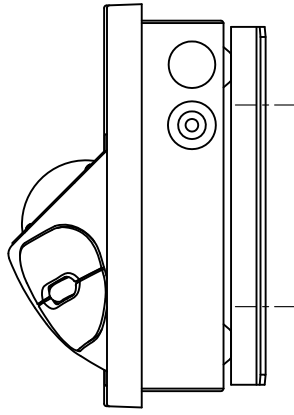
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
L ≤ 50	± 1.5
50 < L ≤ 100	± 2.5
100 < L ≤ 500	± 3



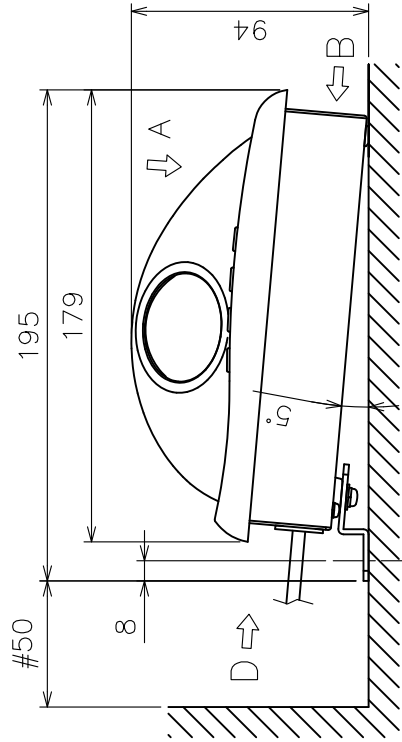
矢視 A
VIEW A



矢視 B
VIEW B

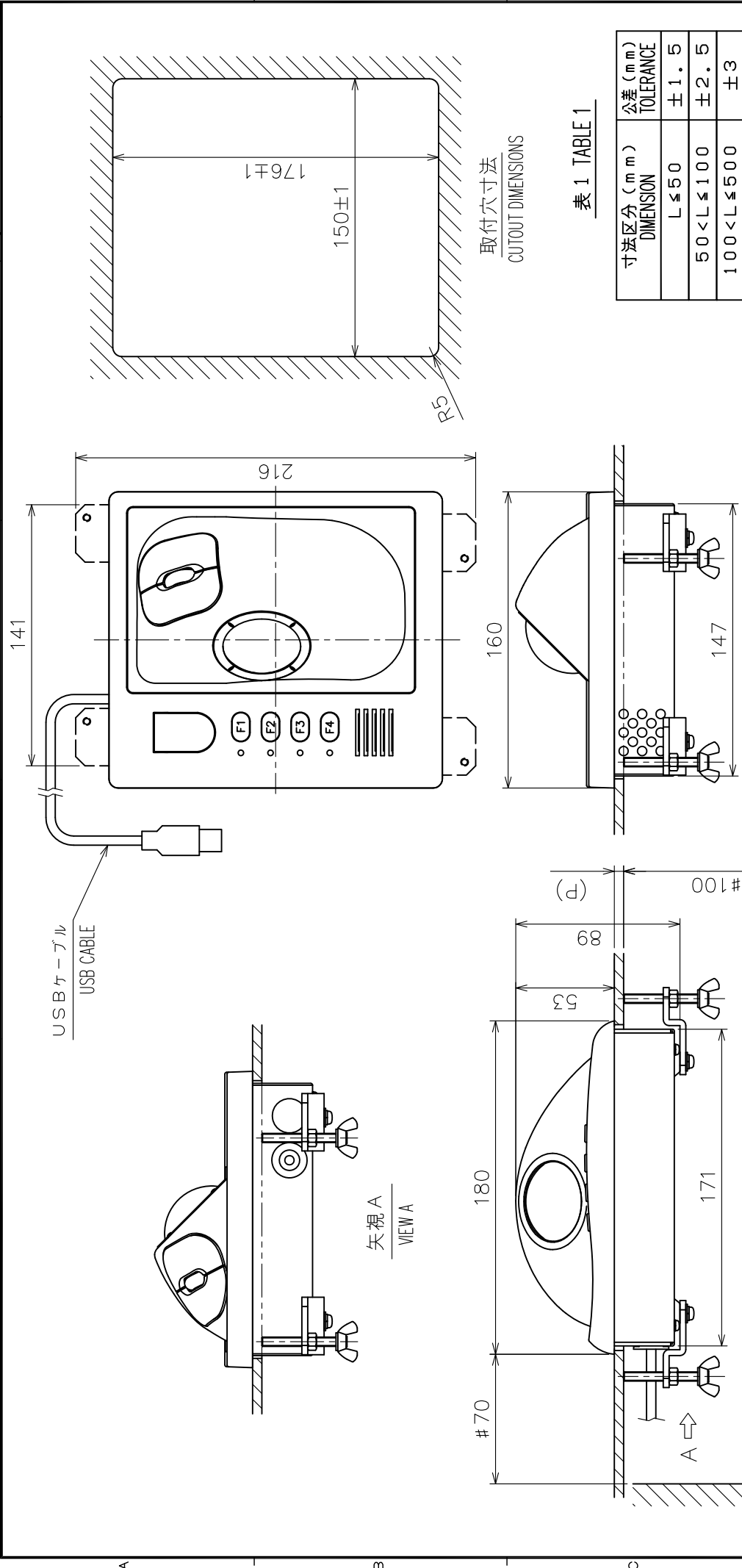


矢視 D
VIEW D



- 注 記 1) 指定外の寸法公差は表 1 による。
 2) # 印寸法は最小サービスペース寸法とする。
 3) 取付用ネジはトラスタップネジ呼び径 6、または M6 ボルトを使用のこと。
- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 2. #: MINIMUM SERVICE CLEARANCE.
 3. USE TAPPING SCREWS $\phi 6$ OR M6 BOLTS FOR FIXING THE UNIT.

DRAWN	9/Sep/2011	T.YAMASAKI	TITLE	FSV-853
CHECKED	9/Sep/2011	H.MAKI	名称	簡易操作部 (取付金具)
APPROVED	13/Sep/2011	Y.NISHIYAMA	外寸図	
SCALE	1/3	質量 1.4 kg	NAME	SUB CONTROL UNIT (W/ FIXTURE)
DWG.No.	C1335-G07-B	質量はケーブル (5m) を含む。 MASS INCLUDES 5m CABLE.	REF.No.	10-088-853G-0
				OUTLINE DRAWING



取付穴寸法
CUTOUT DIMENSIONS

表 1 TABLE 1

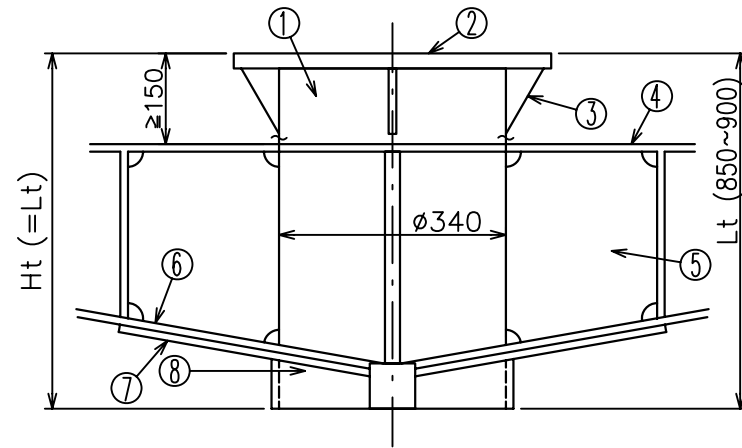
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
L ≤ 50	± 1.5
50 < L ≤ 100	± 2.5
100 < L ≤ 500	± 3

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 2. # : MINIMUM SERVICE CLEARANCE.
 3. SELECT SIDE OR BOTTOM FOR CABLE ENTRY.
 4. THICKNESS (P): 10 MAX.

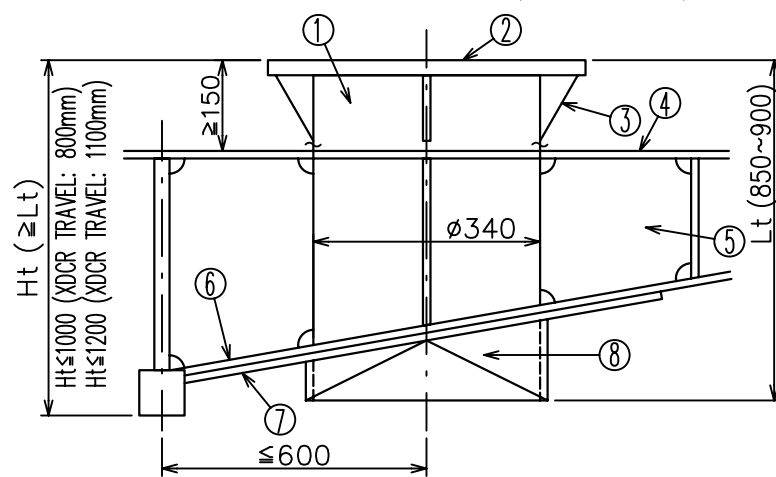
DRAWN	g/Sep/2011	T.YAMASAKI	TITLE	FSV-853
CHECKED	g/Sep/2011	H.MAKI	名称	簡易操作部 (埋込装備)
APPROVED	13/Sep/2011	Y.NISHIYAMA	外寸図	
SCALE	1/3	1.4 kg	NAME	SUB CONTROL UNIT (FLUSH MOUNT)
DWG.No.	C1335-G08-B	REF.No.	10-088-853G-0	OUTLINE DRAWING

注記 1) 指定外の寸法公差は表 1 による。
 2) # 印寸法は最小サービス空間寸法とする。
 3) ケーブル導入口は側面・底面から選択のこと。
 4) 板厚 (P) は最大 10 とする。

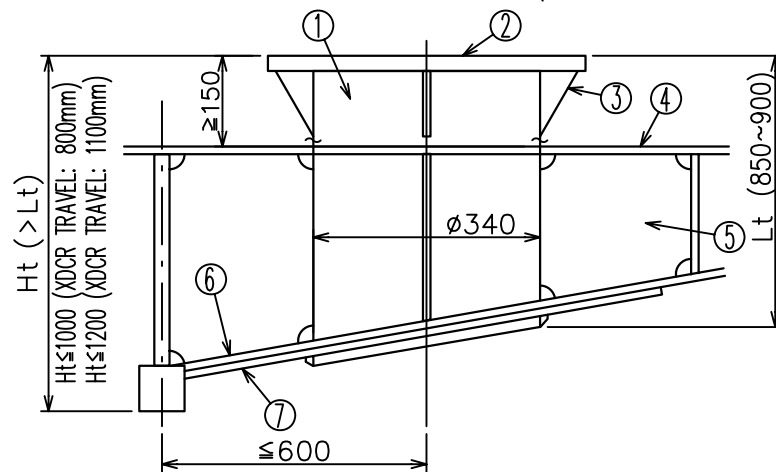
A. キール上(突出) ON KEEL (PROJECTED)



B. キール横(突出) OFF KEEL (PROJECTED)

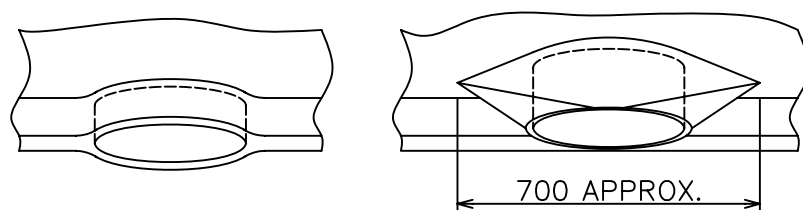


C. キール横(非突出) OFF KEEL (NOT PROJECTED)



D. 整流覆 FAIRING PLATE

キール上 ON KEEL キール横 OFF KEEL



装備手順

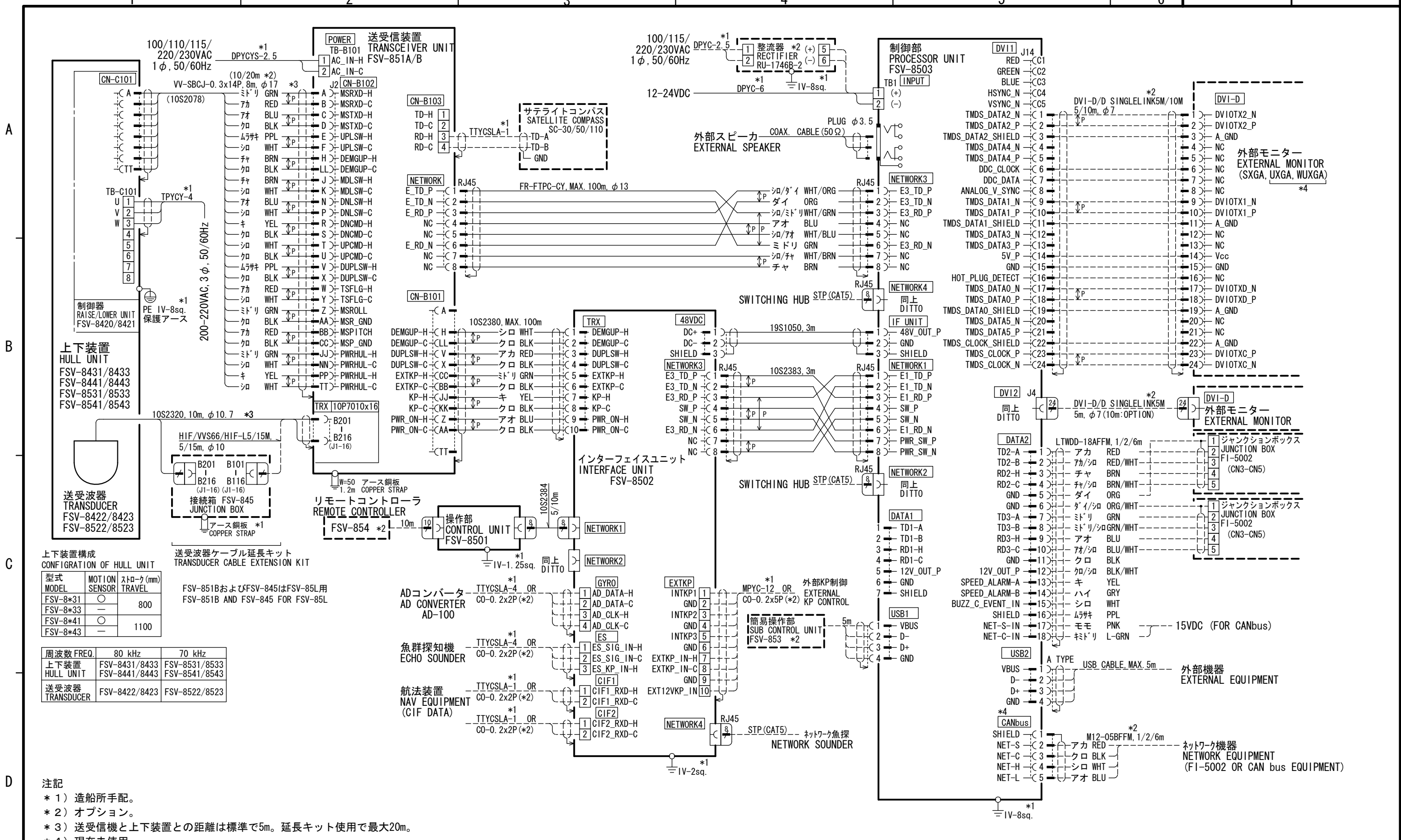
- 次の点に注意して、格納タンクを船底板に連続スミ肉溶接する。
 - * タンクのフランジ面が標準走航時に水平になること。
 - * フランジ面のボルト穴の中心が船首方向になること。
 - * 送受波器を突出させたときに送受波ビームがキールで遮られないように、フランジ面のキールよりの高さ”Ht”を図示の範囲内にすること。
 - * タンク下端がキールより下に出ないようにタンク長さ”Lt”は、”Ht”より短くする。かつ、送受波器がタンク下端より出ないように図示の範囲内にする(標準支給長900mm)
- 格納タンクの周囲に外径φ700以上のダブリング⑦を取付ける。また、突出装備(A・B図)の場合には、整流覆⑧(D図)を取付ける。ダブリングと整流覆には、船底板と同じ材質・肉厚のものを使用すること。
- タンク周囲と隔壁⑤を溶接する。
- 上下装置本体を格納タンクにボルト締めするのに必要なスペースとしてフランジ面の位置を二重船底板より150mm以上離す。二重船底が高い船にはB図の方法で二重船底板を下げ、スペースを確保すること。

INSTALLATION METHOD OF RETRUCTION TANK

- Install tank to hull plate with fillet welding taking the following points into account;
 - * Flange face is exactly horizontal at normal ship's trim.
 - * One of bolt holes on flange is faced dead ahead.
 - * Allow height of flange face from keel bottom "Ht" mentioned in the drawings, othewize transducer beam is blocked by the keel, when transducer is fully lowered.
 - * Tank's length "Lt" should be less than "Ht". If not so, bottom end of tank is placed below keel level. "Lt" is also limited as shown in the drawings so that the transducer can be fully retracted in tank. (The tank is supplied with 900mm long as standard.
- Fit doubling plate ⑦ of outer dia. φ700 around the tank on hull plate. Fit fairing plate ⑧ referring to the drawing 'D' for installation method 'A' and 'B'. Use same material and thickness of doubling and fairing plate as hull plate.
- Weld the tank into bulkhead ⑤ around the tank.
- Allow clearance of more than 150 mm below the flange face for easy bolting. Sink the inner hull plate as shown in the drawing 'B' for high inner hull plate.

8	整流覆 FAIRING PLATE				
7	ダブリング DOUBLING				
6	船底板 HULL PLATE				
5	油槽隔壁 BULKHEAD				
4	二重船底板 INNER HULL PLATE				
3	補強リブ REINFORCEMENT RIB				
2	タンクフランジ TANK FLANGE				
1	格納タンク RETRUCTION TANK				
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	備考 REMARKS

DRAWN	Mar. 13 '07 T.YAMASAKI	TITLE	OP10-28 (FSV-84/84L)
CHECKED	Mar. 13 '07 T.TAKENO	名称	格納タンク(鋼船用)
APPROVED	Mar. 14 '07 R.Esumi	FSV-84/84L	装備要領
SCALE	MASS kg	NAME	RETRUCTION TANK (FOR STEEL HULL)
DWG No.	C1329-Y01- B		INSTALLATION PROCEDURE



A

B

C

D

上下装置 HULL UNIT
 FSV-8431/8433
 FSV-8441/8443
 FSV-8531/8533
 FSV-8541/8543

上下装置構成 CONFIGURATION OF HULL UNIT

型式 MODEL	MOTION SENSOR	ストローク (mm) TRAVEL
FSV-8*31	○	800
FSV-8*33	—	—
FSV-8*41	○	1100
FSV-8*43	—	—

周波数 FREQ.	80 kHz	70 kHz
上下装置 HULL UNIT	FSV-8431/8433 FSV-8441/8443	FSV-8531/8533 FSV-8541/8543
送受波器 TRANSDUCER	FSV-8422/8423	FSV-8522/8523

- 注記**
- * 1) 造船所手配。
 - * 2) オプション。
 - * 3) 送受信機と上下装置との距離は標準で5m。延長キット使用で最大20m。
 - * 4) 現在未使用。

- NOTE**
- *1: SHIPYARD SUPPLY.
 - *2: OPTION.
 - *3: DISTANCE BETWEEN TRANSCIEVER UNIT AND HULL UNIT: 5 m STANDARD. CABLE EXTENTION KIT MAY EXTEND TO 20 m MAXIMUM.
 - *4: FOR FUTURE USE.

CO-0. 2x2P: CO-SPEVV-SB-C 0. 2x2P, φ 10. 5
 CO-0. 2x5P: CO-SPEVV-SB-C 0. 2x5P, φ 13. 5

DRAWN 30/May/2011 T. YAMASAKI	TITLE FSV-85/85L
CHECKED 30/May/2011 H. MAKI	名称 カラスキャニングソナー
APPROVED 28/Jan/2011 Y. NISHIYAMA	相互結線図
SCALE MASS kg	NAME COLOR SCANNING SONAR
DWG No. C1335-C01-F	REF. No. 10-088-0100-2
INTERCONNECTION DIAGRAM	